Geography

OF

Oklahoma

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TABLE OF CONTENTS.

PREFACE

During the winter of 1907 and 1808 I contributed a series of articles on the Geography of Oklahoma to the Oklahoma School Herald. These articles, very slightly revised, form this volume, which is intended primarily for the use of teachers in county institutes. It is believed, however, that in lieu of more comprehensive information the data herein contained may be found useful for grade teachers in preparing lessons on local geography.

The subject matter is based on ten years' personal experience in the field in all parts of the state. Very little has been written on the geography of Oklahoma. A number of articles more or less technical in character, on various phases of the Geology of the State have been published, but few of them are available for teachers. The two following reports, however, may be obtained free by sending to the Director of the United States Geological Survey at Washington, D. C.:

Water Supply and Irrigation Paper No. 148; dealing with the Geology and Water Resources of the former Territory of Oklahoma.

Professional Paper No. 31; dealing with the Geology of the Arbuckle and Wichita Mountains.

A number of topographic maps, particularly of regions in eastern and southern Oklahoma, may be purchased at five cents per copy from the United State Geological Survey. A list will be sent on application to the Director. Teachers are advised to send twelve cents (cash or money order) to the Superintendent of Documents at Washington, for a Land Office map of Oklahoma. This map is revised up to date and gives all the new counties and county seats.

CHARLES N. GOULD.

The State University of Oklahoma, May, 1908.

Chapter I.

INTRODUCTION.

Location.—Oklahoma lies south of the center of the United States. Oklahoma City, which is not far from the geographical center of the new State, is about 200 miles south of the geographical center of the United States, and 800 miles south of the Canadian line. It is about equidistant from New York and San Francisco, being 1300 miles from each, and about 450 miles north of Galveston, the nearest point on the Gulf of Mexico.

Physiography.—Oklahoma consists of a plain, sloping gently to the east, interrupted particularly in the southern and eastern parts by occasional groups and ranges of hills or low mountains. The most prominent ranges are the Wichita, Arbuckle, Ouachita, Sans Bois and Cavinal mountains, some of which rise to the height of 2000 feet above the surrounding plain. The highest point above the sea, 4700 feet, is on the Black Mesa in the extreme northwestern part of the State. The lowest point, about 350 feet, is in the southeast corner, where Red River flows from the State. The drainage is to the southeast, and all the water flows into the Mississippi river through either the Arkansas or Red River. The Arkansas, which drains nearly three-fourths of the State, receives as its principal tributaries the Grand, Verdigris, Canadian, Cimarron and Salt Fork rivers. The Washita is the chief tributary of Red River.

Geology.—The rocks of the State range in age from the very oldest to the most recent. In the Arbuckle and Wichita mountains, there are rocks containing fossils of the first animals that ever lived. These mountains, themselves were at one time more than two miles high, but have been worn down by water, wind, frost and other agents of erosion, until only their flattened stumps remain. In northeastern Oklahoma there is a large area covered with limestone rocks. West of the limestone area are the Coal Measures, rocks consisting largely of sandstones and shales which occupy about one-third the area of the State. Then come the Redbeds, which lie upon the Coal Measures, and extend southwest to the Red River, and west across the Panhandle of Texas. The vast gypsum deposits which occur in western Oklahoma are members of the Red Beds. Upon the Redbeds there have been laid down in recent geological time, vast deposits of sand, gravel and clay, which form the sand hills north of so many of the streams, and occupy the High Plains in the ex-

treme western part of the State. Along Red River, extending from near Ardmore east to the Arkansas line, there are deposits of limestone and sand belonging to what is known as Cretaceous age.

Botany.—Oklahoma lies partly within the prairie and partly within the forest region of the continent. Of the prairie modest grasses are the dominant population, the chief species being bluestem and buffalo grass. Of the forest population, which is in general confined to the hilly country in eastern and southern parts of the State, the chief hardwood trees are oak, hickory, ash, hackberry, elm and sweetgum. Sycamore, soft maple, cottonwood, walnut and willow flourish best along the streams. On the mountains there are forests of pine and cedar. In the prairie region, which occupies the western part of the State, there are few trees, except along the streams where cottonwood, elm, hackberry, china berry and willow are the most abundant forms.

Zoology.—The State contains a very diverse fauna. The border line of forest and prairie is efficient in promoting animal migration. On the prairie the buffalo and antelope formerly grazed in immense numbers, and deer are still found in certain parts of the wooded mountains. Both the prairie and forests provide a home for many flesh eaters. Migratory wild fowls cover the streams and ponds during certain seasons of the year. Many song birds and carnivorous birds inhabit both the prairie and timbered regions. The waters of most streams abound with fish.

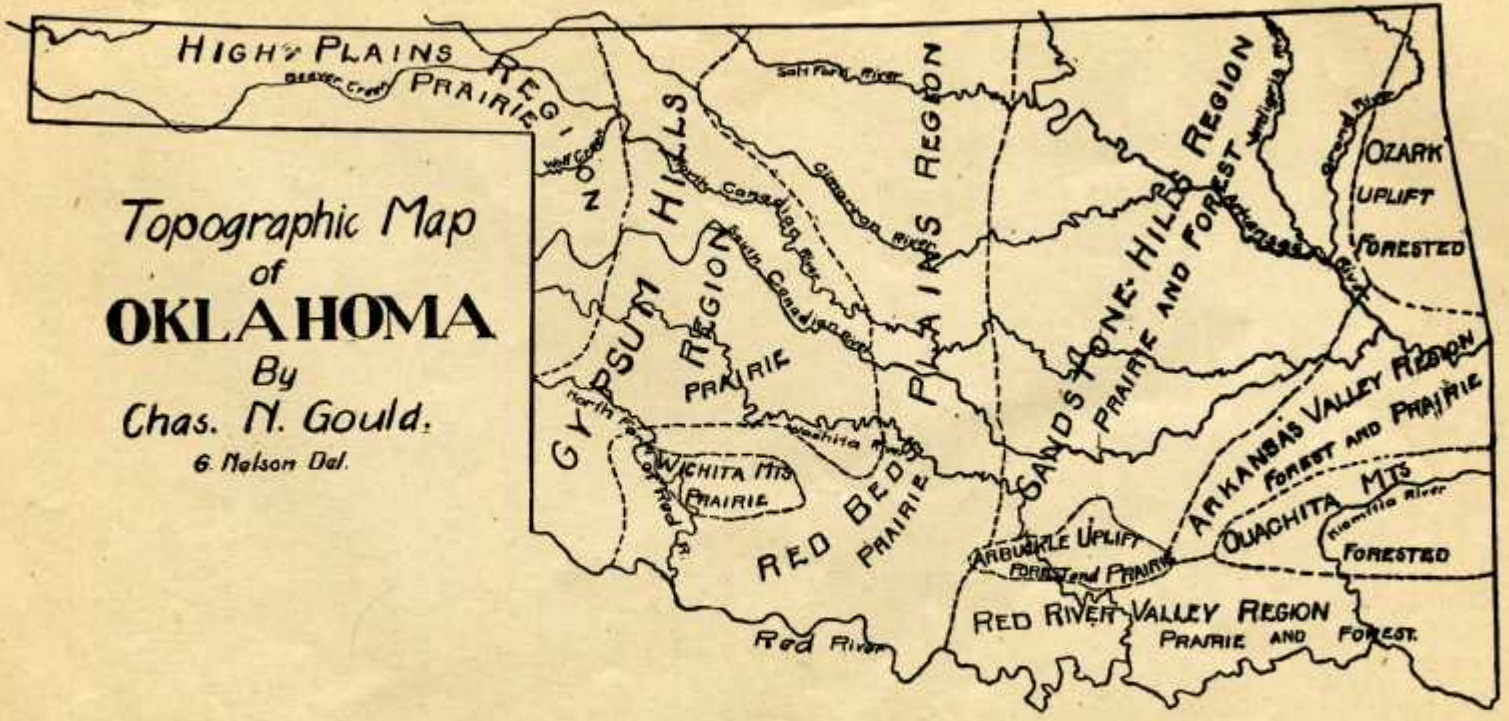
History—Oklahoma has long been the Indian's home. The land comprising the State was originally claimed by the Osage and Quapaw Indians who ceded it to the United States early in the last century. Later all of the territory, except that part in the northwest known as No Mans Land, was given to the so-called five civilized tribes, namely, the Cherokees, Creeks, Seminoles, Choctaws, and Chickasaws. These tribes had owned land in the southern states east of the Mississippi River, but on account of the encroachment of the whites were obliged to leave their homes and move west. Beginning about 1830 these nations at various times crossed the Mississippi and settled on the land they have since occupied. By the terms of the treaties these lands were given to the Indian "as long as the sun shall shine; as long as the grass shall grow; as long as the water shall run." Treaties were afterwards made with these tribes whereby they gave up the western part of their reservations to the government for the use of friendly Indians, and beginning in 1867, a number of tribes and scattered parts of tribes were brought in from different parts of the United States and settled on what is now the western half of the State of Oklahoma. Among the tribes brought in were the Pottawatomies, Iowas, Sac and Foxes, Pawnees, Kickapoos, Osages, Kaws, Poncas, Otoes, Tonkawas, Wichitas, Cheyennes, Arapahoes and Kiowas. Still later at various times the members of these different tribes took allotments of land, each Indian usually receiving 160 acres, and the remainder of the land was from time

to time opened to settlement by white people. Some years ago the government appointed a commission, usually known as the Dawes Commission, which has since been steadily at work settling up the affairs of the five civilized tribes. The land which had hitherto belonged to the tribe as a whole, has been taken as allotments by the individual members of the tribe. At the present time the tribal relations have about been broken up in nearly all the tribes in the State and the Indians are now citizens of the United States. In 1906 Congress passed an enabling act granting to the people of the new State the right to form a state government. A constitutional convention, composed of 112 delegates, met at Guthrie, a constitution was written, which was adopted by the people and state officers elected. Oklahoma has just entered into the sisterhood of states as the forty-sixth State in the Union..

Boundaries—Oklahoma is a piece of patchwork. The boundaries of the State have been determined by the boundaries of the older states which join it. The only natural boundary is on the south, Red River, which separates Oklahoma from Texas. The eastern boundary which separates the State from Missouri and Arkansas, is formed by three straight lines; one line runs south from the Arkansas River at Ft. Smith to Red River; one line runs north from the southwest corner of Missouri to the Kansas line; and the third line runs diagonally northwest and southeast from the Arkansas at Fort Smith to the southwest corner of Missouri. The northern boundary of the State is formed by the 37th parallel of latitude, which is also the south line of Kansas and Colorado. The western line of the main part of the State is 100° west longitude, and the western line of Cimarron County is 103°. The southern line of Beaver County is 36° 30′, the same as the southern line of Missouri.

Extent and Area—The greatest distance across the State from north to south, along the Missouri-Arkansas line, is about 230 miles. The greatest distance from east to west, along the north line of State is 467 miles. Of this distance 163 miles is along that part of the State formerly known as the Neutral Strip or No Mans Land and more recently as Beaver County.

Oklahoma contains about 70,430 square miles, or 45,075,200 acres of land, enough to make 281,720 farms of 160 acres each. The population, according to the census recently made by order of the president, was 1,414,177. There are 96 towns of over 1000 population each.



Topographic Map of Oklahoma.

Chapter II.

TOPOGRAPHY.

Oklahoma is an irregular block cut out of the southern part of the Great Plains. The Plains slope to the east from an altitude of 7,000 feet at the base of the Rocky Mountains to the level of the Mississippi river, an average slope of about eight feet to the mile.

The greater part of Oklahoma consists of grass-covered "rolling prairie," with occasional ranges of hills trending usually north and south. In the southern and eastern parts of the State there are a number of ranges and groups of hills, some of which rise to the dignity of mountains. These hills and mountains are usually covered with timber. Between the hills are areas of rolling and level country, sometimes timbered, sometimes prairie.

The unevenness of land surfaces is called Relief or Topography. A part of the country containing the same general forms of relief is called a Topographic Region. Oklahoma may be divided into the following ten different topographic regions:

The Ozark Uplift,
The Ouachita Mountains,
The Arbuckle Uplift,
The Wichita Mountains.
The Arkansas Valley Region,
The Red River Valley Region,
The Sandstone Hills Region,
The Redbeds Plains Region,
The Gypsum Hills Region,
The High Plains Region.

It must be understood that there is no sharp line of separation between these various regions in Oklahoma. In most instances one region grades insensibly into another so that it is often impossible to say just where one region ends and another begins. The various Topographic Regions will be discussed in detail.

The Ozark Uplift, as represented in Oklahoma, consists of the southwestern extension of the Ozark Mountains which occupy a good part of southern Missouri and northern Arkansas. In a former geological age these mountains stood much higher than now, but erosion has carried away the upper rocks until at the present time the region consists of a broad plateau, with a floor of heavy lime-

stone. This limestone, known as the Boone Chert, is the rock which contains the lead and zinc found at Joplin and in northern Arkansas. The general elevation of the plateau in Oklahoma is about 1100 feet above sea level or 600 feet above the level of the Arkansas and Grand rivers, which flow south and west of this region. Scattered hills and ridges, composed largely of sandstone and shale, rise to the height of 200 to 300 feet above the general level of the plateau. The plateau is deeply dissected by streams which flow south and west. The stream valleys are usually deep and narrow, with ledges of hard rock outcropping as terraces and escarpments. The region is in most places densely wooded and contains many strong springs of

Mountain Stream in Ozark Uplift.

pure water. The Ozark Uplift includes part or all of Ottawa, Delaware, Mayes, Cherokee, Adair and Sequoyah counties.

The Ouachita (pronounced Washita) Mountains Region extends from near Little Rock, Arkansas, westward to Atoka, Oklahoma, a distance of more than 200 miles. Only the western part of the uplift is in Oklahoma. The region includes a number of long, narrow parallel ridges, composed of shale and sandstone rocks standing on edge, separated by narrow valleys. In some cases these ridges rise to the height of 2,800 to 3,000 feet above sea level. Many of the various ridges and ranges have received distinctive names such as Winding Stair, Seven Devils, Kiamitia, Rich, Potato, Pine, Black Fork, Jack Fork, Blue Bouncer, Round and Buffalo. The Ouachitas are generally well wooded, although prairie land is found in some of the valleys. Part or all of the following counties are included in the Ouachita uplift: LeFlore, Latimer, Pittsburg, McCurtain, Pushmataha and Atoka.

The Arbuckle Uplift consists of an irregularly ovel-shaped area sixty miles long east and west, and thirty miles wide, in which

during some former geological epoch, the rocks were thrust up from below into the form of a vast dome. This dome was probably at one time more than two miles high, but nature's tools, such as water,

Washita Gorge in Arbuckle Mountains.

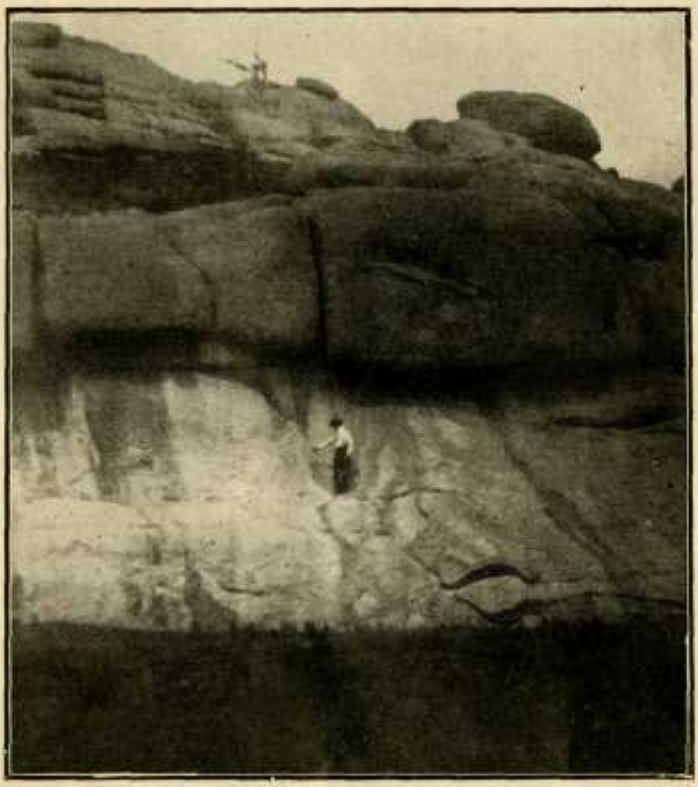
frost and wind, have worn away the rocks, until at the present time the highest peaks are not more than 700 feet above the level of the Washita River, or 1,400 feet above sea level. The greater part of the

Closer View of Washita Gorge.

rocks are hard limestone, which have been upheaved, broken, folded and twisted until now in many places the strata either stand on edge or are overturned. There is no place in the United States

where more interesting geological features may be seen in such a small area than in the Arbuckle Mountains. The slopes are largely forested, the uplands are prairie. Northern Johnston and Carter, and southern Murray counties include the greater part of the Arbuckle mountains.

The Wichita Mountains, which are located in the southwestern part of Oklahoma, consist of a large number of scattered chains, groups and peaks of igneous rock, chiefly granite and porphyry,



Massive Granite, Wichita Mountains.

standing out on a level plain. The length of the entire range is about sixty miles, and its greatest width nearly thirty miles. The region was at one time elevated to a height of two or three miles and has since been worn down by the action of the elements until now practically nothing remains but jagged granite peaks. Some of the most prominent peaks have received special names, such as Scott, Sheridan, Signal, Saddle, Tepee, Devil's Canyon, Quartz, Little Elk, Twin, Navajoe, and Headquarters. On all sides of and be-

tween these ranges and peaks of granite the rocks on the plain are composed of Redbeds shale and sandstone. The peaks are in fact only the tops of buried mountains projecting above the sea of plain. There is a little timber in the valleys and on some of the slopes in the eastern part of the range, but in general the granite peaks are barren of vegetation, while the plain is all grass-covered. Comanche, Kiowa, Jackson and Greer counties contain the Wichita Mountains.

The Arkansas Valley Region lies between the Ozark and Ouachita regions. The western limit where it merges with the Sandstone Hills Region is poorly defined. The rocks consist of massive ledges of sandstone and shale, which have been thrown up by some internal force into immense folds and afterward worn down by water, wind and frost, leaving a number of groups and ranges of high hills, some of which are more than 2,000 feet above sea level. The most prominent elevations, such as Cavinal, Sansbois, Potato, Wild Horse, Rattlesnake, Kiowa and Beaver are known locally as mountains. Between these various elevations are broad stream valleys. The region is mostly timbered, although prairie land is found in the level country. All or part of Sequoyah, LeFlore, Haskell, Muskogee, Pittsburg, McIntosh, Latimer, Atoka and Coal counties are included in the Arkansas Valley Region.

The Red River Valley Region includes that portion of Oklahoma which lies south of the Ouachita and Arbuckle mountains extending west to and grading into the Redbeds Plains south of the western end of the Arbuckles. This is the lowest Topographic Region in Oklahoma, the average elevation above the sea being not more than 600 feet. A number of streams which rise in the mountains to the north and flow south across the region have carved out broad valleys. The rocks are soft sandstones and shales, interstratified with two ledges of rather hard limestone, in which stream erosion has carved out low hills, and in places steep escarpments. The sandstone and shale exposures are usually wooded, the limestone areas are often prairie. McCurtain, Choctaw, Bryan, Pushmataha, Atoka, Johnston, Marshal, Love and Carter counties lie in the Red River Valley Region.

The Sandstone Hills Region includes the country extending west from the Ozark Uplift and the Arkansas Valley Region about as far as the main line of the Santa Fe railroad, and from the Kansas line south to the Arbuckle Mountains. Throughout this region the rocks, which consist of alternating strata of soft shales and hard sandstones, either lie level or dip slightly to the west. The slope of the country is to the east. Erosion has worn away the soft shales and left the hard sandstone standing as prominent hills, which often form continuous ridges extending in a general northeast-southwest direction for many miles. In many cases, however, isolated buttes stand out on the level plain. The steep slope of all these hills is to the east, while the western slope is long and gentle. Some prominent ranges and peaks that have received distinctive names are Concharty

Mountains, Council Hill, Bald Hills, Twin Knobs, Outlaw Mountain, Mount Inola, Catoosa Hills, Scaly Bark Mountain, Osage Knob, Chimney Hill, Shawnee Hills and Claremore Knob. In the northern part of this region there are many ledges of limestone, interstratified between the sandstone and shale, and in the extreme northwestern part occur the southern extension of the Flint Hills which enter Oklahoma from Kansas. Between the hills are many flat prairies and wooded stream valleys. The rougher parts of the region, particularly the steep slopes as well as the valleys, are forested, the intervening plains are grass covered. This region includes all or part of the following counties: Craig, Nowata, Washington, Rogers, Mayes, Wagoner, Tulsa, Muskogee, Okmulgee, MacIntosh, Pittsburg, Coal, Hughes, Pontotoc, Garvin, Seminole, Pottawatomie, McClain, Cleveland, Lincoln, Okfuskee, Creek, Payne, Logan, Noble, Osage and Kay.

The Redbeds Plains Region includes that part of Oklahoma extending west from the Sandstone Hills Region to the Gypsum Hills,

Gypsum Hills.

and from Kansas to Texas. In its southwestern part it entirely surrounds the Wichita Mountains. This region as a whole includes the most fertile area in Oklahoma. There are few prominent hills of any kind, but low bluffs occur along many of the streams. The country is a typical "gently rolling prairie," so level that one may often see twenty miles in any direction. The soil is usually red, being derived from the red clay and shale which makes up the Redbeds. North of such streams as Salt Fork, Cimarron, North and South Canadian, there are strips of country two to twenty miles

in width containing low sand hills. Except along the streams where timber is sometimes found, this region is all prairie. It includes all or part of the following counties: Kay, Grant, Alfalfa, Woods, Major, Garfield, Noble, Logan, Kingfisher, Blaine, Oklahoma, Canadian, Cleveland, McClain, Grady, Caddo, Garvin, Stevens, Jefferson, Comanche, Tillman, Kiowa, Greer and Jackson.

The Gypsum Hills Region includes the greater part of western Oklahoma. The hills are here higher and the topography more broken than in the Redbeds Plains Region. Most of the hills are formed by the unequal erosion of ledges of the soft shales and relatively hard gypsum, sandstone and dolomite. Some of the Gypsum Hills, notably those in Blaine, Major, Woods and Greer counties, consist of steep cliffs, 200 or more feet high; others, like those in Custer and

Lakes on High Plain.

Washita counties, are low rounded mounds. In a considerable part of the country included in the Gypsum Hills Region there is little gypsum and the hills are formed by soft red sandstone.. This is true of northern Caddo, Beckham and Roger Mills counties. The region is all prairie except that there is usually a belt of timber along the larger streams. The following counties are all or in part included in the Gypsum Hills Region: Woods, Harper, Ellis, Woodward, Major, Blaine, Dewey, Canadian, Caddo, Custer, Roger Mills, Beckham, Washita, Greer and Jackson.

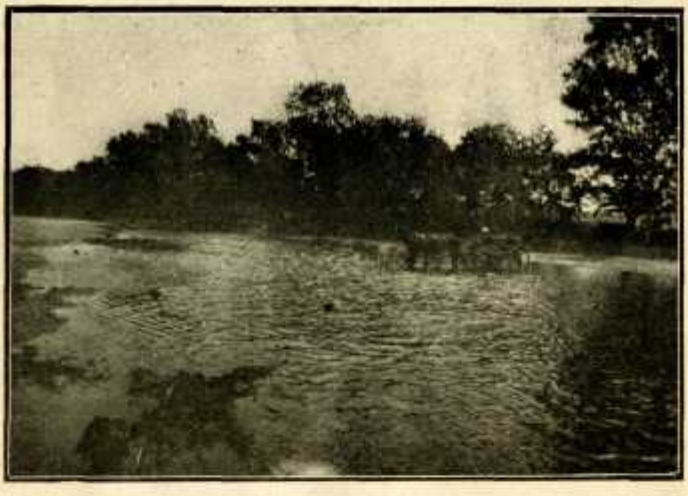
The High Plains Region includes the extreme northwestern part of Oklahoma. The surface in most places appears almost perfectly level, although in fact it slopes to the east eight or ten feet to the mile. A few streams flow east across the region and these have cut channels averaging 50 feet deep and a mile wide in the level plain. There is no timber and the greater part of the country is covered with a soft carpet of buffalo grass. Cimarron, Texas, Beaver and parts of Harper, Ellis and Roger Mills counties are included in the High Plains Region.

Drainage Map of Oklahoma.

Chapter III.

DRAINAGE.

Few states in the Union have as many large streams as has Oklahoma. Ten large rivers cross the State, all of which have broad, fertile valleys. Oklahoma has a larger proportion of fertile bottom land than any other state in the Union. The general course of practically all the larger streams is east, following the slope of the great



A Clear, Running Stream With Wooded Banks.

plains. The water of all the rivers flow into the Mississippi River through either the Arkansas or the Red River. The Arkansas River, which flows across the northeastern part of Oklahoma, drains a little more than two-thirds of the state. The principal tributaries entering the Arkansas from the north are the Grand and Verdigris rivers, and those from the south are Poteau, South Canadian, Cimarron and Salt Fork rivers. Red River, which forms the southern boundary of Oklahoma, drains less than one-third of the state. Its chief tributary is the Washita river.

None of the important rivers rise in the State. The Arkansas

and South Canadian rise among the granite peaks of the Rocky Mountains and all of the others have their head waters outside of Oklahoma, in either Texas, New Mexico, Kansas, Missouri or Arkansas. It may be seen from the map that all the rivers in western Oklahoma have long, narrow, ribbon-like drainage areas, quite different from the broadly-oval, or pear-shaped drainage basins of the streams in the eastern and southern parts of the State. Another striking difference is that, with the exception of the Washita, the western streams which flow across level prairie have broad shallow, sand-choked channels and low sand banks. The streams farther east have deep channels and steep mud or rock banks.

Timber is found along all the streams except those in the extreme western parts of the State. In eastern Oklahoma the trees

Bird Creek, Osage Nation.

are chiefly oak, hickory, sycamore, elm, hackberry, sweet gum, walnut, pecan and ash. Farther west, willow, cottonwood, elm and persimmon are most abundant. In the extreme western counties there is little timber except an occasional lone cottonwood, chinaberry or dwarf elm.

Arkansas River enters Kay County, Oklahoma, from Kansas, and flows across the State in a general southeast direction for about two hundred miles, entering the State of Arkansas at Fort Smith. Throughout its course across Colorado and Kansas, the Arkansas flows in a broad shallow valley cut into the level plain, but about the Oklahoma line it enters the Flint Hills, and for the first eighty miles of its course in this State, the stream winds through a rather deep and narrow valley among the hills, where it is characterized

by sweeping curves and bends. After leaving the Flint Hills it flows in a broad valley often bordered by steep sandstone bluffs. The channel of the Arkansas which averages nearly a quarter of a mile wide, is usually almost filled with sand. It is navigable for small craft during periods of high water as far north as the mouth of the Grand River. In addition to the six tributaries, Grand, Verdigris, Poteau, South Canadian, Cimarron and Salt Fork, which are of sufficient importance to be described in detail, the principal streams entering the Arkansas in Oklahoma are Sallisaw, Sansbois, Illinois, Snake, Polecat, Black Bear, Red Rock and Beaver.

Grand River is formed by the junction of Spring River, which drains southwestern Missouri, and Neosho River, which drains eastern Kansas. The two streams unite in northeastern Oklahoma. The Grand flows southwest along the western slope of the Ozark Uplift, in a channel characterized by broad curves, for a distance nearly one hundred miles, before emptying into the Arkansas. The valley of the Grand is one of most fertile parts of Oklahoma. The principal tributaries are Whitewater, Spavinaw, Saline and Spring creeks, from the east, and Pryor and Big Cabin from the west.

Verdigris River rises in east central Kansas and flows south, entering Oklahoma in Nowata County, and follows a general southeast course for about one hundred miles before emptying into the Arkansas near the mouth of the Grand. In its course in Oklahoma the Verdigris is characterized by a deep and rather swift channel which meanders back and forth in a broad fertile valley. Its chief tributaries are Caney or Little Verdigris, Bird, Big and Dog creeks.

Poteau River rises among the Ouachita Mountains in western Arkansas and flows northwest into Oklahoma. In this State it follows a tortuous course for about sixty miles, winding in and out among high sandstone hills, and finally emptying into the Arkansas at the point where the river flows out of the State. It alone, of all the streams of Oklahoma, flows north. The Poteau has a deep and narrow channel, but it is navigable for small boats during high water, for a distance of about forty miles. It flows across a number of veins of coal and for that reason its valley is destined to become one of the wealthiest manufacturing regions of the State. Its chief tributary creeks are Black Fork, Fourche Maline, Brazil and James Fork.

South Canadian River rises in northern New Mexico and drains an area of approximately 30,000 square miles in that Territory. It crosses the Panhandle of Texas in a valley six hundred feet deep and ten miles wide cut into the High Plains, enters western Oklahoma and flows about three hundred miles in this State emptying into the Arkansas River about forty miles from the Arkansas line. In its course across Oklahoma the width of the drainage basin does not usually exceed twenty-five miles and in many places the distance from the divide north to the divide south of the river is not more than ten miles. The channel of the river is sand-choked, and aver-

ges perhaps half a mile wide, the banks being low and sandy. Its channel is constantly shifting and ox-bow bends and cutoffs are common. This river is the most uncertain and treacherous of all Oklahoma streams, and perhaps more than any other stream on the plains is subject to sudden and rapid rises. The channel may be dry from bank to bank when suddenly without warning, a wall of foaming water several feet high, carrying all sorts of debris, will rush downward at great speed, filling the channel bank full. During this time it is impossible to ford the river. Finally the water will gradually recede, but for some time crossing will be attended with danger on account of the quicksand. The chief tributary of the South Canadian in Oklahoma is North Canadian, which in turn, receives Deep Fork. Other minor streams are Little River, Gaines, Walnut

Crossing the South Canadian Rise in Flood.

and Deer creeks. Besides these there are a great number of short tributary streams, not averaging more than ten miles in length.

North Canadian River is formed by Beaver and Wolf creeks which unite near old Fort Supply in northwestern Woodward County. Wolf Creek rises in the northern part of the Panhandle and flows northeast, while Beaver Creek takes its rise in northeastern New Mexico and flows east across Cimarron, Texas, Beaver, and Harper counties, Oklahoma, before reaching Woodward County. From the point of intersection the North Canadian flows in a general southeastern direction for a distance of approximately three hundred miles before joining the South Canadian near Eufaula; thirty miles above the point where the South Canadian flows into the Arkansas River. Throughout this entire course the width of the drainage basin of the river does not average more than fifteen miles. In several places, as for instance near Oklahoma City and El Reno,

the distance from the bed of the North Canadian across the divide to the waters of the Cimarron is not more than a mile. With the exception of Indian and Persimmon creeks in Woodward County, neither of which are more than twenty miles in length, the North Canadian has few tributaries more than ten miles long. In its upper course the channel of the North Canadian is sand-choked and the banks low, but from Oklahoma City east the stream has cut a deeper channel and the amount of sand is relatively smaller. The channel is characterized by many meanders where the stream sweeps from one side of the valley to the other.

Cimarron River rises among the volcanic peaks in northern New Mexico, and flows from that territory into the northwest corner of Cimarron County, then east for forty miles before turning north into Colorado. The river swings north in a great bend, crossing southeastern Colorado and southwestern Kansas, and again enters Oklahoma in northeastern Beaver County. It flows across the northwest corner of Harper County and again passes into Kansas. For a third time the river enters Oklahoma, and from this point flows in a general southeast direction for a distance of about two hundred and twenty-five miles until it joins the Arkansas River at the southeast corner of Pawnee County. In its upper course the Cimarron carries but little water, in fact in many places all the water in the channel sinks into the sand and flows underground for a number of miles. Throughout the greater part of its course the banks are low and sandy, and the channel is filled with sand. Like the South Canadian, the Cimarron in subject to sudden and rapid rises, which often carry destruction with them. Between Harper and Woods counties the Cimarron flows for a number of miles across the Salt Plains and from this point the water is often so salty that stock will not drink it. The largest creeks emptying into the Cimarron are, Eagle Chief, Indian, Turkey, Skeleton, Salt, Kingfisher and Cottonwood.

Salt Fork of the Arkansas River rises in southern Kansas, enters Oklahoma and flows through Woods, Alfalfa, Grant and Kay counties before emptying into the Arkansas River. The principal tributaries are Medicine, Chikaskia, Mule, Roundpond, Clay and Sand creeks. Its channel is filled with sand, the banks are low, and sudden rises are common. In eastern Alfalfa County Salt Fork flows across the edge of the Great Salt Plains and from this point to the Arkansas the water of the river is often permeated with salt.

Washita River, the largest tributary of Red River, is an anomoly among the streams of the Plains, it alone having steep, mud banks, comparatively little sand in the channel and heavy timber on the bottomland. The peculiarities are accounted for by the fact that the Washita alone of all the rivers in the State flows for practically its entire course through Redbeds rocks. Its channel is very crooked. In Murray County the river flows in a deep gorge, which it has cut in the limestone rocks of the Arbuckle Mountains. Its principal tributaries are Barnitz, Rainey Mountain, Cobb, Little Washita,

Rush, Wild Horse, Caddo, Mill and Pennington creeks.

Red River, which forms the southern boundary of Oklahoma, resembles the South Canadian or Cimarron in having a sandy channel, an intermittent flow, and frequent sudden and rapid rises. In its course along our southern boundary the river flows in a wide fertile valley cut into the plains, bounded by bluffs and hills. The name of the river refers to the color of the water, and red color is derived from the Redbeds, across which the river runs. Red River rises on the High Plains in the western part of the Panhandle of Texas and for part of its course it flows for nearly a hundred miles in a deep canyon, known as Palo Duro Canyon, which is in places a thousand feet deep.

There are in southern Oklahoma a number of streams of considerable size tributary to the Red River. Little River, Mountain Fork and Kiamichi River in the southeastern part of the State rises among the high sandstone hills of the Ouachita Mountains and follow a tortuous course first southwest, then south, and finally turn southeast before entering Red River. Boggy Creek rises in the flat sandstone hills region northeast of the Arbuckle Uplift, and drains parts of Pittsburg, Hughes, Pontotoc, Coal, Atoka, Bryan and Choctaw counties. Blue River drains the eastern part of the Arbuckle Mountain Uplift. Both these streams flow southeast. Mud and Beaver creeks drain the level country between the Arbuckle and Wichita Mountains. Cache Creek and its tributaries drain the region around the eastern and southern part of the Wichita Mountains. North Fork of the Red River is a stream of considerable size which heads on the High Plains and flows east into Oklahoma, then southeast and south before joining Red River. Its principal tributaries are Elm Fork, Elk Creek and Otter Creek. Salt Fork of Red River drains the region between North Fork and South Fork. All of these streams last named above have low, sandy banks and channels filled with sand.

Geological Map of Oklahoma.

Chapter IV.

GEOLOGY.

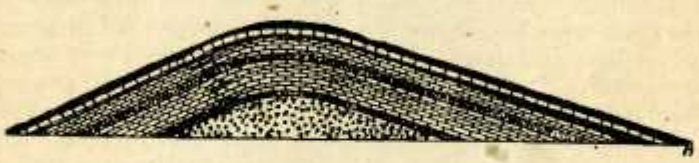
There are very few states that contain rocks of as many geological ages as does Oklahoma. The oldest rocks are in the Arbuckle and Wichita Mountains in the southern part of the State. These are the igneous or fire-formed rocks, chiefly granite and porphyry, which make up such peaks as Scott, Sheridan, Baker and Headquarters mountains in the Wichitas, and East Timbered Hills and the granite hills north of Tishomingo in the Arbuckles. With these exceptions all the rocks in the State are sedimentary rocks, that is, they were deposited as sediments under water. These sedimentary or stratified rocks are chiefly level-lying beds of shale, sandstone and limestone.

In order to understand the story told in the rocks of Oklahoma, we must go very far back in the geological history, back to Cambrian times, or the times of the very first stratified rocks. At that time all the country now occupied by Oklahoma was an open sea, in which were laid down deposits, sometimes of sand, sometimes of mud, and sometimes of shells or remains of sea animals. These various deposits afterward hardened, forming rocks. The sand grains were cemented to make sandstone, the mud hardened and became shale or clay, and the shells were solidified into limestone. These processes of deposition and rock making went on for a very long time, throughout many geological ages, including the Ordovician, Silurian, Devonian, and part of the Carboniferous periods. Then there came a time when, by some great internal force, certain parts of the region were elevated above the ocean in the form of great uplifts or domes. There are four of these uplifts located all or part in Oklahoma, known as the Ozark, Ouachita, Arbuckle and Wichita mountains.

There are a great many places in Oklahoma where the rocks of these mountains may be studied, but one of the best localities, and the one most easily reached by many people in the State is that part of the Arbuckle Mountains along the Washita River between Davis and Ardmore. At this place one may find many fossils, mostly shells, trilobites and corals, the remains of animals which were buried in the mud of long-gone prehistoric seas. One may also see some very fine examples of folding and faulting, showing the

effects of the terrific strains to which the rocks have been subjected. There are a number of waterfalls, the most noted of which are Turner's and Price's Falls, besides the Washita George, the "Burning Mountain," and other places of interest. The geological structure of the mountains is shown in the figures.

The first figure represents a section across the Arbuckle mountains after the rocks had been deposited and the dome had been elevated above the ocean, but before it had been eroded. At that time the Arbuckle Mountains stood up as a great oval dome, sixty miles long, twenty miles wide and two miles high above the surrounding plains. As soon as it was raised out of the water, the



Section Across Arbuckle Mountains Before Erosion.

agents of erosion; rain, running water, wind, frost, etc., began to cut away the rocks and to wash them down into the seas. This process continued for a long period of time. In fact it is still in operation. The higher rocks which formed the top of the dome have all been worn away exposing the rocks beneath, until at the present time nothing remains but the eroded stump of the old mountain, as shown in the second figure. In passing from the Washita River toward the granite peak, known as the East Timbered Hills, which

Eroded Stump of the Old Mountain.

forms the core of the mountains, one walks over the upturned edges of more than two miles of stratified rocks, limestones, shales and sandstones. In ascending 700 feet in altitude one descends more than 10,000 feet geologically.

The general structure of the rocks in the other three mountain regions of Oklahoma is similar to that in the Arbuckles. Each group of mountains consists of an uplifted dome which has been eroded, exposing the edges of stratified rocks. There is, however, this difference. In the Wichita Mountains erosion has gone much farther than in the Arbuckles, and nearly all the sedimentaries have been carried away, so that the mountains are now composed largely

of jagged peaks and ranges of granite and porphyry. In the Ouachita and Ozark Uplifts, on the other hand, there has not been so much erosion as in the Arbuckles and the Wichitas and the granite has not been exposed. In the Ouachita Mountains, in the southeastern part of the State the rocks are chiefly ledges of sandstone and shale standing on edge. In the Ozark Uplifts in northeastern Oklahoma the principal formation is a ledge of limestone 300 feet thick known as the Boone Chert, which lies level or dips slightly to the west.

Surrounding these four uplifted domes on all sides are rocks which were deposited in the seas that were in existence at the time when the domes were uplifted. The rocks of the greater part of eastern Oklahoma, which are of Carboniferous or Coal Measures age, consist of beds of shale and sandstone, lying one above another in regular order. These rocks contain most of the coal, oil, and gas found in Oklahoma. In the northern part of the State there are a number of ledges of limestone which form high hills, the southern extension of the Flint Hills of Kansas. Fossil shells and trunks of coal plants are found in the Carboniferous rocks. In the region south of the Arkansas and Canadian rivers the Carboniferous rocks have been folded into long anticlines and synclines, while north of the Canadian River the beds lie nearly level or dip slightly to the west. The average dip of the rocks throughout a good part of eastern Oklahoma is 50 to 100 feet to the mile.

About the western line of the old Creek Nation the character of the rocks changes, the shales become red, and the sandstone members are thin and unimportant. From this point west to the Panhandle of Texas the rocks are largely typical Redbeds, consisting of a great mass of shales and clays of unknown thickness, brick red in color, and containing an occasional ledge of sandstone, gypsum or dolomite. The ledges of gypsum that make up the Gypsum Hills of western Oklahoma are but members of the Redbeds. The Redbeds contain few fossils of any kind.

After the Carboniferous deposits and Red Beds had been laid down, the land was again raised to practically its present level and has never again been submerged. At the same time the Rocky Mountains were elevated. During the next geological age, the Tertiary, the climate was very moist and the Rocky Mountains were washed down rapidly and the ground-up particles consisting of sand, clay and pebbles, were carried by streams out onto the plains and there deposited. These Tertiary formations now cover all the High Plains east of the Rockies, extending from Canada to the Rio Grande, including western Oklahoma. The flat upland which makes up much of Cimarron, Texas, Beaver, Ellis, Harper, and Roger Mills counties belong to this age. It is believed that the sand which makes up the strips of sandhills north of such streams as the Canadian, Cimarron, and Salt Fork, was derived from the Tertiary deposits also. Bones

of such animals as the rhinoceros, tiger, camel, and the three-toed horse are found in the Tertiary rocks.

The Tertiary deposits of the High Plains are the youngest rocks in Oklahoma except the alluvium bottom deposits found along the streams. Part of this alluvium was laid down during the Quarternary age, but it is also being deposited today. Bones of the mastodon, mammoth and the prehistoric buffalo are found in these alluvial deposits.

A Herd of Oklahoma Pure Bloods.

Chapter V.

RESOURCES AND INDUSTRIES.

Oklahoma has a greater variety of natural resources, agricultural and mineral, than any state in the Union. At the present time not more than one-third of the agricultural resources of the State have been developed. A great part of the most fertile land in the State has not yet been put into cultivation. The mineral resources of the State which are very great are practically undeveloped.

Agricultural Resources.—The State has a number of soil areas which in a general way correspond with the topographic regions outlined in Chapter II. With the exception of the rougher parts of the four mountain regions, and certain localities among the Sandstone and Gypsum Hills, there is very little of Oklahoma that may not be successfully cultivated. On account of the large number of streams which cross the State Oklahoma contains a larger proportion of rich alluvial soil than almost any other state. Part of the upland soil is a limestone soil, part is a clay soil, and part is sandy. The greater part of the limestone soil is found in the Flint Hills, Ozark Mountains and Cretaceous regions in the northeastern and southern part of the State. Clay soils and sandy soils are widely distributed in well-defined belts or zones. The soil of the Redbeds region in west central Oklahoma is largely a red clay soil and is fertile. Clay soil is also found in the region of the Carboniferous rocks in the eastern part of the State.

The great variety of soil combined with an equable climate gives rise to a great variety of productive crops. As the condition of soil, underground water, and climate vary from place to place, the forms of agriculture vary also. The positions of the crop belts in Oklahoma are determined largely by the three sets of factors; namely, amount of rainfall, temperature and character of soil.

Oklahoma ranks high in the production of live stock, especially cattle, hogs, horses and mules. For many years, Oklahoma and Indian Territory constituted the stockman's paradise. Nowhere else on the continent could be found more nutritious grasses and abundant water. Hundreds of thousands of long-horned cattle roamed at will over the broad prairies. As the adjoining states, Kansas and Texas, were settled the range became more restricted. As Okla-

homa was from time to time opened to settlement the cowman retreated from the advance of civilization. His last stand was in "No Mans Land," the Osage Nation, and the "Big Pasture" in Comanche County. But even these regions are now being allotted or settled and the reign of the cattleman in Oklahoma is at an end.

As the country has been settled and the amount of free range decreased, the grade of cattle has been constantly improved. The long horn has disappeared forever. High-grade dairy and beef cattle are now raised on practically every farm in Oklahoma and it is altogether probable that the total number is greater than during the period of free range.

Horses and mules are also raised in all parts of Oklahoma. During the period of free range the only horses in demand were

Oklahoma Porkers.

saddle horses known as "cow ponies." With the coming of the settler, however, the grade of horses has improved until at the present time the farm horses and roadsters bred in Oklahoma will compare favorably with those of any of the older states.

Formerly hogs were raised only in the corn belt, but with the introduction of the growth of alfalfa hogs are being successfully raised in practically all parts of the State. Sheep are raised in certain localities and wool is becoming an important source of income.

Usually the cattle and hogs raised in Oklahoma are shipped out of the State for slaughter, the greater part going to the stockyards at Fort Worth and Kansas City. Many of the products such as salt and canned meats, soap and lard come back to the State and are used on the farms and ranches where the animals were grown.

Dairying is rapidly becoming an important industry. The in-

troduction of hand separators has made it possible to put the milk into marketable condition. Cream is separated on the farms and hauled in cans to shipping stations from whence it is taken regularly to centrally-located creameries. The cheap feed, pure water, and good roads of Oklahoma all combine to make dairying an important industry. The industry is further promoted by instruction in the Agricultural College. The dairy herds are being improved and a number of large dairy farms are scattered throughout the State. The dairy production of Oklahoma is $2,750,000 a year.

Poultry raising is carried on in all parts of the State. There is an abundance of natural food, and the climate and pure water insure the health of fowls and their rapid growth at small expense. Chickens are raised on practically all farms and turkeys, ducks and geese are found in many communities, particularly in the eastern part of the State. Poultry and eggs form an important part of our food, and are shipped in large quantities to other states. The value of the poultry and eggs produced in Oklahoma each year is $3,500,000.

Corn, wheat and oats are the most important grain crops raised in Oklahoma. Corn has the widest range, being produced abundantly in all sections of the State except on the High Plains in the extreme western part. In many of the central and northern counties corn is the great staple crop. On account of the length of the season a corn crop is often raised on land from which a wheat crop has been harvested. Much of the corn is fed to stock on the farm on which it is raised, although many hundreds of thousands of bushels are each year shipped to outside markets. In 1906 134,230,590 bushels of corn, valued at $65,000,000 were raised in Oklahoma

Wheat is raised chiefly in northern Oklahoma. In such counties as Kay, Grant, Garfield, Kingfisher, Woods, Blaine it is the leading crop. Even in the three western counties, which are located on the High Plains, certain varieties of wheat are raised, at a profit. About one-third of the wheat raised is ground into flour in Oklahoma mills. Much of the flour and part of the wheat are exported to the eastern states or to Europe. The wheat crop of 1906 was 21,554,000 bushels, valued at $13,000,000.

Oats are raised chiefly in the central and northern Oklahoma; 19,500,000 bushels of oats, valued at $5,700,000 were raised in Oklahoma in 1906. The greater part of the crop is fed to live stock. Kaffir corn, milo maize, millet, barley, and sorghum, are raised in many parts of the State, particularly in the western counties. These crops are used both for forage and grain. On the High Plains Kaffir corn and milo maize produce as many bushels of grain per acre as do the more common grain crops in a region of greater rainfall.

Cotton, which is one of the most important crops raised in Oklahoma, is cultivated most extensively in the southern part of the State, chiefly in the counties south of the Arkansas and Cimar-

ron rivers. Oklahoma cotton is noted the world over for its long staple and superior quality, and for that reason is in great demand. Cotton always commands a ready sale, and so can be depended upon as a money-making crop. All the cotton raised in the State is exported, the greater part of it going by way of Galveston to European ports or to eastern states. During the past few years much cotton has been exported to the Orient, especially to Japan. In 1906 Oklahoma produced 918,000 bales of cotton valued at $18,500,000, and the value of the cotton seed products was $6,012,000.

Alfalfa, our greatest hay and forage crop, is grown in every county in the State, and each year witnesses a largely increased acreage. From three to five cuttings are produced each year, de-

Kaffir Corn.

pending upon the location and length of the season. Alfalfa does best on bottom land or under irrigation, but it is grown on the upland also. The value of the alfalfa crop is more than one million dollars a year. Bermuda grass is also a valuable forage crop.

Prairie grass was formerly cut for hay in all parts of the State. With more extensive farming in the older counties the greater part of the land once covered with prairie sod has been placed under cultivation, and alfalfa is now grown. In many parts of Oklahoma, however, much prairie hay is still cut, particularly in Craig, Nowata, Rogers, Mayes, Wagoner, Muskogee, Comanche and Tillman counties. The hay is usually baled in the field the same day it is cut, and is stored in hay barns until it is shipped, the greater part of it going to Kansas City, St. Louis, Memphis and New Orleans markets. The hay crop sells for more than $3,000,000 a year.

Fruit raising is destined to become one of the most important industries in Oklahoma. Both soil and climate are particularly adapted to the culture of a very large variety of fruits. Such fruits as blackberries, raspberries, strawberries, grapes, and several species of plums grow wild in many parts of the State. The cultivated varieties of apricots, grapes, cherries, pears, plums, quinces, and several kinds of berries thrive well. The staple fruits are peaches and apples, both of which grow to larger size and possess more excellent flavor than in adjoining states. Extensive orchards are found in many parts of the State, particularly in Cleveland, Oklahoma, Logan, Lincoln and Pottawatomie counties. The income from the orchards of Oklahoma is more than $2,000,000 a year.

Potatoes are grown for home use in every county and as a farm crop in a number of localities. Many farmers have made small fortunes raising potatoes, particularly in the region along the North Canadian River between Oklahoma City and Shawnee. Two crops are raised each year. The first crop, which is harvested in June, is shipped to northern markets. The second crop is harvested in October, and is disposed of largely to local dealers. The value of the potato crop is $1,500,000 annually. Sweet potatoes are extensively grown in many counties, particularly in the warm sandy loam of Canadian and Oklahoma counties. Hundreds of car loads of sweet potatoes are shipped each year to northern and eastern markets.

Vegetable gardening is carried on quite extensively near several of the larger cities. In a number of localities sweet corn, tomatoes and peas are raised for canning purposes. Onions are extensively cultivated in Grant County. The soil and climate of Oklahoma are well adapted to truck farming, and only the absence of a home market prevents the development of a considerable industry.

There are several crops of minor importance which may be mentioned. Broom corn is extensively raised in a number of western counties. Castor beans are also an important source of income in some localities. Water melons are raised chiefly in the sand-hill regions and hundreds of car loads of melons are each year shipped to the northern markets. Cantaloups are becoming an important crop in many places. Pecans and other nuts are gathered and shipped from a number of towns in southern Oklahoma. Peanuts are cultivated in many places. Flax is not an important crop, but has been successfully raised in many counties. Tobacco grows well in the eastern part of the State.

The great need of the Oklahoma farmer is a home market. With a soil and climate capable of producing a very large number of salable crops he is compelled to raise only those products that can be shipped outside the State. As soon as the mineral resources of the State are developed factories and plants will be established, mines and quarries opened, and the army of workmen necessary to operate these industries will create a home market for a great variety of farm products.

Chapter VI.

RESOURCES AND INDUSTRIES (Continued.)

Mineral Resources. Very few states have as many kinds of mineral or as much mineral of a kind as has Oklahoma. The new State has practically inexhaustible quantities of nine valuable mineral products, besides considerable quantities of a number of others. These nine minerals are coal, oil, gas, asphalt, gypsum, salt, clay of all kinds, stone of all kinds, and sand. In addition to these, Oklahoma has considerable amounts of lead, zinc and iron; also some copper and a little gold and silver. There are also known deposits of such substances as tripoli, phosphate, volcanic ash, novaculite and the radium earths and it is very probable that in time a number of other minerals not now known will be discovered.

The minerals which are always of the greatest importance in the upbuilding of any region are the fuels, coal, oil and gas, for unless water power is present in large amounts fuel is absolutely necessary in the development of manufacturing industries. Fortunately in addition to water power Oklahoma has very large deposits of the various fuels.

The total amount of coal in the new State can as yet be only estimated. According to the estimates of the United States Geological Survey, there are in the Choctaw Nation 2,945,138,000 tons of coal which has been seggregated or set apart for the benefit of the Choctaw and Chickasaw Indians. This is probably not more than half the total amount of coal in the State, for there are vast deposits in the Creek, Cherokee and Choctaw Nations that have not been seggregated. The total amount is probably not far from 6,000,000,000 tons. More than 100 coal mines, large and small, are now being operated, and the amount of coal mined is over 3,000,000 tons a year. The principal mines are located at or near McAlester, Krebs, Hartshorne, Haileyville, Alderson, Coalgate, Lehigh, Edwards, Savanna, Blocker, Henryetta, Schulter, Broken Arrow, Dawson and Collinsville. The coal is chiefly a high grade bituminous coal, and the output of the Oklahoma mines supplies a large part of the southern Great Plains with fuel.

Only a small part of the Oklahoma oil and gas fields has yet been developed. Oklahoma produced nearly 50,000,000 barrels of oil in 1907. By far the greater part of the oil and gas so far found occurs in three general areas. The eastermost of the three areas, known as the Coody's Bluff-Alluwe field, lies along the Verdigris River in the eastern part of Nowata County. The oil is here

found at a depth of 500 to 600 feet below the surface and the field is known as the "shallow field." The second line of development is near the 96th meridian in Osage, Washington and Tulsa counties, extending from the Kansas line south for a distance of more than 75 miles. Along this line occur the oil fields at Copan, Dewey, Bartlesville, Ramona, Skiatook, Tulsa and Red Fork. At the southern end of the region lies the famous Glenn Pool, from which 20,000,000 barrels of oil have been produced in less than two years. The oil in this region is found at depths of from 1200 to 1700 feet. The third important oil producing region is at Cleveland, Pawnee County, where oil comes from a depth of 1700 feet. Besides these three there are a number of scattered fields, some of which show great promise of future development. The most important of these are near Muskogee, Coweta, Morris and Wewoka. Small quantities of oil and gas have also been found at Wheeler, south of the Arbuckle Mountains, and at Lawton, and Gotebo, near the Wichita Mountains.

The amount of gas in Oklahoma is very great. Hundreds of wells flowing anywhere from 1,000,000 to 10,000,000 cubic feet a day have been shut in, and many wells are reported to flow 40,000,000 to 60,000,000 cubic feet daily. Large areas of known productive territory have not yet been drilled because there is no market for the fuel. Natural gas is now being used in Oklahoma City, Muskogee, Ardmore, Tulsa, Bartlesville, Pawhuska and a number of other towns in the State. The abundance and cheapness of the gas is attracting manufacturing plants from other states, and before many years the gas and oil region will become the wealthiest part of Oklahoma.

The deposits of asphalt in Oklahoma are, so far as known, the most extensive in the United States. Asphalt is found in many parts of the new State, but chiefly in Murray and Carter counties, south of the Arbuckle Mountains. It occurs along fault lines or fissures, which extend from the surface to an unknown depth. The rocks along either side of the fissure for a distance of 10 to 50 feet are permeated with a semi-liquid asphalt. Hundreds of outcrops have already been found and new veins are constantly being brought to light, so that no one can say how much asphalt will eventually be found. The asphalt is used chiefly for street paving and roofing. The streets and country roads for a good part of the state will soon be paved with Oklahoma asphalt.

There are in western Oklahoma seven regions of salt springs, from which flow salt water so strong that 100 parts of brine will make 40 parts of salt. The springs occur in Woods, Woodward, Alfalfa, Blaine, Beckham and Greer counties. It has been estimated that the water flowing from these springs is sufficient to manufacture 100 car loads of salt per day. At the present time none of this salt water is being utilized and all the salt used in Oklahoma is shipped from Kansas and Michigan.

Gypsum is found in nearly every county in western Oklahoma. Three lines of gypsum hills cross the state. It has been estimated

that the amount of gypsum in the state is at least 123,000,000,000 tons. This is enough to keep 100 plaster mills, each manufacturing 100 tons a day, busy for 34,000 years. There are eight gypsum plaster mills in Oklahoma at the present time, but a good part of the wall plaster used in the State comes from Texas.

Building stone of almost all kinds is found in great quantities in Oklahoma. Granite of very fine quality occurs in vast quantities in the Wichita and Arbuckle mountains. It is being quarried at Granite and Tishomingo. Gabbro, a fine, black, ornamental stone, is found in the Wichita Mountains, and is being quarried at Cold Springs. Porphyry occurs in the Wichita and Arbeukle Mountains. Limestone suitable for building stone or for burning into lime occurs in six widely separated parts of Oklahoma. Marble which is found in several places, is used in the construction of some of the finest buildings in the State. Sandstone is present in every county, and near practically every town; it is used locally in the construction of residences and business blocks. At the present time comparatively little of the Oklahoma stone is being utilized and a considerable part of the building stone used in the construction of buildings comes from Kansas, Missouri and even from Indiana.

Clay of various kinds is present in many parts of Oklahoma. Throughout the western part of the State there is a large amount of red clay shale, which is utilized for making pressed brick. In many places in eastern Oklahoma there is a clay suitable for the manufacture of drain tile, terra-cotta, stoneware, hollowware, and other products. Large deposits of fire clay occur in the coal regions, and good kaolin or fine pottery clay is reported from the Wichita Mountains. Shale from various regions where limestone is abundant is suitable for the manufacture of Portland cement. The abundance and variety of these clay products, and the immense amounts of coal and gas, render it very probable that within a few years a number of clay products plants will be in operation in Oklahoma.

There is no part of Oklahoma where sand does not occur. Building sand is everywhere sufficient for local demands. In several places, particularly in the Arbuckle Mountains, large deposits of a very fine grade of glass sand have been found. In some cases this sand is near veins of coal or natural gas. The glass factories in southern Kansas and northern Oklahoma haul their glass sand from Illinois and Iowa, because it is cheaper to transport the sand to the fuel than to bring the fuel to the sand. As soon as the Oklahoma glass sand deposits have been developed, another valuable industry will be added to the State.

The amount of lead and zinc in Oklahoma is not known, for very little has been devoloped, but it is possible that the amount of these minerals in this state is nearly as great as in Missouri or Arkansas. The greater part of the country east of the Grand River and north of Tahlequah, including Ottawa, Delaware and parts of Adair and Cherokee counties, is known to contain lead and zinc.

These minerals are also reported from the Arbuckle Mountains.

Iron has been found in small quantities in several places. A high grade manganese iron ore has been discovered in the Arbuckle Mountains and deposits of hematite and siderite iron ores are reported near McAlester. Copper occurs widely scattered in Oklahoma, but in small amounts. Traces of gold and silver occur in the Wichita and Arbuckle mountains, but there is little reason for believing that either of these minerals will ever be found in large quantities. Novaculite, or razor-hone rock, occurs in the Ouachita Mountains. Tripoli is found near the Missouri line. Volcanic ash is reported from western Oklahoma. Deposits of phosphate are reported from several regions.

Manufacturing Industries.—The manufacturing industries of Oklahoma are yet in their infancy. Few states have either as much raw material or as much fuel for its manufacture, but the people of the State are importing practically all the manufactured articles they use. The total capital employed in manufacturing in 1906 was $16,,124,417; number of wage earners, 5,456; wages paid $2,799,402; value of products, $24,459,107.

Pressed brick is being made at a number of the larger cities, particularly at Oklahoma City, McAlester, Cleveland, Tulsa, Sapulpa, Bartlesville, Enid and Ardmore. Small plants for the manufacture of common brick are located at a number of towns.

Gypsum plaster mills have been erected at or near Okarche, Alva, Watonga, Ferguson, Southard, McAlester, Marlow and Cement. During 1907, 384,200 tons of plaster worth $4,610,400 was manufactured. The chief difficulty in the way of profitable manufacture of gypsum plaster in Oklahoma is the fact that fuel must be hauled for a considerable distance.

Portland cement plants have been located at Dewey and Ada, and others are in contemplation at Nowata, Bartlesville, Tulsa and McAlester. There is plenty of lime, clay and fuel for the manufacture of Portland cement in many parts of the state, but few of these resources have been utilized.

There are seventy-six flouring mills in Oklahoma, having a total daily capacity of 15,000 barrels of flour and perhaps one-third of the wheat raised is ground into flour in Oklahoma. A pottery plant has been built at El Reno. Several glass plants are being erected in the gas region. Several iron foundries, machine shops, planing mills, sash and door factories and similar industries are located at the various larger cities. There are a number of stone crushers in the state where limestone is crushed for railroad ballast and concrete.

Oklahoma is destined to become one of the wealthiest states in the Union. The great variety and vast amount of the mineral products, and the unsurpassed agricultural resources, taken with the healthful climate will combine to make Oklahoma a very prosperous state. The thing most needed now is the development of the natural resources.

Location of Indian Tribes in Oklahoma.

Chapter VII.

LOCATION OF INDIAN TRIBES IN OKLAHOMA.

By the provisions of the Louisiana purchase of 1893, all of Oklahoma, except No Man's Land, came into the possession of the United States. The Osage Indians claimed all the land north of the South Canadian River, and the Quapaws all the land south of that stream. In 1817 both these tribes ceded their land to the United States.

At this time there were living in the eastern part of the United States several Indian tribes—among others the Cherokees, Creeks, Seminoles, Choctaws and Chickasaws. The Cherokees lived in the country covered by the corners of the states North Carolina, South Carolina, Georgia, Alabama, Tennessee and Virginia. The Creeks, who knew themselves as the Muskogees, lived in western Georgia and Alabama. The Seminoles, a branch of the Muskogees, lived in southern Georgia and Florida. The Choctaws and Chickasaws lived in western Alabama and Mississippi.

Before the year 1820 the Cherokees had sold part of their land in North Carolina to the general government and received a cession of land north of the Arkansas River in what is now northeastern Oklahoma. In 1828 the boundaries of the Cherokee Nation were defined as follows: Starting at Ft. Smith, Arkansas, the line ran up the Arkansas and South Canadian rivers to the mouth of the North Canadian, then northeast to the Grand River, then north twenty-five miles, thence straight west to the Texas line.

In 1820 the Choctaw Indians ceded to the government certain lands in Mississippi and received in lieu thereof lands in the Indian Territory, lying between the Canadian and Red rivers, and in 1832 the Chickasaws, a band to the Choctaws, came west and settled on the same land.

In 1825 the Creek Indians ceded to the United States their lands in Georgia and received, acre for acre, land lying north of South Canadian River extending north to the Cherokee possessions. In 1833 the Seminoles received a grant of land along the southern part of the Creek country, including everything between the North and South Canadian rivers, extending from a point near where Shawnee is now located, westward to the Texas line.

At the opening of the Civil war, the five civilized tribes—the Cherokees, Creeks, Seminoles, Choctaws and Chickasaws—owned all that is now Oklahoma, except No Man's Land and Greer county.

Texas claimed Greer county. After the war, in 1866, all the tribes, except the Cherokees, were forced to give up to the general government part of their territory. The Seminoles ceded to the United States all their land between the North and South Canadian rivers, and bought from the Creeks 200,000 acres of land lying just east of their former possession. At the same time the Creeks ceded all the western part of their lands to the United States. The Choctaws and Chickasaws gave up their land west of the 98th meridian. The Cherokees divided their lands along the 96th meridian and authorized the United States government to settle friendly Indians in the northeast part of their land lying east of the Neosho river and in the Cherokee Outlet.

It was about this time that the government began to pursue the policy of bringing scattered tribes or remnants of tribes from other parts of the country and settling them on this land, which had been given up by the Five Civilized Tribes.

In 1867 the Sac and Fox Indians ceded their lands in Wisconsin to the United States government and received 750,000 acres of land between the Cimarron and North Canadian rivers. The same year several bands and remnants of tribes settled in the northeast corner of the Indian Territory. Among these were the Wyandottes, Quapaws, Miamis, Senecas and Peorias. The Pottawatomies came from Indiana and Michigan the same year and received land between the two Canadian rivers, extending west from the Seminole country to the Indian meridian. The Kiowas and Comanches, two tribes of "Wild Indians of the Plains," were the same year assigned a reservation between the Washita and Red rivers extending west from the Chickasaw country to the North Fork of Red River.

In 1869 the Cheyennes and Arapahoes, also Plains Indians, were given lands between the 98th and 100th meridians, extending from the Washita River north to the Cherokee Strip.

In 1872, the Osages sold their land in Kansas and bought of the Cherokees a tract bounded by the 96th meridian, the Kansas line, the Arkansas River and the Creek country. They, in turn, sold to the Kaw Indians, who came from eastern Kansas, the western part of their country, including that part of Kay County which lies east of the Arkansas river. The same year the Wichitas and Caddos ceded lands which they owned in Texas and Louisiana to the government and received a tract between the Washita and South Canadian rivers extending from the 98th meridian to a line 38 miles west.

The Pawnees in 1875 sold their land in Nebraska and received twelve townships lying between the Arkansas and Cimarron rivers in what is now Pawnee County. In 1881, the Otoes, Missouris and Ponca Indians came from Nebraska and settled on reservations in what is now eastern Kay and Noble counties.

In 1883, the Iowas from Iowa and the Kickapoos from Mexico, received tracts of land in what is now Lincoln County, the former settling north of Deep Fork, the latter south.

The Apache Indians, who were once the terror of Arizona under Geronimo, are now held at Fort Sill Military Reservation in Comanche County, where they have been for sixteen years under military supervision and direction. There are about 260 Apaches in this group.

There still remained a tract of land, known as old Oklahoma, extending from the Indian meridian to the 98th meridian, and from the South Canadian to the Cherokee Strip, which had not been assigned to any Indian tribe. This was opened to settlement April 22, 1889. The next year the Neutral Strip, or No Man's Land, was added to the Territory of Oklahoma.

September 22, 1891, the Sac and Fox, Iowa and Pottawatomie reservations were opened to settlement; April 19, 1892, the Cheyenne and Arapahoe country weas opened; September 16, 1903, the Cherokee Strip came in; and May 23, 1895, the Kickapoo lands were settled.

By a decision of the Supreme Court of the United States, the country lying between the South Fork and North Fork of Red River east of the 100th meridian, comprising Greer county, which had been claimed by Texas, was made part of Oklahoma.

August 5, 1901, the Kiowa and Comanche, and the Wichita reservations, were opened to settlement. At the present time only the Osages and Kaws have not yet taken all their allotments.

For a number of years a commission known as the Commission to the Five Civilized Tribes, or more popularly the Dawes Commission, has been at work settling up the affairs of the Five Civilized Tribes, namely, the Cherokees, Creeks, Seminoles, Choctaws and Chickasaws, which occupied Indian Territory. The various members of the different tribes have received allotments of land and the tribal relations have in general been dissolved. An enabling act was passed by Congress, a constitutional convention was held, a constitution was written which was adopted by the people, and, November 16, 1907, the State of Oklahoma was admitted as the 46th state of the Union.

Chapter VIII.

CITIES AND COUNTIES.

The report of the government census taken in September, 1907, showed that Oklahoma had at that time a total population of 1,414,177. Ninety-five cities have a population exceeding 1000, of which 44 have more than 2000, and 5 more than 10,000 population. The more important cities in the state will be discussed in order of their population as given by the government census.

Oklahoma City, the largest city in Oklahoma, is located within twenty miles of the geographical center of the State. It is a railroad center and carries on a large wholesale trade, having nearly 150 manufacturing and jobbing houses. There are 40 miles of asphalt streets. It is a prominent cotton and grain market. Epworth University, a denominational school, and several private business and academic schools are located here.

Muskogee, second city in importance in Oklahoma, is located near the mouth of the Verdigris and Grand Rivers, and at the head of navigation of the Arkansas River. Muskogee has four competing lines of railroad, a number of wholesale houses and factories, and is located near rich oil, gas, coal, and mineral deposits. Three denominational colleges are located here.

Guthrie, the present capital of the State, is the county seat of Logan County. It has several factories and wholesale houses, 6 lines of railway, and a large retail trade.

Shawnee is located in a rich farming country in the valley of the North Canadian River. Cotton and potatoes being the chief crops shipped. The city contains thirty-seven factories and fifteen jobbing houses. The Rock Island shops are located here.

Enid, the largest city in the northwestern part of the State, owes its prominence to the number of railroads which converge here and to the wholesale and retail trade. A denominational school is located at Enid.

Ardmore, the largest city in southern Oklahoma, has a large cotton trade and is located near rich asphalt, oil and mineral lands. There are several factories and wholesale houses.

McAlester, the largest city in southeastern Oklahoma, owes its prominence to the vast deposits of coal and other minerals located near at hand. The town has a number of wholesale houses and manufacturing establishments and is the chief coal shipping point of the State.

Chickasha, the county seat of Grady County, which is one of

the richest counties in the State, is a distributing point for southwestern Oklahoma. It has three competing lines of railroads and a number of jobbing houses.

Tulsa is situated on the Arkansas River in the center of the oil and gas region of Oklahoma. The city has several lines of railroads and a number of manufacturing plants. A denominational college is located at Tulsa.

Lawton, the county seat of Comanche County, is located near Fort Sill, at the eastern end of the Wichita Mountains. It has a large cotton and grain trade.

El Reno, the county seat of Canadian County, is at the junction of two important lines of railroad. It is the center of a rich farming country and has a large cotton and grain trade.

Durant, in Bryan County, the second largest city in southern Oklahoma, has a denominational school. It has a large cotton trade.

Sapulpa, in Creek County, is an important railroad center, located near the center of the oil and gas fields of the State.

Bartlesville is the county seat of Washington County, which is one of the wealthiest counties in the State. One of the largest known gas fields in the world is located near the city.

Ada, in Pontotoc County, is the center of a rich farming country. A Portland cement mill is located here.

Vinita, the largest city in northeastern Oklahoma, is the county seat of Craig county.

Norman, in Cleveland County, is the seat of the State University, the head of the State school system.

Stillwater, in Payne County, is the seat of the Agricultural college.

Alva, the county seat of Woods County, *Edmond*, in Oklahoma County, and *Weatherford*, in Custer County, contain State normal schools.

Brief mention may be made of the following cities which fall below 3,000 in population:

Sulphur, in Murray County, is located near Platt National Park, where are a number of medicinal springs.

Coalgate and Lehigh, in Coal County, are in the center of one of the most productive coal regions in the State.

Perry, in Noble County, is the center of a good wheat and corn country.

Newkirk, Blackwell and Ponca City, are large towns in Kay County, which is one of the richest counties in the State.

Mangum, in Greer County, is a noted cotton market.

Hartshorne, Haileyville and Wilburton are coal towns in eastern Oklahoma.

Wagoner, Okmulgee, Claremore, Miami and Nowata are county seats in eastern Oklahoma.

Tahlequah is the county seat of Cherokee County, the capital of the former Cherokee National, has fine springs of soft water.

Tishomingo, Purcell, Duncan, Hugo, Pauls Valley and Marietta are county seats in southern Oklahoma.

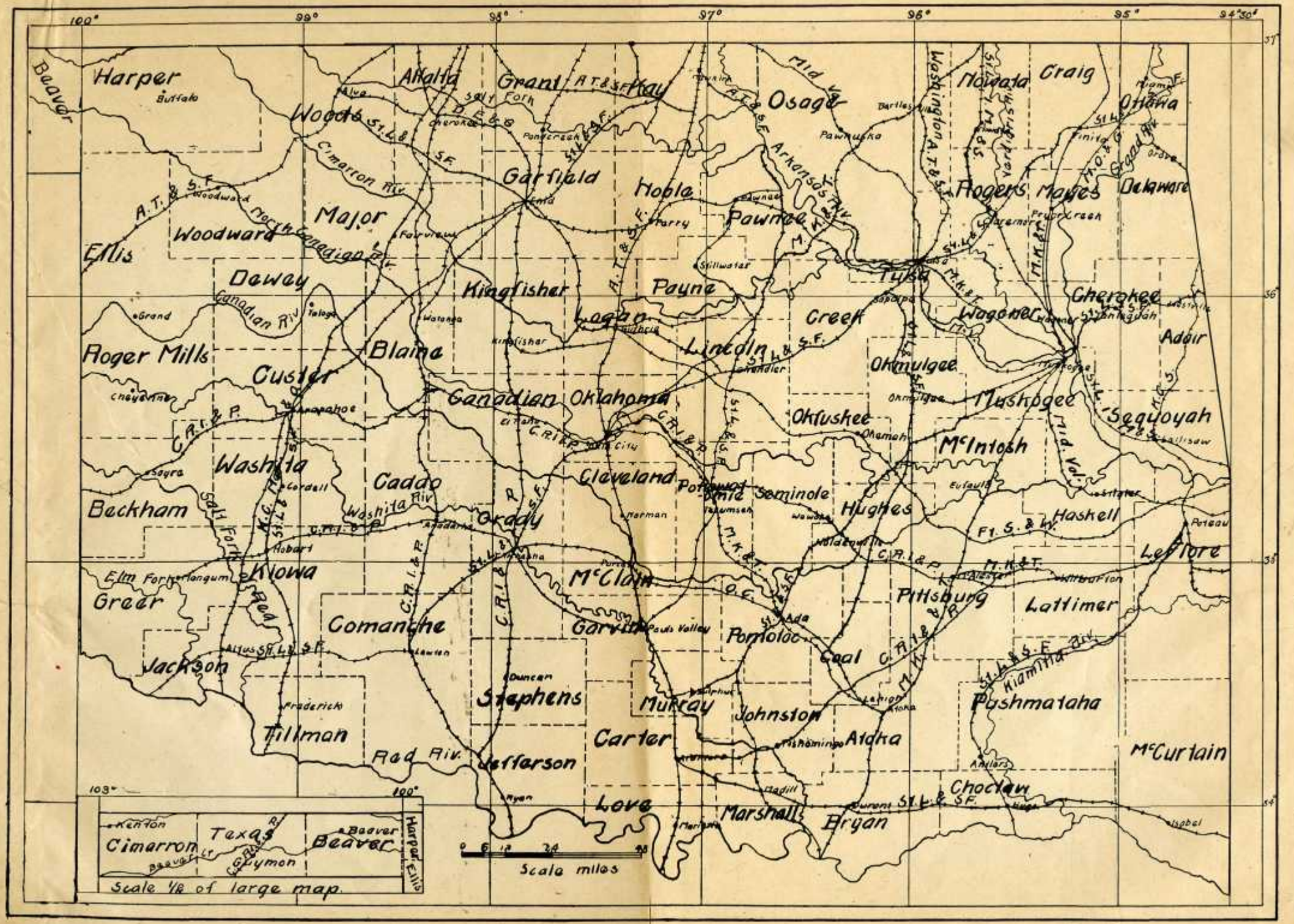
Pawhuska is the capital of the Osage Nation, Wewoka of the Seminole, and Okmulgee of the Creek.

Chandler, Kingfisher, Elk City, Anadarko, Frederick, Wynnewood and Woodward are cities of over 2,000 population.

The following table includes the names of the counties, with the area and population of each, as well as the name and population of the county seat. The figures are those of the census taken in 1907:

Name—	Area.	Population.	County Seat.	Popula.
Adair	612	9115	Stillwell	941
Alfalfa	888	16070	Cherokee	964
Atoka	990	12013	Atoka	1700
Beaver	1890	13364	Beaver	271
Beckham	1044	17379	Sayre	1179
Blaine	1008	17277	Watonga	1608
Bryan	900	27865	Durant	4516
Caddo	1386	30241	Anadarko	2190
Canadian	900	20110	El Reno	5370
Carter	800	36402	Ardmore	8749
Cherokee	792	14274	Tahlequah	1916
Choctaw	825	17340	Hugo	2676
Cimarron	1450	5293	Kenton	125
Coal	522	15585	Lehigh	2188
Cleveland	576	18460	Norman	3040
Comanche	1723	31938	Lawton	5562
Craig	775	14955	Vinita	3157
Creek	972	18365	Sapulpa	4294
Custer	1008	19478	Arapaho	610
Delaware	770	9876	Grove	694
Dewey	1029	13329	Taloga	430
Ellis	1041	13978	Grand	200
Garfield	1080	28300	Enid	10087
Garvin	846	22787	Pauls Valley	2157
Grady	936	23420	Chickasha	7896
Grant	1008	17638	Pond Creek	2200
Greer	1116	23624	Mangum	2672
Harper	980	8089	Buffalo	500
Haskell	612	16856	Stigler	1001
Hughes	792	19945	Holdenville	1868
Jackson	720	13439	Altus	1927
Jefferson	780	13439	Ryan	1115
Johnston	666	18672	Tishomingo	1300
Kay	927	24752	Newkirk	1788
Kingfisher	900	18010	Kingfisher	2300
Kiowa	1486	22165	Hobart	3136
Latimer	756	9349	Wilburton	1451
Leflore	1731	24678	Poteau	1726

Name—	Area.	Population.	County Seat.	Popula.
Lincoln	967	37293	Chandler	2234
Logan	737	30707	Guthrie	11648
Love	500	11134	Marietta	1391
Major	1144	14307	Fairview	887
Marshall	450	13081	Madill	1587
Mayes	684	11064	Pryor Creek	1103
McClain	600	12888	Purcell	2552
McCurtain	1942	10359	Idabell	600
McIntosh	666	17975	Eufaula	950
Murray	450	11948	Sulphur	2936
Muskogee	828	38341	Muskogee	14418
Nowata	576	10453	Nowata	223
Noble	675	11198	Perry	2881
Okfuskee	648	15595	Okemah	1027
Okmulgee	684	14362	Okmulgee	2322
Oklahoma	720	55849	Oklahoma City	32431
Osage	2297	15332	Pawhuska	2407
Ottawa	504	12827	Miami	400
Pawnee	720	17112	Pawnee	1943
Payne	720	22022	Stillwater	2577
Pittsburg	1368	37677	McAlester	8142
Pontotoc	684	23057	Ada	3257
Pottawatomie	864	43272	Tecumseh	1621
Pushmataha	1422	8295	Antlers	854
Roger Mills	1120	12230	Cheyenne	600
Rogers	638	15485	Claremore	2064
Seminole	605	14687	Wewoka	794
Sequoyah	638	22450	Sallisaw	1689
Stephens	810	20148	Duncan	2451
Texas	1962	16428	Guymon	839
Tillman	720	12869	Frederick	2036
Tulsa	900	21693	Tulsa	7588
Wagoner	576	19529	Wagoner	2950
Washington	440	12813	Bartlesville	4215
Washita	1008	22006	Cordell	1393
Woods	1200	15517	Alva	2800
Woodward	1224	14595	Woodward	2018


Harper
Beaver
Woods
Alfalfa
Grant
Kay
Osage
Noweta
Craig
Ottawa
Garfield
Noble
Pawnee
Rogers
Mayes
Delaware
Major
Woodward
Ellis
Dewey
Kingfisher
Payne
Tulsa
Cherokee
Adair
Roger Mills
Blaine
Logan
Creek
Wagoner
Custer
Lincoln
Okmulgee
Canadian
Oklahoma
Muskogee
Sequoyah
Okfuskee
McIntosh
Washita
Caddo
Cleveland
Pottawatomie
Seminole
Hughes
Haskell
Latimer
Pittsburg
Beckham
Grady
Kiowa
McClain
Greer
Comanche
Garvin
Pontotoc
Coal
Jackson
Stephens
Murray
Johnston
Pushmataha
Tillman
Carter
Atoka
McCurtain
Red Riv.
Jefferson
Love
Marshall
Bryan
Choctaw
Cimarron
Texas
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Harper
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Scale 1/2 of large map.
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