

U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF SOILS
IN COOPERATION WITH THE TENNESSEE GEOLOGICAL SURVEY

SOIL SURVEY OF DICKSON COUNTY TENNESSEE

BY

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[Advance Sheets—Field Operations of the Bureau of Soils, 1923]



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[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]

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MAP

Soil map, Dickson County sheet, Tennessee

SOIL SURVEY OF DICKSON COUNTY, TENNESSEE

By J. A. KERR, in Charge, W J. LATIMER, H. G. LEWIS, and E. H. BAILEY

DESCRIPTION OF THE AREA

Dickson County is situated in the north-central part of Tennessee. Its eastern boundary is about 20 miles west of Nashville. The county is bounded on the north by Montgomery and Cheatham Counties, on the east by Cheatham and Williamson, on the south by Hickman, and on the west by Humphreys and Houston Counties. It extends about 23 miles north and south and 21 miles east and west, and comprises an area of 495 square miles, or 316,800 acres.

The county lies in the belt of high, dissected plateau called the Highland Rim, which encircles the Central Basin. The surface is predominantly hilly, the plateau being cut deeply and at frequent intervals by an intricate system of streams. The ridge tops are smooth or gently rolling; but in the valleys there are only small discontinuous areas of smooth land, even along the larger streams.

The widest ridge area in the county is that occupying the divide of the Cumberland and Duck Rivers, which extends diagonally across the southwestern part of the county. In most places it is more than a mile in width. Narrower, somewhat discontinuous strips of smooth land extend out from it along the divides of the local streams. The streams have numerous short branches, and the ridges, branching in corresponding manner, maintain their height well out toward the main valleys, and in places broaden out into considerable areas of smooth surface. But generally the minor ridges are rather narrow and partly rounded. The plateau surface, as represented by the ridges, is undulating to gently rolling, with a gradual general slope away from the divide. Most of the local streams head near the divide and flow directly away from it with a rate of fall but little greater than that of the general slope, so that through most of the county the variations in the steepness of the slopes are local. The streams have cut quite deeply nearly to their headwaters, so that the slopes near the divide are on the average nearly as great as those farther down the valleys.

With few exceptions the valleys are narrow, with only small bodies of terrace or graded lower slope even at the stream junctions. Generally one side of the valley is more moderately sloping than the other; in valleys where the stream tends to flow on one side, that side has the steeper slope. This difference is especially marked on the lower part of the slopes. Very commonly on the steeper side there

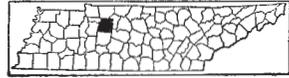


FIG. 11.—Sketch map showing location of the Dickson County area, Tennessee

are stony bluffs rising some 10 or 15 feet from the bottoms of the smaller streams and several times that high on the larger creeks. In their lower courses the creeks generally flow in wide curves, with fairly low, gradual slopes within the curves and high cliffs or steep slopes on the outside. Through most of the county the depth of the valleys is probably between 150 to 250 feet, and the slopes range from those reasonably well adapted to farming to steep slopes better adapted to timber or pasture. In the extreme eastern and northeastern parts of the county the Harpeth and Cumberland Rivers, which bound the county there, have cut deeply into the lower limestone, and the creeks flowing into them have formed especially deep, narrow valleys in their lower courses, with high cliffs on their curves and slopes mostly too steep for farming. Harpeth Ridge, however, slopes down gradually to the junction of the rivers, and a part of the valley slope there is suitable for farming.

Through the north-central part of the county there are several considerable developments of secondary levels and graded slopes along the upper and middle courses of the larger streams. The principal areas are those on the headwaters of Barton and Johnson Creeks, and in the forks of Hawe and Town Branches and Sulphur Fork. The uplands between these streams, in the vicinity of Promised Land Church, are generally moderately rolling.

The elevations on the railroads, which follow the main divides, range from 913 feet above sea level at Abiff on the southern border to 800 feet at Dickson and 828 feet at Tennessee City, near the western border. The Cumberland River, on the northeast border of the county, is about 400 feet above sea level.

The county drains to the Cumberland River on the north and the Duck River on the south, the watershed extending diagonally through the southwestern part of the county. The Cumberland River forms the northern boundary of the county for about 5 miles. It is locked, and is an important waterway. Harpeth River, flowing northwest to the Cumberland, forms the eastern boundary of the county for some distance above its mouth. It is not a large river and is not navigated. The other streams of the county are comparatively small. Numerous small water powers were formerly used for small grist and lumber mills.

Dickson County was organized in 1804, its boundaries then including the present areas of Hickman, Wayne, and Lewis Counties, and part of Houston County. These counties were separated from it prior to 1860, and its boundaries have not been materially changed since that date.

Pioneers from the colonies to the east had settled at various places in the region a considerable time before the organization of the county. In 1793 an iron furnace was built at Cumberland Furnace, and later on small furnaces and forges were built at various deposits of ore. Slave labor was used to some extent in the iron industry, but apparently could not be profitably used in agriculture. The farming population increased slowly, later immigration not being rapid, and the present population consists largely of descendants of early settlers. No iron furnaces are now in operation.

The population of the county in 1920, as enumerated in the census, was 19,342. The negro population is not large and is centered mainly in the towns. The rural population is evenly distributed through the county. Dickson, the largest town and principal market, has a population of 2,263. Charlotte, the county seat, is a small village. White Bluffs, the most important market in the eastern part, has 449 inhabitants.

The main line of the Nashville, Chattanooga & St. Louis Railway extends east and west through the southern part of the county. The Centerville branch extends south from the main line at Colesburg. A branch of the Louisville & Nashville Railroad, extending south from Clarksville, connects with the Nashville, Chattanooga & St. Louis at Pond near Dickson. The northeastern part of the county is served by a line of the Harriman & Northeastern Railroad, which here follows the north side of the Cumberland River.

A considerable mileage of the principal roads of the county has been surfaced with stone or gravel. The gravel beds along the creeks provide very satisfactory surfacing material, and limestone outcrops are common in the valleys in all parts of the county. Where the traffic is not heavy, graded roads remain in good condition through most of the year, especially along the hillsides, where gravely chert accumulates in the road cuts. Formerly many of the valley roads followed the gravelly creek beds. In recent years these routes have been changed considerably, but most of them still have many fords, and these are impassable for a short time after heavy rains.

CLIMATE

The climate of Dickson County is characterized by moderate temperatures both in summer and in winter. The mean temperature of summer is 76° F. Temperatures of 100° F. are unusual, but are sometimes reached in hot spells of a few days' duration. The mean temperature of the winter months is 38.6° F. Cold weather is seldom so severe or persistent as to freeze the soil in open fields more than 2 or 3 inches deep. Ordinarily, even when the nights are very cold, the temperature rises above the freezing point for several hours during the middle of the day. Only a few light snowfalls occur in ordinary winters. The average annual snowfall for the section is about 10 inches.

The average annual precipitation is 48.3 inches. The rainfall of winter and early spring is heavy. That of the growing season is usually sufficiently abundant and well distributed to give good growing conditions. The rainfall decreases in the fall, so that, although frost does not occur in September, it is desirable to have crops planted early enough to mature in good season. The average date of the latest killing frost in spring at Dickson is April 14, and that of the earliest in fall is October 20. This gives an average frost-free season of 188 days. Killing frosts have been recorded as early as October 2 and as late as May 2.

The following table of climatic statistics is compiled from the records of the Weather Bureau station at Dickson:

Normal monthly, seasonal, and annual temperature and precipitation at Dickson

[Elevation 825 feet]

Month	Temperature			Precipitation		
	Mean	Absolute maximum	Absolute minimum	Mean	Total amount for the driest year (1901)	Total amount for the wettest year (1902)
	<i>°F.</i>	<i>°F.</i>	<i>°F.</i>	<i>Inches</i>	<i>Inches</i>	<i>Inches</i>
December.....	38.6	74	-10	4.68	3.35	10.10
January.....	38.3	74	-16	4.82	3.42	4.18
February.....	38.9	78	-3	4.25	1.21	3.50
Winter.....	38.6	78	-16	13.75	7.98	17.78
March.....	49.9	87	5	5.26	2.06	6.00
April.....	58.1	89	22	4.99	4.12	7.60
May.....	66.7	94	29	4.13	1.47	4.00
Spring.....	58.2	94	5	14.38	7.65	17.60
June.....	73.9	101	38	3.69	1.41	2.25
July.....	77.3	102	50	3.82	1.89	1.95
August.....	76.7	103	44	3.96	9.85	5.25
Summer.....	76.0	103	38	11.47	13.15	9.45
September.....	71.0	100	33	2.65	3.02	6.35
October.....	60.4	91	22	2.15	1.13	3.00
November.....	48.6	84	9	3.90	1.57	7.55
Fall.....	60.0	100	9	8.70	5.72	16.90
Year.....	58.2	103	-16	48.30	34.50	61.73

AGRICULTURE

Following the settlement of this region, the country was slowly developed. Even before any great degree of security from Indians was attained, the early settlers generally preferred a degree of isolation, thus obtaining a wider range for their hogs and cattle. They relied almost entirely upon their own resources for food and clothing. Small crops of corn were grown. Smaller areas were devoted to hemp, flax, cotton, and tobacco. Wheat soon became an important crop, and grist-mills were built on the larger streams. Cattle were driven long distances to market. Tobacco became an export crop of some importance at an early date, being shipped down the river to New Orleans.

The iron-ore deposits nearer the river were worked early, and the settlements about the furnaces provided local markets. Considerable tracts of land were soon cut over to provide charcoal for the furnaces. For a long time the landowners near by granted timber to the charcoal burners to have the land cleared; in other places clearings were extended about the homesteads and the timber burned where it lay. The railroad from Nashville to the Tennessee River was built during the Civil War. At about this time the timber became of considerable value, and a system of farming on a small scale in connection with lumbering and hauling was developed. In this section



FIG. 1.—A TYPICAL LUMBERING SCENE

The trees consist of red oak and black oak, with some white oak, chestnut, and persimmon.
Most of the Dickson and Baxter soils are still in forest



FIG. 2.—LOG TOBACCO BARN ON THE DICKSON SILT LOAM

the forests have not been denuded, but the cutting has been selective. The poplars appear to have been cut out first, then the larger oaks. Chestnut was used for the tanning industry and for rails. In more recent years the cutting of the smaller growth has become of more importance. Large quantities of railroad ties have been cut, and hauled for miles to the railroad or river. In recent years ties of red oak and other timber suitable for creosoting have been in demand. Quantities of small dimension stuff, flooring, staves, and tool handles are produced at the local mills, and there is a considerable demand for chestnut for chemical purposes. Largely on account of this gradual widening of the market for lumber, the timber has not generally been bought up in large holdings, but has been held in small tracts; the lumber has been sawed in small mills and hauled by wagon for considerable distances, thus giving seasonal employment to the residents. (Pl. 1, fig. 1.) On many farms a large part of the income is from forest products.

From 1880 to 1920 the area of improved land, as recorded in the census, increased from 63,400 acres to 108,629 acres, and the number of farms increased from 1,766 to 2,544. In 1920, 66.9 per cent of the area of the county was in farms. The average farm, in 1920, included 92.4 acres, of which 42.7 acres was classed as improved land. The unimproved acreage in farms is mainly woodland, not cut-over land, but from which considerable timber has been cut. Roughly, one-third of the county is improved land, one-third woodland in farms, and one-third open forest.

The crops of 1919, as reported in the 1920 census, included 39,602 acres of cereals, 8,767 acres of hay, and 7,653 acres of other forage crops. Tobacco, the only important cash crop, occupied 4,730 acres. The total acreage of field crops amounted to a little more than half of the total improved acreage, the remainder being largely pasture land.

General farming on a small scale, with a few head of cattle, and on some farms a small flock of sheep, is the common practice. In 1919 the value of dairy products, excluding home use, was \$169,149; the value of poultry and eggs, \$251,170; that of wool, \$8,303. The value of livestock sold and slaughtered (not recorded in the 1920 census) was \$373,625 in 1909. On many farms the forest products comprise an additional source of income.

Corn is the principal grain crop, occupying an acreage nearly four times that of the other grain crops combined. In 1919 the area in corn was 31,122 acres, yielding 679,817 bushels. The yields, as recorded in the census years, average about 20 or 25 bushels per acre. The crop is produced on all the extensive types of soil. The best corn lands are the bottoms and the Hagerstown soils. Fair crops are obtained on new land, on sod, or following cowpeas, but average yields are reduced by the common practice of growing two or more crops in succession, even on thin soils. In this region the grain matures slowly through the fall, and by the time the grain is well matured the foliage is brown and brittle and its feeding value is considerably reduced, especially in the uplands. Considerable corn is cut in the bottoms, but in the uplands only a little fodder is saved by cutting or topping, and the bulk of it is left for fall and winter range.

Oats and wheat are the common small grains. The total acreage of these two crops has apparently not increased or varied much since 1880, though the acreage of each has varied considerably. In 1919 there were 3,317 acres in oats, 4,980 acres in wheat. At present (1923), with lower prices for wheat, oats are grown on a much larger acreage. The acreages for 1909 are probably more representative of the common practice; in that year there were 6,497 acres of oats, 3,757 acres of wheat.

The yields of oats, as indicated in the census reports, have averaged about 12 bushels per acre. Considerably larger yields are obtained on the better soils and by improved methods. On many farms only a small acreage is grown, and the oats are fed in the sheaf. The acreage of grains cut green has increased from 1,386 acres in 1899 to 2,902 acres in 1919. This is principally oats hay from steep or gravelly fields where binders can not well be used, or where the acreage is so small that threshing is expensive.

The average yield of wheat has been about 10 or 12 bushels per acre. Larger yields are obtained on the better upland and terrace soils. Acid phosphate or mixed fertilizers in amounts up to about 200 pounds per acre are used by the more progressive farmers. Wheat is also frequently grown following tobacco, without any additional fertilizer, and good yields are obtained.

The total acreage of all tame grasses in 1919 was 8,767 acres. This was made up of 3,071 acres of mixed timothy and clover, 951 acres of clover alone, 1,005 acres of timothy alone, 3,678 acres of "other cultivated grasses," mainly redtop, and 62 acres of alfalfa.

The average yield of mixed clover and timothy was a little more than a ton per acre; that of clover about the same. Clover does not ordinarily make a heavy growth, but is recognized as a valuable and beneficial crop on soils where it succeeds fairly well. The average yields of timothy and of redtop were a little less than a ton per acre.

Alfalfa has been grown mainly in an experimental way with heavy applications of lime and fertilizer. Good stands have been obtained in this way, but the expense is generally regarded as prohibitive.

Redtop is apparently much more commonly grown than timothy. It endures better on worn fields. Bluegrass grows sparingly on newly cleared or fairly well kept upland soils, but does not form a sod. Even when newly cleared land is seeded down for pasture, orchard grass and redtop are used and are the principal grasses in pasture land. Much of the pasture land is thin and not very productive. There has always been a tendency to cultivate newly cleared land for a considerable period without seeding down, then, when the land is worn, to seed it down and use as a permanent or semipermanent pasture. These old pastures are likely to be neglected and permitted to grow up in sassafras, cedar, and weeds. It is commonly remarked that north slopes are more productive pasture land than south slopes. Newly cleared north slopes seeded down make very good pasturage. Doubtless the condition of the pasture land in the county could be greatly improved, if the need of it were felt.

Tobacco is the principal cash crop of the county. The acreage has increased from 775 acres in 1879 to 4,730 in 1919, and the yield from 494,428 to 3,352,835 pounds. The tendency is toward a continued increase in acreage. A dark, heavily fired, export tobacco,

of a type peculiar to this district, is produced. It is commonly spoken of as the Clarksville type, Clarksville, in Montgomery County, being the principal market. The tobacco is apparently very uniform as to variety, little attention being given to breeding or selection. The appearance of the plant and its leaves may vary a good deal with differences in the fertility of the soil, cultivation, and curing. It is generally stated that the better quality is produced on the Dickson and Baxter soils, but apparently tobacco from the bottoms is of nearly equal market value. It is said that the first crop on new ground is not of good quality and tobacco is seldom planted on sod. Though good yields are the most profitable, and the returns from tobacco on bottom lands are much larger than from the smaller yields obtained on the Dickson soils, little or no effort is commonly made to build up a part of the farm on these uplands to a good state of productiveness, to be used for tobacco as frequently as possible.

Cowpeas are a crop of considerable importance. In 1919, 2,175 acres of legumes cut for hay, nearly altogether cowpeas, yielded 2,109 tons of forage. This is a valuable crop, especially where clover does not succeed well, and is regarded as one of the best means of building up depleted land.

Sweet potatoes were grown in 1919 on 334 acres, yielding 46,286 bushels. They are grown mainly on the Dickson silt loam, on a few farms in commercial quantities. Although grown on land in an ordinary state of fertility, without fertilizer, they produce so well that the acreage might well be greatly extended.

Sorghum cane was grown in 1919 on 946 acres, both for forage and sirup. A small acreage is commonly grown for fall feeding. It yields fairly well on rather thin land, and on bottom land may yield 10 tons per acre, according to local estimates.

Livestock has always been ranged a great deal; and although the acreage of pasture land has steadily increased, many cattle and hogs are still being ranged in the forest. The number and variety of mast-bearing trees make the forest a good hog range, but the range or "native" cattle are generally small and thin. Ranging is now commonly regarded as unnecessary.

Fertilizers are not commonly used in the county, except on tobacco. In 1919 fertilizer was used by 1,380 farmers, and the average amount expended was \$26.60 per farm reporting. Apparently little thought has been given to improving the land. Refuse lime from the kilns at Burns, where builders' lime is burned, has been available free of charge for a number of years, the demand being so small that there is no sale for it, although the hardwood ashes mixed with it give it additional value.

Very little hired labor is used. In 1919, 23.8 per cent of the farmers reported the use of hired labor, the average expenditure being \$102.89 per farm. The labor was hired only for a short period. At present (1923) it is difficult to obtain labor.

Farms are generally small throughout the county, or at least the acreage of improved land is small. In 1920 the average size of farms was 92.4 acres, 46.3 acres being improved land. Of the total number of farms, 73.7 per cent are operated by the owners. Where land is rented, it is usually on the share system.

In 1919, according to the census, the average farm with equipment was valued at \$3,307. The average value of farm land, exclusive of the buildings, was given as \$19.53 an acre.

SOILS

The climate of the region, especially as characterized by open winters, with abundant rainfall, and by long, warm summers, has produced soils typically deeply weathered, with the soluble minerals reduced by leaching, and with characteristic colorings in the various layers of the soil. These characteristics are best exemplified by the plateau soils, which occupy positions where the material has remained in place through a long period and has been greatly modified by the weathering agencies. The Dickson silt loam is the representative example here of the more thoroughly matured soil. The slope soils, being more subject to renewal of soil-forming material by erosion and rock decay, have not been reduced to a similar degree of uniformity or maturity. The material here has not been permitted to lie undisturbed sufficiently long to receive the full impress of long-continued climatic forces. The effect of weathering on the old flat land areas is frequently of more importance than the character of the rock from which the material has been formed; but on eroded slopes the character of the rocks is of greater importance.¹

The Tuscaloosa formation, represented by a shallow deposit of rounded gravel of chert and other rocks, appears on a considerable part of the plateau in the western part of the county. The gravel is not loose or porous, but imbedded in clay. Through nearly all other parts of the county the ridges are occupied by deeply disintegrated materials mainly clay, with numerous fragments of blocky chert and silicious rocks. Iron ore is common, and in many places occurs in commercial quantities over small areas. Whatever limestone was originally associated with the chert has been dissolved. In deep cuts in typical situations the depth of clay is 20 to 30 feet. It is said that limestone is not commonly reached in wells above depths of 30 to 40 feet. The limestones of this formation outcrop on the lower valley slopes of the larger streams through most of the county. The Tullahoma-Fort Payne formation outcrops on the lower valley slopes of streams in the extreme eastern and northeastern parts of the county. The upper part here is mainly chert and siliceous rock, the lower part is mainly calcareous shale.

The soils occupying the plateau surfaces have developed from the parent materials through a long period of weathering in place. To some extent the present irregularities of the surface seem to have been caused by the dissolving of the limestone beneath and consequent slumping of the overlying clay, as indicated by occasional depressions and by the irregular contour of beds of chert exposed in cuts. There are no marked differences in the soils overlying the Tuscaloosa gravels and those overlying the material of the upper St.

¹ Geologically, the formations of the county include the lower part of the Cretaceous, the lower Carboniferous (Mississippian), and two thin exposures of the Devonian shale. The formations, as described in the legend of the geological map issued by the Tennessee Geological Survey, 1923, are as follows: Tuscaloosa—composed of gravels, which locally include fragments derived from Carboniferous rocks. St. Louis-Warsaw—blue and gray, cherty, massive, soluble limestone. Tullahoma-Ft. Payne—silicious rocks, shales, cherts, flints, and cherty crinoidal limestones of extremely variable character.

Louis and Warsaw formations. The soil of the undulating plateau was classified in the Dickson² series; that developed in depressions, under conditions of poor drainage, was classified in the Guthrie series.

The soil developed on the upper slopes of the valleys is also mainly from the St. Louis and Warsaw formations. This material extends down the slopes well below the level of the beds from which it originated. It is apparent that the valleys have been widened not only by erosion, but by solution of the underlying limestone, and there has been a large amount of slumping of the overlying clay. This may be seen in the sloping position of seams of chert in cuts on the upper slopes. Farther down the slopes the bedding of these seams has been destroyed. The soil on the slopes has a considerable content of small fragments of chert, brought to the surface by erosion. With better drainage and aeration the material has been oxidized to a more pronounced reddish color. This soil was classified in the Baxter series.

On the lower slopes the soil is derived in larger measure from the limestones of the lower part of the formation, and the characteristic brown color of the well-drained limestone soils of the region is developed. There is generally a considerable content of gravel from chert beds interbedded with the limestone or washed down from the upper slopes. On the steepest slopes the soil contains considerable quantities of large and small limestone fragments, and the bedrock outcrops in places. Where gentle slopes of some width have been formed at the foot of the hill, the soil generally contains little stone or gravel. These brown soils were classified in the Hagerstown series. Commonly there is no well-defined line of separation between the Baxter on the upper slopes and the Hagerstown on the lower slopes. In typical situations the change in appearance is gradual and the soil becomes somewhat more productive toward the lower slopes.

The soils derived from the Tullahoma-Fort Payne formation in the county are generally shallow and shaly. Being imperfectly developed, their characteristics still show the influence of the parent geological material. They are classified in the Clarksville series.

The brown alluvial soils in the first bottoms of the streams of the county were classified in the Huntington series. The gray soils developed in poorly drained situations in the bottoms were classified in the Holly series. The brown alluvial soils of the terraces,

² Formerly the Dickson soils were mapped as Lebanon. More recent investigations have revealed the fact that the Lebanon soils as mapped in the Missouri-Ozark region (where the series originated) are very much more clayey in the subsoil than the areas formerly mapped in Tennessee—now the Dickson soils. These Dickson soils are seldom heavier above the red cherty clay of the parent-material horizon than silty clay, and often not heavier than silty clay loam, whereas the Lebanon soils have a decidedly heavy clay in the subsoil above the cherty or C horizon.

The typical profile (vertical section) of the Dickson silt loam is about as follows (description from dry, flat, forested area):

Horizon A.—A-1. 0 to three-eighths inch, gray silt loam, slightly powdery, apparently low in content of organic matter; pH=6.3. A-2. Three-eighths to 6 inches, pale-yellow silt loam, moderately hard and apparently low in organic matter, pH=6.4.

Horizon B.—B-1. 6 to 14 inches, yellow heavy silt loam to silty clay loam, moderately hard. B-2. 14 to 24 inches, yellow to pale-buff silty clay loam to silty clay, moderately hard. B-3. 24 to 26 inches, pale-yellow and light-gray heavy silt loam, not compact, slightly spongy. B-4. 26 to 32 inches, compact, dry, and decidedly hard, yellow silty clay loam, mottled with light gray and brownish yellow, and containing a few whitish and reddish chert fragments. B-5. 32 to 40 inches, heavy silt loam, dry and hard, mottled light gray, brownish yellow and yellow, containing some whitish and reddish chert fragments; has a platy structure, splitting horizontally.

Horizon C.—C-1. 40 to 60+ inches, red silty clay with whitish and reddish chert fragments; includes some plastic gray clay. C-2. Parent rock at undetermined depths.

similar to the Huntington soils in the first bottoms, were classified in the Elk series.

A soil series consists of soils that are similar in origin, color, and structural characteristics. Each series is divided into soil types, which differ from each other mainly in the texture or relative coarseness or fineness of the surface soils. The soil type is the unit of soil mapping.

The soil types are described in detail in subsequent pages of this report. Their distribution is shown on the accompanying soil map. The following table gives the names and the area of the types of soil mapped in Dickson County:

Areas of different soils

Soil	Acres	Per cent	Soil	Acres	Per cent
Baxter gravelly silt loam	169,408	53.5	Baxter silt loam	4,608	1.4
Dickson silt loam	64,768	20.4	Rough stony land	2,368	.7
Hagerstown gravelly silt loam	26,048	8.2	Guthrie silt loam	576	.2
Clarksville gravelly silt loam	13,440	4.3	Huntington fine sandy loam	320	.1
Huntington gravelly loam	11,200	3.5	Mine diggings	192	.1
Huntington silt loam	11,072	3.5	Holly silt loam	128	.1
Hagerstown silt loam	7,232	2.3			
Elk silt loam	4,608	1.7	Total	316,800	
Poorly drained phase	832				

DICKSON SILT LOAM

The surface soil of the Dickson silt loam, in forest, consists of about an inch of gray or brownish-gray silt loam mixed with particles of leaf mold, overlying pale-yellow silt loam. This is underlain at a depth of about 6 or 8 inches by pale-yellow or yellow heavy silt loam to silty clay loam, passing at about 15 to 20 inches into yellow silty clay loam or silty clay, and below depths of about 26 to 32 inches, into a compact layer, which is of silty clay loam or silty clay texture and yellow color, with streaks or mottlings of light gray. In places the gray coloring is present as more or less vertical streaking, with some reddish brown. Locally the texture at about 36 to 40 inches is more silty. In places a thin layer of spongelike heavy silt loam overlies the mottled layer. There are frequently a few fragments of irregularly distributed chert through the compact layer, but these are more abundant in the yellow and red clay at lower depths. The upper part of a few inches of the mottled clay contains but little reddish clay; the proportion of red clay increases, however, with depth, and below depths of 40 to 48 inches the material commonly consists of red clay mottled with yellow or gray. Locally a foot or more of the material just below the top of this horizon is of a rather bright reddish color, with little mottling. This mottled material often extends to depths of 20 or 30 feet, and usually contains considerable quantities of chert fragments, frequently occurring in layers, representing the original position of this more resistant portion of the parent rock beds.

In untilled land this compact layer becomes very hard after a month or two of dry summer weather; in fact the entire soil section hardens, but the mottled layer becomes much harder than the over-

lying layers. In exposed sections it was observed that the lower part of the compact layer, when dry, has a platy structure, blocks of the material splitting in rough, approximately horizontal plates of irregular thickness.

Some areas show a faint tinge of reddish or light-bluff color in a section above the mottled layer. In an area $2\frac{1}{2}$ miles west of Dickson the material below 14 inches is a yellow to light-buff friable silty clay loam, which passes at about 2 feet into light-buff or rich-yellow friable silty clay, with faint gray mottling coming in at about 30 inches. Here the compaction of the mottled layer usually is not so decided as in the more typical areas, and the red parent clay horizon is reached at depths of about 3 feet. One mile west of Pond the material below 14 to 18 inches is a yellow silty clay loam, with numerous chert fragments appearing in a layer at a depth of approximately 2 feet.

The surface soil and upper subsoil are ordinarily free of gravel, especially in the wider areas, though patches of uneven, gravelly soil are not uncommon. The northern part of the Harpeth Ridge and the northern part of the ridge east of Sylvia are somewhat gravelly, and generally the narrower ridges are uneven and gravelly in places, but not so as to greatly affect cultivation or soil conditions. The gravel, over most of the type, consists of small blocky and angular fragments of chert, with some nodular chert. In the western part of the county, in the general vicinity of Tennessee City, and intermittently along the minor ridges near the western border through the length of the county, much of the gravel is the rounded and subangular chert and quartz of the Tuscaloosa formation. In this section the underlying material in places contains considerable gravel, but is not sufficiently porous to have any marked effect on soil conditions.

In the moist condition the material over the mottled compact layer is moderately friable, showing increasing plasticity as the moisture content rises toward saturation. Fragments of the compact layer break down to a more or less impalpable powdery state with moderate pressure. In winter the soil, including the compact lower subsoil, becomes and remains moist throughout; in this condition the mottled layer loses its hardness and is not difficult to dig.

The Dickson silt loam is extensive, occupying the ridge areas throughout the county. The surface is undulating to gently rolling. On the narrower ridges the surface slopes slightly to each side, and on the wider areas there are frequently rather long gentle slopes to the waterways. Well-defined sinks or depressions are not common, but occur in places. The surface has sufficient slope to give good surface drainage. The underdrainage, although not rapid, is apparently adequate to permit good moisture conditions through the growing season.

About 50 per cent of the type is under cultivation. Large areas in all parts of the county are in forest of white oak, red oak, post oak, hickory, chestnut, persimmon, dogwood, poplar, and other trees. The timber ordinarily is not large, the oak generally being used mainly for railroad ties and small dimension lumber. In the western part of the county there is a considerable growth of blackjack oak in places on cut-over land.

Corn is the principal grain crop, yielding ordinarily about 15 to 25 bushels per acre. Oats yield about 15 to 25 bushels. Little clover

or timothy is grown over most of the type. Redtop is the common grass, which yields up to a ton per acre in new meadows and persists well in pastures. Cowpeas are grown to some extent in place of clover, both as a hay crop and interplanted in corn. Tobacco is grown in small patches on most farms on the type in the northern part of the county. (Pl. 1, fig. 2.) It is generally fertilized with about 200 pounds of mixed fertilizer per acre, and average yields of about 600 or 800 pounds per acre are obtained. A small acreage of sorgo (sweet sorghum) is commonly grown for forage or for producing molasses. On a few farms sweet potatoes are grown, yielding well without the use of fertilizers.

General farming on a small scale is commonly practiced on the type. Only a few cattle are kept. The cattle and hogs are mostly run on the open range. Some income is usually obtained from timber.

The soil is low in organic matter and not very productive naturally. Where lime can be obtained cheaply, as at Burns, it could doubtless be profitably applied and make the growing of clover more practicable. The growing of a larger acreage of peas and redtop hay for feeding cattle on the farm would apparently be more profitable than ranging in the forest. Lespedeza as a seeded crop may be found a valuable feed and soil-improving crop.

The content of uncombined moisture in cultivated and forested areas of the Dickson silt loam, after a drought of two months, is shown in the table below. The samples were collected October 31, 1924, and immediately sealed in glass containers with paraffin. Moisture content was determined by drying at 110° C., and is expressed as percentage of samples.

Uncombined moisture in samples of the Dickson silt loam¹

Number of sample	Location of sample	Description	Content of water
1	4 miles north of Dickson	Forest—gray silt loam, 0 to 6 inches	5.50
2	do	Forest—pale-yellow or yellow silt loam to silty clay loam, 6 to 26 inches.	10.09
1-A	do	Cornfield—brownish-gray silt loam, 0 to 6 inches	8.44
2-A	do	Cornfield—pale-yellow or yellow silt loam to silty clay loam, 6 to 30 inches.	15.05
1-B	2 miles north of Dickson	Forest—grayish-yellow silt loam, 0 to 6 inches	5.81
2-B	do	Forest—pale-yellow or yellow silt loam, 6 to 16 inches	7.58
3-B	do	Forest—pale-yellow or yellow silty clay loam, 16 to 26 inches.	9.25
4-B	do	Forest—pale-yellow or yellow silty clay loam to heavy silt loam, mottled with gray and compact and very hard, 26 to 38 inches.	9.54
1-C	3 miles west of Dickson	Tobacco field—brownish-gray silt loam, 0 to 6 inches	7.79
2-C	do	Tobacco field—pale-yellow or yellow silt loam, 6 to 16 inches.	15.34
3-C	do	Tobacco field—pale-yellow or yellow silty clay loam, 16 to 28 inches.	17.59
4-C	do	Tobacco field—pale-yellow or yellow silty clay loam to silty clay, mottled with gray, compact, 28 to 40 inches.	14.30

¹ Determinations by R. S. Holmes in laboratory of Bureau of Soils. Samples collected by H. H. Bennett and J. A. Kerr.

Under cultivation the soil conserves moisture fairly well; but in untilled grass-covered and forested areas both the soil and subsoil lose water to a much greater degree, usually becoming hard to depths

of more than 3 feet. After long dry periods it is very difficult to bore through the compact layer, which becomes decidedly hard. From the table above it will be observed that, after two months of rainless weather, the section from 6 to 16 inches in a cultivated tobacco field carried more than twice as much moisture as the corresponding section of the same type of soil under forest cover. Even the compact section of the lower subsoil of the same soil type contained 50 per cent more moisture in the tobacco field. The average moisture content of two cultivated surface soils, taken the same day, was 43.5 per cent greater than the average of the two corresponding sections from the same type under forest.

The following table gives the results of mechanical analyses of samples of the Dickson silt loam taken at various depths:

Mechanical analyses of Dickson silt loam

Number	Description	Fine gravel	Coarse sand	Medium sand	Fine sand	Very fine sand	Silt	Clay
		<i>Per cent</i>						
402256	Soil, 0 to 2 inches.....	1.4	2.1	0.9	3.7	7.9	71.6	12.2
402257	Subsurface, 2 to 6 inches.....	.8	1.8	.8	2.8	8.2	69.6	16.2
402258	Subsoil, 6 to 18 inches.....	.8	1.4	.6	1.9	4.8	63.9	26.3
402259	Subsoil, 18 to 26 inches.....	2.7	2.6	.9	3.2	6.1	80.1	4.1
402260	Subsoil, 26 to 30 inches.....	2.7	2.4	1.0	3.3	5.7	64.7	20.2
402261	Subsoil, 30 to 36 inches.....	15.4	11.9	3.8	13.9	11.9	21.9	11.5

GUTHRIE SILT LOAM

The surface soil of the Guthrie silt loam, when dry, is a gray to light-gray silt loam, slightly mottled with light yellow and rusty brown. At about 6 or 8 inches this passes into light-gray silty clay loam, with mottling of yellow and pale yellow and some rusty brown. In the lower subsoil there is commonly a layer of gray, plastic silty clay, highly mottled with light gray, yellow, and brown.

In the lowest part of the depression at Pond the soil consists of whitish silt loam (of a floury feel when dry), showing some specks of pale-yellow soft material at 10 or 12 inches, apparently representing incipient iron concretions. Along the outer edge of this depression overwash from adjacent slopes gives the surface soil a pale-yellow color. This is underlain at 6 to 14 inches by pale-yellow or yellow, friable silty clay loam or heavy silt loam, and at about 18 inches gray mottling appears. This overwash phase is as much like Dickson silt loam as it is like true Guthrie silt loam—it is a gradational soil between the two.

The Guthrie silt loam is inextensive in the county, occupying small poorly drained depressions in the wider ridge areas. Some areas at the heads of waterways have adequate outlet for the surface drainage, others are covered with a shallow depth of water for some time after heavy rains, and some remain in a rather swampy condition through much of the year.

Generally no use is made of the type. The growth consists mainly of sweet and black gum, black oak, maple, and other trees. A few areas have been drained and cleared and are in pasture of wild grasses. In one instance a small depression which had received con-

siderable wash from the surrounding Dickson silt loam was being drained by a deep ditch. The owner expressed the belief that this soil, when ditched, would be considerably more productive than the Dickson. In ditched areas lespedeza could probably be grown as a successful hay and grazing crop.

BAXTER GRAVELLY SILT LOAM

The surface soil of forested areas of the Baxter gravelly silt loam consists of grayish-brown silt loam, somewhat darkened with fragments of leaf mold, to a depth of about an inch, with grayish-yellow or pale-yellow silt loam beneath. This is underlain at about 6 to 10 inches by yellowish-brown or brownish-yellow silty clay loam, which grades at depths of 15 to 30 inches into yellowish-red to red silty clay or clay. In cultivated fields the dry surface soil appears gray, except where, in washed places, the yellowish upper subsoil material is exposed.

Both soil and subsoil contain varying quantities of gravel of blocky and angular chert and small fragments of argillaceous shale. The gravel is mostly about one-half inch to $1\frac{1}{2}$ inches in diameter. (Pl. 2, fig 1.) Occasional larger rocks appear, but not in sufficient quantity to make this a stony soil. The quantity of gravel is variable. In places in plowed fields it nearly covers the surface; in other places there is very little. The amount increases somewhat below the surface. In many places probably one-fourth to one-half the material below a depth of about 2 feet consists of rock fragments. The rock is disseminated through the soil and quite well embedded in it, with little trace of the original bedding planes. Bedrock is seldom reached at depths of less than 6 or 8 feet. The soil varies somewhat from the higher to the lower slopes. Near the ridge crests the surface material often is gray and the lower subsoil is a deeper red than the average. The soil here approaches the appearance of the Dickson silt loam. On the lower slopes the surface soil has a more brownish cast and the subsoil is generally a yellowish red, the deeper red appearing only in patchy areas.

The Baxter gravelly silt loam is the most extensive soil type in the county. It occurs in all parts, generally occupying all but the lowest slopes of the hillsides, and extending over the narrower ridges. Most of the slopes are rather steep. (Pl. 2, fig. 2.) In cultivated fields the run-off during rains is rapid. The soil absorbs moderate falls of rain well, the porosity produced by the gravel favoring absorption. Underdrainage also is good.

Probably about 20 or 25 per cent of the Baxter gravelly silt loam is cleared. The remainder is forested with hardwoods, including white oak, red oak, post oak, hickory, dogwood, with occasional persimmon, ironwood, maple, tulip poplar, chestnut, beech, and cedar.

Corn is generally grown on sod land. The yields range from about 18 to 36 bushels per acre. Wheat yields about 8 to 16 bushels; oats, 15 to 30 bushels; and redtop, about 1 ton per acre in new meadows. Clover is not very commonly grown. Bluegrass grows in places, but is not an important grass, even when newly cleared land is seeded down. Redtop and orchard grass are the important grasses. Many of the older fields show the effects of surface erosion,

although the land does not usually gully deeply. There has been a tendency to cultivate newly cleared land for too long a period before seeding down, and under these conditions the soil is very liable to erosion. Some of the worn fields are rarely cultivated, being used for permanent pasture.

Where farmed in connection with other soils, this type probably should be used mainly for pasture, with cultivated crops only when needed to renew the sod. The "red clay" or "dark soil," as the Baxter is locally known, is considered especially good for tobacco. It is said that this type produces better than the "white land" or Dickson silt loam.

BAXTER SILT LOAM

The typical Baxter silt loam is a brownish-gray silt loam, underlain at about 6 to 8 inches by yellowish-red silty clay loam, which passes at about 16 to 20 inches into red silty clay or clay. In many places the upper subsoil is yellowish brown rather than red, passing at about 20 to 30 inches into red clay. Some fragments of chert and shale are found in the soil, the quantity increasing in the lower subsoil and substratum. The material is generally deeply weathered, with bedrock usually 20 or 30 feet below the surface.

The Baxter silt loam is not extensive in the county. The largest and most typical areas are in the vicinity of Burns and Dickson. The type occurs mainly on the ridges, in places a little lower than the associated Dickson silt loam, and the topography is on the average more sloping than that of the typical Dickson. The browner variation occurs on some ridges between Dickson and Charlotte and in places along the Harpeth Ridge in the northeastern part of the county. A few areas occur on low ridges, and others on lower gentle slopes at the headwaters of Yellow Creek and in the vicinity of Beef Range. The topography is generally smooth to gently rolling. The moisture conditions are good; neither surface soil nor subsoil hardens as much in dry weather as in the Dickson silt loam.

About 65 per cent of the type is cleared and used for cultivated crops or pasture. The tree growth consists of hardwoods, including white oak, red oak, post oak, hickory, maple, dogwood, and sassafras. Corn, oats, and wheat are the most important crops. Timothy, red top, and orchard grass are the common meadow and pasture grasses. On some farms clover is seeded with timothy and succeeds fairly well. Yields are somewhat higher than on the Dickson silt loam. A few fields of alfalfa have been grown on the type with heavy applications of lime and fertilizer.

General farming on a small scale is commonly practiced. The small amounts of manure produced and the plowing under of a sod at intervals of 8 or 10 years are scarcely adequate to keep up the productivity of the land. Liming is practiced on a few farms near the lime kilns at Burns, where the use of lime has been found to increase yields. The growing of a larger acreage of grass, the plowing down of sod before the stand of grass becomes too light, and the increased use of clover and cowpeas would doubtless increase the productivity of this soil.

HAGERSTOWN GRAVELLY SILT LOAM

The surface soil of forested areas of Hagerstown gravelly silt loam typically consists of brown silt loam. This is underlain at about 8 to 10 inches by yellowish-brown silty clay loam, which passes at a depth of less than 3 feet into reddish-yellow or reddish-brown clay. Scattered over the surface and through the soil are varying quantities of chert and shale fragments. There is seldom sufficient gravel to cover the surface and in places there is very little. The chert consists mainly of small fragments of thin layers of bedded chert, an inch or two in thickness. The shale fragments are smaller, and of yellowish-brown, soft, argillaceous shale. In places gray limestone with a rounded and hollowed surface occurs in the lower subsoil. Over most of the type there are no stones at the surface, but in places where the slopes are steep there are included areas of the stony type. The color of the subsoil is more brownish red than in the Baxter soils and is less cherty. There are more chert fragments, however, than are commonly found in the Hagerstown soils as extensively developed in other parts of the Eastern United States.

The Hagerstown gravelly silt loam occurs on moderate to steep lower slopes in nearly all parts of the county, with the Baxter soils on the upper slopes. The transition from one soil to the other is gradual, without change in degree of slope, and is also uneven, as considerable material is washed down from the Baxter soils over the upper margin of the Hagerstown in places. The type also occurs along many small streams in strips and patches too small to map, most of it being obscured by material brought down from the upper slopes.

Corn is the principal grain crop, and redtop the common grass. Not much small grain is produced, the topography generally being rather unfavorable to the use of binders. Red clover apparently thrives on the type, but is not grown extensively. The pastures are mainly of redtop. Bluegrass does not ordinarily thrive, although it appears to some extent in pastures on newly cleared hillsides. Orchard grass is seeded to some extent for pasture, but the redtop is apparently more persistent on worn hillsides. Many old pastures are grown up more or less with broom sedge and brush.

The stony areas of the steeper slopes have about the same fine soil material as the less stony areas; but the average depth is shallower. The more important of the stony bodies are distinguished on the soil map by stone symbols.

HAGERSTOWN SILT LOAM

The surface soil of the Hagerstown silt loam is typically a brown to dark-brown mellow silt loam. At a depth of about 8 to 14 inches this is underlain by yellowish-brown to reddish-brown silty clay loam or silty clay, which becomes reddish-yellow to brownish-red in the lower part of the 3-foot section. In places limestone is reached at a depth of 2 or 3 feet, but the clay ordinarily extends well below 3 feet. Some of the limestone reached at the comparatively shallow depths represents projections from the main mass of bedrock. The surface is nearly free of stone, either limestone or chert. On oc-

casional short slopes some small fragments of chert and shale are present in the soil.

Small areas of this type occur in most of the valleys of the county. The largest and most numerous areas are in the north-central part occupying not only lower slopes and low benchlike positions, but also some rather high levels. (Pl. 3, fig. 1.) Where the type occurs along the streams, it is not everywhere clearly distinguishable on the surface from the terrace soil (Elk silt loam), but generally the subsoil is stiffer and obviously consists of residual material.

The surface is generally a gentle slope toward the streams, for where the slope is greater the gravelly type is developed. Moisture conditions are good.

The Hagerstown silt loam is the most productive upland soil in the county and is nearly all under cultivation. It was originally forested with oak, elm, hickory, maple, walnut, and other hardwoods. Crops are grown in rotation quite systematically, for clover and timothy thrive well, and good yields of other crops are obtained where these crops are grown at fairly frequent intervals. Corn ordinarily yields 30 to 50 bushels per acre, wheat 15 to 20 bushels, oats 15 to 30 bushels, clover and timothy a ton or more per acre. Redtop is grown to some extent, yielding about the same as timothy. Bluegrass does well on land in a high state of cultivation, but does not spread in pastures, timothy, redtop, and orchard grasses being much more important in old pastures. Tobacco yields 1,000 pounds or more per acre, but the crop is not grown to a much greater extent than on the other upland soils, although it is claimed that better results are obtained on this "dark land." Small quantities of complete fertilizer are used on wheat and tobacco. Even on tobacco, 200 pounds is evidently considered a fairly heavy application. The type is generally farmed in connection with bottom soils, and corn is the most important crop. Considerable numbers of hogs, and some cattle, are raised or fitted for market on these farms. Dairying is commonly carried on only on a small scale. Land values at this time (1923) range from about \$50 to \$100 or more an acre.

CLARKSVILLE GRAVELLY SILT LOAM

The Clarksville gravelly silt loam, in forested areas, consists of about an inch of grayish-brown silt loam, underlain by brownish-gray to light-gray or pale-yellow silt loam. At about 6 or 8 inches this passes into pale-yellow or yellow silt loam to silty clay loam, which extends to depths varying from less than 2 feet to more than 3 feet. The underlying rock is composed mainly of thin-bedded argillaceous shales, with some limestone. The shales are limy where not too advanced in weathering. Thin, platy fragments of shale are present through the soil and subsoil. The weathered shale remaining in the soil is not generally calcareous.

In places the soil and subsoil of included areas have a reddish-brown cast, grading toward the color of the Hagerstown, as in the vicinity of Harpeth Valley School. In a forested area about 1 mile east of Whiteoak Flat, on a rather steep slope, the soil predominantly consists of a shallow phase consisting of light-gray silt loam, grading at about 5 to 8 inches into pale-yellow silt loam containing

so many chert fragments that it is impossible to bore deeply into the soil or even dig into it with a mattock. The soil also contains numerous fragments of chert. There are also fragments of yellowish weathered shale of irregular shape and thickness. Some limestone occurs in the beds of shale and cherty material.

The Clarksville gravelly silt loam is developed on the lower slopes of the hills along Harpeth River and the lower courses of its branches, occupying small areas of graded or partly graded slopes, and some benchlike positions. It is rather inextensive, occupying only narrow strips next to the streams.

The timber is hardwood. Beech is common, with oak, maple, cedar, hickory, hornbeam, chestnut, and dogwood. Nearly 75 per cent of the type is under cultivation and is used for the general farm crops. As it is farmed in connection with bottom soils, it is used for small grains, meadow, and pasture to a considerable extent, with corn on a relatively small area. Wheat yields about 10 bushels per acre, oats 15 to 20 bushels, corn 15 to 25 bushels. Redtop is the common grass, but some timothy and orchard grass are grown. The fields on the type are small, and generally more care is given the crops on the bottoms. The land is often left in grass for 10 years. Some farmers state that fertilizer and manure do not have as lasting effects on this as on other upland soils. The type is locally known as soapstone land.

The included steeper areas differ from the smoother agricultural part of the type in steepness of surface and in shallowness of the soil. Partly decomposed disintegrated rock, consisting of soft, yellowish-brown, argillaceous shale, often with cherty beds, is generally reached within 3 feet of the surface. In shallow cuts the rock exposed is not highly calcareous, but in the cliffs a part of the shale is highly calcareous, and some beds of limestone appear. Although the topography is steep, only small areas are so stony or shallow as to be classed as Rough stony land, even the steepest slopes having a fairly uniform covering of shaly soil. Locally, in covelike places at the head of hollows, a brown soil is developed.

This variation occurs on the steep hillsides along Harpeth River and the lower courses of its branches. Except for a few ridge tops, little of the land is used for crops, and the yields are low. It is said that these ridges constitute some of the best locations for fruit in the district. At present, however, there are only a few fruit trees growing on them. The remainder of this land is in forest, for which it is best adapted. The growth is largely of beech, oak, hickory, and dogwood, with much cedar on very shallow soil.

ELK SILT LOAM

The Elk silt loam typically is a brown to light-brown mellow silt loam, passing at about 8 to 12 inches into brownish-yellow or light-brown heavy silt loam, which grades into yellowish silty clay loam to silty clay. In places there is not much change in the subsoil below depths of 10 or 12 inches. Small quantities of waterworn gravel occur locally in the soil and subsoil, but as a rule the type is free of gravel. These alluvial deposits are generally shallow, overlying residual material at depths of 3 or 4 feet.

The Elk silt loam occurs on the terraces or benches along the streams, generally 10 to 20 feet above the first bottoms. A few areas near the mouth of Harpeth River are perhaps 40 feet above the first bottom. All the areas are small. The surface is smooth and nearly level, generally sloping a little toward the stream. The surface drains off well, and moisture conditions are good.

This is one of the best soils in the county, and practically all of it is under cultivation. The general farm crops are grown, with meadows of clover and timothy at fairly frequent intervals. Good yields, about the same as on the Hagerstown silt loam, are obtained. Probably a larger proportion of tobacco is grown on this soil than any other in the county. Yields of 800 to 1,000 pounds or more per acre are obtained.

As the type generally occurs in small areas with other fields of first bottom and of gravelly hillside in the farm, the common practice is to use the bottom land for corn and the Elk silt loam for tobacco. Fertilizer is used only on wheat and tobacco, usually about 200 pounds of mixed fertilizer per acre being applied. Lime could doubtless be profitably applied, for although clover does well, a surer stand and better yields could probably be obtained on limed soil. A few good stands of alfalfa were observed on the type, and the soil is well adapted to alfalfa, provided lime and phosphatic fertilizer are applied.

Elk silt loam, poorly drained phase.—The poorly drained phase of the Elk silt loam consists of yellowish-brown silt loam, lighter in shade than the typical soil, underlain at about 6 to 8 inches by brownish-yellow or yellowish-brown silty clay loam, which passes at about 2 feet into heavier material, mottled gray and yellow. Some small ferruginous concretions are present through the subsoil. Bedrock apparently lies not far below the 3-foot depth. This soil really represents a member of a different series, not yet established because of the almost insignificant areas encountered.

The phase occurs on terraces or benches of streams in the extreme eastern part of the county, principally on Turnbull Creek and Harpeth River. The surface is smooth, generally sloping a little toward the stream. The underdrainage is somewhat deficient. Practically all the land is cleared. It is used mainly for the production of redtop hay for pasture, being cultivated only at intervals of years. Redtop and orchard grass endure well and make good pasture, and fair crops of corn are produced on sod.

HUNTINGTON GRAVELLY LOAM

The Huntington gravelly loam consists of brown to light-brown gravelly loam or gravelly silt loam, underlain at about 8 to 10 inches by yellowish-brown gravelly silt loam or gravelly silty clay loam, which extends well below the 3-foot depth. The content of gravel is variable. In places the subsoil is so porous that the soil is somewhat droughty. In the surface soil the gravel is generally more abundant along the streams.

The type occupies the narrow bottoms of the smaller streams, and also occurs in narrow strips along the larger streams. On the smaller streams the texture of the areas mapped as this type ranges

from loam immediately along the stream to silt loam near the edge of the bottom. The lower subsoil is porous in places, and in other places is somewhat poorly drained and mottled with gray. The soil generally does not show so pronounced a brown color as the silt loam, being composed more largely of wash from the Dickson and Baxter soils.

The greater part of the type is productive, and probably 75 per cent of it is cultivated. Much of it receives additional deposits during overflows, and on such areas corn is grown for years in succession. Corn is the principal crop as a rule. Yields are variable, but generally fair to good.

HUNTINGTON FINE SANDY LOAM

The Huntington fine sandy loam is a brown, medium heavy to light fine, sandy loam, underlain at about 12 to 18 inches by brown, heavy fine, sandy loam.

Very little of the type occurs in the county, and this in a strip of high bottom along the banks of the Cumberland River. Although only a few feet higher than other parts of the bottom, it stands so nearly above the normal overflow that it provides a good location for farm buildings and dwellings. Moisture conditions are good.

This type is practically all under cultivation. Corn is the principal crop, yielding ordinarily about 35 to 50 bushels per acre. The type is also well adapted to the production of peavine hay and for truck crops such as potatoes, melons, and vegetables.

HUNTINGTON SILT LOAM

The Huntington silt loam is typically a brown, mellow silt loam, 12 to 18 inches in depth, passing into yellowish-brown silty clay loam. Some mottling of gray generally appears at about 3 feet. The total depth of the alluvial deposit apparently ranges from about 4 to 6 feet in the smaller stream bottoms to 30 to 40 feet along the Cumberland River. Some waterworn gravel is present in the soil and subsoil, but not in sufficient quantities to affect moisture conditions to any marked extent.

The Huntington silt loam is most typically developed on the larger local streams, where the bottoms are wider (Pl. 3, fig. 2). There is nearly always a strip of gravelly loam along the stream, which, though too small to indicate on the map, makes up a considerable part of the narrow bottoms. In the upstream parts of the smaller bottoms the soil is lighter colored, a larger proportion of the material being wash from the Dickson and Baxter soils; farther downstream, where the bottoms are bordered by narrow strips of Hagerstown soil, the bottom soil contains enough material from this strip to give it a good brown color. In places the outer part of the bottom is low, and the subsoil is somewhat mottled; but commonly the surface is level, or slopes slightly toward the stream, and the subsoil is of good solid color.

In the back part of the bottoms of Cumberland River, and the bottoms of Harpeth River and Johnson Creek for a distance of a mile or more back from the Cumberland, the texture of the soil is



FIG. 1.—VIEW SHOWING GRAVELLY NATURE OF THE BAXTER GRAVELLY SILT LOAM



FIG. 2.—REPRESENTATIVE LANDSCAPE ON THE BAXTER GRAVELLY SILT LOAM



FIG. 1.—TOPOGRAPHY AND FARMSTEAD ON THE HAGERSTOWN SILT LOAM

The farm buildings shown in this picture are above the average



FIG. 2.—TOPOGRAPHY AND FARM BUILDINGS ON THE HUNTINGTON SILT LOAM

heavier than elsewhere, ranging from a heavy silt loam to a silty clay loam. Some soil of a loam texture, occurring in a strip adjoining the Huntington fine sandy loam on the Cumberland River and in the bottom of Yellow Creek below the mouth of Cedar Creek, was included with the type.

Corn is the most important crop, being grown in many places for years in succession. Where recent deposits have been very heavy, corn can be grown in this way without decrease in yield. On other farms, where little wash is being deposited, crops of clover and timothy, and occasionally small grains, are grown from time to time. Corn ordinarily yields 40 to 60 bushels per acre, clover and timothy $1\frac{1}{2}$ tons or more. Wheat and oats yield little more than on the uplands, as they tend to grow rank and lodge. A small acreage of tobacco is grown on this type on many farms, especially along the smaller streams. A good quality of leaf is produced, and yields ordinarily range from 800 to 1,000 pounds. Little or no fertilizer is used. Land values at present (1923) ordinarily range from about \$50 to \$150 an acre.

HOLLY SILT LOAM

The Holly silt loam is a gray to light-gray (when dry) silt loam, faintly mottled with grayish yellow and brown. At depths of about 6 to 10 inches this grades into gray, light-gray or bluish-gray silty clay loam to silty clay, strongly mottled with yellow and brown. In places there are small dark-brown concretions in the subsoil.

The type occurs in low, poorly drained situations in stream bottoms. It is not extensive, occurring only in a few small areas along the larger streams. The type is poorly drained and crawfishy.

A few areas of similar soil on the second bottom of Harpeth River are included because of their small extent. These really represent the type which elsewhere has been mapped as Robertsville silt loam. The only fairly large area of this higher soil is near Petway Ford. The soil is not different from that of the first bottoms in any marked degree, except that it is not subject to overflow.

About one-half of the Holly silt loam has been cleared. The growth of wild grasses furnishes some meadow and pasture. There is some cane in places. The timber growth includes gum, elm, willow, beech, and other trees. Nearly all the type in the county could be profitably drained and put under cultivation, for when ditched it is a fairly productive soil.

ROUGH STONY LAND

Rough stony land includes high limestone cliffs along the larger creeks. These cliffs commonly occur alternately on each side of the bottom, with the stream flowing along their base. They make some valley farms difficult of access, as for instance on lower Jones Creek, where there is no public road down the valley. These areas have no agricultural value.

MINE DIGGINGS

Iron ore has been mined from small areas at various places, mainly in the ridges. The deposits are somewhat irregular, and the surface

of mined areas is pitted with large and small excavations, with undisturbed soil between.

SUMMARY

Dickson County is situated in the north-central part of Tennessee. Its area is 495 square miles, or 316,800 acres. The county is predominantly hilly, consisting of dissected plateaus, with smooth land only on the ridges.

The population of the county in 1920 was 19,342. The population is predominantly rural and uniformly distributed through the county. Dickson, the principal town, has a population of 2,263. The county is well supplied with railroad facilities.

The climate is moderate. The mean temperature of summer is 76° F., that of winter 38.6° F. The average annual precipitation is 48.3 inches.

A large part of the area is in forest, with the more valuable and mature timber cut out; on many farms the cutting and marketing of timber is an important source of income. More than one-third of the area of the county is improved land. General farming on a small scale is the common practice, with tobacco as a cash crop on many farms. Corn is the principal grain crop. Oats and wheat are the common small grains grown. Clover, timothy, and redtop are the common hay crops. Cowpea hay is also of considerable importance. A large acreage is in pasture of redtop and orchard grass. Commercial fertilizer is not commonly used, except on tobacco.

The soils of the county, developed in a moderate, humid climate, are typically deeply weathered, with the content of soluble minerals reduced by leaching. The formations are mainly of the lower Carboniferous. The higher formations are predominantly of deeply weathered clay and chert rock. The lower formations are largely limestone and calcareous shales.

The predominant soil on the plateau is the Dickson silt loam, with some developments of the Guthrie silt loam in poorly drained places. The predominant soil on the hillsides is the Baxter gravelly silt loam. On the lower slopes there are developments of the Hagerstown silt loam and gravelly silt loam. In the first bottoms the brown, well-drained soils are of the Huntington series, and the gray, poorly drained soils are of the Holly series. The brown, well-drained soil on the second bottoms is the Elk silt loam.

The Dickson silt loam is an extensive type of grayish-brown to yellowish soil. Probably 50 per cent of it is in forest. General farming on a small scale is commonly practiced. Corn is the principal grain crop, tobacco the principal cash crop.

The Guthrie silt loam, developed in poorly drained situations, is inextensive and is mainly in forest.

The Baxter silt loam occurs inextensively on the plateau. Yields are somewhat higher than on the Dickson silt loam. The Baxter gravelly silt loam is mainly in forest, but is also used for the general farm crops.

The Hagerstown gravelly silt loam is more productive than the Baxter or Dickson soils. The Hagerstown silt loam has a favorable topography and is a productive soil.

The Clarksville gravelly silt loam occurs mainly on steep slopes and is largely in forest.

The Elk silt loam is a brown, productive terrace soil. It is not extensive in the county.

The Holly silt loam is a gray, poorly drained alluvial soil of small extent in the county.

The Huntington silt loam, the most extensive alluvial soil in the county, is a productive soil. The Huntington gravelly loam occurs mainly on the smaller streams. The Huntington fine sandy loam occurs in small areas in the bottoms of the Cumberland River.



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