

XVII. THE GOVERNMENT SOIL SURVEY OF MARSHALL COUNTY.

The United States Department of Agriculture sent Frank Bennett and Charles W. Ely into Marshall county during the year 1905, who made a soil survey, giving location and boundaries of the area, climate, physiography and geology, soils, the different loams and agricultural conditions, from which the following is reproduced as being of special interest to the farming community of the county.

Prior to the organization of Marshall County this region was inhabited almost exclusively by Pottawattomie Indians, who were very numerous here. The first cession of lands now embraced in Marshall County was made by the Indians at a treaty near Rochester, whereby they gave up a strip of land one mile in width through the present limits of the county to enable the whites to establish the Michigan road, a highway extending from Indianapolis to Michigan City via Logansport and South Bend. These road lands were offered for sale in 1832, and the proceeds were devoted to the building of the Michigan road, which extends through the center of the county in a north and south direction, following the boundary between the level and the rolling topography of the county.

A few years after the sale of the Michigan road lands, most of the lands within the present limits of the county were given up by the Indians, who, after 1838, ceased to be an important factor in the history of Marshall county.

At this time emigrants from Ohio, Pennsylvania and other eastern states were rapidly coming into the county, and as the Michigan road was the first one opened, they naturally established themselves in its vicinity. Many of the settlers were Germans, some of whom came direct from the mother country,

The greater part of the county was originally covered with a heavy growth of timber, consisting principally of walnut, oak and poplar. This timber, except the little that was used for building material, was either burned or destroyed in any possible way to clear the land. As the country became more thickly settled and transportation facilities improved, the lumber business became an important industry in the development of the county. The period from 1860 to 1870 was the most prosperous for this industry.

The first crops grown in Marshall County were corn, wheat, oats, rye, and beans. The soil was prepared by what was known as a "jumping plow" or "breaking shovel," drawn by several yoke of oxen. Grain was sown broadcast and dragged in with a brush. Corn yielded from twenty- five to fifty bushels per acre. Wheat was frequently a failure, but in favorable years produced from fourteen to eighteen bushels. Oats were not a great success. Rye was used principally for feed and pasture, rarely being thrashed. Potatoes gave a large yield, and seemed to be of better quality than those produced at the present time. The sandy soils were best adapted to this crop. The early settlers grew a little tame hay, but depended mostly upon marsh hay or corn fodder for their stock feed. When hay

was scarce the stock often lived on the buds of the basswood for long periods. Flax was also grown for many years and manufactured into clothing.

About 1865 the farmers began to realize that the soils were becoming less productive, and began to grow clover to maintain their productiveness. Timothy was also introduced about the same time.

When first settled a large part of the county comprised swampy areas, but as it became more thickly settled some attention was given to drainage, though no well-planned system was inaugurated until 1876. Since that time more or less drainage work has been in progress every year, and a great many open ditches and tile drains have been constructed, while the Yellow river, in the northeastern part of the county, has recently been dredged. Many open ditches, into which tile drains empty, are seen in the eastern and northeastern parts of the county. Some of the most productive lands in the county have been made available for agricultural purposes by artificial drainage, and at the present time there is little land that is not well drained, aside from the muck areas, and in some of the latter drainage work is now in progress.

There are some small areas where the soil is heavier in texture and darker in color than the typical phase, and often extends to a depth of eighteen or twenty inches. The subsoil in such places is yellowish-drab sandy clay. A small portion of this phase had to be artificially drained before cultivation was a success.

The Marshall loam occupies the largest and most uniform areas of any soil type in the county, though frequently small areas of the other types are found scattered through it. It occupies the greater part of the eastern half of the county, while west of the central dividing line it occurs in comparatively small areas, except in the extreme northwestern corner, where a spur of the main body of the type extends beyond the line.

Agricultural Conditions.

The farmers of Marshall County are in a fairly prosperous condition. In the eastern half of the county, which is largely occupied by the Marshall loam, nearly every acre of which can be cultivated, the farmers as a rule are more prosperous than those living on the sandy soils in the extreme western portion. The houses though often small, are nearly always painted, and the barns are of sufficient size to shelter all the live stock and machinery.

Many silos are also seen. As a rule, the houses are smaller and not quite so good on the more sandy soils and a good dwelling with no barn is frequently seen.

The value of farmland ranges from \$20 to \$100 per acre. The Marshall loam is generally held at from \$65 to \$100; the Marshall sandy loam at from \$65 to \$75; the Marshall sand at from \$30 to \$40 when in cultivation; and other lands at from \$20 to \$60 an acre. Muck undrained sells at from \$20 to \$30, and when drained at from \$40 to \$70 an acre.

About 75 per cent of the land in this county is under cultivation or in a condition to be cultivated. The remainder consists of sand, marshes, timberland, and rough broken land, and, aside from the marshes, the greater part of this land lies in the western half of the county. Much of this uncultivated

land can be used for pasture, so that there is comparatively little land in the county from which some return cannot be secured.

About \$2,000,000 in mortgages is held against the farms of Marshall County, which is between 15 and 25% of their value. While these farm mortgages apply generally throughout the county and are not confined to any one soil type, yet they are fewer in proportion to the total number in the northern and northeastern parts of the county than in other sections. A great many German farmers, living in those parts of the area, and, being of industrious and prudent habits, they have maintained a better financial standing.

About 60 per cent of the farms are operated by the owners. The remainder are cultivated by tenants, who pay a rental of from two-fifths to one-half of the crop made, or very rarely, a cash rent, which ranges from \$3 to \$4.50 an acre. The proportion of grain paid varies in different sections. For corn lands, one half is paid, according to the amount of seed furnished and the proportion of the thrashing bill paid by the owner and tenant, respectively.

About ninety acres is the average size of farms in this county. Where onions and potatoes are grown the farms are below the average in size, but where much livestock is kept they are usually larger. There are several farms of 640 or more acres, but as a rule these large holdings are divided up and rented in smaller tracts.

The smaller farms are generally operated by the owner or tenant and his family, assisted to some extent by labor hired by the day or week during harvest and other pressing seasons. The wealthier farmers usually hire by the month, paying from \$20 to \$25 and board, and employing the men from June 15 to August 15, during which time there is a great demand for laborers, and efficient men receive from \$1.75 to \$2 a day. At other times day laborers receive \$1.25 a day and dinner. During the corn-husking season labor is much in demand, and at times farmers find difficulty in getting the crop out as fast as they desire. The labor is exclusively white and is usually efficient, but the supply is often inadequate.

Corn and wheat are the principal products of Marshall County. From 15 to 25 per cent of the cultivated lands is planted to each of these grains. The average yield of corn in the county is thirty-five bushels per are and of wheat ten bushels. Winter wheat is only grown. Owing to severe damage to wheat by freezing and by the Hessian fly, there has been a tendency in recent years to reduce the acreage somewhat and to give more attention to the planting of rye, but as yet rye is an unimportant crop. The corn is planted in checked rows and cultivated with two-horse machinery. A great part of it is cut for fodder, both by hand and by corn binders, and binders and shockers. The fodder is sometimes shredded, and thus prepared it may be substituted for hay. A part of the crop is put into the silo and utilized in that way. Wheat is generally sown in drills, and is thrashed either in the fields or at the barn. Clover is an important crop, about 15,000 acres being cut every year. It is generally sown with wheat or oats, and produces two crops, one of hay and one of seed, a considerable

proportion of the seed being shipped out of the county. Timothy is grown p all soils except the sand, and will thrive in low, damp places where clover and corn does not do well. Both clover and timothy hay are baled and shipped to eastern markets. Oats are grown largely for home use, but some are shipped.

Among the minor crops cucumbers are probably the most important. They are grown chiefly on the more sandy soils and are sold at the salting stations, of which there are seven within the area. The managers of these stations contract with the farmers, giving them 60 cents a bushel and providing the seed. Cucumbers are rarely grown in large fields, the patches ranging from two to five acres. Onions are grown chiefly on the muck and potatoes on the more sandy soils. On nearly every farm there is an orchard, which supplies the needs of the owner. A great many apples are made into cider, to be sold later as vinegar.

Except on the most sandy land every farmer keeps one or more milch cows. A great many sell milk to the creameries, of which there are several within the area. According to the census of 1900 the value of dairy products in Marshall County was \$163,028. A great many beef cattle, hogs, and sheep are kept also, this being more particularly true in the eastern half of the county. The Shorthorns, Angus, and Herefords are the chief breeds of cattle, and the Chester Whites, Poland Chinas, and Berkshires are the breeds of hogs most in favor. Almost the entire grain crop produced in some sections of the Marshall loam is consumed upon the farm. The raising of livestock is to be commended, for the more manure produced the more productive the lands should become. Increased interest is being shown in the live stock industry.

The farmers of Marshall County have a fair understanding of the adaptation of soils to crops. The Marshall loam is generally recognized as the best soil in the county for general farming and the more sandy soils are best for the special crops. The possibilities of the Marshall sandy loam and the Marshall sand for Irish potatoes, however, are not fully appreciated, especially in the case of the latter type of soil, which produces fair yields of corn and rye, but is excellently adapted to potatoes, which, with liberal applications of manure, give very large yields. It is suggested that where the type lays near muck areas a dressing of the muck would prove very beneficial.

Marshall County is well supplied with railroad facilities. The Baltimore & Ohio crosses the northern part of the county in an east and west direction; the Pittsburg, Ft. Wayne & Chicago the central part; the New York, Chicago & St. Louis, the southern part; the Lake Erie & Western, the western half in a northwest and southeast direction, and the Logansport division of the Terre Haute & Indianapolis passes through the south- western, central and Northern parts of the county. Few points in the area are more than seven miles by wagon road from a station. The three east and west lines are trunk lines from Chicago to the east, so that all produce can be quickly shipped either way from any point in the county. Good dirt roads are found on nearly every section line, and them have been graveled. Except in the most sandy areas there any difficulty in getting products to market.

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Plymouth, the largest town in the county, had a population in 1900 of 3,656. Other smaller towns are Bremen Bourbon, Argos and Culver. Only a comparatively small portion of the produce can be consumed within the county, so that it is necessary to seek larger markets. Plymouth is only eighty-four miles from Chicago by rail; but as this large western market is supplied with enormous shipments from all over the northern part of the Mississippi valley, the farmers of Marshall county find better markets elsewhere. Some of the products are shipped to the larger towns around the state, while a great deal of live stock, hay, .etc., is shipped to Buffalo and Pittsburg. Nearly every railroad station in the county has an elevator, and the exceptionally good railroad facilities enable the farmers to send their products wherever they may desire.

Soils.

The soils of Marshall county have been classified into nine types, including muck and meadow. They range in texture from sand to clay loam, and thus offer opportunity for the production of a diversity of crops.

The following table shows the extent of each type:

SOIL	Acres.	Per cent.
Marshall loam	21,216	42.7
Marshall sandy loam	77,184	27.3
Miami sand	27,840	9.8
Muck	24,768	8.7
Marshall Sand	20,672	7.4
Meadow	6, 784	2.5
Miami clay loam	3,392	0.8
Miami black clay loam	1,536	0.5
Miami gravelly sandy loam	1,216	0.3
Total	284,608	

The Marshall loam, to a depth of fourteen inches, consists of a brown loam containing much sand, underlain to a depth of eighteen inches by a yellowish-brown loam, which is slightly more tenacious than the surface soil. The subsoil, from eighteen inches to three feet, is a yellow sticky sandy loam of often containing some gravel.

A few boulders, sometimes measuring three or four feet in diameter, and some smaller stones are occasionally scattered over the surface, but the greater part of these has been removed. Large piles are often seen in the fields, and they are sometimes used in constructing fences.

The soil is often heavy enough to form clods, but these are easily broken by the harrow and roller. When put in a good state of tilth the soil becomes a very mellow loam.

Climate.

The following table, taken from the records of the Weather Bureau stations at Syracuse and South Bend, shows the mean normal monthly and normal temperature and rainfall. South Bend is about twenty-four miles and Syracuse twenty-six miles northeast of the center of the county.

Normal monthly and annual temperature and precipitation.

MONTH.	SYRACUSE.		SOUTH BEND.	
	Temperature F.	Precipitation Inches.	Temperature F.	Precipitation. Inches.
January.	25.2	2.47	29.2	2.99
February	24.0	2.32	22.8	2.14
March	34.2	4.00	35.6	2.99
April.	50.7	1.93	50.4	1.77
May.	62.6	3.77	60.8	3.09
June.	69.3	3.60	70.5	2.45
July	75.4	4.71	74.1	3.57
August	72.4	3.19	72.8	3.12
September.	63.8	2.76	65.7	2.90
October.	54.8	3.55	54.2	2.44
November	40.2	3.74	39.7	3.12
December	27.4	3.07	27.8	3.07
Year.	50.0	39.11	50.3	33.65

The figures show a fairly uniform distribution of rainfall throughout the year, with the maximum during the growing season. The temperature is characterized by sudden changes during the period from October to April, and by alternate freezes and thaws, which sometimes seriously damage crops.

The average date of the last killing frost in spring is April 20, and of the first in fall October 10, giving a growing season of approximately 172 days.