

# SOIL SURVEY OF SCOTLAND COUNTY, MISSOURI.

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## LOCATION AND BOUNDARIES OF THE AREA.

Scotland County lies in the northeast corner of the State of Missouri. It is bounded on the east by Clark County, on the south by Knox County, on the west by Schuyler and Adair counties, and on the north by the Iowa State line. It is situated between parallels  $40^{\circ} 18'$  and  $40^{\circ} 36'$  north latitude, and meridians  $91^{\circ} 56'$  and  $92^{\circ} 21'$  west longitude. It thus has about the same latitude as New York City, Pittsburg, and Salt Lake City. In shape the county is almost square, being  $21\frac{1}{2}$  miles from east to west and  $20\frac{1}{2}$  miles from north to south. It contains 439.7 square miles, or 281,408 acres. Memphis, with a population of about 3,000, is the county seat and largest town in the area.

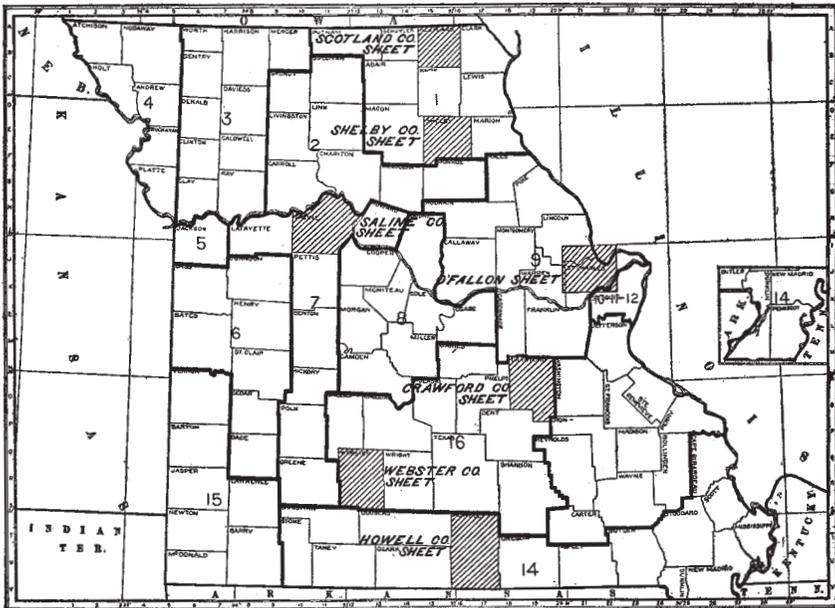


FIG. 37.—Sketch map showing location of the Scotland County area, Missouri.

## HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Though a part of the territory acquired by the Louisiana Purchase of 1803, Scotland County did not receive a settler until 1832. At that time the present territory of Scotland County and the north 6 miles of

Knox County were included in Lewis County. In 1841 Scotland County was organized, but it contained the whole of what is now Knox County. In 1843 the present boundaries were established and Memphis chosen as the county seat.

The lands of the county were divided into three classes and placed on the market in May, 1840. The first class consisted of good land and was sold direct to the settlers by the Government. The other two classes were donated to the State, and consisted of section 16 of each township, the proceeds of which were to be used for educational purposes, and the swamp lands, the proceeds from which were to be spent in reclaiming the swamps. The land classed as swamp amounted to 31,000 acres.

The pioneers who came in 1832 and the next few years were from Kentucky, Pennsylvania, and Virginia. They settled as "squatters" on the rolling land in the vicinity of Sandhill, Biblegrove, and Pleasant Retreat, in the southern and southwestern parts of the county. Here they found a prairie country, with open woods of oak and hickory along the streams, and were thus provided with timber for building log houses and making rail fences. Hunting was excellent, deer and wild turkeys being plentiful. Hunting bands of Indians made it a practice to burn over the prairies in the fall to destroy hiding places of game. This resulted in killing all young tree growth and prevented the foresting of the prairies. Since the practice ceased a scrubby growth of oak and hickory has become very general.

With the implements then obtainable the settlers were unable to break the prairie sod, but used it as a range for cattle, hogs, and sheep. The tall prairie grass was cut and used for roughage during the winter. The first settlers could not wait for crops until they had cleared the heavily timbered lands next to the streams, so they chose the gently rolling underbrush land lying between the prairie and the timber. On this land they could raise a crop of corn the first year. The corn was ground by hand, and, with the vegetables from the garden and the game and honey from the woods, constituted the fare of the pioneers. Clothing was made of wool and skins.

As soon as efficient implements could be obtained the prairies were broken and oats became the staple crop. The yields were not so large as those obtained at present by the use of improved methods and modern implements. From 20 to 30 bushels of corn and about 20 bushels of oats per acre were considered good yields. In recent years rust has injured the oat crop and the acreage has decreased. In the early seventies considerable wheat was grown.

When railroads were constructed through the county stock raising received an impetus, and Scotland County has since become one of the greatest stock-producing counties of the State. The raising of heavy export cattle, horses, mules, and hogs is the most profitable

industry, and poultry raising brings the farmers good returns. Dairy-  
ing is as yet undeveloped.

CLIMATE.

No weather records are available for any place in Scotland County except Gorin, and here the records of temperature are lacking. The appended table, compiled from records of the Weather Bureau, gives the normal monthly and annual temperature and precipitation at Unionville, which lies 35 miles to the west, Steffenville, which is 25 miles southeast of Scotland County, and Gorin, which is in the south-eastern part of the county. This data is believed fairly to represent the climatic conditions of the area surveyed. From these records it will be seen that Scotland County is favored with a fairly moderate normal temperature and an evenly distributed and abundant rainfall for this part of the United States. The heaviest precipitation usually comes during the months of May and June, at a time when it is especially beneficial to crops. The coldest months are January, February, and December, while the hottest are June, July, and August. The prevailing winds are southerly, but during the winter months north-easterly and northwesterly winds are frequent. Snow rarely falls earlier than the last of November or later than the first of April. Generally the weather is open and clear to about the middle of December, thus giving the farmers sufficient time during the pleasant fall months to gather their crops and sow their winter wheat.

From partial records of the dates of the first and last killing frosts, as observed at Unionville, Steffenville, and Gorin during the period from 1897 to 1904, the average dates are computed to be about the first of May and the middle of October. There is thus an average of about 165 days during which tender vegetation is in no danger from frosts.

*Normal monthly and annual temperature and precipitation.*

Month.	Unionville.		Steffenville.		Gorin.
	Temper- ature.	Precipi- tation.	Temper- ature.	Precipi- tation.	Precipi- tation.
	° F.	In.	° F.	In.	In.
January.....	26.0	1.50	30.2	2.20	1.65
February.....	24.1	2.41	24.5	1.99	1.52
March.....	37.4	2.01	40.7	3.16	2.44
April.....	52.5	3.46	53.4	3.37	3.57
May.....	65.0	5.20	65.3	5.96	4.79
June.....	73.6	4.68	72.0	4.45	3.45
July.....	78.7	3.75	77.7	4.22	4.41
August.....	76.4	4.76	76.7	2.92	2.82
September.....	67.6	4.75	67.1	3.79	3.87
October.....	56.5	2.01	55.4	2.13	2.03
November.....	38.2	1.60	42.8	1.79	1.98
December.....	27.6	2.80	28.2	1.89	1.56
Year.....	52.0	38.93	52.8	37.87	34.09

## PHYSIOGRAPHY AND GEOLOGY.

The surface of Scotland County consists of broad, level to gently rolling upland areas, extended areas of broken and hilly country along the stream courses, and broad areas of bottom land. The county has a general southeast to east slope, the larger streams running diagonally across the county from northwest to southeast in almost parallel lines. The elevations range from 640 to about 940 feet above sea level, the highest elevations being found along the western boundary of the county.

The county is naturally divided into three distinct physiographic divisions. The first division consists of the high and practically level uplands known as prairie. The largest areas of this division are found along the Iowa line, in the vicinity of Azen, and to the southwest and southeast of Memphis. The most important upland prairie ridge begins at the southeast boundary of the county and passes in an almost straight line to the northwest corner of the county. The second physiographic division, locally known as "white oak ridges," lies between the level uplands and the bottom lands and consists of rolling, hilly, and broken areas. In some places the hill slopes rise quite abruptly from the stream bottoms. These ridges occur throughout the county, following the direction of the streams and extending along the draws that project out into the uplands. The country to the south of North Fabius River and along the western border of the area has a more broken and hilly surface than the other parts of the county. The third physiographic division consists of the low, level or sometimes gently rolling areas lying adjacent to the streams, having an elevation from 60 to 100 feet lower than the high uplands. These areas occupy a comparatively large proportion of the county and vary considerably in width. For the most part, the streams have carved out deep and very wide valleys, generally leaving steep slopes on each side. From the width of these valleys it is evident that the streams formerly carried much larger volumes of water than at present.

The South Wyaconda River, North Wyaconda River, and Fox Creek, which have their sources in Iowa, enter the county from the northwest and flow through the northeastern part in an almost parallel southeastern direction. The north fork of the North Fabius River enters the county near the northwest corner and empties into the North Fabius River about  $1\frac{1}{2}$  miles west of Memphis. From this point the North Fabius River flows in a southeast direction and leaves the county about  $2\frac{1}{2}$  miles west of the southeast corner. The Middle Fabius River and the north fork of the Middle Fabius flow through the southwestern part of the county. All these streams, with their numerous tributaries, form an excellent drainage system. There are a few slight depressions in the bottoms in a semiswampy condition, but

these can be drained and made cultivable by straightening the stream channels and clearing them of logs and brush.

In the bottom areas the streams are relied upon to a considerable extent for water for stock. In the uplands basins are dug, and by the process of puddling a small pond is formed which catches and holds the rainwater. In some parts of the county well water is hard to obtain at any reasonable expense, while in other parts water can be obtained at a depth of from 20 to 60 feet. Cisterns are used extensively throughout the county.

The soils of Scotland County are of glacial, loessial, and alluvial origin. Bed rock, consisting of limestones, sandstones, and shales, all of the Subcarboniferous period, lies deeply buried beneath the surface and only one or two outcrops of it are to be seen in the county. Overlying the bed rock is glacial drift material of the Kansan glaciation. This has a depth varying from 65 to 150 feet or more and consists of yellow or blue clays with some sand and glacial gravel scattered through it, with here and there masses of soft lime concretions. This formation gives rise to the Shelby loam. The loess is a thin covering of wind-blown material overlying the glacial drift and gives rise to the Shelby silt loam. The alluvial material along the streams is formed by the wash from the loess and drift areas and gives rise to the Wabash silt loam and the Wabash clay. Near Memphis some brick and tile are made from this material.

## SOILS.

Four distinct types of soil were mapped in Scotland County. The extent of each is shown in the following table. The soil map is also, in a way, a physiographic map of the county, since each soil has a characteristic and distinct topographic position.

*Areas of different soils.*

Soil.	Acres.	Percent.
Shelby silt loam.....	136,704	48.5
Shelby loam.....	94,016	33.4
Wabash silt loam.....	46,016	16.5
Wabash clay.....	4,672	1.6
Total.....	281,408	.....

## SHELBY SILT LOAM.

The soil of the Shelby silt loam consists of a light to dark gray silty loam, varying in depth from 12 to 16 inches. It contains a large quantity of organic matter and when wet is black in color. This type is locally called "prairie land." It is a mellow and easily-tilled soil.

On a few narrow ridges of this type, which are sometimes forested to oak and hickory, the soil is a yellowish-gray silt loam. In some localities a thin stratum of whitish crumbly silt lies between the soil and subsoil. The subsoil to a depth of 36 inches is a heavy clay or silty clay. The characteristic colors are gray mottled with yellow, brown, or drab, frequently streaked with yellow or brown. This material is tough and hard and is very impervious to water. It is locally known as "hardpan," but is not hardpan in the correct sense of the word. Immediately below the subsoil is often found a blue or steel-gray colored clay. Upon exposure to atmospheric agencies the subsoil changes to a dull brown color, cracks open when dry, and is very plastic when wet.

The Shelby silt loam is the predominant soil type of the county and is well distributed over the area. It occurs on the upland ridges or "prairies" lying between the streams and forms long, continuous areas extending diagonally across the county from northwest to southeast. The surface of this type is level or gently rolling. It has an elevation of from 730 to 940 feet above sea level and lies from 60 to 100 feet above the level of the bottom lands.

The greater part of the Shelby silt loam has fairly good surface drainage. There are some flat areas which need artificial drainage to secure the best yields and permit easier cultivation. Some of the farmers have resorted to a broad, high bedding of the land and have obtained good results. Tiling will prove beneficial and profitable, as the subsoil is of such a nature that it is almost impossible for water to penetrate it. The structure of the soil is such that it easily rids itself of excess water, and yet it is able by capillary action to draw up from below sufficient moisture for growing crops. Good crops can be secured on this soil in all but the driest seasons.

The Shelby silt loam is of loessial origin. It is composed chiefly of silt, with not more than 5 per cent of all grades of sand and about 20 per cent of clay. It is a very uniform soil, as is the case with all loessial formations. The subsoil, however, contains a higher percentage of clay than is commonly found in loessial deposits.

The Shelby silt loam is adapted to corn, oats, timothy, and sorghum, and to alfalfa and clover on the well-drained areas. Practically all of this type is under cultivation. It sells for from \$50 to \$80 an acre, and some of it near Memphis and Gorin is held at \$100 an acre.

Upon this type are grown all the crops common to the county. Corn yields from 30 to 50 bushels, oats 30 to 55 bushels, and timothy 1 to 2 tons per acre. Sorghum does well, but clover does not give good returns. Potatoes, berries, and fruits, including apples, pears, and cherries, do well. Large areas are in timothy pasture, and many cattle, hogs, and a few sheep and horses are raised on the best farms.

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

*Mechanical analyses of Shelby silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
13590, 14031.....	Soil.....	0.1	1.2	0.6	0.7	1.5	74.7	21.0
13591, 14032.....	Subsoil.....	.4	1.7	.6	1.0	.9	61.1	33.9

In order to study the manurial requirements of this soil, a large sample was collected for examination by the paraffine wire-basket method. The sample was taken from a field about 5 miles west of Memphis. The soil is a dark-gray silt loam, mellow and easily tilled. It contains a large amount of organic matter and holds moisture quite well. The field from which the sample was taken has been in cultivation about thirty years, has been planted to corn, oats, and grass, but has received no fertilizer of any kind.

The results obtained indicate that an excellent increase in productivity may be obtained by the use of stable manure; that cowpeas and lime, sulphate of potash alone or in combination with nitrate of soda will produce a fair increase, and that either nitrate of soda, lime, or acid phosphate will produce only a very small increase when used alone. In these tests wheat plants were used as an indicator, and the results are held to be strictly applicable to related crops only and to the field from which the sample was taken. It is believed, however, that they will be found to apply in a general way to this type of soil throughout a large part of the area.

#### SHELBY LOAM.

The surface soil of the Shelby loam, to a depth of 8 to 10 inches, consists of a gray to light-brown heavy fine sandy or silty loam or loam, the color depending upon the quantity of organic matter incorporated with the soil. In some of the forested areas on the hillsides the soil is a light-gray or yellow silty to very fine sandy loam. At the head of some of the draws and small streams there occur narrow strips of a heavy black soil, which is more productive than the true type, but which could not be mapped separately from the Shelby loam on account of its small extent. The subsoil, to a depth of 36 inches or more, is generally a yellow, reddish-yellow, or light-brown clay, of a stiff, tough texture, which contains particles of sharp sand and some glacial gravel. Here and there in the subsoil, and occasionally on the surface, large granitic boulders occur. The subsoil is quite calcareous, many small, irregular masses of lime being encoun-

tered in most areas. The subsoil is a true boulder clay or till, having a somewhat granular structure when dry and being very plastic and sticky when wet. Sometimes it is underlain by blue or gray clay.

The Shelby loam occurs throughout the county, but as the southwestern part is rolling the largest proportion of this type is located in that region. The type is confined to the vicinity of the stream courses and almost invariably lies between the Wabash silt loam of the bottoms and the Shelby silt loam of the uplands. No broad areas occur, the type usually forming narrow, extended strips with points projecting into the Shelby silt loam areas. The type embraces practically all of the broken and hilly land in the county. It is confined to the hillsides, knolls, and rolling ridges, and no flat areas of it were encountered. About three-fourths of it can be cultivated, while the remaining portion is suited only to pasturage or forestry. Owing to the rolling surface of this type, it has excellent natural drainage, and in many places the rainfall runs off so rapidly that serious erosion has resulted, the small streams and draws cutting deep channels through the soil. This erosion can be prevented to a great extent by ditching, by terracing, by deeper plowing, thereby enabling the surface soil to take up larger quantities of the rainfall, or by seeding these hilly areas to grass and using them for pasture.

The Shelby loam has been derived, through the processes of weathering, from the glacial material of the Kansan drift. It seems that this material, or at least a part of it, was once covered by the loess, and that the Shelby loam has resulted largely from the washing of this loess from the surface of the glacial drift, thus exposing the latter to the action of the elements. The relatively high percentage of sand in the soil in many places would indicate that a considerable amount of clay and fine silt had been carried away in suspension.

The Shelby loam is a good general farming soil, and in wet seasons is more productive than the other soils. It is adapted to tobacco—a crop not grown in this area, but grown in the adjoining county to the west—clover, fruits, berries, potatoes, sweet potatoes, and wheat. Truck crops and vegetables do well on the sandy slopes with southern exposure, where they mature early. The lime in the subsoil of this type is one of the ingredients needed for the best development of clover and alfalfa. When the soil is cleared, bluegrass grows naturally.

The Shelby loam produces from 25 to 40 bushels of corn, 25 to 45 bushels of oats, and 10 to 25 bushels of wheat per acre. Clover, timothy, potatoes, apples, cherries, and pears do well. A considerable proportion of the type is still forested to white oak, post oak, hickory, and elm, and quite a large amount is in pasture. Many cattle, hogs, and sheep are raised on these rolling areas. This type, because of its topography, is especially suited to sheep pasturage.

The following table shows the average results of mechanical analyses of samples of this soil type:

*Mechanical analyses of Shelby loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
13588, 14027.....	Soil.....	0.7	4.2	4.9	13.9	9.3	44.7	21.9
13589, 14028.....	Subsoil.....	1.3	3.4	4.4	13.5	9.4	26.2	41.3

WABASH SILT LOAM.

The Wabash silt loam, to a depth of from 12 to 15 inches, is a light to dark gray silty loam or a gray or brownish loam. Some areas which contain quite a large percentage of organic matter are of a very dark color when wet. In many places the soil contains a high percentage of fine sand and occasional small sandy spots are seen. A few areas of fine sand or sandy loam washed from the Shelby loam are found at the base of the slopes. Throughout this type spots of "gumbo" occur, but they are too small to be shown on the map. The subsoil is a silty loam, varying in color from ashy to light gray, usually compact and sometimes with a stratum of tough, silty clay running through it. In some localities the subsoil is a light-brown or drab colored heavy fine sandy or silty loam.

The Wabash silt loam is a bottom-land soil and is well distributed throughout the county. The largest areas occur along North Fabius and Middle Fabius rivers, South Wyaconda and North Wyaconda rivers, and Fox Creek. Smaller areas and narrow strips are found along the tributary streams. This type occurs in bands varying in width from one-sixteenth of a mile to  $1\frac{1}{2}$  miles.

Occupying the first and sometimes the second bottoms along the streams, this type for the most part has a level surface. The first bottoms are uniformly flat, but the second bottoms are sometimes gently rolling with a gradual slope toward the streams. This type lies from 60 to 100 feet below the level uplands and the greater proportion is subject to overflow during the spring freshets, but is seldom flooded during the summer. By diking in some places and clearing the streams of logs and brush this type could be fairly well protected from overflow. Open ditches are necessary to drain this soil, and tiling would be beneficial in some places. Owing to the nearness of the water table, this soil has good moisture supply through capillary action.

The Wabash silt loam is of alluvial origin and consists of the accumulation of sediments washed from the Shelby silt loam and the Shelby loam areas, together with the material brought down from the headwaters of the streams. Owing to the way in which this soil was formed it is somewhat variable in texture and in the quantity of organic matter it contains.

This type is well suited to the production of corn, timothy, rye, and oats, and the well-drained areas to clover. Sorghum does well. A considerable proportion of this type will probably prove a very desirable soil for alfalfa, and this crop should be given a trial. The percentage of Wabash silt loam under cultivation in any one year depends upon the season. In a fairly dry season practically all of the cleared land will be cropped, but in a wet season only the second bottoms and small areas of the first bottoms will be planted. Some of the type is forested to oak, hickory, and elm, and parts of it are badly dissected by stream channels. Corn produces from 25 to 80 bushels per acre, with 40 or 45 bushels as an average yield in a good season. Timothy yields from 1 to 2½ tons per acre, and clover also does well. Rye gives large yields. Sorghum makes from 50 to 200 gallons of sirup to the acre. Cucumbers are grown with good results.

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

*Mechanical analyses of Wabash silt loam.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
14035, 14037.....	Soil.....	0.1	0.6	0.4	2.5	11.2	62.7	22.1
14036, 14038.....	Subsoil.....	.2	1.3	.5	2.1	7.4	57.9	30.3

WABASH CLAY.

The Wabash clay, to a depth of 8 to 10 inches, is a heavy silty loam or clay loam of a dark-gray or black color. The more silty phase has a dark-gray color, while the heavier and more typically developed areas have a black clay loam soil. The soil is sticky when wet and cracks and bakes hard when dry. It is locally called "gumbo" and is a difficult soil to till. Special care must be taken to plow this soil when it contains the proper amount of moisture, if good tilth is to be secured. The subsoil to a depth of 36 inches or more consists of a drab or mottled gray, sticky, gummy clay, possessing a large clay content and being quite impervious to water. In some places a water-bearing stratum of sand is found several feet beneath this clay.

No large areas of this type were encountered in Scotland County. The greatest development of the type is seen along the North Fabius River to the southeast of Memphis, where it occurs in a long, narrow, disconnected area. A few smaller areas were found in the Wyaconda bottoms and along a few other streams. Patches of this soil too small to be shown upon the soil map are found scattered throughout the Wabash silt loam areas.

The Wabash clay is characterized by a uniformly level and slightly depressed surface. It occurs only in the flat bottom areas near the

streams, is subject to frequent overflow during the spring, and is occasionally flooded in the summer. On account of its level and slightly depressed surface the drainage is poor and water stands in a few of the sloughs for the greater part of the year. Some of the type is, however, sufficiently well drained to permit of cultivation. Open ditches and tiling are essential to the proper drainage of this soil. At present crops are liable to be overflowed or drowned out on most of the areas, but if the natural drainage ways were straightened and cleared of brush and logs this land would not be overflowed so often. In some places diking would pay. The land now remains wet so long in the spring that it is sometimes impossible to get a crop planted in time for it to mature before frost.

The Wabash clay is of alluvial origin and consists of fine sediments which have been deposited by the "back water" from the overflowing streams. It has a high organic-matter content, owing to the fact that the wet condition of the soil has favored the growth and accumulation of vegetable matter.

This soil is peculiarly well adapted to corn and hay, and large yields of these crops ought to be secured. Only a small percentage is now cultivated, and the yields depend on the drainage conditions and the dryness of the season. Some fields were seen where the yield of corn was from 40 to 70 bushels per acre, while other fields would produce scarcely any, because the soil was too wet. Very little of this type is forested. Most of it is used for pasture, but in a few meadows some hay is cut. Owing to the fact that the type is difficult to till and subject to overflow during the crop season, its true value has never been fully appreciated. The Wabash clay is naturally the most productive soil in the county, and it is only a matter of time until all of it is drained and in profitable cultivation to corn and hay.

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

*Mechanical analyses of Wabash clay.*

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		<i>Per cent.</i>						
13592, 14041.....	Soil.....	0.3	1.9	0.7	1.7	3.0	45.4	46.9
13593, 14042.....	Subsoil.....	.4	1.6	.7	1.5	3.7	36.5	55.6

#### AGRICULTURAL CONDITIONS.

The farmers of Scotland County are in a prosperous condition. In 1894 and 1895 this section suffered from drought, the price of corn was low, and the farmers were very much discouraged. In recent years, however, they have secured fairly good crops, prices have been higher,

more attention has been paid to the live-stock industry, and the condition of the farmers has steadily improved. Fairly good frame buildings, usually painted, are seen over the county. A few log houses still remain and are in striking contrast with a few beautiful modern houses scattered here and there through the area. The barns are ordinarily good, but not so conveniently arranged or so commodious as the barns in the Eastern States. The old rail fences are being torn down and new fences are being built, usually of barbed wire or woven wire at the bottom, with 2 or 3 strands of barbed wire above. Modern farm machinery, including sulky plows, riding cultivators, mowing machines, binders, etc., are used on nearly every farm. The prairie farms, which present the greatest evidences of prosperity, are held at from \$50 to \$100 an acre, the latter price being for land near Memphis or Gorin. Land for grazing purposes can be bought for from \$25 to \$40 an acre. The best lands in the county promise to increase considerably in value.

Between 60 and 75 per cent of the farms in the area surveyed are operated by the owners. The remaining farms are leased either on shares or for cash. The grain rent is commonly two-fifths or one-half of the crop produced, while the cash rent varies from \$2.50 to \$4 an acre. The size of the farms varies greatly throughout the county. They range from 40 acres to 160 acres or more, but 130 acres probably represents the average. Frequently one person owns more than one farm, thus making the average statistics somewhat misleading.

The labor employed is nearly all white. Generally there is no difficulty in securing labor except during harvest time. Wages by the month, including board and lodging, range from \$18 to \$25. The ordinary price of day labor is \$1.25, but during harvest it commands from \$1.50 to \$2.50 a day.

Farming in Scotland County is based almost entirely upon stock raising. In general, the county is stocked with an exceptionally good grade of beef cattle, horses, mules, sheep, and hogs. A great many herds of well-bred Angus and Shorthorn cattle and fattening steers are kept, but the dairy breeds are absent. The Duroc Jersey seems to be the most popular breed of swine, though some Poland China hogs were noted. A few horses and mules, as well as some hay and oats, are shipped out of the area. The main money-yielding products, however, are beef cattle, hogs, and sheep. Scarcely any grain is shipped, as it is more profitable to feed it to cattle and hogs and sell them than to sell the grain. Many farmers throughout the county buy cattle and fatten them for market.

The main crops grown are corn, oats, and timothy hay, while the secondary crops are wheat, rye, clover, potatoes, sweet potatoes, cucumbers, millet, and sorghum. Oats are usually planted on land that has been in corn for two years, and are followed by wheat, rye, or

pasture. The acreage devoted to wheat and rye is decreasing. Corn is the most important grain crop of this region, and many fine fields were seen. Some fields with an exceedingly poor stand were observed, evidently the result of poor seed. The farmers would find it profitable to use greater care in the selection of their seed corn. Some fields also show a lack of thorough cultivation. It will be found advantageous to cultivate the crop thoroughly, and, after "laying by," to plant rape, vetch, or cowpeas between the rows, instead of giving the land up to cockleburrs and other weeds.

The farmers of Scotland County fail to appreciate the value of corn stover. There are very few farmers who make any attempt to use it, though the Missouri experiment station states that corn stover is equal to one-half the same weight of timothy hay if fed with hay.

Pumpkins, planted in the corn, make an excellent feed for hogs. It is estimated that 14 tons of pumpkins equal in feeding value 50 bushels of corn, so that a good yield of pumpkins will double the crop value of an acre of 50-bushel corn.

Around every well-established home are seen a few apple trees and occasionally a small orchard. A smaller number of pear, cherry, and peach trees were noted. All of these fruits do fairly well except peaches, which are apt to winterkill. More attention should be given to the production of apples, pears, and cherries, and also to trucking. Cucumbers are grown for pickling, and very satisfactory yields are secured.

Many large fields of gently rolling land are in pasture that could be more profitably employed for growing cultivated crops. The more broken land along the streams is well adapted for bluegrass pastures. Pastures in which clover is kept growing will be found to support from two to three times more cattle than if left in the natural growth of bluegrass. A valuable crop for the rolling land and the sandy areas of the bottoms is alfalfa. It is being grown to some extent, and the acreage is increasing each year. Alfalfa should be sown in the fall on land from which a crop of wheat has been cut and the field well disked. The latter part of August or the fore part of September is the best time for sowing alfalfa in this region. Spring sowing with a nurse crop does not usually give as good results.

The plowing done in the county is seldom deep enough. The land should be plowed a little deeper each year until a depth of 7 or 8 inches is reached. Fall plowing gives by far the best results, especially on meadow land. Deep plowing should always be practiced on the slopes, so that the soil can absorb the rain and not be washed away.

So far as is known, no commercial fertilizers are used in the county. It is highly probable that lime applied to the heavy bottom "gumbo" soils would improve their texture and make them easier to work.

Attention has been given in only a general way to the adaptation of the different soils to certain crops. The Shelby silt loam is a good soil for corn, oats, and hay, and by the addition of lime and better drainage of some areas fairly good yields of clover, alfalfa, wheat, fruits, potatoes, and navy beans can be secured. The Shelby loam is well suited to the production of wheat, clover, fruits, beans, berries, and potatoes, and on the sandy slopes with a southern exposure to early truck crops. It is also well adapted to pasturage. Tobacco will do well on this soil. The Wabash silt loam is admirably adapted to the production of corn, oats, hay, rye, and cucumbers. The Wabash clay is a strong soil and is capable of producing large yields of corn and hay when better drained.

A branch of the Chicago, Burlington and Quincy Railway traverses the central part of the county from east to west. The main line of the Atchison, Topeka, and Santa Fe Railway crosses the southeastern corner of the county. The county roads follow in part the section lines or run parallel with them, and are fairly well distributed over the county. In the summer and fall they are in good condition, but are very bad when the ground thaws in the spring. The rural free delivery of mail is in operation throughout the greater part of the county. Good schoolhouses are seen in the rural districts, and the compulsory attendance law is enforced.

Memphis, Gorin, Rutledge, and Granger consume quite a large quantity of the fruits, vegetables, and poultry produced in the county. Chicago is the market for the cattle, hogs, and sheep, and for most of the other products shipped out of the county.

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