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SECTION VII.—WEATHER AND DATA FOR THE MONTH.

THE WEATHER OF MARCH, 1917.

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PRESSURE.

The distribution of the mean atmospheric pressure over the United States and Canada, and the prevailing direction of the winds are graphically shown on Chart VII, while the average values for the month at the several stations, with the departures from the normal, are shown in Tables I and III.

At the beginning of March relatively high pressure prevailed over practically all districts, except in the extreme eastern Canadian Provinces, where it was near or slightly below the average. High pressure continued for the next several days in most sections, except in the Southeast and far Northwest, where lower pressure obtained. About the middle of the first decade a large area of low pressure moved from the Northwest and overspread most eastern districts, continuing for several days. During the second decade several extensive low and high pressure areas moved in rather rapid succession across the country, resulting in marked pressure changes from day to day in many sections. Toward the latter part of the second decade and during the first few days of the third relatively low pressure obtained in most central districts, while in the Southeast and over the central and southern Rocky Mountain region and to the westward it was generally above the average. During the latter half of the third decade the pressure was generally below the normal in the northern half of the country, while in the southern half it was, as a rule, above the average.

The month closed with pressure above the normal in all southeastern districts and in the central Plateau and Pacific Coast States. Elsewhere it was near or below the average.

For the month as a whole the barometric pressure was below the normal in the upper Lake region, the upper Mississippi and lower Missouri valleys and over the Canadian Northwest, but the departures were generally not large. Over all other portions of the country the average pressure was above normal, the departures being quite marked in the districts to westward of the Rocky Mountains.

The distribution of the HIGHS and LOWS favored westerly and northwesterly winds in the New England and Middle Atlantic States, the upper Mississippi, and Missouri valleys and over the southern Rocky Mountains region, while southerly and southwesterly winds were of frequent occurrence in the South Atlantic and Gulf States, the lower Lakes region, the Ohio and middle Mississippi valleys. Elsewhere variable winds prevailed.

TEMPERATURE.

March opened with cold weather and widespread frosts in the far Southwest and the Pacific Coast States. On the morning of the 4th temperatures considerably below 0°F. prevailed in the Dakotas and Minnesota, and they were also unseasonably low throughout the Plains States as far south as central Texas. By the morning of the 6th the cold weather had overspread the eastern part of

the country, with widespread killing frosts in portions of the Gulf States, Georgia, and South Carolina.

For the first decade as a whole the weather was almost everywhere colder than the normal, especially in the Plateau region and Montana. During the second decade temperatures were below the normal in New England, the upper Mississippi and Missouri Valleys, the Central Plains States, Montana, and west of the Continental Divide, while in most of Texas it was warmer than the average. However, about the 18th heavy frosts occurred in northeastern Texas and freezing temperatures obtained to the northwestward and westward, and on the 19th killing frosts extended to North Carolina and northern Georgia, and light to heavy frosts in almost all other parts of the eastern cotton belt, except Florida. After the 20th temperatures above the normal were the rule, except in the north Pacific States and the Plateau region. In most of the middle and northern Plains States and thence eastward to the Atlantic this period was decidedly warmer than normal.

For the month as a whole the temperature was slightly above the normal in most eastern districts, while in the western portions of Nebraska and the Dakotas, and from the Rocky Mountains westward, it was colder than normal.

PRECIPITATION.

At the beginning of the month rain was falling in most of the cotton belt, being heavy in many portions of Georgia, Tennessee, Mississippi, Alabama, and Arkansas, and during the next few days snow or rain became widespread, extending northward to the Lakes region. About the middle of the first decade rather heavy rain fell in parts of Louisiana and Florida and widespread precipitation occurred throughout most sections to the northward and eastward. Good rains fell in southern Florida about the 7-8th, breaking a prolonged and severe drought in that section, and toward the end of the decade widespread rains again occurred in the Pacific States. During the first few days of the second decade there was rather heavy precipitation in most northern districts, with considerable snow in Michigan. Also toward the middle of the decade an area of low pressure moved from the Southwestern States to the Lakes region, causing heavy precipitation in some sections, and a few days later another storm followed nearly the same path, causing heavy snow in central Nebraska and northeastward to the upper Lakes region.

During the third decade much rain and snow occurred in some of the far Western States, specially in the more northern districts, and important rains occurred from the Middle Plains States eastward on the 22d-24th, and again in the eastern districts on the 27th, being specially heavy in Tennessee and the adjoining States to the southward, and also in the Carolinas and much of New England.

For the month as a whole, in southwestern districts from Texas and Oklahoma to southern California rainfall was generally very light, several areas having no precipitation at all. In southern Nevada and Utah, most of the Dakotas, eastern Montana, and northern Minnesota, most of Colorado, Kansas, and southern Nebraska, and portions of the Florida Peninsula, the

totals were much less than normal. In southeastern districts the falls were decidedly large, save in most of Florida and near the Gulf and Atlantic coasts. In much of Arkansas, in southern Indiana, the Virginias, Maryland, and New Jersey the totals were generally more than 4 inches, and over the southern Appalachian districts a large area received more than 10 inches.

SNOWFALL.

Considerable snow fell during the month in portions of the Ohio Valley and to the northeastward and also from the upper Lake region westward, as well as in many of the mountain regions of the West, particularly in western Montana and portions of Idaho, Washington, Oregon, California, and Colorado. At Duluth, Minn., in 24 hours on the 13-14th, 21 inches fell, being the greatest 24-hour snowfall of record at that place. Again on the 16-17th, 15 inches fell, which, with the unmelted snow from previous falls, made 40 inches on the ground, the greatest depth of record at that place.

To the eastward of the Rocky Mountains the increasing warmth melted the snow rapidly so that by the end of the month only small areas in the vicinity of the upper Lakes region remained snow-covered. In the western mountain districts the season of snowfall appears to have closed with a large supply of well-packed snow in nearly all of the higher ranges specially over the northern districts, and prospects for an abundant supply of water in the more important irrigation districts seemed assured.

RELATIVE HUMIDITY.

The relative humidity for the month as a whole was generally above the normal in the southern half of New England and from the upper Lakes region westward, including the northern Rocky Mountain and Pacific Coast States. On the other hand, the atmosphere was relatively drier than the average for March in the southern half of the country, as well as in the central valleys and the lower Lakes region, the deficiency being unusually great in portions of the Plains region and the far Southwest.

GENERAL SUMMARY.

The month was favorable for farm work in Florida but was unfavorable in practically all other Southeastern States because of frequent rains, while in Texas and Oklahoma germination was delayed by the lack of rainfall. Most spring work was delayed on the Pacific coast.

The weather was generally favorable for the development of winter wheat over the States from Missouri eastward and also in eastern Kansas and small portions of Oklahoma and in the Central and Northern Rocky Mountain States. Elsewhere the conditions were generally unfavorable.

The planting of cotton was delayed by frequent heavy rains east of the Mississippi River. However, during the latter part of the month the weather was more favorable and planting progressed rapidly in some of the more southern districts. Corn and potato planting was well advanced in the South and some progress had been made in planting these crops in the more central sections.

The shortage of feed and the heavy snow cover during much of the preceding winter in the northern Rocky Mountain and Great Plains States have caused severe loss of live stock, specially in Montana, but farther south although the ranges were poor and dry the loss was not so great. Some damage resulted to fruit in the Gulf

States by the cold of March 3d-4th, and the frequent frosts in California injured almonds and apricots.

SEVERE LOCAL STORMS.

The following notes on severe storms have been extracted from reports made by officials of the Weather Bureau:

Alabama.—Tornadoes occurred at Prairieville, near Gallion, Hale County, about 1 p. m., on March 26, and in northeastern Crenshaw and northwestern Pike counties about 12:30 a. m. on the 27th. The Prairieville storm, in a path about one-half mile wide, destroyed about 20 houses and killed one person. The Pike-Crenshaw tornado moved from southwest to northeast over an area about one-half mile wide by 25 miles long. It wrecked the little town of Petrey, Crenshaw County, killing four persons. Farther along its course in Crenshaw, and in Pike County, in the vicinity of Ansley, Harmony, and Orion, five others were killed and many more injured.

Arkansas.—A tornado, in which six persons were killed, a number injured, and a great deal of property destroyed, crossed Clark, Dallas, and Grant counties on March 20. Two tornados occurred on the 31st—one at Mellwood, in Philips County, whereby one person was killed, several injured, and several houses destroyed; and one at Belleville, in Yell County, resulting in one person killed and several buildings destroyed.

Indiana.—On March 11 a tornado crossed parts of Henry and Wayne Counties, reaching the southern part of the city of New Castle at 3:05 p. m. and swept its way through that city, first in an easterly and then in a southeasterly direction, traversing a distance of about 20 blocks in 2 or 3 minutes. The time of its passage at a given point was only a few seconds, and was described by several persons as being instantaneous. The width of the path of greatest damage was from 300 to 500 feet, and therein destruction was practically complete. A number of buildings, with their entire contents, were broken up completely and blown away. Numerous houses for some distance on either side of the tornado path were damaged to a lesser extent. Twenty-one people in New Castle were killed or died from the effects of the tornado and as many more were seriously injured, while between 50 and 100 received minor injuries. Seventy-five buildings were destroyed and about 275 damaged, the property loss being about \$576,500.

After passing through the city, the tornado continued east-southeastward, reaching a point about 1 mile south of Millville at 3:15 p. m., and about one-half mile south of Hagerstown, 11 miles from New Castle, at about 3:30 p. m. Near the former location 1 person was killed, 2 injured, and property damaged to the amount of about \$10,000; at the latter location 2 persons were killed and property loss was about \$3,500. After passing Hagerstown, the storm continued in the same general direction, but decreased in speed and intensity and lost its tornadic character before reaching Green Forks, 7 miles distant.

Heavy rain, with hail in many places, accompanied the tornado along its entire course and in New Castle undoubtedly served to prevent fires that might otherwise have occurred. There were many evidences of tornadic action. The funnel-shaped cloud was well-marked and the penetrating, rushing roar of the wind was heard at a distance of several miles. Many building walls were forced outward as a result of the sudden expansion of the air within as the center of the tornado passed.

On March 23, 1917, a tornado moved in a nearly straight path in an east-northeast direction, cutting a swath through the entire north side of the city of New Albany. The width of the path of practically total destruction varied between 1,000 and 1,500 feet with an area along each side of from 600 to 1,000 feet in which there was a great deal of damage, mostly in spots. The length of the path of the storm was about three and one-half miles, although many articles of furniture and clothing and other debris were found many miles from New Albany, whence they came. In New Albany 41 people were killed or died from injuries received, and several hundred others were injured. Between 200 and 300 houses were destroyed including several manufacturing plants, while several hundred more houses were damaged. Practically 2,500 people, including from 350 to 400 families were made homeless. The storm began at 3:08 p. m. and lasted about five minutes. The property damage was estimated between one and one and a half million dollars. A more detailed report of this storm will appear in a later issue of the MONTHLY WEATHER REVIEW.

In addition to the above, a number of other storms of tornadic character occurred in different parts of the State on the 23d, some of which are as follows:

Over the southern part of Sullivan County, south of Carlyle, at about 1:15 p. m. a tornado swept from west to east, a distance of about 18 miles, killing one man and injuring about 20 others with property damage about \$150,000. Width of path of greatest destruction about one-fourth mile.

In the northern part of Hendricks County, west of Pittsboro, at about 1:30 p. m., a tornado did considerable damage to buildings, orchards, etc., width of path of greatest destruction from 40 to several hundred feet.

In the western part of Grant County, west of Swayzee, about 2:30 p. m., a tornado swept southwest-northeast, doing damage in a path about 40 rods wide. One person was injured.

In the eastern part of Delaware County, southeast of De Soto, at about 3:30 p. m., a tornado moved southwest-northeast doing damage to buildings and trees in a path about 700 feet wide. Two persons were injured and property damaged about \$2,500.

In the northern part of Adams County, near Preble and Magley, at about 2:55 p. m., a tornado swept a path about 200 feet in width, causing property damage amounting to about \$5,000, and injuring two people.

In the central part of Harrison County, about 1 mile north of Corydon, at about 3:30 p. m., a tornado having a path from one-fourth to one-half mile wide did considerable damage to buildings on farms. Twenty persons were injured, but none were killed.

Illinois.—On March 23, storms of a tornadic nature visited Johnson and Crawford counties. In the first-named, buildings were damaged somewhat and two persons were injured, but in the southeastern part of Crawford County the storm was the worst on record. Several persons were injured, and the property loss amounted to several hundred thousand dollars.

Kansas.—Tornadoes were reported near Carlyle and Howard on the evening of March 22. The one near Carlyle occurred about 8 p. m. and moved from southwest to northeast. The width and length of its path could not be ascertained, though neither was great. The funnel-shaped cloud was distinctly seen. No person was injured, but property damage amounted to about \$2,500.

The tornado near Howard on the same date formed to the southwest of that town between 5 and 6 p. m. and

moved northeastward, passing in the vicinity of the town itself. The characteristic cloud was plainly seen. The damage was confined to small farm buildings and did not amount to more than a few hundred dollars. No persons were injured.

Kentucky.—The tornado that visited New Albany, Ind., on March 23, jumped to Harrod's Creek, Ky., as will be reported in the REVIEW for April, 1917.

Ohio.—On March 11, 1917, a tornado occurred in the vicinity of Cincinnati, and two others passed over western Montgomery County. A detailed report of these storms will be found on pages 115-8 of this issue of the REVIEW.

Tennessee.—A severe local storm did considerable damage near Pleasant Point and Dunn, in Lawrence County, during the afternoon of March 16. A number of houses and barns were wrecked and several persons were seriously injured, one probably fatally.

About 5 p. m. of the 23d a storm moved in a northeasterly direction across Trousdale County, destroying considerable property along a path 200 yards wide and 4 miles southeast of Hartsville. Several persons were injured. Both storms were probably tornadoes of a mild character.

Average accumulated departures for March, 1917.

Districts.	Temperature.			Precipitation.			Cloudiness.	Relative humidity.		
	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure for the current month.	Accumulated departure since Jan. 1.	General mean for the current month.	Departure from the normal.	General mean for the current month.	Departure from the normal.
New England.....	34.2	+0.3	-3.0	3.93	+0.23	-1.20	5.6	-0.1	74	-1
Middle Atlantic.....	41.0	+0.9	+0.8	4.46	+0.80	-0.70	5.6	-0.1	71	-2
South Atlantic.....	55.1	+1.1	+6.0	3.81	-0.70	-2.80	5.0	+0.1	73	-2
Florida Peninsula.....	72.3	+2.1	+5.4	2.68	-0.10	-3.90	3.8	+0.1	74	-4
East Gulf.....	59.3	+2.1	+8.4	0.59	+0.80	+1.50	5.3	+0.2	71	-4
West Gulf.....	59.0	+1.2	+7.6	1.72	-1.40	-4.30	5.5	+0.4	67	-5
Ohio Valley and Tennessee.....	45.0	+1.1	+0.7	6.35	+1.90	+2.00	5.7	-0.4	60	-3
Lower Lakes.....	34.9	+1.9	-4.0	2.69	+0.10	-1.00	6.3	-0.2	73	-3
Upper Lakes.....	29.4	+1.8	-0.1	2.44	+0.20	-1.40	6.2	+0.2	75	0
North Dakota.....	23.1	+2.5	-7.1	0.44	-0.50	-0.40	5.1	-0.4	82	+4
Upper Mississippi Valley.....	38.0	+2.0	-4.4	2.66	+0.30	-1.10	5.8	+0.1	70	-4
Missouri Valley.....	37.8	+1.7	+2.2	1.90	0.00	-0.80	4.8	-0.7	68	-2
Northern slope.....	25.3	-5.6	-9.4	0.92	-0.20	-0.10	5.1	-0.3	69	+1
Middle slope.....	41.9	-0.7	+3.5	0.85	-0.60	-1.40	3.6	-1.1	55	-6
Southern slope.....	53.4	+0.2	+5.5	0.22	-0.70	-1.50	2.9	-1.4	38	-16
Southern Plateau.....	46.4	-4.5	-8.6	0.17	-0.40	-0.60	1.5	-2.2	37	-4
Middle Plateau.....	33.7	-7.2	-23.2	0.83	-0.40	-1.10	4.3	-0.7	54	-4
Northern Plateau.....	32.7	-7.5	-12.9	0.97	-0.60	-1.30	7.0	+1.2	68	+2
North Pacific.....	41.1	-3.5	-5.7	4.64	0.00	-4.10	5.2	-1.4	81	+2
Middle Pacific.....	47.9	-3.5	-7.0	1.77	-2.40	-4.20	3.3	-2.0	66	-9
South Pacific.....	54.0	-1.7	-3.4	0.36	-2.20	-1.30	2.2	-2.4	62	-9

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WEATHER CONDITIONS OVER THE NORTH ATLANTIC OCEAN DURING MARCH, 1916.

The data presented are for March, 1916, and comparison and study of the same should be in connection with those appearing in the REVIEW for that month. Chart IX (xlv-27) shows for March, 1916, the averages of pressure, temperature, and prevailing direction of the wind at 7 a. m., 75th meridian time (Greenwich mean noon), together with notes on the locations and courses of the more severe storms of the month.