

19th, inclusive, over eastern Kansas, Missouri, and southern Illinois, but especially over Missouri. At Boonville, Mo., 12.98 inches of rain fell during this period, while an immense amount of water also poured in from the tributaries from the Ozark Mountains. At Chester, Ill., there was a downpour on the 16th and 17th, 8.06 inches of rain falling in 20½ hours. The preliminary warnings of the flood were issued on the 16th and 17th, and these were followed on the 18th by specific warnings of danger-line stages. The following report of this flood was prepared by Mr. E. H. Bowie, Local Forecaster in charge of the U. S. Weather Bureau, St. Louis, Mo.:

Floods, unprecedented both for the season of the year and for the rapidity of the rising waters, occurred in the Missouri River and tributaries east of Kansas City and in the Mississippi River at St. Louis during the second decade of September, when all records for high water in the months succeeding July were broken for the stations at Boonville, Hermann, and St. Louis.

These floods had their inception in phenomenally heavy rains during the period from September 15 to 19, inclusive, and followed immediately after the downpour during the 24 hours ending at 7 a. m., September 17. The following table gives the daily rainfall during September 15-19 at a number of stations in the St. Louis district for the 24 hours ending at 7 a. m.:

Stations.	Date.				
	Sept. 15.	Sept. 16.	Sept. 17.	Sept. 18.	Sept. 19.
	Inches.	Inches.	Inches.	Inches.	Inches.
Kansas City, Mo.....	2.92	2.04	0.59	1.66	0.46
Oseola, Mo.....	1.30	0.00	0.32	0.00	0.48
Albany, Mo.....	0.18	0.70	0.90	3.00	0.50
Trenton, Mo.....	0.97	2.00	1.34	0.45	0.79
Glasgow, Mo.....	2.87	0.00	3.74	0.00	1.20
Jefferson City, Mo.....	1.05	1.90	5.70	0.01	0.82
Boonville, Mo.....	2.34	1.46	6.70	1.70	0.78
Warrenton, Mo.....	0.05	0.76	2.65	0.01	1.44
Hermann, Mo.....	0.12	0.70	3.40	T.	1.52
Grafton, Ill.....	0.04	0.00	1.97	0.73	8.00
St. Louis, Mo.....	T.	T.	3.22	T.	0.25
Ironton, Mo.....	T.	0.00	5.42	0.13	0.34
Arlington, Mo.....			6.00		
Chester, Ill.....	0.00	0.00	8.06	0.00	0.22

During the 24 hours following the rainfall recorded at 7 a. m. of the 17th rapidly rising water prevailed in all of the tributaries of the Missouri east of Kansas City, and unprecedentedly rapid rises were reported from Boonville and Hermann. These floods washed away a number of bridges on the smaller tributaries and caused a suspension of railroad traffic for several days in the flooded district. A considerable loss of corn and other crops was also caused by the rapidly rising floods.

The Missouri reached a crest stage of 17.5 feet, or within 0.5 foot of the danger line, at Glasgow on the 20th, 22.0 feet or 2.0 above the danger line at Boonville, and 25.4 feet or 1.4 feet above the danger line at Hermann, on the same date. The crest of the flood wave passed St. Louis on the 21st, when the stage was 30.2 feet, or 0.2 foot above the danger line. The most rapid rise in the Missouri occurred during the 24 hours

ending at 7 a. m. of the 17th, during which time the river rose 6.3 feet at Boonville and 9.5 feet at Hermann. At St. Louis the river rose 10.3 feet during the 24 hours ending at 7 a. m. of the 18th, which almost equals the record for rapidity of rise at this point. The greatest recorded 24-hour rise was that of 13.2 feet from January 3 to 4, 1897. Another great 24-hour rise was that of 9.3 feet from February 20 to 21, 1882.

The floods in the Mississippi River between Alton and Chester, aside from inundating bottom lands and destroying the corn crop thereon, caused little damage. At St. Louis previous to the time of the flood the levee was well covered with freight, but precautionary measures prevented loss, except in the cases of several shipments of goods that were piled near the water's edge.

On the morning of the 16th of September the Weather Bureau issued a forecast to the effect that the Missouri and tributaries east of Kansas City and the Mississippi at St. Louis would rise rapidly during the next three days, and on the following morning this forecast was repeated. On the 18th of September flood warnings were issued for the lower Missouri River and the Mississippi River between Alton and Chester. The warning stated that the river at St. Louis would approach the danger line by the night of September 20. The actual stage reached was 0.2 foot above the danger line on the 21st.

The following table shows the daily river stages and 24-hour changes from September 15 to 23, the latter date being the one on which the stage was below the danger line at St. Louis:

Date.	Boonville.		Hermann.		Grafton.		St. Louis.	
	Height.	Change.	Height.	Change.	Height.	Change.	Height.	Change.
September 15.....	8.8	+0.2	9.7	-0.4	8.2	-0.4	11.3	-0.8
16.....	10.6	+1.8	11.2	+1.5	8.2	0.0	11.1	-0.2
17.....	16.9	+6.3	20.7	+9.5	8.8	+0.6	12.9	+1.8
18.....	21.3	+4.4	24.3	+3.6	11.0	+2.2	23.2	+10.3
19.....	21.6	+0.3	25.4	+1.1	13.6	+2.6	27.1	+3.9
20.....	22.0	+0.4	25.4	0.0	15.6	+2.0	29.3	+2.2
21.....	22.0	-0.7	24.6	-0.8	16.4	+0.8	30.2	+0.9
22.....	19.5	-1.8	23.3	-1.3	16.2	-0.2	30.1	-0.1
23.....	17.9	-1.6	21.6	-1.7	15.2	-1.0	29.2	-0.9

Warnings were also issued from Cairo, Ill., for the flood from below St. Louis, Mo., to Cairo, Ill. At Cape Girardeau, Mo., a stage of 30 feet, two feet above the danger line, was reached on the 22d. Considerable corn between Chester and Cairo, Ill., was either lost or injured, but there were no other losses of consequence.

The rivers of the other districts were comparative low, and nothing of more than ordinary interest was noted.

The highest and lowest water, mean stage, and monthly range at 270 river stations are given in Table VI. Hydrographs for typical points on seven principal rivers are shown on Chart V. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.—H. C. Frankenfield, Professor of Meteorology.

CLIMATE AND CROP SERVICE.

By Mr. JAMES BERRY, Chief of Climate and Crop Division.

The following summaries relating to the general weather and crop conditions during September are furnished by the directors of the respective sections of the Climate and Crop Service of the Weather Bureau; they are based upon reports from cooperative observers and crop correspondents, of whom there are about 3300 and 14,000, respectively:

Alabama.—Generally favorable for maturing and gathering crops, though locally heavy to excessive rains caused some damage and slightly retarded harvesting. Cotton condition generally unsatisfactory, fruitage practically ceased by 15th; damage by rust, shedding, and boll rot ceased by about 20th, too late for crop to recover; bolls opened rapidly, many prematurely; crop about half gathered by close of month, indicating comparatively light yield. Corn and minor crops advanced well, continuing to make fairly good yields.—F. P. Chaffee.

Arizona.—The rainfall was in excess; temperature normal. Killing frost occurred in the mountain districts on the 18th and 30th. Grain harvest was completed in the north-central counties by the 15th; corn and alfalfa cutting in progress over the central section at the end of the month. The snowfall over the San Francisco range, measuring 2.0 inches, on the 29, was the earliest on record. Fruit and garden truck yielded well. There was an ample supply of water. Range feed deterior-

ated over the southwest. Stock generally healthy and fat.—L. N. Jesunofsky.

Arkansas.—Temperature and precipitation slightly above normal. Cotton deteriorated generally during the month; considerable damage by worms, rust, and shedding; opening slowly in some sections, more rapidly in others; picking more general, but not progressing very rapidly; at close of month amount picked ranged from 5 to 25 per cent. Early corn gathered, yield light, not up to earlier expectations; late corn doing fairly well, but will not make a full crop, total failure in some localities. Sweet and Irish potatoes doing well, having been benefited by rains last week of month. Apples all gathered; yield light, quality inferior.—Edward B. Richards.

California.—The temperature and rainfall were slightly below normal, but conditions were very favorable most of the month for ripening grapes and late fruits, raisin making, fruit drying, and general farm work. Light rains at intervals caused no damage, except to unprotected raisins and drying fruits in portions of the south. As a rule the weather forecasts were heeded, raisins were stacked, and the loss was nominal. The first snow of the season fell in the Sierra Nevada on the 23d.—Alexander G. McAdie.

Colorado.—Conditions were generally favorable, notwithstanding damaging frosts on the 18th and 19th in the south-central division and western valleys. Harvesting of grain was nearly finished; yield of small

grain was generally good, except that of spring wheat. Corn, sugar beets, and potatoes were generally promising, and at close of month corn cutting and beet pulling were under way in the north-central and eastern divisions, and the digging of potatoes had begun in the eastern countries.—*F. H. Brandenburg.*

Florida.—The average temperature during the month slightly exceeded the normal. The precipitation was in excess by half an inch. The weather conditions were unfavorable to cotton, the picking of which was delayed in northern counties. The persistent warm, dry weather in the western cotton counties caused a premature opening of bolls and a deterioration of the plants. The crop will be about two-thirds of an average one. Citrus trees made a vigorous growth; a few complained of fruit splitting, owing to frequent rain. Pineapple slips advanced very well. The corn and hay crops were very good. The fall planting of vegetables was somewhat backward.—*A. J. Mitchell.*

Georgia.—The month was warm, with light rainfall north, increasing southward, amounts varying widely for individual stations. Cotton opened rapidly, some prematurely; picking was pushed; two-thirds gathered in northern and three-fourths in central and southern sections at close of month; no top crop; small yield indicated; some injury by rust, shedding, and caterpillars. A fine crop of forage was saved. Minor crops were seriously injured by drought. Corn was being housed; crop fair to good. Very little fall plowing done.—*W. A. Mitchell.*

Hawaii.—Unsettled weather prevailed during the entire month, with temperature slightly below seasonal average and rainfall considerably above normal in nearly all sections; monthly precipitation totals in many localities (notably windward Hawaii) exceeded those of any other September during the past fifteen years. Growing cane made satisfactory progress, except in southern Hawaii, where the major portion of the month was dry. Excessive moisture seriously interfered with field operations in many windward plantations. Summer pineapple crop all harvested, and winter crop coming along nicely, with indications of fine yield. Coffee ripened rather slowly during month. Second crop rice grew well and that of earliest planting had already headed. Condition of pastures generally satisfactory.—*Alec. McC. Ashley.*

Idaho.—First of month warm and dry; latter part cooler, with good rains in northern counties and some scattering showers elsewhere. Haying, harvest, and gathering of all but the later fruits completed. Fruit below average. Fall wheat good; spring wheat poor to good; total above average. Beets somewhat disappointing. Late hay below average, owing to shortage of water. Corn badly eaten by worms. Other crops average.—*Edward L. Wells.*

Illinois.—Seeding of wheat was begun during the first decade in favored localities, but in many places the work was retarded on account of dry condition of soil. Ideal weather conditions obtained for maturing of corn and at the end of the month the crop was practically safe from injury by frost. A heavy yield of superior quality was indicated. Cowpeas, fall clover, and millet were being put up in good condition. The outlook for potatoes and apples was not favorable.—*Wm. G. Burns.*

Indiana.—Corn was practically all safe from frost by the end of the month and promised an exceptionally good yield. Tomatoes ripened rapidly during the last ten days and canneries continued in operation. Tobacco was cut and housed under favorable conditions. Peaches, pears, and grapes yielded fairly well, but apples were a light crop. Clover seed was light and generally of an inferior quality. Seeding of wheat and rye was general after the 20th. Pastures afforded good food.—*A. V. Randall.*

Iowa.—September was frostless, with mean temperature 2° above normal, and with moderate precipitation, except in southwest district. Conditions generally were excellent for normal development of the corn crop, which was practically mature at close of month. From the 18th to 30th clear, bright, and warm days were highly favorable for ripening late planted corn, thrashing, fall plowing, and harvesting second crop of clover, aftermath, and wild hay. Except potatoes and apples, farm crops were above average.—*John R. Sage.*

Kansas.—Wheat sowing began by the 19th and soon became general. Much corn was cut and considerable husking done, disclosing a fine crop. Prairie haying was finished and potato digging and apple picking begun. The hay crop was large and of good quality, but the potato and apple crops proved disappointing. All corn was safe from frost, except a small per cent in the northern parts of Republic and Jewell counties and about five per cent in Decatur County.—*T. B. Jennings.*

Kentucky.—Temperature and precipitation varied only slightly from normal, but precipitation was uneven, the deficiencies occurring in the extreme western and portions of the northern and northeastern sections, while the greatest excess was in the south-central section. Tobacco was all housed and a nice crop of good quality cured. Corn matured and was mostly shocked at end of the month. Extensive plowing and considerable wheat sowing had been done.—*F. J. Walz.*

Louisiana.—Favorable weather for farming operations prevailed until the close of the month, when a Gulf storm moved northward over the State, causing heavy rain and high winds. Cotton picking was retarded and some lint damaged. Caterpillars and boll worms damaged the crop considerably. Some damage was done in western portion by the cotton boll weevil. The crop deteriorated during the month and was considerably below the average. Sugar cane suffered some damage from high

winds; otherwise the crop was promising. Rice harvest made good progress. The bulk of the corn crop was housed. Truck gardens were injured by heavy rains.—*I. M. Cline.*

Maryland and Delaware.—Temperature moderate; precipitation light, but well distributed; very favorable weather. Corn ripened slowly, but was safe before the end of the month and an excellent crop was assured. Corn fodder unusually heavy and other silage crops good. A good yield of buckwheat was harvested. Early sown wheat was coming up well, and the preparation of ground was nearing completion. Apples and pears were plentiful. Tobacco was a light crop, but cured satisfactorily. Potatoes averaged a fair yield. Tomatoes were a very short crop. Pastures were good.—*C. F. von Herrmann.*

Michigan.—September weather conditions generally favorable for maturing and harvesting of corn, beans, buckwheat, and sugar beets. Corn generally fully matured without being damaged by frost, and yielded excellently. Beans and buckwheat generally well secured at end of second decade. Plowing and preparation of ground for winter wheat and rye seeding well advanced by middle of month, and seeding nearly completed at close. Germination generally good. Potato blight and rot continued throughout month, and yield of late potatoes was poor. Peaches and plums yielded abundantly, but were poor in quality. Apple yields were very poor.—*C. F. Schneider.*

Minnesota.—The heaviest rains occurred on the 1st, 2d, 3d, 14th, 18th, and 19th. No injury by frost, except possibly in extreme north, and vegetation green at end of month. Some late flax cut during month. Thrashing from stack well advanced. Good corn crop about all gathered in good condition. Potatoes being dug. Second crop clover green and being made into hay. Rye and winter wheat seeding finished in good condition. Plowing was in progress all the month.—*T. S. Outram.*

Mississippi.—Weather conditions were generally favorable for crops, except heavy rains at the close of the month in the extreme southwestern counties, where lowland cotton was overflowed. There was some complaint of shedding and premature opening of cotton, and worms damaged the crop in west. Bolls opened rapidly on uplands, but slowly on lowlands in north. Picking was general, being well advanced south. The yield was considerably below the average. Much hay was saved in excellent condition. Corn gathering progressed fairly well, with poor to fair yields. Sugar cane and potato crops were good. Minor crops and pastures did well.—*W. S. Belden.*

Missouri.—Corn was fully matured at the close of the month and heavy yield assured, although much loss occurred on bottom lands from floods, the result of excessive rains from the 14th to 19th inclusive. Cotton deteriorated and the crop was generally inferior; picking became general about the 20th. Potatoes gave fair returns, although considerable blight was reported. Preparations for wheat sowing made good progress where not hindered by rains; early sown grain was coming up well. Pastures and all forage crops were satisfactory.—*George Reeder.*

Montana.—Favorable temperature prevailed, except during the first week, when potatoes and gardens were injured locally by frost. Moisture was deficient, but enough in most sections to germinate fall wheat, and most of the early sown came up. Stock and ranges were in satisfactory condition as a rule. Apple picking and potato digging were completed. Some late fields of grain were harvested early in the month and a third crop of alfalfa was cut in some southern and eastern counties. Thrashing was in progress throughout the month.—*R. F. Young.*

Nebraska.—The high temperature and ample moisture of the month caused corn to mature rapidly and under most favorable conditions. The crop was heavy and of excellent quality. Rapid progress was made with winter wheat seeding. The early sown came up quickly to an excellent stand. Haying was finished, with an excellent crop secured. Thrashing progressed rather slowly. Pastures and ranges were in excellent condition throughout the month. Late potatoes were a light crop.—*G. A. Loveland.*

Nevada.—Warm days and cool nights. Light to heavy showers fell during the latter part of the month. Thrashing was practically completed. Light third crop of alfalfa was harvested. Warm days benefited late vegetables, which were harvested with fair results. Frost damaged vegetables in the latter part of month. The honey crop was better than previous reports indicated. Water for irrigation and stock was low and range grasses were dry, but cattle wore generally in fair condition.—*H. F. Alps.*

New England.—Unusually heavy rains fell during the month, and the average precipitation, 5.41 inches, has been exceeded but once in the section records for September. During the last two decades the rainfall was below normal. Light to killing frosts on the 15th and 27th were not generally injurious to vegetation. Except during the opening days of the month, the weather was favorable to maturing and harvesting crops, and to fall plowing and seeding.—*J. W. Smith.*

New Jersey.—The month, especially the last decade, was very favorable for the late maturing crops and for seeding of wheat and rye. The heavy frosts on the 26th and 27th did no serious injury. The temperature was slightly below the normal. The precipitation was largely in excess, except at stations along the southern sea coast, where it was slightly deficient.—*Edward W. McGann.*

New Mexico.—Temperature and rainfall were slightly in excess of normal. The month was favorable to crops, ranges, and stock. First light

SUMMARY OF TEMPERATURE AND PRECIPITATION BY SECTIONS, SEPTEMBER, 1905.

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

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 temperature and precipitation are based only on records from stations that have ten or more years of observation. Of course the number of such records is smaller than the total number of stations.

The mean temperatures for each section, the highest and

Section.	Temperature—in degrees Fahrenheit.						Precipitation—in inches and hundredths.							
	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.
Alabama	76.2	+ 0.4	Tuskegee	102	23	Anniston	46	22	2.51	-0.24	Daphne	12.46	Livingston	0.57
Arizona	75.9	0.0	Aztec	118	11	Flagstaff (a)	26	30	1.97	+0.69	Huachuca Reservoir	5.70	Aztec	0.10
Arkansas	74.2	+ 0.2	Ilowe	100	1	Oregon	44	4	3.90	+0.42	Fayetteville	8.03	Luxora	0.50
California	68.6	- 0.3	Volcano Springs	118	2	Bodie	- 1	30	0.16	-0.28	Monumental	2.90	50 stations	0.00
Colorado	59.2	+ 1.7	Holly	99	12	Wagon Wheel Gap	13	19	1.32	+0.17	Antelope Springs	3.70	Canyon City	0.02
Florida	80.6	+ 1.5	Lamar	99	15, 16	Molino	58	3 dates	7.62	+0.45	Malabar	17.73	St. Andrew	2.58
Georgia	74.8	+ 2.4	Molino	103	20	Dahlonaga	51	6	2.82	-2.52	St. Marys	15.35	Waynesboro	0.08
Hawaii	74.8	0.0	Hawkinsville	92	1, 20	Ramsey	37	22	18.31	0.00	Honoumahu Valley (Maui)	33.94	Kekaha, Kauai	0.18
Idaho	59.0	0.0	Kihai, Maui	104	16	Humuula, Hawaii	16	19	1.14	0.00	Collins	4.38	Glenns Ferry	0.00
Illinois	68.4	+ 1.6	Glenns Ferry	107	2	Chesterfield	16	19	0.00	0.00	0.00	0.00	0.00	0.00
Indiana	67.8	+ 0.8	Bloomington, Cisue	97	12	Forney	16	29	0.00	0.00	0.00	0.00	0.00	0.00
Iowa	65.8	+ 2.0	Raum	97	27	Vernon	16	18	0.00	0.00	0.00	0.00	0.00	0.00
Kansas	71.4	+ 2.2	Rome	98	1	Rushville	39	7	2.92	-0.37	Chester	9.20	Cairo	0.69
Kentucky	70.2	+ 0.2	Mt. Ayr, Ottumwa	96	1	Bluffton	35	24	3.49	+0.57	Northfield	8.16	Columbus	0.87
Louisiana	79.1	+ 2.0	Independence	107	1	Washita	36	4	3.81	+0.50	Thurman	13.18	Clear Lake	0.50
Maryland and Delaware	67.1	- 0.3	Loretto	95	18	Colby	35	19	5.06	+2.77	Madison	11.76	Farnsworth	0.46
Michigan	62.0	+ 0.2	Alexandria	102	9	Farmers	36	27	2.61	-0.02	Greensburg	6.13	Cattlettsburg	0.52
Minnesota	61.9	+ 3.2	Boettcherville, Md.	94	18	Minden	50	5	5.50	+2.15	Venice	12.74	Mansfield	0.30
Mississippi	76.8	+ 1.8	Allegan	96	28	Deer Park, Md.	24	26	2.91	-0.56	Seaford, Del.	6.19	Chewsville, Md.	1.37
Missouri	69.6	+ 1.1	Long Prairie	92	11	Thomaston	20	13, 14	3.15	-0.02	Mackinac Island	8.20	Grand Marais	0.76
Montana	58.8	+ 3.7	Magnolia	101	7, 8	Hallock	28	12	3.45	-0.57	Hovland	8.19	Asby	1.25
Nebraska	65.9	+ 1.9	Versailles	98	1	Ripley	46	21	3.39	+0.51	Suffolk	9.77	Quitman	0.50
Nevada	61.1	+ 0.4	7 stations	95	10, 22	Willow Spring	41	5	7.67	-3.97	Marshall	16.34	Sikeston	0.55
New England*	59.8	- 1.8	Kirkwood	99	11	Grayling	10	18	0.90	-0.30	Saltese	2.84	3 stations	T.
New Jersey	65.4	- 0.6	Battle Mountain	103	1	Agate	27	19	3.79	+1.68	Nebraska City	11.34	Fort Robinson	0.39
New Mexico	67.4	+ 0.6	Waterbury, Conn.	89	30	Potts	19	30	0.51	+0.14	Pioche	3.28	2 stations	0.00
New York	61.1	+ 0.5	Flemington	90	30	Boulton, Me.	22	15	5.41	+2.03	Durham, N. H.	10.68	Chesuncook, Me.	1.18
North Carolina	71.8	+ 1.4	San Marcial	106	2	Van Buren, Me.	22	15	5.41	+2.03	Durham, N. H.	10.68	Chesuncook, Me.	1.18
North Dakota	59.8	+ 2.6	Elmira	98	18, 19	Charlotteburg	28	27	5.23	+1.33	Chester	9.18	Atlantic City	2.87
Ohio	65.3	- 0.1	Lumberton	97	20	Layton	27	27	5.23	+1.33	Chester	9.18	Atlantic City	2.87
Oklahoma and Indian Territories	75.3	+ 1.9	Berthold Agency	99	28	Elizabethtown	22	19	2.08	+0.87	Socorro	7.96	Fort Stanton	T.
Oregon	60.0	+ 1.7	Thurman	95	19	North Lake	18	14	3.90	+0.15	Blue Mountain Lake	8.50	Shortsville	0.77
Pennsylvania	64.0	+ 0.4	3 stations	105	1	Linnville	37	25	2.51	-1.78	Currituck Inlet	9.60	Linville	0.00
Porto Rico	79.8	0.0	Chamberlain	103	23	Pink Beds	37	23	2.51	-1.78	Currituck Inlet	9.60	Linville	0.00
South Carolina	76.2	+ 2.0	Stephan	103	23	Hannah	23	12	1.63	+0.63	Rolla	7.17	Lamoure	0.22
South Dakota	64.3	+ 3.3	6 stations	93	6 dates	Orangeville	30	27	2.86	+0.49	Urbana	7.59	Ironton	0.63
Tennessee	72.0	+ 2.1	Albany	104	1	Kenton, Okla.	41	19	3.12	-0.23	Webbers Falls, Ind. T.	6.07	Durant, Ind. T.	0.23
Texas	78.9	+ 2.0	Hiite	104	1, 2	Silver Lake	20	3 dates	2.12	+0.59	Glenora	9.79	Van	0.04
Utah	60.7	- 0.4	Cape Henry	93	20	Coudersport	27	26	3.41	+0.03	Mauch Chunk	7.76	Greensboro	1.70
Virginia	68.5	0.0	Woodstock	93	29	Pocoyo Lake	27	27	3.41	+0.03	Mauch Chunk	7.76	Greensboro	1.70
Washington	59.6	+ 1.4	Ziudel	97	1, 22	Adjuntas	55	29	8.48	0.00	Humacao	16.34	Cidra	4.21
West Virginia	65.6	- 0.6	Moorefield	97	1	Seivern	49	29	1.91	-1.91	Darlington	8.60	Due West	T.
Wisconsin	62.0	+ 2.8	Darlington	91	26	Pine Ridge	30	3	1.57	-0.10	Vermillion	4.80	Ipswich	0.10
Wyoming	55.7	+ 1.5	Fort Laramie	97	23	Erasmus	36	25	2.25	-0.73	Nashville	6.12	Leadvale	0.02

* Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. † 48 stations, with an average elevation of 630 feet. ‡ 133 stations.

to killing frosts occurred about the middle and toward the close of the month, but damage was slight, owing to mature condition of crops. Good yields of corn, cane, beans, kafir corn, and milo maize were secured. Harvest of hay was completed and much native or gramma hay stacked. Stock in excellent condition. Range prime and promising abundant winter feed.—*J. B. Sloan.*

New York.—The weather during the month was generally favorable for maturing and gathering fall crops. Killing frosts occurred in some localities, but did little damage, as crops likely to be affected had been secured. Corn and buckwheat were mostly secured in good condition. Potatoes continued to rot and were being dug. Hops were picked during the first half of the month, and the bean harvest was completed late in the month. All the early fruits were picked and the late varieties were being gathered.—*H. B. Hersey.*

North Carolina.—Temperature 1.4° above normal and precipitation 1.78 inches below normal; weather too dry for crop growth and fall plowing. Dry weather caused cotton to open rapidly; bulk of crop open and three-fifths of crop picked at end of month. Early corn had matured and was being gathered. Good crops of hay, fodder, and pea vine hay secured. Peanuts and potatoes were being dug; cabbages a failure; turnips fair. A fair crop of tobacco had been practically all cut and cured at the end of the first decade.—*A. H. Thiessen.*

North Dakota.—The weather during the month was generally favorable for maturing late grain, as well as flax and corn, but was not entirely favorable for thrashing, which was frequently interrupted by rains and high winds. Work in the fields in some parts of the Red River Valley had to be stopped, as the ground was too wet to get on with harvesting machines. Light frosts occurred in the central and killing frosts in the northern sections about the middle of the month, doing but little damage.—*B. H. Bronson.*

Ohio.—The temperature averaged close to normal. Precipitation was in excess, except in the southern section, where a slight deficiency occurred. The maximum temperature occurred generally on the 28th and 29th and minimum on the 26th. Rain periods were the 1st and 2d, 10th and 11th, and 15th to 19th. Corn improved during first half of month, and at close was practically all out of danger from frost. Apples poor. Peaches fair. Grapes and tobacco good. Garden crops mostly good. Wheat seeding progressed rapidly. Pastures were generally in good condition at close of month.—*J. Warren Smith.*

Oklahoma and Indian Territories.—Temperature average; precipitation slightly above the average, but unevenly distributed; conditions droughty over the southeastern portion and late crops somewhat damaged. Cotton was late and yields ranged from poor to fair, but of a good quality; continued damage by boll worms and shedding reported.

Early corn secured and being husked, with poor to good yields; late maturing, with poor to fair prospects. Broom corn and forage crops being secured, with good yields.—*C. M. Strong.*

Oregon.—Showers were general during the latter half of the month. Thrashing was practically completed by the 12th; the grain crop was a very good one. Hops were nearly all harvested by the 24th; the yield was better than expected. The potato crop was below average both in quantity and quality. Corn matured nicely; the crop was above average. Prunes yielded about one-half of a full crop, though they were excellent in quality.—*Edward A. Beals.*

Pennsylvania.—Temperature and precipitation nearly normal. Buckwheat harvesting nearly completed and a full average yield in prospect. Corn cutting well advanced, and late crop nearly safe. Soil in excellent condition; seeding well advanced, and early sown grain up and stand good. Tobacco curing nicely, and crop best in years. Most pastures furnishing ample feed. Garden truck abundant and of good quality. Apple crop light and inferior; peaches and pears fair. No general killing frosts.—*T. F. Townsend.*

Porto Rico.—The weather of the month was generally favorable for farm operations and for all growing crops. The drought in the southern and in the northwestern sections was broken during the latter portion of the month. Tobacco seed beds were in excellent condition, and an unusually large acreage was prepared for tobacco planting. Coffee picking begun, with a prospect of a very large crop. Cotton reports were generally unfavorable, and a decreased acreage was indicated. The sugar cane outlook was excellent. Minor crops were generally abundant.—*A. L. Brockway.*

South Carolina.—Month unusually dry, with temperature above normal, conditions conducive to rapid ripening of fall crops. Cotton opened freely and over two-thirds of the crop was picked. Except a slight deterioration due mostly to drought, cotton suffered no material change in condition. Some corn was housed, rice thrashed, and a large quantity of prime hay made. The ground was too dry to plow, delaying oat seeding. Truck seed germinated poorly in some districts and all truck suffered from want of rain.—*J. W. Bauer.*

South Dakota.—Month warmer than usual, very favorable for ripening an unusually good crop of corn and for curing range grass. Stacking was completed. Thrashing advanced well, though slightly retarded by rains. Very satisfactory yields of oats, barley, spelt, flax, and millet were indicated, but yield and quality of wheat were variable, and considerable barley was discolored. Flax harvest was practically finished. A fine crop of hay was nearly all secured. Potatoes were rather disappointing. Pasturage was good. Fall seeding was in progress. Insufficient moisture retarded plowing.—*S. W. Glenn.*

Tennessee.—Conditions were generally favorable for the maturing of crops. Cotton opened rapidly on uplands, but slowly on lowlands, where the plant was still growing; excess of stalk and light fruitage were generally reported. Early corn was a good crop; late corn fairly good. The tobacco crop was fine and was curing well. A short peanut crop was indicated. Late Irish potatoes were fine; sweet potatoes fairly good. Yields of sorghum were generally excellent. The rainfall was generally deficient and plowing and seeding were much hindered. Some early sown grains were coming up.—*H. C. Bate.*

Texas.—Generally warm during September, with changes to colder

about the end of second and third decades. Rainfall was generally deficient, though good rains fell in localities. Vegetation deteriorated, except in localities where good rains fell. Wheat seeding was delayed and some that was seeded failed to germinate properly. Average condition of cotton did not change greatly. There was some improvement north, but deterioration elsewhere. Boll weevils increased during the month. Weather favorable for picking, which was pushed rapidly. Rice and sugar cane generally did well. Other crops suffered from drought.—*M. E. Blystone.*

Utah.—Temperatures were about normal, but the average precipitation was considerably above the highest ever recorded previously. Farm work was pushed vigorously, fall crops were mostly gathered, and a great deal of fall seeding was done. Scattering jobs of thrashing were being cleaned up, and the last alfalfa crop and late apples and peaches were being gathered. Beet digging was becoming general. The range was splendid, promising abundant winter feed, and stock was fine.—*R. J. Hyatt.*

Virginia.—The weather was more than ordinarily favorable for the securing of crops and for general fall work. Fall seeding was well advanced at the close of the month. While the rainfall was below the average, the pastures and tilled ground remained in good condition. No generally destructive frosts occurred. Corn and tobacco proved good crops. The quality of tobacco was excellent. Apples were generally a poor crop. Potatoes and all truck products were fair.—*R. R. Briggs.*

Washington.—The month was warm and the latter part unusually rainy; in the northwest counties it was the wettest September on record. Hop picking and thrashing of wheat and oats were interrupted by wet weather. Hop crop was below average. Wheat crop was very good, although some was injured by drought and hot winds; some was wet in shock. Oats were wet in shock, and somewhat discolored in northwest counties; yield good, but a trifle below average. Potato digging in progress; good yield. Pastures improved. Fall plowing and seeding in progress.—*G. N. Salisbury.*

West Virginia.—The weather was very favorable for farm work and occasional showers during the first half were beneficial for crop growth. Plowing progressed rapidly and some seeding was done. At the close of the month corn cutting was nearing completion, with a good yield, pastures were drying up, but stock was in good condition, and millet, buckwheat, and cowpeas were mostly cut, with fairly good yields. The prospects for apples were for less than half a crop.—*E. C. Vose.*

Wisconsin.—Killing frosts occurred over the northern and central counties on the 12th and 13th, resulting in considerable damage to corn, potatoes, and gardens. No frost of consequence occurred in the southern section during the month. Corn was generally a very satisfactory crop, but potatoes were poor both in quality and yield. Apples were generally light. The cranberry crop was damaged by high water and insects and the yield was quite unsatisfactory.—*W. M. Wilson.*

Wyoming.—The first half of the month was favorable for the maturing and harvesting of grain, and a good to excellent crop was secured in all sections of the State. Late haying was completed under favorable conditions. Over much of the lower portions of the State no severe frosts occurred during the entire month, and all grain crops and vegetables matured without being injured by freezing.—*W. S. Palmer.*

SPECIAL ARTICLES.

THE LIFTING POWER OF ASCENDING CURRENTS OF AIR.

By HENRY HELM CLAYTON. Dated Blue Hill Observatory, October 17, 1905.

Several instances of the lifting power of the ascending currents of air in ordinary quiet summer weather have come to my attention, and may be of interest to students of the atmosphere and aeronautics.

The first was on August 6, 1894, soon after beginning work with kites at Blue Hill, when a small kite belonging to Mr. Eddy was caught in an ascending current about 50 feet above Blue Hill and lifted rapidly toward the zenith, circling above the heads of the observers as it rose. The string hung loosely beneath the kite, which continued to draw up fresh string from the ground as it ascended. A large cumulus cloud was passing the zenith at the time, and after the kite had risen some 500 feet it slowly followed the cloud off toward the east, but continued to ascend until 1172 feet of cord had been carried up and the kite was estimated to be about 1000 feet above the hill. At this point the kite was drawn out of the ascending current, and being unable to support its own weight and that of the string fell rapidly to the ground. This description is condensed from notes made by me at the time. The occurrence was witnessed by some half dozen persons, among

them being Mr. John Ritchie, jr., of Boston, Mass., who sends the following account of a similar occurrence:

On Friday, September 8, 1905, the walking party of the Appalachian Mountain Club observed a curious atmospheric phenomenon, the action apparently of a vortex. The party had reached the northern summit of Chocorua, in the Sandwich Range, N. H., a subordinate peak, which itself rises sharply from its valleys; its height above the sea is about 3000 feet. The party was seated on the summit engaged in consuming the luncheon, when Mr. J. A. Alden called attention to the movement of a bit of a paper from his box. It was a piece of common paraffine paper, perhaps six by four inches, and had been folded. It was blown out of the box by the wind and, instead of drifting horizontally or settling, it began at once to rise in the air. It retained its folded form, making three sides of a parallelepipedon, there being no ends. The day was perfectly clear and there was very little wind stirring. The sky was bright, blue, and a few small cumulus clouds hung about, not more than half a dozen and all of them small. One of the clouds was to the north of the peak and the others to the south. The attention of the party was directed to the paper which floated steadily upward with moderate velocity. It was not as if blown by a gust of wind, but rose quietly and steadily. We watched it until it became difficult to see, even with the sun shining on it, and finally lost it. We estimated that it had risen at least a thousand feet before it became invisible. It rose at a small angle to the vertical and disappeared at an apparent elevation of about 70° above the horizon. It did not drift in the direction of any clouds, but midway between the two groups. Its general drift was to the west.

In my opinion both the kite and the paper were lifted by