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U. S. DEPARTMENT OF AGRICULTURE,

BUREAU of SOILS--MILTON WHITNEY, Chief

SOIL SURVEY OF THE TISHOMINGO AREA,
INDIAN TERRITORY.

BY

THOMAS D. RICE AND ORLA L. AYRS.

[Advance Sheets-Field Operations of the Bureau of Soils, 1906.]



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF SOILS,
Washington, D. C., October 3, 1906.

SIR: At the official request of the Indian Farmers' Union a soil survey was made of the Tishomingo area, Indian Territory, during the winter season of 1905-6, for the purpose of ascertaining the different types of soil, studying their characteristics, and learning their adaptations to various crops. I transmit herewith the report and map covering this area and recommend their publication as advance sheets of the Field Operations of the Bureau of Soils for 1906.

Respectfully,

MILTON WHITNEY,
Chief of Bureau.

Hon. JAMES WILSON
Secretary of Agriculture.

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SOIL SURVEY OF THE TISHOMINGO AREA, INDIAN TERRITORY.

By THOMAS D. RICE and ORLA L. AYRS.

DESCRIPTION OF THE AREA.

The Tishomingo area is situated in the south-central part of what was at the time of the survey Indian Territory. It lies wholly within the subdivision known as the Chickasaw Nation, and the eastern boundary approaches within 3 miles of the Chickasaw-Choctaw line. The area is almost a perfect quadrangle, and is bounded on the east by meridian $96^{\circ} 30'$ on the south by parallel 34° , on the west by the

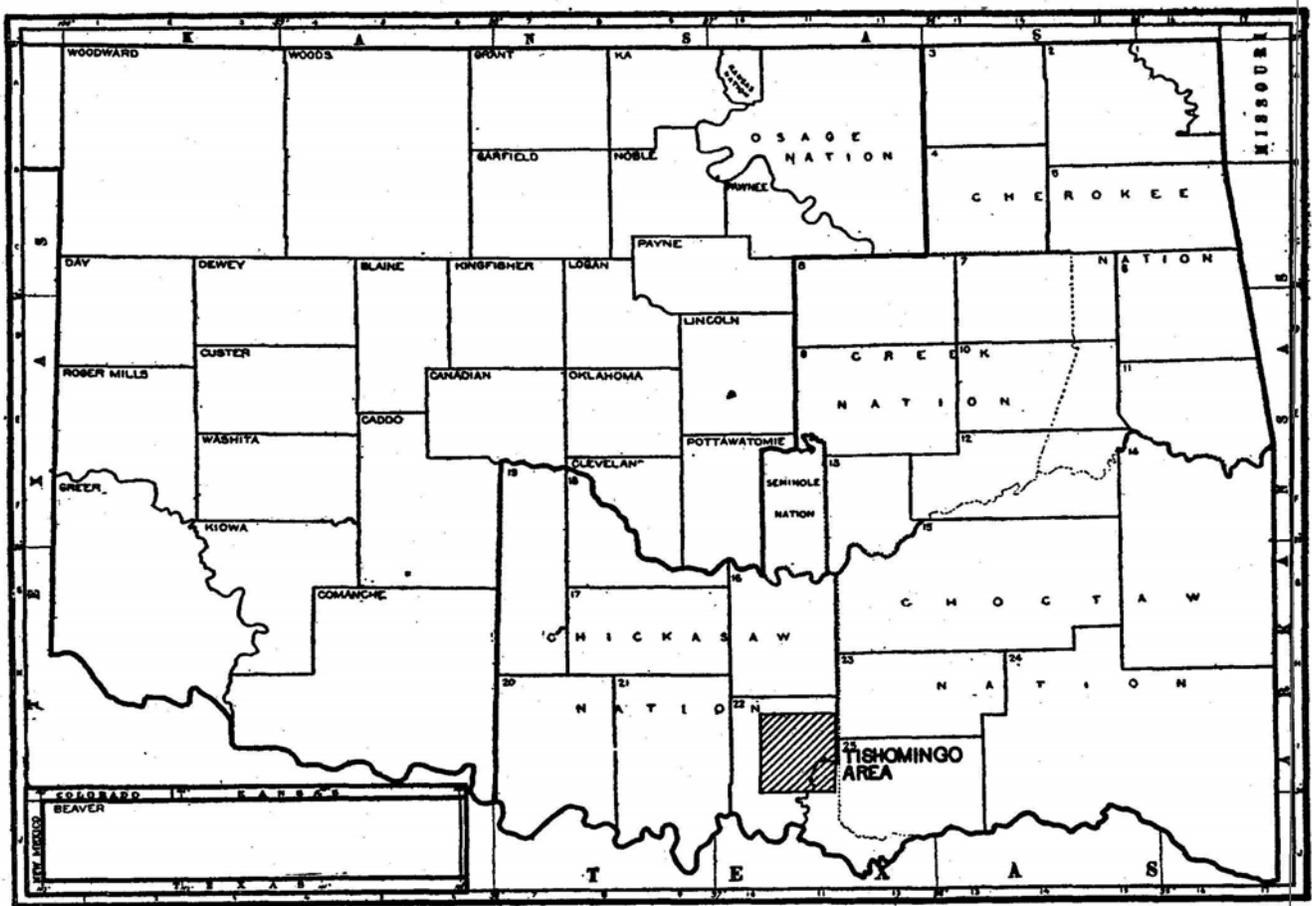


FIG. 1.-Sketch map showing location of the Tishomingo area, Indian Territory.

western line of range 6 east, and on the north by the northern boundary of township 3 south.

In elevation above sea level, the range is from 550 feet in the southeastern part of the area to more than 900 feet in the northwestern part. The surface is gently rolling to rough and broken, and with the exception of the alluvial lands along the Washita River, there are no considerable areas of perfectly level land. The diversity of

surface features has been brought about by the unequal resistance that rock strata of different degrees of hardness have offered to the agencies of erosion. There are portions of two main physiographic provinces included within the area North of Tishomingo is a portion of the Arbuckle Mountain region. It consists of a vast stretch of flattened, rounded granite hills, with two small rougher areas where faults have presented resistant limestones. The general slope of this region is toward the south and the drainage is effected by numerous small parallel streams.

The whole of the area south of the Arbuckle region is a part of the great Red River Plain. It is composed of several Cretaceous formations and recent river sediments. The topographic features of this region depend upon the hardness of the strata cut by the Washita River and its tributaries. Where the lowest member of the Cretaceous -- the soft, easily eroded Trinity sand -- has, not been capped and protected by harder strata, a gently rolling topography has been produced, but where the sand has been overlain by limestone, erosion has resulted in shelves and bluffs overlooking deep and rugged valleys. In the thicker limestone and sandstone areas, where the streams have not cut through to the Trinity sand, there are wide stretches of rolling prairies, with occasional benches marking the terminations of different formations.

The entire drainage of the Tishomingo area is into the Red River. Its largest tributary is the Washita River, which enters this area about midway of its western border, flows in an easterly and then in a southeasterly direction nearly to the southeastern corner of the area, and then turns and flows in a southwesterly direction, leaving the area about 7 miles from the southeastern corner. Blue River, flowing across the northeastern part of the area, is the second stream in importance. There is only a small proportion of the area surveyed that can not be classed as agricultural land.

The land ranges widely in value, but as a whole the agricultural resources of the area are very great. At the present time, the country is thinly settled and is capable of supporting a much larger population.

All industries are in an undeveloped condition, a state of affairs due in part to an unstable government, but more to the uncertainty regarding the ownership of land. So jealously has the National Government guarded the right of the Indians to the land that the country has offered little attraction to home seekers other than persons of Indian blood or intermarried citizens. The Indians and the intermarried citizens may sell their land under certain restrictions after a patent has been obtained, but as comparatively few patents

have been issued up to this time the amount of land on the market has been small. The landowners have in most cases leased part or all of their holdings, which brought in a tenant class that hoped later to be able to purchase land of their own. Many of these despaired finally of becoming landowners and moved away. In later years, a better class of settlers has been coming into the country. Flourishing towns have been established and progressive and well equipped farmers are pushing out into the country. This influx of settlers is due to the expectation of a speedy removal of the restrictions on the sale of land and the establishment of self government in the Territory. A large proportion of the settlers in this part of the Indian Territory are from Arkansas and Texas and are familiar with the climate and agricultural conditions.

Tishomingo is the oldest town of the area and the seat of the tribal government of the Chickasaw Nation. It has a large trade in cotton and other produce and cotton gins and oil mills are operated. Millburn, situated 9 miles east of Tishomingo, has a large country trade, and does a good cotton business. Ravia, 6 miles, west of Tishomingo, is also a trading point of growing importance. Madill is situated at the crossing of two lines of railroad and commands the trade of a large section of the black prairie country. Besides these towns, Emet, Troy, Bee, and Aylesworth furnish markets for the people.

The area is well provided with railroad facilities. A branch line of the Chicago and Rock Island system passes through the area in a northeastern and southwestern direction, touching Milburn and Tishomingo. A main north-and-south line of the St. Louis and San Francisco system passes Troy, Ravia, and Madill, and at the latter point crosses an east-and-west branch of the same system.

The country roads, except where they have been improved by private enterprise, are in a neglected condition. No road laws were provided for the Chickasaw Nation, and the roads as laid out owe their existence to the sufferance of the landowners. No appropriations have been made by the tribal government for the construction and maintenance of roads, and the incorporated towns, except in a few instances, have not felt able to provide roads through the country. As soon as the status of Indian Territory is determined, and the people can assess a tax and provide laws for the purpose, the subject of good roads will be taken up. The limestone and shale rocks covering a large part of the area furnish a good road material at small cost. Bridges are much needed at several points along Washita River. The only bridge across this stream is a toll bridge near Tishomingo, constructed by private capital.

Climate.

No climatic records are available for any point nearer than Healdton, Ind. T. A table of the normal monthly and annual temperature and precipitation for this place is given below. It will be seen that the average annual temperature is 62° F., indicating that this section is well within the warmer part of the Temperate Zone. The rainfall throughout the area is probably slightly heavier than at Healdton, as that point is nearer the region of scanty rainfall. The Tishomingo area has abundant rainfall, and the distribution is fairly uniform throughout the year.

Normal monthly and annual temperature and precipitation.

Month.	Healdton.		Month.	Healdton.	
	Tempera- ture.	Precipi- tation		Tempera- ture.	Precipi- tation
	°F.	Inches.		°F.	Inches.
January	41.3	1.56	August	83.1	2.25
February	41.7	1.28	September	75.9	2.54
March	54.2	2.55	October	64.3	2.52
April	63.8	3.26	November	53.9	2.30
May	70.8	5.63	December	42.5	2.54
June	78.5	2.83			
July	82.4	3.70	Year	62.7	32.96

The following table of first and last killing frosts is nearly correct for this area. On the average about two hundred days, between April 13 and October 30, are free from killing frosts. The frost records are of particular interest to the farmers of the area at this time, as many desire to grow peaches on a large scale. There are soils especially favorable to the peach and markets are assured, but the industry is so dependent on the question of late spring frosts that it is impossible to determine at this time whether the percentage of successful years would be sufficient to make peach growing profitable. A number of orchards are in bearing, and good crops have been grown in favored localities for several years in succession.

Dates of first and last killing frost.

Year.	Healdton.		Year.	Healdton.	
	Last in spring.	First in fall.		Last in spring.	First in fall.
1898	April. 6	Oct. 21	1902	Apr. 1	Nov. 17
1899	Apr. 9	No. 3	1903	May 1	Oct. 24
1900	Apr. 13	Nov. 12	1904	Apr. 10	Oct. 27
1901	Apr. 18	Oct. 14	Average	Apr. 13	Oct. 30

AGRICULTURE.

The early agriculture of the area, as carried on by the Indians and a shifting white population, consisted chiefly of stock raising and the growing of such crops as supplied the immediate needs of the population. Corn was the principal food crop, though some wheat and oats were grown at an early date. As soon as agricultural conditions become more settled cotton was introduced as the chief money crop, a position it has held until the present time. The quantity of cotton grown at different periods has fluctuated, but during recent years its production has been greatly stimulated by the high price and the better facilities for marketing both lint and seed.

At the present time cotton and corn are the principal crops, though there is a hopeful tendency toward a diversification of the crops, and the farmers display an eagerness to take up any new crop that promises to be successful. The growth of towns furnishing local markets for all kinds of farm produce has created an interest in dairying and the production of fruits and vegetables. The improved facilities for shipping to distant markets have led to the consideration of the possibilities of profitable truck farming. It is to be hoped that the tendency toward diversification of crops will continue in spite of high prices for cotton.

No records are available as to the value of the principal crops of the Tishomingo area alone, but the data collected by the Census Bureau for the Chickasaw Nation May be taken as fairly representative of this area, if allowance is made for the improvements in the methods of farming since 1900. The average yields of corn for the entire nation is given as 31 bushels per acre, and for oats 30 bushels. The average yield of cotton was estimated at 140 pounds of lint per acre, but as this area contains the best of the cotton lands its average is much higher, being at least 180 pounds per acre. As those estimates are based on all lands under cultivation, and include much poor and almost worthless land, they do not by any means show the capabilities of the better class of the prairie and bottomlands. A large part of these lands will average three-fourths of a bale of cotton per acre, and small, exceptionally productive tracts have yielded an average of more than a bale to the acre for a period of ten years.

Crop yields will be increased by better cultivation when the farms now held by tenants pass to the ownership of those who have a close interest in their cultivation and have a regard for the permanent improvement of the land. Some of the land owned by landlords and farmed by transitory tenants has been subjected to the poorest and most exhausting system of cultivation. No care has been taken in the preparation of the land for planting; it has been broken to the shallowest possible depth, and often the old cotton stalks are not

disturbed when the new crop is planted. The virgin productiveness of the land has made it possible to grow crops without better cultivation, but as the soil must inevitably deteriorate by such a system a more thorough preparation of the land will be necessary.

There has been little attempt as yet to devote the several types of soil to the crops to which they are best adapted. Corn and cotton are grown indiscriminately over the area and the wheat and oats are generally grown on all types of soil. Some of the river soils are cropped almost continuously to cotton on account of the heavy yields. It would be expected that the black prairie land would be devoted largely to wheat, as this type of soil in Texas is a favorite wheat soil, but for some reason wheat has never produced well in this area. Oats, however, produce heavily on this soil. Peach orchards have been planted on all types of soil, but it is generally recognized that peaches thrive best on the more sandy soils. Some quite extensive orchards are now being planted on the Orangeburg fine sandy loam and the Teller fine sandy loam, and both types are well suited to the crop.

The agricultural methods hitherto employed have been those necessary or unavoidable in a newly developed country, but there is a rapid improvement going on throughout the area. Better farm buildings are now being erected, the use of improved machinery is now general, and more attention is paid to the selection of seed for planting and to better cultural methods. As has been stated, the greater part of the land is owned by the Indians and intermarried citizens and a large part of it is leased to white settlers. There is a great demand for land and the farms would soon be broken up if the owners could sell. The price of land on the black prairie where sales have been made ranges from \$20 to \$35 an acre. The best of the river land sells for \$40 or more, while the price of the upland soils ranges from \$20 to almost nothing. It is expected that when statehood is secured and the restrictions upon the sale of land removed there will be a rapid enhancement of land values.

The average size of farms is naturally large, as the land drawn by the Indian family is usually kept intact for some time. In the Chickasaw Nation, the average farm is 198 acres. Only about 11 percent of the farms are operated by the owners.

The labor available for use on the Farms is scarce. White men are hired almost exclusively, as there are few negro laborers outside the towns. Very little help is employed by the farmers except in the busy seasons. The greater part of the country labor is employed in clearing land, which is usually done by contract. There are men who follow this work exclusively, moving with their families and camping or occupying temporary quarters on the land until the work is completed.

No expenditure is made for commercial fertilizers anywhere in the area, but it is likely that fertilizers will eventually be used on the light sandy soils. The better soils do not respond to any form of commercial fertilizers and some do not show any effect from the application of stable manure.

The natural productiveness of these new soils and their yields under the most indifferent cultivation is apt to make the farmer believe that this condition will last indefinitely. It has been the history of every newly settled country that after a period of reckless and destructive exploitation of the resources of the soil the quality of the lands deteriorates and that it is often expensive and laborious to restore them to their former productiveness. It is earnestly to be hoped that the farmers of this section will from the first so treat their land that this loss of crop producing power will not result. That a proper crop rotation and judicious cultivation will maintain the good condition of these soils is unquestioned, but continuous cultivation to one crop and poor cultural methods will soon bring about an impoverished condition of the soil.

SOILS.

Thirteen types of soil, including Rough stony land and Meadow, were mapped in the Tishomingo area. These soils range in texture from the loosest sands to heavy clays. The relations of the rock strata are in places complex and the soils in a general way conform to outcrops of the various geological formations. The important soil forming rocks are those of the pre Cambrian and Cretaceous ages. The Silurian rocks, such as the Arbuckle limestone, are not important soil makers, as they are so resistant to weathering that they stand up as very stony areas or bare rock outcrops. Again, some of the strata are too thin to produce any distinct soil type.

The granite masses which cover the northern part of the area have weathered into a gravelly loam. It is the only soil derived largely from the Tishomingo granite and is seldom pure, as the weathering of a very fine strata of limestone has modified it in many places. The wash from the granite material has entered into the composition of the Harley sandy loam, which occupies the border of the granite area and is usually in contact with the Trinity sand.

The Trinity sand is the lowest member of the Cretaceous and represents a littoral deposit in a shallow Cretaceous sea as it encroached upon the granite hills. It comes in contact with the granite everywhere except in the western part of the area, where along a fault line masses of Carboniferous and Silurian rocks occur. The Trinity sand, originally a white loamy, though somewhat compact sand, has

weathered on the surface to a white or gray loose sand, underlain by a reddish sandy clay. The soil type thus formed has been called the Orangeburg fine sandy loam.

South of the great granite outcrop and along the winding course of the Washita River, a band of alluvial soils has been deposited. As is generally the case near a stream of this size, the assorting power of the water has given areas of soil types of widely varying composition. In this case the soils vary in texture from the loose Teller fine sand to the heavy Wabash clay. The soils of the Miller and Teller series have more of a reddish color than those of local derivation and show distinctly the effect of wash from the Permian Red Beds that are along the headwaters of the Washita and west of the border of this area.

South of the town of Emet, on the left bank of the Washita and covering almost the whole of the area above the alluvial lands of the right bank, are newer strata of the Cretaceous. They consist of limestones, marly shales, and calcareous sandstones, and nearly all contain marine fossils in great abundance. The soils derived from limestone rocks have not been favorable to forest growth, so that the greater part of the exposure is a rolling prairie. Scrub trees of a few species are found only along the stream courses. The characteristic soil derived from the limestone rocks is the Houston black clay. Near the contact with more sandy formations the sand has modified the character of the soil and another type has been formed, which is called the Houston loam.

Above the limestone sandy strata again occur and give rise to a series of lighter soils. The Bokchito formation, a fossiliferous marly sandstone, produces a characteristic brown fine sandy loam called Durant fine sandy loam. Above it is the pure sandstone of the Silo formation, which weathers into a loose sand called the Durant sand.

The following table gives the area and proportional extent of each of the types of soil mapped:

Areas of different soils.

Soil	Acres	Per cent.	Soil	Acres	Per cent.
Houston black	75,392	26.6	Teller fine sandy loam	11,712	4.1
Orangeburg fine sandy loam	53,888	19.0	Harley sandy loam	8,832	3.1
Houston loam	32,768	11.6	Wabash Clay	6,016	2.1
Tishomingo gravelly sandy loam	29,696	10.5	Durant sand	4,288	1.5
Durant fine sandy loam	25,728	9.1	Meadow	3,904	1.4
Miller loam	17,856	6.3	Teller fine sand	1,344	.5
Rough stony land	12,032	4.2	Total	283,456	-----

ROUGH STONY LAND.

The term Rough stony land has been applied to areas occupied by rock outcrops or strewn with rock fragments to such an extent that cultivation is impracticable. Most of these areas support a growth of wild grasses which furnish good grazing.

In the northern part of the survey these areas occur as long, narrow strips bordering the streams, where there are frequent outcrops of granite. A few small areas of the same material are found at the crests of the divides. Along the western boundary, west of Mill Creek and north of Washita River, is a large area of nearly level prairie with steep bluffs along the stream courses. Fully half of its surface is occupied by upturned strata of Arbuckle limestone. At the point where Blue River enters the survey is an area of like character about 1 mile in extent. The narrow irregular areas occurring through the central and southern part of the survey consist of limestone cliffs and steep rocky slopes strewn with fragments of the same material.

TISHOMINGO GRAVELLY SANDY LOAM.

The soil of the Tishomingo gravelly sandy loam consists of a brown sandy loam containing a variable quantity of small gravel and has an average depth of 10 inches. The subsoil is a gravelly clay, which varies from red to drab in color in different parts of the area. Its gravel content is usually greater than that of the soil. In some cases the gravel increases rapidly, until at 3 feet the underlying material is a mass of disintegrated rock.

The type occupies large irregular areas extending across the northern part of the survey. In its widest part north of Tishomingo this soil occupies a nearly level prairie, sloping gently to the south. Several small intermittent streams have their origin here and flow out through slightly depressed valleys. Along the larger water courses which traverse this type the surface is more irregular, in some cases becoming quite rough and broken.

Owing to the porous nature of this soil, due to the large gravel content, drainage water is rapidly carried away, and the type suffers from drought unless the rainfall is evenly distributed throughout the growing season.

The Tishomingo gravelly sandy loam is a residual soil derived from the weathering of Tishomingo granite, frequent outcrops of which occur throughout the type. During the Cretaceous period a shallow sea extended over this region, and a small amount of sediment was deposited. In the level areas of this type the sediments have been incorporated with the soil, making it slightly heavier in texture and somewhat darker in color. On the steeper slopes all trace of these sediments has been removed by erosion.

The more level areas of this type form prairies covered with a growth of wild grasses, which furnish good grazing and a fair grade of wild hay. Some of this type has been brought under cultivation and planted to cotton and corn. Cotton usually yields from one third to one-half bale per acre. Corn yields a fair crop in a favorable season, but owing to its porous nature the soil dries out quickly and a short period of drought ruins this crop. For some distance back from the streams this soil is covered with a scrub growth of timber mostly oak. Very little of this type has been improved, and its low crop value will hardly warrant the expense of clearing.

The texture of the fine earth of samples of Tishomingo gravelly sandy loam is shown in the following table:

Mechanical analyses of Tishomingo gravelly sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14217	Soil	13.9	18.2	7.4	13.2	15.4	22.0	9.9
14218	Subsoil	8.7	13.9	5.3	9.4	7.3	19.3	36.1

HARLEY SANDY LOAM.

The soil of the Harley sandy loam varies from a grayish-brown loamy sand to a sandy loam from 8 to 12 inches deep, with an average depth of 10 inches. This is underlain to a depth of 3 feet or more by a waxy, tenacious clay varying in color from red to yellow and occasionally drab. Both soil and subsoil contain small quantities of gravel, consisting of quartz and feldspar crystals derived from weathered granite.

This type is found in irregular areas to the south of the Tishomingo gravelly sandy loam the largest areas being north and northeast of Tishomingo. Similar areas occur between Tishomingo and Ravia, and one area nearly a mile in extent lies west of Ravia.

The Harley sandy loam occupies low rolling hills and slopes of small stream valleys. The porous nature of the soil and undulating topography insure ample drainage, while the heavier subsoil retains sufficient moisture to produce good crops.

This type of soil is partly residual in origin and partly sedimentary. Small areas are derived from weathering of the Tishomingo granite, but the greater proportion is derived from Cretaceous sediments which were laid down as a shore deposit along the southern border of the granite. These sediments were an outwash from the surface of the older formation and are identical in character with the residual material derived from the weathering of the granite.

The Harley sandy loam was originally covered with timber, mostly

oak and the greater proportion is still in forest. Small areas have been cleared and planted to corn and cotton. Good yields of these crops have been obtained, but it is probable that after a few years of cultivation the returns would rapidly decrease. This soil is best adapted to potatoes, truck crops, and small fruits. It resembles in many respects some of the best peach soils. A few trees were noted on the type, and in every case showed good growth.

The following table gives the average results of Mechanical analyses of fine earth samples of this soil:

Mechanical analyses of Harley sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14403, 14582	Soil	3.2	6.6	1.8	16.3	22.2	42.9	6.5
14404, 14583	Subsoil	1.4	3.2	1.1	7.5	9.7	37.1	39.4

ORANGEBURG FINE SANDY LOAM.

The soil of the Orangeburg fine sandy loam is a fine, loamy sand varying in depth from 12 to 24 inches, with an average depth of 16 inches. The surface 6 inches contains a considerable quantity of organic matter, causing it to be somewhat heavier and darker in color than the deeper soil. Below this depth the soil is usually a dark gray in color, but in some cases is a light gray and in others yellow or red. The subsoil to a depth of 36 inches is a sandy clay, usually red in color, but occasionally mottled or yellow. At a depth of 5 or 6 feet the clay is usually underlain by a fine sand varying in color from red to chalky white.

The Orangeburg fine sandy loam is most extensively developed in the northeastern part of the Tishomingo area. Other large disconnected areas extend west and south from the main body of the type, along the bluffs of the Washita River. One large area is found at the head of the valley drained by Glasses Creek, extending westward from Madill to the boundary of the survey.

The greater proportion of this type is a gently rolling valley slope extending northward from the bottoms of the Washita River. In the vicinity of Emet and south of the river the formation from which it is derived is covered by a more resistant limestone capping, and the Orangeburg fine sandy loam occurs as steep slopes at the foot of precipitous bluffs. At such points rapid stream cutting is still going on. The soil is badly washed and furrowed by deep gullies which extend back to the foot of the bluffs, rendering the land almost valueless for agricultural purposes.

The undulating topography and porous character of this type

insure ample drainage at all times, while the heavy subsoil retains sufficient moisture to insure good plant growth, except in very long periods of drought.

The greater part of this type is derived from the Trinity sand through the process of weathering. This formation consists of unconsolidated sediments which were laid down as a shore deposit at the beginning of the Cretaceous period. Two small areas north of Linn and others in the vicinity of Bee are derived from a terrace formation which is of recent origin, geologically speaking, but does not differ from the other in its soil forming properties.

The Orangeburg fine sandy loam was originally covered with a scanty forest growth, mostly oak. The timber is of inferior quality and of little value except for cross ties and firewood. At present about one-tenth of the type is under cultivation, the rest being still in forest. Corn and cotton are the principal crops grown. Cotton produces from one-third to one-half bale and corn from 15 to 25 bushels per acre. The soil is best adapted to potatoes, truck crops, and small fruits, and is also well adapted to peaches. A few small orchards have been started and it would seem advisable to extend the cultivation of this fruit.

The character of this soil is such that continuous cropping will soon decrease its productivity, but by practicing some good system of rotation containing cowpeas or some other leguminous crop, its present producing power should be maintained indefinitely.

The following table shows the average results of mechanical analyses of samples of the Orangeburg fine sandy loam:

Mechanical analyses of Orangeburg fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14407, 14580	Soil	.1	2.7	3.3	47.0	31.6	11.7	3.3
14408, 14581	Subsoil	.2	2.1	4.8	43.0	16.2	9.4	23.5

MILLER LOAM.

The soil of the Miller loam consists of a red fine sandy or silty loam having an average depth of 16 inches. The typical subsoil is a silt loam heavier than the soil and of the same characteristic red color. In places, however, the subsoil does not become heavier in texture, but may even become more sandy. The soil has an excellent texture for general farming, and tillage is easy under all conditions.

The Miller loam occurs in narrow strips along the Washita River or in larger bodies in bends of the river and on lowlands subject at times to overflow. The color, texture, and productiveness of this

soil suggests that it is composed largely of wash from the Permian Red Beds which outcrop on the upper course of the river west of the limits of this survey. The greater proportion of the type is found on the upper terraces along the Washita, which represent former flood plains, but which are now cut through by the rivers and left above all danger of overflow. Intermediate strips of this soil are within the limits of occasional overflow, while narrow strips near the stream are frequently flooded. The lower areas are usually variable in texture, ranging from silty clays to fine sandy loams within short distances. These strips have never been cleared of the heavy forests of cottonwood, oak, and other hardwoods which originally covered the whole of the Miller loam.

The upper areas of the Miller loam are naturally well drained, and the very level areas can easily be drained, as the land lies well above the highest level of the river and the soil itself is porous enough to allow a free movement of water.

The high productiveness of the Miller loam makes the better situated areas of the type the most desirable land of the area. While all crops of the region do exceptionally well, cotton is perhaps the most profitable, and it is to this crop and to corn that the land is chiefly devoted. A yield of more than 1 bale of cotton to the acre has been the average on some parts of this soil during the period of ten years that it has been under careful cultivation. Though cotton has been grown too constantly on much of this soil, there is as yet no decrease of production. The average yield of corn is from 40 to 60 bushels per acre, though good farmers exceed this average. The soil is well adapted to oats and to all truck crops. Alfalfa would probably be more successful on the well drained areas of this soil than on any other type of the area.

The following table shows the average results of mechanical analyses of the Miller loam:

Mechanical analysis of Miller loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14372, 14578	Soil	Tr.	0.1	0.1	2.0	38.7	48.1	10.7
14373, 14579	Subsoil	.0	.1	.1	4.2	22.5	54.5	18.2

TELLER FINE SANDY LOAM.

The soil of the Teller fine sandy loam is it fine sandy loam of gray or yellow color and is underlain by a red or yellow heavy fine sandy loam. The soil resembles that of the Orangeburg fine sandy loam,

being, however, slightly loamier in places. The subsoil is stiffer and heavier than that of the Orangeburg fine sandy loam. This type also differs from the other in its position, origin, and topography.

The Teller fine sandy loam is found in large areas south of the Washita River in the, vicinity, of Russet and east of Cumberland. It occupies the highest terrace of the Washita River and is above the limit of the highest overflows. The type occupies a level or gently rolling topography and has good natural drainage. The uncleared areas are covered with a thick growth of oak, but very large trees are rare.

The Teller fine sandy loam is of sedimentary origin, having been deposited along the Washita River when that stream occupied a much higher level than now, the level of the terrace being from 20 to 50 feet above the present level of the river.

The productiveness of the type depends upon the shallowness of the soil. The areas where the depth of the soil exceeds 18 inches are usually not so productive as when the subsoil approaches nearer the surface. Near Russet the type gradually merges into the Miller loam. Where the soil has a reddish color it is usually more productive. Some good farms are to be seen on this type, near Russet. Cotton and corn are the principal crops. The yield of the former ranges from one-half to two-thirds bale per acre and of corn from 30 to 40 bushels. Some attempt is being made to grow fruit, and a peach orchard is being set out near Russet. The soil is well adapted to peaches, and if the climate is favorable the venture should be a success.

The average results of Mechanical analyses of samples of the Teller fine, sandy loam are given below:

Mechanical analyses of Teller fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14420, 14574	Soil	0.5	4.2	6.1	33.4	21.7	25.9	7.8
14421, 14575	Subsoil	.1	2.1	3.9	17.0	27.1	27.9	21.6

TELLER FINE SAND.

The soil of the Teller fine sand has an average depth of 10 inches, and is a medium fine sand containing considerable organic matter which gives it a gray color. The subsoil to a depth of 36 inches or more is similar to the soil, but lacks the organic matter and has a yellow color. In the oxbow bends of the river south of old Fort Washita the soil is light red in color, and there is no perceptible

change between the soil and subsoil. The loose, sandy nature of this type makes cultivation easy at all times.

This is the least extensive of any type in the Tishomingo area. An area covering about 1 square mile is found north of Teller. Other small areas occur north and east of Russet. The type is found entirely in the bottom lands along the Washita, and consequently has a nearly level surface. It has sufficient elevation above the river to insure good drainage at all times. The type is of sedimentary origin, having been laid down by the waters of the Washita River when it occupied a higher stage than at the present time.

The Teller fine sand was originally covered with a forest growth of oak, ash, elm, and cottonwood, but has now nearly all been brought under cultivation. The principal crops grown are cotton and corn, cotton producing from one-fourth to one-half bale per acre and corn from 15 to 25 bushels. The soil is well adapted to potatoes, melons, and other truck crops and small fruits. Better returns can be obtained from these than from the staple farm crops.

Continued cultivation quickly exhausts the humus and lowers the productivity of a soil of this character. To prevent this it should be kept seeded in grass part of the time, and cowpeas or some other green manuring crop should be plowed under frequently.

The following table shows the average results of mechanical analyses of samples of the Teller fine sand:

Mechanical analyses of Teller fine sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14405, 14576	Soil	0.1	5.9	15.3	51.0	12.6	11.0	3.8
14406, 14577	Subsoil	.1	6.0	15.9	51.6	11.7	11.1	3.4

HOUSTON BLACK CLAY.

The soil of the Houston black clay consists of from 10 to 16 inches of a black or dark brown clay. Where the type is well developed the clay content ranges from 25 to 30 per cent and the silt from 50 to 55 per cent. Where the soil is lighter in color there is a larger proportion of silt and less clay. The subsoil is dark drab to brown in color and slightly heavier in texture. Fragments of limestone are sometimes found in both soil and subsoil, and in places the unweathered rock projects above the surface, but it is very rarely that the unweathered rock underlies the soil near the surface over any large area. In poorly drained localities lime concretions are found through the subsoil. Wherever the type is found in the Indian Territory it is locally

known as "black waxy land" or "black prairie." A marked feature of this soil is the difference in its behavior under varying conditions of moisture. When dry it is mellow and friable and is easily tilled. When wet it becomes sticky and gummy to such an extent that it is impossible to drive a vehicle over roads of this material without constantly cleaning off the mud that gathers on the wheels, for if left to accumulate it will form a ball of many hundred pounds weight between the spokes. In dry weather the roads pack and becomes smooth and polished and the wheel tracks glisten with a metallic luster. The Houston black clay is easily cultivated if plowed when the ground is not too wet.

The Houston black clay occupies a large proportion of the high, rolling prairie in the southern half of the area. There are two principal areas of the type, separated by the valley of the Washita River, with its strip of recent alluvium. One of these tracts covers what is known as Twelve Mile Prairie. It begins near Emet and stretches southward, extending to the Washita Valley on the west and south and to the limit of the survey on the east. On the south it is terminated by the overlapping of the Bokchito formation, which gives rise to a sandier soil. The second and largest area of this type begins about 2 miles south of Teller and Russet and stretches in an irregular area over the southwestern quarter of the survey.

The Houston black clay begins abruptly at the tops of the bluffs of rough slopes that border the alluvial lands of the Washita River. When the higher points are reached, the country may be seen stretching off in every direction in gently undulating prairies, the green fields and farm buildings making a sharp contrast against the deep black of the newly planted land. Upon close inspection of the country it will be found that the rolling plain has been cut by stream valleys from one-half to several miles in width and to a depth of from 50 to 200 feet. At the bottom of some of these streams the underlying Trinity sand has been exposed and strips of sandier soil have been formed. The higher land was originally bare of trees, but along the streams there was a scattering growth of oak and bois d arc (Osage orange). The natural drainage of the Houston black clay is good, with the exception of a few small level tracts, and these can be drained without difficulty. The soil, if properly tilled, is retentive of moisture, and crops suffer only during prolonged droughts.

The Houston black clay is derived by weathering from the Cretaceous limestones. In this area three different limestone formations have contributed to the origin of the type, but no great differences are noticeable in the resulting soils. The black color is due to the chemical changes that result when organic matter decays in the presence of lime.

The Houston black clay and the limestone soils associated with it are the best known types of the Southwest. In Texas they comprise the best farming lands of the State, and many prosperous cities have sprung up within their borders. In Indian Territory the Houston black clay is more generally cultivated than other types. Owing to its treeless condition, obviating the expense of clearing and its well known productiveness, this type was naturally favored by the first claimants to allotments under the Indian laws. So far the land has not deteriorated from continuous cropping, nor have its capabilities been fully tested. The principal crops are corn and cotton. From 25 to 40 bushels of corn per acre are produced on an average in good years, and the best farmers secure much larger yields. Three-fourths bale of cotton per acre is considered a good yield, but the average for all classes of farmers lies between that and one-half bale per acre. Oats are a desirable crop for this type, and 35 bushels is no uncommon yield. Wheat has never been so successfully grown on the black prairie soils of this section as on similar soils in Texas, but it is not clear to what this difference is due. Good crops may be grown in favorable years, and many farmers grow wheat for their own bread every year, but the average yields are low.

The following table shows the average results of mechanical analyses of samples of the Houston black clay:

Mechanical analyses of Houston black clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14415, 14572	Soil	Tr.	0.4	0.4	2.6	8.8	53.0	34.4
14416, 14573	Subsoil	0.1	0.4	.5	3.2	8.6	54.5	32.2

HOUSTON LOAM.

The Houston loam varies widely both in texture and in origin. It may be broadly described as a dark-brown loam from 10 to 14 inches deep, underlain by a drab or brown clay. The type is essentially the heavy black material derived from limestone and similar to the Houston black clay mixed with some more sandy substance. This sandy constituent is derived in different parts of the area from various sources. Along the borders of the Orangeburg fine sandy loam and in deep streams throughout the sedimentary rocks of the area the sand is derived from the Trinity sand formation of the Cretaceous. Along the contact between the Houston black clay and the Durant

fine sandy loam the latter type furnishes the sand of the resulting Houston loam. In the northern part of the area a coarse development of the type derives its sand from the disintegrated materials of the Tishomingo granite. From whatever source the more sandy constituent has been derived the sandy limestone soil thus formed has been classed with the Houston loam, although there are wide variations in the quantity and character of the sand content.

The Houston loam occurs in irregular areas wherever it was possible for the limestone, clays, and the sandy soils to become mixed. Large tracts occur in the northern part of the area, the largest of which extends from the northern boundary as far south as Ravia, on which the original limestone is now completely weathered and the resulting material mixed with the underlying granite sands. The type also occurs in the deeper stream channels in limestone areas where erosion has extended down to the Trinity sand beneath the limestone.

The topography of this type naturally varies according to the origin of the soil. In the granitic areas it occupies a nearly level prairie. Along the contact of the Houston black clay and the Durant sand it has a topography similar to that of those types, namely, a gently rolling prairie. Elsewhere the type covers sharply rolling hillsides that in many places do not admit of cultivation and are covered with a sparse forest growth.

The Houston loam taken as a whole is a productive soil. Over the granite areas this soil is highly esteemed in comparison with the purely granitic soils, and many prosperous farmers are found in the region. It is also considered more valuable than the Orangeburg fine sandy loam, and where it comes in contact with the Durant fine sandy loam it is considered as about equal in value to that type. Cotton is the most successful crop, producing in favorable years one-half to two-thirds bale per acre. Corn, oats, and a small amount of wheat are also grown.

There is one phase of the Houston loam that differs widely from the type as already described. It consists of a brown or reddish brown loam underlain by a brown heavy clay similar in texture to the subsoil of the Houston black clay. This phase is derived from the limestone formations, with but little admixture of sand from other formations. The processes of weathering have separated the sandy portion of the limestone and left a loose and friable, though heavy textured, loam.

None of this phase of the Houston loam is under cultivation, as the topography will not permit of successful farming. As a rule, the hillsides on which this type occurs are covered by a scattering growth of hardwood trees.

The average results of mechanical analyses of samples of the Houston loam are given in the following table:

Mechanical analyses of Houston loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14370	Soil	1.3	3.3	2.0	9.6	20.4	39.6	23.8
14371	Subsoil	.6	3.4	2.1	8.8	14.4	38.0	32.7

DURANT SAND.

The soil of the Durant sand has a depth of from 26 to 30 inches and consists of a medium to fine sand. It contains only a small percentage of the coarser grades of sand and of clay. The upper 6 inches of this soil is darkened by a small proportion of organic matter, but below this the sand is white or yellow in color and lacking in humus. The subsoil to a depth of more than 3 feet consists of a yellow very sandy loam containing but slightly less of the medium and fine grades of sand and 10 to 20 per cent of clay.

The Durant sand occupies an irregular area of several square miles in the southeastern corner of the Tishomingo sheet, and extends beyond the borders of the sheet over a large area.

The surface of the border of this type, having a width of about 1 mile, is rough and broken by erosion, but the center, comprising the higher land, is only gently rolling and takes the form of long, flat ridges of nearly uniform height.

The Durant sand is the weathered product of the Silo sandstone which overlies the Bokchito formation that gives rise to the Durant fine sandy loam. The Silo sandstone is a rather loosely consolidated sandstone, which weathers more rapidly than any other compact rock in the area, and deep gullies are cut out where the rock is exposed to running water.

Only a small proportion of the Durant sand is under cultivation at the present time, as the light character of the soil and the expense of clearing have made it less desirable to the settler than other soils of the area. The greater part is covered by a forest of oak and other hardwood trees. The yields on this soil are necessarily light. Cotton produces from one-third to one-half bale per acre, and corn from 15 to 25 bushels. No other crops have been attempted. The texture of the soil would indicate that it is well adapted to trucking.

The table on the following page shows the results of mechanical analyses of a typical sample of the Durant sand.

Mechanical analyses of Durant sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14564	Soil	0.2	3.5	24.2	48.9	8.8	11.1	3.3
14371	Subsoil	.3	2.3	20.2	42.2	7.8	12.7	14.4

DURANT FINE SANDY LOAM.

The soil of the Durant fine sandy loam is a heavy fine sandy loam with a depth of from 14 to 18 inches. It has a characteristic chocolate-brown color that is uniform throughout the extent of the type. The subsoil is always heavier than the soil, and in the heavier phase it passes into a heavy clay loam. The usual color of the subsoil is a mottled yellow and brown. The soil is usually friable and easily tilled, and does not clod or puddle if plowed when not too wet.

The Durant fine sandy loam occupies three large tracts in the Tishomingo area. The largest of these extends north and south between Linn and Aylesworth and has a width of about 5 miles. There is a gradual increase in the heavier constituents of the soil from Lynn southward, due to the heavier strata of the original rock from which the type is derived, but in topography, general appearance, and crop yields there is uniformity.

The second area of this type lies along the center of the southern border of the survey and has a width of from 1 to 2 miles. This area is fairly uniform in texture, the only variations being due to the exposures of limestone. The third area is an irregular strip lying west of the Washita River and flanking the area of Durant sand. This represents a sandier phase of the type produced by the weathering of a thin overlying stratum of the Silo sandstone or by the washing down of sand from the sandstone soils.

The Durant fine sandy loam occupies a rolling plain not unlike that covered by the Houston black clay. Both the topography and the character of the soil insure good drainage. The greater part of the areas west of the Washita River are treeless, but along the streams and moister localities forests have maintained a heavier growth than on the limestone soils.

The Durant fine sandy loam is the weathered product of the Bokchito formation of the Cretaceous. This formation is composed of beds of friable sandstone and sandy clay interspersed with thin strata of limestone and ferruginous clay shale. The limestone strata contain marine deposits in great abundance, and this rock is more resistant to weathering than the more sandy portions. The effect of the limestone strata may be traced in the darker color and heavier texture of the resulting soil.

The Durant fine sandy loam is not so highly esteemed as the Houston black clay for general farming purposes, but the prairie areas were settled earlier than some better lands of the survey on account of the ease with which the land could be put into cultivation. The same crops are grown as on the Houston black clay, but the yields are somewhat smaller. Cotton yields from one-third to two-thirds bale per acre, with higher yields where the land is well cultivated. The average yield of corn is from 25 to 30 bushels per acre. Oats are grown to some extent, with good yields. The sandy phase of the type east of the Washita is for the most part uncleared and uncultivated, as the country is more rough and broken, the soil is not so productive, and the cost of clearing the land is considerable. In the southern part, along the railroad in the vicinity of Medd, however, the land is being rapidly settled.

The following table shows the average results, of mechanical analyses of typical samples of the Durant fine sandy loam:

Mechanical analyses of Durant fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14566, 14568, 14570	Soil	0.4	2.3	3.1	25.5	23.4	31.5	14.9
14567, 14569, 14571	Subsoil	.2	.6	2.7	21.9	16.8	31.8	25.9

WABASH CLAY.

The soil of the Wabash clay has a depth of about 12 inches and consists of a black silty clay to clay. Considerable organic matter is always present, and in the lower depressions this is sufficient to cause the soil to assume some of the characteristics of muck. The subsoil is a clay, varying in color from brown to drab. The mechanical analysis shows but little difference in the composition of soil and subsoil, but the absence of organic matter causes the subsoil to be more stiff and tenacious.

This is one of the least extensive types in the area, and is confined to the river bottoms. An area several miles in extent occurs along Sand Creek; southeast of Tishomingo. One small area is found 3 miles west of Ravia, and others near Russet, Randolph, Linn, and Old Fort Washita.

The Wabash clay occupies a low level position at the outer edge of the bottoms, next to the highlands, and is in a semiswampy condition. It is an alluvial soil, having been laid down in still water in bay like indentations along the bluff line farthest back from the main current of the river. The large area along Sand Creek is still subject to overflow during periods of high water. The greater proportion of the Wabash clay has an elevation of 15 to 25 feet above

the normal level of the river, which is ample to insure good drainage whenever a system of tile drains or open ditches shall be established.

This type is covered with a heavy growth of ash, elm, hackberry, and bois d arc (Osage orange). Owing to its swampy condition but little of it has been cleared as yet. When properly drained and improved it is an excellent soil, producing large yields of cotton and corn.

The following table shows the results of mechanical analyses of a sample of the soil and subsoil of the Wabash clay:

Mechanical analyses of Wabash clay.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>				
14584	Soil	0.1	0.6	0.6	4.9	8.8	35.1	49.2
14585	Subsoil	.2	.5	.5	3.8	8.2	34.5	52.3

MEADOW.

The term Meadow is applied to the heterogeneous materials that compose the low flood plains of some of the smaller streams of the Tishomingo area. These flood plains have been built up of wash from the surrounding hills, mostly from areas of Orangeburg fine sandy loam. The predominating material is a fine loam or sandy loam, containing a large amount of silt, which resembles in texture the Miller loam, but lacks its peculiar red color. There are also beds of sand, gravel, and clay mixed indiscriminately.

The areas of Meadow range in width from strips less than 100 feet wide along the smaller streams to more than a mile wide along Blue River near Millburn. The entire area is subject to frequent overflow, and a very small proportion of it is under cultivation. Much of the larger areas is in a swampy condition during the greater part of the year.

The entire area of Meadow was originally covered by a dense growth of oak, cottonwood, and bois d arc (Osage orange), and while the better part of the timber has been removed the larger areas are still well forested.

SUMMARY.

The Tishomingo area is situated in the south-central part of Indian Territory and lies wholly within the boundaries of the Chickasaw Nation. The range in elevation is from 550 to 900 feet above sea level, the general slope being toward the southeast. The surface is gently rolling to broken, comprising rounded granite hills in the northern and broad, undulating prairies in the southern part of the area, with the sharply eroded valley of the Washita and its

tributaries intervening. The entire drainage is toward the Red River through its tributaries, the Washita River and Blue River.

The climate is temperate and suited to the production of the crops now grown. On an average there are two hundred days free from frost, and ordinary crops rarely suffer from untimely frosts. The rainfall averages nearly 33 inches per year and is well distributed throughout the growing season.

The conditions of agriculture prevailing in the Tishomingo area are those peculiar to a new country. The ownership of land was originally confined to Indians and intermarried citizens, and the restrictions placed on the sale of such lands have prevented the breaking up of the large holdings and the rapid development of the country. The country is now being filled with settlers in expectation of statehood and the early removal of restrictions upon the sale of land. The towns of Tishomingo, Madill, Ravia, Milburn, and several smaller villages have sprung up, furnishing a market for the produce of the area. One great railroad system the Chicago and Rock Island traverses the area with a number of lines.

The early agriculture of this region was confined to the raising of cattle and of the food stuffs to supply the home wants of the settlers. Later cotton and corn became the chief crops, the production of the former having increased enormously within the last few years. Small grains are not grown in excess of local needs. No commercial fertilizers of any kind are used, and in most cases the stable manure is not applied to the land.

Thirteen soil types, including Meadow and Rough stony land, have been mapped in the Tishomingo area. The soils embrace a wide range in texture, varying from gravelly, sandy loams and sands to the finest clays.

Rough stony land is the name applied to areas so covered by rock fragments or rock outcrops that tillage of the soil is impossible. Such lands are utilized only for grazing.

The Tishomingo gravelly sandy loam is farmed with some success, but owing to its porous nature it does not withstand drought well. Cotton is the principal crop.

The Harley sandy loam is more retentive of moisture than the Tishomingo gravelly sandy loam, and more valuable as farmland. Cotton and corn are grown, but the soil is best suited to potatoes, truck crops, and small fruits.

The Orangeburg fine sandy loam was originally covered by a scanty growth of oak, and a large part of it is still uncleared. Cotton and corn are the principal crops. The yield of cotton is from one-third to one-half bale per acre and of corn 15 to 25 bushels. The soil is well adapted to truck crops and peaches, but as yet those industries have not been developed.

The Miller loam occupies the greater part of the overflow bottom lands. Though originally heavily forested, the greater part of the type not subject to constant overflow is now cleared and cultivated and is considered the most desirable soil of the area for all purposes, Cotton may be made to yield from three-fourths to 1 bale per acre and corn from 40 to 60 bushels.

The Teller fine sandy loam occupies the level or gently rolling higher terraces of the Washita River. Cotton and corn are grown, and fair yields are secured. Peach growing will be attempted in the near future, and the soil seems well adapted to this crop

The Teller fine sand has the same position and topography as the Teller fine sandy loam, but the crop yields are lighter. Cotton yields from one-fourth to one-half bale per acre and corn from 15 to 25 bushels.

The Houston black clay is the most important soil type of the area. Locally it is known as "black waxy land" or "black prairie." When wet it is extremely sticky and gummy, but upon drying it breaks up into a mellow, loamy condition. It occupies an extensive area in the high rolling prairie in the southern part of the survey. Almost the entire area of this type is cultivated. From one-half to three-fourths bale of cotton per acre can be grown and from 25 to 40 bushels of corn. Wheat does not do well, but oats make a good yield.

The Houston loam varies in texture and farming value. It is more highly esteemed than the Orangeburg fine sandy loam, but is much less valuable than the Houston black clay. Cotton yields from one-half to two-thirds bale per acre and corn and oats do well.

The Durant fine sandy loam is extensively developed and occupies a part of the high rolling prairie. While not so productive as the Houston black clay, this type was settled early and is now largely under cultivation. The usual crops of the area are grown with smaller yields than the Houston black clay.

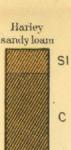
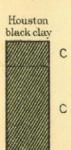
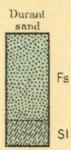
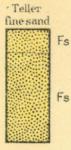
Forests cover the greater part of the Durant sand and very little is under cultivation. Yields are light and the farming value of the land is small.

The Wabash clay is found in low areas on the Outer edge of the river bottoms and is a still water deposit from overflows. The type is largely undrained and covered by a heavy growth of hardwood timber. When properly drained, it will be very productive.

The type mapped as Meadow includes the materials found in the flood plains of the smaller streams. The areas are usually poorly drained, subject to overflow, and are of small agricultural value.



SOIL PROFILE
(3 feet deep)



LEGEND
Fs Fine sand
Fsl Fine sandy loam
Sl Silty loam
Si Sandy loam
Hfsi Heavy fine sandy loam
Grc Gravelly clay
C Clay
Sc Sandy clay
L Loam
Sic Silty clay

LEGEND



Teller fine sand



Teller fine sandy loam



Durant sand



Durant fine sandy loam



Houston loam



Houston black clay



Miller loam



Tishomingo gravelly sandy loam



Harley sandy loam



Orangeburg fine sandy loam



Wabash clay



Meadow



Rough stony land

