

SPECIAL FORECASTS AND WARNINGS. WEATHER AND CROPS.

WEATHER WARNINGS.

By E. H. BOWIE, Supervising Forecaster.

WASHINGTON DISTRICT.

Cold wave and frost warnings.—On the morning of the 1st when the pressure was abnormally low over a wide belt extending from the Great Lakes southward to the Gulf of Mexico, cold-wave warnings were issued for the Upper Lakes Region, the Lower Ohio Valley, Tennessee, the East Gulf States, Northwestern Florida and Northwestern Georgia. Much colder weather followed over these areas during the succeeding 36 hours, freezing weather occurring during the night of the second as far south as the middle Gulf coast and northwestern Florida. On the evening of the 2d the display of cold-wave warnings was extended eastward over the Carolinas, eastern and southern Georgia and northern and central Florida, and a pronounced change to colder weather overspread these regions during the 3d and 4th, when freezing temperature and frost occurred as far south as central Florida. The cold weather continued in the South Atlantic and east Gulf States until the 12th, and during this period warnings of frosts were issued for these regions almost daily. After this date, the 12th, the weather became comparatively warm in the Southern States and no more warnings of cold waves or frosts were required for the Southern States. On the evening of the 10th it was announced that—

The extraordinarily rapid movement of disturbances along the northern border continues. A storm passed eastward off the New England coast Thursday, the 9th, and another had advanced along the northern border and Friday night, the 10th, was over the St. Lawrence Valley. Another had appeared to the north of Montana and yet another off the North Pacific coast. The storm that passed off the coast Thursday was followed by decidedly colder weather during Thursday night in the Lower Lakes Region, the Middle Atlantic and New England States, warning of which was issued on the 9th. This change to colder weather was of short duration, however, and during Friday much warmer weather prevailed in the Ohio Valley, the region of the Great Lakes, and interior of the Middle Atlantic States. This change to warmer weather will be of short duration, however, as a cold wave has already made its appearance to the north of the Great Lakes and will advance southward and eastward over the Great Lakes, the Upper Ohio Valley, and the Middle Atlantic and New England States within the next 36 hours.

Warnings were issued accordingly and were fully verified, the coldest weather of the month occurring over much of these regions during the 11th and 12th. On the 24th cold wave warnings were issued for the New England States, New York, and northeastern Pennsylvania, and while a considerable fall in temperature followed during the 25th it was not of sufficient importance to justify the warnings.

Storm warnings.—On the morning of the 1st, when an intense storm was central over the Great Lakes southwest storm warnings were ordered for the Atlantic coast, but as this storm failed to maintain its intensity the warnings failed of verification except along the coast from the Virginia capes northward to Cape Cod, where winds of gale force occurred during the night of the 1st. On the evening of the 2d northeast storm warnings were displayed on the Atlantic coast between Cape Hatteras and Boston, when a storm of moderate intensity was central over South Carolina. This storm passed up the coast and increased decidedly in intensity, and the morning of the 3d the display of warnings was extended northward to Eastport, Me. Strong winds prevailed along the coast, but at no point did the velocity reach gale force. Warnings were displayed the afternoon of the 8th between New York City and Wilmington, N. C.,

at which time a disturbance was developing over the Florida Peninsula and at the same time a disturbance was passing eastward over the Great Lakes. On the morning of the 9th the warning was changed to "northwest" and continued between New York City and Cape Hatteras, and the area covered by warnings extended northward to Portland, Me. These disturbances apparently united off the New England coast during the 9th, and gales were general on the coast where warnings were displayed, during the afternoon and night of the 9th. On the 10th the warnings were continued but changed to "southwest" on the Atlantic coast from Delaware Breakwater northward to Eastport, Me., the expected strong winds to result from the eastward passage of a cyclone that was over Lake Superior the morning of the 10th. Heavy winds occurred during the night of the 10th and on the 11th north of Delaware Breakwater.

Storm warnings were again displayed on the 18th between Cape Hatteras and Eastport, when a disturbance of considerable intensity was over North Carolina and another was over Lake Erie; these disturbances passed northeastward without causing winds of gale force on the Atlantic coast. On the afternoon of the 23d storm warnings were displayed at and north of Cape Hatteras, and during the night of that date a disturbance of marked intensity developed off the New England coast; it was attended by shifting gales on the Middle Atlantic and New England coasts. The warnings were continued the morning of the 24th at and north of Delaware Breakwater, heavy westerly gales continuing through that day. A storm formed during the night of the 24th over the Gulf of Mexico, and on the afternoon of the 25th warnings were displayed on the East Gulf coast and on the Atlantic coast south of Cape Hatteras. This disturbance advanced rapidly northeastward and left the Atlantic coast near Cape Hatteras the morning of the 26th, without being attended by winds of storm force.

Warnings of heavy snowfalls.—No heavy snowfall warnings were required during the month in the Washington forecast district.

Northers, Panama Canal.—The following communication was received from the Chief Hydrographer of the Panama Canal:

Referring to the cabled storm warning received the 4th instant, "Strong northerly winds indicated next 36 hours over western Caribbean Sea will probably prevail as far south as Colon," the following weather conditions prevailed at the Atlantic entrance of the Canal:

Winds increased Sunday, January 5, to 18 miles an hour from the north, with a maximum velocity of 24 miles an hour from the north. Northeast winds prevailed on the 6th, with an average hourly velocity of 18 miles, and a maximum velocity of 27 miles an hour from the northeast. Higher wind velocities probably prevailed out at sea, and it is thought that the forecast for the western Caribbean Sea was verified.

Windy and unsettled weather continued throughout the week ending January 13, culminating in a "near-norther" on January 12, with an average hourly wind velocity of 20 miles, and a maximum velocity of 32 miles from the north. Unusually heavy seas prevailed on the 11th and 12th, causing some damage to the breakwaters and washing away the small beacon light on Coco Solo Breakwater. The character and magnitude of the swell indicated the prevalence of much higher wind velocities out at sea.

RIVERS AND FLOODS, JANUARY, 1919.

By ALFRED J. HENRY, Meteorologist.

[Dated: Weather Bureau, Washington, Mar. 3, 1919.]

Rain, almost continuous from the 16th to the 24th, in Washington, Oregon, and northern California, caused floods in the streams of those States, and in some cases

serious interruption to traffic, with the loss of bridges, roadbed, and timber rafts. In all other parts of the country, practically all of the floods were due to the general rainstorm which passed eastward from the 1st to the 3d. No severe floods occurred.

Warnings were issued generally well in advance of the flood crest for all rivers on which a warning service is maintained. The usual details and tabular matter follow:

Moderately heavy rains in the South Atlantic and east Gulf States from the 1st to 3d caused most of the streams to rise slightly above the flood stage. This rise had subsided by the 6th to 8th, except in the lower reaches of a few streams. The rivers rose again to near flood stage on the 27th to 29th. At a few places the rivers overflowed to a depth of 2 to 4 feet. These floods did considerable damage, but the main loss was due to the suspension of business.

The heavy rains of the 1st to 3d were quite general in the Ohio River watershed and caused sharp rises in the rivers; but the cold weather of the succeeding days checked the run-off, so that only moderate flood stages were reached on the main stream. Most of the tributaries were slightly above flood stage, but the Allegheny River reached the flood stage at Herrs Island Dam only.

The damage caused by these floods was confined largely to the Pittsburgh and Nashville districts.

Flood stage was not reached on the Mississippi River except at Arkansas City, Ark. The western tributaries below the Ohio River were in slight flood in the lower reaches during the first decade. The Atchafalaya and Sulphur Rivers were bank-full during the last week of the month.

The flood that was in progress in the Trinity River in Texas at the end of December had subsided by the 6th. A sharp rise to near flood stage occurred from the 17th to 20th and a second rise to slightly above flood stage occurred during the last week of the month. The Guadalupe River at Victoria, Tex., was 3.6 feet above flood stage on the 25th. Very little damage resulted from these high waters.

Excessive rains on the 16th and 17th in the Eel River watershed, California, caused a sharp rise in the stream. About 5,000 acres of land were overflowed and damaged by washing and being covered with drift.

Heavy rains beginning on the 15th and continuing for a week caused the Willamette River in Oregon and its tributaries to slightly exceed bankful stages during the latter part of the month.

The estimated losses by floods and by property saved by warnings are shown in the following table:

Estimated loss by flood, January, 1919.

River district.	Tangible property, bridges, etc.	Crops.	Live stock.	Suspension of business.	Value of warnings.
Richmond, Va.....	\$175			\$19,720	\$10,000
Raleigh, N. C.....	5,000		\$2,500	10,000	50,000
Columbia, S. C.....	8,300	\$4,275	4,800	2,300	65,800
Charleston, S. C.....	500		400	20,000	35,000
Mobile, Ala.....			1,250		22,500
Meridian, Miss.....		500	1,000	2,000	2,000
Pittsburgh, Pa.....	75,000				100,000
Cincinnati, Ohio.....					50,000
Cairo, Ill.....	500	2,000		1,000	51,000
Nashville, Tenn.....	3,650	1,800	575	12,750	33,000
Eureka, Cal.....	4,400		240	3,500	
Total.....	97,575	8,575	10,765	71,270	419,300

TABLE I.—Flood stages in the North Atlantic drainage during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
<i>James:</i>	<i>Feet.</i>			<i>Feet.</i>	
Buchanan, Va.....	15	3	3	18.0	3
Columbia, Va.....	13	3	5	29.0	3
Richmond, Va.....	10	4	5	17.2	5
<i>Roanoke:</i>					
Ranolph, Va.....	21	4	5	24.9	4
Weldon, N. C.....	30	4	7	40.8	6
<i>Dan:</i>					
Danville, Va.....	8			7.9	4
Clarksville, Va.....	12	5	5	12.8	5
<i>Neuse:</i>					
Neuse, N. C.....	14	5	7	16.4	6
Do.....	14			13.6	21
Do.....	14			13.9	28
Smithfield, N. C.....	14	6	8	15.4	6
Do.....	14			12.2	22
Do.....	14			13.8	28
<i>Cape Fear:</i>					
Elizabethtown, N. C.....	22	5	7	26.5	6
Do.....	22	28	29	24.1	29
Fayetteville, N. C.....	35			34.4	4
<i>Pee Dee:</i>					
Cheraw, S. C.....	27	4	6	32.8	4
Do.....	27	27	28	31.0	27
<i>Santee:</i>					
Rimini, S. C.....	12	(1)	16	13.6	29
Do.....	12	19	(3)	17.0	31
Ferguson, S. C.....	12	(1)	18	13.8	9-10
Do.....	12	19	(3)	13.8	31
Catawba, S. C.....	11	3	4	13.0	4
Do.....	11	27	27	11.0	27
<i>Wateree:</i>					
Camden, S. C.....	24	4	5	30.0	5
Do.....	24	27	28	29.0	28
<i>Congaree:</i>					
Columbia, S. C.....	15			14.0	4
Do.....	15	27	27	15.8	27
<i>Broad:</i>					
Blairs, S. C.....	15	4	4	15.8	4
Do.....	15	27	27	16.2	27
<i>Saluda:</i>					
Pelzer, S. C.....	7	3	3	7.4	3
Chappell, S. C.....	14	4	5	14.2	5
Do.....	14	26	28	15.0	27
<i>Ocmulgee:</i>					
Macon, Ga.....	18			15.0	3
Abbeville, Ga.....	11	(1)	3	14.8	29
Lumber City, Ga.....	15	2	3	15.3	2

¹ Continued from December. ² December. ³ Continued into February.

TABLE II.—Flood stages in the East Gulf drainage during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
<i>Flint:</i>	<i>Feet.</i>			<i>Feet.</i>	
Bainbridge, Ga.....	25			23.5	1
<i>Alabama:</i>					
Selma, Ala.....	35			34.3	29
<i>Coosa:</i>					
Gadsden, Ala.....	22			19.7	28
Lock No. 4, Lincoln, Ala.....	17	37	28	17.1	27
<i>Etowah:</i>					
Canton, Ga.....	11			10.1	26
<i>Tombigbee:</i>					
Demopolis, Ala.....	39	5	15	47.0	10
<i>Black Warrior:</i>					
Tuscaloosa, Ala.....	46	4	4	47.0	4
<i>Pascagoula:</i>					
Merrill, Miss.....	20			18.5	29
<i>Pearl:</i>					
Jackson, Miss.....	20	4	19	24.3	11-12
Columbia, Miss.....	18			17.5	6
<i>West Pearl:</i>					
Pearl River, La.....	13	(1)	2	14.0	29
Do.....	13	8	31	15.3	29

¹ Continued from preceding month. ² December.

TABLE III.—Flood stages in the Mississippi drainage (Ohio Basin) during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
<i>Ohio:</i>	<i>Feet.</i>			<i>Feet.</i>	
Pittsburgh, Pa.	22	3	3	22.8	3
Davis Island Dam, Pa.	25			22.7	3
Lock No. 2, Coraopolis, Pa.	26			24.0	3
Beaver Dam, Pa.	30	3	3	32.4	3
Dam No. 13, near Wheeling	33			34.6	3
Marietta, Ohio.	33			30.7	4
Parkersburg, W. Va.	36			32.4	4
Point Pleasant, W. Va.	40	3	5	45.0	4
Dam No. 26, Hogsett, W. Va.	40			48.3	4
Dam No. 28, Huntington, W. Va.	50			48.6	4
Dam No. 29, Normal, Ky.	50	4	5	52.7	4
Portsmouth, Ohio.	50	4	5	51.5	4
Maysville, Ky.	50	5	5	50.0	5
Cincinnati, Ohio.	50	5	7	52.0	6
Dam No. 37, Fernbank, Ohio.	50			47.5	6
Dam No. 39, Florence, Ind.	46			43.3	6
Madison, Ind.	48			44.3	6
Louisville, Ky.	28			27.6	7
Cloverport, Ky.	40	6	10	43.4	8
Honderson, Ky.	33	5	13	39.0	9-10
Evansville, Ind.	35	5	13	40.9	9
Mt. Vernon, Ind.	35	6	14	40.0	10
Shawneetown, Ill.	35	5	14	40.6	11
Paducah, Ky.	43			40.5	12
Calro, Ill.	45			41.3	13
<i>Allegheny:</i>					
Herrs Island Dam, Pa.	22	2	3	23.4	2
<i>Monongahela:</i>					
Fairmont, W. Va.	25	2	2	30.3	2
Greensboro, Pa.	20	2	3	31.4	2
Lock No. 4, Pa.	31	2	3	40.0	2
<i>Cheat:</i>					
Rowlesburg, W. Va.	12			11.2	2
<i>Little Kanawha:</i>					
Glenville, W. Va.	22	2	2	27.4	2
Creston, W. Va.	20	2	2	24.6	2
<i>Muskingum:</i>					
Marietta, Ohio.	32	4	4	32.2	4
<i>Tuscarawas:</i>					
Norris Point, Ohio.	8			7.8	3
<i>Scioto:</i>					
Circleville, Ohio.	7	2	3	8.4	3
<i>Kanawha:</i>					
Kanawha Falls, W. Va.	25			24.2	2
Charleston, W. Va.	30	2	3	35.6	2
<i>Greenbrier:</i>					
Renick, W. Va.	17			15.4	2
<i>Elk:</i>					
Clay, W. Va.	18	2	2	22.7	2
<i>Tug Fork of Big Sandy:</i>					
Williamson, W. Va.	26			24.6	2
<i>Big Sandy:</i>					
Pikeville, Ky.	35			32.0	2
<i>Licking:</i>					
Farmers, Ky.	25	2	2	25.5	2
Falmouth, Ky.	28			26.7	2
<i>South Fork of Licking:</i>					
Cynthiana, Ky.	20			18.3	2
<i>Kentucky:</i>					
Jackson, Ky.	24	2	2	26.5	2
Beattyville, Ky.	30			29.5	2-3
High Bridge, Ky.	30	2	2	34.4	2
Frankfort, Ky.	31	2	3	32.0	3
<i>Green:</i>					
Lock No. 6, Brownsville, Ky.	30	2	6	45.0	4
Lock No. 4, Woodbury, Ky.	33	2	9	48.2	5
Lock No. 2, Rumsey, Ky.	34	3	15	40.5	11
<i>Wabash:</i>					
Mt. Carmel, Ill.	15	(1)	7	21.5	* 30
<i>White:</i>					
Decker, Ind.	18	(1)	1	19.8	* 29-30
<i>Cumberland:</i>					
Williamsburg, Ky.	22			20.7	3
Burnside, Ky.	50	2	3	58.0	2
Celina, Tenn.	45	3	6	47.4	3
Carthage, Tenn.	40	3	8	46.7	3
Nashville, Tenn.	40	3	11	44.9	7-8
Lock A, Fox Bluff, Tenn.	43	4	4	43.9	4
Clarksville, Tenn.	40	3	11	48.6	4
Lock B, Dover, Tenn.	49	5	12	50.8	9-11
<i>French Broad:</i>					
Ferrouse, N. C.	13			12.2	3
Asheville, N. C.	4	3	3	4.0	3
Dandridge, Tenn.	12			11.0	3
<i>Big Pigeon:</i>					
Newport, Tenn.	6	2	2	7.2	2
<i>Tennessee:</i>					
Knoxville, Tenn.	12	3	4	16.2	4
Chatanooga, Tenn.	33			32.3	5
Bridgeport, Ala.	24			21.9	6
Guntersville, Ala.	31			29.5	6
Florence, Ala.	18			17.5	8-9
Riverton, Ala.	32	5	11	35.5	9
Johnsonville, Tenn.	31			28.0	6
<i>Holston, N. Fork:</i>					
Mendota, Va.	8	2	3	10.0	2
<i>Clinch:</i>					
Clinton, Tenn.	25	3	4	31.0	4
<i>Powell:</i>					
Tasewell, Tenn.	20	3	3	20.8	3
<i>Duck:</i>					
Columbia, Tenn.	30	2	3	31.5	3

* Continued from December.

* December.

TABLE IV.—Flood stages in the Mississippi drainage during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
	<i>Feet.</i>			<i>Feet.</i>	
<i>Mississippi:</i>					
Arkansas City, Ark.	42	19	21	42.2	20
Memphis, Tenn.	35			31.3	17-18
Helena, Ark.	42			39.0	18
<i>Illinois:</i>					
Morris, Ill.	13	7	11	14.0	8
Peru, Ill.	14	(1)	17	15.5	5
Henry, Ill.	7	(1)	(2)	9.0	29-30
Peoria, Ill.	16	(1)		15.9	* 31
Havana, Ill.	14			13.0	1-2
Beardstown, Ill.	12	(1)	4	12.5	1-2
<i>St. Francis:</i>					
Marked Tree, Ark.	17	6	12	17.2	8-9
<i>Owacha:</i>					
Arkadelphia, Ark.	18	2	2	18.4	2
Camden, Ark.	30	5	9	33.8	6
<i>Atchafalaya:</i>					
Melville, La.	31	26	27	34.0	26-27
<i>Petit Jean:</i>					
Dunville, Ark.	20			18.9	3
<i>White:</i>					
Georgetown, Ark.	22	3	5	22-3	3-4
Clarendon, Ark.	30			28.5	8-9
<i>Black:</i>					
Black Rock, Ark.	14	(1)	5	16.9	2
<i>Cuba:</i>					
Jolks, Ark.	9	(1)	23	11.1	2-3
<i>Sulphur:</i>					
Finley, Tex.	24			23.6	5-6
Do.	24	22	25	24.6	22-23
Ringo Crossing, Tex.	20			18.3	20

* Continued from December.

* December.

* Continued into February.

TABLE V.—Flood stages in the west Gulf drainage during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
	<i>Feet.</i>			<i>Feet.</i>	
<i>Trinity:</i>					
Dallas, Tex.	25	18	20	31.9	19
Do.	25	24	26	30.1	25
Trinidad, Tex.	28	(1)	5	34.3	2
Do.	28	30	(2)	28.3	31
Long Lake, Tex.	40			36.9	1-2
Liberty, Tex.	25	(1)	5	25.3	2-3
<i>Sabine:</i>					
Locansport, La.	25			24.4	6
Merryville, La.	20			19.5	24-25
<i>Gundalope:</i>					
Victoria, Tex.	16	24	26	19.6	25

* Continued from December.

* Continued into February.

TABLE VI.—Flood stages in the Pacific drainage during January, 1919.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
	<i>Feet.</i>			<i>Feet.</i>	
<i>Eel:</i>					
Fernbridge, Cal.	15	17	18	16.4	17
<i>Willamette:</i>					
Eugene, Oreg.	10	18	19	11.5	19
Do.	10	22	24	11.0	22
Albany, Oreg.	20	24	24	20.0	24
Salem, Oreg.	20	23	24	21.0	24
Oregon City, Oreg.	10	19	23	14.4	24
Portland, Oreg.	15	23	26	18.0	24
<i>Santiam:</i>					
Jefferson, Oreg.	10	19	19	11.0	19
Do.	10	22	23	13.0	22
<i>Yamhill:</i>					
McMinnville, Oreg.	35	24	24	38.5	24
<i>Clackamas:</i>					
Cazadera, Oreg.	12	16	16	13.0	16
Do.	12			11.5	23
<i>Tualatin:</i>					
Tualatin, Oreg.	18	25	25	18.0	25