

CLIMATOLOGICAL DATA FOR JANUARY, 1913.

DISTRICT NO. 7, LOWER MISSISSIPPI VALLEY.

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GENERAL SUMMARY.

Unseasonably warm weather prevailed over the eastern and cold weather prevailed over the western portion of the district. The precipitation was frequent and heavy over the eastern portion of the district, and was generally light west of the ninety-sixth meridian. In Colorado, New Mexico, and Kansas the greater part of the monthly precipitation occurred during the first decade. In Texas and Oklahoma the greater part of the precipitation occurred between the 4th and 23d of the month.

The following table summarizes the chief features of meteorological interest in the various portions of the district:

States and portions of States lying within District No. 7.	Mean temperature.	Departure from normal.	Mean precipitation.	Departure from normal.	Greatest precipitation in 24 hours.	Mean snowfall.	Number of days.				Prevailing wind direction.
							With 0.01 inch or more.	Clear.	Partly cloudy.	Cloudy.	
Colorado.....	25.2	-2.7	0.65	+0.04	1.20	9.2	4	19	6	6	w.
New Mexico.....	29.3	-5.7	0.27	-0.02	0.65	3.8	3	19	8	4	sw.
Texas.....	38.4	-0.2	1.69	+0.60	2.88	1.4	3	14	6	11	s.
Kansas.....	31.5	-0.1	0.50	-0.28	0.97	3.2	3	16	8	7	s.
Oklahoma.....	38.3	-0.3	1.37	-0.28	2.74	1.2	4	15	7	9	s.
Missouri.....	36.8	+2.1	7.01	+3.93	5.80	1.1	9	12	5	14	s.
Tennessee.....	44.2	+4.3	11.22	+6.56	4.57	T.	13	10	3	18	s.
Arkansas.....	44.0	+3.6	8.45	+4.34	5.70	0.6	10	12	7	12	sw.
Mississippi.....	51.1	+5.4	9.60	+4.43	4.85	T.	13	9	5	17	s.
Louisiana.....	55.7	+4.7	5.88	+1.68	4.10	T.	8	9	6	16	s.

TEMPERATURE.

Mean temperatures ranged from 2.1° to 5.4° above the normal in Louisiana and Arkansas and in the Missouri, Tennessee, and Mississippi areas; elsewhere there was a deficiency ranging from 0.1° to 5.7°. Below zero readings were reported generally over the Colorado, New Mexico, and Kansas areas and at most stations in Oklahoma and the Texas panhandle. Over other portions of the district the lowest temperature was above zero except at one station in the Missouri area and one station in Arkansas. The highest temperature recorded was 88° at Lake Charles, La., and the lowest, -37°, at Buena Vista, Colo. A minimum reading of -35° was recorded at Elizabethtown, N. Mex.

PRECIPITATION BY DRAINAGE AREAS.

Arkansas River and tributaries.—The precipitation was above the normal over the upper and lower portions of this drainage area and was generally deficient over Kansas and western Oklahoma. In Colorado the average from 33 stations was 0.63 inch, about 0.1 inch above the normal. Over those portions of the Arkansas Valley proper that lie in Kansas and Oklahoma the average from 44 stations was 0.91 inch, about the normal amount. In New Mexico the average from 41 stations in the Canadian Valley was 0.28 inch, about the normal amount. Over those portions of the Canadian Valley lying in Texas and

Oklahoma the average from 32 stations was 1.13, about the normal amount. The amounts from 22 stations in the Cimarron Valley averaged 0.65 inch, about 0.3 inch below the normal. Over the Verdigris Valley the precipitation was light, the average from 11 stations being 0.77 inch, about half an inch below the normal. Over the Neosho Valley the average from 18 stations was 1.46 inches, about 0.3 inch above the normal. Below the Oklahoma-Arkansas line the precipitation over the Arkansas Valley proper was heavy, the average from 15 stations being 8.12 inches, about 4.5 inches above the normal.

Red River and tributaries.—The precipitation was unevenly distributed over this drainage area. The average from 47 stations in those portions of the Red River Valley that lie in Texas and Oklahoma was 1.70 inches, about half an inch above the normal. Below the Texas-Arkansas line the average from 20 stations was 6.25 inches, about 1.9 inches above the normal.

Mississippi River south of St. Louis and small tributaries.—Unusually heavy precipitation occurred over this drainage area. In the immediate Mississippi Valley the average from 38 stations was 9.90 inches, about 5 inches above the normal. The average from 25 stations in the Valley of the White was 7.86 inches, about 4.4 inches above the normal. Over the Yazoo Valley the average from 21 stations was 10.43 inches, about 5.7 inches above the normal. In the Valley of the Big Black the average was 7.58 inches, about 2.6 inches above the normal. In the Ouachita Valley the average from 21 stations was 7.67 inches, about 3.3 inches above the normal.

Louisiana coastal plain.—The precipitation was above the normal in this area, except at a few stations near the coast, the average from 35 stations being 5.70 inches, about 1.6 inches above the normal.

SNOWFALL.

Snow occurred generally over the Colorado, New Mexico, Kansas, and Missouri areas, and in northern Oklahoma, northwest Arkansas, and the Texas panhandle. Only a trace of snow fell in Louisiana, and in the Mississippi and Tennessee areas. About the normal snowfall for January occurred in the Colorado and New Mexico areas, except that there was slightly more than is usual in January over the upper Arkansas Valley. In the Colorado area much drifting resulted from the prevailing high winds which carried considerable snow from the open to the timber and gulches. The usual settling did not occur and the water content of the snow is relatively small.

RIVERS.

All rivers in Oklahoma continued below the normal, and no material changes were reported.

In Kansas the rivers remained low with but slight changes in stages during the month.

Two moderate rises occurred in the Arkansas River. The first rise began on January 6, and a navigable stage

was reached on the 11th for the first time in 54 days; the highest stage recorded was 16.1 feet on the 13th, and a navigable stage continued during the remainder of the month.

Damaging floods occurred in the White River from Batesville, Ark., southward to the mouth, and also in the Black River in Arkansas. The damage by floods in these rivers aggregated about \$10,000.

No flood occurred in the Red River, but there was a sharp rise in the lower reaches of this stream toward the close of the month.

The Ouachita River at Camden rose from a stage of 8 feet on the 1st to 35.9 feet on the 17th, after which there was a steady fall. The lower Ouachita rose steadily after the 6th, when the gauge showed 6.3 feet and a stage of 28.4 feet was recorded at the close of the month.

The Mississippi River was above flood stage at the close of the month from Cairo to Arkansas City. At Memphis the flood stage was reached on the 24th, and the stage at the close of the month was 40.1 feet; Helena, the flood stage was reached on the 23d, and the stage at the close of the month was 47.6 feet; Arkansas City, the flood stage was reached on the 30th, and the stage at the close of the month was 47.8 feet. Stages at other stations at the close of the month were: Vicksburg, 44.3; Natchez, 42.6; Baton Rouge, 30.9; Donaldsonville, 23.9; and New Orleans, 14.8 feet.

The Atchafalaya was rising rapidly at the close of the month.

IRRIGATION BY PUMPING IN WESTERN KANSAS.

By F. D. COBURN, Secretary Kansas State Board of Agriculture.

Irrigation of the valleys in western Kansas by pumping, where water is near the surface, long since passed the experimental stage, and its possibilities are not yet fully realized, as each season sees some new development.

In the Arkansas River Valley from Garden City to Syracuse many pumping plants are in operation or being installed. Finney County alone has 50 or more plants, including a number on the upland, with capacity for irrigating approximately 6,500 acres. Kearny County has 40 plants, each of 1,000 gallons or more per minute, and Hamilton County has 8. These are all equipped with centrifugal pumps, and principally use gasoline or distillate engines for power. In addition and incidentally, it may be mentioned that considerable areas are also irrigated direct from the river or when water is available from that source and from reservoirs where flood waters are stored.

In the Arkansas River Valley the depth to water is only 8 to 10 and 15 feet. The main valley, 4 to 6 miles wide, bounded by sandy territory on the south and by the loamy uplands on the north, contains what is termed the "underflow," and here are the shallow wells. This so-called underflow has been developed sufficiently so that it is pretty well known what can be done with it.

The United States Sugar & Land Co., of Garden City, Kans., which controls extensive areas in that vicinity and owns and operates the beet-sugar mill there, has a novel central power station for pumping at Deerfield, in Kearny County, about 12 miles west of Garden City. They make a producer gas out of cheap residuum of oil, and have a 400-horsepower gas engine and a 350-kilowatt generator. The current developed by this generator is distributed over a transmission line 20 miles in length, and under this line the company has 14 pumping plants, with a capacity of 1,800 to 2,000 gallons per minute. About 3,500 acres are irrigated from this system. There

is also a Government plant at Deerfield which generates electric power to run 23 plants. These are shallow wells in the valley, however.

While developing the underflow for irrigating the valley lands is important, the great significance of the later investigations is demonstrated here and there that the uplands can be profitably irrigated by pumping from deep-bored wells, as these lands comprise by far the greatest acreage.

Only one of these big upland wells was in commission during the crop season of 1911. This was the J. W. Lough well, about 12 miles southwest of Scott, in Scott County. From it were irrigated 180 acres, all that could be made ready in time for planting, but the owner estimates that the well will take care of 320 acres.

Mr. Lough's well meets the water-bearing sand and gravel at a depth of 60 feet and extends through about 70 feet of it. Owing to the abundant supply of water available he has planned to put down other wells in this deposit and operate them by electric power something after the fashion of the Deerfield method of the United States Sugar & Land Co., previously described.

The writer received a letter from Mr. Lough, in which he says:

We now have two wells equipped with pumps and engines; both were thoroughly tested during the hot, dry months of July and August, 1911, by pumping day and night several days in succession, without lowering the water in the wells more than 12 or 14 feet.

The source of the water supply is undoubtedly in the Rocky Mountains of Colorado; it has been tested in different ways, showing that it constantly flows eastward. To my certain knowledge there is no difference in the volume of this underflow, whether the rainfall be scant or heavy.

The water is always clear, cold, soft, and pure, and healthful for the growing of all vegetation. This water is found in coarse sand and gravel and at different depths, say from 15 to 75 feet from the surface and in some cases more.

This well of Mr. Lough's is 130 feet deep, with 24-inch casing. The Niquette well, of practically the same depth and equipment, is at McCue, the first station east of Scott. Each of these wells, it is estimated, will irrigate 320 acres.

The United Well Works report that they have "put down some 20 irrigation wells here in western Kansas, of which a number are being successfully operated at the present time. The others are not yet outfitted with power. The prospect for the immediate future is very good."

In Sheridan, Sherman, Thomas, and Cheyenne, in the northwest; in Scott, in the central west; in Finney, Kearny, Hamilton, and Gray, through which courses the Arkansas River; in Meade, on the southern border; in Morton, in the extreme southwest corner, and in Stanton adjoining it on the north, are various irrigation projects, the water supply being artesian flow or from rivers, creeks, and wells.

The deeply driven upland wells, however, seem to promise by far the greatest possibilities, and these, with centrifugal pumps and powerful cheap-fuel engines, are helping to solve the problem of utilizing the underground waters to irrigate the high lands.

The developments and experiences of the past 18 months seem to demonstrate conclusively not only that the water is available in western Kansas in immense quantities from a sort of subterranean lake, as it were, but that it may be successfully and economically raised for irrigating quite extensive areas. As one westerner said: "It doesn't matter much what it costs to get the water up, if we can lift it in such quantities as we are now doing." And he was right, for its use is transforming land of otherwise questionable value for agriculture into most valuable tracts of great productiveness.