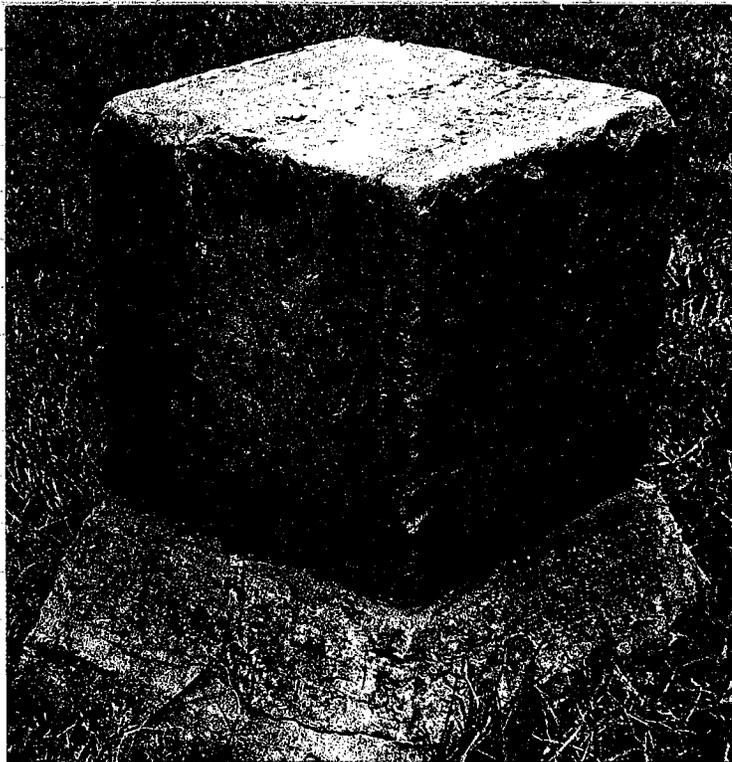


Oklahoma Geology Notes

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“Initial Point,” Arkansas-Oklahoma Boundary

The photograph on the cover shows the “Choctaw” and “1858” sides of the small monument marking the “initial point” of Oklahoma’s eastern boundary survey. The monument is of gray limestone and is surmounted by a capstone 17.5 in. square and 17 in. high. It is marked “Initial Point” on its north face, “Arkansas” on its east face, “Choctaw” on its west face, and “1858” on its south face. The marker is within the bounds of the Fort Smith National Historic Site, which is administered by the National Park Service, U.S. Department of the Interior.

Fort Smith itself was established on December 25, 1817, by Maj. William Bradford and a company of riflemen encamped on ground selected earlier that year by Maj. Stephen H. Long, a topographical engineer. Here, at the confluence of the Arkansas and Poteau Rivers, the fort was established to bring peace to the warring Osages and Cherokees, to prevent eager U.S. settlers from intruding on Indian land, and to protect legitimate settlers in the area.

For more information about Oklahoma’s borders, see “History of the Boundaries of Oklahoma” on page 174 of this issue.

Oklahoma Geology Notes

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Short articles on aspects of Oklahoma geology are welcome from contributors. A set of guidelines will be forwarded on request.

HISTORY OF THE BOUNDARIES OF OKLAHOMA

Arthur J. Myers¹

Introduction

The boundaries of the 13 original states were not defined in the Acts of Ratification, but in general the states maintained their claim to colonial boundaries established by royal decree or by agreement. Other states were admitted into the Union by acts of Congress, usually upon petition of the people residing in the territory, and their boundaries were defined in the enabling acts.

The entire basin of the Mississippi River and its tributaries and much of the coastal region of the Gulf of Mexico were subsequently known as the Territory of Louisiana, and were originally claimed for France by La Salle in 1682. In the early 1800's Napoleon Bonaparte feared a declaration of war by Great Britain and subsequent seizure of the mouth of the Mississippi and with it the Province of Louisiana, so he offered to sell the province to the United States. The offer was promptly accepted, and the consideration named was 60 million francs and the assumption by the United States of the "French spoliation claims," which were estimated to amount to \$3,750,000. Article 3 of the treaty of cession, dated April 30, 1803, fixed the rate of exchange at 5.333 francs to the dollar. The total payment, including interest, made by the United States for this purchase was \$23,213,567.73.

Oklahoma is one of the states formed from the Louisiana Purchase.

State Statistics

Of the 50 states, Oklahoma ranks 33d in size, with a total area of 69,956 sq mi. Of this, 68,924 sq mi is dry land or land temporarily or partially covered by water, such as swamps and river flood plains, streams, and ponds of less than 40 acres in area. The remaining 1,023 sq mi includes lakes, reservoirs, and ponds having an area of 40 acres or more.

The geographic center of Oklahoma is 8 mi north of Oklahoma City. The State's highest point is Black Mesa, in Cimarron County, at 4,973 ft, while

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the lowest point is on the Red River in McCurtain County at 300 ft. The approximate mean elevation of the State is 1,300 ft. Oklahoma City has an elevation of 1,207 ft.

Figure 1 shows the latitude and longitude of the initial point of Oklahoma and the latitude and longitude of the "corners" of Oklahoma and surrounding states.

Figure 2 shows the distance in miles along the border of Oklahoma and its adjacent states. The total mileage along adjacent state boundaries is:

Missouri	34.42 mi
Arkansas	197.96 mi
Texas	903.34 mi
New Mexico	34.45 mi
Colorado	53.01 mi
Kansas	410.71 mi

Figure 3 shows internal distances within the State of Oklahoma. The maximum east-west distance is 466.76 mi from the southwest corner of Missouri to the southwest corner of the Oklahoma Panhandle. The State's initial point, at the Oklahoma-Arkansas border, is the most easterly part of Oklahoma, with Arkoma the most easterly town; the distance from that point to the Texas Panhandle is 314.39 mi.

The maximum north-south distance entirely within Oklahoma is 230.16 mi, which is from a point southeast of Mud Lake in McCurtain County (the crossing of the boundary loop immediately south of the Red River is disregarded) to the Kansas state line north of Ottawa County. The location of the south point is latitude 33°39'35.41" N and longitude 94°39'18.30" W. The north-south distance through central Oklahoma along longitude 97°07'30" from the south side of the Red River to the Kansas state line is 226.24 mi.

Land Divisions

The division of Indian Territory (Oklahoma) into the section-township-range system was authorized by an act of Congress on April 8, 1864. It began in 1870 with the subdivision of the Chickasaw lands into quarter sections. The initial point was established on the north side of the Arbuckle Mountains and marked with a stone post, which is still standing (fig. 4A). The initials "IM" are on the west side of the post, and the date "1870" is on the north side. The point was probably chosen because it was in limestone bedrock, at an elevation above the surrounding land to the north and east, and because of its proximity to Fort Arbuckle. All of Oklahoma, except the Panhandle, has been surveyed as ranges east and west from this longitude, known as the Indi-

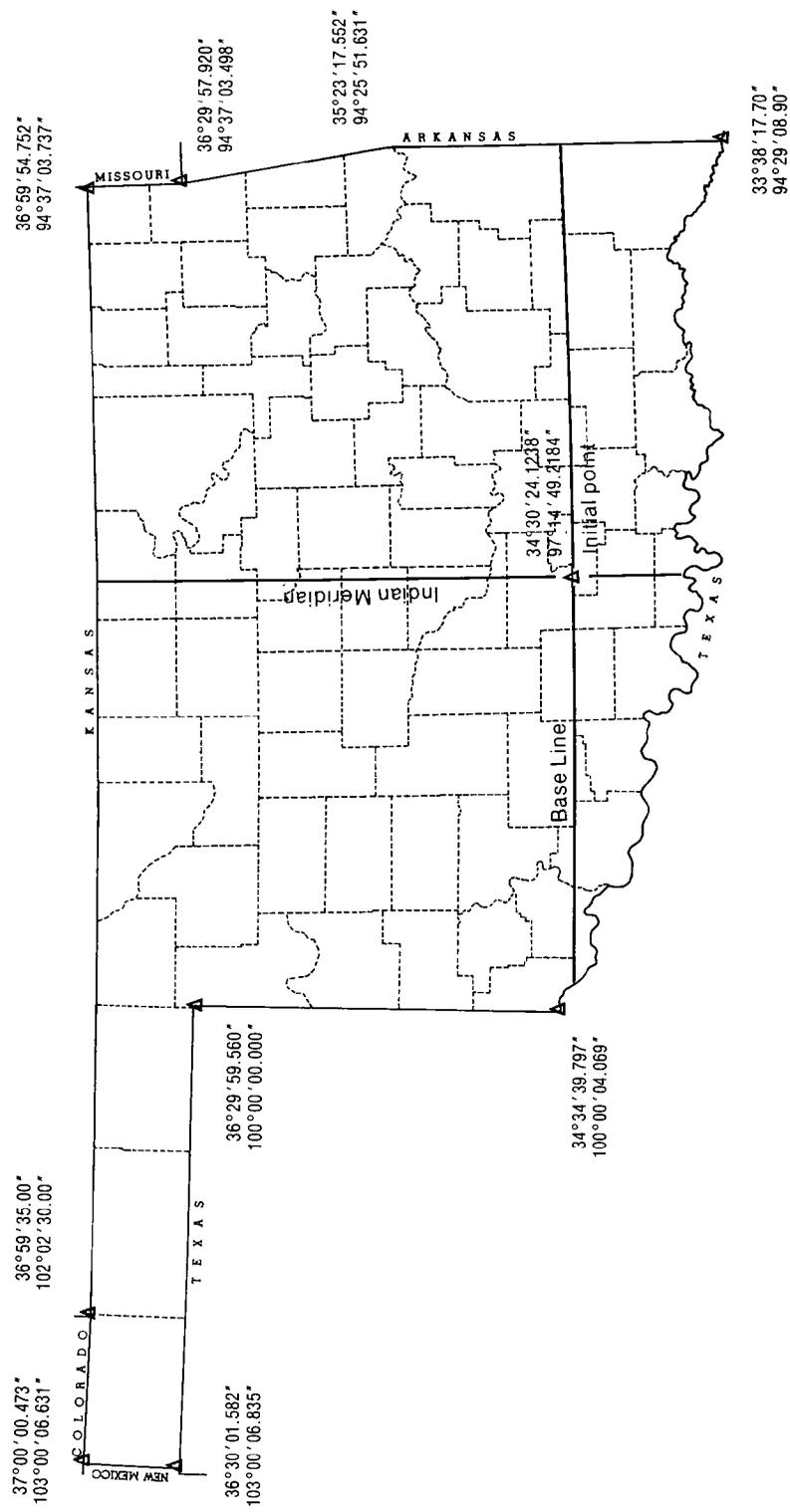


Figure 1. Map of Oklahoma showing latitude and longitude of the initial point and "corners."

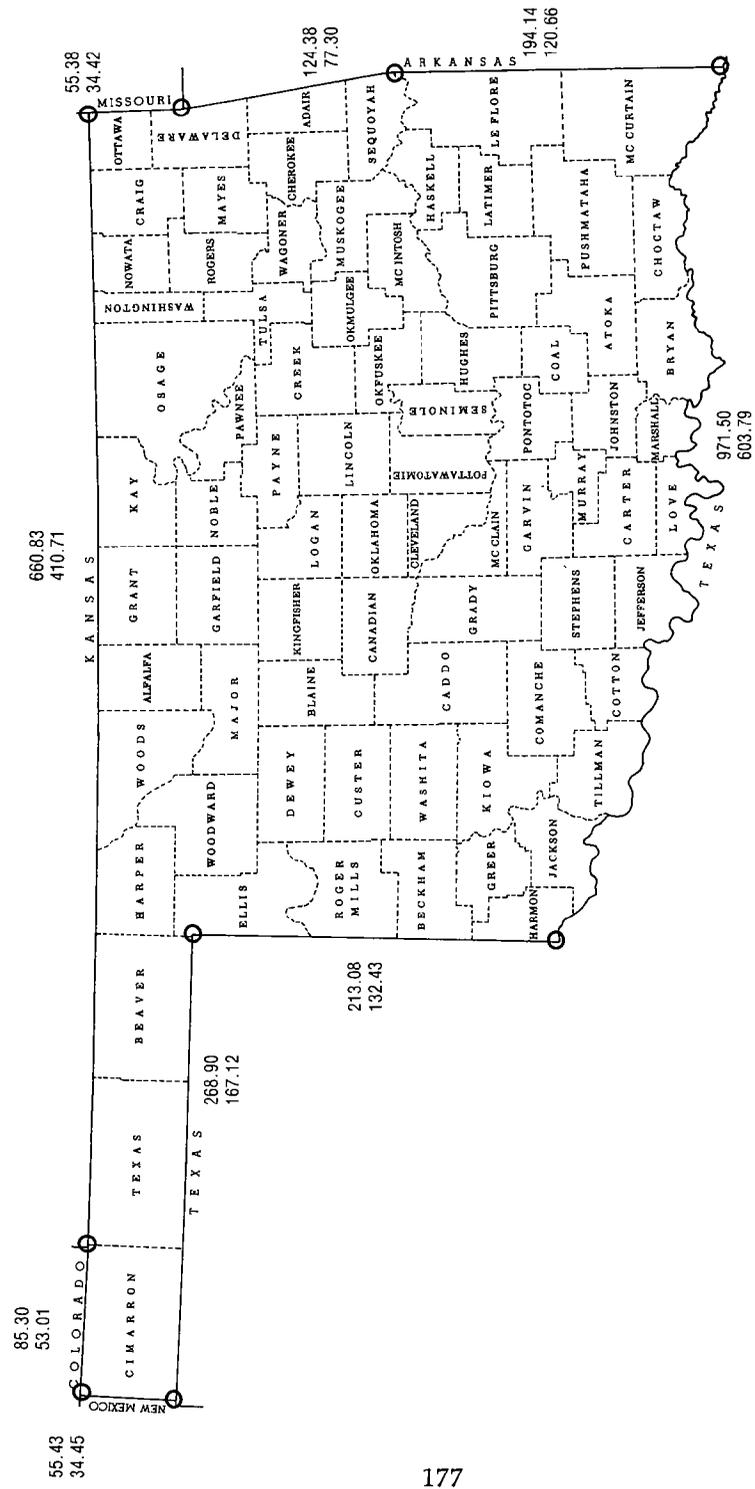


Figure 2. Map of Oklahoma showing distances along border with adjacent states. The bottom number is the distance in miles, the top number the distance in kilometers.

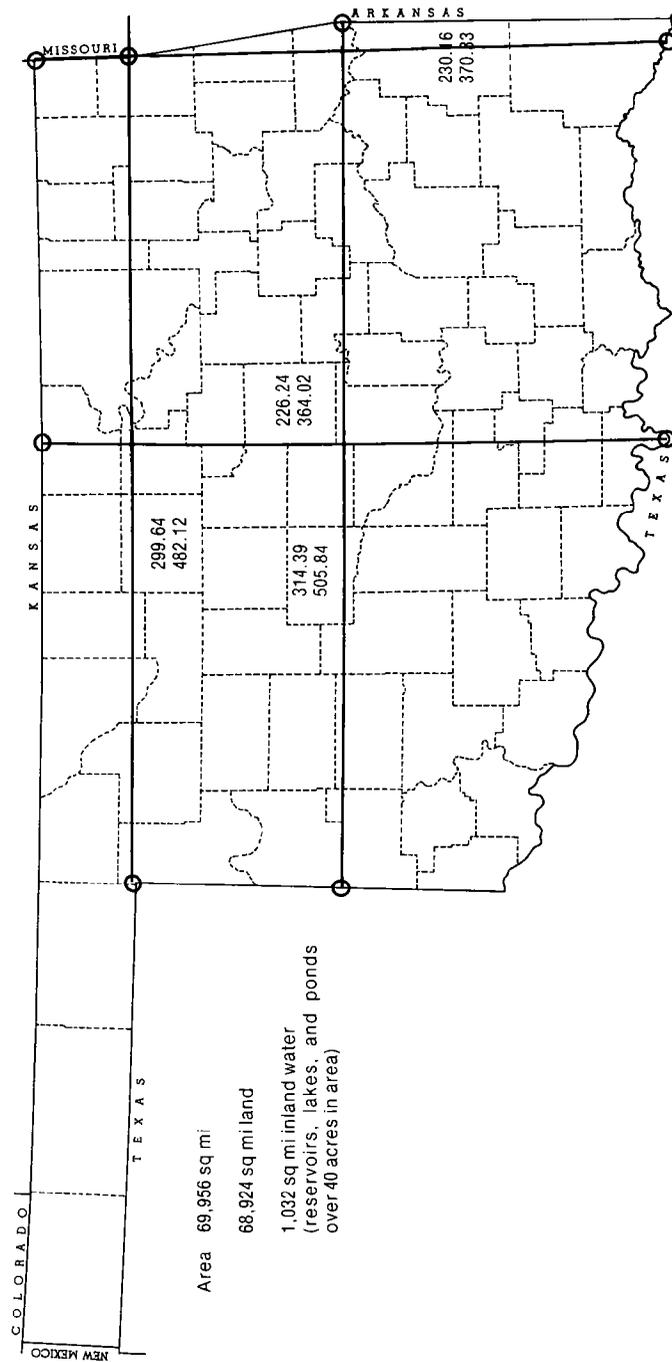


Figure 3. Map of Oklahoma showing internal distances. The top number is the distance in miles, the bottom number the distance in kilometers.

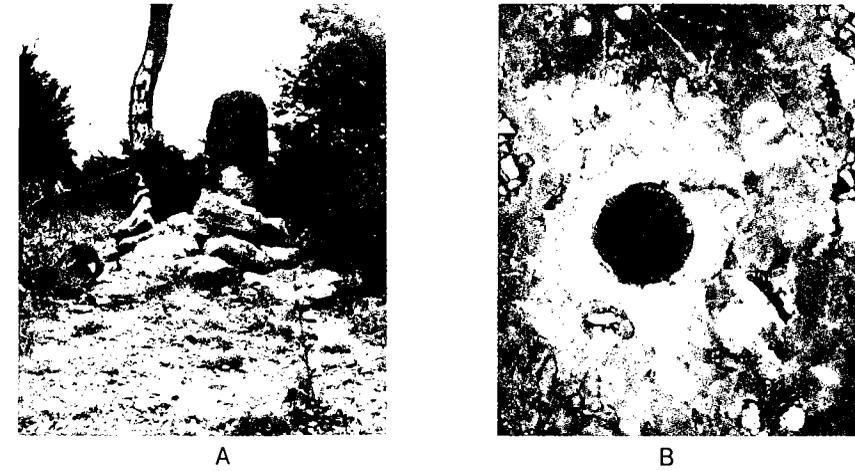


Figure 4. Photographs of Oklahoma initial point. The stone post was set in 1870 and marks the intersection of the Indian Meridian and base line. A, view from the southwest, with Indian 1954 triangulation station in the foreground. B, close-up view of Indian 1954 triangulation station.

an Meridian, and townships north and south are marked from the base line of latitude established by this marker.

During fiscal year 1870-71, 65 townships were surveyed and divided into 160-acre tracts with a total of approximately 1,350,107 acres. Except for the Panhandle, by 1879 most of Oklahoma west of the 96th meridian had been surveyed.

Beginning in 1927 the triangulation net west of the 98th meridian was adjusted. It involved 12,500 mi of arcs in 16 closed loops. Later the net east of the 98th meridian was adjusted, involving 13,000 mi of arcs in 26 loops. The North American datum for the adjustments is the Meades Ranch station in Kansas at latitude $39^{\circ}13'26.686''$ N and longitude $98^{\circ}32'30.506''$ W. First-order triangulation in Oklahoma includes seven first-order arcs (1927 datum) and was published in 1935 (Schmidl). Triangulation has continued, and in 1955 the Indian triangulation station was established. The marker is stamped "Indian 1954," and its position is latitude $34^{\circ}30'24.1238''$ N and longitude $97^{\circ}14'49.2184''$ W, which is 11.73 ft from the stone post set in 1870 by the original survey party. Figure 4B is a closeup of the Indian 1954 triangulation station.

Indian and Oklahoma Territories

Indian Territory was set apart by a Congressional act of June 30, 1834, and was described as follows:

. . . all that part of the United States west of the Mississippi and not within the States of Missouri and Louisiana, or the Territory of Arkansas . . . shall be taken and deemed to be Indian Country.

The Territory of Oklahoma was organized from the western part of Indian Territory under the act of May 2, 1890. The act states, in part:

That all that portion of the United States now known as the Indian Territory, except so much of the same as is actually occupied by the five civilized tribes, and the Indian tribes within the Quapaw Indian Agency, and except the unoccupied part of the Cherokee outlet, together with that portion of the United States known as the Public Land Strip [Donaldson, 1884, p. 462, 1187], is hereby erected into temporary government by the name of the Territory of Oklahoma.

A boundary between two states of the United States may be changed by agreement of the state legislatures, but the agreement must be approved by the U.S. Congress. Congress cannot change a state boundary without the consent of the states. A boundary between a state and a territory is fixed by joint action of Congress and the state. Boundaries between territories are fixed by Congressional action alone. Disputes between states regarding boundaries must be settled by the U.S. Supreme Court, whose decisions are final.

Bordering States

Of the six states that border Oklahoma, all but one, New Mexico, were admitted to the Union before Oklahoma:

Missouri	August 10, 1821	24th
Arkansas	June 15, 1836	25th
Texas	December 29, 1845	28th
Kansas	January 29, 1861	34th
Colorado	August 1, 1876	38th
Oklahoma	November 16, 1907	46th
New Mexico	January 6, 1912	47th

The boundaries of the states were set in the enabling acts for their admission; therefore, the State of Oklahoma is essentially what was left after the surrounding states had been formed.

Missouri

The southwest corner of Missouri was established at a point that sextant observations showed to be in latitude 36°30' N and a large stone post was set to mark the point. In 1845 a mound of earth 5 ft tall, having a 10-ft base, was placed at a point 4.83 chains (318.78 ft; 1 chain = 66 ft) farther south.

A boundary monument, "Oklahoma-Missouri-Arkansas," was surveyed and erected in 1935. It is marked by a 2-ft-sq concrete monument 4 ft high resting upon a 3-ft-sq concrete base that projects 1 ft above ground. A stone set in the top of the monument is 5 x 12 in. and extends 12 in. above the concrete. The stone has "Misr" cut in the north side and "Ark" cut in the south side. The monument has "Missouri 1821" molded in the north side, "Oklahoma 1907" in the west side, "Arkansas 1836" in the south side, and "Erected by Ozark Culture Club 1915" in the east side (U.S. Coast and Geodetic Survey, 1959).

Arkansas

The west boundary of Arkansas was established by a treaty between the United States and the Cherokee Indians signed on May 6, 1828, and which contained the following description:

The western boundary of Arkansas shall be, and the same is, hereby defined viz: A line shall be run, commencing on Red river, at the point where the Eastern Choctaw line strikes said river, and run due north with said line to the river Arkansas; thence in a direct line of the South West corner of Missouri.

The eastern Choctaw line was fixed by treaty with the Choctaw Nation on January 20, 1825, as beginning on the Arkansas River one hundred paces east of Fort Smith and running thence south to the Red River. When Arkansas was admitted as a state, the west boundary was the line described in the treaty with the Cherokee Indians.

The west boundary of Arkansas near Fort Smith was changed by an act of Congress approved February 10, 1905, to include in that state a part of Indian Territory (about one-fifth of a square mile), the boundaries of which were described as follows (Van Zandt, 1976, p. 118):

Beginning at a point on the south bank of the Arkansas River one hundred paces east of old Fort Smith, where the western boundary line of the State of Arkansas crosses the said river, and running southwesterly along the south bank of the Arkansas River to the mouth of the Poteau; thence at right angles with the Poteau River to the center of the current of said river; thence southerly up the middle of the current of the Poteau River (except where the Arkansas State line intersects the Poteau River) to a point in the middle of the current of the Poteau River opposite the mouth of Mill Creek, and where it is intersected by the middle of the current of Mill Creek; thence

up the middle of Mill Creek to the Arkansas State line; thence northerly along the Arkansas State line to the point of beginning.

The west boundary of Arkansas south of the Arkansas River was surveyed and marked in 1825, while the line from old Fort Smith to the southwest corner of Missouri was marked in 1831.

A resurveying and re-marking of the entire west boundary of Arkansas was authorized in 1875 and completed in 1877. The lines from old Fort Smith, both north and south, diverged to the west and added to Arkansas more than 200 sq mi. The boundary mark on the Red River was found to be 4 mi 16 chains (22,176 ft) west of a line due south of old Fort Smith. The Cherokee and Choctaw Indians were paid for the land from which they had been wrongfully deprived (Van Zandt, 1976, p. 118-120).

The Oklahoma-Arkansas initial point was established in 1885 and resurveyed in 1915. The monument is of gray limestone, 4 ft high, 4 ft square at the base, and 17½ in. square at the top, which is surmounted by a capstone 17½ in. square and 17 in. high. It is marked "Initial Point" on its north face, "Arkansas" on its east face, "Choctaw" on its west face, and "1858" on its south face (Shmidl, 1935, p. 81). (See cover illustration and description on page 154.)

Texas

The south border of Oklahoma is now established as the position of the south bank of the Red River at the time when Texas was admitted to the Union. The boundary was in dispute for many years, with Texas claiming to the middle of the river. Briefs in a suit filed by Oklahoma against Texas were submitted to the U.S. Supreme Court at its October term in 1920. A decision was rendered April 11, 1921, reaffirming a former decision by the Supreme Court in 1896 making the south bank the boundary.

The Red River is a meandering stream, and since 1845 the course has changed many times. As a result, parts of Texas are now north of the present course of the Red River, and parts of Oklahoma are south.

The most southerly part of Oklahoma is along the south bank of Gunn Lake, an oxbow lake of the Billy Hall Bend of the Red River, south of its present course. This point is situated at latitude 33°36' 56.46" N and longitude 94°31' 30.11" W.

For more than 50 years the area known as "Greer County" (an area of more than 2,360 sq mi east of the 100th meridian and between the two main forks of the Red River) was in dispute between the State of Texas and the United States. Texas claimed that the North Fork was the main stream referred to in the description of the boundary in the Spanish treaty of 1819. The

United States claimed that the South Fork was the main channel and the proper location of the boundary.

Congress decided the matter on May 4, 1896, and awarded this area to Oklahoma.

In 1926, after a number of surveys, neither the U.S. Congress nor the State of Texas had approved any survey of the 100th meridian. That year the U.S. Supreme Court decreed that neither the boundary survey of 1859-60 nor the location of the 100th meridian in 1902-03 was acceptable in establishing the boundary and ordered that a new survey be made.

In order to locate the line exactly, the court-appointed commissioner placed it on the geodetic meridian determined from first-order triangulation by the U.S. Coast and Geodetic Survey. The marking of the boundary line began in 1928 at a point 340.28 ft east of a 1920 mark near the Red River and extended south to a point near the "cut-bank" on the south side of the river. At that point a large reinforced-concrete monument was built, and a reference mark on the meridian was placed at a point 351.2 ft farther south. From the cut-bank mark the line was run due north for a distance of 133.6 mi, checked in position at each of the 20 geodetic stations, and closed on the eastward extension of the 36°30' parallel boundary line as determined by John H. Clark, the boundary commissioner, in 1860. Along the line there are now 160 concrete monuments, each having a lettered metal tablet set in its upper surface. The line as established was approved by the U.S. Supreme Court on March 17, 1930 (Van Zandt, 1959, p. 122-123).

The southwest corner of Oklahoma is marked by the Kidder monument, which was established in 1902 by the General Land Office. According to Shmidl (1935, p. 95), the station was marked by a stone post 10 x 14 x 45 in. projecting 18 in. above the surface of the ground, although both Douglas (1923, p. 153) and Van Zandt (1959, p. 123) stated that the post was 10 x 10 x 45 in. In 1923 a standard disk station mark was set in the center of the top of the stone and stamped "Kidder, 1902."

The northeast corner of Texas was established in 1928 and marked by a concrete monument with a base 30 in. square, set 24 in. into the ground. The base is surmounted by a galvanized iron form 24 in. in diameter at the base, 18 in. in diameter at the top, and 42 in. high. The monument is marked "The Supreme Court of the United States, Northeast corner of Texas, 1928" (Shmidl, 1935, p. 118).

The geodetic line between the Texas Panhandle and Oklahoma as now marked is 4,040 ft east of the 1859-60 line at the south end and 880 ft east of this line at the north end. The strip of land between the two lines has an area of about 44.6 sq mi, which the Supreme Court decision determined to be in Texas, not in Oklahoma.

The north line of the Texas Panhandle, which is the south boundary of the "public land strip," now the Oklahoma Panhandle, was fixed by statute at latitude 36°30' N. The line was surveyed by Clark in 1860, and 17 monuments were erected.

The value of ft-per-second of arc along a meridian increases progressively northward from the equator; hence the total distance in seconds is converted into feet by increments:

Latitude	Distance (sec)		Value (ft/sec)	Distance (ft)
33	1,224.590	x	101.08	= 123,781.55720
34	3,600.000	x	101.09	= 363,924.00000
35	3,600.000	x	101.11	= 363,996.00000
36	3,594.752	x	101.13	<u>= 363,537.26976</u>
				1,215,238.82696
				= 230.16 mi

The distance along the Red River boundary between Oklahoma and Texas was determined from U.S. Geological Survey topographic maps. Using a map measurer, the boundary was measured a minimum of three times on each map; the average distance (in inches) was multiplied by 0.379 for 7.5-minute topographic maps (scale 1:24,000) and 0.986 for 15-minute topographic maps (scale 1:62,500). A total of 60 7.5-minute topographic maps and eight 15-minute topographic maps were used. The total distance was computed to be 603.79 mi.

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