Soil Survey of the Boonville Area, Indiana.

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LOCATION AND BOUNDARIES OF THE AREA.

The Boonville area is located in the southwestern part of Indiana, bordering on the Ohio River. It is bounded on the east by the

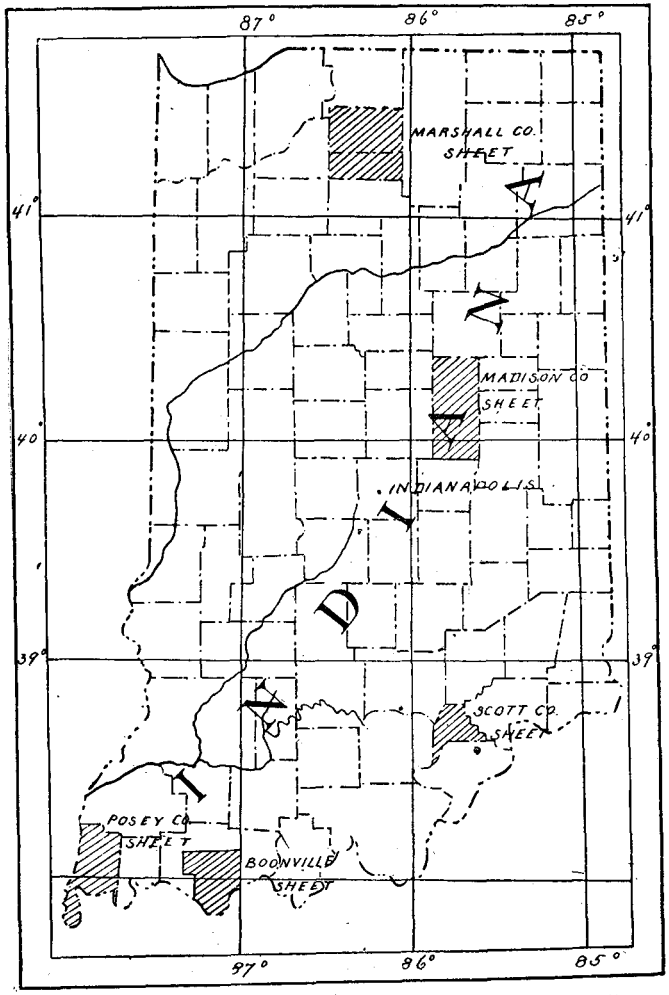

FIG. 1.—Sketch map showing location of the Boonville area, Indiana.

meridian of 87° west longitude and the Ohio River; on the north by a line drawn east and west through Tennyson; on the west by a line running $10\frac{3}{4}$ miles north from the Ohio River to $1\frac{3}{4}$ miles east of the village of Hatfield, thence west for a distance of $4\frac{3}{4}$ miles, and then north to the northern boundary; and on the south by the Ohio River. This territory includes parts of Warrick and Spencer counties, and embraces 169,216 acres, or approximately 264 square miles.

The area is well adapted to agriculture, which, together with the coal industry, forms the leading occupation of the people.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

In 1803, John Sprinkle crossed the Ohio River from Kentucky and settled at Newburg, Warrick County, and in the same year a few other families followed him, taking up the adjoining lands. These first settlers were all known as "squatters," as the county was not surveyed until 1805, and it was some years after that date before these lands were put on sale by the Government. Four years after the settlement at Newburg the present town of Rockport was established by Daniel Grass, and as supplies for the settlement were easily obtained from Owensboro, Ky., its population rapidly increased. The settlement of the area was at first slow, on account of frequent trouble with hostile Indians, but after the battle of Tippecanoe, in 1811, which effectually destroyed all chance of future annoyance from that source, the population of both the inland section and that along the river increased very rapidly. Many settlers came in from Kentucky, Tennessee, Georgia, Virginia, and the Carolinas, as well as from the States to the east.

The development of the northern part of the area progressed more slowly than that of the section which bordered on the river, because there was no outlet for its products and communication with the outside world was much more difficult. All supplies were taken from the river to Boonville in wagons until the railroad reached that town in 1873.

At first the settlers cultivated only small areas of corn, grain and potatoes for home use, depending on the game in the surrounding forests for meat, and on trading with the boats which passed up and down the river for all other necessaries of life. The growing of tobacco began to attract attention soon after the area was settled, and later, when good markets for the product were estab-

lished at Owensboro and Louisville, Ky., its production rapidly increased. Corn, tobacco, wheat, barley and oats soon began to be cultivated on a comparatively large scale, and gristmills were erected, so that the people no longer depended on Kentucky as a source of supplies.

About 1836 two agricultural societies were organized, one at Rockport and one at Boonville, for the purpose of encouraging the farmers of the area in stock raising and the cultivation of general farm products. County fairs and farmers' institutes were held yearly, where a small number of stock and a few other products of the surrounding country were exhibited; but no great interest was taken in these attempts until 1856, when a new organization was formed, which continued for years to be the most prosperous agricultural society in the State.

Corn and tobacco continue to be the leading product of the area. A tobacco market was established at Rockport in 1855. The high prices prevailing during the decade from 1860 to 1870 caused a great increase in the tobacco acreage. The supply from the Southern States was cut off during this period, and there was a great demand for tobacco at high prices. The acreage devoted to this crop increased so rapidly that tobacco was soon cultivated almost to the exclusion of all other crops. Spencer County alone is said to have produced as much as 10,000,000 pounds a year. In more recent years the production of tobacco has greatly decreased, but at the present time the prices offered at the neighboring markets of Owensboro and Louisville are causing renewed interest in its cultivation.

One of the most important factors in the development of the northern portion of the area was the advent of the Lake Erie, Evansville and Southwestern Railroad, which reached Boonville in 1873. This afforded adequate means of transporting the products of this section to both the local markets and those situated at a distance from the area. The coal deposits in the immediate neighborhood soon began to be developed, which caused a large increase in population and property values. It had been known for some time that there were coal beds in the hilly sections of the area, but owing to the lack of transportation facilities no attempt had been made to develop them. During the last ten years coal mining has attained considerable local importance, and coal is now being shipped to more distant markets.

The area at the present time is well developed agriculturally. It contains a number of towns and villages, of which Boonville and

Rockport are the largest, each having a population of about 3,000. They have a number of small factories and are the centers of trade for large and prosperous rural districts.

CLIMATE.

The area surveyed is not subject to severe winters or to excessive heat during the summer months. The winters are not only mild, but of comparatively short duration. The growing season comprises about six months of the year, during which time crops are safe from damage by frosts. There is usually adequate rainfall for the crops grown, and injury from drought is very uncommon, even to crops maturing in the late summer.

During the early part of the spring excessive rains, occurring both in this State and those to the northeast, together with the melting of the snows farther north, cause the Ohio River to overflow. Large areas of the flat, low lands along its course are flooded, rendering them too wet for the early cultivation of crops.

The last killing frost in the spring usually occurs about April 9, and the first in fall about October 31.

The following table shows the normal monthly and annual temperature and precipitation as observed at Evansville, Ind., which is situated only a short distance southwest of the area:

NORMAL MONTHLY AND ANNUAL TEMPERATURE AND PRECIPITATION.

MONTH.	Evansville.		MONTH.	Evansville.	
	Temperature. Degrees F.	Precipitation. Inches.		Temperature. Degrees F.	Precipitation. Inches.
January	35.4	3.31	August	78.4	2.09
February	32.3	2.98	September	71.9	2.48
March	44.6	4.84	October	59.2	2.87
April	57.0	3.55	November	45.0	3.67
May	67.0	4.38	December	35.8	3.02
June	76.3	4.67			
July	79.6	3.54	Year	56.9	41.40

PHYSIOGRAPHY AND GEOLOGY.

The physiographic features of the area are quite marked, varying from rolling uplands and small valleys to bottom lands or river flats. The rolling uplands vary considerably in height, but rarely exceed 500 feet above sea level. The coal knobs, located three and a half miles northwest of Rockport, have an elevation of 600 feet and are the highest hills in the area. The hilliest portions are found in the vicinity of Boonville, in the northwestern corner of

the sheet, around Chrisney, in the northern and eastern portions of the area, and to the south and west of Rockport.

The hills in only a few instances have very steep slopes, but as a rule are characterized by their smooth, gently rounded forms, with intervening shallow depressions. At Rockport, where the hills extend to the river, they have a steep, precipitous bluff, 75 to 100 feet above the level of the river, for about two miles to the south of that town. Where the surface is undulating or less hilly the soil does not erode to any extent. It is only on the steep sides of some of the higher hills that erosion is very great.

The principal valleys of the area occur along the Cypress Creek Ditch and Little Pigeon Creek, which still flow in the same channels they occupied prior to the Glacial period.

The valley formed by the Cypress Creek ditch has an average width of one mile, and extends across the area from north to south immediately west of Boonville. The Little Pigeon Creek valley traverses the area in a northeast and southwest direction and occupies the territory between the Boonville hills on the west and the Chrisney hills on the east. It has an average width of four miles and is the largest valley in the area. Numerous other small valleys occur, especially in the hills, where small streams have cut their way through, but they are not of sufficient importance to warrant separate discussion. The streams usually overflow after heavy rains or long wet periods, and the soils found in the valleys are of a silty or clayey character.

The surface of the bottom lands or river flats in the southern part of the area, along the Ohio River, presents a flood plain, cut by these numerous small streams, old stream channels and bayous. These lands are flooded annually by the overflow of the river, and each year new channels and bayous are formed. A few small ridges occur over these bottoms and have an elevation of three to four feet above the surrounding surface. The elevation of this flood plain is from 340 to 360 feet above sea level.

Following the course of the Ohio River and bordering it is a sand ridge, averaging one-half mile in width, which is somewhat higher than the lands immediately back of it and is rarely overflowed. The soils found in the bottoms are of a stiff, clayey character, and owing to their low-lying position are exceedingly difficult to drain.

All the drainage of the Boonville area finds its way into the Ohio River; the streams flowing in a southerly direction and emptying directly into the river. The largest is Little Pigeon Creek,

which drains over three-fourths of the area. It enters the area two miles east of Tennyson, flows in a southwesterly direction, and passes out about five miles west of Richland City. The Cypress Creek ditch, which flows in a southerly direction through the extreme portion of the area, drains the territory around Boonville and to the west of it. The remainder of the area is drained by smaller streams, which have their sources within the area and flow directly into the Ohio River.

The rocks forming the basal structure of the area belong to the Carboniferous system. The rocks of this system have played an important part in the economic geology of the area, and at present quite extensive coal mines are being developed. The rocks belonging to this period, which are more commonly exposed, consist of sandstone, shale, and shaly sandstone. Exposures may be seen in different parts of the area, especially in deep road cuts.

Inasmuch as the underlying rocks are everywhere covered by a thick mantle of loess, they have played only a minor part in the formation of the soils of the area. During early Quaternary times great ice sheets extended across Indiana some distance north of the area. As the ice melted and the glaciers began to recede it is believed that a part of the material which later formed the soils of the area was released and carried still farther south and deposited over broad flats by streams then issuing from the glacial front. It was later picked up by the winds and generally redeposited in the form of loess over the surface of the uplands, covering all older geological formations. The soils of the bottom lands are of recent alluvial origin, being made up of reworked loess material and very fine sand, and are generally underlain by alluvium of the Glacial age.

SOILS.

The soils of the area are divided naturally into two general groups—upland and bottom land. The several soils, in their typical occurrence, are quite distinct, each possessing its own physical peculiarities. Six types have been recognized in the area, the Miami silt loam and Miami fine sandy loam being found in the upland division; the Waverly silt loam, Waverly clay loam, Waverly clay, and Waverly fine sandy loam in the bottom-land division of the area.

The following table shows the actual and relative extent of each of the different types found in the area:

AREAS OF DIFFERENT SOILS.

SOIL.	Acres.	Per Cent.	SOIL.	Acres.	Per Cent.
Miami silt loam	86,656	51.2	Waverly clay	8,320	4.9
Waverly clay loam	30,208	17.9	Waverly fine sandy loam	3,904	2.3
Miami fine sandy loam	22,848	13.5			
Waverly silt loam	17,280	10.2	Total	169,216	

MIAMI SILT LOAM.

The Miami silt loam is the most extensive type in the area surveyed. Its topographic features, ability to withstand drought, adaptability to a great diversity of crops, and its natural productiveness makes it the most valuable soil in the area for general farming purposes.

The soil is a silt loam averaging from 8 to 10 inches in depth, and varying in color from a light ashy-gray to light brown, according to the amount of organic matter present. It contains, in its typical form, a small percentage of fine sand, and when recently put under cultivation or in its virgin state carries a large amount of organic matter.

The subsoil, from 9 to 36 inches, consists of a silt loam containing a small proportion of very fine sand in the first few inches. It varies in color from dark red to yellow, and becomes heavier as the depth increases. At a depth of four or five feet the clay content is much larger and a very heavy silt loam occurs, which is usually of lighter color than that immediately underlying the soil. The material is very compact at a depth of from 25 to 36 inches, making a subsoil very retentive of moisture, while the fine silty texture of the soil prevents the surface from becoming baked, sun cracked, or difficult to cultivate.

The Miami silt loam, covering 51 per cent. of the entire survey, occurs in the uplands in all parts of the area. The largest unbroken body occurs in the northeastern part of the area and extends from near Rockport to the extreme northern boundary. Small tracts occupy the low ridges in the vicinity of the flat river bottoms. These differ slightly from the typical Miami silt loam, in that the soil is slightly heavier and the underlying subsoil has a larger clay content. These small areas have undoubtedly been submerged at times, and the soil has been slightly altered by material deposited by water, as well as by that washed down from the neighboring uplands.

The topography of the country occupied by this type is rolling. The hills are low and rounded, with gently sloping sides, and the intervening valleys are broad and shallow. This insures good drainage, and with proper attention the land is subject to but little injury from erosion. Artificial drainage is seldom necessary and is practiced in but few localities, the rolling topography being usually sufficient to drain the excess water into the numerous small streams.

The loess from which this soil is derived is of glacial origin. The material, which is supposed to have been transported by wind and water, was deposited as a mantle over the entire country to the southward. It shows no stratification, and has an average depth of from 8 to 10 feet in the more hilly section, although it often reaches a greater depth in the valleys or more level areas. The loess overlies beds of sandstone and shaly sandstone belonging to the Carboniferous system. These rocks, however, have not entered into the composition of the soil, except on an occasional steep slope where a thin layer of sandy shales has been exposed through the process of erosion, in which case they weather rapidly, and, becoming mixed with the silty material, cause a larger percentage of fine sand in the soil of the immediate vicinity.

Great care is necessary to keep the Miami silt loam in a high state of productiveness, and a rotation of crops is very essential in order to secure the best results. Where the soil is in a loose and thorough state of cultivation as is necessary when the crop is corn or potatoes, it suffers greatly from the effects of erosion, and large areas of the subsoil are exposed along the steeper slopes.

The Miami silt loam is well adapted to most of the general farm products of the area. Wheat and oats do especially well, and large yields of clover, timothy, and other grasses are always obtained. Very little tobacco is cultivated on this type, as the other soils of the area are considered better suited to the variety grown in this section. Wheat averages 15 bushels, oats about 30 bushels, and corn from 30 to 35 bushels per acre. Where the soil is well tilled and a good system of rotation practiced, much larger yields are frequently realized without the aid of commercial fertilizers. Clover and timothy average from one and a half to two tons per acre, two or more cuttings often being obtained. Apples, peaches, plums, and pears are all successfully grown in the more hilly sections. No attempt has been made to cultivate vegetables and truck crops, except on a limited scale for home use and for local markets, but excellent yields are generally realized from these crops.

The following table gives the mechanical analyses of typical samples of the Miami silt loam:

MECHANICAL ANALYSES OF MIAMI SILT LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10796	1 mile E. of Pedigo Lake Mills.	Gray to Brown silty loam, 0 to 12 inches.	0.1	0.3	0.2	0.5	4.0	84.2	10.7
10798	¾ mile S. of Chrisney.	Yellow to brown silty loam, 0 to 10 inches.	.2	.8	.5	1.2	6.1	77.1	13.8
10797	Subsoil of 10796..	Heavy, silty loam, 12 to 36 inches.	.0	.2	.1	.3	8.7	68.2	22.4
10799	Subsoil of 10798..	Yellow, silty loam, 10 to 36 inches.	.2	.3	.4	.7	5.2	70.2	22.7

MIAMI FINE SANDY LOAM.

Third in extent and second in agricultural importance among the soil types of the Boonville area is the Miami fine sandy loam. The soil consists of a light to dark brown fine sandy loam, averaging about eight inches in depth. This sandy loam varies from fine to medium in texture, with the coarser material usually occurring in the upper portions of the soil. The sand content rapidly decreases with depth, and below 8 to 14 inches the subsoil is a heavy fine sandy loam, whose color varies from light red to yellow, generally becoming lighter in the deeper layers. The subsoil found from 20 to 36 inches below the surface is a light silt or clay loam, there being only a small percentage of sand present.

The type is practically uniform throughout the area, with the exception of a few minor variations in local spots. On some of the higher elevations a sandy phase occurs which consists of a very sandy loam in which the percentage of sand continues to be quite large throughout the entire 3-foot profile. At a lower depth, however, the sand content decreases rapidly, and at four or five feet below the surface the subsoil is the same as that found underlying the typical soil. The sandy loam of this phase, for a depth of from 20 to 30 inches is somewhat coarser than that of the typical soil, but grades rapidly into a sandy loam of finer texture at lower depths.

In low positions a somewhat heavier phase of the type is encountered which has been slightly modified by the action of water. The soil in this case is a fine sandy loam to a depth averaging eight inches, mixed with varying quantities of organic matter. The underlying subsoil is a heavy fine sandy loam which grades into a clay loam at about 15 to 20 inches below the surface. The color of both soil and subsoil varies from gray to brown, depending upon the amount of organic matter present. These variations occur only in limited areas over the main soil type, and are not of sufficient extent to be shown on a map of the scale used.

The Miami fine sandy loam occurs in one extensive body, reaching from the central part to the southwestern corner of the area. It embraces all the territory from a short distance south of Midway southwest to within three-fourths of a mile of the Ohio River. The eastern boundary of this area is formed by the rolling uplands of the Miami silt loam and the western by the bottoms of Little Pigeon Creek. Two small patches of this type are found a few miles northwest of Rockport, bordering the bottom lands of Lake Drain Creek. In the extreme western part of the area, northwest of Hatfield, two small areas are also found.

The topography of this soil is generally level or slightly undulating. Some portions, however, consist of low hills with shallow depressions intervening. The small hills or ridges trend in a northeast-southwest direction, the general slope being to the south and west.

Many small streams and drains flow across this type in a southwesterly to westerly direction, emptying either into Little Pigeon Creek or the Ohio River. In a few instances the streams have cut out wide depressions, and a heavier type of soil is usually found occurring along them. The type possesses good natural drainage. The streams which flow through it afford excellent outlets for all the drainage waters, and only in a very few instances has it been necessary to construct artificial drainage ditches. Occasionally, however, it has been found advisable to widen and deepen the streams in order to increase their capacity for carrying off the surplus water during times of heavy rains or long wet periods.

In addition to the good natural drainage which this soil type possesses, it also has the power to retain moisture, the underlying silt or clay loam subsoil forming an excellent medium for storage of the soil water, so that with the aid of proper cultivation crops suffer but little from the effects of drought.

Over the more elevated portions of the type, and where the sand content of the soil is above the average, natural drainage is apt to be too thorough for most crops. In this case great care should be exercised in the methods of cultivating, particular attention being paid to the preservation of a surface mulch in order to carry the crops safely through the dry seasons of July and August. The lower lying portions of this soil type require artificial drainage to secure the best crops. Ditching and tiling greatly improve the productivity of such areas, and a large part of these is being artificially drained at the present time.

The Miami fine sandy loam is of alluvial and glacial origin. The underlying silt and clay loam is undoubtedly reworked loess material washed down from the uplands, while part of the sand which goes to make up the sandy loam was deposited at an early date during times of exceptionally high water. The sand underlying the Miami silt loam bordering this type on the east has been washed over the surface of this soil and has entered into its composition.

The type is well adapted to almost all kinds of crops that will grow in this latitude, with the possible exception of timothy, which requires more moisture than this soil can retain during the dry season. Ordinarily wheat averages 20 bushels per acre. The yield of corn on the cob varies from 40 to 80 bushels per acre, depending upon the manner in which it is cultivated, and of oats only from 25 to 30 bushels, owing to the lack of sufficient moisture fully to mature the crop. Early potatoes yield from 75 to 175 bushels, while the late varieties produce from 100 to 125 bushels per acre.

The Miami fine sandy loam is one of the best soils in the area for the production of tobacco. It produces usually from 700 to 1,000 pounds per acre, although a much higher yield is often obtained. Tobacco is considered a sure crop, and often does well when corn, wheat, and other crops are a failure.

Apples and peaches are grown to some extent, but the apples do not keep as well as those grown on heavier types. Small fruits are cultivated to a limited extent, the quantity produced being scarcely sufficient for home consumption. The soil is well adapted to truck crops, but its distance from good markets renders their production unprofitable at the present time.

The following table gives mechanical analyses of typical samples of this type of soil:

MECHANICAL ANALYSES OF MIAMI FINE SANDY LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10790	2 miles E.of Hatfield.	Brown fine sandy loam, 0 to 14 inches.	0.0	1.7	10.0	28.6	19.2	32.1	8.3
10788	1 mile E.of Richland City.	Brown to gray fine sandy loam, 0 to 12 inches.	.2	1.7	6.4	27.1	18.6	34.9	11.1
10791	Subsoil of 10790..	Heavy fine sandy loam, 14 to 36 inches.	.1	1.2	7.7	26.1	10.7	39.7	14.2
10789	Subsoil of 10788..	Yellow loam, 12 to 36 in...	.1	.8	3.0	17.3	14.2	40.3	24.4

WAVERLY SILT LOAM.

The Waverly silt loam covers a very limited part of the area surveyed, but agriculturally it is one of the most valuable soils. The soil has a depth of from 12 to 18 inches. It is a silt loam, slightly plastic when wet, gradually becoming heavier as the depth increases, and varying in color from gray to dark brown, according to the amount of organic matter present.

The subsoil is a light-yellow silt loam, containing a larger percentage of clay than the soil, and becoming heavier at a depth of 25 or 30 inches. In places the subsoil is a mottled, heavy, drab silt loam of a much stiffer nature than the soil, but still retaining its silty character.

The greater part of this type, as it exists in the area, contains a comparatively small amount of organic matter, but in the poorly drained places, where there has been a continual accumulation of humus, the percentage of organic matter is very high.

The Waverly silt loam occurs as narrow strips bordering most of the small streams in all sections of the area, but seldom extends back more than a quarter of a mile from the streams. The largest area, which lies along the Cypress Creek ditch west of Boonville, has an average width of one mile. A second extension occurs at the head of the Willow Pond ditch, northwest of Rockport, where the soil contains a very large amount of organic matter and is of much darker color than the greater proportion of the type. The Willow Pond area has only recently been drained and put under cultivation, and both soil and subsoil are of a slightly heavier nature than the typical Waverly silt loam.

In topography the type is level, with a gentle slope toward the small streams. It occupies the low depressions near the sources of

streams and the narrow valleys between the rolling hills. The streams have usually cut their channels down several feet below the lands bordering them, but are generally insufficient to drain thoroughly the larger areas without artificial means. This soil is easily drained by straightening and deepening the small stream courses and cutting lateral ditches at frequent intervals through the wet areas. Tiles are used with excellent results, and at present the greater part of this soil is well drained. When ditched and tiled thoroughly it is very productive, and in several localities its value has been increased from $10 to $50 an acre by the installation of a good drainage system.

The Waverly silt loam is derived from material washed from the uplands at times of heavy rains and deposited in the depressions and shallow valleys, mixed with decaying vegetable matter. The remains of decomposed logs and other organic matter have been found in the soil at a depth of from 6 to 10 feet below the surface, indicating that the now shallow valleys have been gradually built up to this present level by the steady accumulation of material from the uplands.

Where the soil is well drained, corn averages from 50 to 70 bushels; wheat, 20 bushels; oats, 40 bushels; clover and timothy, about two tons, and tobacco from 1,000 to 1,200 pounds per acre. Large yields of potatoes and other vegetables are obtained. The soil seems best adapted to corn and tobacco. The corn crop is never a failure, and when well cultivated, larger yields than those above mentioned are obtained. Tobacco gives large yields per acre, and, as quantity rather than quality is what the growers strive for, much of this soil type is devoted to its production.

The following table gives the mechanical analyses of typical samples of the Waverly silt loam:

MECHANICAL ANALYSES OF WAVERLY SILT LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10806	4 miles N. of Rockport.	Brown to yellow silty loam, 0 to 10 inches.	0.2	0.5	0.5	3.6	10.4	74.8	10.1
10804	2 miles E. of Boonville.	Yellow fine silty loam, 0 to 12 inches.	.2	.2	.1	.5	5.8	82.1	11.1
10805	Subsoil of 10804..	Yellow silty loam, 12 to 36 inches.	.3	.5	.3	.4	5.7	77.8	15.1
10807	Subsoil of 10806..	Yellow heavy silty loam, 10 to 36 inches.	.2	.5	.5	3.5	10.7	67.5	16.7

Waverly Clay Loam.

The soil of the Waverly clay loam consists of about six inches of heavy, light-brown to gray silt loam, often containing small iron concretions scattered over the surface and through the soil. The soil becomes heavier with depth and grades into a very heavy silt loam containing a large percentage of clay. At a depth of from 12 to 20 inches the subsoil is sticky, mottled clay, usually containing small iron concretions. It becomes stiffer and more tenacious as the depth increases, making the soil difficult to drain. When plowed and exposed to the air the subsoil becomes whitish in color and dries into hard crusts or clods very difficult to pulverize. There is apparently little organic matter in the soil, except in small swampy areas, and no attempt has been made to drain these areas or to put them under cultivation. In such places the soil is known locally as "glade" or "crawfish" land and is of little agricultural value.

The Waverly clay loam occupies small areas adjacent to many of the small streams, but in the north central part of the area there is one body of considerable extent. This occupies the low, flat country which extends along Little Pigeon Creek and other streams from near Tennyson to where Little Pigeon Creek leaves the area. There are a few ridges and shallow depressions in this area, but the greater part of the land is almost level. It is drained with great difficulty, on account of the compact nature of the soil, the level topography, and the slight elevation above the level of the streams.

Where this soil is ditched and tiled and a complete system of artificial drainage established, the least productive phases have been made to produce average crops. Where no system of drainage is practiced, these lands are either covered with a growth of scrub oak or are used exclusively for pasture.

A small area of the type situated about two and a half miles north of Rockport deserves special mention. It occupies an old terrace of the Ohio River, and has a more rolling topography than the typical areas. This, together with its elevation and nearness to the river, gives it better drainage and a higher crop value than this soil usually possesses. This area is of too small extent, and the soil occurring between the low ridges is too typical of the Waverly clay loam to classify it as a separate soil type.

The Waverly clay loam is derived from the same loess material as the Miami silt loam of the uplands, but its position in the

low, flat valleys, only a few feet above the present level of the stream, has caused this material to undergo considerable change. The poor drainage, the addition of finer material washed down from the uplands, the effect of water which collects and spreads over the low areas in wet seasons, and the material deposited over these sections by former inundations, all combine to make this a much heavier soil than that formed from the loess on the well-drained uplands.

The yields of the various crops cultivated on this soil depend to a great extent on the thoroughness of the drainage and cultivation. With the methods usually practiced corn will average from 10 to 15 bushels and wheat from 10 to 12 bushels per acre. Wheat often gives larger yields in a favorable season if preceded by clover. Very little oats is grown on this type, and a yield of from 15 to 20 bushels per acre is estimated as an average crop.

Tobacco is grown quite extensively on this soil, a heavy, coarse-textured leaf being produced. This tobacco does not command so high a price as that grown on the more sandy soils, but the plants are larger and larger yields are obtained, the average being from 1,000 to 1,200 pounds per acre.

This soil seems best adapted to clover, timothy, and redtop, and a large amount of hay is harvested yearly from it. The hay crop averages from two to three tons per acre for each cutting, and the facilities for shipping this product to southern cities make it a profitable industry.

The Waverly clay loam varies considerably in agricultural value, according to its position, topography, and the methods used in its management. The greater part of it is considered a very poor soil for general farming purposes, but where it occupies the low ridges a few feet above the more level areas and is well drained very fair crop yields are usually obtained. Small areas frequently appear only a few rods apart where, on account of the local influences of topography and natural drainage, fair yields are produced on one field, while on the adjacent one, which is too wet and poorly drained, nothing except clover and grass can be successfully grown.

The following table gives mechanical analyses of this type:

MECHANICAL ANALYSES OF WAVERLY CLAY LOAM.

No.	LOCALITY.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10786	1½ miles N. E. of Richland City.	Heavy silty loam, 0 to 6 inches.	0.3	1.0	1.4	3.5	8.9	56.3	28.6
10784	3½ miles E. of Boonville.	Clay, 0 to 6 inches.....	.3	1.0	.7	1.0	1.8	59.0	36.1
10787	Subsoil of 10786..	Gray clay, 6 to 36 inches...	.4	1.3	1.6	3.7	8.6	53.2	31.0
10785	Subsoil of 10784..	Yellow to gray heavy clay, 6 to 36 inches.	.2	.4	.3	.3	1.1	53.9	43.7

WAVERLY CLAY.

The Waverly clay is an alluvial soil found in the low bottom lands bordering the Ohio River. It extends uniformly over that section of the area which is subject to annual inundation during the spring floods.

The soil, to a depth of from 8 to 10 inches, consists of a light-brown clay loam, often containing a small amount of sand. The percentage of silt and clay is very large, and the soil rapidly becomes stiffer and more tenacious with depth, grading into a heavy tenacious clay subsoil of a brown or drab color, which is often mottled in the lower depressions. A few small iron concretions are frequently seen in the more swampy areas, both in the soil and subsoil.

This type of soil is overflowed annually, and when the water recedes the lands, on drying, become baked and sun cracked, making its cultivation difficult.

The Waverly clay occurs in a large area in the extreme southern part of Spencer County and embraces the greater part of the lands lying within the great bend of the Ohio River, southwest of Rockport. It also extends in narrow strips a short distance up the valleys of some of the small streams which flow through this section of the area. These lands are comparatively level, but are traversed by numerous narrow sloughs and shallow, swampy depressions with low ridges intervening.

The type as a whole occupies a basinlike depression, surrounded on three sides by the sand ridge which extends along the banks of the Ohio River and on the north by the rolling uplands. The small streams which flow through it have cut their channels several feet below the surface of the greater portion of the area, and as

soon as the floods subside the water covering the lowlands finds its way back to the river through these outlets. Drainage is difficult over a large proportion of the type, but ditching and tiling greatly increase its agricultural value.

The material from which this soil is formed is brought down by the Ohio River at times of high water and is deposited over the areas flooded. During the annual spring floods the river water backs up through the openings which the small streams have cut in the sandy ridge and spreads out over the low flat country of the interior. The fine particles of silt and clay held in suspension are gradually deposited over the bottom lands, while the sand and coarser particles are deposited nearer the main current of the stream. This annual addition of new material to the soil tends to maintain its productiveness, and when the crops are not damaged by overflow large yields are obtained. Along some of the narrow depressions, where the current of the stream is strongest during the overflow, the surface soil has been eroded and the stiff clay subsoil exposed. Crops planted in such places are either a total failure or give very low yields.

The Waverly clay is cultivated almost exclusively to corn, which averages about 40 bushels per acre. During favorable seasons and where the land is well drained and cultivated as much as 60 bushels is often produced. Wheat yields from 18 to 20 bushels per acre, although the crop is sometimes destroyed or greatly damaged by the floods. It is estimated that about one wheat crop in three is harvested from this soil. Wheat is often sown in the fall, and if the crop is destroyed by the overflow it is followed by corn planted in the late spring. Oats are grown to a very small extent, as they suffer from the same disadvantages as wheat; but when not damaged by floods 40 bushels per acre may be produced. Tobacco is grown to a limited extent, and about the same grade of the dark export type is obtained as that grown on the Waverly clay loam. The yield is about 1,000 pounds per acre. Clover, timothy, and other grasses give yields of from two to three tons per acre.

This type, however, is best adapted to the production of corn. The soil is usually in condition to cultivate by the latter part of April, and often at an earlier date, and as the corn crop is planted in May it is very seldom damaged by overflow, and large and profitable yields are thus almost always assured.

The following table gives mechanical analyses of typical samples of the Waverly clay:

MECHANICAL ANALYSES OF WAVERLY CLAY.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10808	7½ miles S. W. of Rockport.	Heavy clay loam, 0 to 8 inches.	0.3	1.1	0.7	1.8	3.0	58.2	34.8
10810	7½ miles S. W. of Rockport.	Brown heavy clay loam, 0 to 10 inches.	.1	.2	.3	1.1	1.5	55.5	41.2
10809	Subsoil of 10808..	Stiff clay, 8 to 36 inches ...	.7	2.2	1.2	2.9	4.7	51.6	36 6
10811	Subsoil of 10810..	Brown to gray heavy clay, 10 to 36 inches.	.1	.3	.5	1.5	1.8	46.8	49.0

WAVERLY FINE SANDY LOAM.

The Waverly fine sandy loam is a type of minor importance in the area on account of its limited extent. It is well adapted to a variety of crops, and, owing to its elevation above the flood plain, the crops are seldom seriously injured by the overflows of the Ohio River.

The soil to a depth of 15 inches is a light-brown to gray fine sandy loam, the sand content being usually large and of the finer grades. As the depth increases the soil becomes heavier, and at from 15 to 20 inches passes into a brown fine sandy loam, containing a larger percentage of clay. The sand content, depth of soil, and size of the sand particles often vary according to location. That portion of the type lying nearest the river is of a coarser texture and is often deeper than that immediately bordering the Waverly clay.

The Waverly fine sandy loam occupies a narrow ridge extending along the whole course of the Ohio River, where it forms the southern boundary of the area, except where the Rockport hills reach to the water's edge. This ridge slopes gently toward the l w inland basin occupied by the Waverly clay, but its slope toward the river is more abrupt and ends in the steep banks which extend to the water's edge. Its elevation above the river and the neighboring lowlands, together with the sandy nature of the soil itself, gives to this type excellent drainage. Ditching and tiling are never necessary, as only a very small proportion of the type is subject to overflow.

This sandy ridge was formed before the river had cut its channel down to its present level. During times of overflow the water,

spreading over the more level sections, deposited the coarser material near the banks of the river. The coarser sands were deposited near the main current, while the finer grades were carried farther inland and laid down near the deposits of silt and clay. As the river gradually deepened its channels, and as more material was annually deposited along its banks, a natural levee was soon formed, consisting of a sand ridge several feet above the flood plain of the river. Small quantities of silt, clay, and organic matter, becoming mixed with the sand, formed a soil which is not only productive, but easily cultivated.

During a very dry season the crop yields are small, but with an average amount of rainfall large yields of oats, corn, wheat, potatoes, melons, and navy beans are secured. Corn averages from 40 to 50 bushels, wheat from 15 to 20 bushels, and oats from 25 to 30 bushels per acre. Tobacco is also grown on this soil and averages about 700 pounds per acre. The yield is not so large as that obtained on the heavier soils, but the leaf grown usually brings a higher price. All vegetables do well on this soil. A large acreage is devoted to navy beans. It is also excellently adapted to alfalfa, while a large yield of clover is always obtained. The type is best adapted to corn, melons, alfalfa, and early vegetables, the latter being grown for local markets.

The following table gives mechanical analyses of typical samples of the Waverly fine sandy loam:

MECHANICAL ANALYSES OF WAVERLY FINE SANDY LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10802	3 miles S. of Rockport.	Brown fine sandy loam, 0 to 12 inches.	0.1	0.4	0.6	23.1	34.7	31.0	9.9
10800	6 miles S. of Rockport.	Gray to brown heavy fine sandy loam, 0 to 15 inches.	.1	.3	.3	9.7	37.6	38.9	13.1
10803	Subsoil of 10802..	Heavy fine sandy loam, 12 to 36 inches.	.1	.1	.4	18.0	32.8	32.4	16.0
10801	Subsoil of 10800..	Brown loam, 15 to 36 inches.	.1	.2	.2	8.0	32.9	41.2	17.5

AGRICULTURAL METHODS.

To obtain the best results on the soils of the area very careful methods of cultivation are necessary.

When the Miami silt loam is constantly kept in the loose condition required for the successful cultivation of corn, the upper soil soon becomes eroded and its productivity is greatly lessened. The underlying subsoil becomes exposed on the surface and the land often fails to give sufficient yields to make its cultivation profitable. The usual method employed to restore these lands to their former state of productiveness is to seed them down to clover. A fair stand of clover is usually obtained, except on a few small areas where erosion has been greatest. The lands are heavily fertilized with stable manure or commercial fertilizer and the fields are pastured to sheep or other live stock. By this method much of the worn-out land in the area has been reclaimed and profitably cultivated to all crops adapted to the soil.

Where a rotation of crops is practiced the upland soils suffer very little from erosion and profitable yields are continuously obtained without the aid of commercial fertilizers. Some system of crop rotation is in use in all sections of the area and on all the soil types, with the exception of the Waverly clay, but crop rotation is of the greatest importance on the Miami silt loam and the Miami fine sandy loam. The soils occupying the river flats and low upland valleys are not so easily eroded, and are annually enriched by the addition of new material washed down from the surrounding uplands or deposited by water.

Drainage is the most important factor in the management of the soils occupying the lower and more level sections of the area. The agricultural value of a large proportion of the Waverly silt loam and of the Miami fine sandy loam has been greatly increased where a good system of artificial drainage has been established. The Waverly clay loam, on account of its level topography and slight elevation above the level of the streams, is the most difficult soil of the area to drain, but where ditching and tiling are practicable good results are always obtained. Where tile drainage is used the tiles are laid at a depth of two and a half to three feet and are placed 30 or 35 yards apart. These open into the main drainage ditch, which leads to the neighboring stream. This system is adequate to drain the greater part of the upland valleys and low depressions occupied by the Waverly silt loam and the Waverly clay loam, but the topography of some of the small swampy areas occupied by the latter makes thorough drainage almost impossible.

When preparing the soil for the cultivation of wheat the field is plowed about the 1st of August. It is then dragged, harrowed,

and rolled three or four times. The wheat is usually drilled in during the first week in September and is harvested early in July. The preparation of the land for oats is about the same as for wheat, except that the land is seldom worked more than twice before the crop is drilled in. Oats are sown during March and April, and the crop is harvested during the latter part of July.

For corn the soil is plowed in the early part of April or as soon as the season permits. It is then dragged or harrowed until it is in a loose and thoroughly cultivated condition. The crop is planted from the 10th to the 20th of May, and should be cultivated once each week until it becomes too large.

Tobacco seeds are first sown in beds located on the sunny hillsides, which afford them a natural protection. The tobacco beds are covered with a thin canvas or cheesecloth. The plants are set out during the latter part of June and the crop matures in September. It is then cut and hung on low scaffolds in the fields until the leaves begin to turn yellow. Great care is taken to protect it during rainy weather while in the field. After a short interval of time it is removed to open well-ventilated barns, stripped from the stalks, and suspended from scaffolds. It is alternately dried and softened, as the climatic conditions vary from dry to damp, and when thoroughly cured is assorted and put on the market. No curing by means of artificial heat in especially constructed barns is practiced at present in the area.

Agricultural Conditions.

The agricultural interests of the area are centered in the production of corn, wheat, and tobacco. A limited acreage is devoted to the production of oats, hay, and vegetables, but the climatic conditions, soils, and facilities for marketing all tend to make the area particularly well adapted to the three staples first named. The farmers of the area are intelligent and energetic, and the majority of them are prosperous and free from debt. Large yields of all crops grown, together with the prevailing good prices, have placed the farmers in all sections of the area in excellent financial condition. Great interest is manifested in farmers' institutes, agricultural societies, and all kinds of local organizations which tend to advance the interests of the rural population.

The average farm dwelling consists of a neatly painted two-story frame building, while the barns and other outbuildings are

modern and well kept. These are always large enough to store the crops, to shelter the small number of stock which each farmer invariably owns, and to protect the farm machinery during the winter months.

About three-fourths of the farmers own the lands they cultivate, the remainder being tenants on the farms of the larger landholders. Lands are usually rented on a share basis, but a few tenants in the upland sections pay cash. When rented on shares the landowner receives from one-fourth to one-third of the crop produced. The tenant furnishes the seed, work animals, farm machinery, fertilizers, and labor, receiving from two-thirds to three-fourths of the crop made. From $3 to $4 an acre is the usual cash rent for farms in the Miami silt loam or Miami fine sandy loam, but a higher rate is obtained for well-drained lands in the Waverly silt loam. The Waverly clay loam and Waverly clay types of soil are never rented for cash, the uncertainty of a profitable yield, on account of the liability of crops on these areas to damage or destruction by floods, droughts, or unfavorable seasons causing the share system to be preferred by the tenant.

The largest farms in the area are situated along the Ohio River on the low, flat areas of Waverly clay. They average from 150 to 300 acres each, and, owing to the annual flooding of this section during the early spring months, they are cultivated almost exclusively to corn. There are comparatively few dwellings or farm buildings in this part of the area, as the farmers cultivating these lands live on the neighboring uplands or on the sandy ridge bordering the river. On the Miami silt loam of the uplands and on the Miami fine sandy loam the farms have an average size of from 100 to 125 acres, and a very large proportion of the land is under cultivation. No large tracts are being cultivated on the Waverly clay loam. Although some farmers own from 150 to 200 acres of this type, much of it is either used for pasturage or is covered with a growth of hardwood timber.

The average tenant in the area farms from 40 to 75 acres. As a general rule farm labor is plentiful throughout the year, the supply often exceeding the demand, so that many of the farm laborers are compelled at certain seasons to seek employment in the towns or neighboring counties. During harvest there is always a demand for experienced farm hands at good prices, and it is often difficult to obtain them at this season. The labor employed in the area is of a very efficient character. When hired by the

month, from $14 to $20, including board, is paid for farm hands, but during harvest from 75 cents to $1 a day is the usual rate.

Corn, wheat, and tobacco are the principal products, each being grown on every variety of soil found in the area. A failure of the corn crop on many of the soil types is very rare, and during a favorable season an excellent crop is always obtained. This crop can not be grown continuously on the rolling uplands without involving damage to the soil from erosion. As the soil becomes loose and friable when frequently cultivated, much of it is washed from the surface of the rolling hills to the neighboring valleys. However, when a rotation of crops is practiced large yields are continuously obtained and the general productiveness of the soil remains unchanged.

A number of varieties of wheat are grown in the area, the most important being the Pool, the Red Wonder, the Russian Red, and the New Columbia. The Pool is the variety most widely grown, but the Red Wonder seems better adapted to the more sandy soils.

The greater part of the tobacco produced in the area is of the dark export type, but on some of the lighter soils a small amount of Burley is grown. The Pryor and One-sucker are the varieties of dark tobacco most widely cultivated, and a vigorous growth of these is always obtained on the heavier soils. The leaf is heavy and oily, varying in color from a light brown to a dark reddish brown. While a comparatively small quantity of Burley tobacco has been grown in the area, the present good prices are causing the production of this variety to increase rapidly. When the difference in the market prices is not very great the farmers prefer to grow the dark export type, as larger yields per acre are produced and it requires much less attention, both while the crop is in the field and while it is being cured. Only a small part of the tobacco grown in the area is consumed in the United States, the greater proportion being exported to foreign markets, where the dark, heavy types of this product are in greater demand.

In connection with the foreging discussion of the agricultural products of the area it seems advisable to point out again the relation between these products and the several soils. The Waverly clay and the Waverly fine sandy loam are well adapted to corn. The Waverly silt loam is also excellently adapted to this crop, and when well drained it produces larger yields than any other type in the area. The Miami silt loam is best adapted to wheat. Large yields of wheat are also harvested annually from the Miami fine

sandy loam, and while there is no great difference between these types in the yield per acre, that produced on the silt loam of the uplands is of a higher grade and, as a rule, commands better prices on the markets. Large yields of wheat are obtained on the Waverly clay when the crop is not destroyed by floods. The Waverly clay loam, when properly drained, is well adapted to the production of the dark-leaf tobacco, and yields of from 1,000 to 1,200 pounds per acre are realized. This soil, however, is best adapted to clover and timothy, a large part of the hay produced in the area being grown on it.

The Waverly fine sandy loam and the Miami fine sandy loam are well adapted to melons, and the heavier, poorly drained phases of these types produce large yields of oats. Burley tobacco is also grown on these sandy loams, and with proper care in its cultivation, cutting, and curing a very fair grade is often obtained. Tomatoes, small fruits, and early vegetables are well suited to these sandy soils, and limited experiments have demonstrated that alfalfa does well, especially on the Waverly fine sandy loam which borders the Ohio River.

The transportation facilities of the area are excellent. Two branches of the Southern Railroad traverse the area, one of which terminates at Rockport, an important local shipping point on the Ohio River. The facilities afforded by both the river and the railroads cause Rockport to receive a large amount of produce from the surrounding country on the way to more distant markets.

A large number of well-kept county roads connect Boonville, Rockport, Chrisney, and other smaller towns with all sections of the surrounding country. The streams are all well bridged, and the more important county roads are macadamized for some miles out from the leading towns.

Several landings are situated at short intervals along the Ohio River, where the products of the neighboring farms are loaded on the small river steamers and transported direct to Louisville, Owensboro, or other large markets. An electric car line is now being constructed to connect some of the smaller towns with Evansville, Rockport, and other importaint local markets. This will greatly facilitate traffic, and will enable the farmers in certain sections of the area to market their produce with more dispatch and at much less expense that at present.

Owensboro, Ky., is the market for almost the entire corn crop of the area. The large distilleries located there create a constant

demand for this product. The greater part of the wheat and tobacco is shipped to Louisville, Ky. A small portion of the tobacco crop is marketed at Owensboro, and a still smaller proportion is shipped direct from the area to foreign markets. Very few farmers own more than a few head of stock. No cattle are raised for other than the local markets, but a large number of hogs are raised and marketed at Louisville and Cincinnati. A few farmers in the area have made a specialty of this industry, and as good prices are obtained it has proved very profitable.

The diversity of crops grown, the natural productiveness of the land, the transportation facilities afforded by the river and the railroads, and the nearness to large markets all tend to make the area surveyed one of the most prosperous sections of the State.

Soil Survey of Scott County, Indiana.

By A. W. Mangum and N. P. Neill.
U. S. Bureau of Soils.

LOCATION AND BOUNDARIES OF THE AREA.

The extreme dimensions of Scott County are 17 miles from east to west and 15 miles from north to south. The county is bounded on the north by Jackson and Jennings counties, being separated

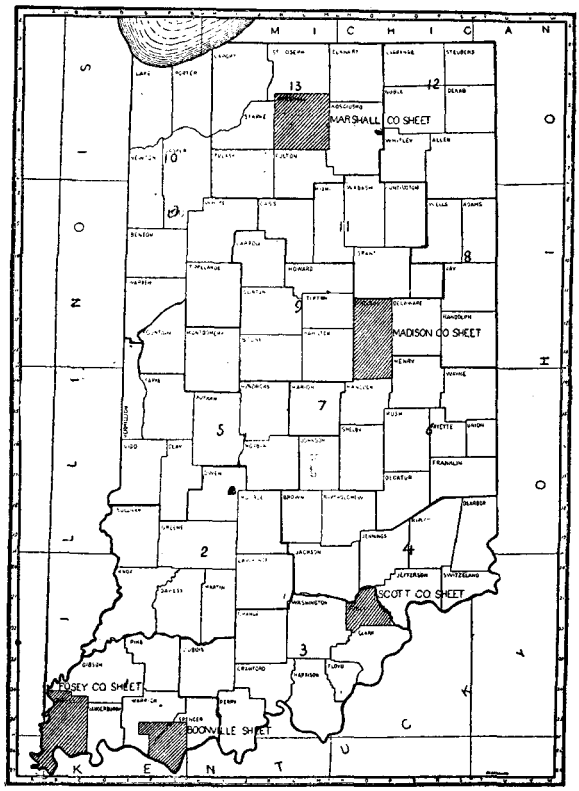

Fig. 1.—Sketch map showing location of the Scott County area, Indiana.

from them by the Muscatatuck River; on the east by Jefferson County; on the south by Clark and Washington counties, and on the west by Washington and Jackson counties. The total area in-

cluded within these boundaries is 126,336 acres, or approximately 197 square miles.

Scottsburg, the county seat, is situated on the main line of the Pennsylvania Railroad, which runs between Chicago and Louisville, and affords an excellent shipping point to some of the large cities. The population of Scottsburg is about 1,200. Prior to 1885, lumbering was the chief occupation, but since that date agriculture has become the leading pursuit of the people.

History of Settlement and Agricultural Development.

Few events of any importance in the history of Scott County transpired before the War of 1812. Several attempts had been made prior to that time to establish settlements in this part of Indiana, but they were generally unsuccessful on account of trouble with the hostile Indians. The Pigeon Roost settlement, which was established in the southern part of the area in 1809, was probably the first settlement of any importance in the county, but this was attacked in 1812 by Indians, most of its inhabitants massacred and the village completely destroyed. The Indians, however, were soon defeated and driven from this part of the State, and settlement then progressed more rapidly. A few foreigners, chiefly Irish, Scotch and Germans, were among these early settlers, but the majority came from Kentucky, Tennessee, North Carolina and Virginia. Scott County was organized in 1817. The county seat was at first located at Lexington, but was later transferred to Scottsburg.

Considering the length of time the county has been settled, its agricultural development has been very slow. The early settlers cultivated small tracts of land to corn, wheat, potatoes, and other general farm crops for home use, but they depended on the timber of the surrounding forests as their main source of income. Larger areas were put under cultivation and more interest was taken in tilling the soil as the land became cleared and the lumber industry declined. About 1850 a railroad, now a part of the Pennsylvania system, was built through the county, and fourteen years later the Baltimore and Ohio Southwestern was constructed. Later on these roads aided materially in the development of the county, as they afforded excellent facilities for transporting its products to eastern markets.

The eastern part of the area was the first to develop agriculturally. The timber in this part of the county was of much lighter

growth than was found on the low, flat valleys farther west. The soil was productive and easily cultivated, and its topography rendered it better adapted to general farming purposes than the rough, broken country of the southwestern part of the area.

About 1880 the lumber industry began to fail, and by 1885 it had become of minor importance. This marked the beginning of the real agricultural progress of the county, and farming soon became the leading occupation of the people. The agricultural wealth of the county is estimated to have increased fully 50 per cent. during the last twelve years. Corn, wheat, oats, clover, timothy, and vegetables are now successfully grown on almost every type of soil in the county, and the rough and hilly sections seem well adapted to orchards and vineyards. Within the last few years tomato growing has developed into a very important industry, and a large acreage is annually devoted to the production of this crop. There have been established in the county a number of canning factories, which afford a ready market for all the tomatoes grown, and the specialization of this crop is proving very profitable.

Great interest is manifested in the county agricultural organizations and in the subject of good roads. Within the last twelve years considerable attention has been paid to road construction, and most of the streams are now spanned by durable iron bridges.

Although there was practically no increase in the population of Scott County during the twenty years from 1880 to 1900, the general progress during the last fifteen years has been very rapid. A telephone system connects the rural districts with the cities, and the rural free delivery of mail has been established. Tile drainage, more thorough cultivation of the soils, and more modern methods of farming are rapidly coming into use, and the county as a whole is in a very prosperous condition.

CLIMATE.

The following table, compiled from Weather Bureau records, shows the normal monthly and annual temperature and precipitation taken at Scottsburg, within the county; at Madison, in Jefferson County, just east of the area surveyed, and at Salem, in Washington County, just west of the area.

NORMAL MONTHLY AND ANNUAL TEMPERATURE AND PRECIPITATIONS.

MONTH.	Scottsburg.		Madison.		Salem.	
	Temperature, ° F.	Precipitation, Inches.	Temperature, ° F.	Precipitation, Inches.	Temperature, ° F.	Precipitation, Inches.
January	32.9	3.28	34.2	4.15	29.2	3.35
February	31.0	2.60	31.5	2.85	30.6	3.57
March	43.2	4.44	43.9	4.86	41.9	3.83
April	52.3	2.31	55.6	3.01	52.4	3.05
May	65.0	3.70	65.3	4.44	63.5	3.22
June	74.4	4.30	74.9	4.14	71.2	4.52
July	78.0	3.02	77.9	3.13	77.2	2.89
August	76.4	2.90	76.3	3.40	74.6	3.50
September	69.1	2.38	70.2	2.33	68.1	2.58
October	57.5	2.13	58.1	2.06	56.4	2.66
November	44.5	3.43	44.8	3.29	44.5	3.94
December	36.3	3.25	35.1	3.30	32.4	3.32
Year	55.1	37.74	55.7	40.96	53.5	40.43

These three places are practically in the same latitude, but it will be noticed from the above table that the precipitation is somewhat greater at Madison and Salem than it is at Scottsburg, while the annual temperature is about the same.

PHYSIOGRAPHY AND GEOLOGY.

There have been two controlling factors in the physiographic development of Scott County—the limestone, sandstone, and arenaceous shale of the Knobstone group and the black, slaty shale of the New Albany series. The upper strata of the Knobstone group, which cap the hills in the southwestern part of the county, have resisted the agencies of erosion better than the softer underlying shale, and the surface of this section is very broken and hilly. The shales belonging to the New Albany series, which underlie the soils of the eastern two-thirds of the county, have given rise to a rolling topography.

The Knobstone hills of the southwestern part of the area have an elevation of from 200 to 400 feet above the drainage level of the country north and east of them, and present the most prominent topographic features of the area. These hills have been cut by numerous northward-flowing streams, which have formed deep, narrow, V-shaped valleys, varying in length from one to five miles. As the streams approach the more rolling country the valleys become much broader and the slope of the hills is more gentle. The surface of these broader valleys was once much lower than it is now, as there has been a silting up of the stream beds since the formation of the valleys until the material deposited is estimated in many cases to exceed a depth of 20 feet.

The level upland parts of the county are best developed west of Scottsburg and in the vicinity of Austin. Here the surface is comparatively level, although it is traversed by many small streams and shallow valleys. The streams flow across these uplands in a general northerly direction, and the shallow valleys vary in width from a few rods to about one mile.

As already pointed out, the topography of the eastern two-thirds of the area is of a gently rolling character. The summits of the rounded hills are comparatively level, and the hillsides slope gently toward the small streams which flow through the broad, intervening valleys. Along the lower stretches of the streams the valleys have been gradually filled up with sediment, and the neighboring hills are lower and more gently undulating. This characteristic is especially well developed just east of Scottsburg and along Stuckers Fork and its larger tributaries, where material has been deposited to a depth of many feet.

In the extreme northern part of the county the topography retains its rolling or undulating character, but the general elevation is much less than it is farther south. The land bordering the Muscatatuck River, in the northwestern part of the area, is low and flat, but marked by many old stream channels, bayous, narrow sloughs, and low, sandy ridges. It has only a slight elevation above the level of the stream, and is subject to frequent overflow during the heavy spring rains. A narrow, sandy ridge, generally a few feet higher than the greater part of this flood plain, extends along the immediate banks of the river, and is not so much subject to overflow as the lower lands farther back from the stream.

However, most of the area has good natural drainage. The rough and hilly country in the southwestern part of the county is drained by the Big Ox Fork and its tributaries. This stream flows across the county in a general northward direction, and empties into the Muscatatuck River. Pigeon Roost Creek, which also has its source in the Knobstone hills, traverses the south central part of the area and empties into Stuckers Fork. The latter stream and its main tributaries, Kimberlins Creek and Big Hog Creek, drain the greater part of the rolling uplands in the eastern and central parts of the area.

The Muscatatuck River, which forms part of the northern and northwestern boundaries of the county, is the principal stream of the area, and receives the drainage waters of almost the entire county.

The approximate glacial boundary of southern Indiana takes in the northeastern two-thirds of Scott County. It is difficult to determine its exact limit, but the ice-sheet is thought to have extended to the Knobstone hills. Although it is believed that a considerable proportion of the surface material covering the greater part of the county is of glacial origin, it is very probable that the material was mainly of local derivation, as no glacial bowlders or fragments of igneous rocks are encountered in the soil.

The geological formations which underlie the area are frequently exposed on the steeper slopes and are seldom at any great depth below the surface. The shales weather rapidly on exposure, and have undoubtedly entered largely into the composition of the various types of soil. The eastern part of the area, including the territory covered by the Volusia silt loam, is underlain by the New Albany black shale, and small, partially decomposed fragments of this rock are frequently encountered in the lower part of the soil section and in the subsoil. These shales, which here form the highest member of the Devonian age, are, in the extreme eastern part of the area, only a few feet thick. They have, however, a general dip to the southwest, and at Scottsburg, in the central part of the county, they attain an estimated thickness of over 120 feet.

A thin layer of limestone, known as the Rockford goniatite limestone, which forms the lowest member of the Lower Carboniferous, sometimes occurs overlying the New Albany black shales, but it has had little, if any, influence on the composition of the soils. Above this layer of limestone, or where the stratum is absent, lying upon the New Albany shales, is a series composed of argillaceous and arenaceous shales and thin layers of sandstone, which belongs to the Knobstone group of the Lower Carboniferous.

The new Providence shales, which occur at the bottom of this group, consist of a soft clay shale of greenish or bluish color. They are estimated to be about 50 feet thick at the southern boundary of the county, but gradually become thinner toward the north. In the northern part of the area it is difficult to distinguish these shales from those occurring just above them. They weather rapidly on exposure and have probably entered into the composition of the soil, though not to so great an extent as the series overlying them.

The Upper Knobstone shales occur just above the New Providence series. They are of a light-gray or greenish color, and grade from a soft argillaceous shale at the bottom to a sandy shale and impure, fine-grained sandstone at the top. Above these shales and

forming the upper series of the Knobstone group are alternate layers of more or less pure sandstone and sandy shales. This series is known as the Knobstone sandstone and varies in thickness from about 75 to 100 feet. It occurs capping the higher elevations in the southwestern part of the county, and does not weather so rapidly as the softer shales of the lower series. Embedded in the strata are considerable quantities of iron concretions, which impart a reddish color to the derived soils.

The surface material of the area is, in the main, so similar to that formed by the disintegration of the underlying geological formations that it is difficult to determine what proportion of the soils is derived from material reworked by glacial agencies and what proportion has been derived directly from the decomposition of the rocks.

SOILS.

Four types of soil occur in Scott County. Of these, three are derived from the weathering of the underlying geological formations and glacial deposits. The fourth, occurring in the low, flat bottom lands, is derived from material deposited by the streams, together with that which has been washed down from the surrounding uplands. The following table shows the extent of each of the four types:

AREAS OF DIFFERENT SOILS.

SOIL.	Acres.	Per Cent.
Volusia silt loam	46,912	37.1
Scottsburg silt loam	37,184	29.4
Dekalb silt loam	22,080	17.5
Waverly silt loam	20,160	16.0
Total	126,336	.....

SCOTTSBURG SILT LOAM.

The Scottsburg silt loam consists of a light to very light ashy gray silt loam, having an average depth of 8 or 10 inches. Small iron concretions are scattered over the surface and through the soil. There is frequently a considerable amount of fine and very fine sand mixed with the silt, which causes the soil to have many of the characteristics of a fine sandy loam. At 10 or 12 inches the soil grades into a light-yellow or slightly mottled silt loam. This becomes gradually heavier and more compact as the depth increases, and at 30 to 36 inches consists of a heavy silt loam of a drab or

gray color, slightly mottled with yellow iron stains and usually containing small iron concretions. This soil resembles the Miami silt loam, but the color is lighter.

This type of soil occurs in areas of greater or less extent in almost all parts of the county. A large area is found just west of the town of Scottsburg, occupying that part of the uplands lying between the hills of the southwestern section and the rolling uplands of the eastern part of the area. In the eastern and northeastern sections of the county the areas gradually become smaller, and finally occupy only the small level areas capping the summits of the rolling hills, many of which do not exceed a few acres in extent.

The entire area embraced by this type has the general appearance of having once been a level upland plateau, but it is now intersected by many small streams with wide, shallow valleys. The topography of the broad areas between these streams is flat or very gently rolling, and the slope toward the small watercourses is seldom steep enough to cause the lands to suffer to any great extent from erosion. The topography of the small areas occupying the summits of the rolling hills east and north of Scottsburg is also comparatively level, as the steeper slopes of the rounded hills are usually occupied by the Volusia silt loam.

The numerous small streams that traverse these sections of the area are adequate to carry off the excess water at times of heavy rains, and the type, as a whole, is fairly well drained. Tile drains are seldom used, but a good system of underdrainage has proved of great benefit to this soil wherever it has been established, both in wet and dry seasons. The crops cultivated on this soil are often considerably damaged by droughts, and the better results are nearly always obtained during seasons when the rainfall is greatest.

The areas included in this soil type are underlain by the soft argillaceous and sand shale of the Knobstone series. However, as this section of the area is thought to be within that part of Indiana which was at one time covered by glaciers, it is very probable that a considerable part of the material from which this soil has been formed was deposited through glacial action. As no bowlders or igneous rocks occur in these areas, this glacial material would seem to be chiefly of local origin. The soft underlying shales disintegrate very rapidly wherever they have become exposed, and also have undoubtedly entered largely into the composition of the soil.

Very careful management is necessary to keep this soil in a productive state, and some system of crop rotation is very impor-

tant, as the continued cultivation of any one crop soon decreases the yields. In order continually to obtain good results, the turning under at least once in every two or three years of clover or some other crop that adds considerable humus to the soil is very essential.

The Scottsburg silt loam is cultivated to corn, wheat, oats, clover, timothy, and tomatoes, and often produces yields equal to those obtained on any other soil type in the area; but when no rotation is practiced and the land has been poorly cultivated, small yields are secured. When properly cultivated, corn yields about 30 bushels per acre. Wheat will average 12 to 15 bushels per acre. Oats, when sown in the spring, average about 25 to 30 bushels, but when put in during the fall months much larger yields are obtained, provided the crop escapes winter killing. Clover and timothy produce about one and one-half tons of hay per acre, while the yield of clover seed ranges from one and one-half to three bushels per acre.

This type of soil seems best adapted to tomatoes, small fruits, vegetables and all early-maturing crops adapted to the climatic conditions of the area. The constant cultivation of the soil necessary in the growing of tomatoes seems to benefit these lands, but if cultivated when in a wet condition the soil dries out rapidly and bakes into clods, and it is difficult to reduce these again to a state of good tilth.

Alfalfa has been successfully grown on limited areas, and experiments have proved that a very fair grade of tobacco can also be produced on this type.

The table following gives the results of mechanical analyses of samples of this soil:

MECHANICAL ANALYSES OF SCOTTSBURG SILT LOAM.

No.	Locality.	Description.	Fine Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
11003	3½ miles N. E. Scottsburg.	Silty loam, 0 to 12 inches..	0.9	3.3	4.1	9.3	9.7	61.8	10.8
11011	2 miles W. of Scottsburg.	Silty loam, 0 to 12 inches..	1.5	2.2	1.7	3.3	6.2	72.7	11.9
11009	1 mile W. of Austin.	Silty loam, 0 to 14 inches..	1.9	4.9	3.8	6.7	8.8	57.6	16.4
11010	Subsoil of 11009..	Silty loam, 14 to 36 inches.	1.6	3.6	3.1	5.6	8.3	59.6	17.9
11012	Subsoil of 11011..	Silty loam, 12 to 36 inches.	.3	1.0	.9	2.2	8.4	69.4	18.0
11004	Subsoil of 11003..	Gray silty loam, 12 to 36 inches.	.8	2.1	2.5	5.9	7.4	59.4	21.8

Dekalb Silt Loam.

The Dekalb silt loam, to a depth of 10 inches, is a silty loam of a gray to light-brown color, becoming light red or yellow at greater depths. The soil is easily eroded and the texture varies slightly according to the steepness of the slopes and the consequent degree of erosion that has taken place. On the steeper hillsides much of the finer material has been washed down to the lower levels and the underlying yellow or red heavy silty loam has become mixed with the coarser material, forming a soil of a more pronounced red to brown color, containing less fine sand.

The subsoil is a heavy reddish to yellow silt loam containing a small proportion of fine sand. It rapidly becomes heavier as the depth increases, and at 30 to 36 inches is a very heavy silt or clay loam, still containing some fine sand, but of a stiff, tenacious character.

Small fragments of chert, limestone, and sandstone are frequently encountered, both on the surface and in the soil. These are the remains of the upper strata of the Knobstone group, which once extended over this part of the area.

The Dekalb silt loam occurs in one large, unbroken area, embracing the whole of the extreme southwestern portion of the county, and extending for some distance along its southern boundary. The topography of the country occupied by this soil is rough and broken. The small streams have cut rapidly through the soft shale, forming deep, narrow valleys. The upper strata of the Knobstone shale and sandstone have not weathered so rapidly as the softer shale beds, and still cap the higher elevations, making the general topographic features consist of a series of isolated knobs and irregular ridges, separated by deep, narrow ravines. The stream valleys widen out as they approach the more level country to the north and east, and the steep, precipitous banks disappear as the adjoining hills become low and more rounded.

Pigeon Creek and Ox Fork have their sources in this part of the area, and these, together with their many small tributaries, furnish the natural drainage system for the surrounding uplands. The land is often excessively drained, and in order to obtain the best results methods for conserving the soil moisture and for protecting the lands against erosion must be used.

Glaciation is thought to have extended to the foothills of the rough and broken country occupied by the greater part of this soil type, and it is very probable that there was a deposition of the

finer glacial material over a considerable part of this section of the county. A large precentage of the material from which this soil is formed is derived, however, from the disintegration of the Knobstone shale. As already stated, small fragments of limestone, chert, and sandy shale are often encountered, scattered on the surface and mixed with the soil; and the soft blue argillaceous shale, containing numerous layers of impure chert and flat, oblong, cherty concretions, is frequently found at a very slight depth below the surface. Thin layers of hard brown ferruginous shale, such as form the outer layers of the embedded geodes and ironstone concretions, frequently occur associated with the softer shale or scattered in small fragments on the surface. The characteristic red or yellow color of the soil is due to the oxidation of the large amount of iron contained in the material from which it is formed.

Many of the hillsides, where the topography is most broken, are too steep to be profitably cultivated, and as a whole less of this type of soil has been developed agriculturally than any other soil in the area; but the greater part of these cultivated lands produces very fair yields of corn, oats, wheat, rye, timothy, clover, and tomatoes.

Crops maturing in the late summer often suffer from drought, but under careful cultivation the average yields per acre will compare favorably with those obtained from any of the upland soils. Corn produces, on an average, 25 bushels; wheat, 10 to 15 bushels; and oats, about 20 bushels per acre. Clover and timothy yield from one and one-half to three tons per acre, and a large quantity of clover seed is thrashed each season, the crop averaging about two bushels per acre. Tomatoes are extensively cultivated and yield an average of six tons per acre. The less hilly areas occupied by this type of soil are well adapted to wheat, clover, oats, tomatoes, and timothy, while the rough and hilly sections are well suited to fruit. Large yields of peaches and apples have been continually realized from the small orchards situated on these lands, but many of the trees have recently been injured by disease—a form of leaf blight—which has lessened the crop yields considerably. The thriving condition of a few small vineyards indicates that this soil is excellently adapted to grapes and might be profitably employed for their production on a commercial scale.

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

MECHANICAL ANALYSES OF DEKALB SILT LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10983	2 miles S. W. of Leota.	Silty loam, 0 to 12 inches..	0.9	2.9	3.7	13.0	12.1	54.2	13.1
10981	Sec. 13, T. 2 N., R. 6 E.	Silty loam, 0 to 18 inches..	.7	2.8	3.6	7.6	7.2	63.4	14.7
10985	1 mile W. of Leota.	Silty loam, 0 to 14 inches..	.3	1.1	1.3	3.0	4.2	66.5	23.5
10984	Subsoil of 10983..	Loam, 12 to 36 inches.....	1.5	3.8	4.8	16.1	12.3	37.9	23.6
10982	Subsoil of 10981..	Heavy silty loam, 18 to 36 inches.	1.2	2.3	7.3	9.9	7.7	47.3	24.2
10983	Subsoil of 10985..	Silty loam, 14 to 36 inches.	.2	1.6	1.4	3.2	5.2	62.8	24.8

WAVERLY SILT LOAM.

The soil of the Waverly silt loam has an average depth of 8 to 10 inches and consists of a gray to light-brown silty loam, which becomes slightly heavier as the depth increases. It contains varying amounts of medium to fine sand and a large quantity of small iron concretions mixed with the soil and scattered over the surface. The soil grades into a heavy silty subsoil of a drab color, usually mottled with yellow iron stains. The sand content of the subsoil decreases with depth and at 36 inches the material is a heavy mottled silty or clay loam, containing a small amount of sand and a large quantity of small rounded iron concretions.

While a typical section of this soil as it occurs over the greater part of the low bottom lands will show a gray to light-brown silty loam containing varying amounts of sand, the texture of the soil is often modified to a considerable extent by local conditions. The areas extending along the smaller streams are influenced by the different geological formations through which the streams have cut their channels and by material washed from the surrounding uplands. Areas of this phase of the soil, such as the one found at the junction of Stuckers Fork and Hog Creek, are usually better drained than much of the type and are not so subject to overflow as the greater part of the bottom lands. The sand content often varies considerably, the texture of the surface soil frequently ranging from sandy to silty within areas less than an acre in extent. These local variations, occurring along the smaller streams in the more rolling parts of the county, are not of sufficient extent to permit the classification of each modification as a separate soil type.

The largest areas of the Waverly silt loam form what is known locally as "The Flats," an area bordering the Muscatatuck River. The type also extends in strips of varied width up the shallow valleys of the other principal streams and their tributaries.

These low flat areas have a very gently rolling or level topography. Occasionally a narrow ridge extends along the immediate banks of the river, and this has an elevation a few feet higher than that of the greater portion of the flat bottoms, while small sandy areas, usually less than an acre in extent, are frequently encountered along the stream. Numerous sloughs, narrow ponds or bayous, old stream beds, and swampy depressions are found scattered over this part of the county. The soil found in these depressions forms the heavier phase of the Waverly silt loam. On drying the surface becomes baked and sun-cracked, causing the soil to be more difficult to cultivate properly than the higher and more sandy areas.

The low-lying position which the Waverly silt loam occupies and the many basin-like depressions lying between the streams and the rolling uplands make the natural drainage very poor. The streams which traverse this type have a very slight fall, and during the heavy spring rains they leave their channels and spread out over the adjoining bottoms. These streams have cut their channels to a sufficient depth below the level of the lands bordering them to admit of ditching and tile draining, and where this is done the lands are in a condition to cultivate soon after the spring floods have subsided. Many of the lower depressions and narrow sloughs would be difficult to drain, but a good system of tile drainage would greatly enhance the agricultural value of the greater portion of this type.

The Waverly silt loam has been formed from material deposited by the streams at times of overflow, mingled in places with material washed down from the surrounding uplands. The coarser material held in suspension by the streams is deposited during overflows near the banks of the main channels, while the silt, clay, and finer sand particles are laid down where the current is more sluggish. The sandy texture of the low ridges that occur near the streams is due to the sorting of the material by currents of varying velocities; but those areas lying nearer the rolling uplands owe their sandy character to material washed down from the neighboring hills. The areas of this type occupying the narrow valleys nearer the sources of the small streams are not as frequently overflowed as the broad,

flat valleys near the river, and the soil here owes its origin more to the erosion of the steeper hillsides than to material laid down by the streams during times of overflow.

The agricultural value of these bottom lands depends to a marked degree on the thoroughness of the drainage. The better drained areas along the river and those occupying the valleys in the rolling uplands produce excellent yields of all crops cultivated, while the poorly drained areas in the low depressions, when cultivated at all, are devoted to the production of timothy and other grasses. Where the soil is well drained and properly cultivated, corn produces an average yield of 45 bushels per acre, and 50 to 60 bushels is not an uncommon yield during a favorable season. Wheat produces from 18 to 20 bushels per acre, but is not extensively sown, owing to the liability of the crop to destruction during the spring floods. Twenty-five bushels per acre is the estimated average yield of oats, but owing to the usually wet condition of these lands during the early spring months, oats are seldom grown. Tomatoes on the better-drained areas yield about six tons per acre. Timothy produces two and one-half to three tons of hay per acre, and clover also does well, especially on the low ridges.

The soil is well adapted to corn and timothy. The corn crop is usually planted after the annual spring floods have subsided, and is seldom a failure. Timothy always produces a profitable yield of hay, and is successfully grown on the poorly drained areas. A comparatively large proportion of these flat bottom lands is still covered with a heavy growth of hardwood timber—oak, hickory, and beech.

The straightening of the channels of many of the small streams, a more extensive use of tile drains, and the removal of driftwood and other obstructions from the channels of the larger streams would greatly improve the conditions over much of this soil and increase its value for general agricultural purposes.

The following table gives the results of mechanical analyses of typical samples of the soil and subsoil of the Waverly silt loam.

MECHANICAL ANALYSES OF WAVERLY SILT LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10999	Sec. 13, T. 4 N., R. 6 E.	Silt loam, 0 to 8 inches.....	1.2	2.2	1.1	3.4	5.6	67.6	18.5
10997	Sec. 7, T. 4 N., R. 7 E.	Silt loam, 0 to 10 inches....	.2	.6	.4	3.2	7.0	70.0	18.7
10995	2 miles E. of Scottsburg.	Heavy clay loam, 0 to 8 inches.	.4	1.3	1.0	3.2	5.2	51.5	37.4
10998	Subsoil of 10997..	Heavy silty loam, 10 to 36 inches.	.4	.8	.5	2.2	11.2	66.8	17.9
11000	Subsoil of 10999..	Heavy silty loam, 8 to 36 inches.	1.1	2.6	1.3	3.0	4.3	66.9	20.7
10996	Subsoil of 10995..	Gray clay loam, 8 to 36 inches.	.5	1.0	.7	2.5	6.9	54.1	34.1

VOLUSIA SILT LOAM.

The Volusia silt loam is the most important upland soil in the area. It covers the greatest extent of territory and is recognized as well adapted to general farming purposes. The best developed and most profitable farms in the area are situated on this type.

The soil is a light-brown silty loam, often containing considerable fine sand. When dry the surface has a gray appearance, but the color changes to light brown or red as the subsoil is approached. The soil has an average depth of 8 to 10 inches, and the texture becomes slightly heavier with increased depth. Small iron concretions occur both on the surface and throughout the soil. The soil grades into a subsoil of light-red to yellow heavy silt loam, containing a small percentage of sand and rapidly becoming heavier and stiffer as the depth increases, until in the lower 10 or 12 inches of the profile is found a heavy silt loam, stiff and compact, but seldom containing a sufficient amount of clay to give it a sticky or tenacious character. As the underlying shale is approached the material becomes yet more stiff and compact, and at from four to five feet below the surface it is a very heavy silt or clay loam, with a very low sand content.

The Volusia silt loam covers the greater proportion of the eastern part of the county. Approached from the west, it first appears as narrow areas extending along the steeper slopes of the rounded hills, but these areas rapidly broaden out and finally cover the entire rolling upland, except where the Scottsburg silt loam occurs capping the higher elevations.

The topography of this type of soil is quite rolling. The hills are low and rounded and slope gently to the broad, shallow stream valleys. In the extreme eastern and northeastern sections the surface is slightly more broken, the hillsides are steeper, and the intervening valleys become more narrow and V-shaped. These steeper slopes suffer greatly from erosion, and the red or yellow silt loam of the upper subsoil is frequently exposed on the surface, or has been washed down and mixed with the soils occupying the lower levels, giving the latter a red to brown tinge.

These lands are very well drained by the natural drainage system furnished by the rolling topography and numerous small streams—are frequently too well drained, in fact, for the successful cultivation of many crops.

It is generally believed by geologists who have made a study of this area that the glacier once covered the section of Scott County occupied by the Volusia silt loam, and that a deposit of glacial drift was laid down over the older geological formations. The material composing this soil contains no glacial bowlders or other evidence of having been transported from other localities by glacial agencies, and the drift seems to be mainly of local origin. The black shale, which is encountered at a depth of from 3 to 30 feet below the surface, forms by disintegration a light-brown to red silty material similar to that found in the overlying soil. This shale is frequently exposed in cuts and along the steeper hillsides, and has entered largely into the composition of the soil. The shale has embedded in it a large quantity of rounded iron concretions, and it is probably to the weathering of these that the derived material owes its red or yellow color.

In the central part of the county the Volusia silt loam is found along the steeper hillsides, where the erosion has been greatest and where outcrops of the underlying shale are frequently encountered.

During a season of average rainfall and where the soil has not suffered from the effects of erosion, profitable yields of corn, wheat, oats, clover, timothy, and tomatoes are produced. Corn yields from 30 to 35 bushels; wheat, 15 to 20 bushels; oats, about 25 bushels, and clover, one to two tons of hay and about two and one-half bushels of seed per acre. Timothy is not as extensively grown on this soil as on some of the other upland types, but will yield about one and one-half tons of hay per acre. The yield of tomatoes is about six tons per acre.

There are a few farms on this soil which give larger yields than the above year after year. The difference is due to more thorough

cultivation, a rotation of crops, and more careful soil management generally. Potatoes and other vegetables are grown on this soil to a limited extent for the local markets, and excellent yields are obtained. In general, the soil of this type is well adapted to general farming, and all crops cultivated in the area can be successfully grown upon it.

The following table gives the results of mechanical analyses of the soil and subsoil of this type:

MECHANICAL ANALYSES OF VOLUSIA SILT LOAM.

No.	Locality.	Description.	Gravel, 2 to 1 mm., Per Cent.	Coarse Sand, 1 to 0.5 mm., Per Cent.	Medium Sand, 0.5 to 0.25 mm., Per Cent.	Fine Sand, 0.25 to 0.1 mm., Per Cent.	Very Fine Sand, 0.1 to 0.05 mm., Per Cent.	Silt, 0.05 to 0.005 mm., Per Cent.	Clay, 0.005 to 0.0001 mm., Per Cent.
10993	2½ miles S. of Lexington.	Brown silty loam, 0 to 12 inches.	0.5	2.8	7.0	6.3	4.2	67.5	11.6
10989	4½ miles E. of Scottsburg.	Brown silty loam, 0 to 18 inches.	1.9	3.5	3.4	7.3	8.2	60.2	14.9
10991	2 miles N. E. of Lexington.	Silty loam, 0 to 10 inches..	.5	2.1	3.0	7.4	6.7	62.6	17.7
10990	Subsoil of 10989..	Heavy silty loam, 18 to 36 inches.	1.7	3.4	2.6	5.3	6.4	60.5	20.1
10994	Subsoil of 10993..	Heavy silty loam, 12 to 36 inches.	.3	1.8	2.8	3.3	4.3	63.5	23.8
10992	Subsoil of 10991..	Clay loam, 10 to 36 inches	.6	2.3	3.0	7.1	8.5	50.9	27 5

AGRICULTURAL METHODS.

A large amount of commercial fertilizer is applied annually to the soils of Scott County, but where modern and improved methods of farming are in use the soils retain their productivity and profitable yields are continuously obtained with the application of a minimum amount of fertilizer.

Some system of crop rotation is necessary on all the soils of the area in order to obtain good results, and rotation, which has been practiced for some time by the more successful farmers, is now coming into general use. The wheat lands are usually plowed in the late summer or early fall and are rolled and harrowed from three to four times before the wheat is drilled in. The crop is sown during September or October and is harvested about July 1. Oats are often cultivated in much the same manner, but when drilled in during the fall months a profitable yield is very uncertain. If the winter is unusually mild, larger yields are often obtained from the winter oats than from those drilled in during the spring months,

but the uncertainty involved in this method causes it to be seldom practiced. The oats crop is put in as early in the spring as the usual wet condition of the soil permits. The lands are given a rather shallow plowing, and then harrowed and dragged. After the seed is put in the fields are again harrowed.

In growing corn and tomatoes, level cultivation is not generally practiced, but where this method has been used on the upland the best results have been obtained, as the soils retain a larger amount of moisture and the crops suffer less from the effects of the summer drought. The lands cultivated to corn are plowed as early as the season permits. The fields are then harrowed and dragged till the clods are broken up and the soil is in a thoroughly pulverized condition. The fields are usually "checked off" by shallow furrows crossing each other at right angles, so that the crop may be cultivated both ways. Corn is planted from the latter part of April to the first of June and is harvested in September. The soil is prepared for the tomato crop in much the same way as for corn. The tomato seed is first sown in beds about the last of March, and the young plants are taken up and set out by hand during the latter part of May or early in June. Level cultivation for this crop, especially where grown on the Scottsburg silt loam, has been very successfully practiced.

The agricultural value of the poorly drained areas occupying the flat lowlands along the more important streams has in many places been greatly increased by the establishment of a good system of tile drainage. The greater part of these lands has a sufficient elevation above the level of the streams to permit tile to be laid from three to four feet below the surface and still have a sufficient fall to the stream to insure good drainage. The average cost per acre for tiling these lowlands is estimated at about $18.

Clover is extensively cultivated on the steeper hillsides of the rolling uplands as a means of checking the excessive erosion to which these soils are subject. Where the greater part of the upper soil has been washed down to the lower levels, leaving the subsoil exposed on the surface, an application of barnyard manure is often necessary in order to get a stand.

Agricultural Conditions.

As pointed out in the paragraphs devoted to the history of the county, its agricultural development has progressed very slowly, and it is only in recent years that the cultivation of the land has

received the whole attention of the farming class. The area was originally covered by a heavy growth of timber, and the principal occupation of the rural population was the cutting of timber for crossties and staves. As the lands were cleared and the timber became less plentiful more interest was taken in farming, and within the last fifteen or twenty years the condition of the farming class has steadily improved and the value of cleared lands has greatly increased. Few of the farmers in the area are wealthy, but the majority are practically free from debt, and as a whole are in a very prosperous condition. The introduction of crop rotation and other improved methods of farming, together with a demand for the general farm products at good prices, have been the principal causes of the present favorable status of the agricultural class, which is most marked in the eastern part of the county, where the lands have been longer under cultivation and the people have depended for a longer period on the products of the farm rather than on those of the forest as their principal source of income.

About 64 per cent. of the farms in Scott County are operated by the owners. The remainder are rented, either for a share of the products or for cash. The owners of the farms on the low river flats also own and cultivate small areas in the neighboring uplands, where they make their homes. The swampy condition of the lowlands and the fact that they are subject to annual overflow make it undesirable to live in this section of the area.

There are a few large landholders in the county who cultivate farms of several hundred acres, but the average size of the farms is approximately 89 acres. The total area in farms is about 113,578 acres, over half of which is at present improved.

Aside from those owning land, the farmers of Scott County are either renters or "tenants" on the farms of the larger landholders. The "tenant" receives a fixed sum, usually about $25 a month, and is entitled to no part of the crop produced. The landowner furnishes the land, farm buildings, work animals, farming machinery, seed, and fertilizers, and receives the entire crop yield. Lands are seldom rented on a cash basis except in small tracts for the production of tomatoes, in which case the rate varies from $3 to $10 an acre. When rented on shares the owner furnishes only the land and farm buildings and receives one-third to one-half of the corn, wheat, and oats, and three-fifths of the clover and timothy produced.

An excellent class of white labor was once abundant throughout the county, but in recent years, as the agricultural interests of the county have rapidly developed, the demand for intelligent farm

hands has greatly increased, and efficient labor is often scarce during harvest. The wages paid during the harvest season range from $1 to $1.50 a day, but when employed by the month or for longer periods the average farm laborer receives about $20 a month and board.

The principal products of Scott County are corn, wheat, oats, timothy, clover, and tomatoes. A small acreage is also cultivated to potatoes and other vegetables. In 1900 the total corn crop was estimated at 407,920 bushels, being an average yield of about 23 bushels per acre for the entire acreage in that crop. The corn crop is seldom a failure, either on the uplands or river flats, and where a good system of rotation is practiced a very profitable yield is always obtained on any of the soil types of the area. Wheat is extensively cultivated over the entire upland section of the county, and, although the acreage devoted to this crop has decreased in the last three years, it is still more widely cultivated than any other crop produced in the area, with the exception of corn. In many localities the wheat crop during the past two or three seasons has been almost a total failure. This has been due to the damage done by the Hessian fly and rust. The result has been a decrease in the acreage devoted to wheat and an increase in the acreage of oats and rye.

Both clover and timothy are successfully grown in all sections of the county, each yielding annually from 5,000 to 7,000 tons of hay. Clover is always included in the crop rotation practiced on the rolling uplands, as it aids materially in checking the excessive erosion common to this portion of the area, and in restoring the lands to their former state of productiveness.

The growing of tomatoes has become one of the most important special industries of the county, and the number of acres cultivated to this crop is yearly increasing. In the county there are six canning factories, which are supplied by the surrounding country. The annual output of each factory is estimated at about 400,000 cans.

A large number of hogs are raised in the county, and a few farmers own a sufficient number to enable them to ship carload lots to the more distant markets. Very few cattle, however, are raised for shipment, and the small shipments sent to the larger markets are usually gathered from all parts of the county. The raising of poultry for shipment to the eastern cities is at present a very profitable industry throughout the county, and large quantities of both chickens and eggs are annually sent out.

The Waverly silt loam is the principal corn soil of the county, as, owing to its annual flooded condition, a profitable yield of any of the other staple crops is very uncertain. The corn crop is planted late in the spring and is less liable to damage by floods than wheat or oats. The annual deposition of new material over these lands during periods of inundation, together with that washed from the surrounding hills, causes them to suffer very little if any from the continuous cultivation of one crop.

Wheat, oats, rye, and clover are well adapted to the Volusia silt loam, and if properly cultivated produce large and profitable yields. These crops are also successfully grown on the more rolling sections of the Dekalb silt loam, and in a wet season or on small areas where the drainage is not excessive they will produce yields equal to those obtained on any other soil type of the area. The rougher and more broken sections of the Dekalb silt loam is best suited to apples, peaches, and grapes. There are at present a few small vineyards in this part of the county, and there has been a ready market for their products. The small orchards have received very little attention, and although large yields are annually obtained, no attempts have been made to raise fruit for other than the local market.

Timothy is extensively grown on the poorly drained areas of the Waverly silt loam and produces larger yields than are obtained on the uplands.

The tomato seems best suited to the Scottsburg silt loam. While the growth of the plant is not as vigorous as on some of the lowland soils, a larger yield per acre is always realized.

Alfalfa has been successfully grown, both on the level uplands and stream bottoms, but no attempts have been made to cultivate more than a few small isolated areas to this crop. Sorghum cane has also been grown as a forage crop on some of the soils and excellent results have been realized.

A small amount of tobacco, chiefly of the heavy export type, has been raised in the county, and the yield and price obtained for the crop indicate that its production could be made a very profitable industry in the area.

Two railroads enter the county, one traversing the west-central and the other the eastern part. These furnish a means of rapidly transporting the products of the county to markets situated at a distance. No section of the county is more than six to eight miles distant from a local shipping point on one or the other of these railroads.

A well-kept system of public roads extends over the county, connecting Scottsburg, Austin, and Lexington, the most important shipping points, with all sections of the surrounding country. Many of these roads are constructed from the hard black shale and limestone which underlie the eastern part of the county, and traffic over them is seldom impeded even during the worst seasons of the year. Iron bridges have also been constructed over the small streams on every important county road.

Scottsburg and Lexington are the local markets for most of the products of the county. The corn not consumed by the local hominy factories is marketed at Cincinnati or Indianapolis, while the wheat and other products exported are shipped to Cincinnati, Chicago, Louisville, and Indianapolis. The entire crop of tomatoes is taken by the local canning factories.

The situation of the area near many of the largest markets and the shipping facilities afforded by the railroads permit those products of the area that are not consumed at home to be placed on the markets in the larger cities in a short time and at a very small cost, and this fact favors the extension of other special crops, such, for instance, as the fruits already indicated as suited to certain soil conditions, but at present produced only on a small scale.