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U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS—MILTON WHITNEY, Chief.

SOIL SURVEY OF BRYAN COUNTY,
OKLAHOMA.

BY

WILLIAM T. CARTER, JR., AND A. L. PATRICK.

HUGH H. BENNETT, INSPECTOR, SOUTHERN DIVISION.

[Advance Sheets—Field Operations of the Bureau of Soils, 1914.]



WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1915.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., May 18, 1915.

SIR: In the extension of soil-survey work in the State of Oklahoma a survey was made of Bryan County during the field season of 1914.

I have the honor to transmit herewith the manuscript report and map covering this area, and to recommend their publication as advance sheets of Field Operations of the Bureau of Soils for 1914, as provided by law.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. D. F. HOUSTON,
Secretary of Agriculture.

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MAP.

Soil map, Bryan County sheet, Oklahoma.

SOIL SURVEY OF BRYAN COUNTY, OKLAHOMA.

By WILLIAM T. CARTER, Jr., and A. L. PATRICK.

DESCRIPTION OF THE AREA.

Bryan County, Okla., is situated in the southeastern part of the State. It is bounded on the south by the Texas State line, on the west by Marshall County, on the north by Johnston and Atoka Counties, and on the east by Choctaw County. The county is irregular in outline, but it is roughly rectangular, being nearly 40 miles long from east to west, and averaging about 24 miles wide from north to south. It has an area of 928 square miles, or 593,920 acres.

Bryan County is in the northern part of the great physiographic province known as the Coastal Plain, which extends from the Gulf of Mexico to a latitude a few miles north of the county. The county lies entirely within the Red River Basin, comprising a broad plain, which is dominantly smooth and undulating to gently rolling. It is mainly treeless and closely resembles the Great Plains, which it adjoins. In one sense it constitutes a part of the Great Plains, differing from it principally in geology. In addition to the large areas of undulating and gently rolling prairies there are extensive belts of rolling to hilly country following the main drainage lines, and also important strips of flat stream bottoms and benchlike terraces. A large part of the county is topographically well suited to cultivation.

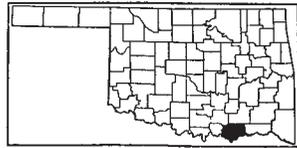


FIG. 1.—Sketch map showing location of the Bryan County area, Oklahoma.

The elevation varies from approximately 700 feet above sea level in the higher areas in the northern part to less than 500 feet in the southeastern section, the general slope of the surface being from northwest to southeast. The general slope is uniform, though there are many local irregularities, consisting of hilly uplands, in various parts of the county.

The inequalities of the surface, which was doubtless once a nearly level plain, are the result of erosion. The differences in character of topography brought about by erosion are due in many places to variations in hardness of the underlying strata affecting their relative resistance to weathering and erosion.

There are three broad topographic divisions in the county: (1) The prairies and forested uplands, (2) the overflowed first bottoms of streams, and (3) the second bottoms or stream terraces no longer subject to overflow.

The prairie region comprises the greater part of the county. Its surface is prevailingly undulating to gently rolling, but there is a considerable area having a rolling topography and some small areas of hilly country. The drainage divides in the rolling areas are broad, and though sometimes rather steeply sloping, are usually not abrupt or precipitous. In most sections surface drainage is well established, being effected by a large number of small streams. Many of these streams are short, but as a whole they have developed distinct valleys, in which they flow at a level considerably lower than the surrounding uplands. Nearly all the streams are intermittent and flow only during seasons of wet weather, though some of the larger streams have permanent flow. In the northern part of the county there are a number of rounded knoblike elevations which occur along a more or less broken and irregular escarpment.

The forested uplands occur mainly in a strip several miles wide, crossing the county in an east and west direction a little north of the central part. Strips of timbered upland which join this main body are encountered along and adjacent to the larger stream valleys. There are a few small prairies in the main body of the timbered uplands. The upland surface is rolling to hilly and broken. Many streams find their source in and flow through these forested areas. In many places the streams have cut deep valleys, forming areas of very rolling or hilly or broken character. The streams of this region flow more regularly than those of the prairies, but even they are dry for months. The forest growth consists principally of several varieties of oak, principally post oak, with some hickory and other trees.

The Red River Valley proper is 3 to 5 miles wide, while the Washita River Valley along the west side of the county is 1 mile to 4 miles wide. These valleys are mainly 50 to 100 feet below the general level of the uplands. They embrace level first bottoms and level to undulating or gently rolling second bottoms or terraces standing at varying elevations above, like broad steps. The first bottoms of the Red River are one-fourth mile to 3 miles wide in places, but the individual steps are narrower. They occur at elevations of 10 or 15 to 100 feet or more above the bottoms. The terraces are level to gently undulating, with the exception of the highest one along the Red River, which is gently rolling in places and has a poorly marked border along its contact with the uplands, where the elevation is almost the same as that of the prairies or timbered uplands. The bottom lands are heavily forested with oak, hackberry, pecan, bois d'arc, cottonwood, ash, and other trees, while the terraces support a growth of oak and hickory.

There are a number of small lakes and old channels throughout the Red and Washita River bottoms. Many of the smaller streams flow into these bottoms and disappear, making the bottoms nearest

the uplands the most poorly drained. As a rule, however, these bottom lands have fairly good drainage in seasons of normal rainfall, and overflows are quite infrequent. Blue River and Island Bayou are the largest streams within the county. They and Clear Boggy Creek in the northeastern corner are bordered by a strip of flood-plain bottoms about one-fourth to 1 mile wide. The bottoms of the other streams are narrow, but collectively they constitute a very important area. There are only narrow strips of terrace along these smaller streams.

As a part of Indian Territory, Bryan County has long been occupied by Indians of the Choctaw and Chickasaw Nations. Island Bayou formed the boundary between these nations to a point a few miles southwest of Durant, from which the boundary line continued northward from the head of the bayou. Thus the extreme western and much of the southern part of the county was within the Chickasaw Nation, and the remainder of the county within the Choctaw Nation.

Long before statehood (1907) many white settlers entered the county to engage in stock raising or farming. These settlers came from the older States, mainly Arkansas and Texas, and the population is practically all American. Within recent years a number of settlers from the Northern States have entered the county. There has been considerable intermarriage between the white settlers and the Indians. There are a few negroes in the county. Through purchase and lease from the Indians, and through intermarriage with them, much of the land has passed into the hands of, or is controlled by, the white people, and as restrictions are removed the Indians continue to sell land to the whites.

In most sections the county is well settled. The prairie lands are practically all well settled, but in some of the rougher forested areas and in some of the more remote river bottoms the settlement is sparse. The population of the county is reported as 27,865 in 1907, and is given as 29,854 in the 1910 census. Only 28 per cent of the population lives in the incorporated towns. Bryan County ranks twelfth in population and twenty-ninth in size in the State.

Durant, the county seat, is one of the larger cities of the State. It has a population of over 5,000. This town is served by three railroads, and is an important distributing point for a large part of southern Oklahoma. It is a shipping point for cotton and cottonseed products, which are manufactured locally. A Presbyterian college and a State normal school are located at Durant.

Caddo, which ranks next in population to Durant, is a thriving town of about 1,200 inhabitants. Bennington, Bokchito, Achille, Kenefick, Calera, Colbert, Platter, Mead, and Blue are railroad towns of several hundred inhabitants, locally important as shipping and

trading centers. Albany, Wade, Roberta, Utica, Silo, and Kemp are small towns located off the railroads.

The greater part of the county is well supplied with shipping facilities, there being three railroads passing through Durant and one through the southwestern part of the county. In the northeastern and southeastern parts of the county some farms are as much as 10 or 15 miles from a railroad. The first railroad in the State was built through Bryan County in 1872. This aided materially in the development of the county. Bryan County is now traversed by two lines and one branch of the St. Louis & San Francisco Railroad, a main line of the Missouri, Kansas & Texas Railway, and the Missouri, Oklahoma & Gulf Railway. These railroads connect directly with Kansas City, St. Louis, Dallas, Galveston, Memphis, and other large markets.

The wagon roads of the county are generally good when dry, except in the most sandy areas. In long-continued wet weather they are difficult to travel, especially on the prairies, where the heavier soils occur. Many new roads are being opened up along section lines, and as more land is placed in cultivation the old meandering roads are abandoned. Considerable attention is being given to road improvement. The county is working some of the roads and building good bridges.

Bryan County is well supplied with good schoolhouses and churches, while the telephone is in general use throughout the rural districts. A large part of the county is reached by rural free delivery mail routes.

CLIMATE.

The climate of Bryan County is fairly equable. The summers are long and during some years high temperatures prevail for considerable periods, especially in seasons of light rainfall. However, there is generally a breeze during the day and the nights are usually cool. There may be several days of very warm and oppressive weather in the summer if normal precipitation does not occur. During the winter months there are sudden drops in the temperature, due to cold winds from the north. These are locally known as "northers" and are the southern and eastern extensions of cold waves from the north or northwest. These extremes of cold weather, however, last but a few days. The ground is rarely frozen for long periods, and no winters are so severe that farming operations can not be carried on. Sometimes the cold weather is severe enough to cause loss among live stock that is in poor condition and not properly protected. Light snows occasionally fall, but the snow does not remain on the ground long. The mean annual temperature is 62° F.

The average annual rainfall is sufficient for agricultural purposes and is usually well distributed throughout the year. During some

years there is insufficient rainfall during the growing season, but these droughts are infrequent, and a total loss of farm crops owing to drought is unknown. There is a mean annual precipitation of about 43 inches.

Severe storms are not common, and heavy winds that do even slight damage are infrequent. Damage to crops by hail is slight and mostly of local extent.

The average growing season between frosts is 234 days, and this is sufficient for the growth and maturity of a wide range of crops. However, late frosts sometimes destroy the fruit crop. The average date of the first killing frost in the fall is November 12, and of the last in the spring, March 23. The earliest date of killing frost recorded in the fall is October 24, and of the latest in the spring, May 1.

The following table gives the normal monthly, seasonal, and annual temperature and precipitation as compiled from the records of the Weather Bureau station at Durant:

Normal monthly, seasonal, and annual temperature and precipitation at Durant.

Month.	Temperature.			Precipitation.		
	Mean.	Absolute maximum.	Absolute minimum.	Mean.	Total amount for the driest year.	Total amount for the wettest year.
	° F.	° F.	° F.	Inches.	Inches.	Inches.
December.....	43.6	79	6	1.80	0.82	0.16
January.....	41.4	80	-5	1.61	2.10	1.51
February.....	41.9	81	-3	2.49	1.69	3.08
Winter.....	42.3			5.90	4.61	4.75
March.....	56.1	99	21	3.31	2.41	5.36
April.....	61.7	92	35	4.19	2.76	8.56
May.....	69.1	100	33	6.69	3.85	8.73
Spring.....	62.3			14.19	9.02	22.65
June.....	77.2	103	51	4.74	7.51	9.48
July.....	80.0	105	57	5.21	4.02	2.49
August.....	81.4	105	50	3.04	1.43	1.40
Summer.....	79.5			12.99	12.96	13.37
September.....	74.8	100	38	2.98	2.62	3.31
October.....	63.0	96	33	4.68	3.42	7.39
November.....	53.3	84	16	2.57	0.50	2.01
Fall.....	63.7			10.23	6.54	12.71
Year.....	62.0	105	-5	43.31	33.13	53.48

AGRICULTURE.

Early agriculture as practiced in Bryan County by the Indians consisted principally of the cultivation of small patches, in which corn, beans, pumpkins, and potatoes were grown for family use. Some stock was also raised. At a later date a few Indians cultivated large farms and produced cotton and corn, while others had large herds of cattle and horses. With the advent of white settlers stock raising and farming were extended. Many settlers leased land for stock raising or grazing, and some developed large farms for cotton and corn production. From the first these crops have been grown with success in the county. The steady settlement of the county by whites, who leased or bought land from the Indians or who intermarried with them, has led to the present extensive agricultural development. Many Indians now operate farms and raise stock along the same lines as the white farmers.

The principal crops grown in Bryan County are cotton, corn, and oats. Small quantities of various other crops are produced, but they are of comparatively little importance. A small aggregate area is devoted to wheat, some kafir is grown, and considerable sorghum is produced. A very small acreage is in alfalfa. Peanuts are grown to a considerable extent in some sections. There are a few successful large orchards, and small fruits are produced in a limited way for local use. Vegetables and berries are grown extensively in small gardens for home use. Stock raising is more important than in many areas given over mainly to the production of cotton, though usually the individual farmers do not own large herds.

Cotton, the important money crop of southern Oklahoma, holds a leading place in Bryan County. The soils and climate are well adapted to it, and the county has the reputation of producing a staple of good grade. The principal variety of cotton grown is the Mebane Triumph. Some long-staple cotton has been grown, but it has not given very good results. It is stated by farmers who have studied for some time the cotton grown here that the county's reputation for producing a good length of staple was built on the old varieties of cotton, such as the Rowdens, Storm Proof, and others. In the last few years the Mebane cotton has been largely substituted for the older varieties; and while this variety yields a larger percentage of lint to seed, it is claimed that the lint deteriorates more rapidly in the field and does not possess so good spinning qualities, color, or length of staple as the older varieties. This may be due in part to the use of impure or imperfect seed. The upland sandy timbered soil, the Durant fine sandy loam, and the Houston black

clay apparently produce the best grades of lint. The alluvial soils give larger yields per acre.

Bryan County is the leading county of the State in cotton production. Between 35,000 and 40,000 bales were produced in the county in 1913. By far the greatest acreage in any crop except corn is devoted to cotton. The boll weevil does not affect the cotton in this county, though sometimes the boll worm does damage.

Corn is a crop of much importance in Bryan County. Many farmers grow corn only for use in feeding the farm stock, but some devote considerable land to it, selling the surplus crop. Yields vary with the season. In dry seasons the yield falls far below the normal productive capacity of the soils. The best and surest yields are produced on the alluvial soils, though in favorable seasons the upland soils give good yields. Native seed corn is generally used, though some improved seed procured outside the county is used with good results. According to the census there were over 105,000 acres in corn in Bryan County in 1909, yielding more than 1,500,000 bushels. The acreage is increasing, as is the average yield per acre. The yields of corn are easily increased by better cultural methods.

Oats are grown quite extensively throughout the county. The 1910 census reports 11,629 acres in oats in 1909, with a yield of 282,044 bushels. Both the acreage and yield have increased during recent years. Oats do well in the county, giving the highest yields as a rule on the Houston black clay and the Durant loam. In some cases, during good seasons, 80 to 100 bushels of oats per acre are harvested. The yields depend largely on the care given to the preparation of the soil and the sowing of the crop, and on the season. During seasons of light rainfall low yields are made, but the crop is never a complete failure. The light sandy soils of the county are not so well adapted to the production of oats for grain, but oats make excellent pasturage on these soils. The alluvial soils are not used extensively for oats as a grain crop, as the plant goes too much to stalk and lodges. The principal variety grown is the Texas Red Rustproof.

During the last few years peanuts have been grown rather extensively by some farmers. Good prices are received for the peanuts, and the extension of this industry seems to offer good opportunities. The sandy soils which are widely developed in Bryan County are well adapted to peanuts.

Considerable prairie grass is cut and baled in Bryan County, though there are only a few pastures that have not been placed in cultivation. Yields of hay depend largely on the spring rainfall. In some seasons wild hay yields less than one-half ton per acre, and in others it yields more than a ton. Most of the hay is produced on

the Durant loam and Houston black clay types. Frequently two cuttings are made in one season.

Very little wheat is grown in the county, though the Houston black clay and Durant loam types are quite well adapted to this crop. Yields are usually not very high, and wheat is not so profitable a grain crop as oats. However, a few farmers produce good crops of wheat.

But little kafir is grown, though in a few cases it has produced good yields. Most of the soils of the county are adapted to kafir. Sorghum does well on all the soils of the county, and is grown in a small way by a large number of farmers for forage. Many farmers have small sirup-making outfits.

Very little alfalfa is grown in the county. The soils of the Miller, Osage, and Verdigris series, as well as the Teller very fine sandy loam, are well adapted to this crop. Some upland soils are more or less well suited to alfalfa, but it suffers considerably on them in dry seasons. Of the upland soils the Houston black clay is doubtless best adapted to it. There seems to be no reason why this valuable legume could not be more extensively grown, with care given to the proper preparation of the soil and to the starting of the crop.

The sandy soils of Bryan County are well suited to vegetables, small fruits, and berries. Peaches do well, and there are some good orchards in the county. Pears are grown, and apples and plums also, in a small way. Fruit is sometimes injured by late frosts. Vegetables, melons, cantaloupes, sweet potatoes, Irish potatoes, and berries for market offer good opportunities on the sandy and loamy soils of the county which are well situated with respect to shipping facilities. At present truck crops are grown only for local or home use.

There are a number of small dairies which supply milk to the towns. The soils of the county are well suited to the production of forage and feed, and dairying on a larger scale should prove successful. The silo is highly advantageous in dairying. A few are being built in the county, mainly, however, to supply feed for beef cattle. Though there are no large single ranches, cattle raising on a small scale is engaged in throughout the county. Many cattle graze along the river bottoms and are fattened for market.

A few hogs are raised on most farms for home use, but there is not enough meat produced in the county to supply the demand. Doubtless hog raising would be profitable if carried on more extensively.

The soils of the county seem well adapted to broom corn, though weather conditions are not always suitable for curing the crop. Some cowpeas are grown, with good yields. More extensive use could be made of this crop, not only for the seed but also for the hay and for improving the soil.

Usually the rainfall is sufficient, but in occasional years the precipitation during the growing season is inadequate for the best growth of crops, especially corn, under the present methods of cultivation. Therefore one of the principal problems in the agriculture of this region is the conservation of soil moisture. On the other hand, rainfall is sometimes heavy, and it is important that the soil should be in such condition that erosion is not excessive. It is sometimes necessary to alter tillage operations from season to season.

In general, Bryan County comprises good average farms. Most of the farmers operating their own farms are progressive, and many make use of the most improved farm machinery, and in general use of modern farm implements is becoming more popular. On many of the farms operated by tenants the agricultural methods are poor and the houses and other buildings are in need of repair.

Systematic crop rotations are not practiced in the county, though the various crops in a particular field are changed from time to time. No commercial fertilizers are used, and where the natural methods of soil improvement are utilized it is probable that fertilizers would not as yet be profitable for the general farm crops on most of the soils.

Farm land is plowed whenever convenient after the crops are harvested and when weather and soil conditions are favorable. As a rule it is much better to plow as early as possible in the fall. A large number of farmers do not plow the land in the fall. This is frequently impossible, as cotton can not always be picked until late in the fall, and in winter the ground is frequently too wet to plow. When the winter is mild and fairly dry, plowing is done in January, as practically all of the cotton has been picked and the corn gathered by that time. Many farmers "flatbreak" or plow the land with turning plows and later harrow and bed the field for seeding. However, many follow the old, inefficient system of "bedding" over the old "middle" or furrow between the old ridges. Land for oats is usually "flatbroken." Plowing is often too shallow for best results.

Oats are usually sowed in the winter. They are seeded at any time from December 1 to late in February. Cotton is planted in April, though sometimes much later when conditions are not suitable during this month. This crop is worked in much the same way as in other sections of the South. More attention is given cotton than any other crop, and it is usually cultivated frequently throughout the growing season, the surface soil being kept loose and free of grass and weeds. Corn is usually planted in March, and, though it is cultivated several times, the fields usually grow up in crab grass and weeds. As a rule the cultivation of corn is not continued long enough. This is perhaps due in part to the necessity of cultivating cotton at the time the corn needs attention.

Too little attention is given to crop rotations and to preparing the land. The soil generally requires considerable organic matter in order to be most productive, and the most practical means of maintaining a good supply of this constituent is to plow under some form of vegetation, preferably the legumes, which supply not only vegetable matter but nitrogen also. Cowpeas, which do well on all the soils of the county, and also peanuts greatly improve the soil. Barnyard manure could be used to good advantage on many of the upland soils. The addition of manure enriches the soil and increases its moisture-holding capacity. Oat straw, where spread over the land and later plowed under, acts likewise.

The soils of Bryan County vary widely in texture, crop adaptation, and agricultural value. However, the same general farm crops are produced on all the soils, though oats are grown mainly on the heavier prairie upland soils, principally the Houston black clay and the Durant fine sandy loam produces the best grade of cotton, having the sandy soils, and on many of the sandy soils small fields are devoted to oats for pasturage.

Cotton is grown on all the soil types of the county. The Miller and Osage soils, the Houston black clay, and Teller very fine sandy loam produce the best yields. It is reported, however, that the Durant fine sandy loam produces the best grade of cotton, having the longest fiber. The Durant loam, where well cultivated, is a good cotton soil, though in many fields, where the surface has been washed until the soil is shallow, its productiveness has been impaired.

Corn is grown on practically all of the soils of the county with varying results. It does best on the Miller and Osage soils and the Teller very fine sandy loam, though in good seasons the Houston black clay, the Durant loam, and the Durant fine sandy loam produce good yields. With better cultivation and by utilizing the natural means of fertilization and using improved seed, corn yields could be materially increased on all the soils.

Practically all the soils are well adapted to sorghum and kafir. The Miller very fine sandy loam, loam, and clay, as well as the Teller very fine sandy loam and the Osage soils, where protected from overflow, are all well adapted to alfalfa. With proper care this crop can be grown also on the Houston black clay and Durant loam.

The fine and very fine sandy loams of the county are adapted to vegetables, peaches, small fruits, and berries. All the sandy soils are adapted to peanuts, the Durant fine sandy loam being probably the best type for this crop.

Considerable quantities of forest products have been sold in Bryan County, and much of the lumber remaining is being cut and utilized for various purposes. The sawed lumber consists principally of oak, cottonwood, ash, etc. Bois d'arc (Osage orange) is used mainly for

posts and in wagon making. Much of the post oak is used for railroad ties. Practically all of the cedar has been cut and sold.

According to the census of 1910 only 21.7 per cent of the farms of Bryan County are operated by the owners. In nearly all cases the farms are rented on the share basis, and little cash rent is paid. The most popular form of renting is the "third-and-fourth" system, under which the owner furnishes the farm with the improvements and receives from the tenant one-third of the corn and one-fourth of the cotton produced. Some tenants are given the use of the land for five years for clearing it, placing it in cultivation, and making some slight improvements. Other systems of renting are also practiced. In some cases land is leased from the Indians for a period of five years and rented to tenants who farm it under the "third-and-fourth" system. The land is leased by the Indians at varying rates. Commonly, they receive \$50 a year for 160 acres, but more than this is often paid.

The 1910 census gives the average size of farms in Bryan County as about 101 acres. Many farms contain 160 acres or more. Doubtless better yields would be made if the individual farmers worked smaller tracts. Labor is sometimes rather scarce, and much of the work is done by the farmer and his family. Farm hands are paid about \$20 to \$25 a month with board. Little day labor is employed, except in the spring for chopping cotton and in the fall for cotton picking.

SOILS.

Thirty-one soil types are mapped in Bryan County. In texture they range from light fine sands to heavy clays. They are classed broadly in two groups: The upland soils, derived from beds of clays and sand, shales, sandstones, and limestones, and the alluvial or stream-deposited soils of the first bottoms and second bottoms, or terraces, of the streams. The upland soils are by far the most extensive, though the alluvial soils cover a large total area in the county.

The upland soils have all been formed by the weathering of sedimentary rocks and unconsolidated materials, but they are of varying characteristics, depending on the nature of the materials from which they have been formed and the processes of weathering through which the material has passed. The geologic formations giving rise to the soils in the county are of the Cretaceous period. The beds were deposited in a nearly flat or horizontal position, and remain in practically their original position, slightly inclined southward.¹

¹The information relating to the geology of the area is taken from the Atoka folio, U. S. Geological Survey.

The principal formations or divisions of the Cretaceous beds are the Caddo limestone, Goodland limestone, Bennington limestone, Kiamichi formation, Bokchito formation, and Silo sandstone.¹

In the northern part of the county the principal areas of the calcareous rocks are found, and of these the Caddo limestone is the most extensive and important. The latter, as well as the Bennington limestone, Kiamichi formation, and Goodland limestone, comprise calcareous clays, semicrystalline limestone, white to yellowish in color, and massive white to dull-blue limestones. Many of these rocks are highly fossiliferous. These formations, on weathering, give rise to the Houston soils in this county. The Caddo limestone has weathered deeply in most places, giving the largest areas of the Houston black clay. The harder limestone formations, such as certain beds of the Caddo and Bennington, have weathered more slowly, have formed stony outcrops on the steeper slopes, and while the fine earth material is much the same as that of the Houston black clay, the stony material is present in such quantities as to make cultivation difficult or almost impossible. These areas of stony land are mapped as the Houston stony clay. In a few locations where the limestone areas are small, and surrounded by the light-textured soils of the Bokchito formation, the weathered soil of the limestone has received, by wash, some of the coarser soil material from adjoining areas, resulting in a slightly lighter limestone type, black in color, which is mapped as the Houston clay loam.

These three types, with the Houston silty clay loam, which is intensively developed in areas of the Bokchito formation, constitute the extent of the Houston series in the county. Of these soils the black clay is the most extensive and most important, occupying many square miles in the northern part of the county. The surface of the country occupied by this series is gently undulating to rolling in the case of the black clay and clay loam, but rather rough and stony where occupied by the stony clay. Small areas of the latter type are included in some of the rougher slopes of the Bokchito formation, many of them too small to be shown on the map. The Goodland limestone and the Bennington limestone are harder rocks, and give rise to most of the Houston stony clay. The Bennington limestone is a thin formation and does not give large areas of soil. It is exposed or occurs near the surface principally along low bluffs. It forms the crests of remnant buttes a few acres in size within large areas of the Bokchito formation.

¹ These formations, according to the Atoka folio, correspond to formations occurring in Texas as follows: The Silo sandstone corresponds to the Eagle Ford formation; the Bennington limestone to the Buda limestone and Del Rio clay; the Bokchito formation, Caddo limestone, and Kiamichi formation to the Georgetown limestone; and the Goodland limestone to the Edwards limestone.

The Bokchito formation occupies a very large part of the county. It consists of clay and sandy clay, with beds of friable sandstone, siliceous shell limestone, clay shales, and ferruginous sandstone segregations and concretions. The weathering of this formation gives rise to the most extensive soils of the county. These belong principally to the Durant series.

The Durant soils are developed both in rolling prairie and rolling forested areas, and are quite productive. The most important types of this series are the Durant loam, a prairie type, and the Durant fine sandy loam, which occurs principally in timbered areas, but also to some extent on the prairie. The Durant very fine sandy loam, a prairie soil, is also derived from the Bokchito formation. In the more rolling sections narrow strips of eroded and stony fine sandy loam occur, and these areas are mapped as the Durant stony sandy loam. Erosion of the Durant loam has resulted in the formation of small areas of the Durant clay. Extreme erosion of the Durant fine sandy loam has produced the timbered phase of the Durant clay.

In poorly drained areas on the prairies occupied by the Bokchito formation the soils of the Grayson series are found. These areas are small and usually occur in basinlike or flat situations about the heads of small streams or draws. The Grayson very fine sandy loam, loam, and silt loam are encountered in Bryan County. These occur in small and widely separated areas.

In the timbered areas of the Bokchito formation the Susquehanna very fine sandy loam, a soil of considerable extent, is found. This is a grayish very fine sandy loam, underlain by mottled gray and red plastic heavy clay.

In the western part of the county there is a considerable area of the Silo sandstone formation, consisting of interstratified fine sands and sandy clays, with considerable ferruginous sandstone fragments. This formation gives rise to the Durant fine sand, the Durant stony sandy loam, and the Norfolk fine sandy loam.

The alluvial soils comprise (1) the overflowed first bottoms, occupied by recently deposited alluvium, and (2) the second bottoms, or stream terraces, occupied by relatively old alluvium which was laid down by water when the streams were flowing at higher levels than at present.

In the first or overflowed bottoms of the Red and Washita Rivers the Miller and Yahola are the important series. Both of these series contain sufficient material washed from the Red Beds region to the west to impart a characteristic chocolate-red color to the soils. The Yahola soils differ from the Miller in having subsoils which are lighter in texture and in color than the soils.

On the first bottoms of the smaller streams of the county the Osage and Verdigris soils predominate. The material of these series represents wash carried by the streams from the various residual prairie soils occurring within their drainage basins, such as the Durant and Grayson soils. Some Osage soil occurs in the bottoms of the Red River.

The Trinity series is represented by a single member, the clay. This soil consists largely of wash from the Houston soils.

On the second bottoms the Teller and Brewer series are encountered. The Teller soils occur on the low and high terraces of the Red and Washita Rivers. These soils apparently have been derived from the same source as the Miller and Yahola soils, but since overflows have ceased the material has undergone much more complete weathering than that of the Miller and Yahola. Some of the higher terraces have been dissected to some extent by drainage ways, being cut through in places sufficiently to expose the underlying Coastal Plain beds along the lower slopes of the deeper valleys. The Teller soils are well drained.

The Brewer soils are imperfectly drained terrace soils, occurring principally along the Red River, but to some extent along the smaller streams. The material represents old alluvium washed from the prairie soils of the region.

In subsequent pages the soils of Bryan County are described in detail.

The following table gives the name and actual and relative extent of each soil type mapped:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Durant fine sandy loam.....	148,992	25.1	Yahola loam.....	8,384	1.4
Durant loam.....	142,656	24.0	Grayson silt loam.....	6,272	1.0
Houston black clay.....	61,696	10.4	Durant stony sandy loam.....	5,312	.9
Teller very fine sandy loam...	27,072	7.5	Brewer silt loam.....	5,184	.9
High terrace phase.....	17,024		Teller fine sandy loam.....	5,120	.9
Susquehanna very fine sandy loam.....	26,048	4.4	Grayson very finesandy loam.	4,608	.8
Osage loam.....	17,024	2.9	Teller fine sand.....	3,584	.6
Miller very fine sandy loam...	14,400	2.4	Miller loam.....	3,584	.6
Durant clay.....	8,256	2.3	Norfolk fine sandy loam.....	3,136	.5
Timbered phase.....	5,760		Yahola clay.....	1,792	.3
Trinity clay.....	12,096	2.0	Houston clay loam.....	1,408	.2
Miller clay.....	11,904	2.0	Brewer clay.....	1,408	.2
Brewer very finesandy loam..	11,072	1.9	Miller very fine sand.....	576	.1
Durant very fine sandy loam.	11,008	1.9	Houston silty clay loam.....	448	.1
Osage clay.....	9,792	1.6	Durant fine sand.....	384	.1
Verdigris finesandy loam.....	9,024	1.5	Grayson loam.....	384	.1
Houston stony clay.....	8,512	1.4	Total.....	593,920	.....

MILLER SERIES.

The Miller soils are prevailingly red, ranging from grayish brown or chocolate brown to pinkish red. The subsoils are chocolate red or pinkish red. The soils and subsoils are calcareous. These soils are encountered in the first or overflow bottoms of streams issuing from the regions underlain by the Permian Red Beds. They are typically developed along the Brazos and Red Rivers in Texas and Louisiana. There are large areas that are rarely overflowed. Four types of the Miller series are mapped in Bryan County, the very fine sand, very fine sandy loam, loam, and clay.

MILLER VERY FINE SAND.

The Miller very fine sand consists of a gray to reddish-gray, loose very fine sand, having a depth of 3 feet or more. In places where it has been wind-blown it is very loose and incoherent and has a gray to white color. Where it occurs in positions as originally placed the reddish cast prevails, and the texture is slightly loamy, owing to the presence of small quantities of silt.

This type occurs in a number of small, narrow strips, principally along the Red River. These areas are usually on the inner bends of the stream. The largest area lies about 4 miles south of Kemp, and extends back some distance from the river. A number of other narrow areas occur along the Red River, and one along the Washita River.

The Miller very fine sand occupies a nearly level position 10 to 20 feet above the stream, but the surface is more or less hummocky, or slightly dunelike in places. These slight surface irregularities are caused by the action of the wind, which blows the fine sand against small obstructions and builds up small dunes. Some of these are above ordinary overflow. The sand grains are very fine and smooth, having been worn and rounded by the water. Both surface and sub-surface drainage is rapid and thorough, the soil being porous and leachy.

The Miller very fine sand represents the coarser river sediments which have been thrown up by the more rapid currents during overflows and shifted about considerably by wind action. Sometimes during overflows this very fine sand is deposited deeply over areas of good soils.

Frequently the areas of this type are without vegetation, and here the very fine sand is constantly being shifted by high winds. The forest growth usually consists of cottonwood trees, which grow thickly on this soil. In some areas various species of oak, hackberry, and other trees grow.

The Miller very fine sand is not a very strong soil, and little of it is cultivated. Small yields of cotton are obtained on the loamy phases of the type, and some vegetables make small yields. However, the soil is not well suited to cultivation and is of little value. The type is not extensive in this county.

Included are certain low strips which are subject to frequent inundation, and on that account can not be safely used for farming. These include some patches of Miller clay.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Miller very fine sand:

Mechanical analyses of Miller very fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450405.....	Soil.....	0.0	0.0	0.2	13.9	69.4	13.6	2.8
450406.....	Subsoil.....	.0	.0	.2	24.9	62.4	9.6	2.9

MILLER VERY FINE SANDY LOAM.

The Miller very fine sandy loam is a salmon-colored to pinkish or dull-red very fine sandy loam having a velvety feel. The soil ranges in depth from about 12 to 24 inches. The subsoil is variable in texture and color, but is most frequently of about the same texture and color as the surface soil, though sometimes it consists of chocolate-red loam to clay. Near the streams, or near areas of the Miller very fine sand, the structure of the soil is loose, and in places it gradually merges into that type. Adjoining the heavier types the soil is somewhat coherent and loamy. Wherever found it is friable and easily tilled.

This soil lies mainly along the Red River in the southern part of the county, although a few small areas are encountered along the Washita River in the western part. It occurs in relatively large tracts, some being several square miles in extent. The type usually adjoins the stream channel or is separated from it only by narrow areas of the Miller very fine sand. There are included a few areas of the other types of the Miller series which are too small to be separated on the soil map.

This soil consists principally of reworked sediments of the Permian Red Beds which have been assorted and placed by the waters of the two rivers.

The Miller very fine sandy loam has a nearly level topography, though the surface in places is hummocky or "bumpy" or slightly undulating. The drainage is good, owing mainly to the ready down-

ward flow of soil water through the porous substratum. Occasionally it is overflowed by the Red River, but such inundations are rare.

This type is cultivated to a considerable extent, the original heavy timber growth of hackberry, pecan, bur oak, elm, bois d'arc, cottonwood, and cedar having been removed from large areas. The soil is well adapted to cotton and corn, and these are the principal crops grown. Corn yields 25 to 50 bushels per acre, and cotton one-fourth to 1 bale. Some of the best cotton produced in the county is grown on this type where the subsoil from 12 inches downward consists of a chocolate-red, heavy clay. The heavier phases of the type are well adapted to alfalfa. The soil is well suited to the production of vegetables, small fruits, and berries, and is capable of producing high yields of corn with careful seed selection and good cultivation. Peanuts do well on the lighter areas.

The Miller very fine sandy loam is recognized as a valuable soil, easy to cultivate, and productive. It is valued at \$20 to \$50 or more an acre.

MILLER LOAM.

The Miller loam consists of a chocolate-red to reddish-brown loam, underlain at variable depths, usually about 8 to 15 inches, by a chocolate-red or chocolate-brown heavy loam or silty clay. The material is not very uniform in texture, and it frequently consists partly of fine sand. The type includes areas of very fine sandy loam too small to map separately.

The Miller loam occurs in irregular, narrow strips in the Washita River bottoms. These strips lie approximately parallel to the stream course, and in some places are as much as a mile in width.

The surface of this type is nearly level to very gently undulating or hummocky. The drainage is thorough throughout the greater part of the type, though in some areas ditching is beneficial. The type is subject to overflow.

The Miller loam is partly forested with a growth of bois d'arc, hackberry, elm, ash, bur oak, pecan, and cottonwood. Much of it has been cleared and is under cultivation. The soil is very productive and is adapted to a wide variety of farm crops. It is particularly suited to cotton and corn, and these crops are most extensively grown. Cotton yields one-half to 1 bale and corn 30 to 60 bushels or more per acre. Under exceptionally favorable conditions as to season and cultivation these yields are exceeded. Alfalfa produces from 1 ton to 2 tons of hay per acre at a cutting, and several cuttings are made in a season. Though alfalfa is grown only in a small way, results indicate that the type is especially adapted to this valuable crop. The Miller loam produces good yields of oats and is well suited to peaches, small fruits, and berries.

This type is valued at \$25 to \$50 an acre, and probably more in the most favorable locations.

MILLER CLAY.

The typical soil of the Miller clay is a dark chocolate red silty clay. There is little change from the surface downward, except that the color of the subsoil is lighter. The surface soil, though sticky when wet, works up into a fairly friable seed bed if cultivated when moisture conditions are favorable.

The type is encountered principally in the Red River bottoms. One of the largest areas occurs just east and northeast of Yarnaby and another south and southeast of Wade.

The Miller clay is composed of fine sediments washed in part from the Permian Red Beds and deposited from the overflow waters of the Red River.

The surface is flat to slightly basin-shaped in places. Much of the type has adequate drainage for cultivation, but in some locations it is wet and slightly swampy much of the time. There are a number of lakes within the type which are portions of the old river channel. Some of these are dry part of the year. There are sloughs throughout the type which could be utilized in draining the surface. The type is subject to overflows, though these are infrequent.

The Miller clay is a strong and productive soil. It is utilized largely for cotton and corn. Cotton yields 1 bale per acre in good seasons and corn 30 to 50 bushels per acre. The soil is well adapted to these crops. It is also well suited to alfalfa where drainage is good, but this crop is not grown extensively.

Much of the land is in cultivation. Forested areas support a heavy growth of bur oak, ash, bois d'arc, hackberry, pecan, elm, and other trees. Land values range from \$20 to \$40 an acre.

YAHOLA SERIES.

The Yahola soils are characterized by the chocolate-red color of the surface soils and the lighter color and lighter texture of the subsoils. They are confined to overflowed first bottoms. The reddish color of the material is due to the presence of sediments from the Permian Red Beds region. The Yahola soils differ from those of the Miller series in having lighter colored and lighter textured subsoils. The series in Bryan County comprises two types, the loam and the clay.

YAHOLA LOAM.

Typically, the Yahola loam consists of chocolate-red to dark chocolate red loam or heavy loam, underlain at variable depths by chocolate-red very fine sandy loam, which grades below into light

chocolate red to yellowish very fine sand. In places chocolate-brown silty clay loam occurs in strata at variable depths, but the lower subsoil is usually a very fine sandy loam or very fine sand. This type differs from the Miller loam principally in having a lighter textured subsoil.

The Yahola loam occurs in small bodies in the overflowed bottoms of the Red River, the largest lying south and southwest of Albany and southeast of Wade. The type covers 13.1 square miles.

The Yahola loam is easily cultivated, and is well suited to the production of corn, cotton, alfalfa, and forage crops. The type has a nearly level topography, and in most places has good drainage. It is seldom inundated.

The principal crops grown are cotton and corn, the former yielding one-half to 1 bale per acre, and the latter 35 to 60 bushels per acre. Alfalfa is grown in small fields with excellent results, yielding 4 or 5 tons of hay per acre in a season. This land is valued at \$25 to \$40 an acre.

YAHOLA CLAY.

The Yahola clay consists of a chocolate-red silty clay underlain at 10 to 20 inches by chocolate-red or light-reddish very fine sandy loam to very fine sand. This type differs from the Miller clay principally in its lighter textured subsoil.

The Yahola clay is encountered in only a few small, widely separated areas in the bottoms of the Red River. Some of the areas are old channels of the Red River, occupied within the last 12 or 15 years. The type is subject to overflow. It usually occupies the lowest positions in the Red River bottoms, and much of it has very poor drainage. Overflows cover this type more readily than the other bottom-land soils.

This type supports the same forest growth as the Miller clay. The type is partly in cultivation, and gives generally good yields, except where the lighter textured subsoil is within 12 inches of the surface. Good yields of cotton and corn are usual. With protection from overflow, alfalfa would probably do well, as it is grown successfully on this type in other counties.

DURANT SERIES.

The soils of the Durant series are dark gray to dark brown, with yellow to dark-brown subsoils. These soils are derived from soft sandstone and calcareous marl. The heavier soils were originally prairie lands, while some of the sandy types were forested. In Bryan County this series is represented by six types—the fine sand, stony sandy loam, fine sandy loam, very fine sandy loam, loam, and clay. Together they cover more than half the county.

DURANT FINE SAND.

The Durant fine sand consists of a grayish-brown, loose fine sand, underlain at 8 to 10 inches by a reddish-yellow to yellowish-red fine sand. Sometimes a yellow fine sandy loam is encountered at a depth of slightly less than 3 feet. Fragments of a reddish ferruginous sandstone are of frequent occurrence and often prevent boring to a depth of 3 feet.

There are only a few small areas of this type mapped, and these are widely separated, occurring principally in the northwestern part of the county. The type occupies smooth-topped knolls or ridges and slopes. It has good drainage.

The Durant fine sand principally supports a growth of blackjack oak and post oak and but little of the soil is in cultivation. It is adapted to vegetables, berries, and small fruits. Corn and cotton produce light yields. Owing to its small extent, the type is of little importance in this county.

DURANT STONY SANDY LOAM.

The Durant stony sandy loam comprises eroded and stony areas of the Durant fine sandy loam. The surface soil is a brown to reddish loamy fine sand¹ to fine sandy loam. At about 6 to 15 inches this is underlain by red clay, mottled with drab and yellow. In places the subsoil is yellowish. Large and small ferruginous-sandstone fragments are encountered in considerable quantities over the surface and throughout the soil and subsoil. These are usually present in such quantities as to make cultivation difficult. In the rougher areas the stones are so large in places as to form tracts of Rough stony land, but of too small extent to be shown separately on the map. In some places much of the fine earth of the surface soil has been washed away, exposing small areas of the clay subsoil. Such areas are properly classed as a stony clay, but are too small to be mapped separately.

This type is not extensive. It occurs in a number of small areas scattered throughout the county, usually surrounded by areas of the Durant fine sandy loam. The largest areas are found a few miles north and northwest of Mead. Many very small areas that could not be mapped separately are encountered within areas of the Durant fine sandy loam.

This type has been formed by the weathering and erosion of the rocks of the Bokchito formation and the Silo sandstone. It occupies steep slopes or rounded knobs or ridges. Drainage is excessive.

Very little of this soil is cultivated. It supports a growth of post oak, blackjack oak, red oak, and hickory. Owing to the steepness of

slope and the stony character of the soil this type is not suitable for cultivation. Its best use is for forestry.

DURANT FINE SANDY LOAM.

The Durant fine sandy loam is a brown fine sandy loam, underlain at about 6 to 10 inches by a lighter brown or yellowish-brown fine sandy loam of somewhat heavier texture. This quickly grades into a friable fine sandy clay, which usually becomes heavier and more plastic with depth. The color of the subsoil varies from brownish red or yellowish red with faint yellowish mottling to yellowish faintly mottled with red. Small black oxide of iron concretions are of common occurrence, especially in the subsoil. Some included areas have a reddish-brown surface soil and a red, friable subsoil, or a dull-red subsoil faintly mottled with yellow. The material of this red phase probably has been more completely oxidized than the typical soil. Sandstone fragments, often ferruginous, are of common occurrence, particularly in the higher elevations. The soil, while loose and easily cultivated, is not incoherent, but has a slightly compact structure.

The Durant fine sandy loam is the most extensive type in this county. It covers one-fourth the surface. The largest areas are encountered in a belt extending east and west through the north-central section. Some smaller areas are found in the southern part of the county, usually adjoining the larger stream valleys.

This type is derived through weathering from the sands, clays, and shales of the Bokchito formation. It has a gently rolling to hilly topography. In the prairie sections the surface is frequently dotted with small, round sandy hummocks, 20 to 60 feet in diameter, which rise 12 to 24 inches above the general surface.

The type has good drainage, and in some sections near streams the steep slopes are subject to excessive erosion. However, in most places the type has not suffered greatly from erosion, though some areas are so steep that cultivation is difficult.

Large areas of the Durant fine sandy loam in the rolling prairies have no forest growth. The largest areas, however, are quite heavily forested, mainly with red oak, post oak, and blackjack oak, with some hickory and other trees.

The greater part of this type is in cultivation. The soil is adapted to a wide variety of crops. It is especially suited to vegetables, small fruits, berries, and peaches, and is also quite well adapted to cotton, corn, sorghum, and peanuts. The principal crops grown are cotton, corn, and peanuts, with some vegetables for home use. There are a few good peach and pear orchards on the type, and some

good truck farms near the larger towns. The soil produces good yields of plums, blackberries, dewberries, and strawberries.

Crop yields vary considerably, according to the season and the cultivation. The heavy subsoil is a reservoir which holds considerable moisture, and the loose surface soil, especially when well cultivated, acts as a mulch and prevents the rapid evaporation of the soil water. Consequently the type withstands drought quite well. Ordinarily cotton yields average about one-half bale per acre. Corn produces 20 to 40 bushels per acre. These yields are easily increased with better methods of cultivation and by giving more attention to soil improvement, such as turning under cowpea vines, keeping humus in the soil, and practicing systematic crop rotation.

During the last few years a considerable acreage has been devoted to peanuts, the yields ranging from 40 to 75 bushels per acre. The soil is well suited to this legume and is improved by its cultivation. Some oats are grown on this type, and on the heavier phases fair yields of grain are obtained. Usually the oats are grown principally as a pasture crop for stock, as the light soil is not especially adapted to the production of the small grains. Kafir and milo could doubtless be grown to advantage on the type, and probably broom corn would do well.

The Durant fine sandy loam is easily cultivated and fairly productive, and is highly esteemed by the farmers of the county. It is valued at \$15 to \$35 an acre, though some farms in good locations are held for more.

DURANT VERY FINE SANDY LOAM.

The surface soil of the Durant very fine sandy loam is a grayish-brown to dark-brown very fine sandy loam. At about 6 to 10 inches this grades into a yellowish-brown sandy clay loam or heavy loam, which in turn grades at about 15 to 20 inches into a mottled yellowish and reddish clay. This passes below into heavier, plastic clay, which is mottled yellow and drab or yellow, drab, and reddish. The surface is dotted in many places with dome-shaped circular mounds of brownish very fine sandy loam. This type is easily worked and kept in good tilth.

The Durant very fine sandy loam occurs in several areas in the southern part of the county, in close association with other soils of the Durant series. The largest bodies are located in the vicinity of Platter, Colbert, and Albany. Other areas of smaller size occur in the vicinity of Achille and Kemp. There are several other very small bodies in various parts of the county.

This soil has been formed by the weathering of the Bokchito formation.

The surface of the Durant very fine sandy loam is gently undulating to gently rolling, and drainage is good.

This type is prairie land, and a large part of it is in cultivation. The soil is well adapted to cotton, corn, vegetables, small fruits, and berries. The principal crops grown are cotton and corn, with some sorghum and oats. Cotton yields one-fourth to three-fourths bale per acre, and corn 20 to 40 bushels per acre. Oats yield 30 to 50 bushels per acre. Peanuts give fairly good results. This land is valued at \$25 to \$40 an acre.

DURANT LOAM.

The Durant loam is a brown or dark-brown loam, underlain at about 6 to 10 inches by a yellowish-brown to faintly mottled yellowish-brown and reddish, crumbly clay loam or clay. This passes below into a stiff heavy clay of mottled yellowish-brown, greenish-yellow, and reddish-yellow or red color. In places the surface soil is a rather light loam. The subsoil shows but little reddish mottling in places, yellow being the dominant subsoil color. Small black oxide of iron concretions are frequently present on the surface and in the soil. Small quantities of quartz and chert gravel are sometimes scattered over the surface. In places the surface soil is only about 4 inches deep, but where it has a depth of less than 4 inches it is mapped as the Durant clay. Occasionally limestone is encountered near the surface, and it outcrops in very small areas.

The surface soil is easy to cultivate, though when wet it is sometimes slightly sticky, especially where the soil is shallow. While it may cake somewhat in dry weather, this is readily avoided by adequate cultivation.

The Durant loam is the second most extensive type in the county. It occupies the greater part of the large prairie which reaches from Durant almost to the Red River and which is about 20 miles wide from east to west. It also occupies large areas in the northern part of the county and prairie areas in the vicinity of Blue, Bokchito, and Bennington.

This soil has probably been formed by the weathering of the clays and shales of the Bokchito formation, with which sandstone and limestone are frequently associated.

Topographically the type is gently undulating to rolling prairie, with long, gentle slopes of common occurrence, and occasional deep valleys give the surface a slightly hilly appearance. In some places, especially near areas of the Durant fine sandy loam, a few small, circular sandy mounds are developed. Good drainage exists throughout most of the type. Many small draws head in the type and carry off surface water to the large streams. All these smaller streams are dry except for a few days after rains.

Practically all of this soil is in farms, and a very large part is cultivated. Originally it was prairie, and covered with the native prairie grasses. It was easily placed in cultivation and is highly esteemed as farm land, being well adapted to the general farm crops. The principal crops are cotton, corn, and oats. Yields vary with location, methods of cultivation, and the season. In good years cotton yields an average of one-half to two-thirds bale per acre and corn 20 to 50 bushels per acre. On the slopes where the soil is thin the yields are much lower, especially in dry seasons. On the other hand, some farmers on the better areas of the type get considerably higher yields of cotton, except in occasional very dry seasons. Oats yield 25 to 50 bushels ordinarily, but much higher yields are frequent. The soil is adapted to kafir, milo, sorghum, and other forage crops. Some sorghum is grown for forage and for sirup. The type is suited to truck crops, but it is not so well adapted to vegetables, berries, or fruits as is the Durant fine sandy loam. On the lighter phases of the soil peanuts can be grown to advantage. Wheat is grown to some extent on the type and returns 15 to 20 bushels per acre.

The Durant loam is a strong and productive soil, and with good management it is capable of producing large yields of a wide variety of crops. On the slopes this soil requires special attention to prevent erosion. Crop yields can be greatly increased on the Durant loam by applying barnyard manure and by keeping a good supply of humus in the soil. A systematic crop rotation, including some legumes, such as cowpeas, aids greatly in maintaining and increasing productiveness.

With careful treatment alfalfa could probably be grown on the better tracts of this soil, that is, where the soil is deep and contains considerable humus. However, alfalfa is subject to injury during the occasional dry summers. Considerable prairie grass is cut, yields ranging from one-half to more than 1 ton per acre, depending on moisture conditions.

The Durant loam is generally valued at \$30 to \$50 an acre. In some locations it has a higher value.

DURANT CLAY.

The Durant clay is a very dark brown to nearly black clay, underlain at 2 to 6 inches by a lighter colored or dark yellowish brown, tough clay, frequently faintly mottled with reddish yellow or yellowish red. The subsoil does not change much in texture within the 3-foot section, but it gradually becomes more yellowish in color as the depth increases. In places red or pink is conspicuous as a mottling in the yellow, while elsewhere the mottling is slight or lacking. Those areas showing more red in the subsoil are most typical. As

mapped the type includes some unimportant areas without red in the subsoil, which are really developments of some other type. The surface soil to a depth of 1 or 2 inches sometimes consists of a loam or clay loam or even of fine sandy loam. A few black iron concretions and some grayish calcareous lime concretions are encountered in the subsoil of some areas. In many places a brownish calcareous sandstone or shaly siliceous limestone occurs near the surface or outcrops. Small water-rounded gravel of quartz and chert and also small fragments of ferruginous sandstone are present in small quantities in some places.

The Durant clay is not an extensive type, but is found in small areas in many parts of the county. Few of these cover more than 1 square mile, and most of them are much smaller. The largest areas are encountered north and east of Achille and within a few miles of that place. The type is surrounded usually by areas of the Durant loam. In some places this soil appears to be largely the result of excessive erosion of the Durant loam. In others it is apparently derived largely from the weathering of associated shale, sandstone, and limestone.

The surface of this type is rolling to hilly. The soil frequently occupies steep slopes adjoining stream valleys and occurs on small, low, knoblike elevations in the prairies. The surface drainage is good and erosion is sometimes quite active.

A large part of the Durant clay is not in cultivation. It is a prairie soil and supports a cover of natural prairie grass and, in places, a scattering growth of trees. Cotton yields an average of about one-half bale per acre in seasons of sufficient rainfall. Corn does not do well. The land is rather difficult to cultivate, the soil being very sticky when wet and compact and hard when dry. Oats and sorghum give fair yields on this soil.

Durant clay, timbered phase.—The surface soil of the Durant clay, timbered phase, is a red clay, slightly mottled with drab. This grades below into mottled drab, yellowish, and reddish, heavy, crumbly clay. The drab color is frequently due to the presence of partially decomposed fragments of clay shale, which material is responsible for the crumbly nature of the subsoil. The reddish mottling is frequently absent in the lower subsoil. In places there is a thin covering of fine sandy loam, clay loam, or loam, but this rarely extends to a depth of more than 3 or 4 inches. Sandstone fragments are found on the surface of some areas of this phase, but not in quantities sufficient to constitute a stony or gravelly soil.

This phase is found in a number of small areas scattered throughout the forested sections of the county, usually closely associated with the Durant fine sandy loam. This soil is apparently residual from

clay shale associated with sandstone and some limestone. The topography is rolling to hilly. The soil often occupies steep slopes and the crests of ridges. The surface drainage is thorough and erosion is excessive. Doubtless much of the timbered phase has been formed by extreme erosion of the Durant fine sandy loam.

The Durant clay, timbered phase, is not cultivated extensively, but is allowed to remain in its native growth of post oak and blackjack oak. Cotton yields fairly well in areas where there is a light surface soil of dark clay or loam, provided there is sufficient rainfall.

The Durant clay and its timbered phase are improved by turning under vegetation, which builds up a surface soil containing a good supply of humus. Cowpea vines plowed under greatly improve this land.

The timbered phase of the Durant clay is inextensive, and is an unimportant soil in Bryan County.

The results of mechanical analyses of samples of the soil and subsoil of the typical Durant clay are given in the following table:

Mechanical analyses of Durant clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450445.....	Soil.....	0.0	0.9	1.4	7.5	21.1	43.4	25.7
450446.....	Subsoil.....	1.3	1.4	.9	3.7	9.4	49.2	34.4

GRAYSON SERIES.

The Grayson series includes dark-gray to brown surface soils and yellow or mottled yellow and gray stiff subsoils. The topography is generally level, and the areas of these soils are locally known as "flats." They are residual from clays and shales, with some wash from surrounding higher land. Low ridges and knolls are occasionally developed over these flat areas, and in some places gullies have been formed by erosion. The drainage is poor. Three members of the Grayson series, the very fine sandy loam, loam, and silt loam, are recognized in Bryan County.

GRAYSON VERY FINE SANDY LOAM.

The surface soil of the Grayson very fine sandy loam is a dark-gray or grayish-brown very fine sandy loam, about 10 to 20 inches deep. The subsoil is a plastic, heavy clay, drab to yellowish brown in color, and usually slightly mottled in the lower part with drab, reddish, and yellow. The soil and subsoil contain small, dark, iron concretions.

Dome-shaped mounds, 12 to 30 inches high and approximately 30 to 50 feet in diameter, are characteristic of this type. The soil of these mounds is usually a very fine sand, which grades below into a yellow or yellowish-brown loamy very fine sand or very fine sandy loam. In places the surface soil of the type is a brownish very fine sandy loam underlain by yellow, plastic, sticky, waxy clay, with some drab mottling. The substratum of the type usually consists of a mottled yellowish and drab, impervious, plastic clay, containing iron concretions. Some included areas of the type are very silty, and if large enough would be mapped as Grayson silt loam.

Though widely scattered throughout the county, this soil occurs usually in small areas. Some of the largest of these are located a few miles west and northwest of Durant, southwest of Halsell, south of Caddo, and near Bokchito. The type occupies low, basinlike areas, surrounded by members of the Durant series.

The Grayson very fine sandy loam is apparently derived from the weathering of the clays and shales that also give rise to the Durant soils but it occupies the low, poorly drained areas where aeration has been so poor that the oxidation of the clays has been less thorough than in case of the Durant types.

The type occurs in low, flat-bottomed depressions at the heads of small streams or draws. Sometimes the areas extend in strips along these streams for some distance, but where the stream becomes large enough to give good drainage there is a change to another soil type, marked by a change in topography. While drainage is rather poor on the surface and the heavy subsoil is somewhat impervious, a large part of the surface water is carried away by the small streams which head in these areas. By ditching to these stream ways, good drainage may be provided. In general the type as it is has sufficient drainage for growing good average crops.

This is a prairie type, and a large part of it is in cultivation. It is fairly well adapted to cotton, corn, oats, and sorghum, and these are the principal crops, cotton and corn being most extensively grown. Cotton yields one-fourth to one-half bale or more per acre, and corn 20 to 40 bushels per acre, depending on the season and methods of cultivation. Oats do fairly well, but this type is not so well adapted to this cereal as are the heavier soils.

The type is fairly productive, and may be greatly improved by draining, growing leguminous crops such as cowpeas, and by keeping a good supply of humus in the soil.

This soil, occurring as it does in small areas, is not important in the county, and is included in but few farms. Its market value is governed largely by that of the adjoining soils.

In the following table the results of mechanical analyses of samples of the soil and subsoil of the Grayson very fine sandy loam are given:

Mechanical analyses of Grayson very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450425.....	Soil.....	0.2	0.5	1.9	31.0	25.0	35.4	6.1
450426.....	Subsoil.....	.1	.5	1.2	21.0	17.8	31.0	28.3

GRAYSON LOAM.

The surface soil of the Grayson loam is a very dark gray to almost black silty loam or loam 8 to 12 inches deep. The subsoil to a depth of 36 inches is a dark-brown, heavy, tough clay mottled in places with gray. It has a mottled drab and reddish-yellow color in some places. Occasionally some quartz and chert gravel occurs on the surface. Iron concretions are sometimes present in the surface soil and subsoil, and occasionally lenses of gray sand are encountered in the lower subsoil. Dome-shaped mounds, like those in areas of the Grayson very fine sandy loam, are of common occurrence.

This is the least extensive soil in the county. It occupies a few small areas. One of the largest of these lies northwest of Durant, another east of Roberta, and two north of Double Springs Church. A few other very small areas are scattered throughout the county. The soil is usually closely associated with the Grayson very fine sandy loam and always adjoins areas of the Durant loam or fine sandy loam.

The Grayson loam is nearly level and is fairly well drained. It is a prairie soil and is cultivated to some extent. The type is adapted to cotton and corn, and these are the principal crops. It produces on an average one-fourth to one-half bale of cotton and 20 to 40 bushels of corn per acre. It is capable of producing 30 to 60 bushels of oats per acre, depending on the season. Sorghum does well on this type.

Owing to its slight extent this is not an important soil in Bryan County.

GRAYSON SILT LOAM.

The surface soil of the Grayson silt loam is a dark-gray to nearly black silt loam about 8 to 12 inches deep. The subsoil is a brown to very dark brown, almost black, tough, heavy clay which with increase in depth changes into a lighter colored or yellowish-brown, sticky, plastic, heavy clay, faintly mottled with drab and occasionally with

reddish yellow. Small, dark, iron concretions are present in the surface soil and subsoil.

The Grayson silt loam is of slight extent and is confined to small areas near stream heads in the Durant soils. These tracts, none of which is 1 square mile in extent, are scattered throughout the prairie sections of the county and are usually surrounded by areas of the Durant loam. Some of the larger areas lie a few miles west and northwest of Durant, north of Colbert, near Armstrong, and southeast of Caddo.

The surface of the type is practically level, and, like the Grayson very fine sandy loam, it occupies flat, basinlike areas. The surface drainage is fair, owing to the small stream channels which pass through or head in the type. Drainage is easily improved by ditching. A few of the small, dome-shaped mounds of very fine sandy loam, similar to those found in areas of the Grayson very fine sandy loam, are scattered over the surface.

This soil is apparently derived from the weathering of clays and shales of the Bokchito formation under conditions of poor drainage.

The Grayson silt loam is a prairie type, and a large part of it is cultivated. The soil is easily tilled when moisture conditions are favorable, but on drying without stirring it cakes very hard.

The soil is well adapted to cotton, which yields on an average one-half bale per acre or more in good seasons. It is not quite so well suited to corn, but gives 20 to 40 bushels per acre in good seasons. Corn yields may be increased by deep plowing, and by the incorporation of organic matter to enrich the soil in humus. The growing of cowpeas on the land, turning under the vines, is beneficial. The soil is well adapted to oats, which yield 20 to 50 bushels per acre, depending on the season. It is also well suited to wheat, sorghum, kafir, milo, and other crops.

The results of mechanical analyses of samples of the soil and subsoil of the Grayson silt loam are given in the following table:

Mechanical analyses of Grayson silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450427.....	Soil.....	0.2	0.7	1.0	11.1	18.0	56.1	13.0
450428.....	Subsoil.....	.7	.4	.6	7.0	13.6	33.8	44.0

NORFOLK SERIES.

The surface soils of the Norfolk series are prevailingly gray, ranging from light gray to grayish yellow. The subsoils are yellow, and have a friable structure. These soils occupy nearly level to rolling

uplands throughout the Coastal Plain. They are derived from unconsolidated deposits of sands and clays. The Norfolk series is represented in Bryan County by a single type, the Norfolk fine sandy loam.

NORFOLK FINE SANDY LOAM.

The surface soil of the Norfolk fine sandy loam consists of a fine sand or loamy fine sand having a depth of 15 to 24 inches. To a depth of a few inches the soil is gray or grayish brown, but below 6 or 8 inches the color is yellow, pale yellow, or yellowish brown. The surface soil grades into a yellow, friable fine sandy loam or fine sandy clay. In places the lower subsoil consists of faintly mottled yellowish and reddish, rather plastic fine sandy clay. Frequently a layer of broken sandstone fragments is encountered at the top of the subsoil. Small fragments of sandstone are present on the surface in many places, but in such small areas, or so thinly scattered, as to have little effect on the agricultural value of the land.

This is an inextensive soil in Bryan County, it being developed in only a few areas in the northwestern part. The largest lies east of Silo, and one somewhat smaller northeast of Durant. A number of much smaller areas are found in the same general section.

The Norfolk fine sandy loam has been formed by the weathering of sedimentary deposits of the formation geologically known as the Silo sandstone.

The topography is undulating to very gently rolling. The type usually occupies the higher locations and seems to be a remnant of an old table land. Where the topography becomes more rolling and slopes away from the type the Durant fine sandy loam is encountered. The Norfolk fine sandy loam is surrounded by areas of that type or of the Durant stony sandy loam. The type has excellent drainage throughout, and water passes readily downward through the soil.

Some areas of this type are heavily forested with post oak, red oak, blackjack oak, and hickory.

A large part of the type is in cultivation. It is not a very strong soil, but conserves moisture well and gives fairly good yields. The soil is well adapted to cotton, peanuts, vegetables, melons, plums and other small fruits, peaches, and berries. The crops grown most extensively are cotton and corn. Cotton yields one-third to one-half bale per acre, and sometimes more. Corn ordinarily produces 10 to 25 bushels per acre, but better yields are easily made possible by growing leguminous crops and by keeping a good supply of humus in the soil. Some peanuts are grown, and produce excellent yields. Sorghum does well, and makes a fine grade of sirup as well as good forage.

This type is well suited to the extensive growing of fruit and vegetables. The production of peanuts for market also offers good opportunities. The land is valued at \$10 to \$25 an acre.

SUSQUEHANNA SERIES.

The Susquehanna soils are gray, ranging to reddish. The subsoils are mottled gray and red or gray, red, and yellow, and consist of plastic, heavy clay. The color of the subsoils varies, often being red, white, drab, yellow, and sometimes purple, although red practically always predominates, the other colors appearing only as mottlings in the lower part of the section. The Susquehanna series is most extensively developed in the higher part of the Coastal Plain, from the vicinity of Chesapeake Bay to Central Texas. Only one member of this series is encountered in Bryan County, the Susquehanna very fine sandy loam.

SUSQUEHANNA VERY FINE SANDY LOAM.

The surface soil of the Susquehanna very fine sandy loam is a gray very fine sand or very fine sandy loam. In places the soil is grayish yellow in color immediately beneath the surface. At about 10 to 15 inches a mottled yellow and grayish silt loam to clay loam is encountered. The subsoil, beginning at 15 to 20 inches, consists of a plastic clay, mottled red, reddish drab and gray, or yellowish brown. In some localities the surface soil is only about 10 inches deep, and is underlain by a yellow heavy clay, which grades below into a mottled yellow, red, and drab, or red and gray, heavy, plastic clay. On slopes the surface soil is frequently underlain at a few inches by very heavy, plastic red clay, which below 18 to 24 inches is mottled with gray. The surface soil of this type is easily cultivated.

This type occurs in a number of large areas throughout the southern part of the county. The largest area is found in the southeastern corner of the county, a few miles south and southeast of Jackson.

The type occupies gently undulating to rolling country and has good drainage. On the dune-shaped mounds common to the type the very fine sandy material extends to a greater depth than over the intermound portion. In some places the surface is dissected by small streams. In such areas the soil is very shallow over large tracts.

The Susquehanna very fine sandy loam supports a forest growth of post oak, red oak, hickory, and other trees. A large part of the type is cultivated. Where the soil is deep, yields are fairly good, but on many slopes where erosion has caused the soil to become thin the yields are very light. The soil is adapted to vegetables, cotton, corn,

fruit, and berries. The principal crops grown are cotton and corn. Cotton yields one-third to one-half bale per acre, and corn 15 to 30 bushels. Sorghum does well. Peanuts thrive where the soil is not shallow.

The better phases of the type are quite productive, and with good cultural methods, utilizing the natural means of fertilization, crop yields are easily increased.

Land values range from \$10 to \$30 an acre, and perhaps more in favorable locations. Some prosperous farms are located on this type.

HOUSTON SERIES.

The Houston soils are black. The subsoils are dark brown, yellowish brown, or mottled yellow and gray, or brown and gray, and usually highly calcareous. The series is developed principally in the black calcareous prairie regions of Alabama, Mississippi, and Texas. The material is derived from the weathering of calcareous clays, chalk beds, and rotten limestones, all of Cretaceous age. In some localities remnants of later sandy and gravelly deposits have been mixed with the calcareous material, giving rise to the gravelly and loam members of the series. Four members of the Houston series are recognized in Bryan County—the clay loam, silty clay loam, stony clay, and black clay.

HOUSTON CLAY LOAM.

The surface soil of the Houston clay loam consists of about 6 to 12 inches of a black or dark-brown clay loam or silty clay loam. The subsoil to 36 inches is a brown to black, heavy clay. Sometimes the subsoil is a mottled yellowish-brown and drab clay. Fossiliferous hard limestone of a white or yellowish color is sometimes encountered within the 3-foot section. The surface soil is friable and easily worked when not too dry or too wet. When wet the soil is quite sticky.

There are only two or three small areas of this type in the county, and these are located about 2 miles north of Durant. They comprise a total area of 2.2 square miles.

This soil has been formed by the weathering of fossiliferous limestones. The areas of limestone where the type occurs are small. The resultant soil was originally the Houston black clay, and the surrounding sandy material (Durant fine sandy loam) has contributed sufficient coarse material to form the lighter textured clay loam. The surface is gently undulating, and drainage is good.

The soil is well adapted to cotton, corn, oats, wheat, sorghum, and probably alfalfa. This is a prairie soil, and the crops most extensively grown are cotton, corn, and oats. Cotton yields one-half bale per acre and more in good seasons; corn, 25 to 40 bushels; and oats,

30 to 70 bushels. Yields of corn and oats exceed these figures in very favorable seasons.

HOUSTON SILTY CLAY LOAM.

The Houston silty clay loam is a nearly black, heavy loam to silty clay loam, underlain at about 6 to 12 inches by a dark-drab to very dark brown, tough clay which passes below into mottled drab and brown, plastic, heavy clay. This is mottled below a depth of about 24 inches with reddish brown and reddish yellow.

This type is very inextensive, being found in only a few small areas. It occurs in depressions or level areas surrounded by the Durant loam, near the city of Durant.

The surface is nearly level, but the soil is fairly well drained by streams which pass through the type.

The Houston silty clay loam is mostly in cultivation, and is well adapted to cotton, corn, and oats, which are the principal crops. Cotton yields an average of about one-half bale per acre, corn 25 to 30 bushels, and oats 35 to 60 bushels. This is a strong, productive soil.

The results of mechanical analyses of samples of the soil and subsoil of this type are given in the following table:

Mechanical analyses of Houston silty clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450417.....	Soil.....	0.2	0.5	1.4	13.4	15.4	45.2	23.8
450418.....	Subsoil.....	.2	.6	1.2	16.0	14.1	36.8	30.8

HOUSTON STONY CLAY.

The soil material of the Houston stony clay consists of a few inches of black, heavy clay underlain by a brown, yellow, or whitish, very calcareous clay. The surface is thickly strewn with limestone fragments, while the bedrock is usually near the surface, and frequently outcrops. The rock fragments are so numerous and some are so large that cultivation is extremely difficult except where they have been removed.

This type is encountered only in narrow strips and in no large areas. It is closely associated with the Houston black clay, and is usually surrounded by that type where it occurs in the widely scattered areas throughout the northern part of the county. Very small areas of the type are found elsewhere in the county in close association with the Durant soils. Many of these areas are too small to be

indicated on the map, and the soil material has frequently been more or less modified by the accumulation of some of the coarser soil materials from the Durant types.

This type is the result of excessive erosion. It is developed mainly on the steep slopes, and represents the badly washed areas of Houston black clay. The type is formed where the process of erosion of the soil proceeds as rapidly as the weathering of the rocks, so that but little soil material remains in place.

The Houston stony clay has a rough surface and occupies gentle to very steep slopes and precipitous blufflike positions. Usually the areas are very narrow, many of them being only 100 to 200 feet wide. The type generally occupies only the first steep slopes, the lower part of the slopes being more gentle and consisting of Houston black clay. In the vicinity of Caddo the principal areas of the type extend east and west across the county, as a more or less broken escarpment which divides undulating areas of Houston black clay, the areas of the latter type south of the escarpment lying 50 to 100 feet lower than those on the higher prairies.

This type has a low agricultural value. It is not cultivated except along the margins of the areas where the soil is not very stony. It is adapted to about the same crops as the Houston black clay, but the yields are lower. In places there is a growth of bois d'arc, post oak, hackberry, and elm.

HOUSTON BLACK CLAY.

The surface soil of the Houston black clay is a black, heavy, waxy clay about 10 to 20 inches deep. The subsoil to a depth of 36 inches is a brown or yellowish-brown heavy, sticky clay. In places the lower subsoil is faintly mottled with drab. The lighter colored subsoil is not always encountered within the 3-foot section, but it is always present in the substratum. The subsoil usually contains numerous small lime concretions, or soft particles of whitish, calcareous material. In some areas on the steeper slopes limestone is found at less than 36 inches. Such areas are not large and occur where erosion has been excessive. Where the limestone is near the surface the rock outcrops in places and fragments are strewn over the surface, giving rise to the Houston stony clay. In some places the type has a few limestone fragments on the surface, and occasionally near sandstone areas a few small, ferruginous sandstone fragments are present on the surface.

When wet the soil is very sticky and cultivation impossible, and, on drying, the surface becomes hard and compact. Under proper moisture conditions it works up into a mellow, friable tilth with a loamy structure. These tendencies are doubtless due to the large amount of lime in the soil.

This is an important soil type. It occurs in a long belt 1 to 5 miles wide extending along the northern border of the county, unbroken except by areas of the Houston stony clay. This belt gradually narrows toward the east, and in the northeastern part of the county it is interrupted by small areas of the Durant loam and fine sandy loam. A few small areas of the type are encountered near Allison in the central part of the county, and one occurs about 2 miles southeast of Achille. There are also several very small areas just north and east of Durant. This type is derived from limestone which has weathered deeply.

The Houston black clay has an undulating to rolling topography, and has good drainage throughout its extent. It is a prairie soil, and is locally known as "black land." In its native condition, before cultivation, the land has numerous slight inequalities which are called "hog wallows."

The type is well adapted to cotton, corn, oats, wheat, alfalfa, sorghum, kafir, milo, and other crops. Though fruits and vegetables may be grown on this soil it is not so well adapted to them as are the sandy soils of the county. The principal crops grown are cotton, corn, and oats. Cotton yields one-fourth to 1 bale and corn 30 to 50 bushels per acre, while oats yield as high as 90 bushels per acre, though ordinarily between 40 and 60 bushels. Yields vary according to season and the methods of farming employed. In seasons of very light rainfall yields of all crops are very low. The soil is well adapted to alfalfa, and this crop is grown to some extent by a few farmers. It suffers, however, during dry summers.

This type is a strong productive soil, and nearly all of it is improved and cultivated. It is held at \$45 to \$60 an acre, except near railroads, where it has a somewhat higher value. Some of the type in good locations can not be bought for less than \$75 to \$100 an acre.

TRINITY SERIES.

The Trinity soils are predominantly black, ranging to dark brown. They occupy first-bottom alluvial lands, usually being developed as flat lands in comparatively shallow stream valleys. They are derived mainly from material washed from soils of the Houston series. The Trinity clay is the only member of this series mapped in Bryan County.

TRINITY CLAY.

The Trinity clay is a black or very dark brown heavy clay, underlain at about 12 to 20 inches by drab or very dark drab clay. When wet it is very sticky.

This soil occurs in narrow strips along the Blue River and along some of the smaller streams in the northern part of the county. It is also encountered in the bottoms of Clear Boggy Creek and along some of its tributaries in the extreme northeastern corner of the county.

The soil consists of alluvium carrying considerable material washed from the Houston soils. It is developed in the overflow bottoms of streams. The surface of the type is nearly flat, but drainage is very good. Although the soil occupies bottom lands, overflows are not of frequent occurrence.

Some of the type is in cultivation, and it is a strong and productive soil. Cotton and corn are the principal crops grown. Cotton yields 1 bale per acre when conditions are favorable, and corn 30 to 50 bushels per acre. The type is well adapted to alfalfa where protected from overflow. Uncultivated areas support a heavy forest growth consisting of post oak, elm, ash, bois d'arc, pecan, and other trees. This land is valued at \$25 to \$50 an acre.

BREWER SERIES.

The Brewer series is the terrace equivalent of the Osage. The surface soils are dark gray to black and the subsoils are drab to black with grayish and rusty-brown mottlings. This series occupies stream terraces. The material is derived mainly from residual prairie soils. In the lower situations drainage is poor. The Brewer very fine sandy loam, silt loam, and clay types are recognized in Bryan County.

BREWER VERY FINE SANDY LOAM.

The surface soil of the Brewer very fine sandy loam is a dark-gray to brown very fine sandy loam. At a depth of about 6 or 8 inches the color becomes lighter, being usually gray, and this lighter colored material is very silty. At 12 to 15 inches the soil is underlain by a brown or mottled drab and yellowish-brown, heavy, tough clay, with occasional reddish spots. The surface soil and subsoil frequently contain a few small iron concretions.

There are a number of small, dome-shaped mounds scattered over the surface. These are about 20 to 40 feet in diameter and 18 inches to 3 feet high. The soil of these mounds is a brown very fine sand or very fine sandy loam, underlain by a light-brown very fine sandy loam. The soil is lighter in texture near these mounds, while some distance away from them the silt content is high. The type includes some areas of the Brewer silt loam too small to be shown on the map.

This type is easily cultivated in the lighter areas, but where the silt content is high the surface bakes rather hard in dry weather, making

cultivation more or less difficult. If handled under proper moisture conditions, this heavier phase works up into good tilth.

The Brewer very fine sandy loam occurs in widely scattered areas, many of which are very small. One of the largest areas occurs 1 mile south of Albany, and several others south and southwest of Achille, east of Colbert, and a few miles northwest of Platter. A number of small areas are encountered along many of the narrower stream bottoms in various parts of the county, one area lying along Mineral Bayou at Durant, and several along Blue River and a number of creeks.

The soil occupies high stream terraces and consists of alluvium deposited when the streams flowed at higher levels than at present.

The topography of the Brewer very fine sandy loam is flat to very gently sloping. Drainage is rather poorly established. However, the natural drainage is sufficient for crop production, though ditching greatly improves the land. The type is not overflowed.

This type supports a growth of oak, elm, post oak, and some other trees. Much of it is in cultivation and the soil is quite productive. It is adapted to cotton, which yields one-fourth to three-fourths bale per acre, depending on the season, local drainage, and methods of cultivation. Corn does not do so well as cotton on this soil. It yields about 20 to 35 bushels per acre. Corn yields are easily increased by drainage, by keeping a good supply of humus in the soil, and by growing cowpeas. Cotton and corn are the principal crops on the type. Some oats are grown, yielding 20 to 40 bushels per acre. Sorghum does well. On the lighter phases vegetables, small fruits, and berries succeed. Farms of this type are valued at \$20 to \$35 an acre.

BREWER SILT LOAM.

The surface soil of the Brewer silt loam is a gray to dark-gray or brown silt loam, underlain at 12 to 15 inches by a mottled yellowish-brown and drab, heavy, plastic clay. A faint reddish mottling is apparent in places. Sometimes the color of the subsoil is uniformly drab or yellowish brown, while in other places it is more or less mottled. Small black oxide of iron concretions are present on the surface and throughout the soil and subsoil. Dome-shaped mounds of brownish very fine sand underlain by light-brown very fine sandy loam are common. Between the mounds in some of the lower, more poorly drained places, the surface soil is rather dark. There are some included patches of loam which are of too little importance to separate.

This type is encountered in several small areas on terraces which lie above overflow along the north edge of the Red River bottoms. It is widely distributed throughout the southern part of the county.

In addition, there are a number of small areas along the narrower stream bottoms in various other parts of the county. The largest area lies just north of Wade and is 2 or 3 square miles in extent. It includes some areas of silty clay loam and also some patches of light gray silt loam resembling the Neosho silt loam. The Brewer silt loam usually occurs in close association with the Brewer very fine sandy loam, and is so mixed with that type in places that a separation on the map is not possible.

The type occupies portions of flat or very gently sloping terraces above stream bottoms. In most places the terrace formation is well marked by the steep escarpment, dropping a few feet to the first bottoms on one side and by the rolling upland on the north. Drainage is rather poor, owing to the flat surface and impervious subsoil, but ordinarily it is sufficient to permit farming. The land is easily improved by ditching.

Much of this land is in cultivation, though it is not highly esteemed, because in dry weather it packs hard and is difficult to cultivate. However, if cultivated when moisture conditions are favorable the surface can be kept in a good tilth. As a rule moisture conditions do not remain favorable for very long periods. Owing to the impervious nature of the subsoil and the flat surface, the soil remains too wet to cultivate for some time after rains. The land is considered much better suited to cotton than to corn. Cotton yields one-fourth to three-fourths bale per acre, and corn 20 to 35 bushels per acre. The physical condition of the soil is greatly improved by increasing the organic content. The growing of cowpeas or other legumes increases the productiveness of the type. Sorghum and other forage crops do well. The soil is not so well suited to vegetables as the more sandy types, but where drainage is good they can be grown successfully. Oats produce well on the type, yielding 25 to 30 bushels per acre.

Where uncultivated this land supports a forest growth of elm, post oak, and other trees. It is valued at \$20 to \$35 an acre.

The results of mechanical analyses of samples of the soil and subsoil of the Brewer silt loam are given in the following table:

Mechanical analyses of Brewer silt loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450451.....	Soil.....	0.1	0.4	1.2	9.7	23.7	55.5	9.1
450452.....	Subsoil.....	.0	.4	.8	6.7	23.0	37.5	31.4

BREWER CLAY.

The surface soil of the Brewer clay is a very dark brown to black clay about 8 to 12 inches deep. The subsoil is a dark-brown, yellowish-brown, or drab, plastic, sticky clay. Sometimes the subsoil is slightly mottled with brown where the color is drab. In those areas occurring in association with the Teller soils the subsoil in places is a reddish-brown to mottled reddish-brown and drab, tough, plastic clay. Occasionally small areas are found with 1 or 2 inches of lighter textured soil, ranging from very fine sandy loam to clay loam, at the surface. Occasionally dome-shaped mounds of brownish very fine sandy loam are present. The type includes small spots of whitish soil.

The type is found only in a few small areas in this county. It occupies small parts of the terraces standing above overflow along the larger stream bottoms. The largest areas are less than a square mile in size. Two of these lie south and east of Yarnaby on a terrace a few feet above the Red River bottom lands. There are a few very small areas along the Blue River and Island Bayou.

The material consists of old alluvium, deposited when the streams flowed at higher levels. The surface is nearly flat to very gently sloping, though in some locations the areas are slightly basinlike. The flat and slightly depressed tracts have poor drainage.

Little of this type is in cultivation. The natural growth consists principally of post oak, water oak, and elm.

The Brewer clay is quite a heavy soil, and is difficult to cultivate. Cotton does well on the type in the better drained locations, yielding about one-half bale per acre. The soil is not so well adapted to corn, but with proper tillage and better drainage it is capable of producing fair yields. Oats should do well with proper drainage. There is very little of this type in the county.

The results of mechanical analyses of samples of the soil and subsoil of the Brewer clay are given in the following table:

Mechanical analyses of Brewer clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450441.....	Soil.....	0.0	0.2	0.6	5.2	22.0	42.1	29.8
450442.....	Subsoil.....	.1	.6	1.0	4.4	16.4	54.1	23.4

TELLER SERIES.

The soils of the Teller series are gray, with yellow to red subsoils. They occupy well-drained stream terraces. These soils con-

sist of old alluvium, washed mainly from residual prairie material. Three members of the Teller series, the fine sand, fine sandy loam, and very fine sandy loam, are mapped in Bryan County.

TELLER FINE SAND.

The surface soil of the Teller fine sand is a grayish or brownish-gray fine sand about 6 to 12 inches deep. The subsoil to a depth of 3 feet or more is a fine sand of pale-yellow to yellowish-brown color, often having a reddish cast. Along some of the slopes small, rounded quartz gravel and quartz fragments are present. The soil is loose and incoherent, and where cleared it drifts somewhat before heavy winds when dry. In places a red fine sandy clay or fine sandy loam is encountered at about 36 inches. Where the heavier subsoil material is encountered at less than 36 inches the soil is mapped as the Teller fine sandy loam.

The Teller fine sand is not an extensive type in this county. It occurs in a few areas in the southwestern part of the county.

This soil occupies high, nearly level to gently undulating old river terraces which have been eroded to some extent. A few miles south of Colbert the type is encountered in one or two areas on the first terrace above the Red River bottom, in close association with the Teller very fine sandy loam and the Brewer very fine sandy loam. All other areas of the type occupy higher terraces. Five miles west of Colbert the type adjoins the Red River bottoms, the boundary being marked by a sloping bluff rising 50 to 75 feet above the bottom lands.

The type has good drainage, owing to the porous nature of the subsoil and substratum.

Where uncleared this soil supports a heavy growth of blackjack oak and post oak. A large part of the land is in cultivation, the crops grown consisting principally of cotton and corn, with some sorghum as a forage crop. Cotton produces one-fourth to one-half bale per acre and corn 10 to 25 bushels.

The Teller fine sand is adapted to vegetables, watermelons, cantaloupes, small fruits, and berries. Peaches do quite well on it, though but little of this fruit is grown. Plums succeed, and peanuts produce good yields.

This soil is greatly improved by growing cowpeas and by turning under cowpea vines and other vegetable matter to provide a good supply of organic matter. Heavy applications of barnyard manure are beneficial. This land is valued at \$20 to \$30 an acre.

TELLER FINE SANDY LOAM.

The surface soil of the Teller fine sandy loam is a grayish to grayish-brown loamy fine sand, which at about 2 to 6 inches grades

into a pale-yellow, yellowish-brown, or slightly reddish brown loamy fine sand. At depths of about 15 to 30 inches the soil is underlain by a red to dull-red fine sandy loam or friable fine sandy clay. The surface soil is loose and only very slightly coherent, and is easily cultivated throughout a wide range of moisture conditions.

This type occurs in one area of 8 square miles in the southwestern part of the county, beginning 1 mile northwest of Platter. It occupies the high river terrace above the Red River bottoms.

The surface is very undulating to almost level. Drainage is good throughout the type.

A large part of this type is in cultivation. However, much of it is forested with a growth of post oak, blackjack oak, and some hickory. The soil is utilized principally for corn and cotton. Yields of cotton range from about one-fourth to three-fourths bale per acre, and corn yields from about 15 to 35 bushels per acre. While this is a very light-textured soil for these crops, the yields are fairly good on account of the moderately heavy subsoil, which conserves soil water very well, and crops do not suffer so much in dry seasons as they sometimes do on the types of heavy surface soils. Crop yields are easily increased by growing cowpeas on the land and by keeping a good supply of humus in the soil by plowing under vegetable matter. Barnyard manure is highly beneficial. This soil makes good yields of sorghum. It is adapted to peaches, plums, and other small fruits, vegetables, melons, and berries, and these crops are grown successfully, but only in a small way. It is a very good trucking soil. Peanuts make good yields, and are valuable for improving the soil. They should prove as profitable on this type as on the Durant fine sandy loam. Some apples are grown on the type, and this fruit does well. This land is valued at \$25 to \$35 an acre.

TELLER VERY FINE SANDY LOAM.

The soil of the Teller very fine sandy loam is a light-brown or slightly reddish brown very fine sandy loam about 8 to 15 inches deep. The subsoil is a red or dull-red, friable, fine sandy clay or, in places, heavy fine sandy loam. In some places the subsoil is a chocolate-red or pinkish-red fine sandy clay. The surface soil, while light, is fairly coherent and easily cultivated. It is mellow and works up easily into a seed bed of excellent tilth. The surface does not have the distinct chocolate-red color of the Miller soils or the corresponding Bastrop soils which have been found in other areas.

This type is extensive, being developed in large areas in the western and southern parts of the county on the old river terraces which border the Red and Washita Rivers for many miles. The largest areas occur south and west of Kemp and in the vicinity of

Finchtown and Ladelle. Smaller areas border the Red River bottom across the southern part of the county and occur along the Washita River bottom in the northwestern corner of the county.

The Teller very fine sandy loam has a nearly level to very gently undulating surface and lies above overflow. Along the Washita River it ranges from 25 to 50 feet or more above the river bottoms. Along the Red River there are two and sometimes three terraces above the bottoms. The first of these is about 25 to 40 feet above the overflowed lands, the second is 15 to 25 feet higher, while the third, occupied by the Teller very fine sandy loam, high-terrace phase, is doubtless more than 100 feet above the river. The soil has very good drainage, the poorly drained areas of the terraces usually comprising soils of the Brewer series. The soil is somewhat coarser on the slopes, but only in very small areas.

The Teller very fine sandy loam is one of the best agricultural soils in the county. It is adapted to a large number of crops, is easily cultivated and very productive, and responds readily to improvement. The soil is well suited to corn, cotton, vegetables, peaches, small fruits, and berries. Peanuts make large yields on this soil. The land is nearly all cultivated to cotton and corn. Cotton yields one-half to 1 bale per acre and corn 25 to 50 bushels per acre. Sorghum is grown as a forage crop and makes good yields. Some oats are grown and yield well. Oats make a valuable winter pasture crop on this type. Some alfalfa is grown with good results. The native forest growth consists mainly of red oak and post oak.

This land is valued at \$30 to \$50 an acre, and some farms are held at a higher price.

Teller very fine sandy loam, high terrace phase.—The soil of this phase averages somewhat grayer at the surface than that of the typical Teller very fine sandy loam occurring on the smoother and younger lower terraces. The soil consists dominantly of grayish-brown or yellowish loamy very fine sand to slightly reddish brown very fine sandy loam, underlain at about 10 to 20 inches by red to dull-red friable fine sandy clay.

This phase occupies several areas, aggregating 26.6 square miles, in the southwestern part of the county. The towns of Colbert and Kemp are located on the largest of these areas.

The high terrace phase occurs on the older, highest terraces of the Red River. It stands considerably above the smoother terraces of the typical soil and about 100 feet or more above the first bottoms of the Red River. The surface configuration is prevailingly gently rolling. This uneven surface is due to erosion by the encroaching drainage ways.

The material constituting this phase has the same origin as that of the main type, as is evidenced by the peculiar red color of the subsoil,

which is the same as that of the typical soil. Some material corresponding to the upland soils proper, and consisting of old Red River alluvium, is included in patches along the lower slopes of drainage ways.

This phase has the same crop adaptation and practically the same agricultural value as the typical soil. Yields average lower, however, over large areas owing to the less favorable topography. A large part of the phase is heavily forested with red oak, post oak, and hickory.

The results of mechanical analyses of samples of the soil and subsoil of the typical Teller very fine sandy loam are given in the following table:

Mechanical analyses of Teller very fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450455.....	Soil.....	0.1	2.0	6.8	17.0	37.0	29.5	7.6
450456.....	Subsoil.....	.2	1.8	6.8	18.8	23.5	34.0	14.9

VERDIGRIS SERIES.

The Verdigris series includes brown soils with brownish subsoils. These soils are alluvial and occur along the streams in the Great Plains region. The material has been washed largely from the limestone, sandstone, and shale soils of the prairies. The Verdigris soils occupy first bottoms and are subject to overflow. They are decidedly silty in texture and are often underlain at considerable depth by gravel and sand. The drainage, both surface and subsurface, is good. This series is the brown equivalent of the Osage. Only one type is mapped in Bryan County—the Verdigris fine sandy loam.

VERDIGRIS FINE SANDY LOAM.

The Verdigris fine sandy loam is a dark-gray to brown or dark-brown fine sandy loam throughout the 3-foot soil section. The subsoil is generally somewhat lighter in color than the surface. In places the surface soil has a slightly reddish color, due to overwash from adjoining areas of Durant soils. The type includes patches of Osage loam which are not large enough to be shown separately on the map. In one area along the Blue River the soil and subsoil of this type are rather darker than the typical. In places the soil is lighter than usual, without a markedly loamy texture, being a loamy fine sand, less productive than the heavier soil.

The Verdigris fine sandy loam is developed along many of the small streams of the county. It occupies narrow, flat-bottomed val-

leys, and is subject to inundation after heavy rains. Few of these bottoms are over one-fourth mile wide. The surface is nearly flat, but the porous structure of the soil gives good drainage.

This soil is formed by the deposition of material washed principally from areas of the Durant fine sandy loam.

Much of the type is forested with water oak, red oak, hackberry, elm, and other trees. Some of it is in cultivation, and good yields are usual. Cotton and corn are the principal crops. Cotton yields one-half to 1 bale per acre, and corn 25 to 40 bushels. The type is well suited to peanuts, vegetables, small fruits, and berries.

OSAGE SERIES.

The Osage soils are dark gray to almost black. They consist of alluvial wash from the sandstone and shale soils of the prairie regions. They are poorly drained and subject to overflow. The Osage series is represented in Bryan County by two types, the loam and the clay.

OSAGE LOAM.

The surface soil of the Osage loam is a brown or dark-brown to almost black loam. It is underlain at about 8 to 12 inches by a dark-brown heavy loam or clay, which quickly grades into a dark-drab clay mottled with brown, or a dark yellowish brown, tough, heavy clay. The type is quite variable in texture, ranging from a heavy loam to heavy fine sandy loam, and in places the subsoil is mottled with various colors. Very small areas of Verdigris fine sandy loam, clay loam, and clay occur in the type, but can not be shown separately on the map.

The Osage loam is encountered in various parts of the county, and occurs in the narrow bottoms along the smaller streams. The widest developments are along Blue River and Island Bayou. The bottoms are rarely over one-half mile wide.

The soil is alluvial in origin, and consists of reworked material washed principally from areas of the Durant loam.

The surface is flat to very gently sloping. The drainage is fair in most areas. Overflows are very rare and do not prevent farming on the type.

The type supports a thick growth of hackberry, elm, bois d'arc, post oak, and other trees. Much of the land is in cultivation. Cotton and corn are the principal crops. Cotton yields one-half to 1 bale per acre and corn 25 to 60 bushels. The well-drained areas are well suited to alfalfa. Sorghum does well on this soil, and oats can be grown to good advantage, but this crop has a tendency to grow too rank and often lodges badly. This land is valued at \$20 to \$35 an acre.

OSAGE CLAY.

The surface soil of the Osage clay is a dark-brown to black, heavy clay. This grades at 10 or 12 inches into a brown or yellowish-brown, heavy, plastic clay, which is usually faintly mottled with drab.

There are two main areas of the type in this county. The largest lies along the Blue River in the southeastern part of the county and the other along the lower reaches of Island Bayou in the southern part. A smaller area is developed along Muddy Creek, east of Kemp. There are two small areas in the Red River bottoms which consist of black clay underlain by dense black clay showing brownish mottlings or having a dark-drab color in the lower part. The bottom lands occupied by this type are over 1 mile wide in places, but usually they are somewhat narrower. The soil is composed of sediments washed from areas of other soils of the region.

The surface is flat and in places the type has very poor drainage. However, ordinary tillage operations provide sufficient drainage for crop production. In some of the more poorly drained locations there are slight depressions or "hog wallows."

A large part of this type supports a heavy growth of water oak, red oak, ash, elm, bois d'arc, hackberry, pecan, and other trees. Where cultivated the land is utilized almost entirely for cotton and corn. Cotton yields 1 bale per acre and corn 25 to 50 bushels per acre in the better drained areas. Alfalfa should grow well in the better drained places. This soil is strong and productive. It is very difficult to work when wet, but where cultivated under favorable moisture conditions it assumes a fairly mellow and loamy structure. The Osage clay is a good agricultural type and damaging overflows from the streams are very infrequent. Land of this type is valued at \$20 to \$35 an acre.

The following table gives the results of mechanical analyses of samples of the soil and subsoil of the Osage clay:

Mechanical analyses of Osage clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	<i>Per cent.</i>
450415.....	Soil.....	0.0	0.4	0.8	3.8	9.1	54.7	31.5
450416.....	Subsoil.....	.0	.2	.4	3.4	8.0	46.3	41.8

SUMMARY.

Bryan County is located in the southeastern part of Oklahoma, within the Coastal Plain province. It has an area of 928 square miles, or 593,920 acres. The surface is undulating to rolling over the

greater part, but some small areas are rough and hilly. The county is bordered by some large stream valleys, and is dissected by a large number of small streams. The elevation of the county ranges from a little less than 500 feet to more than 700 feet above sea level.

The greater part of the county is well settled.

The climate is mild, with no great extremes of temperature. The mean annual temperature is 62° F., and the mean annual precipitation is 43.31 inches. Ordinarily the precipitation is sufficient for the production of crops.

Transportation facilities are good. There are a number of railroads in the county, and wagon roads are good as a rule.

The agriculture of the county consists primarily of general farming, with some stock raising. Cotton is the main crop, and corn and oats rank next in importance. There are a few peach and pear orchards, but the fruit industry is not important.

A large part of the land is farmed and the cultivated area is being extended. Farms range in size ordinarily from 80 to 160 acres. Land values are rather low, ranging from \$20 to \$50 an acre for good farm land, though some lands sell for a higher price.

Thirty-one soil types are recognized in Bryan County. The upland soils are derived from sedimentary formations, and the soils of the first bottoms and terraces are composed of alluvial deposits. The upland soils are by far the most extensive. The Durant fine sandy loam, Durant loam, Houston black clay, Teller very fine sandy loam, and the Susquehanna very fine sandy loam are the most extensive types mapped.

The soils range in texture from fine sand to clay. Two inextensive fine sand types, the Durant fine sand and the Teller fine sand, occur in the county. These soils are adapted to vegetables, but are utilized principally for corn and cotton. Where cultivated, only moderate yields are realized.

A very fine sand type, the Miller very fine sand, is encountered in narrow strips along the Red River. It has little agricultural value.

Of the fine sandy loams, the Durant fine sandy loam is the most extensive. It is an upland soil, well suited to truck crops, peanuts, and fruits. This is not an ideal soil for cotton and corn, but these crops are grown exclusively and do well. They apparently suffer less in seasons of dry weather than when growing on the heavier soils.

The Teller fine sandy loam and Norfolk fine sandy loam are two types of slight extent with much the same adaptability and agricultural value as the Durant fine sandy loam.

The Verdigris fine sandy loam is an inextensive alluvial soil, well suited to cotton and corn.

The Grayson very fine sandy loam, Durant very fine sandy loam, and Susquehanna very fine sandy loam are types located throughout the upland regions of the county. These soils are well adapted to cotton, corn, and vegetables. Cotton and corn are the principal crops produced on these types.

The Miller very fine sandy loam is an alluvial soil along the Red River. It is adapted to cotton, corn, vegetables, and, in places, to alfalfa. A large part of the type is cultivated. Good yields of cotton and corn are obtained, these being practically the only crops grown.

The Teller very fine sandy loam is an extensive type, occurring on the old river terraces of the Red and Washita Rivers above overflows. This type is very productive and is adapted to a wide variety of crops. A phase of the Teller very fine sandy loam occurs on very high, gently rolling terraces. The best areas of this type are well suited to alfalfa. The land is utilized principally for cotton and corn, and good yields are usual.

The Brewer very fine sandy loam is a less extensive type which occupies small areas on the stream terraces above overflow. This type is poorly drained as a rule but produces fair yields of cotton. Corn does not do so well.

The Durant loam is a very extensive prairie type. It is farmed extensively and good yields are obtained. Cotton, corn, and oats are the principal crops, and the soil is well suited to them. On many slopes the surface soil of this type is being removed by erosion, with a consequent deterioration in crop value. With care the Durant loam is capable of producing heavy crop yields, and many excellent farms are located on the type.

The Grayson loam, a nearly level type, occurs in close association with the Durant loam and has about the same crop adaptation. There are only a few areas of this soil in the county.

The Osage loam and Miller loam are extensive types of alluvial soils. They occupy stream bottoms. Cotton, corn, and alfalfa do well on these soils. Cotton and corn are the principal crops grown.

The Yahola loam is an alluvial type occurring in the Red River bottoms. It is well suited to cotton and corn and is mainly devoted to these crops.

Two silt loam types are recognized in the county—the Grayson silt loam and the Brewer silt loam. The former type occurs in small areas which are distributed throughout the prairie section of the county and are usually surrounded by the Durant loam. It produces good yields of cotton, but is somewhat less well suited to corn. Oats do well. The Brewer silt loam occurs in several small areas on terraces along the Red River bottoms and throughout the southern part of the county. The soil packs in dry weather and drainage con-

ditions are poor. It is somewhat better suited to cotton than to corn.

A silty clay loam is encountered in a few very small spots on the prairies, and this soil is classed with the Houston series. Although a good cotton, corn, and grain soil, it is of very little importance because of its slight extent.

The Houston clay loam also occurs in only a few small areas. It is a good corn, cotton, and grain soil.

The Houston black clay is an extensive prairie type which is particularly adapted to small grains, cotton, and corn. Oats, cotton, and corn are the main crops and produce good yields. This soil is very heavy and crops suffer during prolonged periods of dry weather unless good cultural methods are employed.

The Durant clay and the timbered phase of the type occupy small areas on eroded slopes, and do not have, as a rule, a high agricultural value.

The Miller clay is an alluvial soil developed along the Red River. This type is especially adapted to cotton, corn, and alfalfa. Good yields of cotton and corn are made. But little alfalfa is grown.

The Yahola clay occurs in the same locations as the Miller clay. It differs from the latter in having a lighter subsoil and a slightly lower agricultural value.

The Osage clay is also an alluvial soil. It occurs along some of the smaller streams of the county and has about the same adaptability and crop value as the Miller clay.

The Brewer clay is encountered in a few small areas on low stream terraces. It is adapted to cotton and corn and should prove fairly well suited to alfalfa.

The Trinity clay is an inextensive stream-bottom soil, well suited to cotton, corn, and alfalfa.

The Houston stony clay and Durant stony sandy loam are types of little value. They occupy narrow slopes and are not cultivated.

[PUBLIC RESOLUTION—No. 9.]

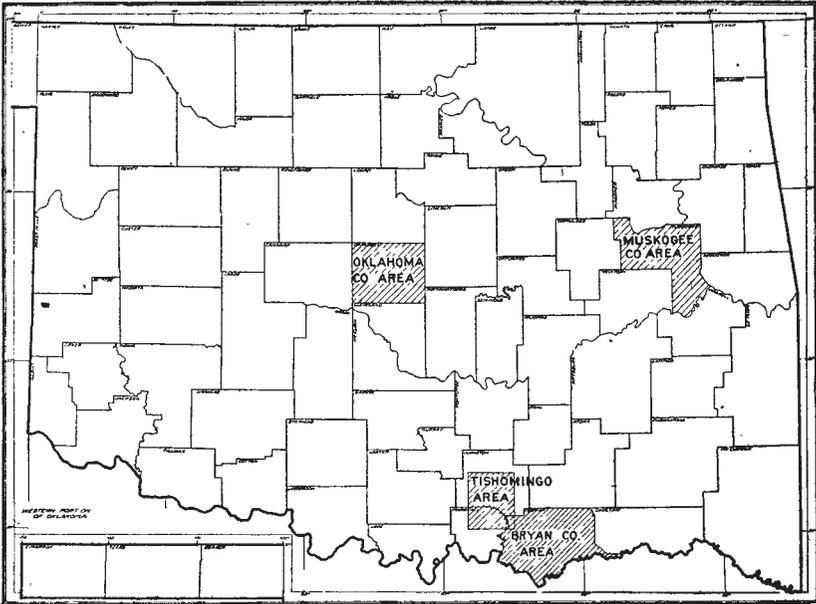
JOINT RESOLUTION Amending public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, "providing for the printing annually of the report on field operations of the Division of Soils, Department of Agriculture."

Resolved by the Senate and House of Representatives of the United States of America in Congress assembled, That public resolution numbered eight, Fifty-sixth Congress, second session, approved February twenty-third, nineteen hundred and one, be amended by striking out all after the resolving clause and inserting in lieu thereof the following:

That there shall be printed ten thousand five hundred copies of the report on field operations of the Division of Soils, Department of Agriculture, of which one thousand five hundred copies shall be for the use of the Senate, three thousand copies for the use of the House of Representatives, and six thousand copies for the use of the Department of Agriculture: *Provided*, That in addition to the number of copies above provided for there shall be printed, as soon as the manuscript can be prepared, with the necessary maps and illustrations to accompany it, a report on each area surveyed, in the form of advance sheets, bound in paper covers, of which five hundred copies shall be for the use of each Senator from the State, two thousand copies for the use of each Representative for the congressional district or districts in which the survey is made, and one thousand copies for the use of the Department of Agriculture.

Approved, March 14, 1904.

[On July 1, 1901, the Division of Soils was reorganized as the Bureau of Soils.]



Areas surveyed in Oklahoma.

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