McHENRY COUNTY SOILS

SOIL REPORT 81

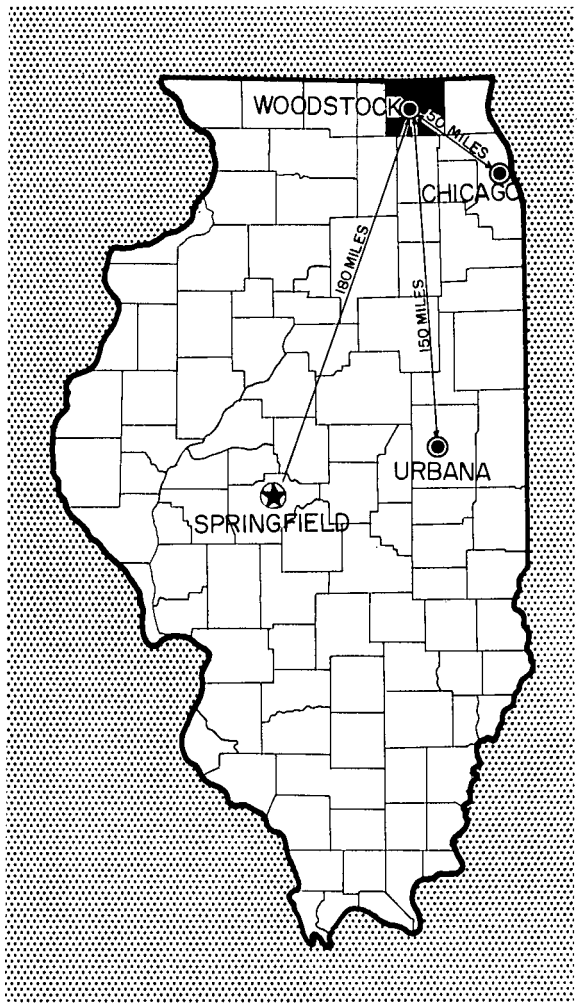
UNIVERSITY OF ILLINOIS
AGRICULTURAL EXPERIMENT STATION

In cooperation with SOIL CONSERVATION SERVICE, U. S. Department of Agriculture

COVER PICTURE

The picture on the cover is an aerial view of a portion of McHenry county as it appeared in 1961. Fox river, flowing diagonally from northeast to southwest, passes through the town of Algonquin. Highway Illinois 62 from the southeast joins north-south highway Illinois 31 in town. The road along the bottom of the picture is the Kane-McHenry county line. Large gravel pits show in the northwestern part. The bottom of the northernmost pit was leveled for farming a number of years ago.

The tillable land consists of several soils, some formed in water-deposited sediments and others primarily in glacial till. The more important soils include Warsaw silt loam to loam, Dresden silt loam to loam, and Fox silt loam to loam, which have gravel at a depth of 3½ feet or less, and Proctor silt loam and Harvard silt loam, which often have gravel below 3½ feet in this area. The western edge of Algonquin is on Strawn silt loam and Miami silt loam, which formed in loam-textured till. In the eastern part of the picture, south of Fox river, three soil types occur which formed in sandy loam till. They are Ringwood silt loam, McHenry silt loam, and Lapeer loam.



McHenry county is in northeastern Illinois. Woodstock, the county seat, is about 50 miles from Chicago, 180 miles from Springfield, and 150 miles from Urbana, the location of the University of Illinois.

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The authors are indebted to A. H. Reimer, C. A. Skimina, and P. T. Veale, Illinois Agricultural Experiment Station, and D. C. Hallbick, E. G. Holhubner, R. L. Newbury, and L. H. Pierard, Soil Conservation Service, U.S. Department of Agriculture, for their assistance with the field work. Laboratory studies and soil correlations were made by the Illinois Agricultural Experiment Station in cooperation with the U.S. Department of Agriculture. The section on climate was prepared in cooperation with W. L. Denmark, State Climatologist, U.S. Weather Bureau and Illinois State Water Survey. Yield data in Tables 33, 34, and 35 were furnished by A. L. Lang, L. B. Miller, and D. L. Mulvaney, University of Illinois Department of Agronomy; the Department of Forestry helped in the preparation of the tree-growth data in Table 36. The section on engineering was prepared in cooperation with T. H. Thornburn, Civil Engineering Department.

Urbana, Illinois August, 1965

McHENRY COUNTY SOILS

By B. W. RAY and H. L. WASCHER

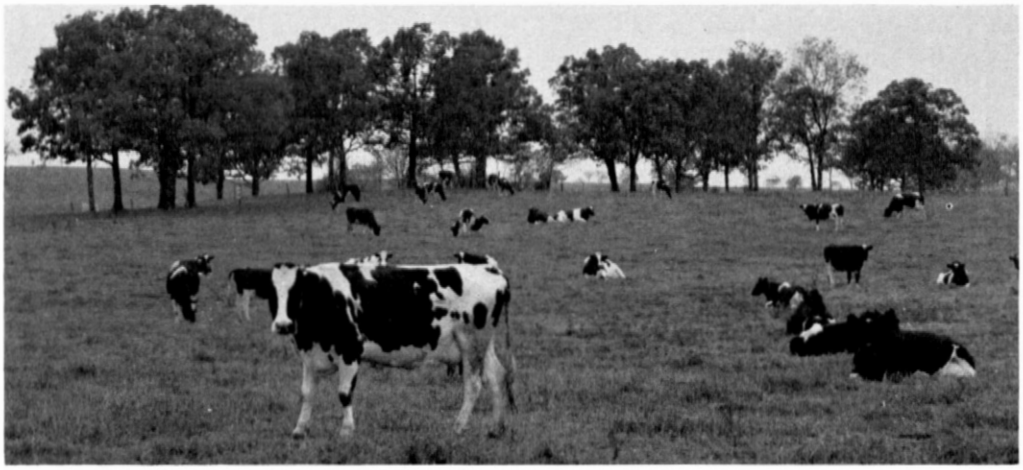
THIS SOIL REPORT has been prepared to help answer the following questions: What soils occur in McHenry county and where are they located? What are the characteristics of the soils and how may the soils be classified? What crops are adapted to each soil and how much will they yield? How can the different soil types best be used for woodland, engineering, and urban development? What are some of the important natural and cultural features of the county?

The report is concerned primarily with soil characteristics that undergo little change over a period of many years. Thus the facts gained from past experience and research may be used in classifying the soils and in predicting their behavior under various uses and their productivity under different management systems.

Characteristics that are important in determining the best agricultural uses of soils are considered. Specific management suggestions, however, are not included. They are given in a separate publication entitled, "Soil Management Guide, McHenry County, Illinois, Your Personal Guide to Better Understand and Manage Your Soils" (*27*).[1,2] This guide may be revised from time to time as new management facts become known and new farming techniques are developed. It is designed to give the farmer up-to-date, specific management sugges-

[1] Italicized numbers in parenthesis refer to literature cited on page 129.

[2] The McHenry county soil management guide is available through the offices of either the McHenry county farm adviser or the McHenry County Soil Conservation District.



McHenry county is noted for its dairy farms and scenes like this are common. This picture was taken in Dorr township. (Fig. 1)

tions for his farm. It includes a large-scale soil map of the individual farm with aerial photographic background. In addition to the soil types, this map shows the slope and estimated thickness of remaining topsoil. It is especially useful in planning soil and water management programs on farms.

A small-scale soil map of the entire county, printed in color, is in the pocket at the back of this report. It shows the location and extent of the various soil types in the county.

To obtain information for this soil report and the map, soil scientists walked over all of McHenry county, boring holes at appropriate points on the landscape to examine soil profiles. Exposed profiles along stream banks, road and railroad cuts, and other excavations were observed in numerous places. The soil scientists noted the number, arrangement, and thickness of the horizons comprising different profiles as well as their color, texture, structure, and other characteristics. A discussion of soil profiles and horizons is on pages 13-15.

Lines were drawn on aerial photographs carried in the field to show the boundaries of the individual soils. The colored soil map was prepared from information recorded on these photographs.

Individual soil types were described and information concerning them was collected as the survey progressed. Selected profiles were sampled by horizons and their chemical and physical properties were determined in the laboratory. Results of these analyses are presented for several soils.

NATURAL FEATURES OF McHENRY COUNTY

Location and size of county. McHenry county is located in the northernmost part of Illinois. Its eastern boundary is approximately 20 miles west of Lake Michigan. It is bounded on the north by portions of Walworth and Kenosha counties, Wisconsin. Lake county borders it on the east, Boone on the west, and Kane and small portions of DeKalb and Cook counties border it on the south.

McHenry county has an area of 611 square miles and is almost square in shape, being about 26 miles east and west and 23½ miles north and south. Woodstock, the county seat, is located in the center of the county.

Physiography and drainage. During the glacial epoch several ice sheets advanced across McHenry county. During the most recent glacial stage, the Wisconsinan, ice covered the entire county, leaving thick deposits of glacial drift (till and outwash). It is primarily responsible for the existing topography.

The eastern four-fifths of the county is characterized by complex morainal topography. It has greater relief and a more complicated slope pattern than most of northeastern Illinois. The drainage pattern is very youthful and incomplete. Irregularly shaped hills, mounds, and ridges are intermingled with basins, marshes, and occasional lakes. Esker, kame, kame-terrace, and kettle-hole formations are more abundant in this region of Illinois than in any other. Within this hilly morainal area, however, there are also a few sizable level to gently sloping outwash plains and old lake beds.

A prominent north-south moraine, Marengo ridge, occurs in the western part of McHenry county in line with the towns of Harvard and Marengo (Figs. 2 and 5). This moraine and all of the county to the east is in the Wheaton Morainal Country of the Great Lake section of the Central Lowland province (*25*). The remainder of the county, west

of Marengo ridge, is in the Rock River Hill Country of the Till Plains section of the Central Lowland province.

A relatively level outwash plain lies immediately west of Marengo ridge and along its entire length (Fig. 5). West of this outwash plain, in the extreme western part of the county, till-covered upland comprises the eastern edge of the Rock River Hill Country. This part of McHenry county contrasts greatly with the morainal area to the east. It lacks the knob and basin topography of the more youthful area, being characterized by long, gentle, uniform slopes and a well-developed drainage pattern.

The western part of the county is drained by the Kishwaukee river and its tributaries, including Piscasaw, Rush, and Coon creeks. Drainage is westward to the Rock river. The eastern part of the county is drained by the Fox river and its tributaries, including Nippersink and Boone creeks (Fig. 3). Drainage is southward to the Illinois river.

A few important natural lakes are in the eastern third of the county, the largest being Pistakee lake (Fig. 4). Won-

Marengo ridge on the horizon, viewed looking eastward from the center of Section 15 in Dunham township. A relatively level outwash plain occurs in the foreground. (Fig. 2)

A Rodman-Casco complex occurs on the steep slope in the background and Lena muck occurs in the center of this area of Boone creek valley in Dorr township. Several outwash soils, with poor to well natural drainage, also occur in the valley. (Fig. 3)

This area around Pistakee lake, which occurs in the eastern part of the county, provides homesites and recreation facilities. (Fig. 4)

der lake, also in the east, is man-made, formed in Nippersink creek valley.

The highest elevations in McHenry county are on the West Chicago moraine northeast of Harvard and less than 2 miles south of the Illinois-Wisconsin state line. The highest knobs on the moraine are about 1190 feet above sea level. The lowest elevation is slightly less than 730 feet where the Fox river leaves the county south of Algonquin. The Kishwaukee river leaves the county west of Marengo at an elevation slightly below 780 feet. Approximate elevations of some of the larger towns are: Harvard, 966 feet; Marengo, 837 feet; Hebron, 930 feet; Woodstock, 943 feet; Huntley, 889 feet; Richmond, 815 feet; McHenry, 747 feet; Crystal Lake, 929 feet; Algonquin, 734 feet.[1]

Geology. At least two, possibly three, glaciers advanced from the northeast across the area now occupied by McHenry county (*17*). The glaciers of Wisconsinan age were sources for the parent materials of the soils except for peat and muck. Thickness of drift left by the glaciers varies from about 50 to 400 feet and is commonly more than 200 feet in morainal areas (*17, 31*).

The uppermost bedrock under a major part of the county is Niagaran or Alexandrian dolomite of the Silurian system. In the southwestern one-fourth of the county and along the western edge of the northern part, Maquoketa shale of the Ordovician system is the dominant uppermost rock formation (*16*). The thick glacial drift prevents the underlying bedrock from having much direct influence on the soils. In the western part of section 31 of Marengo township (T44N, R5E), dolomite occurs at depths of less than 4 feet. This is the only area in the county where bedrock directly influences classification of the soil.

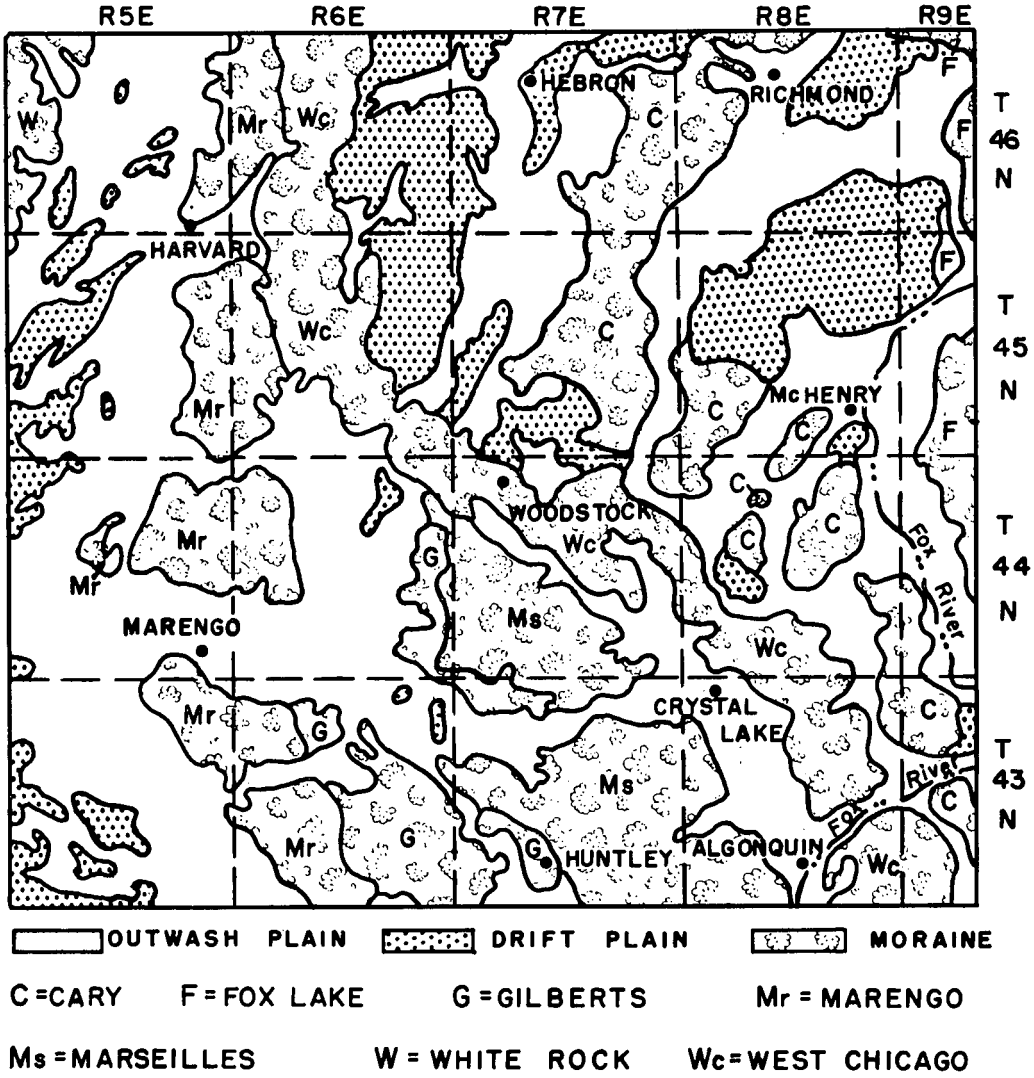
The thick till deposits of the Wisconsinan glacial stage occur as a series of morainal ridges and till plains interspersed with areas of outwash (Fig 5). The moraines were formed successively by retreating ice in an eastward direction, with the White Rock moraine in the northwest the oldest and the Fox Lake moraine in the east the youngest.

On Marengo ridge and moraines to the east, till soils have been leached of carbonates to depths of 3 feet or somewhat less. On White Rock moraine, depth of leaching is 4 feet or more except in scattered areas where calcareous till at 3 feet or less overlies or replaces leached till. This difference in the depth of leaching between the White Rock and Marengo moraines indicates that more time elapsed between the deposition of these two moraines than between the deposition of any other two morainal areas in the county. The scattered areas of calcareous till on top of leached till appear to be the result of a later glacial advance over portions of the White Rock moraine.

According to Leighton (*23, 24*), a difference in trend or direction between the Marengo and Marseilles moraines and the West Chicago moraine indicates a substage separation in the Wisconsinan. He named the earlier substage Tazewell and the later Cary. Frye and Willman (*13*) prefer to include all moraines in McHenry county in one substage because of the geologically short period of deposition, believed to be less than 10,000 radiocarbon years, and because "the individual moraines cannot be traced with certainty across re-entrants within a lobe." Soil survey information indicates that if a significant substage interval did occur, the division should be between Marengo ridge and moraines to the west. Till areas west of Marengo ridge are leached more deeply (except as noted above) than areas to the east. Furthermore, the loess cover over the leached till is thicker in the western areas and the drainage systems are more complete, with fewer undrained depressions.

Glacial drift, including till and outwash, varies in texture from loamy gravel to clay. The original texture of the glacial deposits has greatly influ-

[1] Elevations from U.S. Geological Survey topographic maps.



Glacial map of McHenry county. All moraine names and some boundaries are from G. E. Ekblaw (See Figure 5 in reference *31*). Many boundaries were modified after the soil survey information was interpreted. (Fig. 5)

enced the soils developed within the deposits (*35*). A detailed discussion of the textural groups of drift recognized in classifying soils of McHenry county may be found on page 102. The areal distribution of different textures of drift is shown on the general soil map, page 104. The role of glacial melt water in modifying surface features and in depositing soil parent materials may be appreciated from a study of Figure 5. Four distinct channels were cut through Marengo ridge by melt water from the ice which formed the moraines east of Marengo ridge.

During melting and soon after the last glacier melted and left its deposits, the wind deposited a thin, discontinuous blanket of silty material, or loess. A loess covering 2 to 3½ feet thick is common in upland areas west of Marengo ridge. On Marengo ridge and areas to the east, the loess cover is variable but is mostly less than 2 feet thick. A loess

cover usually occurs on more level, lower lying areas but is generally absent or very thin in sloping morainal areas.

The source of loess material is generally attributed to the floodplains of major rivers. Some of the loess in McHenry county may be of local origin, emanating from silt-covered outwash plains or stream floodplains. The outwash plain west and south of Hebron, for example, is possibly a local source for the loess cover on that portion of the Cary moraine east of Hebron. The loess on this moraine is thicker than on much of the Marengo and West Chicago moraines.

The loess in McHenry county is of Peorian (Wisconsinan glacial) age.

Mineral resources. McHenry county is not richly endowed with high-value mineral resources which favor industrial development. Gravel and sand are abundant throughout the county, occurring in both outwash and morainal areas (*2*). Several large commercial pits are in operation, particularly in Algonquin township, south and east of Crystal Lake (Fig. 6). In 1961 McHenry county led all counties in Illinois in the combined production of common sand and gravel. Production was estimated at approximately 3.9 million tons.[1] Many small gravel pits supply materials for local needs and occasionally for an individual farm. Frequently little or no overburden needs to be removed to expose usable gravel. Many of the pits are shown by symbols on the soil map.

Dolomitic limestone is quarried at one location in the county — section 31 of Marengo township (T.44N, R.5E). Nine miles directly north of the operating quarry are four, very small, inactive quarries, all in section 18 of Dunham township (T.45N, R.5E). Except for these minor areas in the extreme western part of the county, the thick mantle of glacial deposits restricts development of limestone resources (*20*).

Local clay materials were once used in

Commercial sand and gravel pits are common in the county, particularly in Algonquin township. (Fig. 6)

manufacturing brick and tile at a few locations in the county (*5*). Lack of good supplies of high-quality clay materials brought the industry to an early end. One clay products corporation, specializing in structural clay products, is currently operating. Local clay resources were used for a time by this company but materials presently used are shipped in from outside sources.

Deposits of peat or mixed peat and muck are excavated in limited amounts for commercial use. Supplies of these materials are relatively large.

Bog iron and marl deposits have been observed in small amounts.

Water resources. Ground-water resources of McHenry county are generally abundant. Demands for domestic and industrial uses are rapidly increasing, however, because of proximity to the Chicago metropolitan area. According to a comprehensive report on ground-water resources of the Chicago area, including McHenry county, ground water in the county is obtained from four well-defined aquifer systems (*31*). One system includes sand and gravel deposits of glacial drift; another includes shallow dolomite formations of bedrock. The remaining two are associated with formations found at increasing depths in the underlying bedrock.

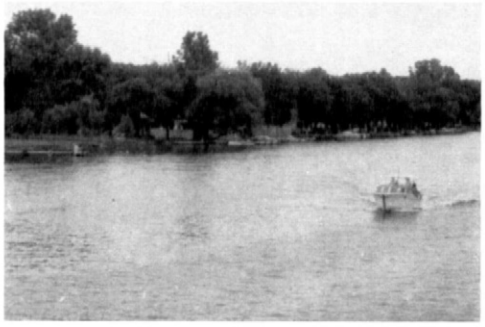
Municipal pumpage is largely from aquifers in glacial drift, with lesser amounts supplied by wells from aquifers in shallow dolomite or deep bedrock. In-

[1] Communication from Mineral Economics Group, Ill. State Geol. Surv.

dustrial pumpage is primarily from deep aquifers in the older rock formations.

Most farm wells are in coarse-textured glacial drift or in the upper part of the dolomitic bedrock formations of Silurian age. Numerous natural springs are widely distributed in glacial deposits and are used, along with small natural or artificial ponds and many flowing streams, as a supplemental water supply for livestock.

The larger natural and artificial lakes in McHenry county are used for recreation and serve as nuclei for residential developments. The Fox river area also provides recreation and is widely used for homesites (Fig. 7).



Fox river, looking south from the Johnsburg bridge. (Fig. 7)

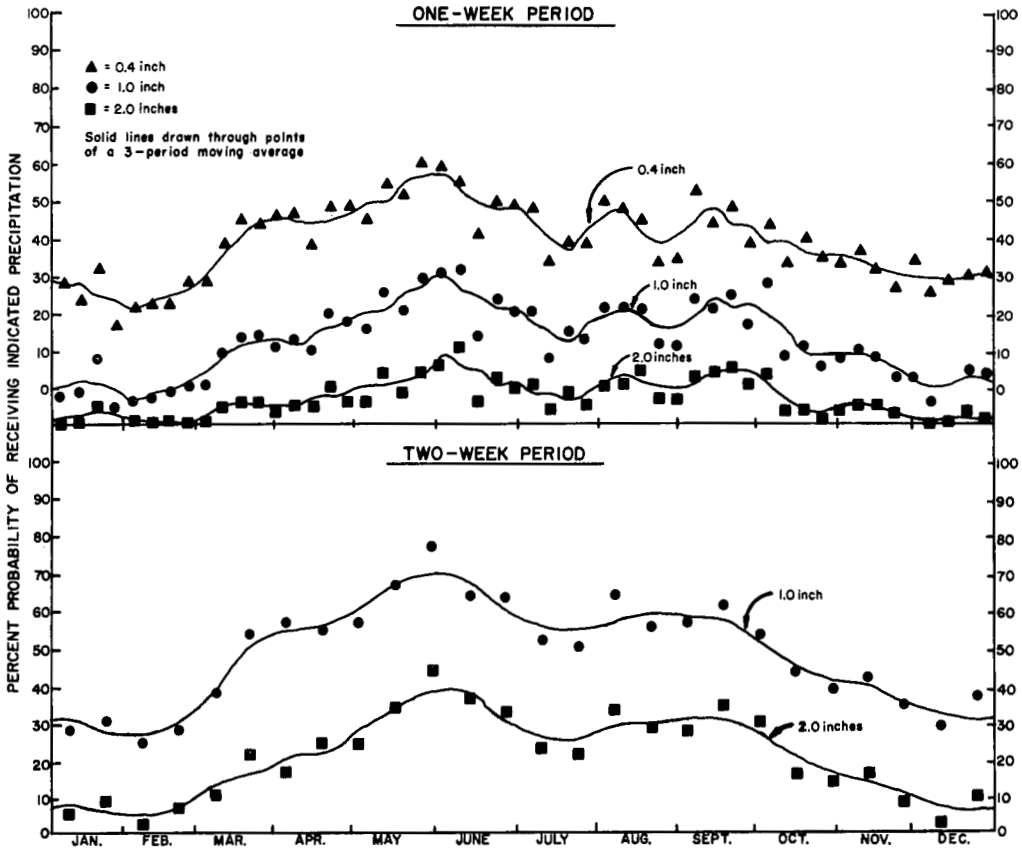
Climate. A continental climate typical of the north-central United States prevails in McHenry county. This includes a wide range in temperature between winter and summer and an irregularly distributed but usually abundant rainfall (Table 1 and Fig. 8). The relatively rapid interchange of low- and high-pressure systems brings frequent short-period changes in the weather.

At the Marengo weather station the highest recorded temperature was 109° F. in July 1936, and the lowest was -27° F. in February 1905. From 1931 through 1960, the average mean annual temperature was 49° F. The July mean maximum was 86° F. and the January mean minimum was 14° F. Approximately 85 percent of the days from December through March during this 30-year period had temperatures of 32° F. or lower; nearly one-third of the days in June, July, and August had temperatures of 90° F. or higher.

Table 1. — SELECTED TEMPERATURE AND PRECIPITATION DATA, McHENRY COUNTY[a]

Month	Temperature[b]				Precipitation			
	Mean daily max.	Mean daily min.	Highest recorded (71 yr.)	Lowest recorded (71 yr.)	Mean monthly total	1 yr. in 10 will be Less than	1 yr. in 10 will be More than	Mean monthly snowfall
	degrees Fahrenheit				*inches*			
January	31	14	62	−25	1.84	.7	3.0	8.7
February	33	16	73	−27	1.41	.3	2.0	6.1
March	43	25	81	−16	2.31	1.1	3.8	6.3
April	59	36	94	13	2.81	1.1	4.3	.8
May	71	47	107	26	3.55	1.2	6.1	0
June	81	57	107	32	3.89	2.1	5.8	0
July	86	61	109	42	3.43	1.4	5.4	0
August	84	60	108	37	3.35	1.6	5.0	0
September	76	52	103	24	3.13	.7	7.8	0
October	64	41	88	8	2.55	.8	5.6	T[c]
November	47	29	80	−17	2.15	.8	3.5	2.2
December	34	18	65	−26	1.81	.6	2.9	7.5
Year	59	38	109	−27	32.23	24.7	40.1	31.6

[a] Data are based on observations at Marengo, Illinois, for the period 1931 through 1960 (except for highest and lowest temperatures recorded).
[b] The mean daily temperature for any month can be computed by averaging the mean maximum and mean minimum temperatures.
[c] T = Trace.



Percent probability of receiving 0.4, 1.0, and 2.0 inches of rainfall during a 1-week period and of receiving 1.0 and 2.0 inches of rainfall during a 2-week period. Based on records of the Marengo weather station. (Fig. 8)

The average date of the last killing frost (32° F. or lower) in the spring is May 6 and the first in the fall is October 7. Thus the average frost-free growing season is 155 days. Because all crops are not seriously damaged at temperatures of 32° F., some probability occurrences of several threshold temperatures are shown in Table 2 (*22*).

From 1931 through 1962, total yearly precipitation at Marengo averaged 32.23 inches of water. The total was less than 25 inches during four years of this period but not less than 23 inches. Precipitation during the growing season (mid-April to mid-September) averaged about 17 inches.

Average yearly evapotranspiration in this region, most of which occurs during the growing season, is estimated at 26-27 inches of water (*33*). Thus for highest crop production, some subsoil moisture must be stored during the fall and early spring. Although major drouths are rare in McHenry county, moderately prolonged dry periods are common, somewhat reducing crop yields.

Short-lasting showers or thunderstorms account for most of the summer precipitation. Somewhat more than half of the 35 to 40 annual thunderstorms occur in June, July, and August (*19*).

On the average, less than one hailstorm occurs in any one place during June, July, and August, and less than two occur annually. Most hail falls between 2:00 and 8:00 p.m. Not all hailstorms have stones of sufficient size or quantity to cause extensive damage (*18*).

Table 2. — PROBABILITY OF GIVEN TEMPERATURES OCCURRING LATER IN SPRING OR EARLIER IN FALL THAN CERTAIN DATES[a]

Probability of later and earlier occurrence	32°F.	28°F.	24°F.	20°F.	16°F.
5 yr. in 10 later than (mean date)	May 6	Apr. 24	Apr. 6	Mar. 27	Mar. 17
2 yr. in 10 later than	May 11	May 2	Apr. 15	Apr. 7	Mar. 26
1 yr. in 10 later than	May 17	May 7	Apr. 20	Apr. 12	Mar. 31
1 yr. in 10 earlier than	Sept. 23	Oct. 1	Oct. 14	Oct. 29	Nov. 6
2 yr. in 10 earlier than	Sept. 27	Oct. 6	Oct. 21	Nov. 5	Nov. 11
5 yr. in 10 earlier than (mean date)	Oct. 7	Oct. 20	Nov. 3	Nov. 14	Nov. 22

[a] Data are based on records from Marengo, Illinois, for the years 1921 through 1960. Temperatures were taken in a standard U.S. Weather Bureau thermometer shelter that was about 5 feet above ground in a representative exposure. Colder temperatures will sometimes occur nearer the ground because of different types of soil or ground cover or they may occur in local low spots where cold air accumulates.

CULTURAL FEATURES OF McHENRY COUNTY

Organization and population. McHenry county was established by legislative act in 1836. Its present boundaries were set in 1839, when Lake county was formed. It was named for William McHenry, early pioneer, soldier in the War of 1812 and Blackhawk's war, and state legislator.

The first permanent white settlers entered the territory that is now McHenry county in 1834, settling at the present site of the town of Algonquin (*10*). In 1835 settlements were made in eastern Dorr township and at the present site of the town of Marengo. The census of 1840 indicated a county population of 2,578. Following Blackhawk's war the population increased rapidly and consistently. In 1960 the reported total population was 84,210 (Table 3). Woodstock, the largest town in the county, had a population of 8,897 in 1960.

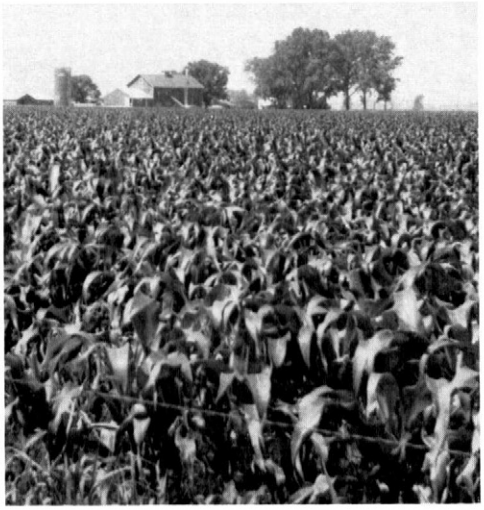
Transportation and industrial development. Facilities for transporting agricultural and industrial products, as well as commuters to and from Chicago, are well developed. Railroads and paved highways traverse the county in several directions with direct routes to Chicago and Rockford, Illinois, and Madison, Wisconsin. Nearly all secondary roads are covered with some form of all-weather surfacing, primarily gravel or blacktop. There are several small airports accommodating light planes.

Although few large mills, factories, or power plants are located in the county, small industries are numerous and varied. Some of their products include tools, dies, molds, jigs, castings, farm machinery, dairy barn equipment, packaging machinery, cartons for packaging, electronic equipment, plastics and plastic products, typewriters, and special metal

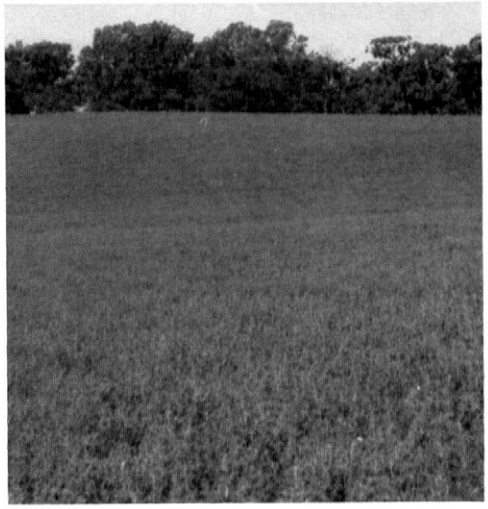
Table 3. — POPULATION OF McHENRY COUNTY AND OF THE FIVE LARGEST TOWNS IN THE COUNTY, 1910-1960[a]

County or town	1910	1920	1930	1940	1950	1960
McHenry county	32,509	33,164	35,079	37,311	50,656	84,210
Woodstock	4,331	5,523	5,471	6,123	7,192	8,897
Crystal Lake	1,242	2,249	3,732	2,094	2,899	5,432
Harvard	3,008	3,294	2,988	3,121	3,464	4,248
Marengo	1,936	1,758	1,948	2,034	2,726	3,568
McHenry	1,031	1,146	1,354	1,596	2,080	3,336

[a] U. S. Census.



Corn is the most important crop in the county. It is well adapted to level areas of medium-textured outwash, such as this field of Drummer silty clay loam in Dunham township. (Fig. 9)



Alfalfa, alone or in mixtures, is grown extensively and provides excellent hay and pasture. When grown on sloping land, alfalfa helps control erosion. (Fig. 10)

products. Milk processing plants are located throughout the county.

New housing construction is important, particularly near small lakes and along Fox river.

Agriculture. Corn is the most important crop and dairying is the most important livestock enterprise in McHenry county (Figs. 1 and 9). Of the 216,000 acres devoted to crops in 1960, corn was grown on 116,000 acres, alfalfa on 45,300, oats on 30,900, and soybeans on 13,600 (Fig. 10). The combined value of these and all other grain and hay crops for that year was $11,200,000.

The trend in numbers of livestock and chickens, according to U.S. Census figures for 1910 through 1960, are given in Table 4. Dairy cow numbers were at a peak in 1910 and about 1940 and lowest in 1960. The number of cattle other than dairy cows was lowest in 1940, showing an increase since then and reaching a peak in 1960. Hog numbers increased since 1930 but chicken numbers declined. The number of horses and mules dropped sharply between 1920 and 1930 and between 1940 and 1950. According to the Illinois Cooperative Crop Reporting Service, the total farm inventory value of all livestock on January 1, 1961, was $14,411,000.

Table 4. — LIVESTOCK AND CHICKENS ON McHENRY COUNTY FARMS, 1910-1960[a]

Kind of animal	1910	1920	1930	1940	1950	1960
Dairy cows	50,726	47,219	37,160	47,351	42,172	33,937
Other cattle	27,251	21,203	23,780	15,431	27,369	38,248
Hogs	35,702	30,295	20,094	20,121	34,391	48,365
Sheep	6,828	3,759	6,406	3,060	2,967	4,320
Horses and mules	15,450	15,511	9,634	9,049	3,041	1,232
Chickens	246,114	276,628	293,249	224,313	207,112	147,059

[a] U. S. Census.

HOW TO USE THE SOIL REPORT AND SOIL MAP

Examine the soil map. The soil map of McHenry county consists of eight sheets. The part of the county covered by each sheet is shown on the back of the sheet.

General soil characteristics are indicated by broad color groupings on the map. Shades of yellow, orange, and pink generally indicate light-colored, well-drained soils developed under forest vegetation. Shades of blue, green, and purple are used for dark-colored, well-drained to poorly drained soils developed under prairie vegetation. The bottomland soils, excluding organic soils, are also shown in green. Shades of dark brown and dark purple primarily indicate the very dark-colored mineral soils which are naturally poorly drained. Gray colors are used for the organic soils (peat and muck) which are naturally very poorly drained.

Uncolored places on the map indicate areas occupied by water or areas where man has removed or destroyed the natural soil. The latter include gravel pits, borrow pits, and other stripped or graded areas. The few small areas of bog-iron accumulation are also uncolored.

Each soil type is shown on the map by a distinctive color and number. The same color and number are used for all areas of a given soil type. The soil type names, soil type numbers, and other map symbols are given in the legend on each map sheet. Four of the map units are not individual soil types but are complexes of two soil types, indicating that separation was not feasible in certain areas. Where an area is too small to accommodate a soil type number, the number is put outside the area and connected to it with a line or a single letter symbol is used instead of a number.

During the field mapping, soil type areas were subdivided into many smaller units based on significant differences in slope and thickness of the surface and subsurface, or A horizon. These subdivisions are neither discussed in this report nor shown on the accompanying soil map. They are, however, shown on the soil map supplied the farmer in his individual management folder (*27*). The subdivisions affect productivity and should be considered in making soil-management and land-use decisions.

To help find a particular tract of land, many cultural features such as roads, railroads, towns, and farmhouses are indicated. Section boundaries, section numbers, township and range numbers, and physical features such as streams and lakes are also shown. The cultural features shown were those existing in 1955, the year the field mapping was completed. Since then many changes in roads, houses, and boundaries of populated areas have occurred.

Study the characteristics of the soils. After you have located the tract of land in which you are interested and have identified the soil types on it, turn to the index, page 130, to find where the soil types are described.

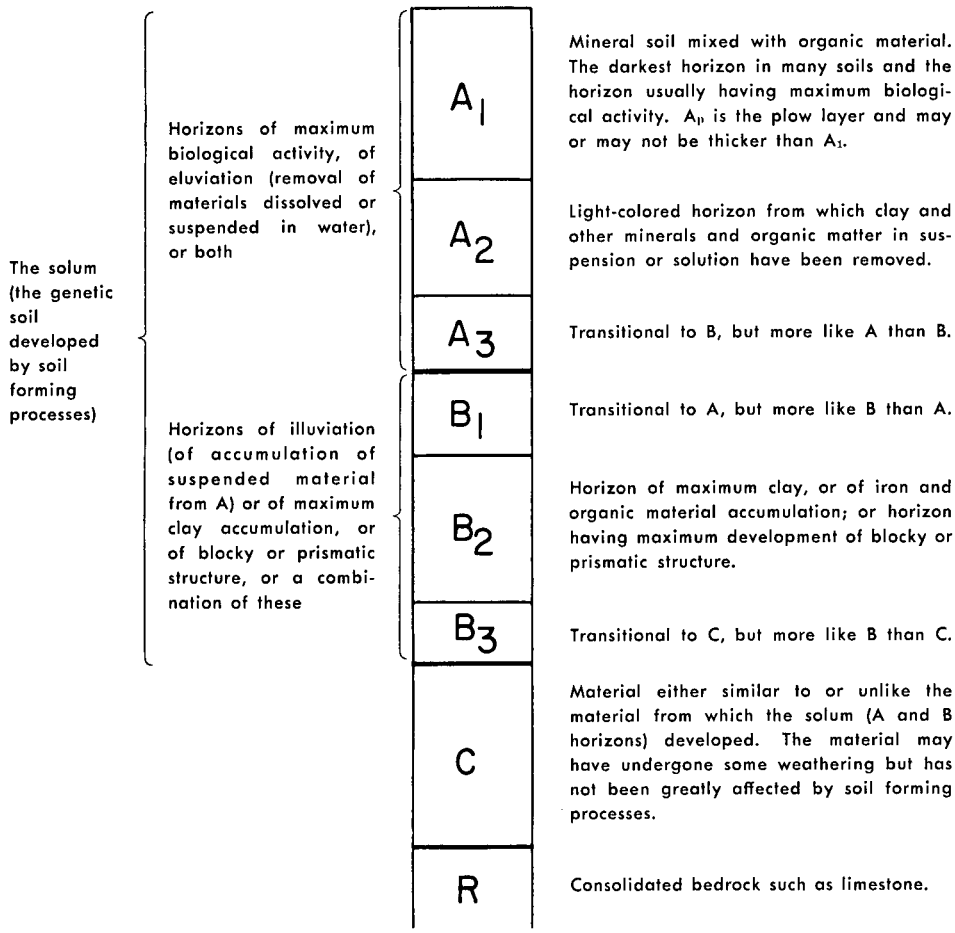
In studying soil types and soil type descriptions it is important to note that soils are usually separated on the basis of their characteristics to depths of 3 or more feet, not on the plowed layer or surface few inches alone. The surface of one soil type is frequently little or no different from that of another, and yet the two types may differ so greatly in the subsoil or substratum that they vary widely in many specific uses and in agricultural value. The nature of the subsoil and substratum is especially important in determining the drainability and moisture-supplying ability of most soils.

Soils in McHenry county, except those of very recently deposited sediments such as the bottomlands, are made up of several layers called horizons. These soil horizons lie approximately parallel to the earth's surface and were formed in

place through weathering of parent material. A vertical section of a soil through all its horizons, extending into the unweathered parent material below and including such other underlying material that is significant to the use or management of the soil or to plant growth, is known as a soil profile (Fig. 11). That portion of the soil profile in which the processes of soil formation are primarily taking place (A and B horizons) is known as the solum.

Most McHenry county soils have three major horizons — A, B, and C. A few have only A and C horizons. Bottomland soils, organic soils, and some of the upland soils occurring mainly in small depressions receive recent washed-in sediments and therefore do not have distinct horizons. Thus the A-B-C system is difficult to apply to these soils and contrasting layers are designated numerically.

Three major horizons and several subhorizons of a soil in McHenry county are shown in Figure 12. The relationship of the letter designations of horizons to the general horizon terms commonly

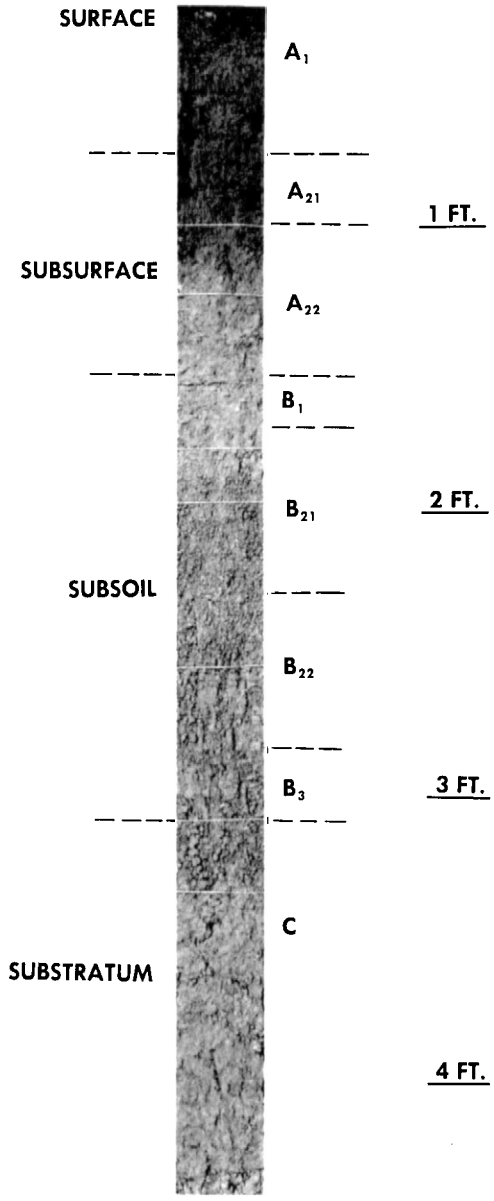


Principal horizons of upland soils. Not every horizon shown here, however, is necessarily present in all soils. (Adapted from *Nomenclature of soil horizons*, U.S. Dept. Agr. Handbook 18, pp. 174-183. 1951). (Fig. 11)

used — surface, subsurface, subsoil, and substratum — are also indicated. Roman numerals are prefixed to horizon designations to indicate changes in lithology in the soil profile. The uppermost material is not numbered because Roman numeral I is understood. Other contrasting materials are numbered II, III, and so on, consecutively with depth (*34*).

The letter g is sometimes used to indicate horizons that are predominantly gray because of gleying. The letter b indicates buried soil horizons which are important to plant growth.

In studying the characteristics of various soils, it is necessary to understand that each soil type includes a range in properties and that the boundaries between soil types are not necessarily sharp. Rather broad gradational zones may occur between some types even though these boundaries are shown as lines on the soil map.



This profile of Millbrook silt loam, from Section 6 of Dunham township, shows the major soil horizons as well as a few subhorizons. General horizon terms are given at left and technical letter designations at right. (Fig. 12)

Descriptions of McHenry county soils begin on page 19.

Table 5. — McHENRY COUNTY SOILS: ARRANGED ACCORDING TO PARENT MATERIALS, NATIVE VEGETATION, B HORIZON DEVELOPMENT, AND NATURAL DRAINAGE CLASS

Parent material of soil profile (solum and underlying materials)	Soil assoc. area[a]	Native[b] vegetation	Degree[c] of B horizon development	Natural drainage class						
				Excessive	Somewhat excessive	Well	Moderately well	Imperfect	Poor	Very poor
About 12″ or less silty to loamy material on calcareous loamy gravel drift	A + B	P. or F.	Weak	Rodman (93)						
Between 12 and 24″ silt loam or loam material on calcareous loamy gravel drift	A	Prairie	Weak to moderate		Lorenzo (318)					
	B	Forest	Weak to moderate		Casco (323)					
Between 24 and 42″ silt loam or loam material on calcareous loamy gravel drift	A	Prairie	Moderate		←	Warsaw (290)		Kane (343)	Will (329)	
	B	Forest	Moderate		←	Fox (327)				
	A + B	P.-F.	Moderate		←	Dresden (325)		Matherton (342)		
<12″ loess on sandy loam till, calcareous <18″	D	F. or P.-F.	Weak		Hennepin (25)	→				
<12″ loess on sandy loam till, calcareous between 18 and 40″	C	Prairie	Moderate			Griswold (363)				
	D	Forest	Moderate			Lapeer (361)				
12-36″ loess on sandy loam till, calcareous between 30 and 50″	C	Prairie	Moderate			Ringwood (297)	→		Drummer (152)[d]	
	D	Forest	Moderate			McHenry (310)	→			
	C + D	P.-F.	Moderate			Nippersink (299)	→			
30-40″ loess on sandy loam till, calcareous >42″	C	Prairie	Moderate					Elburn (198)	Drummer (152)	
	C + D	P.-F.	Moderate					Virgil (104)		
<12″ loess on loam till, calcareous <18″	F	F. or P.-F.	Weak		Hennepin (25)	→				
<18″ loess on loam till, calcareous <24″	E	Prairie	Moderate			LaRose (60)				
	F	Forest	Moderate			Strawn (224)				
<24″ loess on loam till, calcareous between 24 and 42″	E	Prairie	Moderate			Saybrook (145)	Saybrook (145)			
	F	Forest	Moderate			Miami (24)				
	E + F	P.-F.	Moderate			Montmorenci (57)	Montmorenci (57)			
20-36″ loess on loam till, calcareous between 24 and <42″	E	Prairie	Moderate					Lisbon (59)	Drummer (152)[d]	Peotone (330)[d]
	E + F	P.-F.	Moderate					Herbert (62)		
18–42″ sandy loam or loamy sand on loam till, calcareous 24–48″	F	Forest	Moderate		←	Metea (205)				

Table 5. — Continued

Parent material of soil profile (solum and underlying materials)	Soil assoc. area[a]	Native[b] vegetation	Degree[c] of B horizon development	Natural drainage class						
				Excessive	Somewhat excessive	Well	Moderately well	Imperfect	Poor	Very poor
18–40″ loess on loam (some sandy loam) till, calcareous >42″	G	Prairie	Moderate			Sidell (55)	Dana (56)		Drummer (152)	
	H	Forest	Moderate			Russell (322)	Xenia (291)			
	G + H	P.-F.	Moderate				Wingate (348)	Toronto (353)		
24–50″ loess and weathered loam till over limestone bedrock	G	Prairie	Moderate				Plattville (220) →			
<24″ loess on silty clay loam till, calcareous 20–42″	I	Prairie	Moderate			Varna (223)	Varna (223)	Elliott (146)	Ashkum (232)[d]	Peotone (330)[d]
	J	Forest	Moderate			Morley (194)	Morley (194)	Blount (23)		
	I + J	P.-F.	Moderate				←	Beecher (298)		
<24″ loess or loam to sandy loam deposits on silty clay to clay till or lacustrine sediments, calcareous <36″	J	Forest	Moderate				←	Eylar (228)		
Sandy loam on sand (outwash), noncalcareous >40″	O	Prairie	Weak		Sumner (87)					
	N + O	Prairie	Moderate		←	Onarga (150)		Ridgeville (156)		
	..	Forest	Moderate		←	Alvin (144)				
Loam 40 to 60″ thick on sand (outwash), noncalcareous >40″	N	Prairie	Weak			Lomax (265) →				
	N + O	Prairie	Moderate					LaHogue (102)	Selma (125)	Selma (125)
Loam and silt loam on sand (outwash), calcareous at surface	O	Prairie	Weak					←	Harpster (347)	
Loam and silt loam 24 to 42″ thick on sand and fine gravel (outwash), noncalcareous >40″	N	Prairie	Moderate		←	Volinia (79)				
	N	Forest	Moderate		←	Ellison (137)				
	N	P.-F.	Moderate		←	Dowagiac (346)				
12–36″ loess on medium-textured outwash to 60″, noncalcareous >40″	K	Prairie	Moderate			Proctor (148)	Proctor (148)	Brenton (149)	Drummer (152)	Peotone (330)
	M	Forest	Moderate			Camden (134)	Camden (134)	Starks (132)		
	K + M	P.-F.	Moderate			Harvard (344)	Harvard (344)	Millbrook (219)		
12–36″ loess on medium-textured outwash, calcareous at surface	K	Prairie	Weak						Harpster (67)	
	K	Prairie	Weak					←	Harpster (347)	

[a] Letters refer to soil association on general soil map, page 104. Only main associations are indicated; many soils occur in several areas. Where no designation is made, the soil occurs in very small delineations in several association areas.

[b] P. = prairie (including marsh vegetation); F. = forest. For areas of recently deposited sediments in bottomlands or depressions, where native vegetation has not been a factor, P. indicates dark-colored materials, P.-F. indicates moderately dark-colored materials, and F. indicates light-colored materials.

[c] Degree of B horizon development is based primarily on clay accumulation. Weak = little or no textural B or a moderate B <8–10″ thick; moderate = definite clay accumulation in addition to that in parent material; strong = considerable clay accumulation in addition to that in parent material. Some Humic-Gley (poorly and very poorly drained) soils show less development than associated soils on higher ground (shown on the same line in table), but may be formed in finer textured parent materials.

[d] Carbonates in some Drummer, Ashkum, and Peotone soils are often deeper than in associated soils on higher ground.

(Table is concluded on next page.)

Table 5. — Concluded

Parent material of soil profile (solum and underlying materials)	Soil assoc. area[a]	Native[b] vegetation	Degree[c] of B horizon development	Natural drainage class						
				Excessive	Somewhat excessive	Well	Moderately well	Imperfect	Poor	Very poor
Mineral soils occurring primarily in closed depressions in till and outwash areas	..	Prairie	Weak				Troxel (197)	Troxel (197)		Peotone (330)
	..	Prairie	Moderate					Knight (191)	Knight (191)	
	..	Prairie	Strong						Thorp (206)	
	..	Forest	Weak				Pistakee (364)	Pistakee (364)		
	..	P. or F.	Weak						Washtenaw (296)	Washtenaw (296)
15–40″ of mineral material over muck or peat	..	P. or F.	Weak						Wallkill (292)	Wallkill (292)
Medium-textured alluvium, noncalcareous	P	Prairie	Weak						Otter (76)	Otter (76)
Medium-textured alluvium, calcareous	P	Prairie	Weak						Millington (82)	Millington (82)
Noncalcareous muck on peat	Q	Prairie	Weak							Houghton (103)
Noncalcareous peat	Q	Prairie	Weak							Houghton (97)
Calcareous muck on peat	Q	Prairie	Weak							Lena (210)
Burned organic material	Q	Prairie	Weak							L. b. muck (358)

[a] Letters refer to soil association on general soil map, page 104. Only main associations are indicated; many soils occur in several areas. Where no designation is made, the soil occurs in very small delineations in several association areas.

[b] P. = prairie (including marsh vegetation); F. = forest. For areas of recently deposited sediments in bottomlands or depressions, where native vegetation has not been a factor, P. indicates dark-colored materials, P.-F. indicates moderately dark-colored materials, and F. indicates light-colored materials.

[c] Degree of B horizon development is based primarily on clay accumulation. Weak = little or no textural B or a moderate B <8–10″ thick; moderate = definite clay accumulation in addition to that in parent material; strong = considerable clay accumulation in addition to that in parent material. Some Humic-Gley (poorly and very poorly drained) soils show less development than associated soils on higher ground (shown on the same line in table), but may be formed in finer textured parent materials.

DESCRIPTIONS OF McHENRY COUNTY SOILS

The soil types in McHenry county are discussed in numerical order on the following pages. Soil type numbers correspond to those used on the colored map at back and in the tables.

Profile characteristics are shown by means of a generalized drawing and a description of a representative specific profile. Important variations or inclusions are mentioned.

Drawings show only the major soil horizons of the accompanying descriptions, not all possible variations. As discussed on page 14, horizons are designated by letters or numbers. Thickness of surface or A horizons are for areas that have not been seriously eroded. Munsell color notations[1] and consistence are for moist soils.

A key to McHenry county soils, showing major differences between and similarities among the soil types, is given in Table 5. Table 6 shows the area of each type or complex in the county. Tables 7 and 8 and 10 through 27 present some physical and chemical properties of selected soil types. Particle size data in these tables are given as determined and do not always equal 100 percent. Estimated yields of the principal field crops grown under a high level of management are given in Table 32 for each soil type.

[1] These notations refer to soil color standards developed by the Munsell Color Company, Inc. The notations consist of three variables: hue, value, and chroma. In the notation 10YR 4/2, for example, the hue is denoted by the 10YR (YR = yellow-red), the value by the 4, and the chroma by the 2. Hue is the dominant spectral (rainbow) color and is related to the dominant wave length of the reflected light. Value refers to the relative lightness of color and is a function of the total amount of light. Chroma is the relative purity or strength of the spectral color.

Table 6. — AREAS OF SOIL TYPES AND COMPLEXES IN McHENRY COUNTY

Type No.	Type name	Area in square miles	Area in acres	Percent of total area
23	Blount silt loam	1.99	1,271	.32
24	Miami silt loam	24.44	15,639	4.00
25	Hennepin loam	.57	366	.09
55	Sidell silt loam	.35	227	.06
56	Dana silt loam	1.00	643	.16
57	Montmorenci silt loam	3.81	2,440	.62
59	Lisbon silt loam	9.68	6,197	1.58
60	LaRose silt loam	4.30	2,751	.70
62	Herbert silt loam	2.74	1,756	.45
67	Harpster silty clay loam	9.43	6,037	1.54
76	Otter loam, bottom	14.18	9,077	2.32
79	Volinia silt loam to loam	13.40	8,574	2.19
82	Millington loam, bottom	7.29	4,667	1.19
87	Sumner sandy loam	2.21	1,412	.36
93	Rodman gravelly loam	2.49	1,590	.41
93-318	Rodman-Lorenzo complex	2.07	1,327	.34
93-323	Rodman-Casco complex	12.73	8,148	2.08
97	Houghton peat	2.75	1,760	.45
102	LaHogue loam	5.55	3,549	.91
103	Houghton muck	24.04	15,387	3.93

(Table is concluded on next page.)

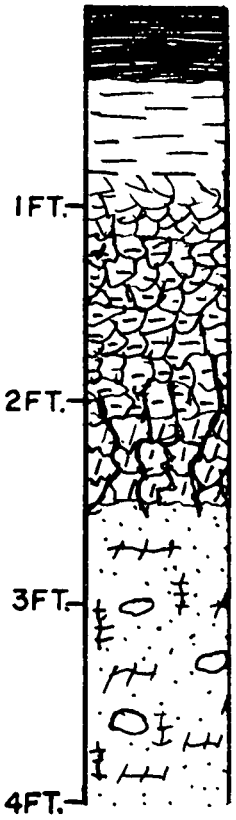
Table 6. — Concluded

Type No.	Type name	Area in square miles	Area in acres	Percent of total area
104	Virgil silt loam	3.78	2,418	.62
125	Selma loam	4.15	2,655	.68
132	Starks silt loam	3.16	2,021	.52
134	Camden silt loam	12.23	7,826	2.00
137	Ellison silt loam to loam	3.07	1,963	.50
144	Alvin sandy loam	.98	627	.16
145	Saybrook silt loam	22.04	14,104	3.61
146	Elliott silt loam	4.73	3,025	.77
148	Proctor silt loam	22.60	14,466	3.70
149	Brenton silt loam	23.20	14,847	3.80
150	Onarga sandy loam	1.44	924	.24
152	Drummer silty clay loam	65.49	41,912	10.72
156	Ridgeville sandy loam	1.39	890	.23
191	Knight silt loam	.60	383	.10
194	Morley silt loam	3.19	2,044	.52
197	Troxel silt loam	2.95	1,890	.48
198	Elburn silt loam	9.40	6,017	1.54
205	Metea sandy loam	1.63	1,044	.27
206	Thorp silt loam	2.34	1,499	.38
210	Lena muck	7.75	4,961	1.27
219	Millbrook silt loam	11.06	7,079	1.81
220	Plattville silt loam	.13	85	.02
223	Varna silt loam	2.73	1,746	.45
224	Strawn silt loam	15.50	9,919	2.54
228	Eylar silt loam	.59	379	.10
232	Ashkum silty clay loam	3.54	2,265	.60
265	Lomax loam	6.27	4,012	1.03
290	Warsaw silt loam to loam	21.04	13,463	3.44
290-318	Warsaw-Lorenzo complex	2.24	1,432	.37
291	Xenia silt loam	7.41	4,741	1.21
292	Wallkill silt loam	.24	151	.04
296	Washtenaw silt loam	.56	361	.09
297	Ringwood silt loam	31.41	20,100	5.14
298	Beecher silt loam	.66	421	.11
299	Nippersink silt loam	5.42	3,466	.89
310	McHenry silt loam	24.18	15,473	3.96
318	Lorenzo silt loam to loam	7.83	5,010	1.28
322	Russell silt loam	3.08	1,974	.50
323	Casco silt loam to loam	9.80	6,272	1.60
325	Dresden silt loam to loam	5.79	3,707	.95
327	Fox silt loam to loam	19.17	12,268	3.14
327-323	Fox-Casco complex	8.12	5,197	1.33
329	Will silty clay loam	5.02	3,215	.82
330	Peotone silty clay loam	2.76	1,763	.45
342	Matherton silt loam to loam	.71	457	.12
343	Kane silt loam to loam	6.45	4,128	1.06
344	Harvard silt loam	6.08	3,888	.99
346	Dowagiac silt loam to loam	1.20	766	.20
347	Harpster silt loam to loam	11.74	7,513	1.92
348	Wingate silt loam	1.57	1,007	.26
353	Toronto silt loam	1.12	716	.18
358	Loamy burned muck	.21	137	.03
361	Lapeer loam	27.91	17,865	4.57
363	Griswold loam	6.67	4,268	1.09
364	Pistakee silt loam	.80	511	.13
L. Q.	Limestone quarry	.06	39	.01
G. P.	Gravel pit	2.58	1,652	.42
M. L.	Made land and borrow pit	1.00	643	.16
Water		7.21	4,617	1.18
	Total	611.00	391,040	100.00

Blount silt loam (23)

Blount silt loam is a light-colored upland soil developed under forest vegetation from a thin covering of loess (usually less than 2 feet) over silty clay loam till. Calcareous till normally occurs at depths of 2 to 3½ feet. Blount occurs mainly on slopes ranging from about 1 to 5 percent in association with Morley (194), Beecher (298), and

Representative profile, Blount silt loam



A_1 (0-4″) — A_1. Very dark grayish-brown (10YR 3/2) friable silt loam; moderate, medium crumb structure; slightly acid; clear smooth boundary.

A_2 (4-10″) — A_2. Grayish-brown to brown (10YR 5/2-5/3) friable silt loam; weak, medium platy structure; medium to strongly acid; clear smooth boundary.

B_1 (10-14″) — B_1. Dark brown to brown (10YR 4/3) firm silty clay loam with common, fine, faint yellowish-brown (10YR 5/6) mottles; moderate, fine subangular blocky structure; strongly acid; clear smooth boundary.

IIB_2 (14-25″) — IIB_2. Mixed dark grayish-brown, dark brown, and brown (10YR 4/2, 4/3, and 5/3) firm, light silty clay with common, fine, faint yellowish-brown (10YR 5/6) mottles; strong, medium subangular to angular blocky structure; strongly to medium acid; clear smooth boundary.

IIB_3 (25-30″) — IIB_3. Mottled dark grayish-brown, dark brown, brown, and yellowish-brown (10YR 4/2, 4/3, 5/3, and 5/6) firm, heavy silty clay loam; moderate, coarse angular blocky structure; slightly acid to neutral; clear smooth boundary.

IIC (30-40″+) — IIC. Mottled dark grayish-brown, grayish-brown, brown (10YR 4/2, 5/2, 5/3), and light brownish-gray (2.5Y 6/2) firm silty clay loam till with some pebbles; massive to weak, coarse angular blocky structure; calcareous.

Table 7. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF BLOUNT SILT LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p	0–7	2.7	22.2	53.5	19.0	5.6	2.3	.09	.33	10.0	84	5.3	1.99
A_2	7–10	19.5	23.7	52.7	20.9	5.0	1.7	.17	.19	8.2	84	5.1	.60
B_1	10–13	27.7	21.8	39.4	35.5	6.9	3.7	.13	.26	14.4	76	4.9	.51
B_{21}	13–19	1.6	10.6	36.0	50.2	8.6	5.7	.18	.37	18.0	77	4.7	.49
B_{22}	19–25	.9	9.3	40.0	47.7	11.8	6.7	.20	.33	16.0	100+	6.4	.56
C	31–37	2.4	10.6	53.9	34.9	...[d]	...	...	...	...	...	7.8	.47

[a] Will county, T.34N., R.14E., Sec. 24, SW ¼, SE 40, NW 10 acres. [b] Data from J. D. Alexander (*1*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm. [d] Not determined.

Ashkum (232). It is an imperfectly drained soil, but includes a few moderately well-drained areas on the steeper slopes. It is most extensive in the southwestern half of Dorr township, restricted primarily to the northern portion of the Marseilles moraine (Fig. 5). Some physical and chemical properties of Blount silt loam are given in Table 7.

Blount is low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high but permeability is moderately slow to slow. Drainage is needed on level and gently sloping areas. Water movement to tile is moderately slow, and shallow ditches may remove surface water more effectively. Sloping areas will erode if intensively cultivated without erosion-control measures. Legumes, grasses, and small grains are better adapted than corn. Productivity is about medium in uneroded, fertilized areas.

Miami silt loam (24)

Miami silt loam is a light-colored soil developed under forest vegetation. It is a well-drained soil but a few moderately well-drained areas are included. It occurs mainly on upland slopes ranging from about 1 to 10 percent. Parent material is a thin covering of loess over loam or silt loam till. Loess cover varies from none in eroded areas to about 2 feet in more level, uneroded areas. Calcareous till normally occurs at depths between 2 and 3½ feet. Miami is the predominant soil on Marengo ridge (Fig. 5). It is associated with many soils of similar parent material, including Strawn (224), Montmorenci (57), Herbert (62), Lisbon (59), and Saybrook (145).

Some chemical and physical properties of Miami silt loam are given in Table 8. The data were obtained from the same profile described here. At two other Miami sites in the county the cation-exchange capacity of the surface 6 inches (plow layer) was approximately 13 me./100 gm. of soil. This value compares favorably with the 13.9 me./100 gm. of soil for the A_1 horizon given in Table 8. Table 9 gives some data on the percent of total and extractable iron found in selected horizons of the Miami profile described here. Iron influences profile color.

Miami is low in organic matter, medium to very strongly acid, low in available

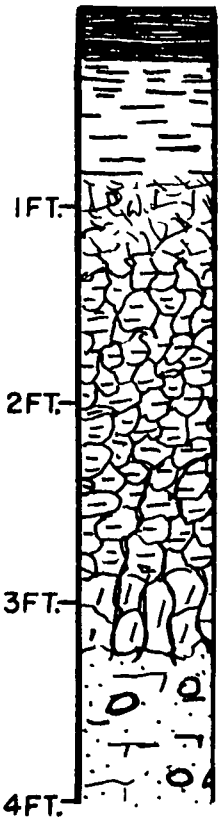
Table 8. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF MIAMI SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–3	...[c]	31.3	51.4	10.4	6.1	1.6	.67	.27	13.9	62	5.9	3.32
A_{21}.....	3–5	...	33.6	64.9	9.2	.1	2.0	.07	.10	6.6	34	4.9	1.13
A_{22}.....	5–10	...	33.2	55.8	9.8	.1	1.3	.14	.09	5.0	32	5.1	.56
B_1.....	10–15	...	33.7	48.4	16.9	2.2	2.3	.06	.14	8.4	55	5.0	.43
IIB_{21}...	15–22	...	35.4	35.2	28.5	4.1	4.4	.09	.28	14.7	60	5.0	.51
IIB_{22}...	22–28	...	39.4	30.8	29.6	4.9	5.1	.10	.30	15.4	67	5.1	.37
...	28–34	...	40.7	28.1	30.6	6.2	6.0	.13	.31	15.2	83	5.4	.38
IIB_3....	34–39	...	46.2	29.6	24.3	...	...	...	...	...	...	7.4	...
IIC....	39–54+	...	47.3	35.5	17.3	...	...	...	...	...	...	7.7	...

[a] McHenry county, T.44N., R.5E., Sec. 12, NE ¼, NE 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. A high percentage of Miami areas have been cleared and are used as cropland. Some areas are presently supporting native trees. Miami responds well to good management. Productivity is moderately high if the soil is properly fertilized and sloping areas are protected against erosion.

Representative profile, Miami silt loam



A_1 (0-3″) — A_1. Very dark brown (10YR 2/2) friable silt loam; moderate, fine crumb structure; medium acid; clear smooth boundary.

A_{21} (3-5″) — A_{21}. Grayish-brown to brown (10YR 5/2-5/3) friable silt loam; moderate, thin platy structure; very strongly acid; clear smooth boundary.

A_{22} (5-10″) — A_{22}. Grayish-brown to pale brown (10YR 5/2-6/3) friable silt loam; moderate, medium platy structure; strongly to very strongly acid; clear smooth boundary.

B_1 (10-15″) — B_1. Dark brown to brown (7.5YR 4/4-5/4) firm silty clay loam; moderate, very fine subangular blocky structure; strongly to very strongly acid; clear smooth boundary.

IIB_{21} (15-22″) — IIB_{21}. Dark reddish-brown to reddish-brown (5YR 3/4-4/4) firm silty clay loam to clay loam; moderate, fine subangular blocky structure; strongly to very strongly acid; clear smooth boundary.

IIB_{22} (22-34″) — IIB_{22}. Dark reddish-brown (5YR 3/4) firm clay loam; moderate, medium subangular blocky structure; strongly to very strongly acid; clear smooth boundary.

IIB_3 (34-39″) — IIB_3. Dark reddish-brown (5YR 3/4) firm clay loam; weak, coarse subangular blocky structure; mildly alkaline with a few limestone pebbles; clear wavy boundary.

IIC (39-54″+) — IIC. Reddish-brown (5YR 4/4) friable, heavy loam glacial till; massive; calcareous.

The B_2, B_3, and C horizons of this profile are formed in more reddish glacial till than those of Miami soils in most other areas in Illinois.

Table 9. — TOTAL AND EXTRACTABLE IRON EXPRESSED AS FERRIC OXIDE IN SELECTED HORIZONS OF MIAMI SILT LOAM[a]

Horizon	Depth	Total Fe_2O_3			Extractable Fe_2O_3 (total sample)
		Sand	Silt	Clay	
	in.	*pct.*	*pct.*	*pct.*	*pct.*
B_1	10–15	.97	1.51	6.30	1.02
IIB_{21}	15–22	.86	1.66	7.25	1.54
IIB_{22}	22–28	.76	1.61	7.60	1.58
IIB_3	34–39	.76	1.78	6.85	1.25
IIC	39–54+	.67	1.21	6.47	.85

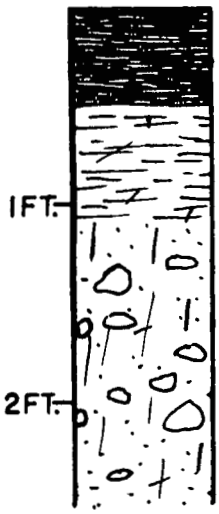
[a] Data from G. F. Hall (*14*).

Hennepin loam (25)

Hennepin loam is a light-colored to moderately dark upland soil developed under forest vegetation from loam and sandy loam glacial till with little or no loess cover. It is well drained to somewhat excessively drained and occurs mainly on slopes greater than 10 percent. It has a very thin solum, usually lacking a textural B horizon. The surface is often eroded where cultivated, leaving calcareous till at or near the surface (Fig. 13). Hennepin is not an extensive soil in the county. It is found primarily in areas of sandy loam till in association with Lapeer (361) and McHenry (310). In areas of loam till it is associated with Strawn (224) and Miami (24).

Hennepin is low in organic matter, neutral to calcareous, low in available phosphorus, and about medium in available potassium. It has moderate to moderately rapid permeability. Moisture-holding capacity is medium to low. Erosion is a serious problem on this soil. Most areas should be used for permanent pasture or woodland. Where slopes can be seeded, forage crops will produce good yields under proper management.

Representative profile, Hennepin loam



A_1 (0-6″)	A_1. Very dark grayish-brown (10YR 3/2) friable loam; weak, fine crumb structure; neutral; clear smooth boundary.
B (6-13″)	B. Dark yellowish-brown (10YR 3/4-4/4) friable, light loam; weak, fine crumb structure; neutral; clear smooth boundary.
C (13-40″+)	C. Yellowish-brown (10YR 5/4) and light yellowish-brown (10YR 6/4) loose sandy loam till; massive; calcareous.

A small knob of Hennepin loam on which calcareous till is exposed, causing a nutrient imbalance and low moisture-holding capacity. The surrounding area, also in corn, is composed primarily of Lapeer, McHenry, and Virgil soils. (Fig. 13)

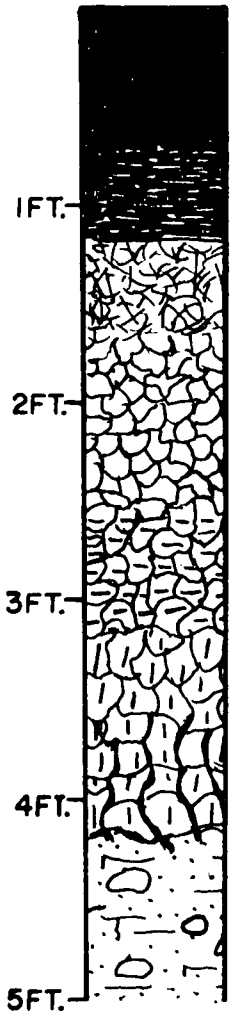
Sidell silt loam (55)

Sidell silt loam is a dark, well-drained upland soil developed under prairie vegetation. It occurs on slopes ranging from 1 to 6 percent, but most areas have slopes of less than 4 percent. Parent material is 1½ to 3½ feet of loess on till with the solum extending into the till. Calcareous loam till occurs below a depth of 3½ feet. Most

areas of Sidell silt loam are in the west-central part of Riley township. One small area occurs in section 3 of Dunham township. Associated soils are Saybrook (145), Dana (56), and Drummer (152). Sidell is similar to Saybrook but has a thicker solum.

Sidell is high in organic matter, about medium acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. Erosion is a hazard on the sloping areas. Productivity is very high under proper management.

Representative profile, Sidell silt loam



A_1 (0-8″)	A_1. Very dark brown (10YR 2/2) friable silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.
A_3 (8-14″)	A_3. Dark brown (10YR 3/3) friable silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.
B_1 (14-20″)	B_1. Dark yellowish-brown (10YR 4/4) slightly firm, light silty clay loam; weak, fine subangular blocky structure; medium acid; clear smooth boundary.
B_{21} (20-30″)	B_{21}. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) firm silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.
IIB_{22} (30-38″)	IIB_{22}. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) firm, gritty silty clay loam to clay loam; moderate, medium subangular blocky structure; medium acid; gradual smooth boundary.
IIB_3 (38-50″)	IIB_3. Dark brown to brown (7.5YR 4/4-5/4) firm clay loam; weak, coarse subangular blocky structure; slightly acid; clear wavy boundary.
IIC (50-60″+)	IIC. Dark brown (7.5YR 4/4) friable loam till; massive; calcareous.

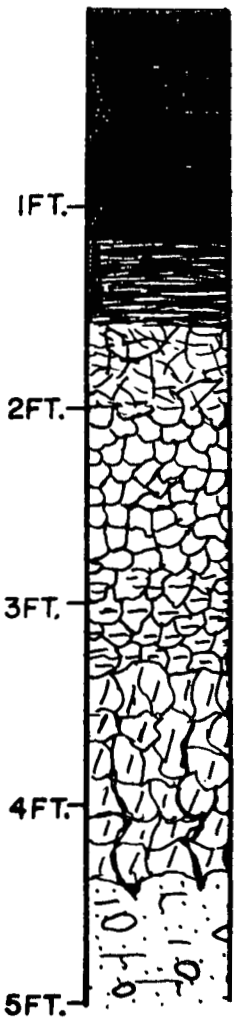
Dana silt loam (56)

Dana silt loam is a dark, moderately well-drained, upland soil developed under prairie vegetation from about 1½ to 3½ feet of loess over loam till. The solum extends into a portion of the till. Calcareous till occurs below a depth of 3½ feet. The soil occupies level and gently sloping areas not exceeding about 3-percent gra-

dient. Dana occurs in the extreme western part of the county, with a large portion in one continuous area of sections 8, 9, 16, and 17 of Dunham township. It is closely related to Wingate (348) and Sidell (55) and often occurs with them. It is darker than Wingate, however, and is not as well drained as Sidell.

Dana is high in organic matter, about medium acid, low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. It is very productive and well adapted to intensive cultivation.

Representative profile, Dana silt loam



A_1 (0-14″) — A_1. Black (10YR 2/1) in upper part grading to very dark brown (10YR 2/2) in lower part, friable silt loam; weak to moderate, medium granular structure; slightly acid; clear smooth boundary.

A_3 (14-19″) — A_3. Dark brown (10YR 3/3) friable silt loam; weak, very fine subangular blocky structure; medium acid; clear smooth boundary.

B_1 (19-24″) — B_1. Dark brown to dark yellowish-brown (10YR 4/3-4/4) slightly firm silty clay loam; weak, fine subangular blocky structure; strongly acid; clear smooth boundary.

B_{21} (24-34″) — B_{21}. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) firm, heavy silty clay loam; moderate, medium subangular blocky structure; strongly acid; clear smooth boundary.

IIB_{22} (34-40″) — IIB_{22}. Dark yellowish-brown (10YR 4/4) firm, gritty silty clay loam with a few light gray (10YR 7/2) silt coatings and a few fine, faint yellowish-brown (10YR 5/8) and grayish-brown (10YR 5/2) mottles; moderate, medium subangular blocky structure; medium acid; gradual smooth boundary.

IIB_{23} (40-53″) — IIB_{23}. Dark brown to brown (7.5YR 4/4) firm, heavy clay loam with grayish-brown (10YR 5/2) spots and common, fine, distinct black (10YR 2/1) iron-manganese stains; weak, coarse subangular blocky structure; slightly acid; clear wavy boundary.

IIC (53-60″+) — IIC. Dark brown (7.5YR 4/4) slightly firm, heavy loam till with grayish-brown (10YR 5/2) spots and black iron-manganese stains; massive breaking to coarse angular blocky structure; calcareous.

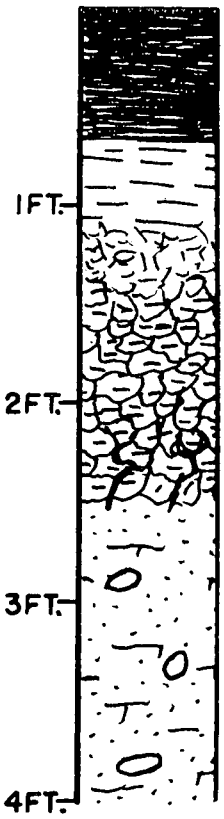
Montmorenci silt loam (57)

Montmorenci silt loam is a moderately dark, moderately well- to well-drained soil developed under mixed prairie-forest vegetation on upland slopes ranging from about 1 to 6 percent. The parent material is a thin covering of loess, varying from a few inches to slightly more than 2 feet thick, on loam or silt loam till. Calcareous till

occurs at depths between 2 and 3½ feet. The soil occurs with Miami (24), Strawn (224), and Saybrook (145), primarily on the Marengo, Gilberts, and Marseilles moraines (Fig. 5). It also occurs in other areas, usually in close association with Miami (24).

Montmorenci is moderately low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. Most areas are adapted for cropland and have moderately high productivity when properly managed. Sloping areas should be protected from erosion when cultivated.

Representative profile, Montmorenci silt loam



A_1 (0-8″)	A_1. Very dark brown (10YR 2/2) friable silt loam; weak, medium granular structure; slightly acid; abrupt smooth boundary.
A_2 (8-13″)	A_2. Dark grayish-brown (10YR 4/2) friable silt loam; weak, medium platy structure; medium acid; clear smooth boundary.
B_1 (13-16″)	B_1. Dark brown (10YR 4/3) slightly firm, light silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.
IIB_{21} (16-22″)	IIB_{21}. Dark brown (7.5YR 3/3) firm clay loam; strong, fine subangular blocky structure; strongly acid; clear smooth boundary.
IIB_{22} (22-30″)	IIB_{22}. Reddish-brown (5YR 4/4) firm clay loam; moderate, medium subangular blocky structure; medium acid in upper part to slightly acid in lower part; clear wavy boundary.
IIC (30-40″+)	IIC. Dark brown to brown (7.5YR 4/4) friable loam glacial till; massive; calcareous.

Some of the till in the lower part of this profile is more reddish than that of Montmorenci soils in many other areas in Illinois.

Lisbon silt loam (59)

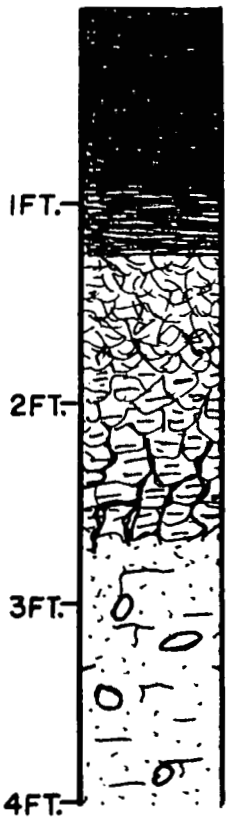
Lisbon silt loam is a dark, imperfectly drained, upland soil developed under prairie vegetation. It occurs in level areas and in drainageways with slopes ranging from 0 to 3 percent. The parent material is about 1 to 3 feet of loess on loam or silt loam glacial till. Calcareous till occurs at depths between 2 and 3½ feet.

Lisbon occurs most extensively in the southern row of townships in the county from the western edge of Algonquin township westward to the Boone county line. It is associated with Drummer (152), Saybrook (145), and LaRose (60). It also occurs in minor amounts in other areas and is present on Marengo ridge in the upper portions of many drainageways, where it is associated with Drummer (152), Miami

(24), Strawn (224), and Herbert (62). Areas of Lisbon with the thickest loess cover and the greatest depth to carbonates occur west of Marengo ridge.

Lisbon is high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. It has high moisture-holding capacity and moderate permeability. Drainage is needed for maximum crop production and tile function well. Lisbon is a very productive soil and is used mainly as cropland.

Representative profile, Lisbon silt loam



A_1 (0-11″) — A_1. Black (10YR 2/1) friable silt loam; moderate, medium granular structure; slightly acid; gradual smooth boundary.

A_3 (11-15″) — A_3. Very dark brown (10YR 2/2) friable, heavy silt loam; moderate, coarse granular structure; slightly acid; clear smooth boundary.

B_1 (15-22″) — B_1. Mottled dark gray (10YR 4/1), grayish-brown (10YR 5/2), and brown (7.5YR 4/4) firm silty clay loam; moderate, fine subangular blocky structure; slightly to medium acid; clear smooth boundary.

IIB_2 (22-32″) — IIB_2. Mottled grayish-brown (10YR 5/2) and brown (7.5YR 4/4) firm clay loam; moderate, medium subangular blocky structure; slightly acid grading to neutral with depth; clear smooth boundary.

IIC (32-50″+) — IIC. Dark brown to brown (7.5YR 4/4) friable loam glacial till with gray and grayish-brown (10YR 5/1 and 5/2) spots; massive; calcareous.

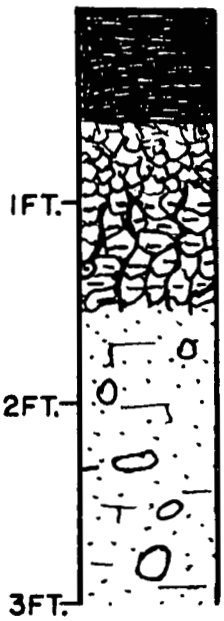
LaRose silt loam (60)

LaRose silt loam is a naturally well-drained, upland soil developed in thin loess (usually less than 18 inches thick) over loam or silt loam glacial till. It is a dark soil developed under prairie vegetation on slopes normally ranging from about 5 to 15 percent. Calcareous till occurs at depths of about 1½ to 2 feet. The original surface has been partially or completely removed on many cultivated slopes, exposing varying amounts of B horizon in the plow layer. The soil occurs primarily in Coral, Grafton, western Algonquin, and eastern Seneca townships in association with Saybrook (145) and Lisbon (59).

LaRose is moderately high in organic matter when uneroded, medium to slightly acid, low in available phosphorus, and about medium in available potassium. It has moderately high moisture-holding capacity and moderate permeability. Most areas

of LaRose are cultivated. Severe erosion is a hazard on the steeper slopes if row crops are grown frequently and no erosion-control measures taken. In areas where calcareous till is near the surface because of erosion, productivity may be greatly reduced. Many areas are best adapted to hay and pasture production.

Representative profile, LaRose silt loam



A_p (0-7″) — A_p. Very dark grayish-brown (10YR 3/2) friable silt loam; weak, fine granular structure; slightly acid; abrupt smooth boundary.

B_1 (7-11″) — B_1. Dark brown (10YR 3/3) firm silty clay loam; moderate, fine subangular blocky structure; slightly acid; clear smooth boundary.

IIB_2 (11-18″) — IIB_2. Dark brown to brown (10YR 4/3) firm clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.

IIC (18-40″+) — IIC. Dark brown to brown (7.5YR 4/4) friable loam glacial till; massive; calcareous.

Herbert silt loam (62)

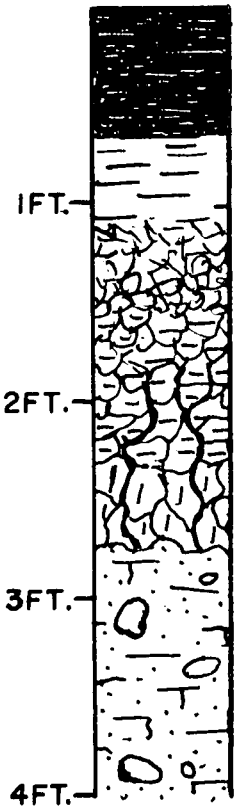
Herbert silt loam is a moderately dark, imperfectly drained, upland soil developed under mixed prairie-forest vegetation. It occurs primarily in nearly level areas or in the upper portions of drainageways with slopes ranging from 0 to 3 percent. The solum has developed in about 1 to 3 feet of loess over loam or silt loam till. Calcareous till occurs at depths between 2 and 3½ feet. Herbert occurs in small areas and is not extensive. It occupies some of the drainageways on Marengo ridge, where it is associated with Miami (24), Strawn (224), Lisbon (59), and Drummer (152). It occurs in a few other areas, usually in association with Miami (24).

Herbert is moderately high in organic matter, medium to slightly acid, low in available phosphorus, and medium to high in available potassium. It has high moisture-holding capacity and moderate permeability. Drainage is usually needed for maximum crop yields and tile function well. Erosion control may be a problem in drainageways that receive large amounts of runoff. Most areas are cultivated and have moderately high productivity. (Profile drawing is on page 30.)

Harpster silty clay loam (67)

Harpster silty clay loam is a dark soil developed under marsh vegetation from medium-textured to moderately fine-textured drift. Parent material is dominantly outwash sediments but till and loess are included. The soil usually contains freshwater snail shells or shell fragments which in many places give the surface a grayish

Representative profile, Herbert silt loam



A_1 (0-8″) — A_1. Very dark gray (10YR 3/1) friable silt loam; weak, medium crumb structure; slightly acid; clear smooth boundary.

A_2 (8-13″) — A_2. Dark gray to grayish-brown (10YR 4/1-5/2) friable silt loam; weak, thin platy structure; medium acid; clear smooth boundary.

B_1 (13-18″) — B_1. Dark grayish-brown (10YR 4/2) slightly firm silty clay loam with common, fine, faint light brownish-gray (10YR 6/2) and yellowish-brown (10YR 5/6) mottles; moderate, fine subangular blocky structure; medium to strongly acid; clear smooth boundary.

B_2 (18-28″) — B_2. Mixed gray (10YR 5/1), grayish-brown (10YR 5/2), and yellowish-brown (10YR 5/6) firm, gritty silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_3 (28-33″) — IIB_3. Brown (7.5YR 5/2) firm clay loam with common, fine, distinct, very dark gray (10YR 3/1) and strong brown (7.5YR 5/8) mottles; weak, coarse subangular blocky structure; slightly acid to neutral; clear smooth boundary.

IIC (33-50″+) — IIC. Reddish-brown (5YR 4/4) friable loam glacial till with very dark gray (5YR 3/1) spots; massive; calcareous.

Till in the lower part of this profile is more reddish than that of Herbert soils in many other areas in Illinois.

cast. It is a poorly to very poorly drained soil. It occurs in depressions of various sizes, in gently sloping areas such as drainageways, in nearly level outwash plains and old lake plains, and around the margins of depressions occupied by organic soils. Very occasionally it occurs on slopes with gradients as great as 12 percent. Sloping areas are poorly drained because of seepage from lateral movement of ground water.

Areas of Harpster occur to some extent in every township in the county. Some are too small to show on the map (Fig. 14); others are as large as 200 or 300 acres. Harpster is associated with many soils because of its widespread occurrence and wide variety of parent materials. But it is most commonly associated with other poorly drained soils, such as Drummer (152). Some physical and chemical properties of Harpster silty clay loam are given in Table 10.

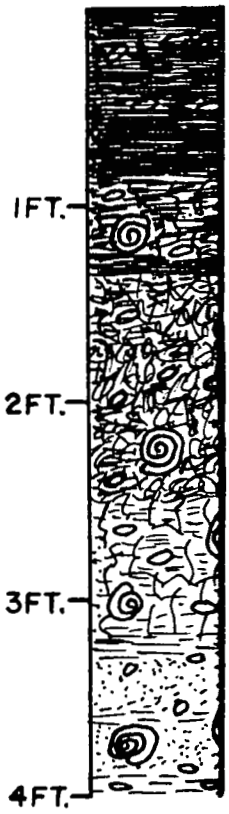
Light-colored spots of Harpster silty clay loam in an area of Drummer silty clay loam, Section 21 of Grafton township. Snail shells give Harpster its grayish cast. These spots, like many areas of Harpster, were too small to show on the soil map. (Fig. 14)

Table 10. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF HARPSTER SILTY CLAY LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Calcium carbonate equivalent[d]	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–11	0	26.2	42.7	29.0	...[e]	...	...	.46	29.1	15.3	7.9	4.01
A_3.....	11–17	0	24.8	44.4	27.3	...	...	...	.31	20.9	14.5	8.0	1.79
B_1.....	17–22	0	27.5	43.7	25.2	...	...	...	.31	16.5	11.4	8.1	.71
B_2.....	22–32	0	27.3	45.3	25.1	...	...	...	.33	14.0	3.7	8.1	.35
B_3.....	32–39	1.0	20.1	48.4	30.4	...	...	...	.31	11.9	15.3	8.1	.28
C_1.....	39–45	3.0	40.1	39.7	19.0	...	...	...	.23	6.4	15.9	8.1	.20

[a] Iroquois county, T.26N., R.13W., Sec. 26, NW ¼, SW 40, NW 10 acres.
[b] Data from D. B. Freeman (*12*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Calcium carbonate equivalent reported in place of base saturation. Base saturation is >100 percent in all horizons.
[e] Not determined.

Representative profile, Harpster silty clay loam



A_1 (0-10″) — A_1. Black (10YR 1/1-2/1) firm silty clay loam with numerous light gray to white (10YR 7/2-8/2) snail-shell fragments; moderate, medium granular structure; calcareous; gradual smooth boundary.

AB (10-16″) — AB. Black to very dark gray (10YR 2/1-3/1) firm silty clay loam with numerous white snail shells and shell fragments; moderate, medium to coarse granular structure; calcareous; gradual smooth boundary.

B_{2g} (16-30″) — B_{2g}. Gray (10YR 5/1) firm silty clay loam with common, fine, faint dark gray and yellowish-brown (10YR 4/1 and 5/8) mottles; many white snail shells and fragments; moderate, medium subangular blocky structure; calcareous; gradual smooth boundary.

B_{3g} (30-38″) — B_{3g}. Mottled dark gray, grayish-brown (2.5Y 4/1, 5/2), and yellowish-brown (10YR 5/6-5/8) firm silty clay loam to clay loam with some white snail shells and fragments; weak, medium to coarse subangular blocky structure; calcareous; gradual smooth boundary.

C_g (38-60″+) — C_g. Dark grayish-brown to grayish-brown (2.5Y 4/2-5/2) friable loam to sandy loam with common, medium, distinct dark gray and yellowish-brown (10YR 4/1 and 5/8) mottles and some white snail shells; massive; calcareous; contains a small amount of gravel.

Harpster is high in organic matter, calcareous, and low in available phosphorus and available potassium. Permeability is moderate and moisture-holding capacity is high. Drainage is needed because the soil has a naturally high water table. Tile usually function well but good outlets are not always available. Drainage ditches

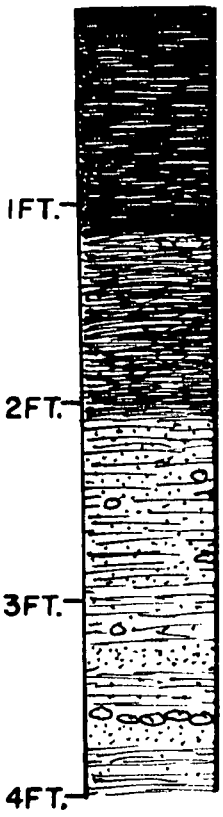
are helpful in larger areas. Liming materials should not be applied to Harpster because there is already too much calcium carbonate. Phosphorus deficiencies should be corrected by use of superphosphate rather than rock phosphate. Regular additions of potassium are needed. Productivity is high in areas that have been drained and properly fertilized. Small grains tend to lodge.

Otter loam, bottom (76)

Otter loam is a very dark, poorly to very poorly drained soil formed under marsh vegetation from stream alluvium. It has no developed horizons and is subject to periodic flooding which adds or removes sediment. It often has a mucky surface and is quite variable in texture. The upper 30 to 40 inches are usually loam, sandy loam, or silt loam sediments, and are often stratified. Mixed sandy or gravelly deposits may occur below these depths. Areas of fine-textured sediment approaching silty clay loam occur in bottomlands along Piscasaw and Lawrence creeks. An area of coarse sediment (primarily sandy loam) occurs along Kishwaukee river from near Marengo west into Boone county (Fig. 15).

This soil generally occurs in level areas but occasionally the surface is broken and irregular where more than one level of alluvium occurs. It is one of the two bottomland or alluvial soils mapped in the floodplains of the major streams; Millington (82) is the other. Otter areas contain numerous spots of Millington as mapping inclusions.

Representative profile, Otter loam



1 (0-14″) — 1. Black (10YR 1/1-2/1) friable loam with high organic content and a few fine, distinct dark brown (7.5YR 4/4) mottles or iron-manganese concretions; weak, coarse crumb to subangular blocky structure; neutral; gradual smooth boundary.

2 (14-25″) — 2. Black to very dark gray (10YR 2/1-3/1) friable loam with a few fine, distinct dark yellowish-brown (10YR 3/4) mottles; weak, medium crumb structure; neutral; gradual smooth boundary.

3 (25-35″) — 3. Mixed black (10YR 2/1), gray (2.5Y 5/1), and dark yellowish-brown (10YR 4/4) friable loam and silt loam with some sand and pebbles; massive; neutral; gradual smooth boundary.

4 (35-40″+) — 4. Mixed very dark brown (10YR 2/2) and dark gray (2.5Y 4/1) friable, stratified loam and fine sandy loam with a few pebbles and common, medium to coarse, prominent dark brown (7.5YR 4/4) mottles and iron-manganese concretions; massive; neutral becoming calcareous with depth.

An area of Otter loam in the Kishwaukee river floodplain just west of the bridge on Illinois 23. This is a poorly drained soil with a hummocky surface. Many areas of Otter are used extensively for pasture, because they are too wet to cultivate and are often difficult to drain and protect from flooding. Some spots are mucky. (Fig. 15).

The major difference between the two soils is that Otter is neutral and Millington is calcareous.

Otter is high in organic matter and low to medium in available phosphorus and available potassium. Permeability is about moderate and the water table is usually high. Most areas of Otter are used for pasture but occasionally, if outlets are available, areas may be tile drained and converted into productive cropland. In many areas, however, flooding is a recurring hazard.

Volinia silt loam to loam (79)

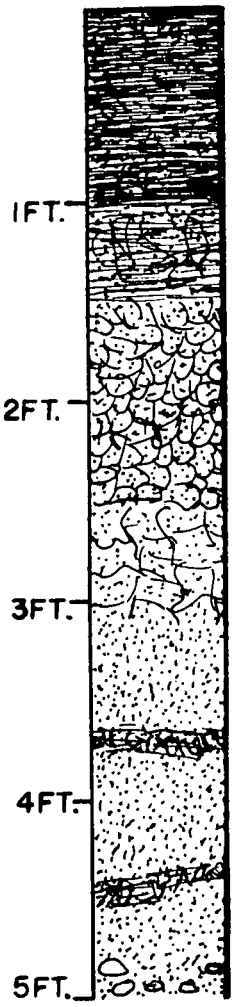
Volinia silt loam to loam is a dark soil formed under prairie vegetation. Parent materials are silt loam or loam sediments, averaging about 2 to 3 feet thick, over loose noncalcareous sand and fine gravel deposits that grade to calcareous sand and fine gravel with depth (usually below 50 inches). This soil type includes areas with both silt loam and loam A horizons. It is a well-drained to somewhat excessively drained soil, occurring most commonly in level or gently sloping outwash areas. Occasionally it occurs on steeper slopes, such as on terrace breaks or in water-deposited sediments on morainal ridges. The largest areas of this soil occur in outwash plains near Franklinville, north of Union, and in a narrow strip north of the Kishwaukee river in Marengo and Seneca townships. It is associated with a variety of soils including Warsaw (290), Proctor (148), and Lomax (265).

Volinia is high to moderately high in organic matter, about medium acid, low to medium in available phosphorus, and medium in available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is medium to low. Most areas are used as cropland and are productive when rainfall is abundant and well distributed. Crops suffer noticeably in periods of low rainfall. Surface irrigation for vegetable crop production is a limited but promising practice, particularly in Seneca township near the Kishwaukee river and its tributaries. (Profile drawing is on page 34.)

Millington loam, bottom (82)

Millington loam is a dark, poorly to very poorly drained soil composed of variable-textured calcareous sediments supporting marsh vegetation. Snail shells are usually abundant throughout the profile. The soil is recently deposited alluvium and has no developed horizons. Texture is commonly loam, fine sandy loam, or silt loam, but

Representative profile, Volinia loam



A_1 (0-12″)	A_1. Black (10YR 2/1) friable loam; moderate, fine granular structure; slightly acid; clear smooth boundary.
A_3 (12-17″)	A_3. Very dark brown (10YR 2/2) friable loam; moderate, medium granular structure; slightly acid; clear smooth boundary.
B_{21} (17-30″)	B_{21}. Dark brown (10YR 3/3) firm clay loam; weak, medium subangular blocky structure; slightly acid; gradual smooth boundary.
IIB_{22} (30-36″)	IIB_{22}. Dark brown (7.5YR 3/2) friable sandy clay loam; weak, medium to coarse subangular blocky structure; medium acid; clear smooth boundary.
IIC_1 (36-58″)	IIC_1. Brown (7.5YR 4/4) loose sand with some fine gravel; single grain; medium acid; clear wavy boundary.
IIC_2 (58″+)	IIC_2. Brown (7.5YR 4/4) loose sand with some fine gravel; single grain; calcareous.

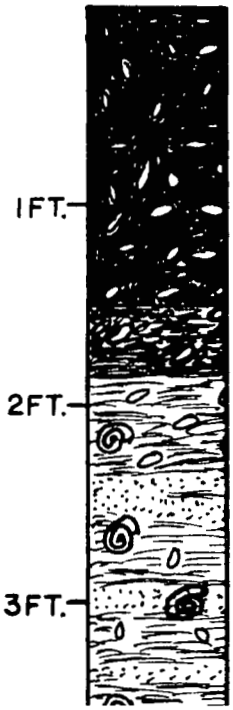
A Beta horizon (7), or a brown to reddish-brown, clay-enriched layer that occurs immediately above calcareous coarse-textured material, is present in some areas of Volinia in McHenry county.

the surface may be mucky in places. Sand and gravel frequently occur below depths of 30 or 40 inches.

Large continuous areas of Millington occur in the floodplains of Nippersink creek. Lesser amounts are mapped in the floodplains of other streams. The soil occupies level areas except in a few minor places where more than one level of floodplain occurs. Millington loam and Otter loam (76) are the only bottomland or alluvial soils mapped in McHenry county (see page 32). Areas of Millington may contain small areas of Otter as mapping inclusions.

Millington loam is high in organic matter, calcareous, and low in available phosphorus and available potassium. It has moderate permeability and a high water table. Drainage is difficult but tile will function if outlets are available. Although

Representative profile, Millington loam



1 (0-18″) 1. Black (10YR 1/1-2/1) friable loam with high organic content and numerous white (10YR 8/1) snail-shell fragments; weak, medium crumb structure; calcareous; gradual smooth boundary.

2 (18-22″) 2. Very dark gray (10YR 3/1) friable loam with a few fine, distinct dark brown (7.5YR 4/4) mottles and many white (10YR 8/1) snail-shell fragments; weak, medium to coarse granular structure; calcareous; gradual smooth boundary.

3 (22-28″) 3. Mixed very dark gray (10YR 3/1) and dark brown (7.5YR 4/4) friable loam with some white (10YR 8/1) snail shells and fragments; massive; calcareous; gradual smooth boundary.

4 (28-40″+) 4. Mixed very dark gray (10YR 3/1), dark gray (2.5Y 4/1), and dark brown (7.5YR 4/4) friable loam with lenses of fine sand and a few white (10YR 8/1) snail shells and fragments; massive; calcareous.

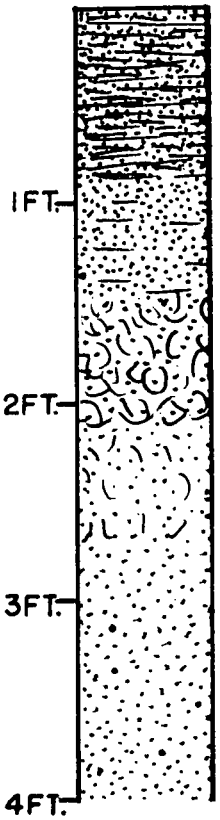
this soil is commonly used for permanent pasture, occasional areas with minor flooding hazards are drained and make productive cropland where properly fertilized. Liming materials should not be used on this soil and phosphorus deficiencies should be corrected with a readily soluble phosphate. Regular additions of potassium are recommended.

Sumner sandy loam (87)

Sumner sandy loam is a dark to moderately dark soil occurring mainly in level to gently sloping areas but occasionally on slopes ranging up to about 10 percent. Natural drainage is somewhat excessive. The soil formed under prairie vegetation from sandy outwash deposits. In some places these deposits occur as low ridges, probably as a result of being reworked by wind. The sandy solum has a weakly developed B horizon. Some areas are underlain by gravelly material at depths below 4 feet. Sumner is not an extensive soil and often occurs in small areas surrounded by soils with silt loam or loam A horizons. The largest areas occur in northwestern Riley and southwestern Marengo townships.

Sumner is moderately high in organic matter, about medium acid, and low to medium in available phosphorus and available potassium. Permeability is rapid, and moisture-holding capacity is low. Drouthiness, wind erosion, and low natural fertility are problems on this soil. Most areas are cultivated, but crop yields are variable and highly dependent on amount and distribution of rainfall. Early maturing small grains and grass-legume mixtures are best adapted on this soil. A vegetative cover or strip cropping is recommended to help control wind erosion.

Representative profile, Summer sandy loam



A_1 (0-10″) — A_1. Very dark brown to very dark gray (10YR 2/2-3/1) very friable sandy loam; weak, medium to coarse crumb structure; slightly acid; clear smooth boundary.

A_3 (10-17″) — A_3. Very dark grayish-brown to dark brown (10YR 3/2-3/3) very friable sandy loam; weak, medium to coarse crumb structure; medium to slightly acid; clear smooth boundary.

B_2 (17-25″) — B_2. Dark brown (7.5YR 3/3-10YR 3/3) to brown (10YR 4/3) friable sandy loam to loam; weak, medium to fine subangular blocky structure; medium acid; clear smooth boundary.

B_3 (25-32″) — B_3. Brown to dark yellowish-brown (10YR 4/3-4/4) very friable to loose sandy loam; single grain; slightly acid; gradual smooth boundary.

C (32-50″+) — C. Strong brown (7.5YR 5/6) to yellowish-brown (10YR 5/6) loose loamy sand to sand; single grain; neutral; grades to pale brown (10YR 6/3) calcareous sand with some fine gravel at a depth of 55 inches.

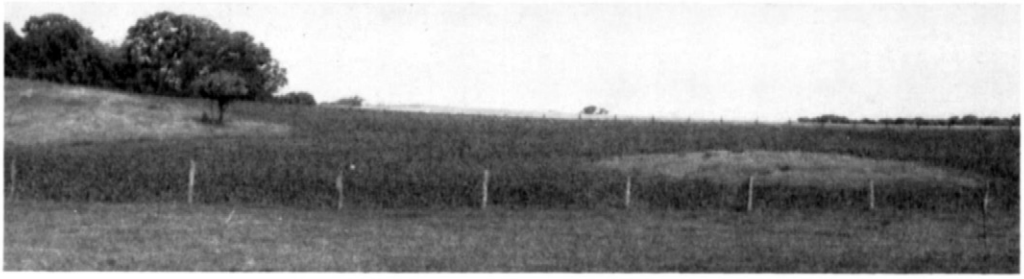
Rodman gravelly loam (93)

Rodman gravelly loam is a dark to moderately dark, excessively drained soil developed from a few inches of loamy material over loose, loamy gravel glacial drift containing a very high percentage of limestone. It developed under prairie, forest, or mixed prairie-forest vegetation on slopes ranging from about 5 to over 30 percent. The profile does not have a B horizon. Rodman was mapped separately and also in two complexes—with Lorenzo (318) and with Casco (323). It is also associated with Warsaw (290) and Fox (327).

Rodman is usually calcareous, but occasionally neutral, and is low in available phosphorus and available potassium. It is a drouthy soil with very low moisture-holding capacity because of underlying coarse-textured materials at shallow depths (Fig. 16). It has very rapid permeability. It is used primarily for pasture or hay with limited use for timber.

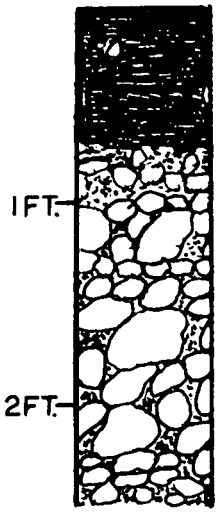
Rodman-Lorenzo complex (93-318)

In some areas Rodman gravelly loam (93) and Lorenzo silt loam to loam (318) are so intermingled that they could not be separated and are shown on the map as a complex. They occur in areas where prairie vegetation was present during soil development. Slopes range from about 5 to over 30 percent. Because of Rodman, the complex is limited for use as cropland. It is best adapted for pasture or hay production and is sometimes used for timber production.



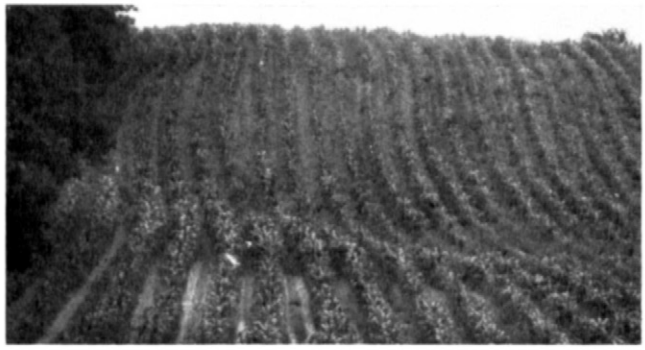
Knobs of drouthy soils such as Rodman or Hennepin are often surrounded by productive soils. These drouthy areas have been left out of cultivation. (Fig. 16)

Representative profile, Rodman gravelly loam



A_1 (0-8″) — A_1. Black to very dark brown (10YR 2/1-2/2) very friable gravelly loam; weak, fine crumb to granular structure between gravels; calcareous; gradual smooth boundary.

IIC (8-42″+) — IIC. Varicolored gravels and cobbles, mostly 1/2 to 6 inches in diameter, with high percentage of limestone and dolomite; some sand and finer material; single grain; calcareous.



Planting corn like this on a steep slope of a Rodman-Casco complex invites erosion. Although the corn may look good early in the season, a few dry weeks in July or early August can drastically cut yields. (Fig. 17)

Detailed descriptions of these soils are given on page 36 and above for Rodman and page 83 for Lorenzo.

Rodman-Casco complex (93-323)

In some areas Rodman gravelly loam (93) and Casco silt loam to loam (323) occur in a complex pattern which makes their separation impractical. In these areas they are shown on the map as a complex. The soils in this complex developed under forest vegetation on slopes ranging from about 7 to over 30 percent. Because the soils are drouthy and occur on steep slopes, hay, pasture, or timber production should be favored (Fig. 17). Native timber stands have been maintained in some areas.

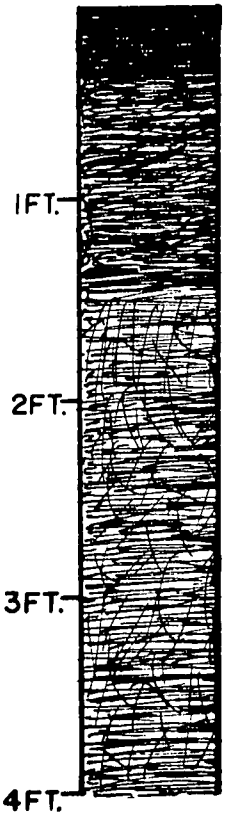
Casco is described in detail on page 85.

Houghton peat (97)

Houghton peat is a moderately dark to dark organic soil occurring as old glacial lake beds that vary in size from a few acres to more than 100 acres. It consists of partially decomposed but identifiable fibrous remains of grasses, reeds, rushes, and sedges. Sedimentary peat may occur below the fibrous peat. The peat is usually more than 3 feet thick although there are a few areas with mineral deposits of various textures at depths of less than 3 feet. The soil is associated with Houghton muck (103), Lena muck (210), and numerous mineral soils. It differs from Houghton muck, being less decomposed and dark brown rather than black. It is not as extensive as the muck soils. The largest areas occur in eastern Nunda township.

Houghton peat is very high in organic matter, neutral to very slightly acid, and low in available phosphorus and available potassium. Moisture-holding capacity is high and permeability is moderate. The soil developed under a permanently high water table. Several undrained areas remain as natural marshes. Drainage is a prerequisite for cultivation. Tile will drain the soil but a solid foundation is needed to keep them in line. Large areas require a system of both tile and ditches. When properly drained and fertilized, the soil is usually productive for corn and vegetables (Fig. 18). Small amounts of peat have been excavated for commercial use.

Representative profile, Houghton peat



1 (0-4″) 1. Black (10YR 2/1) very friable mucky peat; weak, fine to medium crumb structure; neutral; clear smooth boundary.

2 (4-17″) 2. Dark brown (7.5YR 3/2) friable peat; massive to weak, medium crumb structure; neutral; gradual smooth boundary.

3 (17-50″+) 3. Dark brown (7.5YR 3/2-10YR 3/3) with some black (10YR 2/1) friable fibrous peat; massive; neutral.

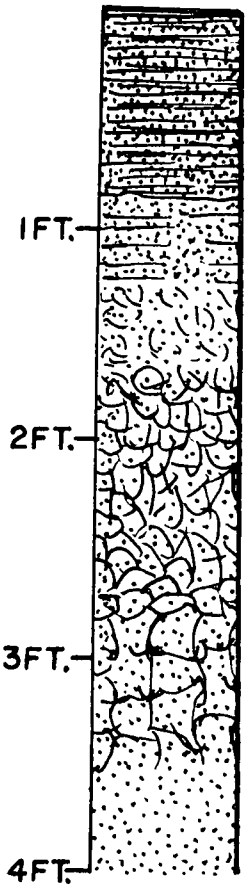
Properly drained organic soils, such as this area of Houghton peat in eastern Nunda township, are well adapted to vegetable production. (Fig. 18)

LaHogue loam (102)

LaHogue loam is a dark, imperfectly drained soil. It formed under prairie vegetation from loam-textured, water-deposited sediments, 3½ or more feet thick, on loamy sand or sand at less than 5 feet. Material below the solum is often stratified and variable in texture. A few areas, particularly in northwestern Riley township, have B horizons that are not as thick or as well developed as in other areas. The soil occurs in level to gently sloping areas, usually in association with Lomax (265), Selma (125), and Ridgeville (156). It is found in minor amounts in many outwash areas but is mainly concentrated in the southwestern part of the county along Coon creek and Kishwaukee river.

LaHogue is high in organic matter, neutral to medium acid, and low to medium in available phosphorus and available potassium. Permeability is about moderate and moisture-holding capacity is medium to high depending on development of the subsoil and thickness of solum. Drainage is frequently needed. Tile usually function well, but in some areas loose sand may interfere with installation. When the soil is properly drained and fertilized, productivity is moderately high to high.

Representative profile, LaHogue loam



A_1 (0-10″) — A_1. Black (10YR 2/1) friable loam; moderate, fine granular structure; slightly acid to neutral; gradual smooth boundary.

A_3 (10-15″) — A_3. Black to very dark gray (10YR 2/1-3/1) friable loam; moderate, medium granular to very fine subangular blocky structure; slightly acid to neutral; clear smooth boundary.

B_1 (15-19″) — B_1. Very dark brown (10YR 2/2) slightly firm, light clay loam with a few fine, faint dark yellowish-brown (10YR 4/4) mottles; weak, fine subangular blocky structure; slightly acid; clear smooth boundary.

B_2 (19-34″) — B_2. Mixed very dark gray and dark grayish-brown (10YR 3/1 and 4/2) firm clay loam with common, fine, faint yellowish-brown (10YR 5/8) mottles; weak, fine to medium subangular blocky structure; slightly acid; gradual smooth boundary.

B_3 (34-42″) — B_3. Mixed dark gray, light brownish-gray, and yellowish-brown (10YR 4/1, 6/2, and 5/4) slightly firm sandy clay loam; weak, medium to coarse subangular blocky structure; neutral; clear smooth boundary.

C (42-60″+) — C. Mixed dark grayish-brown, grayish-brown (2.5Y 4/2, 5/2), pale brown, and yellowish-brown (10YR 6/3 and 5/4) loose loamy sand to sand; single grain; neutral grading to calcareous with depth.

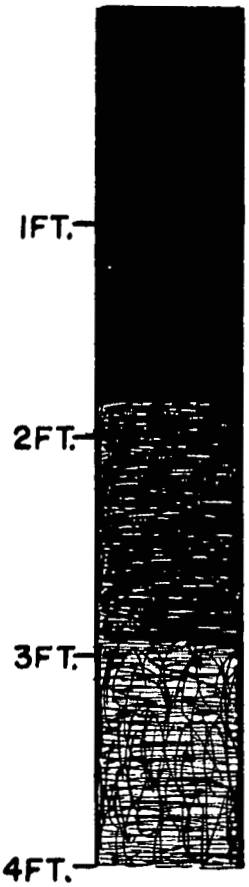
Houghton muck (103)

Houghton muck is a very dark, naturally very poorly drained, organic soil consisting of decomposed vegetation, such as rushes, reeds, and sedges, mixed with small amounts of mineral matter. The organic accumulation is usually greater than 3 feet thick but ranges from several feet to as little as about 1 foot thick. Peat usually underlies the thick muck, and variable-textured mineral sediments underlie the thin muck. In a few areas marl deposits occur below the muck.

This soil normally occurs in level to depressional areas but occasionally occurs on slopes where lateral seepage keeps the soil saturated. In the southern part of section 11 of Nunda township an area of Houghton muck occurs on a slope averaging between 12 and 18 percent. Size of individual areas varies from those too small to delineate on the soil map (shown by a wetspot symbol) to large former glacial lakes and marshes of more than 300 acres. The soil occurs throughout the county. It is most closely associated with Houghton peat (97), Lena muck (210), and poorly drained mineral soils such as Drummer (152), Ashkum (232), Harpster (67 and 347), Otter (76), and Millington (82).

Houghton muck is very high in organic matter, usually neutral but occasionally very slightly acid, and low in available phosphorus and available potassium. It has a high water table unless drained. Undrained areas remain natural marshes. Drain-

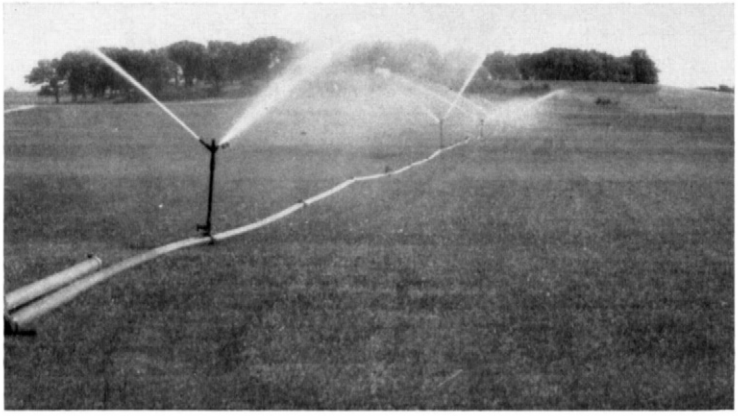
Representative profile, Houghton muck



1 (0-22″) 1. Black (10YR 1/1) very friable muck; moderate, medium crumb structure in upper few inches, massive below; neutral; gradual smooth boundary.

2 (22-35″) 2. Black to very dark brown (10YR 2/1-2/2) very friable muck with small pieces of identifiable plant material; massive; neutral; gradual smooth boundary.

3 (35-50″+) 3. Dark brown to brown (10YR 3/3-4/3) very friable fibrous peat; neutral.



This Marion bluegrass sod is being commercially produced on an area of Houghton muck in Grafton township. (Fig. 19)

age is needed for production of most general farm or vegetable crops. Tile will satisfactorily drain small areas but a system of open ditches with tile or corrugated pipe is recommended for large areas. Tile should be placed on a firm foundation such as boards to help keep them in line. Shallow organic deposits underlain by mineral sediments should be carefully checked before draining. If the underlying sediments are sandy or gravelly there is danger of overdraining. Productivity is often variable but is usually high for corn and some vegetable crops when the soil is adequately drained and fertilized (Fig. 19).

Virgil silt loam (104)

Virgil silt loam is a moderately dark, imperfectly drained, upland soil developed under mixed prairie-forest vegetation. Parent material is loess (about 30 to 40 inches thick) over sandy loam till. Calcareous till usually occurs below 3½ feet. Some areas which have a thinner loess cover are included with Virgil. The soil occurs in depressions or in drainageways that are usually level but occasionally range up to about 3-percent gradient. It is associated mainly with McHenry (310) and Lapeer (361) but also occurs with Nippersink (299) and Elburn (198).

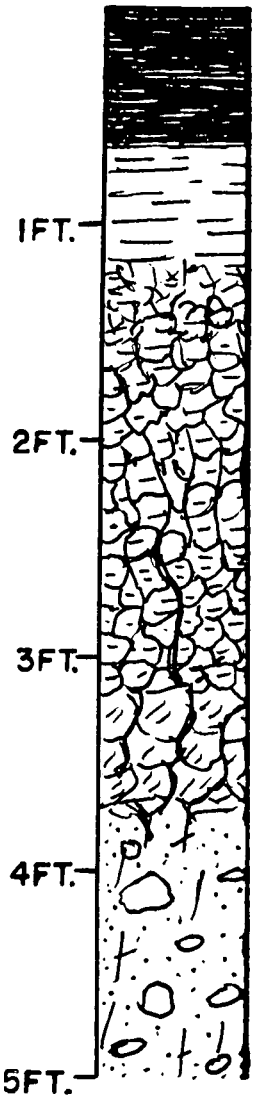
Virgil is moderately high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate and moisture-holding capacity is high. Drainage is needed for maximum crop production and tile function well. Most areas are used as cropland and are productive. (Profile drawing is on page 42.)

Selma loam (125)

Selma loam is a dark to very dark, poorly to very poorly drained soil. It developed in outwash sediments under marsh vegetation in level to depressional areas, frequently in natural drainageways. Parent material is loam-textured, water-deposited sediments (usually 3 or more feet thick) over loamy sand or sand at less than 5 feet. Occasionally the material below the solum is stratified and variable in texture. In some areas, particularly in northwestern Riley township, the B horizon is less developed than in other areas. The soil occurs in an irregular pattern in outwash areas where sandy sediments have a high water table. Some of the larger areas occur in the southwestern part of the county along Coon creek and Kishwaukee river. Selma is associated with LaHogue (102), Ridgeville (156), and other soils.

Selma loam is high in organic matter, neutral to slightly acid, and low to medium in available phosphorus and available potassium. Permeability is about moderate and moisture-holding capacity is high to medium depending on subsoil development

Representative profile, Virgil silt loam



A_1 (0-8″) — A_1. Very dark gray (10YR 3/1) friable silt loam; moderate, medium crumb structure; slightly acid; clear smooth boundary.

A_2 (8-14″) — A_2. Dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) friable silt loam with a few fine, faint mottles of dark yellowish-brown (10YR 4/4); weak, thin platy structure; slightly acid; clear smooth boundary.

B_1 (14-18″) — B_1. Dark grayish-brown (10YR 4/2) and dark brown (10YR 4/3) friable, heavy silt loam with common, fine, faint mottles of dark yellowish-brown (10YR 4/4); weak, fine subangular blocky structure; medium acid; clear smooth boundary.

B_{21} (18-27″) — B_{21}. Dark grayish-brown (10YR 4/2) and brown to dark brown (10YR 4/3) firm silty clay loam with common, fine, distinct mottles of dark brown (7.5YR 4/4) and strong brown (7.5YR 4/6); moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

B_{22} (27-38″) — B_{22}. Dark grayish-brown (10YR 4/2), gray (10YR 5/1), and dark brown (10YR 4/3) firm silty clay loam with common, fine, distinct mottles of strong brown (7.5YR 5/8); moderate, medium subangular blocky structure with clay films on ped surfaces; medium acid; clear smooth boundary.

IIB_3 (38-44″) — IIB_3. Mottled gray (10YR 5/1), dark grayish-brown (10YR 4/2), dark brown (10YR 4/3), and strong brown (7.5YR 5/6) firm clay loam; weak, medium subangular to angular blocky structure; neutral; clear wavy boundary.

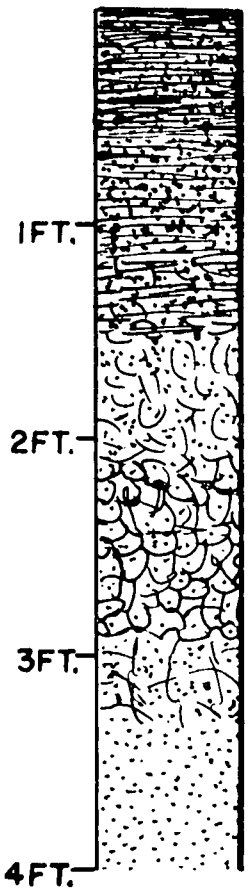
IIC (44-60″+) — IIC. Yellowish-brown (10YR 5/4) friable sandy loam glacial till; massive; calcareous.

and solum thickness above loose sand. Drainage is required for cropping. Tile normally function well but in some areas loose sand may interfere with installation. Ditches have been helpful in some of the larger areas and provide tile outlets. Productivity is moderately high to high in properly drained and fertilized areas.

Starks silt loam (132)

Starks silt loam is a light-colored, imperfectly drained soil developed under forest vegetation. Parent materials were stratified, medium-textured water deposits with a mantle of silty material varying from about 1 to 3 feet thick. The solum is 3½ or more feet thick and carbonates, if present, normally occur below that depth. The soil is found in small areas throughout the county. Some of the largest areas are in central Chemung township and have a thicker silt cover than areas east of Marengo

Representative profile, Selma loam



A_p (0-7″) — A_p. Black (10YR 1/1-2/1) friable loam; moderate, fine granular structure; slightly acid to neutral; abrupt smooth boundary.

A_1 (7-14″) — A_1. Black (10YR 1/1-2/1) friable, heavy loam; moderate, medium granular structure; slightly acid to neutral; gradual smooth boundary.

A_3 (14-18″) — A_3. Very dark gray (10YR 3/1) friable loam; weak, medium granular structure; slightly acid to neutral; gradual smooth boundary.

B_{1g} (18-25″) — B_{1g}. Very dark gray to very dark grayish-brown (2.5Y 3/1-3/2) friable, light clay loam with a few fine, prominent yellowish-brown (10YR 5/4) mottles; weak, fine subangular blocky structure; slightly acid to neutral; clear smooth boundary.

B_{2g} (25-35″) — B_{2g}. Dark gray to dark grayish-brown (2.5Y 4/1-4/2) firm clay loam with common, fine, prominent yellowish-brown (10YR 5/4) mottles; weak to moderate, medium subangular blocky structure; slightly acid to neutral; gradual smooth boundary.

B_{3g} (35-40″) — B_{3g}. Grayish-brown to dark grayish-brown (2.5Y 5/2-4/2) friable, light clay loam to sandy clay loam with common, medium, prominent yellowish-brown (10YR 5/8) mottles; weak, coarse subangular blocky structure; neutral; clear smooth boundary.

C_g (40-60″+) — C_g. Mixed grayish-brown (2.5Y 5/2) and brown (10YR 5/3) loose loamy sand to sand with a few medium, distinct yellowish-brown (10YR 5/8) mottles; single grain; neutral becoming calcareous with depth.

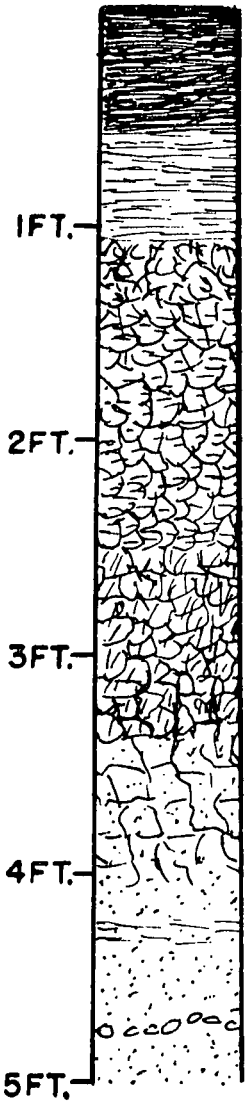
ridge. Starks occurs in outwash plains and on stream terraces, usually in level to gently sloping areas. On some slopes lateral movement of water keeps the soil partially saturated. Starks is most commonly associated with Millbrook (219) and Camden (134). In virgin areas, Starks has a thinner A_1 horizon than Millbrook, and in cultivated areas, it has a lighter colored plow layer. It is more poorly drained than Camden. (Profile drawing is on page 44.)

Starks is low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has moderate or sometimes moderately slow permeability and high moisture-holding capacity. Drainage is needed for maximum crop production. Most areas are cultivated, and productivity is moderately high when the soil is drained, fertilized, and properly managed.

Camden silt loam (134)

Camden silt loam is a light-colored soil developed under forest vegetation from stratified, medium-textured water deposits in outwash plains and on stream terraces, with a silty cover varying from 1 to 3 feet thick. Areas west of Marengo ridge, primarily in Chemung and northwestern Dunham townships, have a thicker silt cover than areas to the east. The solum is more than 3½ feet thick and carbonates,

Representative profile, Starks silt loam



A_p (0-7″) — A_p. Dark gray (10YR 4/1) friable silt loam; weak, fine crumb structure; medium acid; abrupt smooth boundary.

A_2 (7-13″) — A_2. Gray to grayish-brown (10YR 5/1-5/2) friable silt loam; weak to moderate, thin platy structure; strongly acid; clear smooth boundary.

B_1 (13-16″) — B_1. Grayish-brown (10YR 5/2) friable to firm, light silty clay loam with common, fine, faint yellowish-brown (10YR 5/6) mottles; weak, fine subangular blocky structure; strongly acid; clear smooth boundary.

B_{21} (16-30″) — B_{21}. Gray to grayish-brown (10YR 5/1-5/2) firm silty clay loam with common, fine, distinct dark brown (7.5YR 4/4) and yellowish-brown (10YR 5/6) mottles; moderate, medium subangular blocky structure; strongly acid; clear smooth boundary.

B_{22} (30-40″) — B_{22}. Dark grayish-brown to grayish-brown (2.5Y 4/2-5/2) firm silty clay loam with common, fine, distinct dark brown (7.5YR 4/4) mottles; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

B_3 (40-47″) — B_3. Grayish-brown (2.5Y 5/2-10YR 5/2) firm clay loam with common, fine, distinct dark brown (7.5YR 4/4) and yellowish-brown (10YR 5/8) mottles; weak, medium to coarse subangular blocky structure; medium to slightly acid; clear smooth boundary.

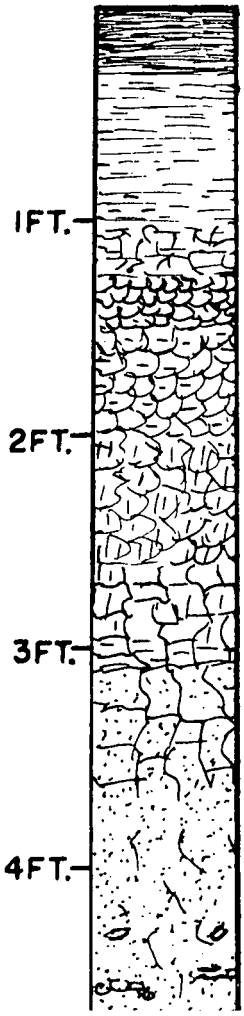
C (47-60″+) — C. Mixed grayish-brown (2.5Y 5/2), gray, and brown (10YR 5/1 and 5/3) friable, stratified silt loam, fine sandy loam, and clay loam; massive to weak, coarse angular blocky structure; neutral.

if present, normally occur below that depth. Camden is a well-drained to moderately well-drained soil occurring in an irregular pattern on slopes ranging from about 1 to 10 percent. It is most commonly associated with Fox (327), Harvard (344), and Starks (132).

Some physical and chemical properties of Camden silt loam are given in Table 11. The samples were collected from the same profile described here. This soil type includes some areas underlain by sand and gravel (instead of medium-textured sediments) below a depth of about 4 feet.

Camden is low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. Most areas of this soil are cultivated and respond well to fertilization and good management. If the more sloping areas are cultivated they must be protected from erosion. Productivity is medium to moderately high.

Representative profile, Camden silt loam



A_1 (0-4″) — A_1. Very dark grayish-brown (10YR 3/2) friable silt loam; moderate, fine crumb structure; slightly acid; clear smooth boundary.

A_2 (4-12″) — A_2. Dark grayish-brown (10YR 4/2) friable silt loam; moderate, thin platy structure; slightly acid; clear smooth boundary.

A_3 (12-15″) — A_3. Yellowish-brown (10YR 5/4) friable silt loam; weak, fine subangular blocky structure; medium acid; clear smooth boundary.

B_1 (15-18″) — B_1. Yellowish-brown (10YR 5/4-5/6) slightly firm, light silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

B_{21} (18-24″) — B_{21}. Yellowish-brown (10YR 5/4) firm silty clay loam; moderate, fine subangular blocky structure; strongly acid; clear smooth boundary.

B_{22} (24-31″) — B_{22}. Brown (10YR 4/3) firm silty clay loam with a few fine, distinct light brownish-gray (2.5Y 6/2) mottles and a few dark reddish-brown (5YR 3/2) iron-manganese concretions; moderate, medium subangular blocky structure; strongly acid; clear smooth boundary.

B_{23} (31-37″) — B_{23}. Mixed dark yellowish-brown and brown (10YR 4/4 and 5/3) firm, gritty silty clay loam with a few fine, faint yellowish-brown (10YR 5/6) mottles; moderate, medium subangular to angular blocky structure; strongly to very strongly acid; clear smooth boundary.

B_3 (37-44″) — B_3. Yellowish-brown (10YR 5/4-5/6) and pale brown (10YR 6/3) slightly firm, gritty, light silty clay loam; moderate, medium angular blocky structure; strongly acid; gradual smooth boundary.

C (44-60″+) — C. Light brownish-gray and pale brown (10YR 6/2-6/3) friable, heavy silt loam with noticeable sand and common, fine, faint yellowish-brown (10YR 5/6) mottles; weak, coarse angular blocky structure; strongly acid in upper part grading to neutral with depth; sand content increases with depth.

A Beta horizon (?) occurs above a depth of 60 inches in some areas of Camden in McHenry county.

Table 11. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF CAMDEN SILT LOAM[a]

Horizon[c]	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_2.....	4–12	0	5.2	75.2	19.6	7.9	2.8	.1	.8	17.8	65	6.1	1.10
B_{21}.....	18–24	0	3.7	63.3	33.0	14.7	6.6	.1	.5	30.4	72	5.4	.19
B_{22}.....	24–31	0	3.3	62.7	34.0	13.4	5.7	.1	.7	30.1	66	5.2	.20
B_{23}.....	31–37	0	7.5	60.2	32.3	14.4	6.0	.1	.6	31.0	68	5.0	.07
C.....	44–50	0	11.1	64.4	24.5	9.2	4.0	<.1	.5	21.3	64	5.2	.09

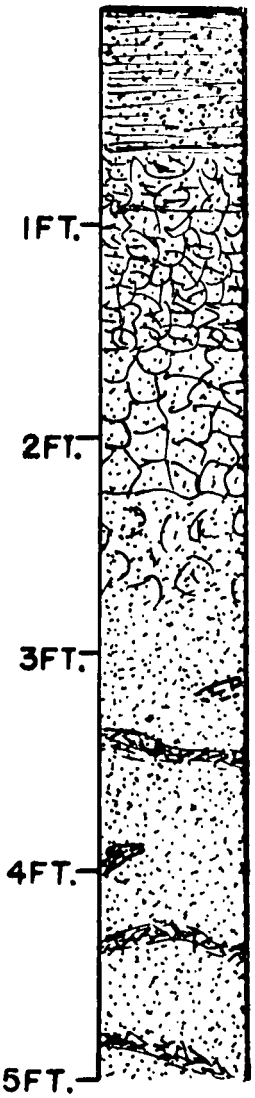
[a] McHenry county, T.45N., R.5E., Sec. 7, NE ¼, NE 40, SE 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] A_1, A_3, B_1, and B_3 horizons were not analyzed.

Ellison silt loam to loam (137)

Ellison silt loam to loam is a light-colored soil formed under forest vegetation. Parent materials are thin silt loam or loam sediments averaging about 2 to 3 feet thick, over loose noncalcareous sand and fine gravel deposits which grade to calcareous sand and fine gravel with depth (usually below 50 inches). This soil type includes areas with both silt loam and loam A horizons. It is a well-drained to somewhat excessively drained soil.

Ellison occurs in small areas in an irregular pattern. It is primarily found on level to gently sloping outwash plains, but it occasionally occurs on steeper slopes or terrace breaks or in water-deposited sediments in morainal areas. It is frequently associated with Camden (134) and Fox (327).

Representative profile, Ellison loam



A_p (0-8″) — A_p. Dark grayish-brown (10YR 4/2) friable loam; massive; medium acid; abrupt smooth boundary.

B_1 (8-11″) — B_1. Dark yellowish-brown (10YR 4/4) firm, gritty silty clay loam; weak, fine to very fine subangular blocky structure; strongly acid; clear smooth boundary.

B_{21} (11-19″) — B_{21}. Brown (7.5YR 4/3) firm, gritty silty clay loam borderline to clay loam; moderate, fine subangular blocky structure; strongly acid; gradual smooth boundary.

B_{22} (19-27″) — B_{22}. Dark brown (7.5YR 4/4) firm clay loam; weak, medium subangular blocky structure; strongly acid; clear smooth boundary.

IIB_{31} (27-33″) — IIB_{31}. Dark brown (7.5YR 4/4) friable loamy sand; massive; medium acid; clear wavy boundary.

IIB_{32}-C (33-52″+) — IIB_{32}-C. Mixed zone composed of C horizon with ½- to 1½-inch irregular horizontal bands of B horizon. C horizon is yellowish-brown (10YR 5/4) loose loamy sand; single grain; medium acid. B horizon bands are dark brown (7.5YR 4/4) friable sandy loam; massive; medium acid. Boundaries between bands and interbands are abrupt and wavy. Calcareous sand and fine gravel occur at a depth of 67 inches in this profile.

The A_1 and A_2 horizons in this profile are incorporated in the A_p. In the IIB-C horizon, the dark brown sandy loam bands are considered Beta (7) bands.

Table 12. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF ELLISON LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p	0–8	0	40.2	45.9	13.9	4.1	1.6	<.1	.2	7.6	78	5.5	.55
B_1	8–11	T[c]	30.5	42.2	27.3	6.8	3.9	.1	.3	14.4	77	4.8	.28
B_{21}	11–19	5.0	56.0	18.7	25.3	5.8	4.4	.1	.3	14.2	75	4.7	.16
B_{22}	19–27	3.0	81.7	5.1	13.2	3.2	2.4	<.1	.2	8.0	72	4.8	.07
IIB_{31}	27–33	T	91.7	2.5	5.8	1.5	.9	<.1	.1	3.4	74	5.0	.05
IIB_{32}	33–52[d]	T	89.0	2.3	8.7	2.4	1.6	<.1	.1	5.0	82	5.5	.06
IIC	33–52[d]	T	94.6	2.7	2.7	1.1	.4	<.1	<.1	2.1	71	5.5	.04

[a] McHenry county, T.44N., R.6E., Sec. 6, NW ¼, NW 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] T = Trace.
[d] Mixed B and C horizons occur between 33 and 52 inches. The B occurs as ½- to 1½-inch-thick bands. Both components were analyzed separately.

Some chemical and physical properties of Ellison are given in Table 12. The samples were collected from the same profile described here. The textures given for the description are field estimates and are not based on data in the table.

Ellison is low in organic matter, medium to strongly acid, low to medium in available phosphorus, and medium in available potassium. It has moderate to moderately rapid permeability and medium to low moisture-holding capacity. Most areas of this soil are cultivated and respond to fertilization and good management. However, productivity is largely determined by the amount and distribution of rainfall during the growing season. Crops suffer badly during dry periods.

Alvin sandy loam (144)

Alvin sandy loam is a light-colored soil developed under forest vegetation from sandy loam over loamy sand and sand deposits which were probably water-laid and later reworked by wind. It is well drained to somewhat excessively drained and occurs on slopes ranging from 1- to over 20-percent gradient. As mapped in McHenry county, Alvin is a variable soil with a wide range in the development and thickness of the B horizon and in the thickness of solum. The soil occurs in small areas in an irregular pattern in association with a variety of soils. It is most frequently found in McHenry, Seneca, Dorr, and Nunda townships but small isolated areas occur elsewhere.

Some chemical and physical properties of an Alvin fine sandy loam are given in Table 13. The data are from a soil containing more fine sand than is typical of Alvin in McHenry county.

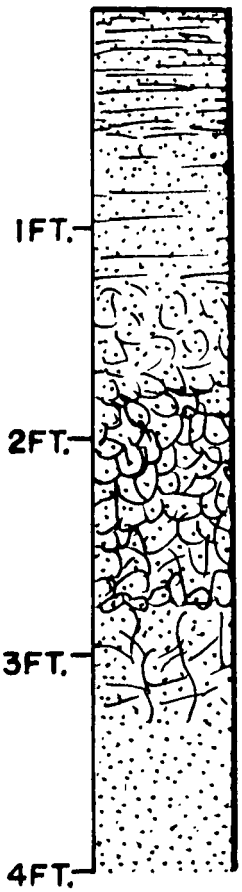
Alvin sandy loam is low in organic matter, medium to strongly acid, and low to medium in available phosphorus and available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is medium to low. Most areas of this soil are drouthy. Controlling wind erosion is a common problem and water erosion may be a problem on some sloping areas. Early maturing small grains, legumes, and grasses are best adapted to this soil. Occasionally fair crops of corn and soybeans are grown on the level to moderately sloping areas. Red and white pine are recommended for steep and eroded areas. Productivity ranges from low to medium depending on subsoil development, topography, and management.

Table 13. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF ALVIN FINE SANDY LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p	0–6	0	67.0	27.7	5.3	2.9	1.8	<.1	.1	7.5	64	6.8	.61
A_{21}	6–11	0	65.4	29.2	5.4	1.2	.9	<.1	<.1	5.3	40	5.8	.18
A_{22}	11–16	0	64.8	28.0	7.2	1.7	.7	<.1	<.1	5.3	45	5.4	.08
B_1	16–20	0	65.5	22.9	11.6	3.2	1.2	.1	<.1	8.7	52	5.3	.10
B_{21}	20–27	0	67.7	15.8	16.5	3.9	2.6	.2	.2	12.8	54	5.0	.09
B_{22}	27–35	0	75.1	9.5	15.4	4.0	3.7	.1	.1	13.0	61	5.0	.05
B_{23}	35–44	0	77.1	9.8	13.1	3.2	3.2	<.1	.2	10.6	62	4.8	.03
B_3	44–50	0	77.8	10.7	11.5	2.7	2.9	<.1	.2	10.2	57	4.8	.03
C	50–65	0	82.1	10.1	7.8	2.0	1.9	.1	.2	7.4	56	5.0	.07

[a] Will county, T.32N., R.10E., Sec. 7, NE ¼, NW 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.

Representative profile, Alvin sandy loam



A_p (0-7″) — A_p. Very dark grayish-brown to dark grayish-brown (10YR 3/2-4/2) very friable sandy loam; weak, fine crumb structure; slightly acid; abrupt smooth boundary.

A_2 (7-15″) — A_2. Dark grayish-brown to brown (10YR 4/2-5/3) very friable to loose sandy loam; very weak, thin platy structure in place breaking to fine crumb structure; medium to strongly acid; clear smooth boundary.

B_1 (15-20″) — B_1. Brown (10YR 4/3) friable sandy loam; weak, fine subangular blocky structure; strongly acid; clear smooth boundary.

B_2 (20-33″) — B_2. Brown (7.5YR 4/4) friable, light sandy clay loam; weak, medium subangular blocky structure; strongly to medium acid; clear smooth boundary.

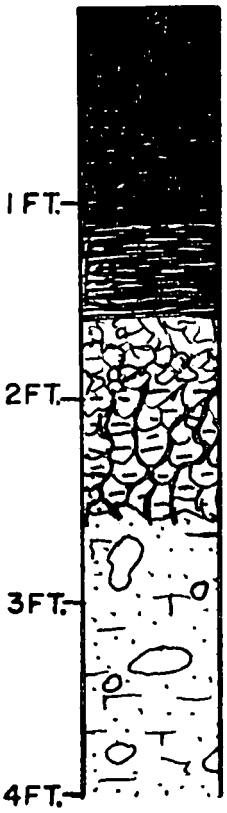
B_3 (33-40″) — B_3. Brown to strong brown (7.5YR 4/4-5/6) friable sandy loam; weak, medium to coarse subangular blocky structure; medium acid; clear wavy boundary.

C (40-60″+) — C. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) loose loamy sand to sand; single grain; slightly acid.

Saybrook silt loam (145)

Saybrook silt loam is a dark, well-drained to moderately well-drained, upland soil developed under prairie vegetation from about 1 to 3 feet of loess over loam or silt loam till. Calcareous till normally occurs at depths of 2 to 3½ feet. Slopes range from about 1 to 7 percent. Saybrook occurs most extensively across the southern

Representative profile, Saybrook silt loam



A_1 (0-13″) — A_1. Black to very dark brown (10YR 2/1-2/2) friable silt loam; moderate, medium granular structure; slightly acid; gradual smooth boundary.

A_3 (13-19″) — A_3. Very dark brown to very dark grayish-brown (10YR 2/2-3/2) friable silt loam; moderate, fine granular structure; slightly acid; clear smooth boundary.

B_1 (19-23″) — B_1. Dark brown to brown (10YR 3/3-4/3) slightly firm silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

IIB_2 (23-31″) — IIB_2. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm, gritty silty clay loam to clay loam; moderate, medium subangular blocky structure; medium to slightly acid; clear smooth boundary.

IIC (31-50″+) — IIC. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) friable loam glacial till; massive; calcareous.

Table 14. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF SAYBROOK SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–14	...[c]	9.5	59.9	30.6	16.1	8.0	...	.2	27.1	90	7.6	2.4
AB.....	14–19	...	9.0	55.6	35.4	12.1	7.9	...	.3	24.6	83	7.1	1.0
IIB_2....	19–30	...	14.4	48.7	36.9	9.7	6.8	...	.2	21.4	78	6.7	.6
IIC....	30–40	...	22.6	62.9	14.5	20.9	4.5	...	.1	25.5	100	8.1	.9

[a] Will county, T.37N., R.9E., Sec. 18, NW ¼, SE 40, SE 10 acres.
[b] Particle size distribution indicates a silty clay loam A_1 horizon. Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

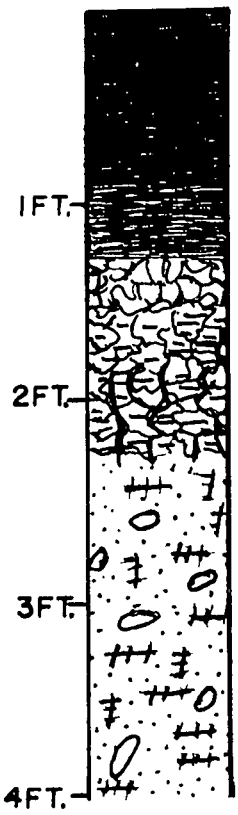
row of townships from western Algonquin township westward to the Boone county line. It is associated with Drummer (152), Lisbon (59), and LaRose (60). Saybrook areas in southwestern Riley township have a thicker loess cover and greater depth to carbonates than areas to the east. Some chemical and physical properties of a Saybrook soil are given in Table 14.

Saybrook is high in organic matter, about medium acid, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate and moisture-holding capacity is high. Erosion is a hazard on sloping areas under intensive cultivation and loss of surface soil greatly reduces productivity. Saybrook is highly productive when properly managed.

Elliott silt loam (146)

Elliott silt loam is a dark upland soil developed under prairie vegetation from a thin loess cover (usually less than 2 feet thick) over silty clay loam till. Calcareous till normally occurs at depths between 2 and 3½ feet. The soil is imperfectly drained and occurs in level areas and on slopes of usually less than 5-percent gradient. A few small areas occur on steeper slopes. Elliott is found mainly in the south-central part of the county on the Marseilles moraine (Fig. 5). It is most extensive in eastern Seneca, southwestern Dorr, northern Grafton, and western Algonquin townships. It is associated with Varna (223) and Ashkum (232). Some physical and chemical properties of an Elliott soil are given in Table 15.

Representative profile, Elliott silt loam



A_1 (0-11″)

A_1. Black (10YR 2/1) friable, heavy silt loam; moderate, fine granular structure; slightly acid; gradual smooth boundary.

A_3 (11-15″)

A_3. Very dark gray (10YR 3/1) friable, light silty clay loam; moderate, fine granular structure; medium acid; clear smooth boundary.

B_1 (15-18″)

B_1. Very dark grayish-brown and dark grayish-brown (10YR 3/2 and 4/2) firm silty clay loam with a few fine, faint dark yellowish-brown to yellowish-brown (10YR 4/4-5/6) mottles; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

IIB_{21} (18-23″)

IIB_{21}. Dark brown and dark yellowish-brown (10YR 4/3 and 4/4) firm silty clay with common, fine, faint dark grayish-brown (10YR 4/2) and yellowish-brown (10YR 5/8) mottles; strong, medium angular blocky structure; medium acid; clear smooth boundary.

IIB_{22} (23-26″)

IIB_{22}. Mottled dark yellowish-brown, dark grayish-brown, yellowish-brown (10YR 4/4, 4/2, 5/6), and grayish-brown (2.5Y 5/2) firm silty clay; strong, medium angular blocky structure; slightly acid grading to neutral with depth; clear smooth boundary.

IIC (26-40″+)

IIC. Grayish-brown (2.5Y 5/2) firm silty clay loam till containing some gravel with common, fine, distinct dark gray (10YR 4/1) and yellowish-brown (10YR 5/6) mottles; weak, medium angular blocky structure in upper part grading to massive with depth; calcareous.

Table 15. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF ELLIOTT SILT LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_{11}.....	0–5	.1	8.8	57.4	25.5	17.4	3.2	.30	1.2	24.2	92	6.2	4.31
A_{12}.....	5–10	.1	8.5	59.1	27.0	16.0	2.6	.18	.7	22.2	87	5.8	3.28
A_3.....	10–14	.2	7.9	58.1	30.4	14.6	2.3	.15	.6	20.2	87	5.8	2.08
B_{21}.....	14–19	.4	8.3	51.3	37.9	13.4	3.2	.15	.6	19.6	88	5.9	1.33
B_{22}.....	19–24	1.2	9.4	45.0	44.3	12.9	4.4	.17	.6	18.6	97	6.5	.88
B_3.....	24–29	.5	10.5	44.9	44.1	12.8	4.6	.14	.5	18.4	98	7.0	.93
C.....	29–48	7.4	15.2	55.1	30.6	...[d]	...	...	...	...	...	7.9	.57

[a] Will county, T.33N., R.9E., Sec. 1, NE ¼, NE 40, NW 10 acres.
[b] Data from J. D. Alexander (*1*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.

Elliott is high in organic matter, about medium acid, low in available phosphorus, and medium to high in available potassium. Permeability is moderately slow and moisture-holding capacity is high. Drainage is needed in level and gently sloping areas. Tile are usually effective but water moves somewhat slowly through the B and C horizons. Shallow ditches effectively remove surface water. Sloping areas may be severely eroded if not protected. According to a study on Elliott silt loam (*29*), acre yields of corn are 10 bushels greater where the A horizons are 12 inches thick than where they are only 4 inches thick. For every inch of A horizon lost by erosion, corn yields were reduced by about 1.2 bushels per acre.

Proctor silt loam (148)

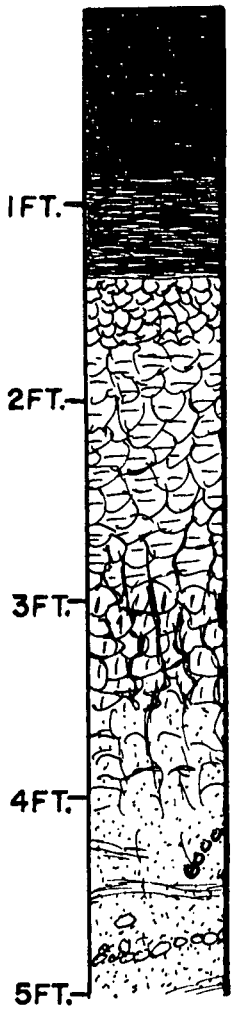
Proctor silt loam is a dark soil developed under prairie vegetation from stratified, medium-textured water deposits usually having a silty covering about 1 to 3 feet

Table 16. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF PROCTOR SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_{11}.....	0–8	0	3.1	70.6	25.3	14.2	5.2	...[c]	.52	20.4	99	7.1	2.48
A_{12}.....	8–15	0	2.8	69.4	26.7	10.7	4.9	...	.29	19.3	84	6.3	1.91
A_3.....	15–19	0	2.6	68.6	28.2	7.8	5.3	...	.27	18.4	74	5.5	1.39
B_1.....	19–24	0	2.5	66.6	30.8	8.1	6.8	...	.28	19.2	81	5.4	.96
B_{21}.....	24–32	0	2.7	64.4	31.9	8.0	8.7	...	.32	20.1	86	5.4	.58
B_{22}.....	32–41	.2	10.5	57.3	30.1	9.4	7.0	...	.36	19.0	89	5.5	.40
IIB_3 (Beta)	41–48	36.3	29.7	31.0	37.9	10.9	8.4	...	.38	21.6	92	6.2	.61
IIC....	48–60	62.0	72.6	19.1	7.6	5.5	1.9	...	.10	1.9	100+	7.9	.23

[a] La Salle county, T.31N., R.4E., Sec. 13, SE ¼, NE 40, SE 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

Representative profile, Proctor silt loam



A_1 (0-10″)	A_1. Very dark brown (10YR 2/2) friable silt loam; weak, fine crumb structure; slightly acid; gradual smooth boundary.
A_3 (10-16″)	A_3. Very dark grayish-brown (10YR 3/2) friable silt loam; moderate, fine granular structure; slightly acid; clear smooth boundary.
B_1 (16-20″)	B_1. Dark brown (10YR 3/3-4/3) firm, light silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.
B_{21} (20-35″)	B_{21}. Dark yellowish-brown (10YR 4/4) firm silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.
B_{22} (35-42″)	B_{22}. Dark yellowish-brown (10YR 4/4) firm silty clay loam with some sand grains and a few fine, faint yellowish-brown (10YR 5/8) and grayish-brown (10YR 5/2) mottles; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.
B_3 (42-48″)	B_3. Dark grayish-brown (10YR 4/2) to dark brown (10YR 4/3) firm clay loam; weak, medium to coarse subangular blocky structure; slightly acid; gradual wavy boundary.
C (48-60″+)	C. Mixed yellowish-brown, brown, and pale brown (10YR 5/4, 4/3, and 6/3) friable, stratified loam, silt loam, and clay loam; massive to weak, coarse angular blocky structure; neutral in upper part becoming calcareous with some gravel at a depth of 55 inches.

A Beta horizon (?) occurs above a depth of 60 inches in some areas of Proctor in McHenry county.

thick. The solum is thicker than 3½ feet and carbonates, if present, usually occur below that depth. In this county some areas are included with Proctor that are underlain by sand and gravel (instead of medium-textured sediments) at depths below 4 feet. The soil is well drained to moderately well drained.

Proctor occurs throughout the county, occupying outwash plains and stream terraces on slopes of 0 to 7 percent. Areas west of Marengo ridge generally have the thickest silt cover. Large areas of Proctor occur in Chemung and Dunham townships, in Hebron township, and in Hartland and Seneca townships. The soil is associated with Warsaw (290), Brenton (149), Drummer (152), and others. Some physical and chemical properties of a Proctor soil are given in Table 16. The profile analyzed, however, has more gravel at depths between 3½ and 5 feet than normal.

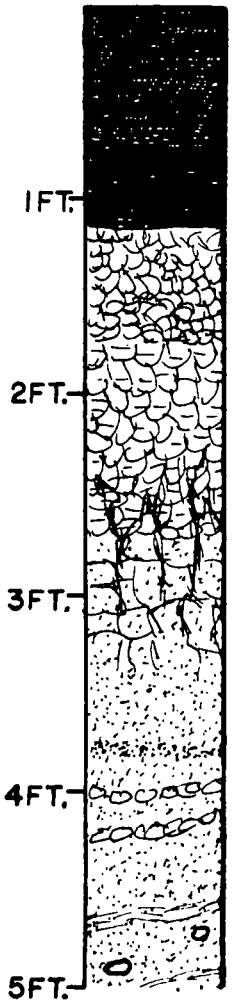
This soil type is high in organic matter, medium acid, low in available phosphorus, and medium to high in available potassium. It has high moisture-holding capacity and moderate permeability. Most areas are cultivated and productivity is high when the soil is properly managed. Slopes of greater than 3- or 4-percent gradient should be protected from erosion.

Brenton silt loam (149)

Brenton silt loam is a dark, imperfectly drained soil developed under prairie vegetation from stratified, medium-textured water deposits, usually having a silty covering about 1 to 3 feet thick. The solum is normally 3½ feet thick or thicker and carbonates, if present, usually occur below that depth. The soil occurs on stream terraces and outwash plains, primarily in level to gently sloping areas. It is irregularly distributed throughout the county, often occurring in small areas. It is most closely associated with Proctor (148), Millbrook (219), and Drummer (152). Brenton is very similar to Millbrook but has a thicker, darker A_1 horizon and lacks an A_2 horizon. It is better drained than Drummer but more poorly drained than Proctor.

Brenton is high in organic matter, medium to slightly acid, low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. The water table is periodically high and drainage is needed in most areas. Tile function well where outlets are available. Most areas can be intensively cropped and are highly productive when the soil is properly drained and managed (Fig. 20).

Representative profile, Brenton silt loam



A_p (0-8″) — A_p. Black (10YR 2/1) friable silt loam; weak, medium granular structure; slightly acid; abrupt smooth boundary.

A_1 (8-13″) — A_1. Black to very dark brown (10YR 2/1-2/2) friable, heavy silt loam; weak, medium to coarse granular structure; medium to slightly acid; clear smooth boundary.

B_{21} (13-20″) — B_{21}. Mixed very dark gray (10YR 3/1) and dark grayish-brown (10YR 4/2-2.5Y 4/2) firm silty clay loam with a few fine, distinct yellowish-brown (10YR 5/6) mottles; moderate, fine subangular blocky structure with dark gray clay coatings; medium to slightly acid; clear smooth boundary.

B_{22} (20-32″) — B_{22}. Mottled dark grayish-brown, dark brown, dark yellowish-brown (10YR 4/2, 4/3, 4/4), and dark gray (2.5Y 4/1) firm, gritty silty clay loam; moderate, medium subangular blocky structure with dark gray clay coatings; medium to slightly acid; clear smooth boundary.

B_3 (32-38″) — B_3. Mottled gray (10YR 5/1), dark grayish-brown (10YR 4/2), and yellowish-brown (10YR 5/6) firm clay loam; weak, medium to coarse angular blocky structure; neutral; clear smooth boundary.

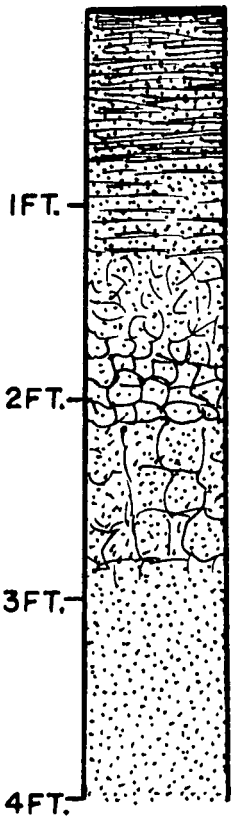
C (38-50″+) — C. Mottled gray, dark gray, dark yellowish-brown, and yellowish-brown (10YR 5/1, 4/1, 4/4, and 5/6) friable, stratified silt loam, sandy loam, and clay loam; massive; neutral in upper part becoming calcareous at a depth of 48 inches; contains small amounts of gravel.

Cabbage and pepper production on Brenton and Drummer soils east of Chemung. Although these soils are excellent for grain production, a limited acreage is used for growing vegetables. (Fig. 20)

Onarga sandy loam (150)

Onarga sandy loam is a dark to moderately dark, well-drained to somewhat excessively drained soil. It developed under prairie vegetation from sandy loam over loamy sand or sand. The deposits were probably water-laid and in some places reworked by wind. Slopes normally range from 1 to 6 percent but occasionally they are as steep as 10 percent. Small areas of the soil occur in an irregular pattern with other outwash-derived soils. The largest areas are found in the southwestern part of

Representative profile, Onarga sandy loam



A_1 (0-9″) — A_1. Black to very dark brown (10YR 2/1-2/2) friable sandy loam; weak, medium to fine granular structure; slightly acid; clear smooth boundary.

A_3 (9-15″) — A_3. Very dark grayish-brown to dark brown (10YR 3/2-3/3) friable sandy loam; weak, medium crumb structure; slightly acid; clear smooth boundary.

B_1 (15-20″) — B_1. Dark brown to brown (7.5YR 3/3-4/4) friable sandy clay loam; weak, medium subangular blocky structure; medium acid; clear smooth boundary.

B_2 (20-25″) — B_2. Dark brown to brown (7.5YR 4/3-4/4) firm clay loam; weak, medium subangular blocky structure; medium acid; clear smooth boundary.

B_3 (25-33″) — B_3. Brown (7.5YR 4/4) friable, light sandy clay loam; weak, coarse subangular blocky structure; slightly acid; gradual smooth boundary.

C (33-50″+) — C. Brown (7.5YR 4/4) to yellowish-brown (10YR 5/4) loose loamy sand to sand; single grain; slightly acid to neutral.

the county along the lower Kishwaukee river and Coon creek in association with Sumner (87), Ridgeville (156), and LaHogue (102). Onarga is similar to Sumner but has a somewhat heavier textured subsoil and is less drouthy.

Some Onarga areas occurring with Saybrook (145) and Lisbon (59), particularly in Riley, Coral, and Grafton townships, developed in thin sandy deposits, about 2 to 4 feet thick, over calcareous loam till. These inclusions tend to have higher moisture-holding capacity than portions developed in deeper sandy deposits.

Onarga is medium to moderately high in organic matter, about medium acid, and low to medium in available phosphorus and available potassium. It has moderate permeability and medium moisture-holding capacity. Crops suffer during prolonged dry periods. Most areas are cultivated and should be protected from wind erosion. Productivity is moderately high when the soil is fertilized according to soil-test recommendations.

Drummer silty clay loam (152)

Drummer silty clay loam is a very dark, poorly drained soil developed under wet prairie or marsh vegetation from medium-textured to moderately fine-textured material. Parent material is mainly outwash but in some areas the lower part of the B horizon and the C horizon occur in loam or sandy loam till. In many areas a thin covering of loess has influenced the surface horizon. The soil occurs in level areas or gently sloping drainageways with slopes ranging from 0 to 3 percent. A few areas of Drummer very occasionally occur on slopes of as much as 7-percent gradient. These steeper areas are poorly drained because of seepage from lateral movement of ground water.

Drummer is the most extensive soil in the county, occupying about 42,000 acres. It occurs in broad delineations in level outwash and lake plains, particularly the outwash plain directly west of Marengo ridge (Fig. 5). When it occurs in morainal areas, it is generally restricted to narrow drainageways.

Some physical and chemical properties of Drummer are given in Table 17. In most Drummer profiles, the lower A and upper B horizons are finer textured than shown in the table. The average cation-exchange capacity of the surface 6 inches of two Drummer sites in western McHenry county was about 45 me. per 100 gm. of soil. This value is greater than that of the A_p horizon in Table 17.

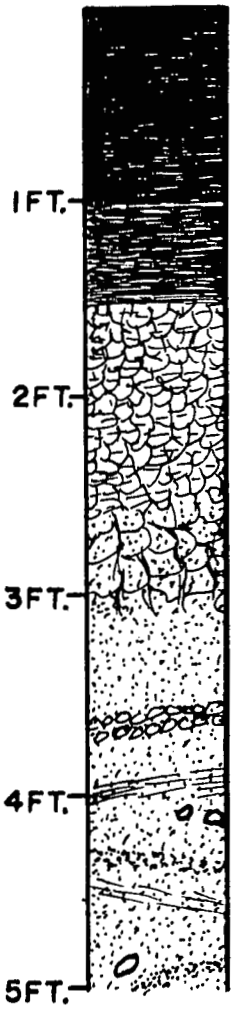
Table 17. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF DRUMMER SILTY CLAY LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p	0–8	.2	11.1	62.5	26.4	26.2	8.1	...[c]	.36	33.7	100+	6.3	4.00
A_{12}	8–16	.6	15.6	59.8	24.6	17.1	7.5	...	.35	24.2	100+	6.8	1.50
B_1	16–20	.8	17.7	59.6	22.7	12.7	6.8	...	.30	17.5	100+	7.1	.56
B_{21}	20–24	.5	14.8	61.2	24.0	13.2	6.9	...	.36	19.9	100+	7.2	.46
B_{22}	24–31	.1	7.4	65.1	27.5	14.3	8.1	...	.41	21.5	100+	7.1	.37
B_{23}	31–41	0	3.2	65.2	31.6	15.9	9.0	...	.40	24.9	100+	7.2	.31
C	41–60	.1	7.2	68.9	23.9	12.2	6.6	...	.40	17.8	100+	7.2	.28

[a] Grundy county, T.32N., R.6E., Sec. 21, NW ¼, SW 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

Drummer is high in organic matter, slightly acid to neutral, low to medium in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability moderate. The water table is high for relatively long periods. Drainage is required and tile function well. Large areas should be drained by dredge ditches which serve as outlets for tile lines. Sloping areas are subject to erosion. Drummer is adapted to intensive cropping and is highly productive when properly drained and fertilized. (See Fig. 9, page 12.)

Representative profile, Drummer silty clay loam



A_1 (0-12″) — A_1. Black (10YR 1/1-2/1) firm, light silty clay loam; moderate, fine to medium granular structure; slightly acid; gradual smooth boundary.

AB (12-18″) — AB. Black to very dark gray (10YR 2/1-3/1) firm silty clay loam; moderate, medium granular structure; slightly acid; clear smooth boundary.

B_{2g} (18-30″) — B_{2g}. Dark grayish-brown and grayish-brown (10YR 4/2 and 5/2) firm silty clay loam with noticeable sand in lower part and common, fine, distinct yellowish-brown (10YR 5/6-5/8) mottles; weak to moderate, medium subangular blocky structure with tendency toward fine to medium prismatic; slightly acid to neutral; gradual smooth boundary.

B_{3g} (30-36″) — B_{3g}. Dark grayish-brown (10YR 4/2) to grayish-brown (2.5Y 5/2) firm clay loam with common, medium, distinct yellowish-brown (10YR 5/6-5/8) mottles; weak, medium to coarse subangular blocky structure; neutral; clear wavy boundary.

C_g (36-60″+) — C_g. Mixed gray, grayish-brown (2.5Y 6/1, 5/2), and yellowish-brown (10YR 5/6-5/8) stratified, friable silt loam, loam, and sandy loam with some gravel; massive; neutral in upper part becoming calcareous at a depth of 45 inches.

Ridgeville sandy loam (156)

Ridgeville sandy loam is a dark, imperfectly drained soil developed under prairie vegetation in level areas and occasionally on slopes ranging up to about 5 or 6 percent. It occurs in outwash areas where sandy loam deposits overlie loamy sand or sand. This soil typically has a well-developed subsoil, but it includes a few small areas with weakly developed subsoils. Small areas of the soil occur in an irregular pattern

in sandy outwash sediments. The largest areas occur in southwestern Marengo and northwestern Riley townships.

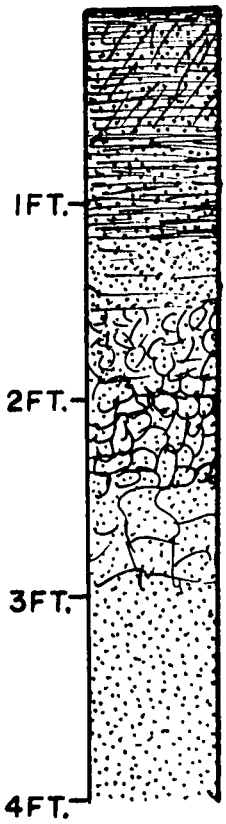
Some physical and chemical properties of a Ridgeville soil are given in Table 18. This profile represents some of the Ridgeville areas in the county; other areas have thicker B horizons that contain more clay.

Table 18. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF RIDGEVILLE FINE SANDY LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_{11}	0–9	0	77.1	14.4	8.5	7.2	2.6	.11	.13	12.5	80	5.7	2.22
A_{12}	9–18	0	79.5	13.1	7.4	3.6	0.9	.28	.05	8.1	59	5.1	1.33
A_3	18–23	0	79.0	13.9	7.1	2.3	...[d]	...	.04	6.1	46	5.0	.64
B_1	23–33	0	85.7	8.2	6.1	1.8	...	...	.03	3.8	68	5.5	.26
B_2	33–44	0	79.3	6.8	13.9	5.1	...	...	.16	9.6	95	6.2	.17
B_3	44–53	0	84.3	7.2	8.5	3.2	...	...	.08	4.8	100	7.3	.10

[a] Will county, T.32N., R.9E., Sec. 2, NW ¼, NW 40, NW 10 acres.
[b] Data from W. W. Janssen (*21*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.

Representative profile, Ridgeville sandy loam



A_p (0-8″) — A_p. Black to very dark brown (10YR 2/1-2/2) friable sandy loam; weak, fine crumb structure; slightly acid; abrupt smooth boundary.

A_1 (8-14″) — A_1. Very dark brown (10YR 2/2) friable sandy loam; weak, medium crumb structure; slightly to medium acid; clear smooth boundary.

A_3 (14-18″) — A_3. Very dark grayish-brown (10YR 3/2) friable sandy loam; weak, medium crumb structure; medium acid; clear smooth boundary.

B_1 (18-22″) — B_1. Very dark grayish-brown and dark yellowish-brown (10YR 3/2 and 4/4) friable, light sandy clay loam with a few fine, faint yellowish-brown (10YR 5/8) mottles; weak, fine subangular blocky structure; medium to strongly acid; clear smooth boundary.

B_2 (22-29″) — B_2. Mottled light brownish-gray, dark yellowish-brown, and yellowish-brown (10YR 6/2, 4/4, and 5/8) slightly firm sandy clay loam; weak, medium subangular blocky structure; medium acid; clear smooth boundary.

B_3 (29-35″) — B_3. Yellowish-brown (10YR 5/6) very friable sandy loam with common, medium, distinct light brownish-gray (10YR 6/2) mottles; weak, coarse subangular blocky structure; slightly acid to neutral; clear wavy boundary.

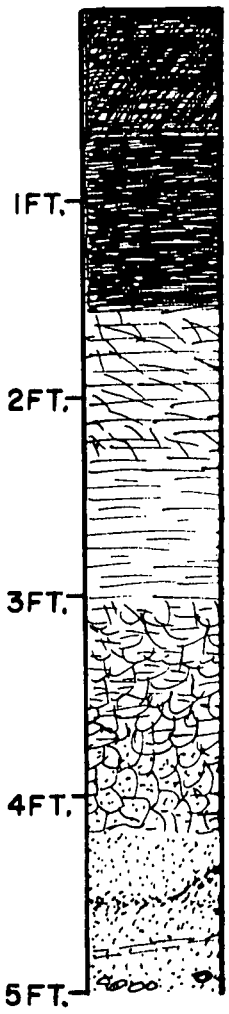
C (35-60″+) — C. Mixed dark yellowish-brown, yellowish-brown, light brownish-gray, and pale brown (10YR 4/4, 5/6, 6/2, and 6/3) loose loamy sand to sand; single grain; neutral.

Ridgeville sandy loam is moderately high in organic matter, about medium acid, and low to medium in available phosphorus and available potassium. Because of the wide range in subsoil development, permeability varies from moderate to moderately rapid and moisture-holding capacity varies from moderately high to moderately low. Most areas are cultivated and productivity is moderately high where subsoil development is moderate. In areas of weak subsoil development, the soil tends to be drouthy during prolonged dry periods. Drainage is needed in most areas but the water table should not be lowered too far. Open ditches are generally satisfactory. Loose sand is often present and interferes with tile installation. Wind erosion is occasionally a problem.

Knight silt loam (191)

Knight silt loam has a dark to moderately dark A_1 horizon underlain by a thick, light-colored A_2 horizon. It formed under prairie vegetation from 4 feet or more of silty or loamy deposits on sandy loam or loamy gravel glacial drift. It is imperfectly

Representative profile, Knight silt loam



A_p (0-7″)	A_p. Very dark gray (10YR 3/1) friable silt loam; moderate, medium granular structure; slightly acid; abrupt smooth boundary.
A_1 (7-18″)	A_1. Black (10YR 2/1) friable silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.
A_{21} (18-28″)	A_{21}. Dark gray to dark grayish-brown (10YR 4/1-4/2) friable silt loam; weak, medium platy structure; medium to strongly acid; gradual smooth boundary.
A_{22g} (28-36″)	A_{22g}. Gray to grayish-brown (10YR 5/1-5/2) friable silt loam; moderate, thin to medium platy structure; strongly acid; clear smooth boundary.
B_g (36-50″)	B_g. Gray (10YR 5/1-6/1) firm silty clay loam in upper part to clay loam in lower part, with common, fine, distinct yellowish-red (5YR 5/8) mottles and very dark gray (5YR 3/1) iron-manganese concretions; moderate, medium to coarse subangular blocky structure; medium acid; gradual smooth boundary.
IIC_g (50″+)	IIC_g. Mixed grayish-brown (10YR 5/2), gray (10YR 6/1), and pale brown (10YR 6/3) friable sandy loam with common, fine, distinct yellowish-red (5YR 5/8) mottles; massive; slightly acid grading with depth to calcareous, stratified glacial drift.

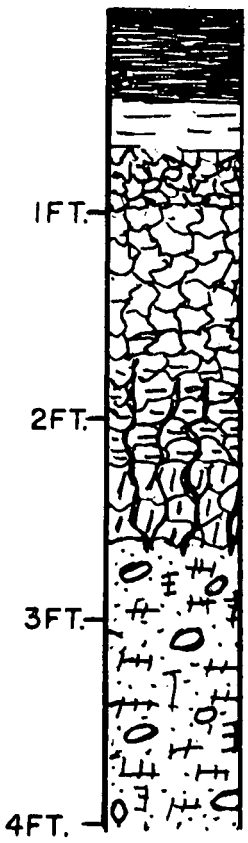
to poorly drained and occurs in small closed depressions in till or outwash plains in association with Warsaw (290), Ringwood (297), and occasionally McHenry (310). Some areas were too small to delineate and are shown on the map by a depression symbol. Knight has properties somewhat intermediate between Troxel (197) and Thorp (206), both of which occupy depressions in the same areas as Knight.

Knight is high in organic matter, medium to slightly acid, low in available phosphorus, and medium to high in available potassium. Permeability is moderately slow and moisture-holding capacity is high. Most areas are cultivated but crops occasionally drown out. Drainage is usually required and tile function satisfactorily where outlets can be provided. Surface inlets to tile lines are often required to remove water that collects in depressions.

Morley silt loam (194)

Morley silt loam is a light-colored upland soil developed under forest vegetation from a thin covering of loess (usually less than 2 feet thick) over silty clay loam till. Calcareous till occurs at depths of less than 3½ feet. In eroded areas the solum is thinner and the loess cover may be absent. Morley occurs on slopes ranging from about 4 to 20 percent. It is naturally moderately well to well drained. It is most extensive in southwestern Dorr township but occurs in minor amounts in other areas. It occurs with Blount (23), Beecher (298), Ashkum (232), and other soils.

Representative profile, Morley silt loam



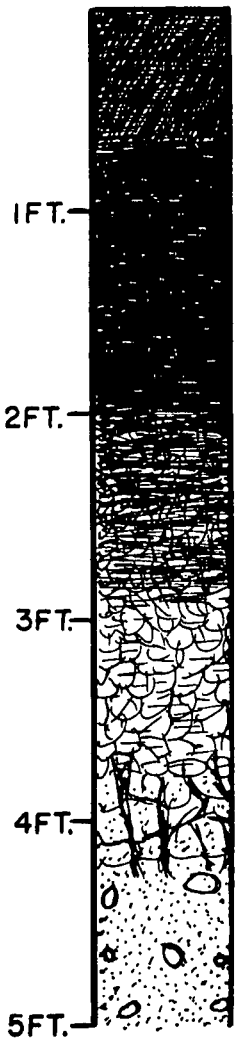
A_p (0-5″)	A_p. Very dark grayish-brown to dark grayish-brown (10YR 3/2-4/2) friable silt loam; moderate, fine to medium crumb structure; slightly to medium acid; abrupt smooth boundary.
A_2 (5-8″)	A_2. Dark grayish-brown to brown (10YR 4/2-5/3) friable silt loam; weak, thin platy structure; medium acid; clear smooth boundary.
B_1 (8-11″)	B_1. Dark brown (10YR 3/3) firm, light silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.
B_{21} (11-20″)	B_{21}. Dark yellowish-brown (10YR 4/4) firm silty clay loam; moderate to strong, fine to medium angular blocky structure; medium acid; clear smooth boundary.
IIB_{22} (20-26″)	IIB_{22}. Dark yellowish-brown (10YR 4/4) firm, gritty, heavy silty clay loam; moderate, medium subangular to angular blocky structure with very dark grayish-brown (10YR 3/2) discontinuous clay coatings; medium to slightly acid; clear smooth boundary.
IIB_3 (26-31″)	IIB_3. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) firm, gritty, heavy silty clay loam with a few fine, distinct strong brown (7.5YR 5/6) mottles; moderate, medium subangular to angular blocky structure; neutral with a few calcareous spots; clear smooth boundary.
IIC (31-40″+)	IIC. Dark grayish-brown, grayish-brown (10YR 4/2, 5/2), and light brownish-gray (2.5Y 6/2) firm silty clay loam till with some gravel; massive to weak medium angular blocky structure; calcareous.

Morley is low in organic matter, about medium acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderately slow to slow. Runoff may cause serious erosion on this soil and erosion control is a major problem. Cultivated slopes should be kept in rotation sod crops as much as possible. Steeper slopes are best adapted to permanent pasture or woodland. Stands of native trees are maintained in some areas. Productivity is medium in uneroded areas under good management.

Troxel silt loam (197)

Troxel silt loam is a dark soil developed under prairie vegetation from about 4 feet or more of silty or loamy deposits on sandy loam or loamy gravel glacial drift. It is moderately well drained to imperfectly drained and occurs in small closed depressions and occasionally in upland drainageways in till or outwash plains. Some small areas of Troxel are shown on the map by a depression symbol. The soil is widely

Representative profile, Troxel silt loam



A_p (0-8″) — A_p. Very dark brown (10YR 2/2) friable silt loam; moderate, medium granular structure; slightly acid; abrupt smooth boundary.

A_1 (8-24″) — A_1. Black (10YR 2/1) friable silt loam; moderate to strong, medium granular structure; slightly to medium acid; gradual smooth boundary.

A_3 (24-34″) — A_3. Very dark brown (10YR 2/2) grading with depth to very dark grayish-brown (10YR 3/2) friable silt loam; weak, fine subangular blocky to coarse granular structure; medium acid; gradual smooth boundary.

B_2 (34-45″) — B_2. Dark grayish-brown to dark brown (10YR 4/2-4/3) slightly firm, heavy silt loam to light silty clay loam with a few fine, faint yellowish-brown (10YR 5/8) mottles; weak, medium subangular blocky structure; medium acid; gradual smooth boundary.

IIB_3 or Beta (45-50″) — IIB_3. Dark brown (7.5YR 3/2-3/4) friable, light clay loam; weak, coarse subangular blocky structure; slightly acid; clear smooth boundary.

IIC (50-60″+) — IIC. Yellowish-brown (10YR 5/4) friable sandy loam drift; massive; neutral to calcareous; contains much gravel.

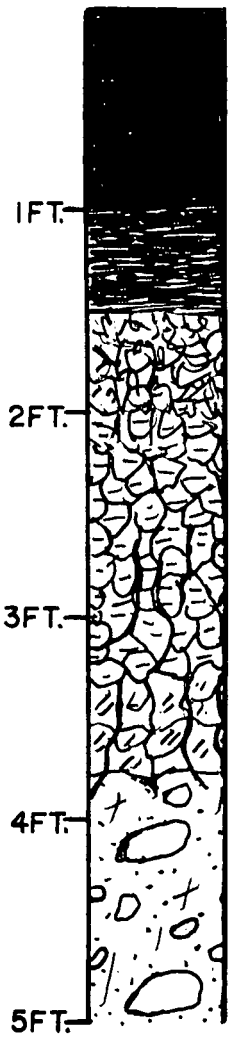
distributed in the county, occurring primarily in association with Warsaw (290), Ringwood (297), Proctor (148), and Volinia (79). It also occurs in many areas that contain Thorp (206) and Knight (191). Troxel can easily be distinguished from Thorp and Knight, because it lacks an A_2 horizon.

Troxel is high in organic matter, neutral to slightly acid, medium to low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. Drainage is usually needed. Surface inlets to tile lines help remove water that collects in depressions. Most Troxel areas are cultivated. In dry years crops generally do better in depressions than on surrounding well-drained soils. In very wet years crops may occasionally drown out.

Elburn silt loam (198)

Elburn silt loam is a dark, imperfectly drained soil developed under prairie vegetation in depressions and level areas and occasionally on slopes ranging up to about 3 percent. Parent material is loess (about 30 to 40 inches thick) over sandy loam

Representative profile, Elburn silt loam



A_1 (0-12″) — A_1. Black (10YR 2/1) friable silt loam; weak, fine granular structure; slightly acid; clear smooth boundary.

A_3 (12-18″) — A_3. Very dark brown (10YR 2/2) friable silt loam; moderate, fine granular structure; slightly acid; clear smooth boundary.

B_1 (18-24″) — B_1. Dark grayish-brown (10YR 4/2) and brown (10YR 5/3) firm silty clay loam with common, fine, distinct dark brown (10YR 4/4) mottles; moderate, fine subangular blocky structure; slightly acid; clear smooth boundary.

B_{21} (24-30″) — B_{21}. Mottled dark grayish-brown (10YR 4/2), grayish-brown (10YR 5/2), and yellowish-brown (10YR 5/8) firm silty clay loam; moderate, fine subangular blocky structure; slightly acid; clear smooth boundary.

B_{22} (30-39″) — B_{22}. Mixed dark grayish-brown (10YR 4/2) and grayish-brown (10YR 5/2) firm silty clay loam with common, fine, distinct strong brown (7.5YR 5/8) mottles; moderate, medium subangular blocky structure with thin discontinuous clay coatings; medium acid; clear smooth boundary.

IIB_3 (39-45″) — IIB_3. Dark grayish-brown (10YR 4/2) and dark yellowish-brown (10YR 4/4) firm clay loam with common, fine, distinct strong brown (7.5YR 5/8) mottles; weak, medium subangular blocky structure with some clay coatings; slightly acid to neutral; clear smooth boundary.

IIC (45-60″+) — IIC. Yellowish-brown (10YR 5/4) friable sandy loam glacial till; massive; calcareous.

till. Calcareous till usually occurs below 3½ feet. Some areas with thinner loess cover are included with Elburn. It is associated with Ringwood (297), Griswold (363), Nippersink (299), and other soils.

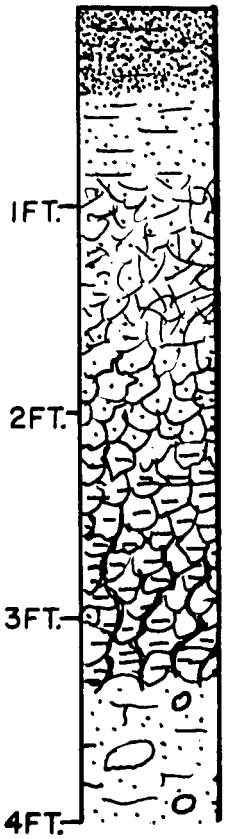
Elburn is high in organic matter, slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. Drainage is needed for maximum crop production and tile function satisfactorily. Most areas are used as cropland and are very productive.

Metea sandy loam (205)

Metea sandy loam is a light-colored upland soil developed under forest vegetation from about 1½ to 3½ feet of sandy material on loam or silt loam glacial till. Calcareous till occurs at depths ranging from 2 to 4 feet. The dominant slope range is between 1 and 12 percent. The soil is well drained to somewhat excessively drained. It occurs primarily in the southern part of the county on the glacial moraines in northeastern Riley, Coral, and southwestern Grafton townships. The sandy overburden in some Metea areas was probably windblown from areas of water-deposited sands occurring along Kishwaukee river and Coon creek. The soil is primarily associated with Miami (24) and Strawn (224).

Metea is low in organic matter, medium to strongly acid, low in available phosphorus, and low to medium in available potassium. It has moderate to moderately

Representative profile, Metea sandy loam



A_1 (0-5″) — A_1. Very dark grayish-brown (10YR 3/2) to very dark brown (10YR 2/2) friable fine sandy loam; moderate, fine crumb structure; neutral; clear smooth boundary.

A_2 (5-10″) — A_2. Brown (10YR 4/3-5/3) with channel fillings of very dark brown (10YR 2/2) friable fine sandy loam; weak, very thin to thin platy structure with light gray (10YR 7/2) silt coatings when dry; slightly acid; clear smooth boundary.

B_1 (10-20″) — B_1. Dark brown (7.5YR 4/4) friable, heavy, fine sandy loam; weak, medium subangular blocky structure showing light gray (10YR 7/2) silt coatings when dry; medium acid; clear smooth boundary.

B_{21} (20-26″) — B_{21}. Dark brown (7.5YR 4/4) firm clay loam; strong, fine to medium subangular blocky structure with discontinuous clay coatings of dark reddish-brown (5YR 3/3); medium to slightly acid; clear smooth boundary.

IIB_{22} (26-40″) — IIB_{22}. Reddish-brown (5YR 4/4) firm clay loam with discontinuous clay coatings of dark reddish-brown (5YR 3/3); moderate, medium subangular to angular blocky structure; neutral; clear wavy boundary.

IIC (40″+) — IIC. Reddish-brown (5YR 4/3 and 4/4) friable loam till; massive breaking to coarse angular blocky structure; calcareous. This profile contains occasional pebbles beginning at about 20 inches.

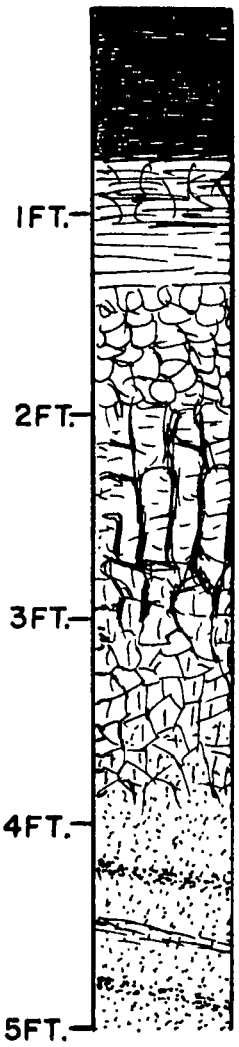
Till in this profile is more reddish than that of Metea soils in many other areas in Illinois.

rapid permeability and medium moisture-holding capacity. Most areas can be used as cropland but should be protected from wind erosion. Sloping areas may also be subject to water erosion. Small grains, grasses, and legumes are better adapted than corn because Metea tends to be drouthy.

Thorp silt loam (206)

Thorp silt loam is a moderately dark, poorly drained soil developed under prairie vegetation from about 3 or 4 feet of silty or loamy sediments over loam, sandy loam, or loamy gravel glacial drift. It occurs in depressions or level areas in association with Troxel (197) and Knight (191), which also occur in depressions. It is more poorly drained and has a finer textured B horizon than either Troxel or Knight. Thorp is also associated with Saybrook (145), Proctor (148), Ringwood (297), and Warsaw (290).

Representative profile, Thorp silt loam



A_1 (0-9″) — A_1. Very dark brown (10YR 2/2) friable silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.

A_{21} (9-13″) — A_{21}. Very dark gray (10YR 3/1) friable silt loam; moderate, coarse granular structure; slightly acid; gradual smooth boundary.

A_{22g} (13-16″) — A_{22g}. Dark gray to gray (10YR 4/1-5/1) friable silt loam; moderate, thin platy structure; small brown iron-manganese concretions; medium to strongly acid; clear smooth boundary.

B_{21g} (16-23″) — B_{21g}. Dark gray (10YR 4/1) firm silty clay loam with common, fine, faint brown (10YR 5/3) mottles; moderate, medium subangular blocky structure; small brown to black iron-manganese concretions; strongly acid; clear smooth boundary.

B_{22g} (23-33″) — B_{22g}. Grayish-brown (10YR 5/2-2.5Y 5/2) firm silty clay with common, fine, distinct strong brown (7.5YR 5/6-5/8) mottles and many iron-manganese concretions; moderate, medium prismatic breaking to medium to coarse angular blocky structure; medium to strongly acid; clear smooth boundary.

B_{3g} (33-46″) — B_{3g}. Olive-gray (5Y 5/2) firm silty clay loam with a few fine, distinct strong brown (7.5YR 5/6) mottles and many iron-manganese concretions; weak, coarse angular blocky structure; slightly acid; gradual smooth boundary.

IIC_g (46-50″+) — IIC_g. Gray (5Y 5/1) friable, stratified silt loam, loam, and sandy loam; massive; neutral grading to calcareous with depth.

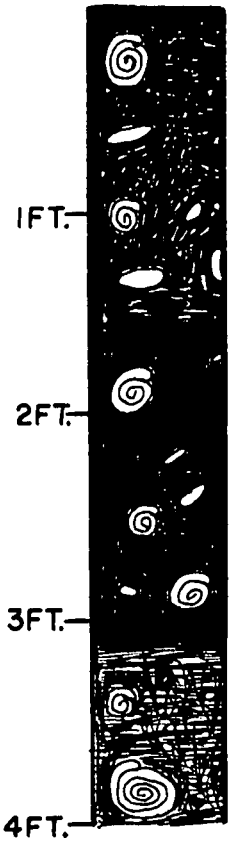
Thorp is about medium in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Permeability is slow to moderately slow and moisture-holding capacity is high. Depressions are sometimes difficult to drain adequately and crops often drown out. Tile function fairly well in most areas if outlets are available. Surface inlets to tile lines help remove water that collects in depressions. Most areas are cultivated.

Lena muck (210)

Lena muck is a very dark, naturally very poorly drained, organic soil. It consists of decomposed reeds, rushes, sedges, and other nonwoody, water-loving vegetation, mixed with small amounts of mineral matter. Snail shells and shell fragments occur throughout the profile. The organic deposit is usually more than 3 feet thick. Fibrous or sedimentary peat usually occurs at variable depths below the muck. A few areas have a surface layer of muck 1 to 3 feet thick which overlies marl deposits or sandy or silty materials. Other areas are primarily peat deposits, lacking a muck surface.

The soil occurs mainly in level to depressional areas but occasionally occurs on slopes where lateral seepage keeps the soil saturated. Areas vary in size from small depressions to many acres. Lena is associated with Houghton muck (103) and

Representative profile, Lena muck



1 (0-18″) 1. Black (10YR 1/1) very friable muck with numerous light gray (10YR 7/1-7/2) snail shells and fragments; moderate, medium crumb structure; calcareous; gradual smooth boundary.

2 (18-38″) 2. Black (10YR 2/1) very friable muck with numerous light gray to white (10YR 7/1-8/1) snail shells and fragments; massive; calcareous; gradual smooth boundary.

3 (38-50″+) 3. Black to very dark brown (10YR 2/1-2/2) very friable muck grading to dark brown (10YR 3/3) fibrous peat, both containing light gray to white (10YR 7/1-8/1) snail shells and fragments; massive; calcareous.

Houghton peat (97) and with poorly drained soils such as Drummer (152), Harpster (67 and 347), Otter (76), and Millington (82). It is very similar to Houghton muck but it is calcareous.

Lena muck is very high in organic matter and low in available phosphorus and available potassium. Permeability is moderate and moisture-holding capacity is high. Undrained areas remain natural marshes and drainage is needed for cultivation (Fig. 21). Tile will function but should be placed on a firm foundation. A system of open ditches and tile is needed for large areas. Productivity is high for corn and certain vegetable crops when the soil is properly drained and fertilized. Yields of other crops are variable on this soil and small grains tend to lodge.

Many areas of organic soils such as Lena muck are too wet to cultivate and often contain ponded water — indicated on soil map by swamp symbols. (Fig. 21)

Millbrook silt loam (219)

Millbrook silt loam is a moderately dark, imperfectly drained soil developed under mixed prairie-forest vegetation from stratified, medium-textured water deposits which usually have a silt cover about 1 to 3 feet thick. The silt cover is thickest in areas west of Marengo ridge. The solum is normally more than 3 feet thick and carbonates, if present, usually occur below 3½ feet. Recent forest encroachment resulted in the development of an A_2 horizon below a relatively thick, dark to moderately dark A_1 horizon. A photograph of a Millbrook profile is shown in Figure 12.

Millbrook occurs on stream terraces and outwash plains in level to gently sloping areas. It is primarily found as small areas in an irregular pattern throughout the county. Some of the largest areas are in the level outwash plains near Rush and Piscasaw creeks in Chemung, Dunham, and Marengo townships. The soil is commonly associated with Brenton (149), Starks (132), Drummer (152), and Harvard (344). It is closely related to Brenton and Starks in parent material and drainage and is intermediate between the two soils in many other properties.

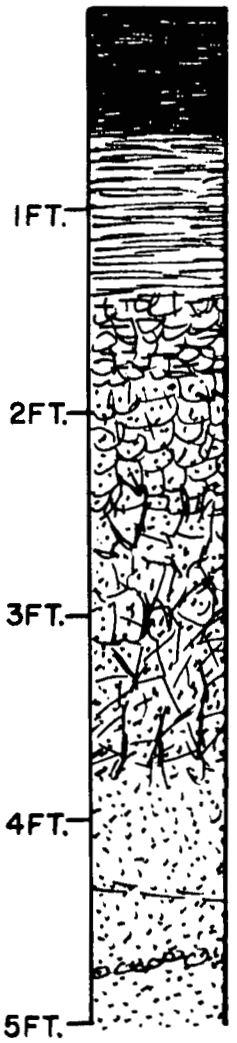
Millbrook is moderately high in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has high moisture-holding capacity and moderate permeability. The water table is periodically high and drainage is needed in many areas. Tile function satisfactorily where outlets are available. Productivity is moderately high to high when the soil is properly drained and managed. (Profile drawing is on page 66.)

Plattville silt loam (220)

Plattville silt loam is a dark soil developed under prairie vegetation from loess and glacial till (averaging about 2 to 3½ feet in combined thickness) over dolomitic limestone. The entire mantle is weathered and included in the solum. In McHenry county, the soil ranges from imperfectly to moderately well drained. It occupies only 85 acres, all within section 31 of Marengo township. It occurs mostly on slopes ranging from about 1 to 3 percent, but one small area has slopes averaging slightly more than 7 percent. Plattville is similar to Dana (56) and Sidell (55), but it has limestone bedrock within rooting depth of some of the commonly grown crops.

This soil type is high in organic matter, about medium acid, low in available

Representative profile, Millbrook silt loam



A_p (0-7″) — A_p. Very dark brown to very dark gray (10YR 2/2 to 3/1) friable silt loam; weak, fine crumb structure; slightly acid; clear smooth boundary.

A_2 (7-17″) — A_2. Very dark grayish-brown (10YR 3/2) in upper part grading to dark grayish-brown (10YR 4/2) in lower part; very friable silt loam with a few fine, faint dark gray (10YR 4/1) and grayish-brown (10YR 5/2) mottles; weak, thin to medium platy structure; medium to strongly acid; abrupt smooth boundary.

B_{21} (17-21″) — B_{21}. Mottled dark grayish-brown, dark yellowish-brown, and yellowish-brown (10YR 4/2, 4/4, and 5/6) firm, gritty silty clay loam; weak, medium to fine subangular blocky structure with dark gray clay coatings; strongly acid; clear smooth boundary.

B_{22} (21-30″) — B_{22}. Dark grayish-brown to dark brown (10YR 4/2-4/3) firm clay loam with common, fine, distinct dark brown to strong brown (7.5YR 4/4-4/6) mottles; moderate, medium subangular blocky structure with dark gray clay coatings; strongly acid; clear smooth boundary.

B_3 (30-44″) — B_3. Mottled dark grayish-brown (10YR 4/2), grayish-brown (2.5Y 5/2), and dark brown to strong brown (7.5YR 4/4-4/6) slightly firm clay loam to friable sandy loam; weak, coarse blocky structure; medium to slightly acid; gradual smooth boundary.

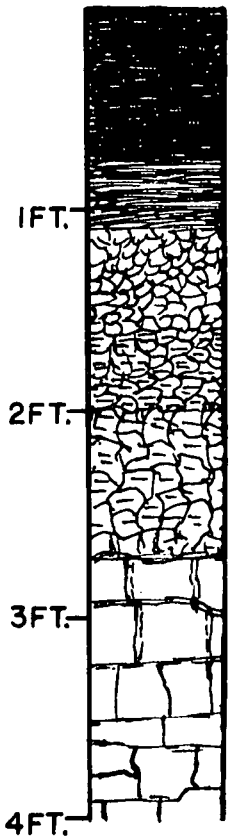
C (44-60″+) — C. Mixed gray (N 5/0), grayish-brown (10YR 5/2), and pale brown (10YR 6/3) friable clay loam to sandy clay loam with common, fine, distinct dark brown (7.5YR 4/4) mottles; massive; slightly acid in upper part grading to neutral and becoming calcareous at a depth of 64 inches in this profile.

phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity above bedrock. Steeper areas should be protected against erosion. Plattville is adapted to crops commonly grown in the county. Certain crops may suffer in dry years. Productivity ranges from moderately high to high.

Varna silt loam (223)

Varna silt loam is a dark, moderately well- to well-drained, upland soil developed under prairie vegetation on slopes ranging from about 3 to 15 percent. The solum developed in a thin loess cover, usually less than 2 feet thick, over silty clay loam till. Calcareous till occurs at depths of less than 3½ feet. Thickness of loess cover and depth to carbonates decrease as the slope and erosion increase. The soil is mainly associated with Elliott (146) and Ashkum (232). It is most extensive in

Representative profile, Plattville silt loam



A_1 (0-9″) — A_1. Black to very dark brown (10YR 2/1-2/2) friable silt loam; moderate, fine to medium granular structure; slightly acid; clear smooth boundary.

A_3 (9-13″) — A_3. Very dark grayish-brown to dark brown (10YR 3/2-3/3) friable silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.

B_1 (13-19″) — B_1. Dark brown (10YR 4/3) slightly firm silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

IIB_{21} (19-24″) — IIB_{21}. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm, gritty silty clay loam with a few very thin light gray (10YR 7/2) silt coatings when dry and a few fine, faint yellowish-brown (10YR 5/8) mottles; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_{22} (24-32″) — IIB_{22}. Dark brown (7.5YR 4/4) firm clay loam with a few fine, distinct grayish-brown (10YR 5/2) and yellowish-brown (10YR 5/8) mottles; moderate, medium subangular blocky structure; slightly acid; abrupt smooth boundary.

IIIR (32″+) — IIIR. Pale yellow (5Y 7/3-8/3) dolomitic limestone bedrock.

southwestern Dorr township but also occurs in eastern Seneca, northern Grafton, and western Algonquin townships, primarily on the Marseilles moraine (Fig. 5).

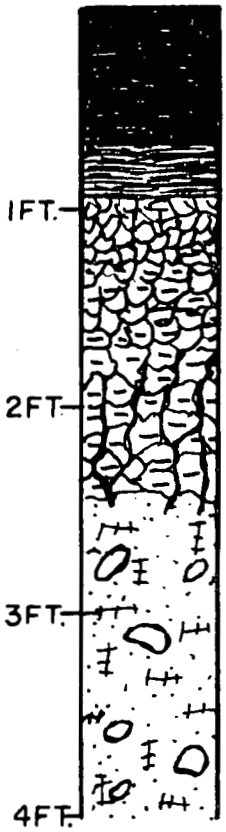
Varna is high in organic matter unless eroded, slightly to medium acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderately slow. Erosion control is a major problem. Productivity is medium to moderately high in uneroded areas. (Profile drawing is on page 68.)

Strawn silt loam (224)

Strawn silt loam is a light-colored, well-drained, upland soil developed under forest vegetation from a thin loess cover (usually less than 18 inches thick) over loam or silt loam till. Calcareous till usually occurs at depths of 2 feet or less. The surface is often eroded away on cultivated slopes and the plow layer may consist mainly of subsoil that is silty clay loam or clay loam. The soil occurs extensively on Marengo ridge on slopes ranging from about 5 to 15 percent and less extensively in other areas. It is associated with Miami (24), Montmorenci (57), Herbert (62), Lisbon (59), and Drummer (152).

Strawn is low in organic matter, about medium acid, low in available phosphorus, and about medium in available potassium. It has moderate permeability and moderately high moisture-holding capacity. The soil is somewhat drouthy because of the

Representative profile, Varna silt loam



A_1 (0-8″) — A_1. Very dark brown to very dark grayish-brown (10YR 2/2-3/2) friable, heavy silt loam; moderate, fine granular structure; slightly acid; clear smooth boundary.

A_3 (8-11″) — A_3. Dark brown (10YR 3/3) friable, heavy silt loam; moderate, medium granular structure; slightly acid; clear smooth boundary.

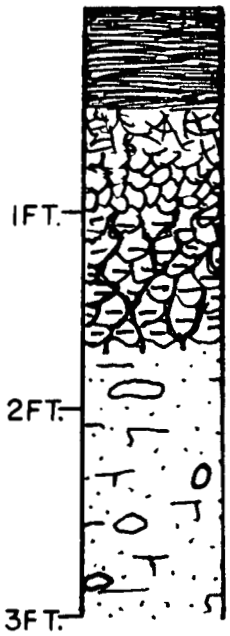
B_1 (11-15″) — B_1. Dark yellowish-brown (10YR 3/4) firm silty clay loam; weak, fine subangular blocky structure; slightly to medium acid; clear smooth boundary.

IIB_{21} (15-20″) — IIB_{21}. Dark brown to brown (10YR 4/3) firm, heavy silty clay loam; strong, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_{22} (20-29″) — IIB_{22}. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm silty clay with a few fine, faint yellowish-brown (10YR 5/6) mottles; strong, medium subangular to angular blocky structure; slightly acid grading to neutral; clear smooth boundary.

IIC (29-40″+) — IIC. Dark yellowish-brown, yellowish-brown, and light brownish-gray (10YR 4/4, 5/4, and 6/2) firm silty clay loam till with some pebbles and a few fine, faint yellowish-brown (10YR 5/6) mottles; massive to weak, medium angular blocky structure; calcareous.

Representative profile, Strawn silt loam



A_p (0-6″) — A_p. Dark grayish-brown (10YR 4/2) friable silt loam; weak, medium crumb structure; slightly acid; abrupt smooth boundary.

B_1 (6-12″) — B_1. Dark brown (10YR 4/3) firm, gritty silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_2 (12-20″) — IIB_2. Reddish-brown (5YR 4/4) firm clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.

IIC (20-40″+) — IIC. Reddish-brown (5YR 5/4) friable loam glacial till; massive breaking to coarse angular blocky structure; calcareous.

The A_1 and A_2 horizons in this profile are incorporated in the A_p. The till in this profile is more reddish than that of Strawn soils in many other areas in Illinois.

thin solum. Some areas, especially the steeper slopes, are covered by stands of native trees. However, large areas are cleared and cultivated and are subject to severe erosion. Steeper slopes and eroded areas are best adapted to hay and pasture.

Eylar silt loam (228)

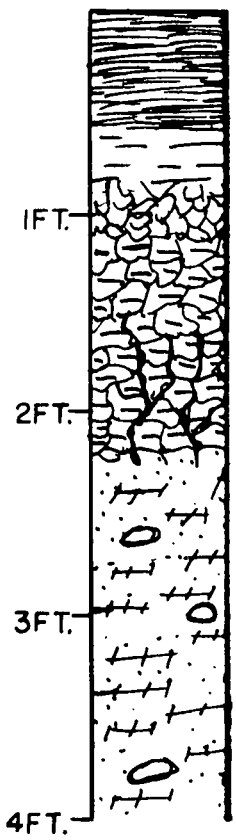
Eylar silt loam is a light-colored soil developed under forest vegetation from a thin cover of loess or medium-textured outwash over calcareous silty clay or clay drift. The drift is mostly till but may be lacustrine material in certain areas. It is usually calcareous at depths of 3 feet or less. In some places the fine-textured drift is underlain with coarser textured drift. The Eylar in these areas is well drained or moderately well drained. Where only fine-textured drift is present, the soil is imperfectly drained.

Surface texture in McHenry county varies considerably. About 70 acres have a sandy loam surface with fine-textured material at depths of 2 feet or less. These areas occur in section 28 of Richmond township and section 12 of Nunda township.

Altogether 380 acres of Eylar were mapped in the county. These are all in the eastern part, mostly in eastern McHenry and Nunda townships between Pistakee and Griswold lakes. Some physical and chemical properties of an Eylar soil are given in Table 19.

Eylar is low in organic matter, about medium acid, low in available phosphorus, and medium in available potassium. Moisture-holding capacity is high but perme-

Representative profile, Eylar silt loam



A_p (0-7″)	A_p. Dark grayish-brown (10YR 4/2) friable silt loam; moderate, fine to medium granular structure; slightly acid; abrupt smooth boundary.
A_2 (7-10″)	A_2. Grayish-brown (10YR 5/2) friable silt loam; weak, thin platy structure; medium acid; clear smooth boundary.
B_1 (10-13″)	B_1. Dark yellowish-brown (10YR 4/4) firm silty clay loam; strong, fine to medium subangular blocky structure; medium acid; clear smooth boundary.
IIB_{21} 13-19″)	IIB_{21}. Dark yellowish-brown (10YR 4/4) firm, light silty clay with common, fine, faint grayish-brown (10YR 5/2) mottles; strong, medium subangular blocky structure with discontinuous very dark grayish-brown (10YR 3/2) clay coatings; medium acid; clear smooth boundary.
IIB_{22} (19-26″)	IIB_{22}. Brown to yellowish-brown (10YR 5/3-5/4) firm silty clay with common, fine, faint grayish brown (10YR 5/2) mottles; strong, medium to coarse subangular blocky structure with discontinuous very dark gray (10YR 3/1) clay coatings; medium to slightly acid; clear smooth boundary.
IIC (26-40″+)	IIC. Mixed grayish-brown, brown, and light yellowish-brown (10YR 5/2, 5/3, and 6/4) firm silty clay drift; moderate, medium to coarse angular blocky structure; calcareous.

Table 19. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF EYLAR SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_{11}.....	0–3	.4	12.0	57.8	20.4	14.3	7.4	.23	.60	21.0	100+	7.3	3.96
A_{12}.....	3–5	.5	13.1	62.0	19.9	9.8	5.5	.16	.35	14.6	100+	7.3	2.34
A_2.....	5–9	1.7	13.0	64.9	20.3	5.1	3.9	.04	.30	9.8	95	7.1	.88
B_1.....	9–14	1.2	9.6	51.6	34.6	3.7	4.6	.10	.36	12.8	68	5.2	.52
B_2.....	14–21	.7	7.4	35.3	51.7	4.8	5.8	.17	.40	18.4	52	4.5	.50
B_3.....	21–26	.8	8.8	36.3	49.1	7.0	9.4	.15	.25	16.0	100+	5.8	.45
C.....	26–45	4.9	16.7	40.9	41.6	...[c]	...	...	...	...	...	7.8	.35

[a] Will county, T.35N., R.12E., Sec. 19, NE ¼, SE 40, SE 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

ability is slow to very slow. Because of a high clay content water is held tightly in the B and C horizons, so crops may suffer from lack of moisture even when the soil contains moderate amounts. Level to gently sloping areas may need drainage but tile usually do not function well. When sloping areas are cultivated, they are subject to severe erosion because of excessive runoff.

Productivity of Eylar is usually low even under good management. Legume-grass mixtures are better adapted than grain crops. Sloping areas which have been cleared of timber should be replanted to trees.

Ashkum silty clay loam (232)

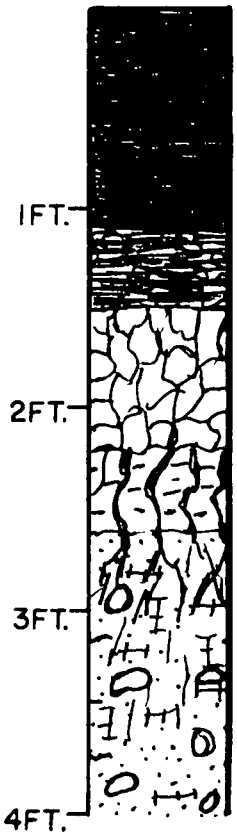
Ashkum silty clay loam is a very dark, poorly drained, upland soil formed in a thin covering of loess or local slope wash over silty clay loam till. Calcareous till occurs at depths of less than 3½ feet. A few areas may be underlain by calcareous silty clay loam lacustrine deposits rather than till. Ashkum developed under wet prairie

Table 20. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF ASHKUM SILTY CLAY LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p.....	0–6	T[c]	7.7	52.7	39.6	28.7	10.1	...[d]	.5	38.2	82	6.4	4.7
A_{11}.....	6–8	T	7.9	51.0	41.1	29.9	10.3	...	.5	37.5	83	6.5	4.1
A_{12}.....	8–11	T	9.0	48.9	42.1	25.0	9.8	...	.4	31.6	88	6.8	1.9
B_1.....	11–16	T	9.2	49.7	41.1	20.6	8.4	...	.4	26.4	89	7.1	1.0
B_{21}.....	16–21	T	7.3	52.9	39.8	17.8	7.8	...	.4	23.6	91	7.3	.6
B_{22}.....	21–26	T	6.5	53.8	39.7	18.4	8.6	.1	.4	23.5	93	7.3	.5
B_3.....	26–32	T	14.5	48.5	37.0	14.2	6.4	.1	.3	18.0	94	7.5	.6
C.....	32–50	T	15.2	48.7	36.1	16.2	6.4	...	.3	11.3	98	7.9	.7

[a] Will county, T.34N., R.11E., Sec. 22, NW ¼, NE 40, NE 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] T = Trace.
[d] Not determined.

Representative profile, Ashkum silty clay loam



A_1 (0-13″) — A_1. Black (10YR 1/1-2/1) firm silty clay loam; moderate, medium granular structure; slightly acid to neutral; gradual smooth boundary.

AB (13-18″) — AB. Very dark gray (10YR 3/1) firm silty clay loam with a few fine, faint dark grayish-brown (2.5Y 4/2) mottles; moderate, fine subangular blocky structure; slightly acid to neutral; clear smooth boundary.

B_{2g} (18-26″) — B_{2g}. Dark gray (10YR 4/1) to dark grayish-brown (2.5Y 4/2) firm silty clay loam with a few fine, distinct yellowish-brown (10YR 5/6) mottles; weak, fine to medium prismatic breaking to medium to coarse angular blocky structure; slightly acid to neutral; clear smooth boundary.

IIB_{3g} (26-31″) — IIB_{3g}. Dark grayish-brown and grayish-brown (2.5Y 4/2 and 5/2) firm, gritty silty clay loam with common, fine, distinct yellowish-brown (10YR 5/6-5/8) mottles; weak, medium prismatic breaking to coarse angular blocky structure; neutral; clear smooth boundary.

IIC_g (31-40″+) — IIC_g. Mixed dark grayish-brown, grayish-brown, and light olive-brown (2.5Y 4/2, 5/2, and 5/4) firm silty clay loam till with some pebbles and common, fine, distinct yellowish-brown (10YR 5/6) mottles; massive to weak, coarse angular blocky structure; calcareous.

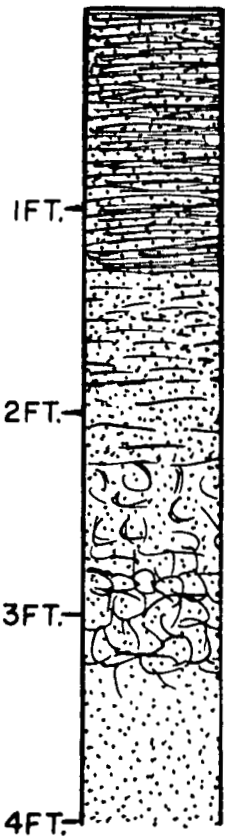
or marsh vegetation in level to gently sloping areas. It occurs in the south-central part of the county in association with Morley (194), Blount (23), Beecher (298), Varna (223), and Elliott (146). Some physical and chemical properties of an Ashkum soil are given in Table 20.

Ashkum is high in organic matter, neutral to slightly acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderately slow. The water table is high except during summer. Drainage is needed for general farm crops and tile function satisfactorily if outlets are available. Drained areas are cultivated and have moderately high productivity. Narrow strips of Ashkum that occur in gently sloping drainageways are subject to erosion if runoff is great. These areas should be maintained as grass waterways.

Lomax loam (265)

Lomax loam is a dark, well-drained to moderately well-drained soil developed under prairie vegetation from about 3 to 4 feet of loamy sediments on loamy sand and sand. It has a thick A_1 horizon and a weakly developed loam to heavy loam B horizon. Lomax mainly occurs south of Kishwaukee river in Marengo, Seneca, and Riley townships. It usually occupies level to gently sloping topography but occasionally (particularly near Kishwaukee river bottomland) occurs on slopes ranging

Representative profile, Lomax loam



A_{11} (0-15″) — A_{11}. Black (10YR 2/1) friable loam; weak, medium to fine granular structure; slightly acid; gradual smooth boundary.

A_{12} (15-22″) — A_{12}. Very dark brown (10YR 2/2) friable loam; weak, medium to fine granular structure; slightly to medium acid; gradual smooth boundary.

A_3 (22-27″) — A_3. Very dark grayish-brown (10YR 3/2) friable loam; weak, medium granular structure; medium acid; clear smooth boundary.

B_1 (27-32″) — B_1. Dark brown (7.5YR 3/3) friable loam; weak, medium subangular blocky structure; medium acid; gradual smooth boundary.

B_2 (32-39″) — B_2. Dark brown to brown (7.5YR 4/3-4/4) friable, heavy loam; weak, medium subangular blocky structure; medium to slightly acid; gradual smooth boundary.

C (39-50″+) — C. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4-5/6) loose sandy loam grading to loose sand with depth; single grain; slightly acid.

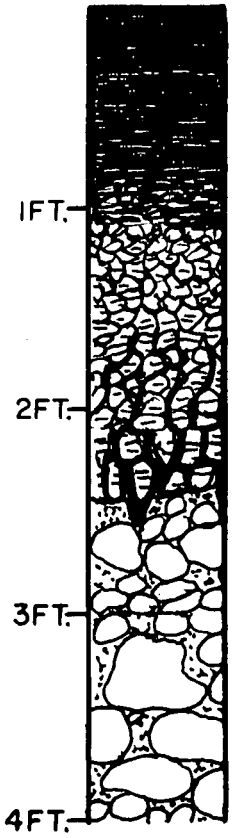
up to 4 or 5 percent. Lomax is associated with and similar to Volinia (79) but has a somewhat less-developed B horizon and less gravel with the underlying sand. It gradually grades into soils with sandy loam surfaces, such as Sumner (87), Onarga (150), and Ridgeville (156). Small portions of Lomax may have sandy loam surfaces where they border sandy soils.

Lomax is high in organic matter, about medium acid, and low to medium in available phosphorus and available potassium. Moisture-holding capacity is medium to low and permeability is moderately rapid. Most areas can be used for general cropping but corn frequently suffers from lack of moisture. Sizable areas of Lomax are near the Kishwaukee river, suggesting that irrigation systems might be developed to permit growing of specialized vegetable crops.

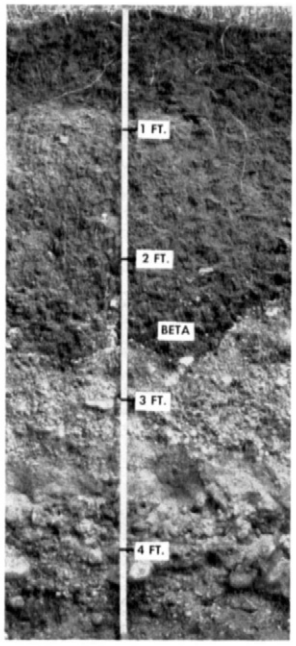
Warsaw silt loam to loam (290)

Warsaw silt loam to loam is a dark soil developed under prairie vegetation from about 2 to 3½ feet of silt loam or loam material over loose, calcareous, loamy gravel glacial drift (Fig. 22). Large areas with both loam and silt loam A horizons are included in this soil type. A few areas in Riley township have sandy loam A horizons. Warsaw is well drained to somewhat excessively drained and occurs on slopes ranging from about 1 to 10 percent. It is associated with Rodman (93) and Lorenzo (318). Where it was not possible to separate Lorenzo and Warsaw on the soil map,

Representative profile, Warsaw silt loam



A_1 (0-10″)	A_1. Very dark brown (10YR 2/2) friable silt loam; moderate, fine to medium granular structure; neutral; gradual smooth boundary.
AB (10-13″)	AB. Dark brown (10YR 3/3) firm silty clay loam; weak, very fine to fine subangular blocky structure; neutral; clear smooth boundary.
B_2 (13-25″)	B_2. Dark brown (7.5YR 4/4) firm silty clay loam; weak, fine to medium subangular blocky structure; medium acid; clear smooth boundary.
B_3 or Beta (25-29″)	B_3. Dark brown (7.5YR 4/4) firm sandy clay loam to loam; weak, medium subangular blocky structure; slightly acid to neutral; abrupt wavy boundary.
IIC (29-42″+)	IIC. Varicolored loamy gravel drift with high percentage of limestone and dolomite; single grain; calcareous.



Profile of Warsaw silt loam. Note the dark-colored, clay-enriched layer or Beta horizon (7) directly above the coarse-textured calcareous drift. (Fig. 22)

the two types are indicated as a complex. Some chemical and physical properties of Warsaw are given in Table 21. The samples were collected from the same profile described here.

Warsaw is moderately high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. It has moderate to moderately rapid permeability. Available moisture is primarily restricted to the solum above the coarse-textured drift, and the soil is somewhat drouthy. Most areas of Warsaw are suitable as general cropland and yields are high in seasons of adequate and well-distributed rainfall. Sloping areas should be protected against erosion.

Table 21. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF WARSAW SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–10	.2	8.0	56.3	26.5	16.8	7.6	.22	.24	23.9	100+	7.6	2.55
AB.....	10–13	.3	4.6	55.9	34.9	14.0	9.8	.21	.27	25.0	97	7.3	1.34
B_{21}.....	13–19	.2	4.1	57.0	35.5	11.4	7.7	.18	.30	23.8	82	5.6	.91
B_{22}.....	19–25	.4	12.4	56.3	27.7	8.0	6.6	.12	.22	20.4	77	5.5	.51
B_3 (Beta)	25–29	4.2	40.3	35.6	20.6	7.0	4.9	.11	.18	14.4	85	5.8	.54
IIC....	29–50	81.8	86.5	10.4	1.7	...[c]	...	...	...	...	...	8.0	.22

[a] McHenry county, T.44N., R.8E., Sec. 25, SW ¼, SW 40, SW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

Warsaw-Lorenzo complex (290-318)

In some areas Warsaw silt loam to loam (290) and Lorenzo silt loam to loam (318) were so intermingled that their separation was impractical. These areas are shown on the map as a complex, 290-318 (alternate symbol R). Both soils are dark-colored, having developed under prairie vegetation. The complex occurs on slopes ranging from about 4 to 15 percent. Slopes should be protected against erosion. Less sloping areas are used as cropland but the complex tends to be drouthy. Warsaw is described on page 72, Lorenzo on page 83.

Xenia silt loam (291)

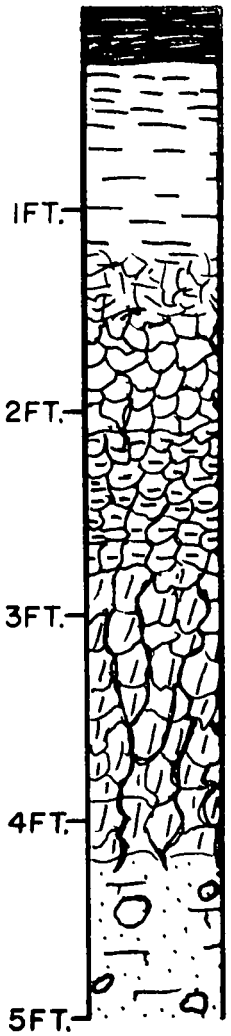
Xenia silt loam is a light-colored, moderately well-drained soil developed under forest vegetation from about 1½ to 3½ feet of loess over loam till. The solum extends into the till, and calcareous loam till occurs below 3½ feet. A few areas are underlain by sandy loam till rather than loam till. Slopes usually range from about 1 to 4 percent although some are slightly steeper. The soil is restricted to the glacial till areas in the northwestern part of the county. It is moderately extensive in western Chemung and Dunham townships and also occurs in the northwestern corner of Marengo township. It is closely associated with Russell (322), Wingate (348), and Toronto (353).

Xenia is low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has high moisture-holding capacity and moderate permeability. Sloping areas need protection from erosion. The long, uniform slopes—characteristic of Xenia topography—are well suited to contour tillage. Xenia is a productive soil when properly fertilized and managed.

Wallkill silt loam (292)

Wallkill silt loam is a light-colored to moderately dark-colored soil composed of recently washed-in mineral sediments over deposits of peat or muck. The sediments normally range from about 15 to 40 inches thick and are usually silt loam or loam but small spots of sandy loam are included. The soil is poorly to very poorly drained.

Representative profile, Xenia silt loam



A_1 (0-3″) — A_1. Very dark gray to dark gray (10YR 3/1-4/1) friable silt loam; weak, fine crumb structure; slightly acid; clear smooth boundary.

A_{21} (3-7″) — A_{21}. Dark grayish-brown to grayish-brown (10YR 4/2-5/2) friable silt loam; weak, thin platy structure; medium acid; clear smooth boundary.

A_{22} (7-14″) — A_{22}. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) friable silt loam; weak, medium platy to crumb structure; medium acid; clear smooth boundary.

B_1 (14-18″) — B_1. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) firm, light silty clay loam; weak, fine subangular blocky structure; medium acid; clear smooth boundary.

B_{21} (18-25″) — B_{21}. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm, heavy silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_{22} (25-33″) — IIB_{22}. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm, gritty silty clay loam to clay loam with common, fine, distinct black (10YR 2/1) and strong brown (7.5 YR 5/8) mottles; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

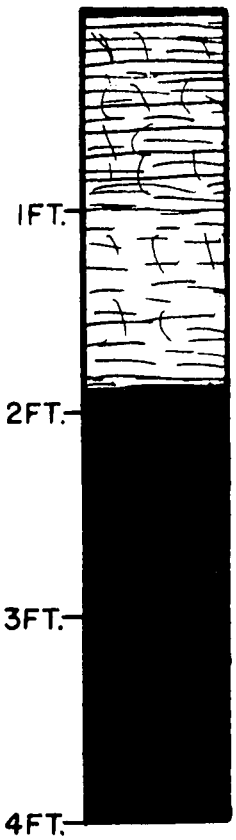
IIB_3 (33-50″) — IIB_3. Dark brown (7.5YR 4/4) to reddish-brown (5YR 4/4) firm clay loam with common, fine, distinct strong brown (7.5YR 5/8) and black (5YR 2/1) mottles; weak, coarse angular blocky structure; slightly acid grading to neutral in lower part; clear wavy boundary.

IIC (50-60″+) — IIC. Dark brown (7.5YR 4/4) friable loam till with grayish-brown (10YR 5/2) mottles and black iron-manganese stains; massive breaking to weak, coarse angular blocky structure; calcareous.

It normally occurs in closed depressions or along the edges of large deposits of peat or muck where recent sediments from adjacent higher ground have accumulated. The sediments were so recently deposited that horizons have not developed and surface color comes from the sediments. The soil is very similar to Washtenaw silt loam but is underlain by peat and muck instead of dark, fine-textured mineral material. It is not an extensive soil and some small areas are shown by a wetspot symbol. (Profile drawing is on page 76.)

Wallkill is low to moderately low in organic matter (in the washed-in mineral part of the profile), slightly acid to neutral, and variable in available phosphorus and available potassium. Moisture-holding capacity is high and permeability is moderate. Some areas are difficult to drain and are primarily used for pasture. Drained areas can be farmed and are frequently planted to corn. It is difficult to install tile firmly in the underlying organic material.

Representative profile, Wallkill silt loam



1 (0-12″) 1. Dark gray (10YR 4/1) friable silt loam; moderate, coarse granular structure; neutral; clear smooth boundary.

2 (12-22″) 2. Dark grayish-brown (10YR 4/2), with very dark gray (10YR 3/1) spots and a few fine, distinct reddish-brown (5YR 4/4) mottles, friable silt loam; moderate, coarse and very coarse granular to fine and medium subangular blocky structure; neutral; clear smooth boundary.

II_3 (22-50″+) II_3. Black (10YR 2/1) friable muck with a few streaks of dark brown (7.5YR 4/2) mineral material in upper part; tends to break into coarse angular fragments; neutral; grades to light silty clay loam mineral sediments at a depth of 55 inches.

Washtenaw silt loam (296)

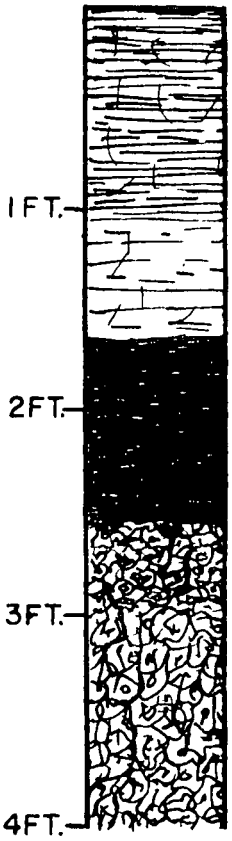
Washtenaw silt loam is a light-colored to moderately dark, poorly to very poorly drained soil composed of recently washed-in silty or loamy sediments on an old dark mineral soil surface of silty clay loam. The sediments normally range from about 15 to 40 inches thick and were so recently deposited that horizons have not developed and the surface color comes from the sediments. The soil largely occurs in closed depressions. Some small areas are shown on the map by a wetspot symbol. Washtenaw is very similar to Wallkill but is underlain by a mineral soil rather than peat and muck.

Washtenaw is low to moderately low in organic matter, usually slightly acid to neutral, and variable in available phosphorus and available potassium. It has moderate to moderately slow permeability and high moisture-holding capacity. Some areas are difficult to drain because of poor outlets. These areas may occur as intermittent ponds and may be used primarily for pasture. Tile function if outlets are available. Surface inlets to tile lines help remove surface water. Drained areas are used as cropland and are usually planted to corn.

Ringwood silt loam (297)

Ringwood silt loam is a dark upland soil developed under prairie vegetation from about 1 to 3 feet of loess over sandy loam till (Fig 23). Calcareous sandy loam till usually occurs at depths of 3 to 4 feet. The soil is well drained to moderately well

Representative profile, Washtenaw silt loam



1 (0-13″) — 1. Very dark gray (10YR 3/1) friable silt loam; moderate, coarse to very coarse granular structure; neutral; clear smooth boundary.

2 (13-20″) — 2. Mixed dark gray (10YR 4/1) and very dark gray (10YR 3/1), with common, fine, distinct dark brown (7.5YR 4/4) mottles, friable silt loam; moderate, coarse to very coarse granular with tendency toward weak, medium to thick platy structure; neutral; clear smooth boundary.

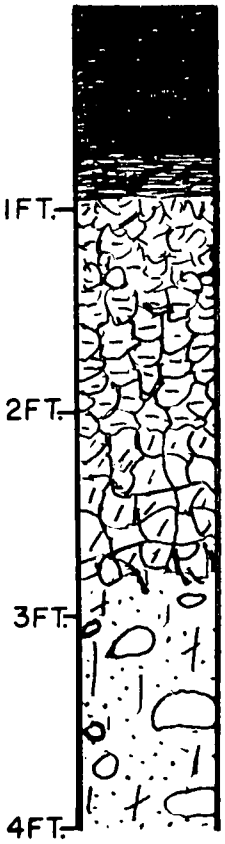
A_{1b} (20-30″) — A_{1b}. Black (10YR 2/1) firm silty clay loam; moderate, fine to medium subangular blocky structure; neutral; clear smooth boundary.

B_{1bg} (30-36″) — B_{1bg}. Very dark gray (10YR 3/1) firm silty clay loam; moderate, medium subangular blocky structure; neutral; gradual smooth boundary.

B_{2bg} (36-50″+) — B_{2bg}. Mixed dark gray (5Y 4/1) and gray (5Y 5/1 and 6/1), with many fine, distinct strong brown (7.5YR 5/6 and 5/8) mottles, firm silty clay loam; moderate, medium subangular blocky structure; neutral; gradually grades to loam-textured massive material.

Ringwood silt loam in a pit located between Ringwood and Wonder Lake, Illinois. The dark-colored A horizon and the upper part of the B formed in loess. The lower part of the B is in till. The light-colored C horizon is in calcareous sandy loam till. Note the tonguing of the B horizon into the C at right of lower spade. (Fig. 23)

Representative profile, Ringwood silt loam



A_1 (0-9″) — A_1. Very dark brown (10YR 2/2) friable silt loam with a few sand grains; weak, fine to medium crumb structure; neutral; clear smooth boundary.

A_3 (9-11″) — A_3. Very dark grayish-brown (10YR 3/2) friable silt loam with a few sand grains; moderate, fine to medium granular structure; neutral; clear smooth boundary.

B_1 (11-17″) — B_1. Dark brown (7.5YR 4/2) firm silty clay loam borderline to silt loam; moderate, fine subangular blocky structure; neutral; clear smooth boundary.

IIB_2 (17-25″) — IIB_2. Brown (7.5YR 4/4) firm clay loam to sandy clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.

IIB_{31} (25-29″) — IIB_{31}. Brown (7.5YR 4/3) firm sandy clay loam; weak, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_{32} (29-34″) — IIB_{32}. Brown (7.5YR 4/4) friable loam; weak, medium subangular blocky structure; nearly neutral; clear wavy boundary.

IIC (34-48″+) — IIC. Light brown (7.5YR 6/4) very friable sandy loam till; massive; calcareous.

A well-defined Beta horizon (?) is present immediately above calcareous till in some areas of this soil.

Table 22. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF RINGWOOD SILT LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–4	.4	28.1	44.7	18.0	15.6	7.5	.12	.25	21.2	100+	7.3	3.56
.....	4–9	.1	26.2	45.5	21.8	12.8	6.4	.14	.19	18.0	100+	7.3	2.32
A_3.....	9–11	.1	25.8	45.5	23.0	10.3	6.4	.13	.16	17.8	96	7.3	1.86
B_1.....	11–17	1.4	29.5	40.7	24.5	8.5	6.9	.11	.17	17.2	91	7.0	1.07
IIB_2....	17–25	6.7	46.6	28.7	21.3	6.8	4.4	.10	.18	12.8	89	6.2	.67
IIB_{31}...	25–29	8.3	53.3	27.4	17.4	4.0	3.7	.08	.12	9.4	84	5.9	.32
IIB_{32}...	29–34	6.1	57.1	24.6	15.0	3.7	3.4	.08	.10	7.6	96	6.3	.46
IIC....	34–48+	14.4	55.5	36.0	7.9	...[c]	...	...	...	...	...	8.2	.23

[a] McHenry county, T.45N., R.8E, Sec. 2, NW ¼, NW 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

drained and occurs primarily on slopes ranging from about 1 to 7 percent. It occurs extensively in the upland prairie areas north and east of Woodstock and is associated with Griswold (363) and Elburn (198). Some chemical and physical properties of Ringwood are given in Table 22. The samples were collected from the same profile described here.

Ringwood is high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate and moisture-holding capacity is high. Sloping areas should be protected from erosion. Ringwood is a productive soil and is used extensively as cropland (Fig. 24).

A typical landscape of the Ringwood-Griswold soil association northeast of Ringwood on the "German prairie." (Fig. 24)

Beecher silt loam (298)

Beecher silt loam is a moderately dark upland soil developed under mixed prairie-forest vegetation from a thin covering of loess (usually less than 2 feet thick) over till. Calcareous silty clay loam till usually occurs at depths of 2 to 3½ feet. Beecher is an imperfectly drained soil occupying slopes that range from about 1 to 5 per-

Table 23. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF BEECHER SILT LOAM[a, b]

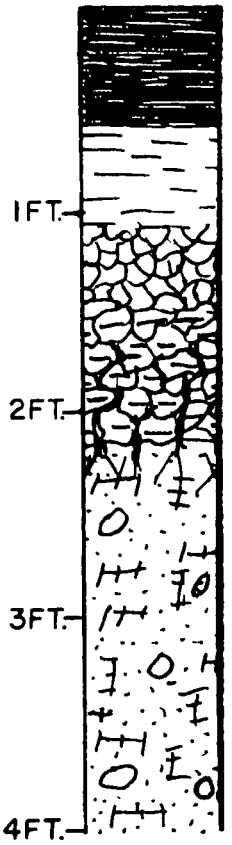
Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_p	0–7	.4	14.3	50.5	27.4	8.8	5.1	.18	.85	17.2	87	5.4	3.46
A_2	7–11	3.0	14.1	51.1	30.4	6.7	2.5	.16	.60	14.4	69	4.9	1.53
B_1	11–14	5.2	11.9	42.0	42.1	8.1	4.6	.15	.54	18.4	73	4.7	1.10
B_{21}	14–18	1.0	8.4	32.2	54.8	12.0	7.5	.17	.52	23.4	86	5.0	.93
B_{22}	18–22	2.8	8.9	36.4	51.8	12.8	7.8	.18	.38	18.0	100+	6.0	.75
C	34–40	2.9	13.2	52.5	34.2	...[d]	...	...	...	...	...	7.8	.34

[a] Will county, T.34N., R.14E., Sec. 24, SW ¼, SE 40, NW 10 acres.
[b] Data from J. D. Alexander (*1*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.

cent. A few moderately well-drained areas with slopes ranging up to about 10 percent are included. The soil is not extensive, occurring mainly in the south-central part of the county. It is associated with Blount (23), Morley (194), Elliott (146), and Ashkum (232). Some physical and chemical properties of a Beecher soil are given in Table 23.

Beecher is moderately low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Permeability is moderately slow and moisture-holding capacity is high. Drainage is needed on level to gently sloping areas and tile function slowly. Sloping areas erode severely if unprotected. Productivity is about medium on well-managed, uneroded areas.

Representative profile, Beecher silt loam



A_p (0-7″) — A_p. Very dark gray to very dark grayish-brown (10YR 3/1-3/2) friable silt loam; weak, fine crumb structure; slightly acid; abrupt smooth boundary.

A_2 (7-13″) — A_2. Dark grayish-brown to grayish-brown (10YR 4/2-5/2) friable silt loam; weak, medium platy to medium crumb structure; medium acid; clear smooth boundary.

B_1 (13-18″) — B_1. Dark grayish-brown to dark brown (10YR 4/2-4/3) firm silty clay loam with a few fine, faint yellowish-brown (10YR 5/6) mottles; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

IIB_2 (18-26″) — IIB_2. Mixed dark grayish-brown to brown (10YR 4/2-5/3) firm, light silty clay with a few till pebbles and a few fine, faint dark gray (10YR 4/1) and yellowish-brown (10YR 5/6) mottles; moderate, medium to coarse subangular blocky structure; medium to slightly acid; clear smooth boundary.

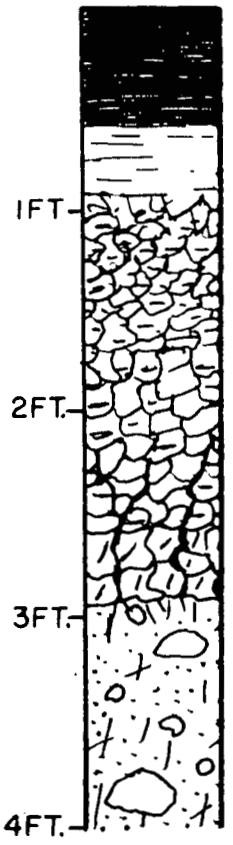
IIC (26-40″+) — IIC. Mottled dark grayish-brown, brown (10YR 4/2 and 5/3), and light brownish-gray (2.5Y 6/2) firm silty clay loam till with some gravel; massive to weak, medium angular blocky structure; calcareous.

Nippersink silt loam (299)

Nippersink silt loam is a moderately dark, well-drained to moderately well-drained, upland soil developed under mixed prairie-forest vegetation. Parent material is 1 to 3 feet of loess over sandy loam till usually occurs at depths of 3 to 4 feet. The soil occupies slopes ranging up to about 12 percent. It is associated with McHenry (310), Lapeer (361), Ringwood (297), Virgil (104), and Elburn (198).

Nippersink is moderately low in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. Most areas are cultivated and are adapted to the major crops of the county. The soil responds well to good management. Erosion control is a problem on steeper slopes.

Representative profile, Nippersink silt loam



A_1 (0-7″) — A_1. Very dark brown (10YR 2/2) friable silt loam; moderate, fine granular structure; slightly acid; clear smooth boundary.

A_2 (7-11″) — A_2. Dark gray to dark grayish-brown (10YR 4/1-4/2) friable silt loam; weak, thin platy structure; slightly acid; clear smooth boundary.

B_{21} (11-20″) — B_{21}. Dark brown to dark yellowish-brown (10YR 4/3-4/4) firm silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

IIB_{22} (20-31″) — IIB_{22}. Dark brown (7.5YR 4/4) firm clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_3 (31-35″) — IIB_3. Dark brown (7.5YR 4/4) to reddish-brown (5YR 4/4) slightly firm sandy clay loam; weak, coarse subangular blocky structure; slightly acid; clear wavy boundary.

IIC (35-40″+) — IIC. Brown to yellowish-brown (10YR 5/3-5/4) very friable sandy loam till with some gravel; massive; calcareous.

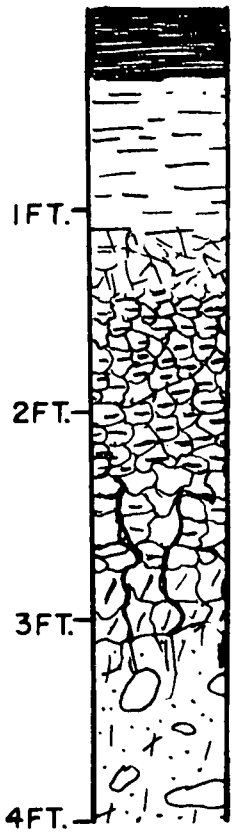
A well-defined Beta horizon (?) is present immediately above calcareous till in some areas of this soil.

McHenry silt loam (310)

McHenry silt loam is a light-colored upland soil developed under forest vegetation from about 1 to 3 feet of loess on sandy loam till. Calcareous sandy loam till normally occurs at depths of 3 to 4 feet. The soil is well drained to moderately well drained and occurs on slopes usually ranging from 1 to 12 percent. It occurs primarily on the West Chicago moraine and in forested areas of moraines and till plains to the east. It is associated with Lapeer (361), Nippersink (299), Virgil (104), Ringwood (297), and other soils. Some chemical and physical properties of a McHenry soil are given in Table 24. The data were obtained from the same profile described here.

McHenry is low in organic matter, medium to strongly acid, low to medium in available phosphorus, and medium to high in available potassium. It has moderate

Representative profile, McHenry silt loam



A_1 (0-4″) — A_1. Very dark gray (10YR 3/1) friable silt loam; weak, fine to medium granular structure; neutral; abrupt smooth boundary.

A_2 (4-13″) — A_2. Brown to pale brown (10YR 5/3-6/3) friable silt loam; weak, thin platy structure; neutral to slightly acid; clear smooth boundary.

B_1 (13-17″) — B_1. Dark yellowish-brown (10YR 4/4) firm silty clay loam borderline to silt loam; weak, very fine to fine subangular blocky structure; strongly acid; clear smooth boundary.

B_{21} (17-27″) — B_{21}. Brown (10YR 4/3) firm silty clay loam with a few pebbles; moderate, fine subangular blocky structure; strongly acid; clear smooth boundary.

IIB_{22} (27-33″) — IIB_{22}. Mostly brown (7.5YR 4/4) with some very dark grayish-brown (10YR 3/2) firm sandy clay loam; moderate, medium to coarse subangular blocky structure; strongly acid; clear smooth boundary.

IIB_3 (33-37″) — IIB_3. Mostly brown (7.5YR 4/4) with some dark brown (7.5YR 4/2) firm loam; weak, coarse subangular blocky structure; slightly acid; clear wavy boundary.

IIC (37″+) — IIC. Brown to yellowish-brown (10YR 5/3-5/4) very friable sandy loam till with some gravel; massive; calcareous.

A well-defined Beta horizon (7) is present immediately above calcareous till in some areas of this soil.

Table 24. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF McHENRY SILT LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1	0-4	.4	14.2	62.8	10.9	15.6	6.6	.14	.21	19.6	100+	7.2	3.77
A_2	4-13	1.1	13.1	70.3	11.9	3.0	3.1	.09	.07	6.8	92	6.8	.58
B_1	13-17	1.0	15.3	55.1	26.8	5.1	5.4	.11	.19	16.2	67	5.0	.38
B_{21}	17-27	5.2	23.3	42.2	32.5	7.5	6.9	.14	.24	19.8	74	5.0	.37
IIB_{22}	27-33	14.3	62.3	14.0	20.8	5.4	5.6	.11	.19	12.8	88	5.5	.30
IIB_3	33-37	6.8	72.0	14.2	15.8	5.2	4.5	.12	.18	10.1	99	6.1	.39
IIC	37+	36.3	67.5	25.1	6.6	...[d]	...	...	...	...	...	8.0	.15

[a] McHenry county, T.46N., R.6E., Sec. 3. SE ¼, NE 40, SW 10 acres.
[b] Data from D. C. Hallbick (*15*).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.

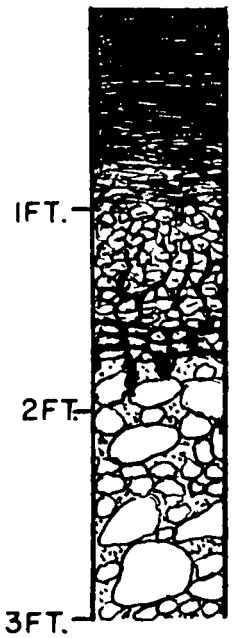
permeability and high moisture-holding capacity. Most areas are cultivated but scattered stands of native trees are present in some places. The soil is productive when properly fertilized and managed. On steeper slopes erosion is a serious problem if it is not properly controlled.

Lorenzo silt loam to loam (318)

Lorenzo silt loam to loam is a dark soil developed under grass vegetation from about 12 to 24 inches of silt loam or loam material over loose, calcareous, loamy gravel drift. Both loam and silt loam A horizons commonly occur in this soil type. Some areas (mainly in Riley township) with sandy loam surfaces are included. Lorenzo is somewhat excessively drained and occurs on slopes ranging from 1 to over 20 percent. It was mapped separately and also in two complexes—one with Rodman (93), the other with Warsaw (290).

Lorenzo is moderately high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium in available potassium. Moisture-holding capacity is low because of shallow depth to gravel, and permeability is moderately rapid. The soil is intermediate in drouthiness between Rodman and Warsaw. The Warsaw-Lorenzo complex is better adapted for crops than the Rodman-Lorenzo complex. Although Lorenzo is used for general crops, drouth resistant or early maturing crops are best adapted. Grasses and legumes should be a major part of crop rotations.

Representative profile, Lorenzo loam

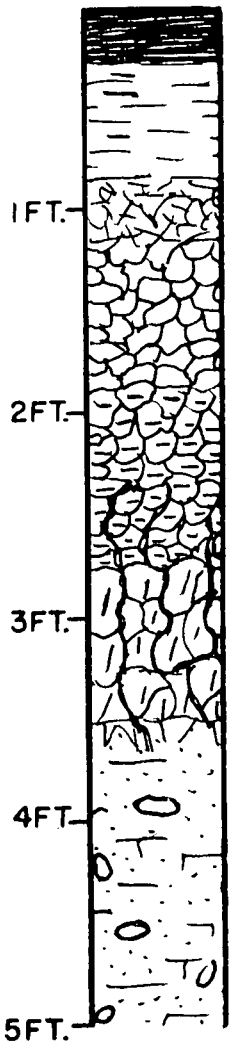


A_1 (0-8″)	A_1. Very dark grayish-brown (10YR 3/2) friable loam; weak, fine granular structure; neutral; clear smooth boundary.
AB (8-12″)	AB. Dark brown (10YR 3/3 to 4/3) friable, heavy loam; weak, coarse granular structure; neutral; clear smooth boundary.
B_2 (12-18″)	B_2. Dark brown (7.5YR 4/4) firm clay loam; weak to moderate, fine subangular blocky structure; slightly acid; clear wavy boundary.
IIB_3 or Beta (18-20″)	IIB_3. Dark reddish-brown (5YR 3/4) gravelly sandy clay loam; weak, medium subangular blocky structure; neutral; abrupt wavy boundary.
IIC (20-40″+)	IIC. Brown (10YR 5/3) and dark yellowish-brown (10YR 4/4) loose sand and gravel with high percentage of limestone and dolomite; single grain; calcareous.

Russell silt loam (322)

Russell silt loam is a light-colored, well-drained soil developed under forest vegetation on slopes ranging from about 2 to 15 percent. Parent material is generally 1½ to 3½ feet of loess over loam till, with calcareous till below depths of 3½ feet.

Representative profile, Russell silt loam



A_1 (0-3″) — A_1. Very dark grayish-brown (10YR 3/2) friable silt loam; weak, fine to medium crumb structure; slightly acid; clear smooth boundary.

A_2 (3-10″) — A_2. Dark grayish-brown to dark brown (10YR 4/2-4/3) friable silt loam; moderate, medium platy structure; medium acid; clear smooth boundary.

B_1 (10-14″) — B_1. Dark brown to dark yellowish-brown (10YR 4/3-4/4) slightly firm, light silty clay loam; weak, fine subangular blocky structure with a few brown (10YR 5/3) coatings; medium acid; clear smooth boundary.

B_{21} (14-22″) — B_{21}. Dark yellowish-brown (10YR 4/4) firm silty clay loam; strong, medium subangular blocky structure with discontinuous coatings of dark brown (10YR 3/3); strongly acid; clear smooth boundary.

IIB_{22} (22-33″) — IIB_{22}. Dark brown (7.5YR 3/3) firm, gritty, heavy silty clay loam; strong, medium to coarse subangular blocky structure; medium acid; clear smooth boundary.

IIB_3 (33-42″) — IIB_3. Dark brown (7.5YR 3/3), with a few dark reddish-brown (5YR 3/3) spots, firm clay loam; weak to moderate, coarse subangular blocky structure; slightly acid; clear wavy boundary.

IIC (42-50″+) — IIC. Dark brown to brown (7.5YR 4/4-5/4) friable loam till; massive with tendency to break into angular blocky structure; calcareous.

Because of the wide slope range, thickness of loess cover and depth to carbonates are quite variable. On steeper, eroded slopes, the loess cover may be very thin and carbonates may occur slightly above 3½ feet. Areas of sandy loam till and a few areas underlain by stratified sand and gravel are mapping inclusions.

Except for a small area in northwestern Riley township, Russell occurs only in Chemung and Dunham townships, where it is moderately extensive in the western part. The soil is associated with Xenia (291), Wingate (348), and Toronto (353) in areas of the older glacial till. Some chemical and physical properties of Russell silt loam are given in Table 25.

Russell is low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. Steeper slopes are subject to severe erosion and are not well adapted to intertilled crops. Gently sloping areas make productive

Table 25. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF RUSSELL SILT LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–4	.1	6.3	76.8	16.9	16.0	3.2	...[d]	.35	22.0	94	7.0	2.92
A_2.....	4–9	T[e]	4.8	78.2	17.0	7.8	1.7	...	.16	11.6	91	7.4	.70
A_3.....	9–13	T	4.1	72.5	23.4	6.6	3.6	...	.24	14.0	82	6.7	.43
B_1.....	13–17	T	2.2	65.2	32.6	5.2	6.2	...	.15	20.5	62	5.0	.39
B_{21}.....	17–25	T	1.5	61.6	36.9	4.1	6.6	...	.23	26.2	47	4.6	.42
B_{22}.....	25–38	T	2.9	63.9	33.2	5.4	6.6	...	.22	24.9	54	4.6	.36
IIB_{31}...	38–48	8.2	35.9	37.2	26.9	5.8	6.2	...	.16	17.8	76	4.6	.20
IIB_{32}...	48–57	4.6	43.3	29.3	27.4	7.8	6.2	...	.12	15.7	96	6.1	.18
IIC....	57–65+	6.7	50.4	27.8	21.8	...	...	...	...	...	...	7.5	...

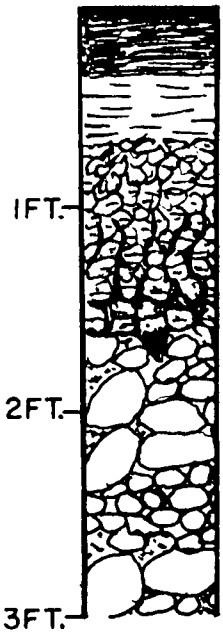
[a] Piatt county, T.18N., R.5E., Sec. 29 NE ¼, SE 40, NW 10 acres.
[b] Data from L. W. Bailey, *et al.* (4)..
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.
[e] T = Trace.

cropland when properly fertilized. A few scattered areas have been maintained in native trees.

Casco silt loam to loam (323)

Casco silt loam to loam is a light-colored soil developed under forest vegetation from about 12 to 24 inches of silt loam or loam material over loose, calcareous, loamy gravel drift. The A horizon is dominantly silt loam or loam with occasional areas

Representative profile, Casco silt loam



A_1 (0-4″) — A_1. Very dark brown (10YR 2/2) friable silt loam; weak, fine crumb structure; neutral; clear smooth boundary.

A_2 (4-7″) — A_2. Brown (10YR 5/3) to dark brown (10YR 4/3) friable silt loam to loam; weak, thin platy to fine crumb structure; slightly acid; clear smooth boundary.

B_1 (7-9″) — B_1. Dark yellowish-brown (10YR 4/4) friable, light clay loam; moderate, fine subangular blocky structure; slightly acid; clear smooth boundary.

B_2 (9-16″) — B_2. Dark brown (7.5YR 4/4) firm clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

IIB_3 or Beta (16-19″) — IIB_3. Dark reddish-brown (5YR 3/4) firm, gravelly clay loam; moderate, medium subangular blocky structure; neutral; abrupt wavy boundary.

IIC (19-40″+) — IIC. Mixed dark yellowish-brown (10YR 4/4), yellowish-brown (10YR 5/4 and 5/6), and light yellowish-brown (10YR 6/4) loose gravel and sand with a high percentage of limestone and dolomite; single grain; calcareous.

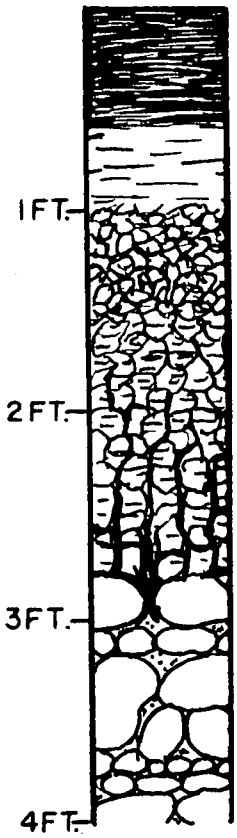
of sandy loam included. The soil is somewhat excessively drained and occurs on slopes ranging from 1 to over 20 percent. It was mapped separately and also in two complexes—one with Rodman (93), the other with Fox (327).

Casco is low in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium in available potassium. It has moderately rapid permeability. Moisture-holding capacity is low because of shallow depth to gravel and the soil is drouthy. Although some areas are used for general cropping, legumes and grasses are better adapted than grain. Most sloping areas are subject to erosion when cultivated. The Fox-Casco complex is better cropland than the Rodman-Casco complex.

Dresden silt loam to loam (325)

Dresden silt loam to loam is a moderately dark soil formed under mixed prairie-forest vegetation from about 2 to 3½ feet of silt loam or loam material over loose, calcareous, loamy gravel glacial drift. Both silt loam and loam A horizons are included in this type. The soil is well drained to somewhat excessively drained and occurs on slopes ranging from about 1 to 10 percent. It is primarily associated with other soils underlain by loamy gravel glacial drift, including Fox (327), Warsaw (290), Casco (323), and Lorenzo (318).

Representative profile, Dresden loam



A_1 (0-7″)	A_1. Very dark brown (10YR 2/2) friable loam; moderate, fine crumb structure; neutral; clear smooth boundary.
A_2 (7-11″)	A_2. Dark grayish-brown (10YR 4/2) friable loam; weak, fine crumb to very fine subangular blocky structure; medium acid; clear smooth boundary.
B_1 (11-18″)	B_1. Dark yellowish-brown (10YR 4/4) firm clay loam to sandy clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.
B_2 (18-28″)	B_2. Dark yellowish-brown (10YR 4/4) firm sandy clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.
IIB_3 or Beta (28-34″)	IIB_3. Dark brown (7.5YR 3/4) firm, gravelly sandy clay loam; moderate, medium subangular blocky structure; neutral; clear wavy boundary.
IIC (34-40″+)	IIC. Varicolored loose loamy gravel drift with a high percentage of limestone and dolomite; single grain; calcareous.

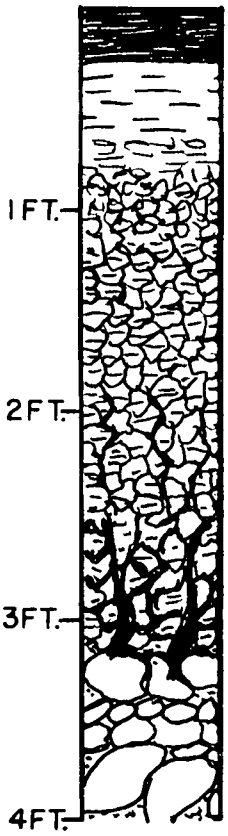
Dresden is moderately low in organic matter, about medium acid, low to medium in available phosphorus, and about medium in available potassium. Permeability is moderate in the upper part of the profile and very rapid in the underlying gravel. Moisture-holding capacity is primarily restricted to the solum above the loamy gravel drift and the soil is somewhat drouthy. This soil is largely used as cropland and responds well to good management. Sloping areas should be protected against erosion. Yields are high in seasons of adequate, well-distributed rainfall.

Fox silt loam to loam (327)

Fox silt loam to loam is a light-colored soil developed under forest vegetation from 2 to 3½ feet of silt loam or loam material over loose, calcareous, loamy gravel glacial drift. Silt loam and loam A horizons are included in this soil type. The soil is well drained to somewhat excessively drained and occurs on slopes ranging from about 1 to 15 percent. It is associated with Warsaw (290), Dresden (325), Lorenzo (318), Casco (323), and Rodman (93). Where it was not possible to separate Casco and Fox on the soil map, the two types are indicated as a complex.

Some chemical and physical properties of Fox are given in Table 26. The samples were collected from the same profile described here. The textures given for the description are field estimates and are not based on data in the table.

Representative profile, Fox loam



A_1 (0-3″)	A_1. Very dark brown (10YR 2/2) friable loam to silt loam; weak, fine to medium crumb structure; neutral; abrupt smooth boundary.
A_2 (3-7″)	A_2. Brown (10YR 4/3) friable loam to silt loam; weak, very thin platy structure; slightly acid; clear smooth boundary.
A_3 (7-9″)	A_3. Brown (7.5YR 4/4) friable loam; weak, medium granular structure; medium acid; clear smooth boundary.
B_1 (9-13″)	B_1. Brown (7.5YR 4/4) firm loam; weak, fine to medium subangular blocky structure; strongly acid; clear smooth boundary.
B_{21} (13-21″)	B_{21}. Brown (7.5YR 4/4) firm clay loam with more pebbles than above; moderate, fine to medium subangular blocky structure; strongly acid; clear smooth boundary.
B_{22} (21-27″)	B_{22}. Brown (7.5YR 4/4) firm clay loam with more pebbles and sand than above; moderate, fine to medium subangular blocky structure; strongly acid; clear smooth boundary.
B_{23} (27-30″)	B_{23}. Dark reddish-brown (5YR 3/4), with dark reddish-brown (5YR 2/2) spots, firm clay loam borderline to loam; many small and medium pebbles; moderate, medium to coarse subangular blocky structure; mildly alkaline; clear smooth boundary.
IIB_3 or Beta (30-37″)	IIB_3. Dark reddish-brown to reddish-brown (5YR 3/4-4/4) firm, gravelly clay loam between pebbles and stones which are mostly limestone; massive; mildly alkaline; clear wavy boundary.
IIC (37-50″+)	IIC. Light yellowish-brown (10YR 6/4) loose loamy gravel drift; single grain; calcareous.

Table 26. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF FOX LOAM[a]

Horizon	Depth	Particle size distribution[b]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–3	.1	45.7	39.1	10.3	...	...	...	...	13.3	96	6.7	4.43
A_2.....	3–7	.1	47.1	41.8	9.6	...	...	...	...	6.9	86	6.1	1.27
A_3.....	7–9	.1	45.2	41.4	12.8	...	...	...	...	7.8	82	5.7	.78
B_1.....	9–13	.1	46.8	32.7	19.5	...	...	...	...	12.0	88	5.5	.68
B_{21}.....	13–21	2.4	48.1	23.8	27.5	...	...	...	...	17.4	80	5.2	.64
B_{22}.....	21–27	7.4	61.5	9.3	28.9	...	...	...	...	17.8	86	5.3	.46
B_{23}.....	27–30	20.2	63.2	9.3	27.0	...	...	...	...	16.1	94	7.5	.43
IIB_3 (Beta)	30–37	60.3	69.6	13.3	16.7	...	...	...	...	...	...	7.4	...
IIC....	37–50+	61.8	85.8	9.9	3.6	...	...	...	...	...	...	7.8	...

[a] McHenry county, T.44N., R.9E., Sec. 6, NE ¼, SE 40, NW 10 acres.
[b] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[c] Not determined.

Fox is low in organic matter, about medium acid, low to medium in available phosphorus, and medium in available potassium. It has moderate to moderately rapid permeability. Although moisture-holding capacity is high in the solum, coarse drift at less than 3½ feet makes the soil somewhat drouthy. Fox is primarily used as cropland and responds well to fertilization and good management. Sloping areas need protection from erosion. Yields are high in seasons of adequate, well-distributed rainfall.

Fox-Casco complex (327-323)

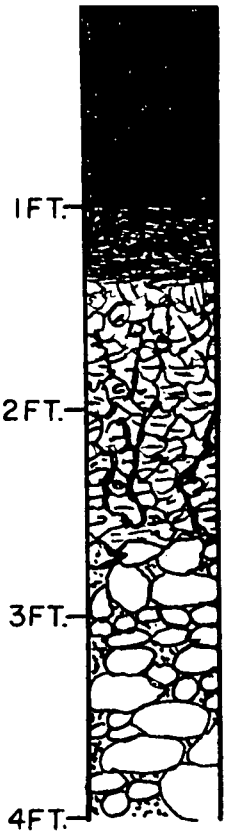
In areas marked 327-323 (alternate symbol V) on the soil map Fox silt loam to loam (327) and Casco silt loam to loam (323) were so intermingled that their separation was impractical. They are shown on the map as a complex. The complex occurs primarily on slopes ranging from about 4 to 15 percent. Both Fox and Casco are light-colored soils, having developed under forest vegetation. Both soils tend to be drouthy. The complex is less productive than Fox alone. Steeper slopes should be used for pasture and hay or timber production. Cropland requires special protection from erosion. Fox is described on page 87, Casco on page 85.

Will silty clay loam (329)

Will silty clay loam is a very dark, poorly drained soil formed under marsh vegetation from about 2 to 3½ feet of silty clay loam to clay loam sediments over loose, calcareous, loamy gravel glacial drift. It occurs in drainageways, depressions, and in level areas where the water table has remained at or near the surface. Most areas of Will are nearly level, but the soil occasionally occurs on slopes ranging up to 2 or 3 percent. Will occurs in association with Warsaw (290), Lorenzo (318), Kane (343), Drummer (152), and Fox (327).

This soil type is high in organic matter, slightly acid to neutral, low in available phosphorus, and medium in available potassium. Permeability is moderate and

Representative profile, Will silty clay loam



A_1 (0-12″) — A_1. Black (10YR 2/1) firm silty clay loam; moderate, medium granular structure; neutral; gradual smooth boundary.

A_3 (12-16″) — A_3. Very dark gray (10YR 3/1) firm silty clay loam; moderate, fine subangular blocky structure; neutral; clear smooth boundary.

B_{1g} (16-21″) — B_{1g}. Very dark gray (10YR 3/1) and some dark grayish-brown (10YR 4/2) firm silty clay loam with sand grains and a few pebbles; moderate, fine subangular blocky structure; neutral; clear smooth boundary.

B_{2g} (21-31″) — B_{2g}. Dark gray (10YR 4/1) and dark grayish-brown (10YR 4/2), with a few fine, faint brownish-yellow (10YR 6/6) mottles, firm silty clay loam to clay loam; moderate, medium subangular blocky structure; neutral; abrupt wavy boundary.

IIC (31-40″+) — IIC. Light gray (10YR 7/2), very pale brown (10YR 7/3 and 7/4), and pale brown (10YR 6/3) loose, stratified sand and gravel with a high percentage of limestone; single grain; calcareous. Upper 5 inches slightly cemented with very dark gray (10YR 3/1) fine-textured material.

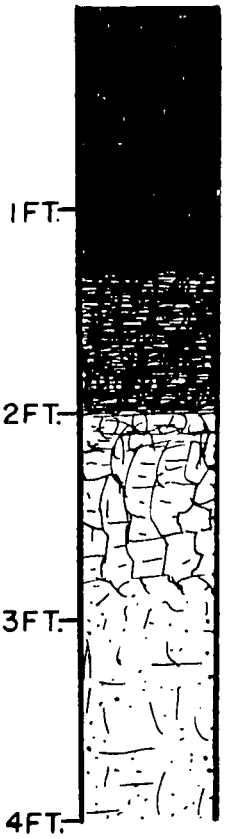
moisture-holding capacity is high in that part of the profile occurring above coarse drift. Drainage is needed and tile may be used where gravel does not interfere with installation. Open ditches may be more practical where gravel occurs at shallow depths. The water table should not be lowered too far into the loamy gravel substrata. Areas that are adequately drained are used for general cropping. Intertilled crops are usually favored in rotations. Erosion may occasionally be a problem in sloping, natural drainageways. Productivity is high under good management.

Peotone silty clay loam (330)

Peotone silty clay loam is a very dark soil developed under marsh vegetation from medium-textured to moderately fine-textured outwash or slope wash. On till plains or moraines glacial till may occur at depths of 3 or 4 feet. The soil is very poorly drained, occurring primarily in small closed depressions. It is distributed in an irregular pattern in association with many soils, but most commonly occurs in depressions surrounded by Drummer (152). Some very small areas are shown on the map by a wetspot symbol.

Peotone is high in organic matter, usually neutral, low to medium in available phosphorus, and medium to high in available potassium. Moisture-holding capacity

Representative profile, Peotone silty clay loam



A_{11} (0-16″) — A_{11}. Black (10YR 1/1) firm silty clay loam; moderate, medium granular structure; neutral; gradual smooth boundary.

A_{12} (16-24″) — A_{12}. Black to very dark gray (10YR 2/1-3/1) firm silty clay loam; weak, very coarse granular to medium subangular blocky structure; neutral; gradual smooth boundary.

B_g (24-34″) — B_g. Dark gray and grayish-brown (N 4/0 and 2.5Y 5/2) firm silty clay loam with common, medium, distinct yellowish-brown (10YR 5/6-5/8) mottles; weak, medium to coarse angular blocky structure; neutral; gradual smooth boundary.

C_g (34-60″+) — C_g. Dark gray to gray (N 4/0-5/0) firm silty clay loam to clay loam with common, medium, distinct yellowish-brown (10YR 5/6-5/8) mottles; massive; neutral in upper part becoming calcareous at a depth of 45 inches.

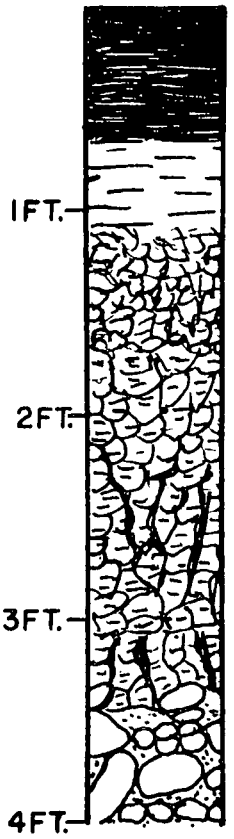
is high and permeability is moderately slow. After heavy rainfall the water table is at or above the surface and crops often drown out. Undrained areas are usually too wet for cropping and may exist as intermittent ponds. Many areas are undrained because tile outlets are not available. If tile systems are installed, open inlets into tile lines help remove surface water. If drainage is provided productivity ranges from moderate to moderately high.

Matherton silt loam to loam (342)

Matherton silt loam to loam is a moderately dark, imperfectly drained soil developed under mixed prairie-forest vegetation from about 2 to 3½ feet of silt loam to loam sediments over loose, calcareous, loamy gravel glacial drift. Both silt loam and loam A horizons are included in this soil type. The soil occurs primarily in relatively level outwash areas but occasionally occurs on slopes ranging up to about 3 percent. It is associated with Kane (343), Dresden (325), Fox (327), and Will (329).

Matherton is moderately high in organic matter, usually slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is high in the solum above coarse drift. Most areas can be used as cropland, but drainage

Representative profile, Matherton silt loam



A_1 (0-8″)

A_1. Black (10YR 2/1) to very dark gray (10YR 3/1) friable silt loam; moderate, medium to coarse granular structure; neutral; clear smooth boundary.

A_2 (8-13″)

A_2. Dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) with channel fillings of very dark gray (10YR 3/1) and a few fine, distinct brown to dark brown (7.5YR 4/4) mottles; friable silt loam with noticeable sand and an occasional pebble; weak, thin to medium platy structure in place breaking to moderate, medium granular; slightly acid; clear smooth boundary.

B_1 (13-20″)

B_1. Mixed dark grayish-brown (10YR 4/2) and brown to dark brown (10YR 4/3) with common, fine, distinct dark brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles; firm, light silty clay loam with noticeable sand and an occasional pebble; moderate, fine to medium subangular blocky structure; slightly acid; clear smooth boundary.

B_{21} (20-27″)

B_{21}. Mixed dark grayish-brown (10YR 4/2) and brown to dark brown (10YR 4/3) with common, fine, distinct dark brown (7.5YR 4/4) and strong brown (7.5YR 4/6) mottles and a few fine, distinct black (N 2/0) iron-manganese stains and concretions; firm, medium clay loam; moderate, medium subangular to angular blocky structure with discontinuous clay coatings of dark gray (10YR 4/1); slightly acid; clear smooth boundary.

B_{22} (27-37″)

B_{22}. Mixed dark grayish-brown (10YR 4/2), grayish-brown (10YR 5/2), dark brown (7.5YR 4/4), and strong brown (7.5YR 5/6 and 5/8) with common, medium, distinct black (5YR 2/1) iron-manganese stains and concretions; firm sandy clay loam with some fine gravel; moderate, medium to coarse subangular to angular blocky structure with patchy clay coatings of dark gray (10YR 4/1); slightly acid; gradual smooth boundary.

IIB_3 (37-42″)

IIB_3. Very dark gray (10YR 3/1) and dark gray (10YR 4/1) with varicolored gravels and some light gray (10YR 7/1) to white (10YR 8/1) soft limestone pebbles; firm sandy loam to gravelly loam; weak, medium angular blocky structure; neutral; clear wavy boundary.

IIC (42-50″+)

IIC. Brown (10YR 5/3), pale brown (10YR 6/3), very pale brown (10YR 7/3), light gray (10YR 7/1), and white (10YR 8/1) loose gravel and sand; single grain; calcareous.

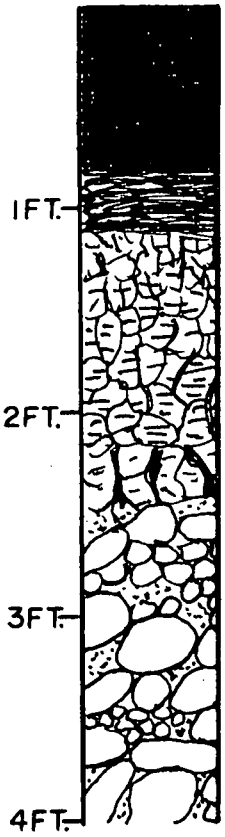
is needed for maximum production. Tile will function but gravel may interfere with installation. Open ditches may also be used. If the water table is lowered too far into the gravel, the soil will become drouthy.

Kane silt loam to loam (343)

Kane silt loam to loam is a dark, imperfectly drained soil formed under prairie vegetation from about 2 to 3½ feet of silt loam or loam sediments over loose, calcareous, loamy gravel glacial drift. The A horizon varies from silt loam to loam. The soil occurs in nearly level outwash areas and occasionally on slopes ranging up to about 2 or 3 percent. It is associated with Will (329), Warsaw (290), Lorenzo (318), and Fox (327).

Kane is high in organic matter, usually slightly acid to neutral, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is high in the solum above coarse drift. Most areas can be used as cropland but drainage is usually needed for maximum production. Tile function well but open ditches may be more practical where gravel occurs at shallow depths. The water table should not be lowered too far into the gravel or the soil may become drouthy. Corn, small grains, and legume-grass mixtures are the major crops grown. Productivity is high under good management. (Profile drawing is on page 92.)

Representative profile, Kane silt loam



A_1 (0-10″) — A_1. Black (10YR 2/1) to very dark brown (10YR 2/2) friable silt loam; moderate, medium granular structure; neutral; gradual smooth boundary.

A_3 (10-13″) — A_3. Very dark brown (10YR 2/2) to very dark grayish-brown (10YR 3/2) friable silt loam; moderate, medium granular structure; slightly acid; gradual smooth boundary.

B_{21} (13-20″) — B_{21}. Mixed dark grayish-brown (10YR 4/2), grayish-brown (10YR 5/2), and dark yellowish-brown (10YR 4/4), with common, fine, faint yellowish-brown (10YR 5/6) mottles, firm silty clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.

B_{22} (20-26″) — B_{22}. Mixed dark gray (10YR 4/1), dark grayish-brown (10YR 4/2), and yellowish-brown (10YR 5/6 and 5/8) firm clay loam; moderate, medium subangular blocky structure; neutral; clear smooth boundary.

IIB_3 (26-29″) — IIB_3. Mixed dark gray (10YR 4/1), dark grayish-brown (10YR 4/2), and yellowish-brown (10YR 5/8) firm, gravelly clay loam; moderate, medium subangular blocky structure; neutral; contains a few limestone pebbles; clear wavy boundary.

IIC (29-40″+) — IIC. Mixed brown (10YR 5/3), pale brown (10YR 6/3), and white (10YR 8/1) stratified, loose gravel and sand with a high limestone content; single grain; calcareous.

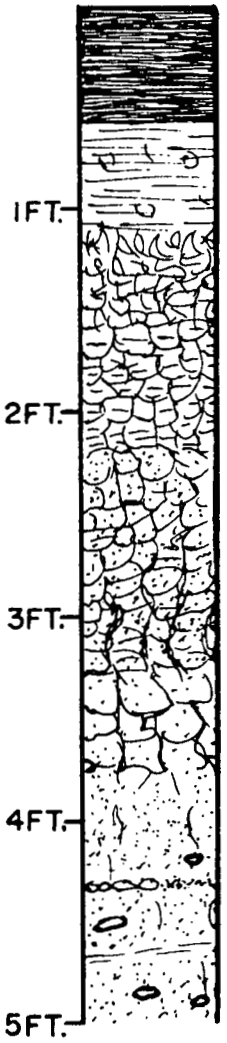
Harvard silt loam (344)

Harvard silt loam is a moderately dark soil developed under mixed prairie-forest vegetation from stratified, medium-textured water deposits which have a silty cover about 1 to 3 feet thick. The thickest silt cover occurs in areas west of Marengo ridge. The solum is normally thicker than 3 feet and carbonates, if present, usually occur below 3½ feet. Some areas included with this soil type in McHenry county are underlain with sandy or gravelly deposits at depths of 4 to 5 feet.

Harvard is well drained to moderately well drained. It occurs primarily in nearly level outwash and stream-terrace areas but occasionally occurs on slopes ranging up to about 6 percent. It is scattered throughout the county primarily in association with Camden (134), Proctor (148), Brenton (149), and Millbrook (219). The A_1 horizon in Harvard is intermediate in color and thickness between Proctor (developed under prairie) and Camden (developed under forest).

Harvard silt loam is moderately low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. It has moderate permeability and high moisture-holding capacity. Most areas are cultivated and the soil responds well to good management. Sloping areas under cultivation should be protected against erosion. Productivity ranges from medium to moderately high.

Representative profile, Harvard silt loam



A_p (0-7″) — A_p. Very dark brown (10YR 2/2) friable silt loam; moderate, fine crumb structure; slightly acid; abrupt smooth boundary.

A_2 (7-13″) — A_2. Dark grayish-brown to brown (10YR 4/2-5/3) friable silt loam; weak, thin platy to fine crumb structure; medium acid; clear smooth boundary.

B_1 (13-19″) — B_1. Dark yellowish-brown to yellowish-brown (10YR 4/4-5/4) slightly firm, light silty clay loam; weak to moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

B_{21} (19-26″) — B_{21}. Dark yellowish-brown (10YR 4/4) firm silty clay loam; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

B_{22} (26-39″) — B_{22}. Dark yellowish-brown (10YR 4/4) to dark brown (7.5YR 4/4) firm silty clay loam to clay loam; moderate, medium subangular blocky structure; medium to slightly acid; gradual smooth boundary.

B_3 (39-45″) — B_3. Dark brown (10YR 3/3-7.5YR 4/4) to dark yellowish-brown (10YR 4/4) slightly firm, light clay loam; weak, medium to coarse subangular blocky structure; slightly acid to neutral; gradual smooth boundary.

C (45-60″+) — C. Mixed yellowish-brown, pale brown, and light yellowish-brown (10YR 5/4, 6/3, and 6/4) friable, stratified loam, clay loam, and sandy loam with occasional gravel and with a few fine, faint yellowish-brown (10YR 5/8) mottles; massive to weak, coarse subangular blocky structure; neutral becoming calcareous with depth.

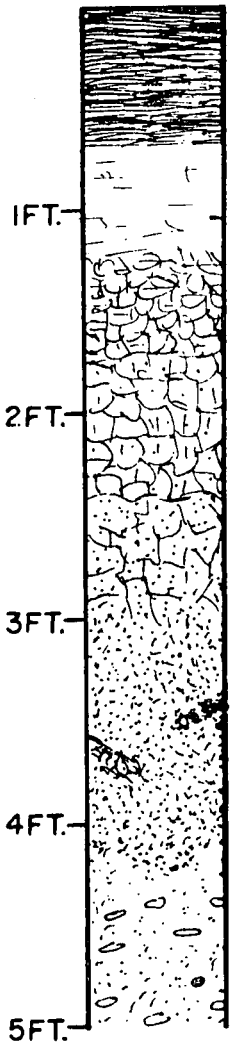
A Beta horizon (7) occurs above a depth of 60 inches in some areas of this soil in McHenry county.

Dowagiac silt loam to loam (346)

Dowagiac silt loam to loam is a moderately dark soil formed under mixed prairie-forest vegetation. Parent materials are thin silt loam or loam sediments (averaging about 2 to 3 feet thick) over loose, noncalcareous sand and fine gravel which become calcareous with depth, usually below 50 inches. Areas with both silt loam and loam A horizons are included. Dowagiac is a well-drained to somewhat excessively drained soil. It is not an extensive soil, occurring in an irregular pattern in level to gently sloping outwash areas. It is associated with several soils and has some properties intermediate between Volinia (79) and Ellison (137).

Dowagiac is moderately low in organic matter, medium to strongly acid, low to medium in available phosphorus, and medium in available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is medium to

Representative profile, Dowagiac silt loam



A_1 (0-8″) — A_1. Very dark grayish-brown (10YR 3/2) friable silt loam; weak, medium granular structure; slightly acid; clear smooth boundary.

A_2 (8-14″) — A_2. Dark grayish-brown (10YR 4/2) friable silt loam; weak, medium platy structure; slightly acid; clear smooth boundary.

B_{21} (14-20″) — B_{21}. Dark brown (10YR 3/3) firm silty clay loam; moderate, fine subangular blocky structure; medium acid; clear smooth boundary.

B_{22} (20-29″) — B_{22}. Dark reddish-brown (5YR 3/3) firm clay loam; moderate, medium subangular blocky structure; strongly acid; gradual smooth boundary.

IIB_3 (29-34″) — IIB_3. Dark reddish-brown (5YR 3/4) friable sandy clay loam to sandy loam; weak, coarse angular blocky structure; medium acid; clear smooth boundary.

IIC (34-50″) — IIC. Dark yellowish-brown (10YR 3/4) loose loamy sand; single grain; neutral grading to calcareous sand and fine gravel below a depth of 50 inches.

A Beta horizon (7) occurs just above calcareous coarse-textured material in some areas of Dowagiac in McHenry county.

low. Most areas are used as cropland. Yields vary depending on depth to coarse underlying sediments and on the amount and distribution of rainfall during the growing season. Crops usually suffer badly during dry periods.

Harpster silt loam to loam (347)

Harpster silt loam to loam is a dark soil developed under marsh or wet prairie vegetation from medium-textured drift. Although the dominant parent material is outwash, till is included in some areas and loess may have influenced the surface horizons. Both loam and silt loam A horizons commonly occur in this soil type. A few areas in Riley township with sandy loam surfaces are also included. The soil primarily occurs in depressions of various sizes, in nearly level areas such as drainageways, in outwash and lake plains, and along the margins of depressions that contain organic soils. Occasionally it occurs in sloping areas which are wet because of seep-

Representative profile, Harpster loam

A_1 (0-9″) — A_1. Black (10YR 2/1) very friable loam with numerous light gray to white (10YR 7/2-8/2) snail-shell fragments; moderate, medium granular structure; calcareous; gradual smooth boundary.

AB (9-15″) — AB. Very dark gray to dark gray (10YR 3/1-4/1) friable, heavy loam with numerous white snail shells and fragments; moderate, medium to coarse granular structure; calcareous; gradual smooth boundary.

B_{2g} (15-32″) — B_{2g}. Dark grayish-brown to grayish-brown (2.5Y 4/2-5/2) slightly firm clay loam to gritty silty clay loam with many white snail shells and fragments and common, fine, distinct strong brown (7.5YR 5/8) mottles; weak, medium subangular blocky structure; calcareous; gradual smooth boundary.

B_{3g} (32-36″) — B_{3g}. Grayish-brown (2.5Y 5/2) friable loam with some white snail shells and fragments and common, fine, distinct strong brown (7.5YR 5/8) mottles; weak, coarse subangular blocky structure; calcareous; gradual smooth boundary.

C_g (36-60″+) — C_g. Dark gray and grayish-brown (2.5Y 4/1-5/2) friable to loose, stratified, heavy loam to gravelly sandy loam with some white snail shells and common, medium, distinct strong brown (7.5YR 5/8) mottles; massive; calcareous; contains narrow bands of sand and gravel.

age from lateral movement of ground water. Drainage is naturally poor but ranges to imperfect in a few slightly sloping areas.

Harpster silt loam to loam occurs to some extent in every township. Size of individual areas varies from those too small to show on the map to an area of about 1000 acres in southeastern Riley township. The soil is chiefly associated with Drummer (152), Harpster silty clay loam (67), Houghton peat (97), Houghton muck (103), and Lena muck (210). It is similar to Harpster silty clay loam (67), having a calcareous surface and usually freshwater snail shells and shell fragments throughout the solum. However, this Harpster soil has a loam or silt loam surface, slightly less clay throughout the solum, and usually a more variable texture of underlying sediments. Some areas are similar to Millington (82), but usually show more horizon development in the solum and usually do not receive the periodic flooding characteristic of Millington.

This soil type is high in organic matter, calcareous, and low in available phosphorus and available potassium. Moisture-holding capacity is high and permeability is about moderate. Most areas have a high or fluctuating water table and need drainage for maximum crop production. Tile normally function well. Drainage ditches provide tile outlets and are needed to properly drain large areas. Substrata vary in texture and will include sandy and gravelly materials. Areas to be drained should be checked for undesirable substrata such as loose sand or pockets of muck.

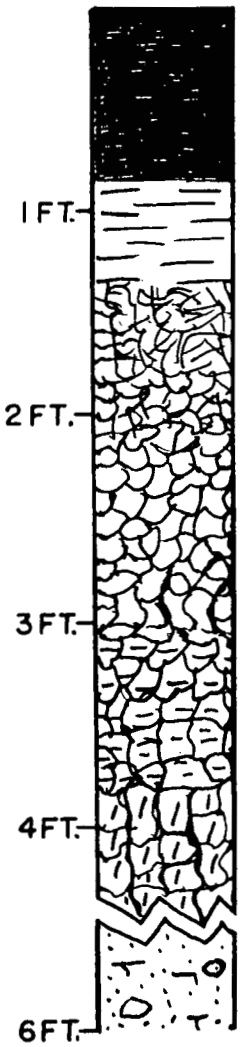
Liming materials should not be applied to this calcareous soil and superphos-

phate should be used to supply phosphorus. Potassium is often needed. Productivity varies from moderately high to high in drained and fertilized areas. Farmers frequently refer to this soil as "pushground" because of its tendency to be pushed along in front of the plow instead of forming clean furrow slices.

Wingate silt loam (348)

Wingate silt loam is a moderately dark upland soil developed under mixed prairie-forest vegetation from about 1½ to 3½ feet of loess over loam till, with the solum extending into the till. Calcareous loam till occurs below 3½ feet. The soil is moderately well drained and occurs primarily on slopes ranging from 1 to 6 percent. It is found almost entirely in the western portions of Chemung and Dunham townships in association with Xenia (291), Russell (322), and Toronto (353). It is similar to Xenia but has a darker plow layer or, if uncultivated, a thicker A_1 horizon.

Representative profile, Wingate silt loam



A_1 (0-10″) — A_1. Very dark gray (10YR 3/1) friable silt loam; moderate, medium to coarse granular structure; slightly acid; clear smooth boundary.

A_2 (10-16″) — A_2. Dark grayish-brown (10YR 4/2) friable silt loam with silt coatings of light gray (10YR 7/1-7/2) when dry and a few fine, faint yellowish-brown (10YR 5/6) mottles; weak to moderate, thin platy structure; medium acid; clear smooth boundary.

B_1 (16-25″) — B_1. Dark brown and dark yellowish-brown (10YR 4/3 and 4/4) firm, light silty clay loam; moderate, fine to medium subangular blocky structure with light gray (10YR 7/2) silt coatings when dry; strongly acid; clear smooth boundary.

B_{21} (25-37″) — B_{21}. Brown to dark brown (10YR 4/3) firm silty clay loam with a few fine, faint yellowish-brown (10YR 5/6) mottles and a few fine, distinct black (10YR 2/1) iron-manganese stains; strong, medium subangular blocky structure with discontinuous clay coatings of dark grayish-brown (10YR 4/2); strongly acid; clear smooth boundary.

IIB_{22} (37-46″) — IIB_{22}. Dark yellowish-brown (10YR 4/4) with spots of grayish-brown (10YR 5/2); firm clay loam to silty clay loam with common, fine, distinct yellowish-red (5YR 5/6-5/8) mottles and black (5YR 2/1) iron-manganese stains and concretions; moderate, medium to coarse subangular blocky structure; medium acid; clear smooth boundary.

IIB_{23} (46-68″) — IIB_{23}. Reddish-brown (5YR 4/4) and yellowish-red (5YR 4/6) with spots of grayish-brown (10YR 5/2); firm heavy loam with common, fine, distinct black (5YR 2/1) iron-manganese stains; weak, coarse angular blocky structure; slightly acid to neutral; clear wavy boundary.

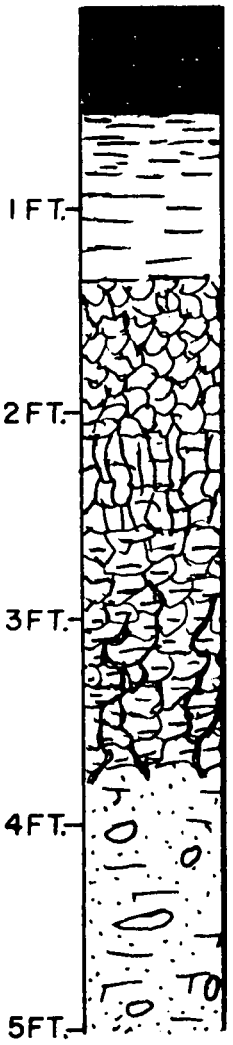
IIC (68″+) — IIC. Brown to dark brown (7.5YR 4/4) firm, heavy loam till; massive breaking to weak, coarse angular blocky structure; calcareous.

Wingate is moderately low in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Permeability is moderate and moisture-holding capacity is high. Most areas are used as cropland. Productivity is moderately high when the soil is properly drained and fertilized. Sloping areas need protection against erosion.

Toronto silt loam (353)

Toronto silt loam is a moderately dark upland soil developed under mixed prairie-forest vegetation from about 1½ to 3½ feet of loess over loam till. The solum developed in both loess and till with calcareous loam till occurring below 3½ feet. The soil occurs on level to gently sloping topography (frequently in the upper ends of drainageways) in the glacial till areas of western Chemung and Dunham townships and in northwestern Marengo township. It occurs with Russell (322), Xenia (291), and Wingate (348). Toronto is similar to these soils in parent materials, but it is

Representative profile, Toronto silt loam



A_p (0-6″) — A_p. Very dark gray (10YR 3/1) friable silt loam; weak, medium granular structure; slightly acid; abrupt smooth boundary.

A_{21} (6-10″) — A_{21}. Very dark gray (10YR 3/1) friable silt loam with a few fine, faint dark brown (10YR 3/3) mottles; moderate, medium platy structure; slightly acid; clear smooth boundary.

A_{22} (10-16″) — A_{22}. Dark gray to gray (10YR 4/1-5/1) friable silt loam; moderate, thick platy structure; medium acid; clear smooth boundary.

B_{21} (16-26″) — B_{21}. Dark gray to dark grayish-brown (10YR 4/1-4/2) firm silty clay loam with a few fine, faint dark brown (10YR 4/3) mottles; moderate, medium subangular blocky structure; medium acid; clear smooth boundary.

B_{22} (26-31″) — B_{22}. Mixed dark yellowish-brown (10YR 4/4) and dark gray (10YR 4/1) firm silty clay loam with common, medium, distinct yellowish-brown (10YR 5/6) mottles and many iron-manganese concretions; weak, medium prismatic structure breaking to moderate, medium to coarse angular blocky structure; medium acid; clear smooth boundary.

IIB_3 (31-45″) — IIB_3. Dark brown (7.5YR 4/4) firm clay loam with dark gray (10YR 4/1) and strong brown (7.5YR 5/8) mottles; weak, coarse angular blocky structure with discontinuous dark clay coatings and iron-manganese concretions and stains; slightly acid to neutral; clear wavy boundary.

IIC (45-60″+) — IIC. Dark brown (7.5YR 4/4) friable, light loam till; massive; calcareous.

Table 27. — PARTICLE SIZE DISTRIBUTION AND SOME CHEMICAL ANALYSES OF TORONTO SILT LOAM[a, b]

Horizon	Depth	Particle size distribution[c]				Exchangeable cations				Cation exchange capacity	Base saturation	pH	Organic carbon
		Gravel	Sand	Silt	Clay	Ca	Mg	Na	K				
	in.	*pct.*	*pct.*	*pct.*	*pct.*	*me. per 100 gm. soil*					*pct.*		*pct.*
A_1.....	0–7	.2	7.4	74.3	18.3	11.9	4.0	...[d]	.15	23.0	74	5.8	2.78
A_2.....	7–14	.2	7.4	71.1	21.5	6.4	3.3	...	.12	17.7	59	5.1	.96
A_3.....	14–17	T[e]	6.0	67.8	26.2	8.2	5.2	...	.16	21.3	69	5.1	.74
B_1.....	17–21	T	4.9	61.8	33.3	9.7	7.6	...	.16	25.2	75	5.1	.87
B_{21}.....	21–28	T	6.2	59.6	34.2	10.6	7.5	...	.20	26.7	70	5.1	.80
B_{22}.....	28–36	T	12.5	57.8	29.7	10.4	7.6	...	.20	24.2	78	5.2	.66
IIB_3....	36–45	5.5	52.7	27.7	19.6	7.0	5.4	...	.12	15.2	90	5.8	.52
IIC_1....	45–49	7.0	39.5	38.3	22.2	...	...	...	...	...	...	7.8	...
IIC_2....	49–61+	10.6	40.1	39.8	20.1	...	...	...	...	...	...	8.1	...

[a] Piatt county, T.18N., R.5E., Sec. 28, SW ¼, NW 40, SE 10 acres.
[b] Data from L. W. Bailey, *et al.* (4).
[c] Gravel is material >2.0 mm.; sand, 2.0-.05 mm.; silt, .05-.002 mm.; clay, <.002 mm. Percentages for gravel are based on entire sample; those for other particle sizes are based on material <2.0 mm.
[d] Not determined.
[e] T = Trace.

imperfectly drained while the other three soils are well drained or moderately well drained. Some chemical and physical properties of a Toronto soil are given in Table 27.

Toronto is moderately high in organic matter, medium to strongly acid, low in available phosphorus, and medium to high in available potassium. Moisture-holding capacity is high and permeability is moderate. Most areas need drainage for maximum crop production and tile function satisfactorily. Productivity is moderately high in drained, well-managed areas.

Loamy burned muck (358)

Loamy burned muck is a very minor and variable soil, more correctly classified as a land type. It consists of areas of organic deposits which have burned for variable periods of time (Fig. 25). The ash may be underlain by organic deposits or medium- to coarse-textured mineral materials. Thickness of ash varies. Burned areas have a reddish-brown cast and occasionally contain holes or hollows because of uneven burning. The water table was low when these areas were burned, perhaps in some cases because of overdraining.

Most areas of this land type are small but an area of about 100 acres occurs in section 22 of Dunham township. There may be some minor or recently burned

Organic matter burning in eastern McHenry county. The few areas of the Loamy burned muck land type in the county resulted from long periods of such burning. (Fig. 25)

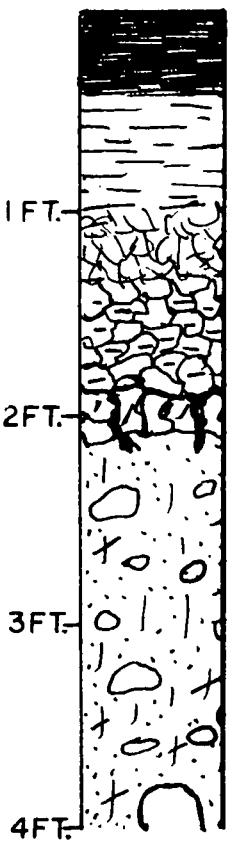
areas that are not shown on the map. A representative profile description is not given for loamy burned muck because it is so variable.

Surface material of loamy burned muck is mostly neutral or calcareous. Fertility and available moisture are extremely variable. In tillable areas productivity depends on such factors as depth to water table, thickness of ash and nature of underlying material, mineral composition of surface ash, and added fertilizers.

Lapeer loam (361)

Lapeer loam is a light-colored, well-drained, upland soil developed under forest vegetation on slopes ranging from about 5 to 18 percent. It developed in calcareous sandy loam till which may have a loess cover up to 1 foot thick. Solum thickness

Representative profile, Lapeer loam



A_1 (0-5″)	A_1. Very dark grayish-brown (10YR 3/2) friable loam; moderate, medium crumb structure; neutral; abrupt smooth boundary.
A_2 (5-12″)	A_2. Dark grayish-brown (10YR 4/2) to brown (10YR 5/3) friable loam; moderate, medium crumb to weak, medium platy structure; neutral; clear smooth boundary.
B_1 (12-16″)	B_1. Dark yellowish-brown (10YR 4/4) firm clay loam; weak, fine subangular blocky structure; slightly acid; clear smooth boundary.
B_2 (16-23″)	B_2. Dark brown (7.5YR 4/4) firm clay loam to sandy clay loam; moderate, medium subangular blocky structure; slightly acid; clear smooth boundary.
B_3 or Beta (23-25″)	B_3. Dark brown (7.5YR 4/4) friable, light sandy clay loam; weak, medium subangular blocky structure; neutral; clear wavy boundary.
C (25-40″+)	C. Brown (10YR 5/3) to yellowish-brown (10YR 5/4) friable sandy loam glacial till; massive; calcareous; contains considerable gravel.

A typical landscape on the West Chicago moraine in Section 36 of Hartland township. Lapeer and McHenry soils dominate the complexly sloping high ground. A variety of poorly drained soils occur in closed depressions such as those in the foreground. (Fig. 26)

or depth to calcareous till ranges from about 20 to 42 inches but is usually less than 3 feet. The soil principally occurs on the West Chicago moraine and in forested morainal areas to the east (Fig. 26). It is associated with McHenry (310), Nippersink (299), and Virgil (104).

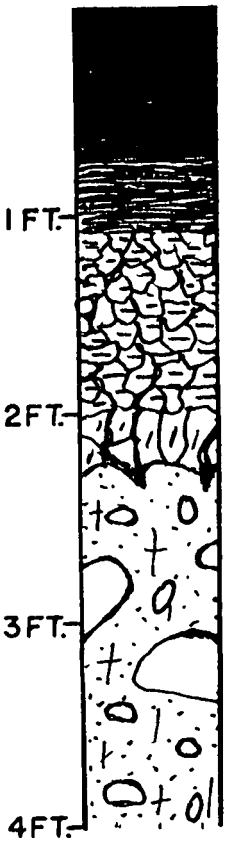
Lapeer is low in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. It has moderate to moderately rapid permeability and about medium moisture-holding capacity. Many areas are too steep for cultivation and remain in forest or are used as pasture. Cultivated areas require good management, including erosion control.

Griswold loam (363)

Griswold loam is a dark, well-drained, upland soil developed under prairie vegetation on slopes ranging from about 5 to 12 percent. Parent material is sandy loam till or in some places a few inches of loess (less than 1 foot thick) on sandy loam till. Depth to calcareous till ranges from about 20 to 42 inches but is usually less than 3 feet. The soil occurs primarily in upland prairie areas in the north-central and northeastern parts of the county in association with Ringwood (297) and Elburn (198).

Griswold is high in organic matter, medium to slightly acid, low to medium in available phosphorus, and medium to high in available potassium. Permeability is moderate to moderately rapid and moisture-holding capacity is about medium.

Representative profile, Griswold loam



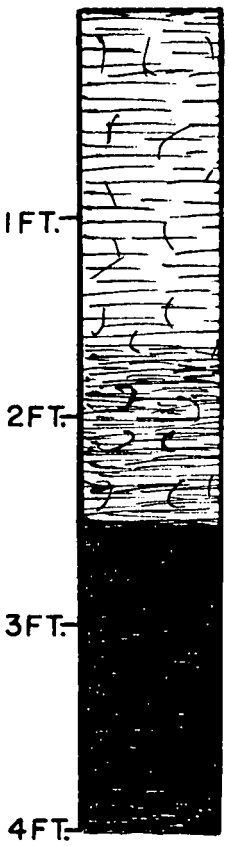
A_1 (0-9″)	A_1. Very dark brown (10YR 2/2) friable loam; moderate, medium granular structure; neutral; clear smooth boundary.
A_3 (9-13″)	A_3. Dark brown (10YR 3/3) friable loam; moderate, medium granular structure; neutral; clear smooth boundary.
B_2 (13-24″)	B_2. Dark yellowish-brown (10YR 3/4 to 4/4) firm clay loam; weak, medium subangular blocky structure; slightly acid; clear smooth boundary.
B_3 or Beta (24-27″)	B_3. Dark brown (7.5YR 4/4) firm to friable, light sandy clay loam grading to sandy loam in lower part; weak, coarse subangular blocky structure; neutral; clear wavy boundary.
C (27-40″+)	C. Yellowish-brown (10YR 5/4) and light yellowish-brown (10YR 6/4) friable sandy loam glacial till; massive; calcareous; contains considerable gravel.

Moisture-holding capacity decreases as solum thickness nears the minimum of about 20 inches. Most areas are used as cropland and are productive when properly managed. Erosion control is necessary in many areas.

Pistakee silt loam (364)

Pistakee silt loam is a light-colored to moderately dark soil consisting of recently washed-in silt loam or loam sediments over a dark soil with a silt loam surface. Washed-in material (ranging from about 20 to 40 inches thick) was deposited so recently that horizons have not developed. The soil is imperfectly drained or occa-

Representative profile, Pistakee silt loam



1 (0-21″) 1. Dark grayish-brown (10YR 4/2) to grayish-brown (10YR 5/2) friable silt loam; moderate, medium granular structure; neutral; clear smooth boundary.

2 (21-30″) 2. Dark grayish-brown (10YR 4/2) to dark brown (10YR 4/3) friable silt loam; moderate, medium to coarse granular structure; slightly acid; clear smooth boundary.

A_{1b} (30-40″+) A_{1b}. Black (10YR 2/1) to very dark grayish-brown (10YR 3/2) friable silt loam; moderate, medium granular structure; neutral; this horizon is the surface of a buried, dark-colored mineral soil.

Pistakee silt loam in a depression in eastern McHenry township. The surrounding soils are Rodman, Casco, and Fox. (Fig. 27)

sionally moderately well drained. It normally occurs in very small closed depressions but sometimes occurs in small drainageways (Fig. 27). It is mainly associated with McHenry (310), Lapeer (361), Fox (327), and Casco (323). Occasionally it is associated with Washtenaw (296), which also occurs in depressions. Pistakee has better natural drainage than Washtenaw, however, and is underlain by silt loam rather than silty clay loam material. Many areas of Pistakee were too small to delineate on the map and are shown by a depression symbol.

Pistakee is low to moderately low in organic matter, usually slightly acid to neutral, and variable in available phosphorus and available potassium. It has moderate permeability and high moisture-holding capacity. Most areas need drainage for maximum crop production but many areas are farmed without draining. Crops occasionally suffer in wet years.

GENESIS, FORMATION, AND CLASSIFICATION OF McHENRY COUNTY SOILS

Factors of Soil Formation

The soils of McHenry county were formed by the weathering of earth materials, aided by the action of plants and animals and their residues. Topography, or relief, and depth to water table affected soil formation by influencing aeration and drainage. In general, the length of time that parent materials were subjected to these forces determined the degree to which the present soils are weathered and developed.

Parent materials of McHenry county soils were distributed by the action of ice, water, and wind. Glaciers destroyed old soils or covered them with fresh till. Running water removed former soils or covered them with sand and gravel, while water in glacial lakes deposited several feet of fresh silt and clay sediments. These water-deposited materials are known as outwash or as lacustrine sediments. And finally a thin covering of silt particles (loess) was blown onto most of the till and outwash materials.

Glacial till was deposited by ice sheets and is primarily unsorted or unstratified. It varies in texture from nearly clean gravel through sand, loamy sand, sandy loam, loam, silt loam, silty clay loam, and silty clay to clay. Textures differ according to the proportions of the different mineral particle size fractions.

After intensive study (*35*), the calcareous glacial tills in northeastern Illinois were divided into six textural groups: loamy gravel, sandy loam, loam and silt loam, silty clay loam, silty clay, and clay. All of these textures occur in McHenry county. Particle size distribution of the textural groups is given in Table 28, but silty clay and clay are not included because of their very limited occurrence. Only one soil type, Eylar, represents these two fine-textured tills in the county.

Water that flows down streams, across outwash plains, or into lakes can deposit layers of sediment with different textures and thicknesses. Texture of the outwash varies from coarse, nearly clean gravel to very fine, nearly pure clay but usually consists of two or more particle size fractions. Thickness of the strata varies from a fraction of an inch to several feet. General areas of till and outwash materials and associated soils are outlined on the general soil map, page 104.

Loess consists mainly of silt but also includes a small amount of clay and sometimes a little fine sand. It originated from barren areas exposed to wind currents which separated the silt particles from coarser fragments. These areas were usually large bottomlands and valley trains of glacial rivers. Although some loess was deposited before the last

Table 28. — PERCENTAGES OF GRAVEL, SAND, SILT, AND CLAY IN THE FOUR IMPORTANT TEXTURES OF CALCAREOUS GLACIAL TILL IN McHENRY COUNTY[a]

Texture of glacial till	Average or range	Gravel (>2 mm.)	Sand (2–.05 mm.)	Silt (.05–.002 mm.)	Clay (<.002 mm.)
		pct.	*pct.*	*pct.*	*pct.*
Loamy gravel[b]	Average	62.5	30.9	4.8	1.5
	Range	31.9–82.2	15.5–64.6	1.0–14.4	.3–7.8
Sandy loam	Average	24.7	46.5	23.6	4.2
	Range	14.4–36.3	42.3–51.8	16.0–30.8	2.1–6.8
Loam and silt loam	Average	7.5	24.0	46.0	20.7
	Range	4.3–16.2	14.0–39.3	36.5–54.2	14.3–25.5
Silty clay loam	Average	4.1	12.0	52.5	31.3
	Range	.1–14.0	3.8–16.3	45.5–65.1	24.2–36.4

[a] Data are from many samples collected in McHenry county and neighboring counties in northeastern Illinois (*35*).
[b] Includes materials reworked by water.

glacier movements, only that deposited on top of the uppermost till and outwash is important to present-day soils. Because loess is the surface material, it is responsible for silt loam textures in the A horizons of more than half the soil types in McHenry county.

Peat and muck are primarily shallow-water accumulations of the fibrous remains of certain grasses, sedges, rushes, reeds, and creeping mosses. Sedimentary peat (deep-water accumulations of aquatic plants) underlies fibrous peat in some areas. The basal mineral material is mostly medium textured but varies from sand to silty clay. Peat is usually more than 65 percent organic matter, consisting of only slightly decomposed, identifiable plant remains. Muck is well-decomposed peat and usually includes more mineral matter. Large areas of peat and muck soils in the county are shown on the general soil map; many very small areas are not shown. Organic materials are usually more than 3 feet thick in the peat and muck areas.

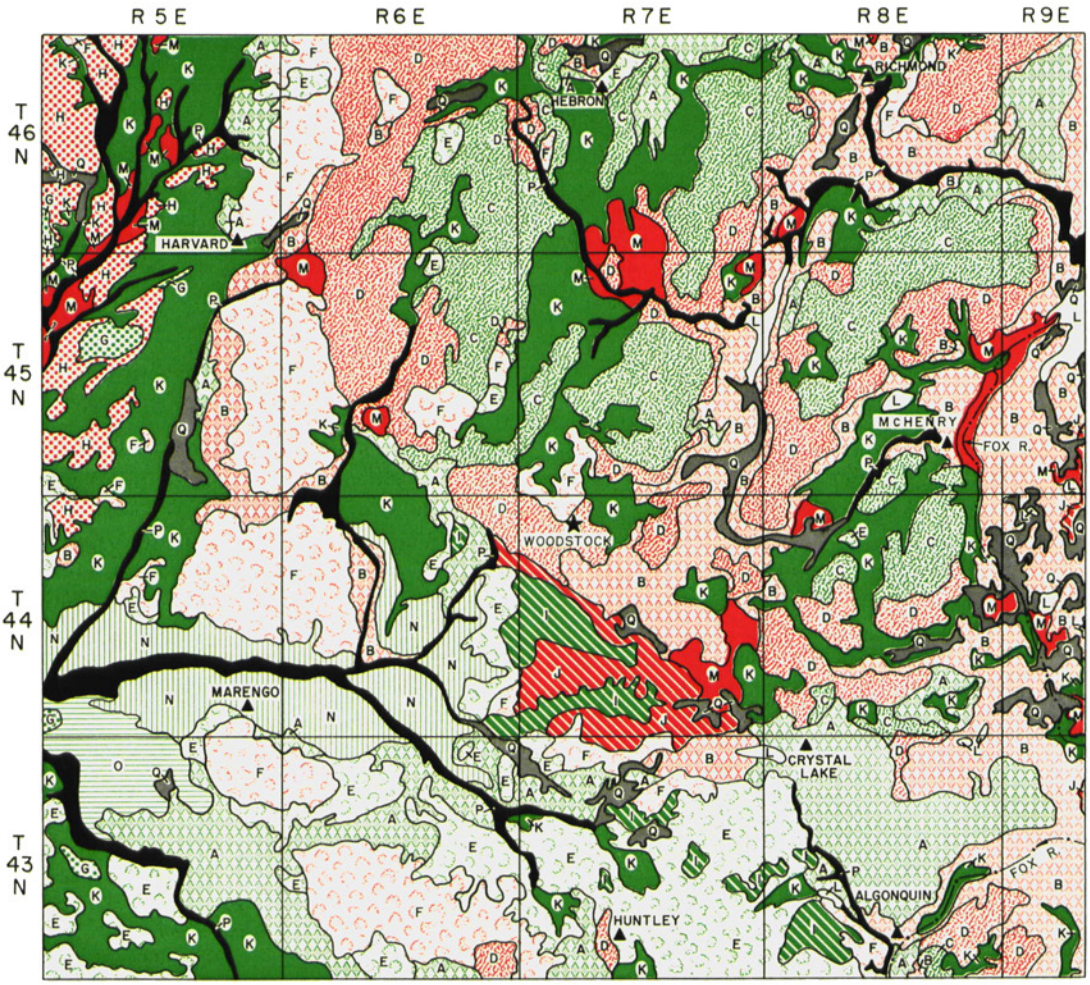
Native vegetation, including all associated plant and animal life, was responsible for the accumulation of organic matter. Two kinds, tall-grass prairie and deciduous forest, produced large amounts of organic matter. Organic matter that accumulated from the decaying fibrous root systems of grasses was within the mineral soil and was well preserved. Forest debris accumulated primarily on the soil surface, where it decayed rapidly or was burned or eroded away. A small amount of leaf litter was carried by soil organisms into the upper few inches of the mineral soil surface.

In the virgin or uncultivated state, soils that developed under both types of vegetation have dark A_1 horizons due to an accumulation of organic matter. However, the dark layer is much thicker in prairie soils, usually varying between 10 and 15 inches. In soils developed under forest, the A_1 horizon is 1 to 5 inches thick (Figs. 28 and 29). Where a mixed type of vegetation occurred or where forest recently encroached on prairie, the A_1 varies between 5 and 10 inches in thickness.

The colors on the general soil map, page 104, indicate the original vegetation in different parts of the county. Areas shown in green formed under prairie vegetation, those in red under forest vegetation. Black indicates soils formed under wet prairie or marsh vegetation.

Topography and drainage. Oxidation or reduction and hydration of certain mineral compounds (primarily iron) determine the brown and yellowish-brown to gray colors of the soil, especially the sub-

GENERAL SOIL MAP OF McHENRY COUNTY



A WARSAW-LORENZO. Dark, excessively to poorly drained soils developed in medium-textured material on calcareous loamy gravel drift.

B FOX-CASCO. Light-colored, excessively to imperfectly drained soils developed in medium-textured material on calcareous loamy gravel drift.

C RINGWOOD-GRISWOLD. Dark, well-drained to poorly drained soils developed in 0-3′ of loess on calcareous sandy loam till.

D McHENRY-LAPEER. Light-colored, well-drained to imperfectly drained soils developed in 0-3′ of loess on calcareous sandy loam till.

E SAYBROOK-LaROSE. Dark, well-drained to poorly drained soils developed in 0-3′ of loess on calcareous loam till.

F MIAMI-STRAWN. Light-colored, well-drained to imperfectly drained soils developed in 0-3′ of loess on calcareous loam till.

G DANA-SIDELL. Dark, well-drained to imperfectly drained soils developed in 1½-3½′ of loess on loam till leached to greater than 3½′.

H XENIA-RUSSELL. Light-colored, well-drained to imperfectly drained soils developed in 1½-3½′ of loess on loam till leached to greater than 3½′.

I ELLIOTT-VARNA. Dark, well-drained to poorly drained soils developed in 0-3′ of loess on calcareous silty clay loam till.

J BLOUNT-MORLEY. Light-colored, well-drained to imperfectly drained soils developed in 0-3′ of loess on calcareous silty clay loam till.

K BRENTON-PROCTOR. Dark, well-drained to poorly drained soils developed in medium-textured outwash.

M STARKS-CAMDEN. Light-colored, well-drained to imperfectly drained soils developed in medium-textured outwash.

N LOMAX-VOLINIA. Dark, well-drained to imperfectly drained soils developed in loam and silt loam material over sand and fine gravel.

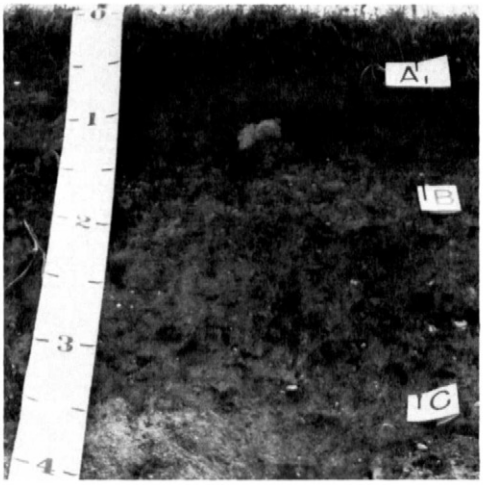
O SUMNER-SELMA. Dark, somewhat excessively to poorly drained soils developed in sandy outwash.

P OTTER-MILLINGTON. Dark, poorly drained, variable-textured but primarily loamy, neutral to calcareous alluvial (bottomland) soils.

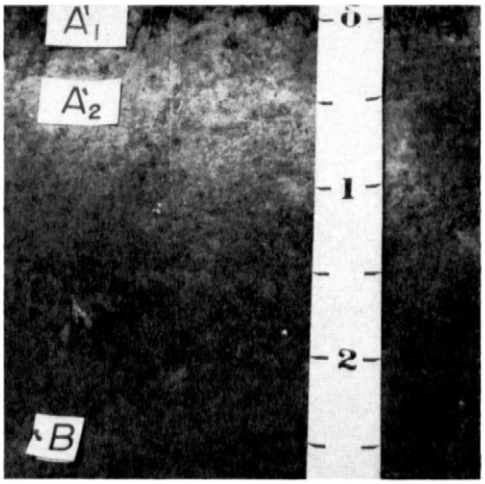
Q HOUGHTON-LENA. Dark, very poorly drained organic (muck and peat) soils.

L LAKE

FOX RIVER



A thick dark-colored A_1 horizon develops under prairie vegetation, but an A_2 horizon is absent. This is the upper portion of a Griswold loam profile. (Fig. 28)



Horizons developed under forest vegetation. Note the thin A_1 and light-colored A_2 horizons in this profile of McHenry silt loam. (Fig. 29)

soil. In permeable materials, where the water table is deep, the soil profile is well oxidized (well drained) and the overall subsoil colors are mostly brown to yellowish-brown, centering primarily around 10YR 5/4-5/6. In very slowly permeable materials or where the permanent water table is shallow, the soil profile is poorly oxidized (poorly drained) and the overall subsoil colors are gray, centering primarily around 2.5Y 5/1. Between these extremes, or where the water table fluctuates slowly into and out of the subsoil, the soils are moderately well to imperfectly or somewhat poorly oxidized (moderately well to imperfectly drained) with mixed or mottled colors.

In McHenry county, relief and slope are important to drainage conditions in that they influence runoff and depth to water table. Texture and compactness of the soil parent material, as well as depth of drainage outlets, are also important.

Climate largely determines the type of soil weathering that takes place. In most years, the humid, temperate climate of this region provides enough rainfall and melted snowfall to moisten all of the soil profile. Degree of saturation varies, however, depending on such soil properties as permeability, slope, and water-holding capacity.

In general, water either percolates downward to underground outlets, evaporates or is transpired by plants, or moves across the land surface to streams, carrying with it material in solution and suspension. Salts of calcium, magnesium, potassium, and other bases, as well as various organic and inorganic colloids and plant-nutrient ions, are formed. Some accumulate where formed, some are carried away in drainage waters, some are moved to other parts of the soil section to help form soil horizons, and some are taken up by plants.

Freezing and thawing help to break down rock fragments to smaller particles while the action of sun and wind influences many phases of plant and animal life.

The net effect of the prevailing climate is to leach out bases and to form clay. As alkali and alkaline earth elements leach out and are replaced by hydrogen, soils become acid. As iron and aluminum move out, silicon increases proportion-

ately. As clay is formed and accumulates, it imparts properties which differ significantly from those of the original material. This is particularly evident in soils with well-developed B horizons.

Time. The longer soils weather (up to a certain point), the more strongly developed and distinct are their profiles. But soil weathering and development cannot always be measured directly in years;

Table 29. — CLAY MINERALOGY OF THE MAJOR HORIZONS OF CERTAIN SOIL TYPES IN McHENRY COUNTY

Soil type	Horizon	Relative amounts[a] of			
		Illite	Montmorillonite	Chlorite	Vermiculite
Light-colored, Gray-Brown Podzolic soils					
Fox silt loam to loam[b]	A_1	M	S	T	S
	A_2	S	M	T	S
	B_2	S	L	T	S
	Calcareous gravel[c]	S	S	T	M
McHenry silt loam[b]	A_1	M	T	S	S
	A_2	S	S	S	S
	B_2	S	L	T	S
	Calcareous till	M	S	S	S
Miami silt loam	A_1	M	T	S	S
	A_2	M	S	S	T
	B_2	M	S	T	S
	Calcareous till	L	O	T	T
Blount silt loam	A_p	L	T	S	T
	A_2	L	T	T	T
	B_2	M	S	T	S
	Calcareous till	L	O	S	T
Eylar silt loam	A_1	L	O	S	O
	A_2	L	T	S	T
	B_2	L	T	T	S
	Calcareous till	L	O	T	T
Dark-colored, Brunizem soils					
Warsaw silt loam to loam[b]	A_1	M	M	T	T
	B_2	M	M	T	T
	Calcareous gravel[d]	M	S	T	T
Ringwood silt loam[b]	A_1	M	S	T	S
	B_2	M	S	T	S
	Calcareous till	L	T	S	O
Saybrook silt loam	A_1	M	M	O	T
	B_2	S	L	T	T
	Calcareous till	L	T	T	O
Elliott silt loam	A_1	L	T	O	T
	B_2	L	T	T	S
	Calcareous till	L	T	T	T
Very dark-colored, Humic-Gley soils					
Drummer silty clay loam	A_1	S	M	T	T
	B_2	S	L	T	T
	Calcareous till	L	S	T	T
Ashkum silty clay loam	A_1	L	S	T	T
	B_1	S	L	T	T
	Calcareous till	L	O	T	T

[a] Symbols used to indicate relative amounts of clay minerals are: L = large amount (60-100 percent), M = moderate amount (35-60 percent), S = slight amount (15-35 percent), T = trace (5-15 percent), and O = none or amount too small to identify.
[b] These profile samples are from McHenry county; other samples are from neighboring counties in northeastern Illinois. [c] Clay content is < 7 percent. [d] Clay content is < 3 percent.

other factors help determine the degree to which a profile weathers within a given time. Soils on gentle, very slowly eroding slopes weather faster and form well-developed profiles in less time than soils on steep, rapidly eroding slopes. Also, unconsolidated materials weather faster than solid bedrock, so that a soil profile weathered from the former materials will reach a certain stage of development sooner than a profile weathered from bedrock. Both profiles, however, become more strongly weathered with the passing of time.

In the geological time scale McHenry county soils are young. They are developed in materials deposited during late Tazewell or early Cary time. Organic materials found buried in till or outwash of Cary time show a radiocarbon date of about 13,000 years ago (*28, 30*). However, estimates based on geological evidence, such as varve accumulations, wave cutting, recession of Niagara Falls, and depth of leaching, indicate that Cary age materials were deposited about 25,000 years ago (*3, 11*).

Regardless of the actual number of years that have passed, the soils range from very weakly developed to moderately well developed. Soils on steep slopes, which are subject to continued slow erosion, have weakly developed profiles. Those on nearly level areas or in slight depressions with a deep water table, where all rainfall moves downward, are relatively well developed.

Man in our modern world must also be considered a factor in soil formation. He harvests the native vegetation and plows the land. By cultivating slopes, he hastens erosion and deposition. He drains wet soil areas and irrigates dry ones. He applies crushed limestone to reduce or eliminate soil acidity. He applies fertilizer to replenish depleted plant nutrients. And through much excavating, grading, and filling, he completely covers or destroys the presently developed soil profiles and causes a new cycle of soil formation to begin.

Clay Mineralogy

The major horizons (A_1, A_2, B_2, and C or calcareous till) of several till-derived soils have been analyzed for clay minerals (Table 29) (*35*). Where loess was a surface deposit, horizons derived from it were analyzed as part of the till-derived soils. Extensive study has not been made of the clay minerals of soils derived from outwash.

The four important clay minerals found were illite, montmorillonite, vermiculite, and chlorite. Kaolinite was indicated in most samples, but the amounts were too small to be measured by the method used. Following is a summary of results for 38 samples of 11 soil types found in McHenry county.

Horizon	A_1	A_2	B	C
Number of samples	11	5	11	11
Samples in which illite predominated	8	3	5	10
Samples in which montmorillonite predominated	1	1	5	0
Samples in which vermiculite predominated	0	0	0	1
Samples in which chlorite predominated	0	0	0	0
Samples in which vermiculite was greater than montmorillonite	2	0	2	4
Samples in which chlorite was greater than montmorillonite	4	1	0	5

Illite is the predominant clay mineral in the soils of McHenry and neighboring counties in northeastern Illinois. It

is a relatively nonexpanding type with low swelling properties.

Montmorillonite is among the most active clay minerals. It is a highly expanding type capable of absorbing large amounts of water. It shrinks and swells considerably more with changes in moisture than illite, vermiculite, or chlorite. It is probably the principal clay mineral that has moved to and accumulated in the B horizon. It was not the predominant clay mineral in any of the 11 calcareous till samples and did not occur at all in 3.

Vermiculite has limited swelling properties, probably intermediate between illite and montmorillonite. It was the most abundant clay mineral in one sample (a calcareous till C horizon). It was less abundant than illite in all other samples, but was more abundant than montmorillonite in 7 additional samples.

Chlorite has low swelling properties. It was not the predominant clay mineral in any sample. It was lower than illite in all samples except 1 A_2, in which it was about equal. It was greater than montmorillonite in 4 of the 5 A_1 samples and 1 of the 5 A_2 samples of the Gray-Brown Podzolic soils studied, but it was less than montmorillonite in the A_1 of the Brunizem and Humic-Gley soils. It was less than montmorillonite in 9 of the 11 B horizon samples and about equal in the other 2. It was greater than montmorillonite in 5 calcareous till samples, about equal in 3, and less in 3.

Taxonomic Classification of McHenry County Soils

The taxonomic classification of soils is based on observable natural profile characteristics or certain other measurable properties. It includes such morphological features as color, texture, structure, consistence, and thickness of horizons, as well as reaction, mineralogy, and chemical composition.

Soils are grouped into categories ranging from soil type and series through family, subgroup, group, and suborder to order. As soil types and series are grouped into higher categories, differentiating features become fewer. Of the eight Great Soil Groups shown in Table 30, seven are based on kinds of surface or subsurface horizons — that is, the number, color, thickness, and organic matter content of the A_1, A_2, and A_3 horizons. One group, Alluvial, is characterized by the absence of developed horizons, with the possible exception of the accumulation of some organic matter in an A horizon.

A different, more comprehensive system of classifying soils is now being developed. In Table 31 and in the following discussion, a system for McHenry county soils is presented that is designed to fit into the new system insofar as our present knowledge permits. Some of the terminology used is the same as that proposed for the new system.

Soil type (Category I). The soil type is the lowest category used in this report.[1] Areas of the same soil type are similar in differentiating characteristics, including surface texture and parent material. Soil type is the unit about which the most detail can be observed and the most accurate predictions can be made. Each type differs from all other types in one or more features but tends to grade into surrounding types at its outer margins. Its lower limit is the depth to which the natural soil-forming factors are operative or the depth to which roots of native plants penetrate, whichever is deeper. A few types in McHenry county have both loam and silt loam surfaces. The surface texture of these types is either on the border between loam and silt loam or their field distribution was too complex to separate at the scale used in mapping. Category I is not included in Table 31.

[1] Slope and erosion or surface-depth subdivisions are discussed in the soil management guide and are shown only on the individual farm maps accompanying the guide (*27*).

Detailed descriptions of the soil types are given on pages 19 to 101.

Series (Category II). A soil series is a group of soil types which are similar in kind and sequence of horizons but which differ in texture of the surface layer. Many series in McHenry county are composed of a single type. This is due primarily to the silty loess cover that forms silt loam A horizons, with B horizons developed in various other materials. Also, where no loess is present, a change in the texture of the A horizon usually accompanies a change in parent material. Series is the lowest category of soils in Table 31.

Family (Category III). Series are grouped into families according to properties that affect the development of plant roots and the movement and retention of soil

Table 30. — CLASSIFICATION OF McHENRY COUNTY SOIL SERIES BY GREAT SOIL GROUP[a]

Great soil group	Soil series	
Gray-Brown Podzolic, including imperfectly oxidized (drained) associates	Alvin Blount Camden Casco Ellison Eylar Fox Lapeer	McHenry Metea Miami Morley Russell Starks Strawn Xenia
Regosol intergrade to Gray-Brown Podzolic	Hennepin	Rodman
Gray-Brown Podzolic intergrade to Brunizem, including imperfectly oxidized (drained) associates	Beecher Dowagiac Dresden Harvard Herbert Matherton	Millbrook Montmorenci Nippersink Toronto Virgil Wingate
Brunizem (formerly Prairie), including imperfectly oxidized (drained) associates	Brenton Dana Elburn Elliott Griswold Kane LaHogue LaRose Lisbon Lomax Lorenzo Onarga	Plattville Proctor Ridgeville Ringwood Saybrook Sidell Sumner Troxel Varna Volinia Warsaw
Planosol intergrade to Low Humic-Gley	Knight	Thorp
Humic-Gley soils	Ashkum Drummer Harpster	Peotone Selma Will
Bog soils	Houghton Lena	Loamy burned muck
Alluvial soils	Millington Otter Pistakee	Wallkill Washtenaw

[a] THORP, JAMES, and SMITH, G. D. Higher categories of soil classification: order, suborder, and great soil groups. Soil Sci. 67, 117-126. 1949. This table relates the former classification system to the proposed new system (see Table 31).

Table 31. — TAXONOMIC KEY TO THE SOILS OF McHENRY COUNTY

Order (VII)	Suborder (VI)	Group (V)	Subgroup (IV)	Family (III)	Series (II)	
					Other criteria	Name
Mineral soils with an A_1 or A_p (plowed layer) 7 or more inches thick; with chroma of 3 or less and value of 3 or darker (Munsell notations) when moist and uneroded; with a minimum base saturation in all parts of the A horizon mostly greater than 75% in untreated areas; with calcium as the dominant metallic cation; and containing between 1.5 and 6.0% organic carbon (approximately 2.0 and 10.0% organic matter), except possibly in some of the dry sands. If the solum is less than 15 inches thick, the A_1 may be less than 7 inches but is more than ⅓ the thickness of the solum.	Moderately dark soils with thin or no A_2. Base saturation high.	Soils without textural B.	Solum less than 12–15″ thick and without mottles.	Loamy, skeletal, carbonatic.	Calcareous gravel at <12″	Rodman
	Moderately dark soils with an A_2 and with a B that shows evidence of a periodic high water table. Base saturation in B mostly 70-90%.	Soils with textural B that is primarily gray; many Fe-Mn concretions.	Soils with abrupt textural change[a] from A_2 to B. Mottles in B faint if present.	Fine silty, medium acid, mixed.	Sand or gravel at >42″ and >24″ to B	Knight
					Sand or gravel at >42″ but <24″ to B	Thorp
	Dark soils without an A_2 but showing evidence of a periodic high water table. Base saturation mostly 90-100% in B horizon.	Soils without textural B but primarily gray at 20–30″; many Fe-Mn concretions.	No textural B. Mottles faint if present at 20–30″.	Fine silty to fine loamy, calcareous, mixed.	A thicker than 16–20″	Millington
					A thinner than 16–20″	Harpster
				Fine loamy, neutral, mixed.	Variable A	Otter
		Soils with weak[b] to moderate textural B that is primarily gray; many Fe-Mn concretions.	Gradual to diffuse boundary from A to B. Mottles in B faint to distinct if present.	Fine loamy, slightly acid to neutral, mixed.	Calcareous gravel at >24″, <42″	Will
					Sand at 40–60″	Selma
				Fine silty to fine loamy, slightly acid to neutral, mixed.	Medium textured to 60″+	Drummer
				Fine, slightly acid to neutral, mixed.	Calcareous silty clay loam at <42″	Ashkum
					A thicker than 20–24″	Peotone
	Dark soils without an A_2 and with little or no evidence of a periodic high water table. Base saturation in B primarily between 70 and 90%, except possibly in sandy soils.	Soils with weak textural B that is brown or yellowish-brown with few or no Fe-Mn concretions.	Gradual to clear boundary from A to B. No mottles above 36–40″.	Coarse loamy, medium acid, siliceous.	Sand at 40-60″, A_1 >14-16″ thick	Lomax
					Sand at <40″, A_1 <14-16″ thick	Sumner
		Soils with moderate textural B that is primarily brown to yellowish-brown or grayish-brown with few to some Fe-Mn concretions.	Clear boundary from A to B. B may be free of mottling. If B is mottled, no mottles occur above 20″.	Coarse loamy, medium acid, mixed.	Sand at <40″	Onarga
				Fine loamy over sandy skeletal, medium to slightly acid, mixed.	Calcareous gravel at >12″, <24″	Lorenzo
					Calcareous gravel at >24″, <42″	Warsaw
				Fine loamy over sandy, medium acid, mixed.	Sand or gravel at >24″, <42″	Volinia
				Fine loamy, medium acid, mixed.	Calcareous sandy loam at >18″	Griswold
					Calcareous sandy loam at >30″, <50″	Ringwood
					Calcareous loam till at >18″, <24″	LaRose
					Limestone bedrock at >24″, <50″	Plattville
				Fine silty to fine loamy, medium acid, mixed.	Calcareous loam till at >24″, <50″	Saybrook
					Medium textured to 60″, stratified at <42″	Proctor

Table 31. — Continued

Order (VII)	Suborder (VI)	Group (V)	Subgroup (IV)	Family (III)	Series (II)	
					Other criteria	Name
				Fine silty, medium acid, mixed.	Calcareous loam till at >42″, no mottles in B	Sidell
					Calcareous loam till at >42″, mottled lower B	Dana
				Fine, medium acid, illitic.	Calcareous silty clay loam at <42″	Varna
			Clear boundary from A to B. Mottled in upper B or above 20″.	Coarse loamy, medium acid, mixed.	Sand at <40″	Ridgeville
				Fine loamy, medium to slightly acid, mixed.	Calcareous gravel at >24″, <42″	Kane
					Sand at >40″, <60″	LaHogue
				Fine silty to fine loamy, medium to slightly acid, mixed.	Calcareous loam till at >24″, <42″	Lisbon
					Medium textured to 60″, stratified at <42″	Brenton
				Fine silty, medium to slightly acid, mixed.	Calcareous sandy loam at >42″, <60″	Elburn
					Sand or gravel at >42″, A_1 >20″ thick	Troxel
				Fine, medium to slightly acid, illitic.	Calcareous silty clay loam at <42″	Elliott
Mineral soils with an A_1 less than 7 inches thick or an A_p (plowed layer) with color value of 3.5 or lighter (Munsell notations) when moist, and an A_2 with value of 4 or lighter when moist. Base saturation is usually less than 75% in some part of the A horizon where untreated; organic carbon is mostly less than .9% (approximately 1.5% organic matter) in the A_2 or A_3, or both, except in some intergrades.	Light-colored soils that show slight to no evidence of a periodic high water table. Minimum base saturation in some part of B mostly between 50 and 80%.	Soils without textural B, or B less than 8–10″ thick if present.	Solum less than 15–18″ thick.	Fine loamy, neutral to calcareous, mixed.	Calcareous sandy loam to clay loam till at <18″	Hennepin
		Soils with moderate textural B that is primarily brown to yellowish-brown or grayish-brown with few to some Fe-Mn concretions.	Gradual to clear boundary from A to B. B may be free of mottling. If B is mottled, no mottles occur above 20″.	Coarse loamy, medium acid, mixed.	Sand at <40″	Alvin
					Calcareous loam till at >24″, <42″	Metea
				Fine loamy over sandy skeletal, medium acid, mixed.	Calcareous gravel at >12″, <24″	Casco
				Fine loamy over sandy, medium acid, mixed.	Calcareous gravel at >24″, <42″	Fox
					Sand or gravel at >24″, <42″	Ellison
				Fine loamy, medium acid, mixed.	Calcareous sandy loam at >18″	Lapeer
					Calcareous sandy loam at >30″, <50″	McHenry
					Calcareous loam till at >18″, <24″	Strawn
					Calcareous loam till at >24″, <42″	Miami
				Fine silty to fine loamy, medium acid, mixed.	Medium textured to 60″, stratified at <42″	Camden

[a] Abrupt textural change is one of 20 percent or more in clay content in a 3-inch vertical distance.
[b] A weak textural B is one in which a small amount of clay has accumulated but without significant textural change from parent material.

(Table is concluded on next page.)

Table 31. — Concluded

Order (VII)	Suborder (VI)	Group (V)	Subgroup (IV)	Family (III)	Series (II)	
					Other criteria	Name
				Fine silty, medium acid, mixed.	Calcareous loam till at >42″, no mottles in B	Russell
					Calcareous loam till at >42″, mottled lower B	Xenia
				Fine, medium acid, illitic.	Calcareous silty clay loam at <42″	Morley
			Clear to abrupt boundary from A to B. Mottled in upper B or above 20″.	Fine silty to fine loamy, medium acid, mixed.	Medium textured to 60″, stratified at <42″	Starks
				Fine, medium acid, illitic.	Calcareous silty clay loam at <42″	Blount
					Calcareous silty clay at <42″	Eylar
	Moderately dark soils that show slight to no evidence of a periodic high water table. Minimum base saturation in some part of B mostly between 60 and 90%.	Soils with moderate textural B that is primarily brown to yellowish-brown or grayish-brown with few to some Fe-Mn concretions.	Gradual to clear boundary from A to B. B may be free of mottling. If B is mottled, no mottles occur above 20″.	Fine loamy over sandy, medium acid, mixed.	Calcareous gravel at >24″, <42″	Dresden
					Sand or gravel at >24″, <42″	Dowagiac
				Fine loamy, medium acid, mixed.	Calcareous loam till at >24″, <42″	Montmorenci
					Calcareous sandy loam at >30″, <50″	Nippersink
				Fine silty to fine loamy, medium acid, mixed.	Medium textured to 60″, stratified at <42″	Harvard
				Fine silty, medium acid, mixed.	Calcareous loam till at >42″	Wingate
			Gradual to clear boundary from A to B. Mottled in upper B or above 20″.	Fine loamy over sandy skeletal, medium acid, mixed.	Calcareous gravel at >24″, <42″	Matherton
				Fine loamy, medium acid, mixed.	Calcareous loam till at >24″, <42″	Herbert
				Fine silty to fine loamy, medium acid, mixed.	Medium textured to 60″, stratified at <42″	Millbrook
				Fine silty, medium acid, mixed.	Calcareous loam till at >42″	Toronto
					Calcareous sandy loam at >42″, <60″	Virgil
				Fine, medium acid, illitic.	Calcareous silty clay loam at <42″	Beecher
Mineral soils without diagnostic A_1 or A_2 (may have an A_p) with color value of 3.0 or lighter when moist. Surface of buried soil at 20 to 40″.	Light-colored soils showing evidence of a periodic high water table.	Soils without textural B, mostly gray (chroma of 1 or less).	Abrupt to clear boundary to buried, dark-colored soil. Few or no mottles.	Fine loamy, neutral, mixed.	Muck at >20″, <40″	Wallkill
					Mineral soil at >20″, <40″	Washtenaw
	Light-colored soils showing slight to no evidence of a periodic high water table.	Soils without textural B, chroma mostly 2 or more.	Abrupt to clear boundary to buried soil. Sometimes mottled.	Fine loamy, nearly neutral, mixed.	Mineral soil at >20″, <40″	Pistakee
Organic soils with more than 20% organic matter.	Soils with high base saturation and pH greater than 6.0.	Fibrous organic materials.	Abrupt boundary to underlying mineral material.	Calcareous in surface.	Organic material >42″ thick	Lena
				Slightly acid to neutral.	Organic material >42″ thick	Houghton

moisture. The properties considered are texture, reaction, and mineralogy of sola (A + B horizons). Many families may be considered management groups, although some are primarily taxonomic and may include soils requiring somewhat different management.

Subgroup (Category IV). A subgroup includes families that are similar in thickness of the solum, mottlings in B, and boundary of A to B horizon. Characteristics used to define a subgroup represent some of the principal profile features that distinguish individual soil series, except that parent materials within a subgroup may vary.

Group (Category V). Development of a B horizon, along with its color and the presence of iron-manganese concretions that result from variable degrees of wetness, is the main criterion for this category. Each group is relatively uniform in kind and arrangement of A and B horizons but may vary widely in kind of C horizon.

Suborder (Category VI). A suborder is primarily based on presence or absence of an A_2 horizon, degree of wetness in the solum, and saturation of bases in the B horizon.

Order (Category VII). The orders are based on measurable differences in color and thickness of A_1 (or A_p) horizons. These differences are determined by the amount of organic matter accumulated and preserved. This is due, in turn, to the type of native vegetation — which was forest and prairie in McHenry county. Preservation of organic matter under ponded conditions, as well as probable differences in vegetation, was a factor in the formation of peat and muck soils. Percent base saturation is an accessory characteristic which may assist in defining profiles of untreated soils. It is not, however, a reliable criterion for treated soils.

INTERPRETATION FOR SPECIFIC PURPOSES

Present and future uses of the soils and soil materials in McHenry county are many and varied. Glaciers carried many kinds of rock materials into the region (page 6). Some materials were reworked and sorted by wind and water. All were weathered to some extent, which produced soil layers or horizons (page 14). Each of these materials and soil horizons has characteristics that tend to determine its best use.

Agriculture

Some of the important management problems for each soil type are mentioned in the type descriptions, pages 19 to 101. Differences in slope and degree of erosion, while not shown on the map accompanying this report, are important in detailed farm planning and need to be considered. For these features and for more specific management suggestions consult the guide (*27*) for individual farms or see the county farm adviser or work unit conservationist.

Estimated average yields of the major farm crops adapted to McHenry county are given in Table 32. These yields are for uneroded or slightly eroded soils and for a typical slope range on which each soil is found. Yields for bottomland soils assume no damage from flooding. A high level of management is assumed, including (1) adequate drainage where needed; (2) a cropping system which retards erosion and helps maintain good soil tilth; (3) additional erosion-control practices where needed; (4) timely use of good cultural practices; (5) careful handling of manure and crop residues; (6) use of limestone, phosphate, and potash as soil tests indicate; and (7) use of supplemental nitrogen and minor elements where needed to maintain high plant-nutrient levels.

Table 32. — ESTIMATED AVERAGE ACRE YIELDS OF CROPS ON McHENRY COUNTY SOILS UNDER A HIGH LEVEL OF MANAGEMENT[a]

Type No.	Type name	Slope range	Corn	Soybeans	Oats	Alfalfa-mixed hay	Alfalfa-mixed pasture
		pct.	*bu.*	*bu.*	*bu.*	*tons*	*days*[b]
23	Blount silt loam	1–4	82	30	63	3.6	180
24	Miami silt loam	2–7	88	31	65	3.9	195
25	Hennepin loam	7–18	..	..	45	2.5	125
55	Sidell silt loam	1–4	95	37	70	4.3	215
56	Dana silt loam	0–2	97	37	72	4.5	225
57	Montmorenci silt loam	1–4	93	35	65	4.2	210
59	Lisbon silt loam	0–2	102	38	75	4.7	235
60	LaRose silt loam	7–12	76	29	58	3.5	175
62	Herbert silt loam	0–2	95	35	65	4.4	220
67	Harpster silty clay loam	0–2	91	36	62	4.0	200
76	Otter loam, bottom	0–2	93	38	63	3.9	215
79	Volinia silt loam to loam	1–4	82	30	60	3.5	175
82	Millington loam, bottom	0–2	91	36	62	3.8	210
87	Sumner sandy loam	1–4	70	24	51	3.2	160
93	Rodman gravelly loam	7–18	..	..	35	2.0	100
93-318	Rodman-Lorenzo complex	7–18	..	..	45	2.5	125
93-323	Rodman-Casco complex	7–18	..	..	41	2.5	125
97	Houghton peat	0–2	84	30	..	...	...
102	LaHogue loam	0–2	96	38	69	4.5	225
103	Houghton muck	0–2	90	35	..	...	...
104	Virgil silt loam	0–2	91	34	63	4.3	215
125	Selma loam	0–2	90	36	62	3.9	195
132	Starks silt loam	0–2	86	33	63	4.0	200
134	Camden silt loam	2–7	85	31	63	3.8	190
137	Ellison silt loam to loam	1–4	73	28	54	3.2	160
144	Alvin sandy loam	4–12	68	25	50	2.9	145
145	Saybrook silt loam	1–4	97	37	73	4.5	225
146	Elliott silt loam	1–4	90	34	65	4.0	200
148	Proctor silt loam	1–4	97	37	70	4.3	215
149	Brenton silt loam	0–2	104	38	75	4.7	235
150	Onarga sandy loam	1–4	82	30	60	3.5	175
152	Drummer silty clay loam	0–2	102	39	70	4.4	225
156	Ridgeville sandy loam	1–4	84	32	63	4.0	200
191	Knight silt loam	0–2	77	34	52	3.4	180
194	Morley silt loam	7–12	70	27	55	3.2	160
197	Troxel silt loam	0–2	100	37	73	4.5	225
198	Elburn silt loam	0–2	100	37	73	4.5	225
205	Metea sandy loam	2–7	82	30	63	3.8	190
206	Thorp silt loam	0–2	75	33	49	3.3	175
210	Lena muck	0–2	88	32	..	...	...
219	Millbrook silt loam	0–2	95	35	65	4.4	220
220	Plattville silt loam	1–4	85	31	60	4.0	200
223	Varna silt loam	4–7	84	29	59	3.5	175
224	Strawn silt loam	7–12	71	27	55	3.2	160
228	Eylar silt loam	4–7	60	25	48	3.0	150
232	Ashkum silty clay loam	0–2	93	36	60	4.0	210
265	Lomax loam	0–2	78	30	55	3.4	170
290	Warsaw silt loam to loam	1–4	89	32	62	3.8	190
290-318	Warsaw-Lorenzo complex	4–12	70	26	59	3.5	175
291	Xenia silt loam	1–4	90	34	65	4.1	205
292	Wallkill silt loam	0–2	90	34	58	4.0	200
296	Washtenaw silt loam	0–2	93	35	60	4.0	200
297	Ringwood silt loam	1–4	94	36	69	4.2	210
298	Beecher silt loam	1–4	86	32	64	3.8	190
299	Nippersink silt loam	1–4	90	32	65	4.0	200

Table 32. — Concluded

Type No.	Type name	Slope range	Corn	Soybeans	Oats	Alfalfa-mixed hay	Alfalfa-mixed pasture
		pct.	*bu.*	*bu.*	*bu.*	*tons*	*days*[b]
310	McHenry silt loam	2–7	84	30	64	3.8	190
318	Lorenzo silt loam to loam	4–12	66	24	55	3.0	150
322	Russell silt loam	4–7	85	33	64	3.9	195
323	Casco silt loam to loam	4–12	63	22	50	2.9	145
325	Dresden silt loam to loam	1–4	84	30	61	3.6	180
327	Fox silt loam to loam	1–4	80	28	59	3.5	175
327-323	Fox-Casco complex	4–12	67	24	54	3.3	165
329	Will silty clay loam	0–2	90	36	62	3.9	195
330	Peotone silty clay loam	0–2	85	34	56	3.5	185
342	Matherton silt loam to loam	0–2	85	32	62	3.7	185
343	Kane silt loam to loam	0–2	90	34	64	4.0	200
344	Harvard silt loam	1–4	93	35	65	4.1	205
346	Dowagiac silt loam to loam	1–4	77	29	57	3.3	165
347	Harpster silt loam to loam	0–2	91	36	62	4.0	200
348	Wingate silt loam	1–4	93	35	65	4.2	210
353	Toronto silt loam	0–2	95	35	65	4.4	220
358	Loamy burned muck	0–2	V[c]	V	V	V	V
361	Lapeer loam	7–12	67	23	48	3.2	160
363	Griswold loam	7–12	70	26	50	3.3	165
364	Pistakee silt loam	0–2	90	36	60	4.0	200

[a] Estimates are based on current information and represent averages for approximately the last 10 years. Yields are for uneroded or only slightly eroded conditions and for the slope range indicated. Yields for bottomlands assume no damage from flooding. Absence of yield figures indicates the crop is not well suited to that particular soil. A high level of management is defined on page 113.
[b] Expected number of days that one acre will carry one cow.
[c] Crop yields are too variable to indicate estimates. See soil description, page 98.

The yield estimates are based on current information. With more intensive practices or with improvements in soil and crop technology and farming practices, higher yields may be expected. Where practices are less intensive, where slope is unfavorable, or where erosion has been severe, lower yields may be expected.

Yields obtained on the Joliet experiment field in Will county are shown in Table 33. The soils on this field are primarily Elliott and Ashkum. Management is considered high level, except that liming and fertilizer treatment is variable as shown in the table, and nitrogen may not be adequate for maximum yields.

All crops grown on this field responded well to additions of manure alone. Residues alone produced little or no increase in yields. A residue-limestone treatment, however, increased corn yields, as did a manure-limestone treatment. Neither the residue-lime treatment nor the manure-lime treatment had an appreciable effect on yields of crops other than corn. For all crops, phosphorus produced moderate to large increases over the manure-lime and residue-lime treatments. Extra phosphorus in the form of superphosphate gave little or no additional increase on corn and soybeans but did give a small increase on oats and wheat. Potassium, when added to the residues-lime-phosphorus treatment, produced significant increase in corn yields, only slight increases of soybeans and wheat, and no increases of oats.

For each treatment in the manure system, corn yielded about the same whether it was preceded by soybeans or by legume hay. But in the residue system corn yields were 6 to 16 bushels an acre higher after legume hay than after soybeans. The lower yields of second-year corn were probably due to inadequate nitrogen.

Table 33. — AVERAGE ACRE YIELDS — JOLIET AGRONOMY EXPERIMENT FIELD,[a] WILL COUNTY, CHIEFLY ELLIOTT SILT LOAM (146) WITH SOME ASHKUM SILTY CLAY LOAM (232)

12-year Average, 1949-1960, Series 100-600

Treatment[b]	1st-year corn	Soybeans	2nd-year corn	Oats	Wheat	Hay
	bu.	*bu.*	*bu.*	*bu.*	*bu.*	*tons*
O	34.9±1.7[c]	21.9±1.4[c]	30.4±2.7[c]	42.0±3.8[c]	17.3±1.6[c]	.8±.10[c]
M	51.9±2.1	26.0±1.2	55.3±3.5	55.2±4.7	26.3±2.2	1.3±.14
ML	61.8±2.2	27.0±1.2	65.0±3.8	60.6±3.6	29.0±2.0	1.6±.13
MLrP	72.7±2.7	29.3±1.2	72.9±3.2	65.9±3.8	35.9±2.3	2.4±.16
O	38.0±1.9	23.4±1.3	30.0±2.7	47.9±3.7	17.6±1.5	.9±.12
R	41.6±1.9	24.2±1.3	33.0±1.6	47.7±4.0	18.7±2.0	.....
RL	50.5±2.3	25.2±1.4	44.4±1.7	49.6±3.9	20.3±1.9	.....
RLrP	75.4±2.5	29.5±1.4	58.8±2.8	59.3±3.8	32.3±2.5	.....
RLrPK	82.3±3.3	32.0±1.7	67.9±3.1	57.3±3.2	34.7±2.3	.....
RLrP+0-20-0	76.7±2.6	29.5±1.4	61.0±3.2	60.9±3.8	35.8±2.0	.....
RLrPK+0-20-0	82.0±3.0	31.8±1.6	67.6±3.3	59.4±3.7	35.7±2.1	.....

[a] The cropping system followed was a 6-year rotation of corn-soybeans-corn-oats (with legume catch crop)-wheat-legume hay. The field was discontinued in 1962.

[b] O = no treatment; M = manure at the rate of 1 ton for each ton of crops removed; R = crop residues of stover, straw, legumes, including hay crop; L = limestone in 4 applications for a total of 9 tons per acre since 1915; rP = rock phosphate in 4 applications for a total of 4 tons per acre since 1915; K = muriate of potash (0-0-60) at 500 lb. an acre per rotation applied on the wheat, hay, and corn; 0-20-0 at 300 lb. per acre on the wheat since 1947 in addition to the normal treatment.

[c] Standard error of mean, $SEm = \frac{SEx}{\sqrt{n}}$, indicates the variability of sample means around the true mean, and hence the reliability of the observed mean. On the basis of 12 annual crop yields included in each mean, the true mean is expected to fall within ± 2.2 SEm approximately 95 percent of the time. The standard error of the mean is also useful in judging the significance of differences between two means. If the difference is greater than 3 times the larger SEm of the means being compared, the difference is probably significant.

Yields from the Antioch experiment field in Lake county, located on Miami silt loam borderline to Blount silt loam, are given in Table 34. These yields are for 1924-1950, the field having been discontinued in 1951. Corn, oats, winter wheat, and clover-alfalfa hay were grown in rotation, but only one crop was grown each year because the field provided space for a single series of plots. Thus the average yields of 6 crops of corn, 7 of oats, 5 of winter wheat, and 4 of legume hay for each treatment do not indicate the true yield potential for this soil for these crops or the current potential for modern varieties. The *differences* in yields for the various treatments are meaningful, however, as one crop was grown on all plots during the same crop season.

On both the Joliet and Antioch fields, phosphorus increased the yields of all crops grown, giving relatively large increases for corn, oats, and wheat, and moderate to small increases for soybeans and hay. Potassium increased yields of corn and soybeans but gave variable to no increases for oats, wheat, and hay. Limestone also gave variable results but generally gave slight increases, particularly in combination with manure or residues. One can assume that results from these two experiment fields will apply to McHenry county soils that test acid and low in available phosphorus or potassium, particularly if the soils have calcareous till at shallow depths.

Additional data for 1935 through 1943 were obtained from a few cooperative plots on a Miami silt loam soil in McHenry county (Table 35). These plots were in Hartland township (T45N, R6E) in the north-central part of section 7. All were planted to the same crop each year. Fertilizer treatments were variable, except all plots received

Table 34. — AVERAGE ACRE YIELDS — ANTIOCH AGRONOMY EXPERIMENT FIELD, LAKE COUNTY, MIAMI SILT LOAM BORDERLINE TO BLOUNT SILT LOAM, 1924-1950[a]

Plot No.	Treatment[b]	Corn 6 crops	Oats 7 crops	Winter wheat 5 crops[c]	Clover-alfalfa 4 crops[d]
		bu.	*bu.*	*bu.*	*tons*
1	O	25.2	33.1	22.5	1.25
2	LrP	26.7	40.5	38.7	2.70
3	LRrP	30.3	46.0	43.5	2.07
4	LsP	27.1	47.7	42.0	2.75
5	LrPK	27.5	36.8	42.0	2.47
6	LRsP	28.0	49.1	41.6	2.16
7	LRK	24.0	30.7	29.0	1.36
8	LsPK	30.2	48.6	34.9	2.80
9	LRsPK	37.9	52.0	41.1	2.08
10	RsPK	38.8	54.0	40.0	2.01
Average increase or decrease for					
	Limestone	−.9	−2.0	1.1	.07
	Residues	4.1	3.4	3.5	−.65
	Superphosphate	13.9	21.3	12.1	.72
	Potash	9.9	2.9	−.5	−.08

[a] The field was established in 1902 and discontinued in 1951. Rotation and treatment systems reported here began in 1924.
[b] O = no treatment; R = crop residues; L = limestone; sP = superphosphate (bone meal used prior to 1922); rP = rock phosphate (no phosphate applied on these plots before 1924); K = potash.
[c] A wheat failure in 1934 and a crop of spring wheat in 1938 are not included in the average yields of winter wheat.
[d] Crops of mixed hay in 1929 and 1933 are not included in the average yields of clover-alfalfa.

Table 35. — AVERAGE ACRE YIELDS FOLLOWING SOIL-TREATMENT EXPERIMENTS ON MIAMI SILT LOAM, McHENRY COUNTY

Treatment[a]	Hay, aver. of 1935, '36, '37	Corn,[b] aver. of 1938, '39, '41	Wheat 1940	Oats 1943
	tons	*bu.*	*bu.*	*bu.*
O	2.2	62.9	20.2	52.5
L[c]	2.3	66.7	24.5	55.5
rP	2.2	58.8	21.1	63.0
sP	2.0	63.6	30.4	57.3
LrP	2.1	61.7	22.7	60.0
LsP	2.0	55.6	27.7	67.8
LK	2.3	68.7	30.9	60.6
LN	2.7	73.4	31.0	76.5
L 2-12-6	2.2	65.1	31.0	47.7
LrPN	2.7	67.0	23.0	**80.4**[d]
LsPN	2.7	71.3	34.2	67.5
LKN	**3.0**	73.1	36.6	63.3
LN 2-12-6	2.9	69.2	41.6	60.9
LrPK	2.4	73.6	29.3	69.9
LsPK	2.4	77.8	28.0	58.5
LrPKN	2.7	**81.9**	36.8	67.5
LsPKN	2.9	77.8	40.3	69.0
LsPN 2-12-6	2.7	77.2	**45.0**	61.2

[a] All plots were covered with 8-10 tons of manure in 1938 and 1941. O = no treatment; L = limestone in 1934 at 2¾ tons per acre; sP = superphosphate (0-20-0) at 100 or 200 lb. per acre per year; rP = rock phosphate at 400 lb. per acre in 1934, 1935, and 1937, and 800 lb. per acre in 1939; K = muriate of potash (60 percent) at 100 lb. per acre per year; N = nitrogen as ammonium sulfate at 100 lb. per acre per year, except 275 lb. per acre in 1939; 2-12-6 = mixed fertilizer at 100 or 200 lb. per acre per year.
[b] All plots were in corn in 1942 and were cut for silage.
[c] Values are the averages of 7 limed plots each year. All other treatments are for only 1 plot in any one year.
[d] Highest yields for each crop are shown in **bold face.**

8 to 10 tons of manure per acre in 1938 and 1941. The limestone plots were replicated seven times but all other treatments were on single plots.

A comparison of these data (Table 35) with those from the Antioch field (Table 34) shows that considerably higher yields of corn can be obtained from Miami and related soils than was obtained at Antioch. The difference may be due partly to the manure treatment and partly to the more permeable soil on the plots in McHenry county.

The data in Table 35 indicate that phosphate and potash fertilizers may be of little or no benefit when used in addition to heavy applications of manure and adequate limestone. Nitrogen, however, may help produce higher yields as indicated by the data.

Woodland

Trees, shrubs, and associated vegetation are important to the general welfare of McHenry county. They are principally used for erosion control, shade, and ornamentation. In established woodlots some trees are cut for sawlogs, pulpwood, and firewood. Yields of wood could be profitably increased through new plantings in areas that are not well suited to general agriculture and where costs of land and forest maintenance are not excessive (Fig. 30).

Yield information from various woodland plots scattered throughout northern Illinois, but primarily from the Sinnissippi forest in Ogle county, is given in Table 36. The plots are ranked poor, medium, and good according to rate of tree growth and yield of marketable products. McHenry county soils are grouped to correspond with these ratings according to profile features that are generally unfavorable, moderately favorable, or favorable to tree growth and survival.

The table includes only light-colored (forest) and moderately dark-colored (prairie-forest) soils, which in many areas are now supporting stands of native trees (Fig. 31), and those few dark-colored (prairie) soils that are relatively sandy or are not naturally well adapted for most grain crops. The remaining dark-colored soils are more important as general agricultural soils. Knight and Thorp, both gray-spot soils, and Houghton and Lena, the peat and muck soils, usually do not support adequate stands of desirable trees and therefore are not listed in the table.

Permanent cover of grasses or trees is recommended for a number of soil areas in McHenry county. These include sloping areas too steep for the use of ordinary agricultural machinery, severely eroded areas, and areas too drouthy to consistently produce satisfactory grain crops. The choice between grasses and trees as a permanent cover should be made according to individual needs.

Mixed pine plantation on Alvin sandy loam in Seneca township. (Fig. 30)

Many areas in McHenry county support stands of native trees, mainly mixed oak and hickory. This area is in Dorr township. (Fig. 31)

Table 36. — AVERAGE ACRE NET YIELDS EXPECTED FROM PINES AND NATIVE HARDWOODS IN McHENRY COUNTY[a]

Soil series[b]	Tree species	Mean annual growth[c] (board feet)	Primary uses
Poor sites (naturally well-drained to drouthy soils)			
Alvin, Casco, Hennepin, Lorenzo, Rodman, Sumner	Red pine White pine	150–200 175–225	Christmas trees and greens, posts, pulpwood, poles, sawlogs
	Mixed oak[d]	50–75	Pulpwood, fuel wood, low-grade sawlogs
Medium or fair sites (naturally well-drained to imperfectly drained soils)			
Beecher, Blount, Dresden, Dowagiac, Ellison, Eylar, Fox, Griswold, Lapeer, LaRose, Matherton, Metea, Morley, Onarga, Strawn, Varna	Red pine White pine	225–275 300–400	Christmas trees and greens, posts, pulpwood, poles, sawlogs
	Mixed oak Mixed hardwoods[e]	75–125 100–150	Fuel wood, pulpwood, sawlogs
Good sites (naturally well-drained to imperfectly drained soils)			
Camden, Harvard, Herbert, McHenry, Miami, Millbrook, Montmorenci, Nippersink, Pistakee, Ridgeville, Russell, Starks, Toronto, Virgil, Wingate, Xenia	Red pine White pine	300–400 500–700	Christmas trees and greens, posts, pulpwood, poles, sawlogs
	Mixed oak Mixed hardwoods	125–150 150–200	Fuel wood, pulpwood, sawlogs
Good sites (naturally poorly drained soils)			
Millington, Otter, Wallkill, Washtenaw	Bottomland species[f]	500–800	Pulpwood, sawlogs

[a] Prepared in cooperation with the University of Illinois Department of Forestry.
[b] Dark-colored upland soils that are well suited to general farming, along with certain wetspot soils, peats, and mucks, are not included in this table.
[c] Mean annual growth is the stand volume divided by the stand age.
[d] Mixed oaks native to northern Illinois include White, Black, Northern red, and Bur. Pine is favored over deciduous hardwoods on poor sites.
[e] Mixed hardwoods native to northern Illinois include Shagbark and Bitternut hickory, Hard maple, Hackberry, Black walnut, and those oak species listed in footnote d above. Some bottomland hardwoods are also included (see footnote f).
[f] Bottomland species native to northern Illinois include White ash, Green ash, Sycamore, Cottonwood, Silver maple, etc.

Wooded areas should be well managed. This includes (1) proper planting to encourage survival and growth of young trees; (2) using adapted practices to retard erosion while trees are small; (3) protection from fire and grazing to prevent damage to young trees; (4) protection from insects and diseases, including immediate removal of diseased trees; and (5) harvesting mature, defective, and undesirable trees unless they are needed to protect desirable species.

Engineering

This soil report contains information of value to engineers although it is somewhat generalized for certain engineering uses. It does not eliminate the need for detailed sampling and testing of soil materials in the immediate area of any construction project. The soil type descriptions on pages 19 to 101, the soil map at the back, and the data in Tables 37, 38, and 39 will help engineers make preliminary choices of construction sites. This information helps engineers avoid areas with unfavorable soil properties as well as areas that should be reserved for agriculture.

Data in Table 37 are from samples taken in McHenry county to represent the modal and part of the range of each of three soil types as mapped in the county. Data for the soil types in Table 38, however, are from samples taken in nearby counties and represent only a part of the range of each type. Table 39 contains estimates of engineering properties for the remaining soils mapped in McHenry county; estimates are based on the data for similar soils given in Tables 37 and 38, as well as on other investigations.

Some important soil properties in the application of engineering practices are organic matter content, texture or grain size, kind of clay, and compactness (*26*). Because McHenry county soils range widely in these properties, the profile characteristics of each type as described on pages 19 to 101 should be studied thoroughly. Although the use of large earth-moving machinery usually precludes separating the material of one soil horizon from that of another, such separations are desirable and important for certain purposes (*32*).

Organic matter will absorb large quantities of water and will swell and shrink a great deal. Material high in organic matter should not be used for earthen dams, levees, terraces, road fill, subgrade, or for any similar structure where stability is needed. It may be used as top dressing for lawns and on cuts where grasses, trees, or other plants are to be grown.

The A_1 horizon of most soils is relatively high in organic matter (Tables 7 and 8 and 10 through 27). Houghton peat, Houghton muck, Lena muck, the substratum of Wallkill silt loam, and some areas of Loamy burned muck are particularly high in organic matter and present special engineering problems. Areas of these soils should either be bypassed during construction or all unstable material should be removed and replaced with gravel, crushed rock, or other stable materials.

Texture, grain size or particle size distribution, is an important characteristic for engineering purposes. Gravel, sand, silt, and clay are the main particle sizes. Figure 32 shows the relationships between the four major particle size fractions as used by the Soil Survey and as used by the American Association of State Highway Officials.

Gravel is too coarse to flow when saturated with water. It is easily moved with power-driven machinery. Gravel is excellent for subgrade material and footings for structures but poor for diversion terraces, levees, and dams. When clean it is useful in concrete construction. Sewage-disposal systems function well in areas of gravel if the water table is deep. The systems should not, however, be placed near shallow wells that supply

drinking water. The substrata of Casco, Dresden, Lorenzo, Fox, Matherton, Kane, Rodman, Warsaw, and Will are composed primarily of gravel.

Sand is nonplastic and flows readily when saturated with water. It is unstable when wet but fairly stable when dry. It is easy to move but generally has only fair compaction characteristics. It is not suitable for terraces, levees, or dams and is not good subgrade material unless drained. All well-drained sandy soils are excellent for home sewage-disposal systems. Clean sand is used in concrete construction.

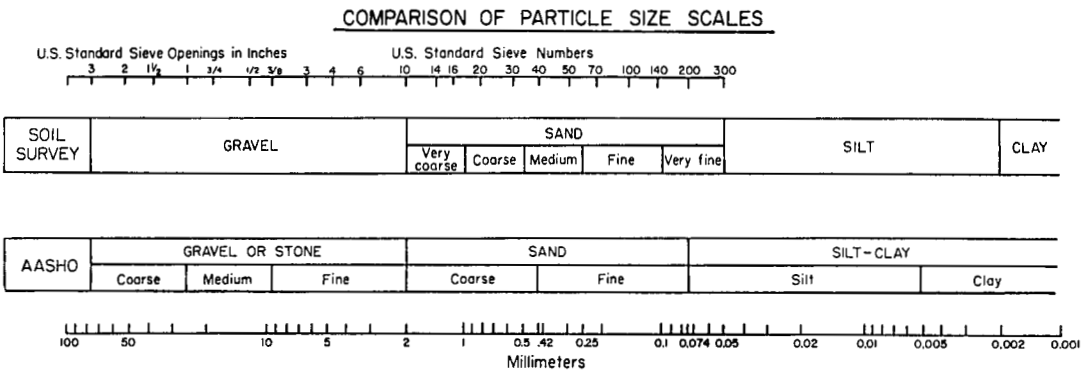
Alvin, Metea, Onarga, Ridgeville, and Sumner are sources of sand although their A_1 horizons contain some organic matter and their B horizons contain some clay. Metea also has loam-textured till in the C horizon. The substrata of several other soils contain large amounts of sand or gravel or mixtures of the two. These soils are Camden, Dowagiac, Elburn, Ellison, Griswold, Harvard, Hennepin (where associated with Griswold or Lapeer), Knight, LaHogue, Lapeer, Lomax, McHenry, Nippersink, Proctor, Ringwood, Selma, Troxel, Virgil, and Volinia.

Silt has high absorptive capacity, is nonplastic, and flows easily when saturated. It is unstable when wet but stable when dry. It is easy to move but has fair to poor compaction characteristics. Silt is fair material for low dikes, levees, and level terraces, but it erodes easily. It makes a good top dressing for lawns, particularly when organic matter is high as in the dark brown to black A_1 horizons of the Brunizem soils listed in Table 30. Soils high in silt are suitable for sewage-disposal absorption fields if factors such as slope and depth to water table are favorable.

The A horizons of all loam, silt loam, and silty clay loam soil types are high in silt. The B horizons also have relatively high silt contents but contain more clay. The C horizons or other underlying strata are often also high in silt. Some of these soils are underlain with till and some with water-deposited silts.

Soil material that is more than about 27 percent clay is hard when dry. It absorbs relatively large amounts of water and is semifluid and unstable when thoroughly saturated. When moderately moist, it is pliable and has good compaction characteristics. However, it is also plastic or sticky and is difficult to move, tending to adhere to the earth-moving machinery.

In general, liquid limit and plasticity index increase with an increase in clay content (Tables 37, 38, and 39). But for a given amount of clay, the liquid



Relationships between the four major particle size fractions as used by the Soil Survey and as used by the American Association of State Highway Officials. Principal differences are the points at which silt is separated from sand and clay is separated from silt. (Fig. 32)

Table 37. — ENGINEERING TEST DATA FOR SUMNER, McHENRY, AND FOX SOILS[a]

Soil type name, number, slope, and water table	Range of type represented	Horizon	Depth in inches	Grain sizes: Percent passing sieve: 1 in.	No. 10	No. 40	No. 200	% silt[b] .05-.002 mm.	% clay[b] <.002 mm.	Maximum dry density lb./cu. ft.	% optimum moisture	Liquid limit	Plasticity index	Classification: AASHO	Unified	B.P.R. report number
Sumner sandy loam (87) Slope range about 1 to 10 percent. Water table below 5 to 6 feet. Natural drainage is somewhat excessive.	Modal	A_1	0–10	100	100	88	31	19	10	115	13	25	7	A-2-4 (0)	SM-SC	S30735
		B_2	19–31	100	100	85	20	11	9	121	11	NP[c]	NP	A-2-4 (0)	SM	S30736
		C_1	31–40	100	99	88	10	5	5	111	13	NP	NP	A-3 (0)	SW-SM	S30737
	Stronger B development than modal	A_1	0–10	100	100	87	38	24	12	111	15	30	10	A-4 (1)	SC	S30738
		B_3	20–30	100	97	82	26	12	13	123	11	20	6	A-2-4 (0)	SM-SC	S30739
		C_2	36–59	100	96	62	10	4	5	113	15	NP	NP	A-3 (0)	SW-SM	S30740
	More sandy than modal	A_1	8–17	100	100	93	17	9	7	119	11	NP	NP	A-2-4 (0)	SM	S30741
		B_1	21–32	100	96	90	17	7	6	112	12	NP	NP	A-2-4 (0)	SM	S30742
		C_1	38–52	99	99	92	11	3	6	110	13	NP	NP	A-2-4 (0)	SP-SM	S30743
McHenry silt loam (310) Slope range about 1 to 12 percent. Water table occasionally at 3 to 4 feet in spring but normally deeper. Natural drainage is well to moderately well.	Modal	A_2	4–11	100	98	95	81	62	13	106	15	26	5	A-4 (8)	ML-CL	S30750
		B_{22}	19–29	100	95	87	58	23	31	109	17	43	26	A-7-6 (11)	CL	S30751
		C	34+	99	78	66	34	23	7	132	8	NP	NP	A-2-4 (0)	SM	S30752
	Higher gravel content in C than modal	A_2	4–9	100	97	93	79	59	16	113	14	25	5	A-4 (8)	ML-CL	S30744
		B_{21}	13–21	100	93	86	65	30	32	108	17	48	29	A-7-6 (15)	CL	S30745
		C	31+	85	66	54	28	19	4	132	8	NP	NP	A-2-4 (0)	SM	S30746
	Finer textured C than modal	A_2	3–8	100	100	96	70	53	11	113	13	NP	NP	A-4 (7)	ML	S30747
		B_{22}	17–28	100	96	88	62	31	27	110	16	41	23	A-7-6 (11)	CL	S30748
		C_2	34+	99	88	80	57	41	11	129	9	17	4	A-4 (4)	ML-CL	S30749
Fox silt loam and loam (327) Slope range about 1 to 15 percent. Water table below 5 to 6 feet. Natural drainage is well to somewhat excessive.	Modal	A_2	3–7	100	100	97	54	40	12	118	11	18	3	A-4 (4)	ML	S30759
		B_{21}	13–21	100	95	91	50	20	29	110	15	40	23	A-6 (8)	SC	S30760
		C	37+	75	39	26	9	5	2	129	8	NP	NP	A-1-a (0)	GW-GM	S30761
	Higher sand, lower gravel content in C than modal	A_1	0–5	100	99	86	55	37	15	107	16	35	11	A-6 (4)	ML-CL	S30753
		B_2	13–24	100	96	82	50	22	26	114	14	40	24	A-6 (8)	SC	S30754
		C	33–45	98	69	28	7	3	3	120	13	32	11	A-2-6 (0)	SW-SC	S30755
	Higher gravel content in C than modal	A_2	5–10	100	100	98	93	63	25	109	16	56[d]	32[d]	A-7-6 (19)[d]	CH[d]	S30756
		B_2	13–22	100	99	96	90	47	39	102	21	58[d]	34[d]	A-7-6 (20)	CH	S30757
		C_2	38+	60	26	14	8	5	2	131	9	21	4	A-1-a (0)	GW-GM	S30758

[a] The soils were sampled in McHenry county. Tests were performed by the Bureau of Public Roads, U.S. Department of Commerce, using standard procedures of the American Association of State Highway Officials (A.A.S.H.O.)
[b] Silt and clay analyses were by the hydrometer method.
[c] NP = nonplastic.
[d] These data and ratings are not in line with those from comparable horizons of other Fox profiles or of profiles of other soils.

Table 38. — ENGINEERING TEST DATA FOR CERTAIN SOIL TYPES IN McHENRY COUNTY[a]

Soil type name, number, slope, and water table	Range of type represented	Horizon	Depth in inches	Grain sizes: Percent passing sieve No. 10	No. 40	No. 200	% silt[b] .05-.002 mm.	% clay[b] <.002 mm.	Maximum dry density lb./cu. ft.	% optimum moisture	Liquid limit	Plasticity index	Classification: AASHO	Unified	B.P.R. report number
Ashkum silty clay loam (232) <1 percent slope to depressional. Water table near surface most of year unless drained.	Fine-textured A_1	A_1	0–12	100	100	98	56	39	93	21	54	21	A-7-5 (15)	MH	87965
		B_{2g}	12–26	100	100	100	51	47	97	23	59	33	A-7-6 (20)	CH	87966
Blount silt loam (23) 1 to 2–3 percent slopes. Water table deep, perched at 1–2 feet in spring.	Borderline to Morley	A_p	0–10	98	96	87	67	17	108	17	29	8	A-4 (8)	CL	87955
		B_2	15–27	96	95	90	40	48	104	22	52	28	A-7-6 (18)	CH	87956
		C	27+	97	94	88	53	32	113	15	33	14	A-6 (10)	CL	87957
Drummer silty clay loam (152) <1 percent slope to depressional. Water table near surface most of year unless drained.	Fine-textured profile	A_1	0–20	100	98	94	56	36	89	25	64	25	A-7-5 (18)	MH	87947
		B_{2g}	20–32	100	98	93	50	40	101	20	57	28	A-7-6 (19)	CH	87948
		C_g	32+	100	98	93	50	41	103	20	59	34	A-7-6 (20)	CH	87949
Elliott silt loam (146) 1 to 2–3 percent slopes. Water table deep, perched at 1–2 ft. in spring.	Borderline to Varna	A_1	0–8	100	100	95	62	29	105	18	34	11	A-6 (8)	CL	87963
		B_2	18–33	100	99	87	45	40	105	19	45	23	A-7-6 (14)	CL	87964
Eylar silt loam (228) ½ to 3–4 percent slopes. Water table deep, perched at 1–2 ft. in spring.	Fine-textured till portion	A_p	0–6	99	97	88	57	28	106	18	33	13	A-6 (9)	CL	87960
		B_2	11–22	99	98	95	34	61	102	22	53	30	A-7-6 (19)	CH	87961
		C	22+	100	98	94	40	54	107	20	43	22	A-7-6 (13)	CL	87962
Miami silt loam (24) 2–3 to 8–10 percent slopes. Water table deep, perched at 3–4 ft. in spring.	Near modal	A_1	0–6	100	98	92	64	25	104	19	35	12	A-6 (9)	CL	87953
		B_2	16–32	99	98	94	45	45	106	19	50	27	A-7-6 (17)	CL-CH	87954
Morley silt loam (194) 3–4 to 12–15 percent slopes. Water table deep, perched at 3–4 ft. in spring.	Borderline to Eylar	A_1	0–4	97	92	82	62	17	91	28	46	14	A-7-5 (11)	ML	.....
		A_2	4–10	99	95	87	60	25	107	17	30	8	A-4 (8)	CL	.....
		B	13–19	98	96	90	30	61	93	23	52	27	A-7-6 (17)	CH	.....
		C	26–36	93	87	78	39	39	109	18	35	17	A-6 (11)	CL	.....
Peotone silty clay loam (330) Depressional. Water table at surface most of year unless drained.	Fine-textured portion	A	3–13	98	95	86	42	42	94	24	49	21	A-7-6 (15)	CL	.....
		B_g	15–27	99	96	86	41	45	102	19	47	26	A-7-6 (16)	CL	.....
		C_g	40–46	99	98	91	41	50	105	19	41	20	A-7-6 (12)	CL	.....
Proctor silt loam (148) 2 to 4 or 5 percent slopes. Water table at 3–4 ft. in spring, deep in summer and fall.	Borderline to Warsaw	A_1	0–16	100	93	66	42	20	104	18	39	16	A-6 (9)	CL	87967
		B_2	28–45	91	77	39	17	20	115	13	33	16	A-6 (2)	SC	87968
		C	45+	43	30	16	8	6	123	11	28	11	A-2-6 (0)	GW-GC	87969
Saybrook silt loam (145) 2 to 8–10 percent slopes. Water table deep, perched at 3–4 ft. in spring.	Fine-textured B horizon	A_1	0–12	100	99	92	62	27	93	24	50	20	A-7-5 (14)	ML-CL	87950
		B_2	21–32	100	99	94	48	44	101	22	50	25	A-7-6 (16)	CL-CH	87951
		C	32+	84	80	74	44	27	117	15	33	15	A-6 (10)	CL	87952
Varna silt loam (223) 3–4 to 12–15 percent slopes. Water table deep, perched at 3–4 ft. in spring.	Fine-textured till portion	A	0–7	97	91	71	42	26	101	20	37	13	A-6 (8)	CL	.....
		B	14–22	99	97	91	39	52	99	21	44	20	A-7-6 (13)	CL	.....
		C	30–36	98	96	90	46	44	109	17	38	18	A-6 (11)	CL	.....
Warsaw silt loam (290) 0 to 10 percent slopes. Water table below 5–6 ft.	Near modal	A_1	0–14	100	99	95	69	25	98	21	51	15	A-7-6 (10)	ML-CL	87944
		B_2	24–30	100	97	91	51	43	97	23	54	26	A-7-6 (17)	CH	87945
		C	33+	28	15	4	3	1	129	12	NP[c]	NP	A-2-4 (0)	GP	87946

[a] Soils were sampled in Lake and Will counties, Illinois. Samples for Morley, Peotone, and Varna were analyzed in the soils laboratory of the University of Illinois Engineering Experiment Station using A.A.S.H.O. standard procedures. Tests for all other samples were performed by the Bureau of Public Roads, U.S. Department of Commerce, also using A.A.S.H.O. standard procedures. [b] Silt and clay analyses by the hydrometer method. [c] NP = nonplastic.

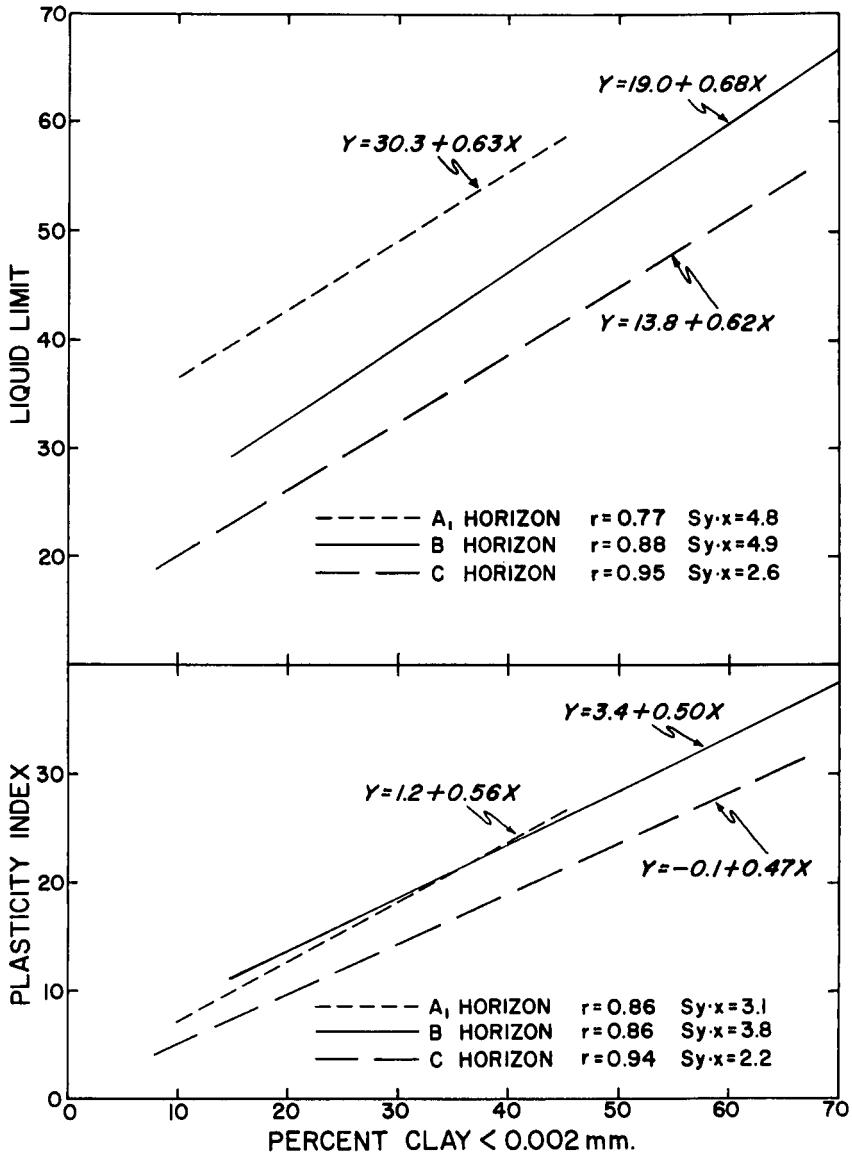
Table 39. — SOME ESTIMATED ENGINEERING PROPERTIES OF CERTAIN SOILS IN McHENRY COUNTY[a]

Soils[b]	Percent organic matter[c]	Water table[d] ft.	Horizon	Maximum dry density lb./cu. ft.	% optimum moisture	Liquid limit	Plasticity index	A.A.S.H.O. classification	
								Group	Index
Alvin	1	5	A_1	100–120	10–15	NP[e]–25	NP–10	A-3, A-2-4	0
			A_2	110–125	8–12	NP	NP	A-3, A-2-4	0
			B	110–125	10–15	NP–30	NP–10	A-4, A-6	0–6
			Sand	105–120	8–15	NP	NP	A-3, A-2-4	0
Onarga	1–2	3–4	A_1	100–120	10–15	NP–30	NP–10	A-3, A-2-4	0
Ridgeville	2–3	1–3	B	110–125	10–15	NP–30	NP–10	A-4, A-6	0–6
			Sand	105–120	8–15	NP	NP	A-3, A-2-4	0
Metea	1	4–5	A_1	100–120	10–15	NP–25	NP–10	A-2-4, A-3	0
			A_2	110–125	8–12	NP	NP	A-2-4, A-3	0
			B	105–115	10–15	NP–30	NP–10	A-4, A-6	0–6
			Loam till	110–120	12–30	25–35	11–20	A-4, A-6	4–12
Rodman	1–5	5	A_1	95–110	15–25	25–40	5–25	A-1-b, A-2-4	0–4
			Gravel	115–130	8–15	NP	NP	A-1-a, A-1-b	0
Casco, Dresden, Ellison, Dowagiac	1–5	4–5	A_1	100–110	15–25	20–30	5–15	A-4, A-6	2–10
Matherton	3–5	1–2	A_2	105–120	10–15	NP–25	NP–10	A-4, A-6	0–8
			B	95–110	18–22	25–55	10–30	A-6, A-7-6	6–20
			Gravel	115–130	8–15	NP	NP	A-2-4, A-3, or A-1-b	0
Lorenzo, Volinia	5–8	3–4	A_1	100–110	17–20	20–65	5–30	A-4, A-6, A-7-5	4–18
Troxel	5–8	2–3	B	100–120	10–20	25–40	11–25	A-6, A-7-6	5–20
Kane	5–8	1–2	Gravel	115–130	8–15	NP	NP	A-2-4, A-3, or A-1-b	0
Will	8–12	<1	A_1	90–100	19–25	50–70	20–30	A-7-6, A-7-5	15–20
			B	95–100	15–25	35–60	20–35	A-3, A-7-6	16–20
			Gravel	115–130	8–15	NP–15	NP–6	A-1-b, A-3, or A-2-4	0
Lomax	3–5	3–4	A_1	105–115	10–15	NP–30	NP–15	A-2-4, A-4, A-6	0–10
La Hogue	5–8	1–2	B	95–105	18–20	25–45	8–20	A-6, A-7-6	4–15
			Sand	115–125	8–12	NP	NP	A-2-4, A-3	0
Lapeer, Nippersink, Hennepin	1–5	4–5	A_1	100–105	17–20	30–45	5–15	A-4, A-6, A-7-5	6–13
Virgil	3–5	1–2	A_2	105–120	10–15	NP–25	NP–10	A-4	0–8
			B	100–105	15–20	35–50	15–25	A-6, A-7-6	10–16
			Sandy loam till	125–135	7–12	NP–20	NP–10	A-2-4, A-3, A-4	0–8
Griswold, Ringwood	5–8	4–5	A_1	95–105	15–25	30–50	10–20	A-4, A-6, A-2-4	5–10
Elburn	5–8	1–2	B	100–115	15–25	30–55	15–25	A-6, A-7-6	10–18
			Sandy loam till	125–135	7–12	NP–20	NP–10	A-2-4, A-4	0–4
Camden, Harvard	1–5	2–3	A_1	105–112	15–20	30–40	10–15	A-4, A-6	6–12
Millbrook, Starks	1–5	1–2	A_2	105–120	10–15	NP–25	NP–10	A-4, A-6	0–8
Knight, Thorp	3–5	<1	B	100–115	19–22	40–55	20–35	A-6, A-7-6	10–18
			Stratified	115–125	10–15	NP–35	NP–20	A-2-4, A-3, A-4	0–8
Brenton	5–8	1–2	A_1	90–105	20–25	30–40	10–20	A-4, A-6	8–10
			B	100–115	15–22	30–50	15–25	A-6, A-7-6	15–20
			Stratified	105–125	10–18	NP–40	NP–25	A-2-4, A-3, A-4, A-6	0–8

Table 39. — Concluded

Soils[b]	Percent organic matter[c]	Water table[d] ft.	Horizon	Maximum dry density lb./cu. ft.	% optimum moisture	Liquid limit	Plasticity index	A.A.S.H.O. classification	
								Group	Index
Harpster, Selma	8–12	<1	A_1	95–115	10–25	20–60	10–25	A-4, A-6, A-7-6	4–16
			B	95–110	15–25	35–60	20–35	A-6, A-7-6	10–18
			Stratified	105–125	10–20	NP–40	NP–25	A-2-4, A-4, A-6	0–10
Hennepin, Strawn, Russell	1–3	>5	A_1	90–100	20–25	30–50	15–25	A-4, A-6	8–10
Montmorenci, Wingate, Xenia	1–5	2–3	A_2	105–120	10–20	NP–25	NP–15	A-4, A-6	0–8
Herbert, Toronto	3–5	1–2	B	100–110	15–22	30–50	15–30	A-6, A-7-6	10–16
			Loam till	110–120	12–20	25–35	11–20	A-4, A-6	6–12
La Rose, Sidell	4–6	4–5	A_1	90–100	20–25	35–55	15–25	A-4, A-6, A-7-5	8–12
Dana	5–8	2–3	B	100–110	15–22	30–50	15–30	A-6, A-7-6	10–18
Lisbon	5–8	1–2	Loam till	110–120	12–20	25–35	11–20	A-4, A-6	4–12
Beecher	3–5	1–2	A_1	100–110	17–20	25–35	5–15	A-4, A-6	6–10
			A_2	105–120	15–20	NP–25	NP–15	A-4, A-6	6–10
			B	100–110	15–23	35–60	15–30	A-7-6, A-6	9–16
			Silty clay loam till	105–115	15–20	30–42	11–25	A-6, A-7-6	8–13
Plattville	5–8	2–3	A_1	90–105	20–25	25–50	8–20	A-4, A-6, A-7-5	6–15
			B	100–110	15–25	30–50	10–25	A-6, A-7-6	12–18
			Dolomite	...	...	...	...	...	...
Otter, Millington	8–12	<1	A_1	95–115	12–24	20–40	10–20	A-4, A-6	6–10
Pistakee, Washtenaw	2–4	1–2	Stratified	100–120	15–25	20–50	10–30	A-4, A-6, A-7-6	6–10
Wallkill	5–8	1–2	A_1	95–115	12–24	20–40	10–20	A-4, A-6	6–10
			Muck	...[f]	...	NP	NP		
Houghton, Lena	>20	Above surface	Muck	...	...	NP	NP		
			Fibrous peat	...	...	NP	NP		

[a] Estimates are based on the data in Tables 37 and 38, along with other information collected by members of the University of Illinois Agricultural and Engineering Experiment Stations in cooperation with the Illinois Division of Highways and the U.S. Bureau of Public Roads. The table includes soils other than those listed in Tables 37 and 38.
[b] Soils are grouped to show similar engineering properties by horizons. See profile descriptions, pages 19 to 101, for detailed differences.
[c] Percentages refer to organic matter in the surface 7 inches (approximate plow depth) of uneroded soils.
[d] Water table is usually highest in spring and may be permanent or perched. In areas of compacted, fine-textured till it is usually perched. Depths refer to approximate highest average seasonal level.
[e] NP = nonplastic.
[f] Unsuitable for subgrade material.



Liquid limit and plasticity index increase with an increase in clay content. Liquid limit also increases with organic matter. Kind of clay is sometimes important. Clay-content data used in this chart were determined by the pipette method. (Fig. 33)

limits and plasticity indexes are higher in the A_1 and B horizons than in the C horizons (Fig. 33). This is due primarily to the organic matter in the A_1 horizon and to the montmorillonitic clay in the B.

Clay is present in all horizons of all McHenry county soils, but in widely varying amounts. In the gravel strata underlying Fox and associated soils and in the sand strata underlying Sumner and associated soils, the clay content may be as low as 5 percent or less (Table 37). In the B horizon of Eylar, it may be greater than 60 percent (Table 38). Other soils that are relatively high in clay in some part of the profile, particularly in the B horizon, include Beecher, Blount, Elliott, Morley, Peotone, Thorp, and Varna.

Soil materials that contain large amounts of one or more specific particle size fractions (that is, gravel, sand, silt, or clay) have different engineering uses than those containing small amounts. Uses also vary with the degree of wetness or dryness. Engineering problems tend to become more difficult as the amount of moisture increases, particularly if clay content is high.

Engineering uses may be affected by the kinds of clay minerals in soil material (*26, 36*). Montmorillonite is the most active clay mineral and generally presents the most engineering problems. A detailed discussion of the different kinds of clay in McHenry county is given on pages 106 to 108.

Compaction characteristics of soil materials are also important in determining the uses of various soils. Some materials are readily compacted whereas others are not. Some are very compact in place but become loose when excavated and are not easily recompacted. Some can be compacted at optimum moisture but not when very wet or very dry.

Little information on soil compaction is available. Bulk density measurements[1] or maximum dry density (Tables 37, 38, and 39) reflect compaction, but they are also influenced by texture, structure, and organic matter content. Other things being equal, compact material has a higher density than material that is not compact. In general, loess and water-deposited sediments are less compact than till because much of the till was compacted in place by glacial ice. Also, weathered till is less compact than unweathered till.

Water moves very slowly through compact till. Farm drainage systems do not function properly where the tile are placed in compact till of silty clay loam or finer textures. Such compact material is also unsuitable for sewage-disposal absorption fields.

If left undisturbed, compact till is usually very stable and is excellent as subgrade or footings for structures. The finer textures are also suitable as basins for lakes or ponds. After a compact till is dug up it more nearly assumes the properties of its texture or grain size.

Urban Development

McHenry county is on the outer fringe of the Chicago metropolitan area. It has land and water resources for residential, recreational, and industrial development, as well as for agriculture (Fig. 34). Public utilities and transportation facilities are well developed.

The agricultural importance of the different soils in the county can be found by studying the soil type descriptions on pages 19 to 101 and the yield data in Table 32. Certain soils have high crop-producing potential and should be reserved primarily for agriculture. The largest areas of these soils occur in the western, south-central, and northern parts of the county. The most important agricultural soils include Brenton, Dana, Drummer, Elburn, LaHogue, Lisbon, Proctor, Ringwood, and Saybrook.

Many other soils are moderately productive and can be managed to produce rather good yields of certain crops or woodland. The agricultural potential of these soils should be weighed carefully when deciding whether land should be used for agricultural or nonagricultural purposes.

Soils such as Alvin, Casco, Eylar, Hennepin, and Rodman are poor for agriculture. With adequate knowledge of soil conditions, areas of these soils can often be made suitable sites for residences, recreation, and industry. Many soil characteristics mentioned in the detailed profile descriptions, as well

[1] Bulk density values are determined from the weight of a given volume of oven-dry (105° C.) soil material divided by the weight of an equal volume of water.

Farmland is rapidly giving way to urban development as shown in this scene in McHenry township. Note the water tank in the middle of the barnyard. (Fig. 34)

These footings for a new home are being placed in Houghton muck. Organic soils are poor for building sites even when the water table has been lowered by drainage. (Fig. 35)

as some of the features discussed in the foregoing agricultural, woodland, and engineering interpretation sections, apply to the use of soils and soil materials for urban development (*6*). These sections, together with the soil map at the back of this report, will indicate the soil characteristics in any given area.

Locations for development should be chosen where soil material is suitable for as many purposes as possible and then the best use should be made of each material. This is necessary to obtain stable footings (Fig. 35), adequate drainage around the base of foundations, satisfactory absorption fields for home sewage-disposal systems (*9*), a suitable surface for landscaping, and a topsoil for lawn and garden that is fertile and porous without being loose and drouthy.

Not all housing or industrial developments can be built in areas of desirable soil materials. But the indiscriminate location of such developments in McHenry county without a thorough understanding of soil conditions can mean undesirable consequences in the form of health hazards and added expense.

If a chosen area does not provide soil materials suitable for every purpose, the selection of building materials, construction methods, and drainage systems that are adequate for existing conditions becomes especially important. Often prior examination by trained personnel and careful planning by the subdivider and contractor will be needed for best results.

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Much new information about soils has been obtained since the older soil maps and reports in the above list were printed, especially Nos. 1 to 53, which were issued before 1933. For many areas this newer information is necessary if the maps and other soil information in the reports are to be correctly interpreted. Help in making these interpretations can be obtained by writing to the Department of Agronomy, University of Illinois, Urbana.

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WHAT SOILS OCCUR IN McHENRY COUNTY?

WHAT ARE THEIR CHARACTERISTICS?

WHAT CROPS ARE ADAPTED TO EACH SOIL AND HOW MUCH WILL THEY YIELD?

WHAT TYPES ARE BEST USED FOR AGRICULTURE? FOR WOODLAND? FOR INDUSTRIAL AND URBAN DEVELOPMENT?

This Soil Report aims to answer these as well as other questions for farmers and landowners, engineers, and others who are interested in the best use of land in McHenry county.

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