

the morning of the 31st, 8° above zero was reported at Flagstaff, and the temperature fell below the freezing point at Roswell for the first time during the season, with a killing frost. The first heavy frost was reported at Salt Lake City, with a temperature of 34°. Warnings of freezing temperature were repeated on the 31st for southwestern Colorado and Utah, with possibly frost in south-central Arizona. Freezing temperatures occurred in these districts on November 1, and frost temperatures were reported at Phoenix on the mornings of October 31 and November 1.—*Frederick W. Brist.*

SAN FRANCISCO FORECAST DISTRICT.

During the greater portion of the period from the 1st to the 23d, high-pressure areas prevailed over the region between southeastern Alaska and the State of Washington. The Aleutian low-pressure area was pronounced during the entire month and on several occasions the barometer fell below 29 inches. None of the offshoots from this center of action succeeded in getting clear of the high-pressure barrier until late in the month, and then their energy was greatly diminished before crossing the Coast Range.

Storm warnings, however, were necessary at northern seaports on the 4th-5th, 24-25th, and 29th and along the California coast on the 9th and 26th. Although the wind at the stations where the storm warnings were displayed did not become very high, the gales were undoubtedly severe a short distance offshore.

Frost warnings were issued on several occasions for the States of Nevada, Idaho, and for the east portions of Washington and Oregon. These predictions were generally correct, and by the end of the month the growth of vegetation has ceased throughout this large area and no more warnings will be needed in that section until next spring.

Rain warnings were issued in California sufficiently in advance of every storm to enable those drying fruit in the open to stack their trays in time to prevent losses. The few losses that did occur through neglect or lack of help were an insignificant fraction of the crops involved as compared with the total output.—*E. A. Beals.*

RIVERS AND FLOODS

By H. C. FRANKENFIELD, Meteorologist.

There was no change in the prevailing low-water conditions, and there were no floods, except in the Santee River, where there were moderate floods from October 19 to 24, inclusive, from the heavy rains that fell on October 16 and 17. The swamps and adjacent lands have been flooded since the winter of 1921-22, and consequently there was no damage done.

Flood stages during October, 1922.

River and station.	Flood stage.	Above flood stages—dates.		Crest.	
		From—	To—	Stage.	Date.
ATLANTIC DRAINAGE.					
Santee:	Feet.			Feet.	
Rimini, S. C.	12	19	22	13.3	20
Ferguson, S. C.	12	20	24	12.7	23

MEAN LAKE LEVELS DURING OCTOBER, 1922.

By UNITED STATES LAKE SURVEY.

[Detroit, Mich., November 6, 1922.]

The following data are reported in the "Notice to Mariners" of the above date:

Data.	Lakes. ¹			
	Superior.	Michigan and Huron.	Erie.	Ontario.
Mean level during October, 1922:				
Above mean sea level at New York.....	Feet. 602.50	Feet. 579.97	Feet. 571.96	Feet. 245.61
Above or below—				
Mean stage of September, 1922.....	-0.19	-0.36	-0.47	-0.42
Mean stage October, 1921.....	-0.03	+0.11	+0.07	+0.50
Average stage for October, last 10 years.....	-0.22	-0.57	-0.33	-0.26
Highest recorded October stage.....	-1.06	-2.97	-1.84	-2.20
Lowest recorded October stage.....	+0.92	+0.37	+1.06	+1.94
Average relation of the October level to:				
September level.....		-0.20	-0.30	-0.30
November level.....		+0.20	+0.20	+0.20

¹ Lake St. Clair's level: In October, 574.69 feet.

INFLUENCE OF WEATHER ON CROPS AND FARMING OPERATIONS.

By J. WARREN SMITH, Meteorologist.

October, 1922, was mild for the season in all sections of the country, with scanty precipitation in most districts. Freezing weather extended during the week ending on the 24th as far south as southwestern Kansas, northwestern Arkansas, and southwestern Ohio, but no widespread damage occurred, as crops were mostly harvested or fully matured. Considerable local damage, however, occurred to grapes in the Chautauqua belt in New York during that week. The month was favorable as a rule for maturing late crops and for outdoor operations, and farm work made good advance, except where the soil was too dry for plowing and seeding. It was especially favorable for the harvest of corn in practically all sections, and at the close of the month cribbing was well under way, although it was rather too warm for storage in large quantities in some interior States, particularly in Iowa. Late corn made rather unsatisfactory growth in the central Gulf districts because of lack of rainfall.

At the beginning of the month there was a serious lack of moisture in much of the Great Plains and the Southwest which was unfavorable for seeding winter grains, and the drought was intensified during the first half of October by persistent absence of precipitation. Droughty conditions east of the Mississippi, however, were largely relieved in the Central and Eastern States by good rains about the 7th of the month. The increased moisture was very beneficial to early sown grains and facilitated seeding which had become backward. The latter half of the month was mostly favorable in the eastern grain States, but very little rain fell in the western Plains area, where wheat continued to suffer. The drought was broken in most of Texas and Oklahoma the latter part of the month, and at the same time rains and snows were beneficial in the central Rocky Mountain States.

Fair and moderately warm weather was the rule in the Cotton Belt and picking and ginning made unusually rapid progress. The weather was favorable for the development of late cotton in North Carolina, which turned out well; but, on the whole, conditions were unfavorable for top crop in nearly all sections of the belt and very little was produced. At the close of the month cotton was nearly all gathered in Tennessee and picking

was completed in many localities in Arkansas and was well advanced in the more northwestern portion of the belt.

Satisfactory progress was made in the harvesting of white and sweet potatoes and sugar beets under mostly satisfactory weather conditions. There was too much rain in the trucking districts of the Southeast, particularly in Florida, where much lowland was under water, but there was some improvement during the latter part of the month and planting winter truck was resumed.

Pastures were generally poor because of drought in Oklahoma and were practically gone at the end of the month in much of Kansas, while the range continued poor to bare in New Mexico and was much too dry in Arizona. There was sufficient precipitation to benefit ranges, however, in most other western grazing sections, while the rainfall the last half of the month was helpful in most districts east of the Mississippi River, although it continued too dry in some sections.

CLIMATOLOGICAL TABLES.¹

CONDENSED CLIMATOLOGICAL SUMMARY.

In the following table are given for the various sections of the climatological service of the Weather Bureau the monthly average temperature and total rainfall; the stations reporting the highest and lowest temperatures, with dates of occurrence; the stations reporting the greatest and least total precipitation; and other data as indicated by the several headings.

The mean temperature for each section, the highest and lowest temperatures, the average precipitation, and the greatest and least monthly amounts are found by using all trustworthy records available.

The mean departures from normal temperatures and precipitation are based only on records from stations that have 10 or more years of observations. Of course, the number of such records is smaller than the total number of stations.

Condensed climatological summary of temperature and precipitation by sections, October, 1922.

Section.	Temperature.								Precipitation.					
	Section average.	Departure from the normal.	Monthly extremes.				Section average.	Departure from the normal.	Greatest monthly.		Least monthly.			
			Station.	Highest.	Date.	Station.			Lowest.	Date.	Station.	Amount.	Station.	Amount.
° F.	° F.	° F.	° F.	° F.	° F.	In.	In.	In.	In.	In.	In.			
Alabama.....	65.3	+ 0.5	Tuscaloosa.....	92	3	3 stations.....	32	2 19	2.56	- 0.42	Robertsdale.....	5.83	Healing Springs.....	T.
Arizona.....	63.2	+ 1.2	2 stations.....	106	2	Lakeside.....	3	30	0.31	- 0.56	Fort Valley.....	1.63	17 stations.....	0.00
Arkansas.....	63.1	+ 0.6	Rison.....	98	4	2 stations.....	20	18	1.47	- 1.53	Pindall.....	4.25	Arlberg.....	0.15
California.....	59.7	- 1.1	Greenland Ranch.....	103	2	Madeline.....	13	30	1.51	+ 0.23	Twin Valley.....	6.75	6 stations.....	0.00
Colorado.....	47.2	+ 1.3	Lamar.....	89	4	Dillon.....	1	30	0.45	- 0.83	Yampa.....	1.43	15 stations.....	0.00
Florida.....	74.5	+ 1.3	Orlando.....	96	7	Garniers.....	38	5	3.73	+ 3.73	Lomestead.....	23.89	Wausau.....	1.50
Georgia.....	65.9	+ 1.1	Hazlehurst.....	94	8	Blue Ridge.....	28	27	3.73	+ 0.91	St. George.....	8.67	Concord.....	1.29
Hawaii.....	73.8	+ 0.3	Kaneohe No. 2, Hawaii.....	91	2	Volcano Observatory, Hawaii.....	50	9	5.44	+ 0.23	Eke, Maui.....	27.00	Olowalu, Maui.....	0.03
Idaho.....	49.5	+ 3.3	Deer Flat.....	94	1	Warren.....	4	30	0.71	- 0.63	Sandpoint.....	4.58	Challis.....	0.00
Illinois.....	58.5	+ 3.3	Carbondale.....	96	3	Froepert.....	22	18	2.28	- 0.30	Flora.....	5.76	Mount Carroll.....	0.13
Indiana.....	57.8	+ 3.2	Crawfordsville.....	98	6	Connersville.....	24	19	2.57	+ 0.17	Royal Center.....	4.83	Moore Hill.....	0.95
Iowa.....	56.1	+ 5.3	Guthrie Center.....	96	4	Little Sioux.....	11	17	1.81	- 0.65	Fayette.....	3.03	Davenport (Pine Acres).....	0.06
Kansas.....	59.3	+ 2.8	Hitchinson.....	97	6	Smith Center.....	13	17	1.27	- 0.59	Winfield.....	3.87	2 stations.....	0.00
Kentucky.....	60.2	+ 2.4	2 stations.....	96	2	Greensburg.....	25	19	2.24	- 0.26	Blandville.....	1.41	Berea.....	0.76
Louisiana.....	68.1	+ 0.6	Dowson.....	95	1	Robeline.....	32	25	2.71	- 0.16	Abbeville.....	6.79	Logansport.....	0.01
Maryland-Delaware.....	58.4	+ 2.0	2 stations.....	93	5	Oakland, Md.....	15	31	1.88	- 0.99	Baltimore, Md.....	5.58	Aberdeen, Md.....	0.74
Michigan.....	50.0	+ 1.3	St. Joseph.....	91	1	Ewen.....	10	20	2.15	- 0.53	Ceresco.....	3.88	Eagle Harbor.....	0.39
Minnesota.....	49.4	+ 3.9	Ada.....	95	3	Wheaton.....	9	13	1.00	- 1.02	Fairmont.....	2.50	3 stations.....	T.
Mississippi.....	65.7	+ 1.0	2 stations.....	95	1	Batesville.....	31	19	1.63	- 0.95	Woodville.....	4.44	Okolona.....	0.28
Missouri.....	59.9	+ 2.4	Carnthersville.....	97	3	Dean.....	18	18	2.00	- 0.77	Grant City.....	3.53	Selligman.....	0.51
Montana.....	48.0	+ 4.0	2 stations.....	95	2	2 stations.....	8	2	1.68	- 0.57	Upper Yaak River.....	3.14	3 stations.....	0.00
Nebraska.....	54.7	+ 3.6	Newport.....	99	3	Curtis.....	5	17	0.63	- 0.93	Pawnee City.....	2.80	5 stations.....	0.00
Nevada.....	52.0	+ 1.3	Las Vegas.....	98	2	Rye Patch.....	4	30	0.32	- 0.27	2 stations.....	1.15	3 stations.....	0.00
New England.....	49.7	+ 1.3	Turners Falls, Mass.....	92	2	Garfield, Vt.....	10	19	2.54	- 1.00	Nantucket, Mass.....	5.34	Bethlehem, N. H.....	1.07
New Jersey.....	56.6	+ 1.6	3 stations.....	92	2	2 stations.....	18	21	1.48	- 2.25	Charlotteburg.....	2.70	Somerville.....	0.55
New Mexico.....	54.1	+ 0.6	Gage.....	98	4	Elizabethtown.....	3	31	0.34	- 0.90	Turney's Ranch.....	2.11	20 stations.....	0.00
New York.....	50.7	+ 0.4	Port Jervis.....	90	6	2 stations.....	8	18	2.47	- 0.96	Carmel.....	4.74	New York City.....	1.17
North Carolina.....	61.3	+ 1.2	2 stations.....	93	4	Banners Elk.....	22	13	4.50	+ 1.05	Sloan.....	8.34	Cullowhee.....	1.67
North Dakota.....	45.7	+ 1.9	Carson.....	98	3	2 stations.....	8	17	0.57	- 0.43	2 stations.....	1.70	3 stations.....	0.00
Ohio.....	55.8	+ 2.2	3 stations.....	93	5	Millport.....	21	19	1.78	- 0.89	Summerfield.....	3.43	2 stations.....	0.54
Oklahoma.....	63.3	+ 1.7	Hollis.....	98	3	2 stations.....	21	18	1.84	- 0.83	Fairfax.....	5.00	Kenton.....	0.01
Oregon.....	51.9	+ 1.4	Medford.....	88	7	Fremont.....	5	29	2.54	+ 0.42	Classic Lake.....	9.58	Harper.....	0.08
Pennsylvania.....	54.8	+ 2.5	3 stations.....	94	2	Wellsboro.....	12	21	2.51	- 0.80	Selins Grove.....	5.60	Neshaminy Falls.....	0.65
South Carolina.....	64.5	+ 0.9	Florence No. 1.....	94	4	Landrum.....	31	25	5.57	+ 2.48	Eflingham.....	9.00	Orangeburg No. 2.....	3.04
South Dakota.....	50.9	+ 3.3	Colome.....	102	4	Lead.....	4	17	0.83	- 0.66	Fairfax.....	2.69	Oelrichs.....	T.
Tennessee.....	60.9	+ 1.2	2 stations.....	96	1	Mountain City.....	22	19	1.49	- 1.46	Mountain City.....	3.00	Florence.....	0.56
Texas.....	67.7	+ 0.2	San Benito.....	103	7	Dalhart.....	25	31	2.16	- 0.46	Matagorda.....	7.44	2 stations.....	0.00
Utah.....	50.7	+ 1.9	St. George.....	94	1	Great Basin Alpine.....	9	30	0.72	- 0.54	Kanosh.....	3.22	2 stations.....	T.
Virginia.....	59.4	+ 2.0	Lynchburg.....	95	5	Burkes Garden.....	19	19	3.20	+ 0.11	Callville.....	6.55	Speers Ferry.....	0.80
Washington.....	51.5	+ 2.4	Colfax.....	87	10	2 stations.....	17	29	2.63	+ 0.04	Cedar Lake.....	11.20	Pomeroy.....	0.15
West Virginia.....	55.4	+ 0.5	Wheeling.....	91	5	2 stations.....	18	18	2.45	- 0.50	Bluefield.....	4.81	Kanawha Falls.....	0.39
Wisconsin.....	50.5	+ 2.6	2 stations.....	90	4	2 stations.....	11	20	1.01	- 1.62	2 stations.....	2.13	Beloit.....	0.24
Wyoming.....	45.6	+ 3.0	Gillette.....	98	3	2 stations.....	0	29	0.84	- 0.29	Ervay.....	2.95	Pinebluff.....	T.

LATE REPORTS FOR SEPTEMBER, 1922.

Hawaii.....	74.8	0.0	Mahukona.....	96	25	Kula Sanitarium, Maui.....	51	2	7.36	+ 1.70	Eke, Maui.....	30.50	Lahaina, Maui.....	0.11
Porto Rico.....	78.6	- 0.3	4 stations.....	97	27	4 stations.....	60	24	6.51	- 1.65	Mayaguez.....	23.42	Isabela.....	2.30

¹ For description of tables and charts, see REVIEW, July, 1922, pp. 384-385.

² Other dates also.