

TABLE 3.—Mean free-air temperature, humidity, vapor pressure and resultant wind (m. p. s.) during September, 1925, at Washington, D. C.

Altitude m. s. l. (meters)	Naval air station (7 meters)			Weather Bureau (34 meters)	
	Temperature, °C.	Relative humidity per cent	Vapor pressure, md.	Wind	
				Direction	Velocity
Surface.....	20.4	81	19.94	N. 16° W.	1.0
250.....	19.5	76	17.67	N. 42° W.	1.3
500.....	19.0	71	16.12	N. 60° W.	1.8
750.....	18.1	69	14.79	N. 49° W.	1.8
1,000.....	17.1	70	14.08	N. 55° W.	3.8
1,250.....	16.2	69	12.94		
1,500.....	15.4	68	12.00	N. 65° W.	6.2
2,000.....	13.4	60	9.31	N. 64° W.	7.4
2,500.....	10.9	55	7.23	N. 66° W.	7.8
3,000.....	7.6	51	6.16	N. 67° W.	8.3
3,500.....	3.8	45	5.60	N. 70° W.	8.7

THE WEATHER ELEMENTS

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PRESSURE AND WINDS

The day-to-day fluctuations of atmospheric pressure were on the whole moderate, but the distribution of cyclonic and anticyclonic areas at times greatly influenced the temperature and precipitation conditions over large areas, most notably during the first decade, when unusually stagnant atmospheric conditions existed over most central and southeastern districts. An anticyclone of only moderate dimensions became established over the Southeastern States, while moderately low pressure was maintained over the more northern districts from the Rocky Mountains eastward, due to the passage over that region of several unimportant low-pressure areas.

Due to the slight pressure gradients over the eastern half of the country there was little air movement, and under the influence of clear skies and a generally dry condition of the soil due to previous long periods without material precipitation, particularly over the Gulf States and portions of the Ohio and Mississippi Valleys, the atmosphere became unduly heated and one of the longest periods of intense heat ever experienced in September resulted. The maximum effects were felt from about the 4th to the end of the first decade, the highest temperatures over large portions of the area referred to ranging from 100° to 110° or even higher daily, records in many cases never before reached in September, and in some cases not previously exceeded in any summer month. At the same time the drought conditions that had previously existed over much of the same region grew daily more severe due to the extreme heat, the combination of heat and lack of rain resulting in one of the longest and severest droughts ever known, the more important details of which are given later in this section.

By the end of the first decade the pressure distribution had become reversed; cyclonic conditions developed in the Southwest and gradually overspread the districts to the eastward, while an anticyclone entered the Northwest bringing cooler weather as it moved to the eastward.

Shortly after the middle of the month moderately high pressure again became established over the Southeastern States and unseasonably hot weather again prevailed over the South and Southeast, though the daily maxima did not reach the high points registered earlier in the month.

Near the end of the second decade the atmospheric circulation became more active; a cyclone of considerable proportions, developing over the Northwest, moved rapidly eastward, quickly followed by the first important anticyclone of the month, which overspread the upper Missouri Valley by the morning of the 20th, attended by sharp falls in temperature over northern districts. As it moved rapidly eastward the cooling effects extended into the central and southern districts to some extent, though not sufficiently to lower the temperature to normal.

The last decade of the month, save as indicated above, was without important pressure variations, though low pressures persisted over the central valleys and considerable precipitation occurred between the Great Plains and Appalachian Mountains, though little fell over the dry areas of the Southeast.

The average pressure was mainly below normal, slight excesses occurring along the immediate Gulf coast, from Lake Superior to Montana and northward into Canada, and along the coast of California. The greatest deficiencies occurred over the central valleys. Compared with the preceding month the pressure averaged considerably lower in nearly all portions, the exception being a small area over the extreme Northeast, locally in northern California, and in portions of the upper Missouri Valley and adjacent Canadian areas.

In the absence of persistent important high or low pressure areas, as shown by the chart of average pressure, there was much local diversity in the directions of the prevailing winds, though they were mainly from the south in the east Gulf and South Atlantic States and over the Great Plains, and from northerly points along the Pacific coast.

Despite the general absence of extensive cyclonic areas there were apparently more than the usual number of wind or other damaging storms distributed through all portions of the month and in nearly all sections east of the Rocky Mountains, and a few to the westward. No important loss of life occurred, however, save that occasioned by the wreck of the airship *Shenandoah* in Ohio on the 3d. The more important facts in connection with the severe storms of the month appear in the table immediately following this section.

TEMPERATURE

September, 1925, set a mark for heat over the territory from the lower Mississippi Valley eastward, and from the Ohio drainage area southward to the Gulf, that in many instances has probably not been surpassed in the authentic history of that part of the country, and that will probably stand unsurpassed for as long in the future.

The center of this heated area embraced the interior of the Gulf and South Atlantic States, the southern Ohio drainage, and portions of the middle Mississippi Valley. In the central portion of this area the average daily temperatures were normal or above on every day of the month, and at many points in the outlying portions only one or two days had temperatures below. Here, too, the averages and the maxima for the month were the highest ever known in September and in a number of cases the highest for any month. Despite the intense and long-continued heat few cases of prostration occurred, and the ordinary occupations were pursued without material hindrance, due probably to the dry condition of the atmosphere.

Aside from the intense heat over the regions referred to above, temperature conditions over the country were not

far from normal, though the month was moderately cool over most districts from the Rocky Mountains westward, particularly in the interior valleys of California, where August had likewise been mainly cool. Considerable delay resulted in the ripening and drying of fruit in California due to continued cool weather, but otherwise the month was favorable in most Western States.

The warmest periods were from the 1st to 3d over the districts west of the Rocky Mountains and over the northern Plains, and from the 4th to 10th in most central and eastern districts, extending a few days later over the Northeastern States.

The lowest temperatures occurred on the first two days in portions of the east Gulf and South Atlantic States, but in most other States the coldest weather was during the last decade.

Temperatures were below freezing in all the northern tier of States and generally at the higher elevations of the western Mountain sections. As a rule, however, the main crops had advanced too far toward maturity to suffer material damage from frost.

PRECIPITATION

September added another to the long list of months in 1925 with generally deficient precipitation, and unfortunately this condition included the greater part of the territory from central Texas eastward and northeastward to the Atlantic coast where drought has already persisted since early in the year. Outside of this area the drought conditions were mostly relieved at some time during the month.

In portions of the upper Mississippi Valley and thence eastward some relief occurred during the first week, and there were some heavy rains in southern Texas, and moderate falls occurred in the far Northwest.

A heavy fall in the drainage area of Squill Chuck Creek, Chelan County, Wash., on the 5th caused the loss of 14 lives and much damage to property, and a severe hailstorm on the same date in Douglas County, same State, caused great damage to fruit.

During the second week good to heavy rains occurred from New Mexico and northern Texas northeastward to the Great Lakes, effectually relieving the shortage previously existing in portions of the Ohio and Mississippi Valleys and West Gulf States. The third week had continued good rains in portions of Kansas and Missouri, and more or less rain fell in nearly all other districts save from central Texas and Oklahoma eastward, where there was little or none, only light showers if any occurring during the week in the southern Appalachian region where drought was daily growing more serious.

The last decade of the month had considerable rain along the immediate Gulf coast, over much of Texas and thence northeastward to the Great Lakes, but it was scanty in the more eastern districts, except locally. Some relief occurred in the worst drought area, but in many sections of western North Carolina and the near-by areas of southwestern Virginia, eastern Tennessee, the northern portions of Alabama, and Georgia, and western South Carolina the drought was still unbroken at the close of the month.

A somewhat detailed account of the drought conditions existing over much of the country from the Rocky Mountains eastward during the spring, summer, and early fall months of the present year follows at the end of this section.

SNOWFALL

Some notably heavy snows occurred in the mountain districts of Montana, particularly near Helena, on the 19th and again on the 27th and 28th. Heavy damage to trees, shrubs, and overhead wires occurred, due to the wet condition of the snow and the fact that the foliage had not yet fallen.

Snowfalls up to 5 inches, or slightly more, occurred in the main chain of the Rocky Mountains from northern New Mexico to Montana, and similar amounts were reported from the high mountains of California, Oregon, and Nevada. East of the Rocky Mountains not more than traces were reported and these mainly in the Dakotas.

RELATIVE HUMIDITY

As is usually expected, the excesses and deficiencies of relative humidity are largely confined to similar areas of precipitation, and the present month is no exception, as the relative humidity was greatly deficient from Arkansas and eastern Texas northeastward to southern New England, closely coinciding with the area of deficient precipitation. Over most other parts of the country there was generally a small excess, except in portions of the western mountain regions where it was large.

THE DROUGHT OF 1925, OVER THE SOUTHEASTERN UNITED STATES

The year 1925 has been marked by one of the most widespread droughts of recent decades, and the intensity in the southern Appalachian region equaled or exceeded anything in the memory of the oldest inhabitants. Here August and September usually brought the climax, though in portions of the affected area substantial relief was received by mid-September.

In the Middle and West Gulf States, dryness which set in during the midsummer of 1924 was practically unrelieved till far into 1925, occasionally not until the fall. Many districts just west of the Mississippi River, as far north as Iowa, and in the middle or southern Plains likewise began to suffer from dryness in the fall of 1924, and the rains in subsequent months were too scanty to give complete relief till about the close of the present growing season.

The area which was decidedly affected by the scanty precipitation of 1925 includes much of New Mexico, large parts of Texas, Oklahoma, and Kansas, and practically all districts to eastward of these. The northern limit usually is found near the fortieth parallel, being near the Kansas River in eastern Kansas, and the Missouri River in Missouri. The southern parts of Illinois, Indiana, and Ohio were considerably affected, also large portions of the Virginias with a little of Maryland. In Florida, however, the peninsula has had either more rainfall than usual or about as much in most months of the last 12.

In much of southern and eastern Texas the early portion of the winter was marked by abundant rains, and most of the other Gulf States had excessive falls and often very damaging floods during December and January. However, from northwestern Texas northeastward over Oklahoma and northwestern Arkansas and most of the Ohio Valley dry conditions set in either before or during January and the same is true of eastern Tennessee and western North Carolina, where light rains, far apart, became the prevailing condition.

In early February the dry weather became dominant in nearly all parts of the Gulf States and in much of the South Atlantic and southern Middle Atlantic States, and early in March from northern Alabama northward over Tennessee, also over southeastern Arkansas. Usually the States of Oklahoma, Kansas, Missouri (save the southern part), and Iowa had ample moisture till May or later, and the immediate South Atlantic coast, as a rule, was well watered till at least the end of April.

Important portions of the dry area had liberal rains during certain limited periods of time, thus separating the drought into two or more portions. For example, the latter half of April with early May brought temporary relief in most of northern Texas; June gave helpful rains to much of Kansas and Missouri; also to much of southern Georgia, and the districts north of the lower Ohio River; while July and the first fortnight of August had helpful rains in Oklahoma, Arkansas, western Tennessee and northern Mississippi. These rains which came between comparatively dry periods were of prodigious importance in partially saving the important crops, and often were sufficient, in combination with thorough cultivation, to give yields above average for cotton or other staple crops in large portions of the States affected.

Considerable portions of New Mexico and Texas have received as much rain as normal each month since June, but most of southern Texas, also the north-central and northeastern portions, like nearly all States to north-eastward and eastward of Texas, reached the climax of the drought late in the summer.

The last 10 days of August and the opening week of September had remarkably hot and dry weather in the eastern portions of Kansas, Oklahoma, and Texas and practically everywhere eastward to the Atlantic Coast. The corn and cotton crops were much affected by this weather, being greatly reduced in prospects and too rapidly pushed to early maturity.

The end of the drought came by the 10th of September over nearly all parts of Kansas, Missouri, Oklahoma, Arkansas, Louisiana, and northern Texas, and by the middle of September over the lower half of the Ohio Valley and some parts of Tennessee. It was late in September or early in October before some parts of the last-named State and most portions of the Virginias received ample rains, while most portions of the Carolinas and Georgia, and some parts of the East Gulf States were relieved after the middle of October, and a few districts, chiefly in South Carolina, are still but partially relieved.

The dry weather did hardly any damage to field crops anywhere north of the Ohio River, save in southern Illinois and Indiana, but pastures and meadows were

considerably affected in portions of Ohio. In most of southern Missouri and some parts of Kansas, and especially in Arkansas, Tennessee, and North Carolina, and to southward the corn crop suffered greatly. From central Texas southward, in most of Arkansas, Georgia, and the Carolinas, save eastern North Carolina, and in some parts of Alabama the cotton crop was seriously reduced in yield, but the rainfall shortage was not great enough in many important portions to cut the yield to the average, and high quality of crop was reported for an unusually extensive area. Potatoes, tobacco, and oats were seriously hurt in many States and portions of States, while nearly everywhere south of the Ohio River pastures and forage crops were so greatly harmed as to cause vast loss or inconvenience. In several localities sale of cattle for removal or slaughter was found necessary in view of scanty prospective supply of feed for winter. The condition of pastures in the southern Appalachian region, has seldom, if ever, been worse, and here fruit and forest trees in many tracts have been defoliated, and it is feared they will prove to be dead when next spring comes.

The shortage of water was annoying in several districts west of the Mississippi River and was the cause of enormous trouble and expense in large areas east of the Mississippi and south of the Ohio and in the coal-mining region of southern Illinois. Almost everywhere from the lower and middle Ohio River and the middle latitudes of West Virginia and Virginia southward nearly to the southern limits of Mississippi, Alabama, and Georgia, and nearly to the South Atlantic coast, the farm and city supplies were failing or on the verge of failing for several weeks, or in a few districts for months. In the southern Appalachian region the water-power situation was the worst in memory, small streams never before known to fail being dry or reduced to occasional pools, while large streams reached lower stages than any indicated by available records.

When comparison is made with previous droughts it is found that hardly any area west of the Mississippi River has suffered as much as in some one or more previous years. Most of Texas, save the easternmost and north-central counties, had a more serious drought in 1917 than during the present year. From the eastern coast of Texas northeastward to central Mississippi the late months of 1924 were drier than any part of this year, while in the central valleys 1901 set a mark far beyond the drought of the present year. Large portions of the Ohio Valley and the Virginias report that the dryness of 1881 remains the worst in memory, but usually from southwestern Virginia southward and southwestward to the north-central portions of Georgia and Alabama and as far east as the middle counties of the Carolinas the drought of 1925 appears to be the most severe that the region has ever known.

SEVERE LOCAL HAIL AND WIND STORMS, SEPTEMBER, 1925

[The table herewith contains such data as have been received concerning severe local storms that occurred during the month. A more complete statement will appear in the Annual Report of the Chief of Bureau]

Place	Date	Time	Width of path ¹	Loss of life	Value of property destroyed	Character of storm	Remarks	Authority
Oxford (10 miles north of southeastward into Vance County, N. C.) Ohio.....	1	5-6 p. m....	4 mi.	\$250,000	Heavy hail.....	Very heavy crop damage, especially to tobacco..	Official, U. S. Weather Bureau.
	3			14		Thunderstorms...	Storms general over State; with the exception of the wrecking of the airship, Shenandoah, only slight damage resulted.	Cleveland Times (Ohio).
Providence, R. I., and vicinity.	4	8:01 a. m.- 12:18 p. m.				do.....	Some damage by lightning.....	Official, U. S. Weather Bureau.
Quincy Wash. (6 miles north of).	5	A. m.....				Hail.....	No material damage.....	Do.
Southwestern Douglas County, Wash.	5	P. m.....			200,000	Destructive hail...	Apple crop made practically unsalable.....	Do.
Browntown, Ill.....	6	2 p. m.....	367	3	25,000	Wind squall.....	A church and garage wrecked; 12 persons injured.	Do.

¹ Yards when not otherwise specified; mi. signifies miles.