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Agricultural Experiment Station

SOIL REPORT No. 69

CUMBERLAND COUNTY SOILS

By R. S. SMITH and L. H. SMITH

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"It must be remembered that the productive power of the soil is the basic support of all prosperity."

C. G. HOPKINS

"It is the duty of every landowner to see that his land when he leaves it is as good or better than when he received it."

J. G. MOSIER

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INTRODUCTORY NOTE

IT IS A MATTER of common observation that soils vary tremendously in their productive power, depending upon their physical condition, their chemical composition, and their biological activities. For any comprehensive plan of soil improvement looking toward the permanent maintenance of our agricultural lands, a definite knowledge of the various existing kinds or types of soil is a first essential. It is the purpose of a soil survey to classify the various kinds of soil of a given area in such a manner as to permit definite characterization for description and for mapping. With the information that such a survey affords, every farmer or landowner of the surveyed area has at hand the basis for a rational system for the improvement of his land. At the same time the Experiment Station is furnished a scientific inventory of the soils of the state; and with such an inventory as a basis it can proceed intelligently to plan those fundamental investigations so necessary for the solution of problems of practical soil improvement.

This county soil report is one of a series reporting the results of the soil survey which, when completed, will cover the state of Illinois. Each county report is intended to be as nearly complete in itself as it is practicable to make it, even at the expense of some repetition.

While the authors must assume the responsibility for the presentation of this report, it should be understood that the material for it represents the contribution of a considerable number of the present and former members of the Agronomy Department working in their respective lines of soil mapping, soil analysis, and experiment field investigation.

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CUMBERLAND COUNTY SOILS

By R. S. Smith, and L. H. Smith[1]

GEOGRAPHICAL AND HISTORICAL FEATURES

CUMBERLAND COUNTY lies in the southeastern part of Illinois a short distance north of the thirty-ninth parallel and about 25 to 30 miles west of the Indiana border. It is rectangular in shape, extending about 25 miles east and west and about 14 miles north and south, thus embracing an area of almost 350 square miles.

At the time of its organization in 1843, Cumberland county was already considerably settled. In fact it had a population of about 2,000 as early as 1830.

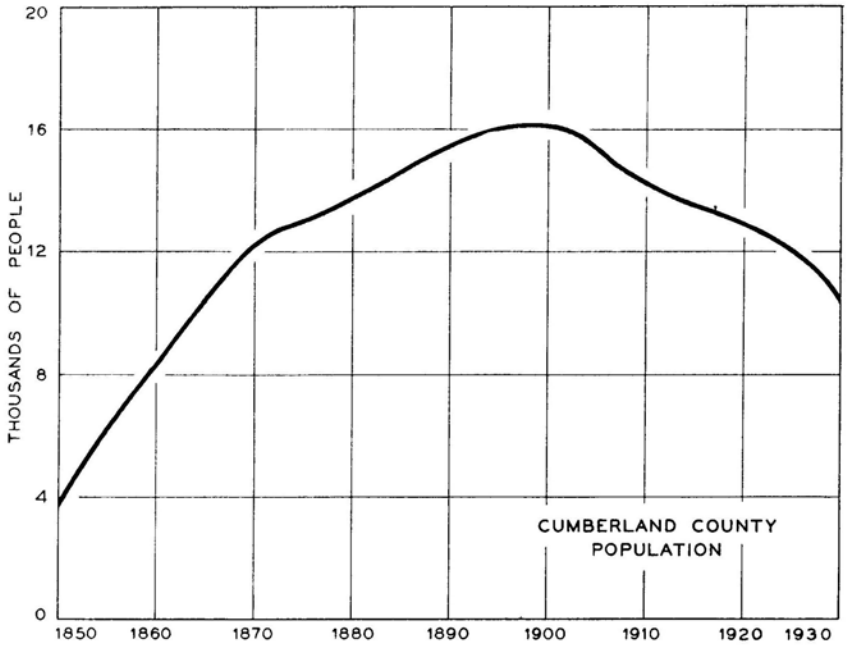


Fig. 1.—Growth of Population in Cumberland County

The rapid increase in population during the latter half of the past century has been followed by a marked decline. The population in 1930 was about 10,000.

The county derived its name from the famous Cumberland road which cuts across the southeast corner of the area on the route from Indianapolis to St. Louis. The county seat, formerly located at Greenup, was changed in 1857 to Toledo, which is situated at just about the center of the county.

[1]R. S. Smith, Chief in Soil Physics and Soil Survey; and L. H. Smith, Chief in Charge of Publications of the Soil Survey.

Population changes in Cumberland county since the time of the first census in 1850 are shown in Fig. 1. A fairly steady growth in number of inhabitants, it will be noted, occurred between 1850 and 1900, since which time there has been a fairly steady decline. The population in 1930 was about 10,000.

Transportation facilities are fairly well provided. Two railroad lines, the Illinois Central and the Nickel Plate, cross in the northwest corner of the county at Neoga. Another line of the Illinois Central traverses the county north and south and is crossed by the Pennsylvania Railroad at Greenup. These railroads, along with a number of concrete highways, provide good travel and shipping facilities for the longer hauls. The unimproved country roads, however, become extremely muddy at times.

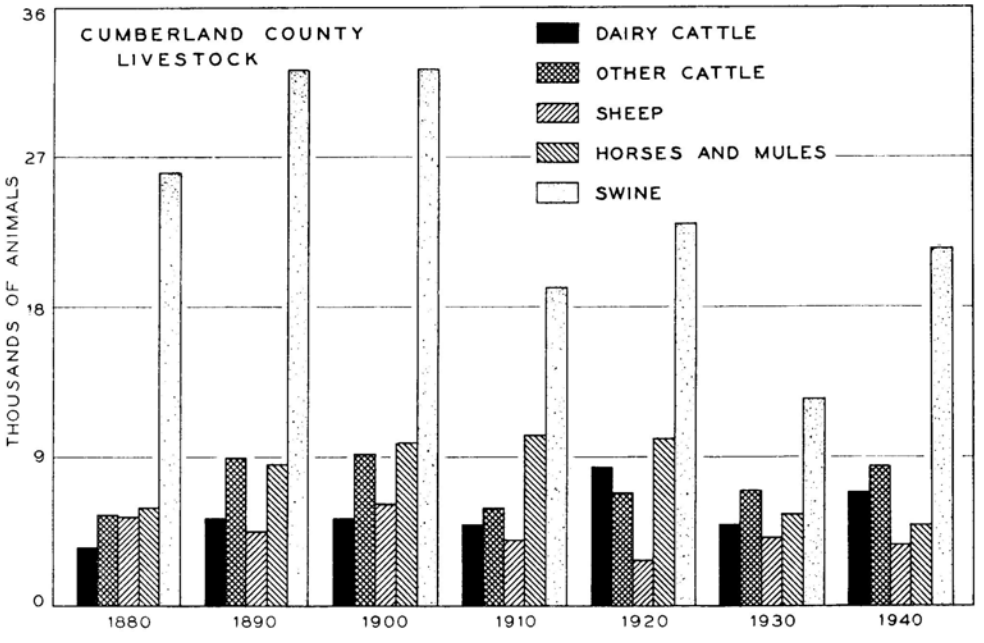


FIG. 2.—PRODUCTION OF PRINCIPAL CLASSES OF LIVESTOCK IN CUMBERLAND COUNTY

The number of sheep, dairy cattle, and other cattle fluctuated considerably during the period shown by this graph. The number of swine declined markedly between 1900 and 1930 but by 1940 had increased again. Horses and mules follow the general trend thruout the country in showing a distinct decrease during the past twenty years as mechanical power has come into increasing use.

Agricultural Production

Cumberland is essentially an agricultural county. The crops and livestock produced are those common to the corn belt. Corn is the major crop, an average of about 42,000 acres a year having been grown during the ten years 1930 to 1939. The second most extensive crop is hay, of which more than 28,000 acres a year are cut. Soybeans have come into prominence in Illinois in recent years, the ten-year average for this county being nearly 13,000 acres, of which about 2,300 were threshed.

Other crops produced on a less extensive scale are, in round numbers: broom-

corn 7,000 acres; wheat 5,000 acres; and alfalfa 1,400 acres. Small amounts of rye, cowpeas, and potatoes are listed in the official reports. About 6,000 acres of sweet clover, which is becoming recognized as an excellent soil-improving crop, are sown each year.

Besides the area in these cultivated crops, over 53,000 acres are used as pastureland, about 9,000 acres of which are recorded as woodland. Somewhat more than 4,000 acres of additional woodland are listed in the 1930 U.S. Census.

The number of farm animals of various kinds, at ten-year intervals beginning with 1850, is shown in Fig. 2. The numbers of farm animals in 1939 were: horses 5,030; milk cows 6,600; other cattle 8,000; sheep 3,800; and hogs 17,100. More than 170,000 chickens are raised each year, and over 1 million dozen eggs are produced.

Climate

The humid, temperate climate of Cumberland county is characterized by a wide range in temperature between the extremes of winter and summer and a somewhat irregularly distributed rainfall. The mean summer temperature during the twenty-one-year period 1919 to 1939, inclusive, as taken from the records of the Effingham Weather Station, was 75.4° F., while that of winter was 35.1° F. The highest temperature recorded during this twenty-one-year period was 111° F. in July, 1936, and the lowest was –24° F. in January, 1930, thus giving a maximum spread for this period of 135 degrees.

The average date of the last killing frost in the spring was April 23 during this twenty-one-year period, and the earliest in the fall was October 18, giving an average frost-free season of 180 days. The shortest growing season recorded was 138 days in 1925, and the longest, 207 days in 1929. The growing season in this region usually gives ample time for the maturing of the crops commonly grown, but occasionally, when the spring is wet and planting delayed, early frosts catch such crops as corn, broomcorn, and soybeans before they have fully matured.

The average annual rainfall recorded at the Effingham Weather Station during the twenty-one-year period mentioned above was 41.06 inches. The yearly rainfall varied from a minimum of 30.4 inches in 1925 to a maximum of 65.2 inches in 1927. The rainfall during the growing season—that is, from April thru September—has varied between 15.1 and 37.1 inches. In most seasons the amount would be more than adequate for the crops of the region if it were properly distributed. The weather records at Effingham show, however, that during this twenty-one-year interval there were 49 periods 21 days or more in length when no rain totalling as much as half an inch fell within any 24 hours. Of these 49 rainless periods, 22 exceeded 30 days, and one in 1925 and also one in 1936 lasted 72 days.

When 30 days or more elapse without rain during a critical period of crop growth, such for example as the period during which corn pollinates, severe injury is likely to result. This is especially true on soils having heavy claypan subsoils. Rainless periods of less than 20 days probably do little permanent harm, especially on the more fertile soils, but summer crops on a number of the upland soils are damaged by rainless periods of as short duration as three weeks when they occur during critical periods of crop growth.

Topography and Drainage

The prevailing topography of Cumberland county, with the exception of approximately 25 square miles north of Bradbury, is that of a dissected glacial drift plain. The divides between the streams which have cut back into this plain are nearly level, with poor surface drainage and underdrainage. Shallow lakes or ponds occurred on the upland thruout the county prior to the installation of drainage ditches. The areas where these shallow lakes formerly existed are now occupied by Ebbert and Newberry soil types.

North of Bradbury the topography is rolling but not too rolling for permanent tillage if intelligent erosion-control methods are used. This region was covered by the Wisconsin ice sheet, and the rolling topography is due to the moraine built up by this glacier. The entire county south of this morainal area is a glacial drift plain left by the Illinoian glacier and later covered with a thin blanket of loess.

The Embarrass bottom is subject to overflow thruout much of its extent and is therefore used chiefly for summer crops, principally corn.

The slopes leading from the bottoms to the uplands are commonly short and steep. In the morainal area, where the gravel is calcareous, these slopes are shown as Hennepin gravelly loam. In the rest of the county, where the parent material is leached till of Illinoian age, they are indicated as Hickory gravelly loam.

FORMATION OF CUMBERLAND COUNTY SOILS

Origin of Soil Material

The nature of Cumberland county soils can be more readily understood if one has some knowledge of the formation and composition of the material from which they were derived. The upland and terrace soils have developed from material deposited during and immediately following the Glacial Epoch. As the soil materials in the bottomlands have been deposited by running water, their character depends upon the regions thru which the streams flow that have deposited them. The sediments left by Embarrass river are better parent materials for soils than those deposited by smaller creeks because they were derived in part from the dark-colored soils to the north.

Since all the soils of Cumberland county have been derived either directly from material deposited by the glaciers or from reworked glacial material, a brief history of the Glacial Epoch is of special interest in connection with a study of the soils of this county.

During the Glacial Epoch the climate alternated between long intervals in which it was much like that of today and intervals when the average temperature was so low that the snow which fell in winter did not entirely melt in the following summer. During these colder intervals snow and ice accumulated in the northern parts of the continent in such enormous amounts that the pressure developed in the mass caused it to push outward from the centers of accumulation, forming glaciers.

The glaciers, aided by further accumulations of snow and ice at their margins, moved southward until they reached a region where the climate was warm enough to melt the ice as rapidly as it advanced. In moving across the country,

the ice sheets picked up great masses of rock, gravel, sand, silt, and clay, ground them together and carried them sometimes hundreds of miles. The pressure of the moving ice leveled off hills and filled in old valleys, often completely obliterating the features of the surface over which the ice passed. The mixture of materials deposited by a glacier is known as glacial drift. The term "drift" includes all glacial deposits such as "till," which was deposited by the ice sheets, as well as outwash silts, sands, and gravels. The terms "till" and "outwash" will appear frequently in the discussion to follow, especially in the descriptions of the individual soil types.

The territory that is now Cumberland county was probably covered by at least three of the four major advances of ice from the north, but only two of the glaciers, the Illinoian and the Wisconsin, have had much influence on the present topography or on the soils. The Illinoian, the earlier of the two ice sheets, covered the entire county and on melting back left a broad gently undulating plain, large portions of which still persist over most of the county. The Wisconsin, the last glacier to enter this region, advanced from the northeast and covered approximately 13 square miles north of Bradbury. The general level of the Wisconsin till plain varies from 25 to 75 feet above that of the Illinoian and its terminus is marked by the broad ridge of rolling topography known as the Shelbyville moraine. This moraine begins near Diona and swings southwest to just north of Bradbury and thence northwest, leaving the county near Trilla.

As the ice of the Wisconsin glacier melted, the waters spread over the old Illinoian glacial plain and formed outwash plains in a number of places. In the other places the glacial waters poured directly into the channels of Embarrass river and some of its tributaries and in certain locations deposited thick beds of sand and gravel. Remnants of these beds of sand and gravel form our present-day terraces. The glacial waters also carried enormous quantities of fine silt and clay sediments. Much of the silt was deposited on the broad flats of the Wabash river bottoms, while much of the clay was carried to the lower Mississippi valley and into the Gulf of Mexico.

Presumably each winter when low temperatures checked the melting of the ice sheet, the floodwaters receded, exposing the large mud flats of the bottomlands. When these flats became dry, the wind picked up the silty sediment and carried it onto the upland, burying the previously deposited till and outwash and forming deposits of uniform texture called "loess." No doubt other sources have contributed small quantities toward these loess deposits, as the dust storms of 1934 suggested (Fig. 3).

Several advances and retreats of the Wisconsin ice sheet, only the first of which touched Cumberland county, flooded the Illinois and Mississippi river valleys a number of times. Thus there was opportunity for thick deposits of loess to accumulate immediately adjacent to the broad river flats. Some of the loess bluffs along the Illinois river are more than 50 feet thick. The territory that is now Cumberland county lies so far from these major sources of loess, however, that it received only thin deposits. Nowhere does the loess exceed about 40 inches in thickness and over much of the county it is so thin as to be indistinguishable. All these materials—loess, till, and outwash—in varying proportions in different parts of the county, make up the parent soil materials.

It is of particular interest to note that the soils, at least those of the northern portion of the county, have been favorably influenced by outwash materials from the Wisconsin ice sheet. During the time when the ice sheet was building up its moraine just north of where Bradbury is now located, immense volumes of water flowed from it to the south. Good soil-building sediments were carried along by these glacial streams and deposited along their courses, forming outwash plains and terraces, as has been stated. In other places the sediment was left in deposits so thin that they cannot now be recognized.

FIG. 3.—LOESS IN THE MAKING

The upland soils of Cumberland county owe their productivity largely to the silty wind-blown material, called loess, deposited near the close of the ice age by dust storms similar to the one pictured above. In this region the Illinois river bottom was the source of most of the dust. This picture was taken in Texas in the spring of 1935. *(Photo by courtesy of U. S. Soil Conservation Service.)*

These thin deposits of sediments from the Wisconsin ice sheet had, however, a very favorable effect on the soils that were later developed. This influence may be noted in the yields on the soil experiment field at Toledo, located in this county, compared with those on the Newton field in Jasper county. At Toledo the average yield of corn on the unfertilized plots has been about 19 bushels an acre, while at Newton it has been only about 12 bushels. On the best fertilized plots the yields at Toledo have been about 45 bushels and at Newton only about 30 bushels. The higher yields at Toledo are thought to be due, at least in part, to the favorable influence of outwash materials from the Wisconsin morainic area north of Bradbury.

How the Soils Were Developed

As soon as the parent loess, till, or outwash materials were deposited, they were subjected to the action of weathering forces, and the processes of soil development began. When first deposited, the loess, till, and outwash were high in lime content and amply supplied with the mineral elements of plant food, but

as time elapsed the rain water, the oxygen and carbon dioxid of the air, and products of the decaying plant remains attacked the primary minerals, leaching out the free lime and reducing some of the minerals to clay. Since the weathering forces are most active near the surface and decrease in activity with increasing depth, various degrees or stages of weathering occur at different depths. Thus carbonates are leached first from the surface, for it is there that decomposition of the minerals is most active. Most of the organic matter accumulates in the surface, as is indicated by the darker color of the surface soil. The clay particles formed at or near the surface are gradually carried downward by the percolating waters to a depth where they accumulate, forming a clay subsoil. Thus horizons are gradually formed, and the parent material acquires characteristics that permit it to be called a soil.

During the period when clay is forming rapidly near the surface and before appreciable amounts have been carried down into the subsoil, the horizons of the soil are but faintly developed, and the soil is said to be young, or in a youthful stage of development. This stage is best exemplified in Cumberland county by the dark heavy-textured soils, such as the type known as Drummer clay loam, found in the northern part of the county. As weathering continues, the soil characteristics become more clearly developed and the horizons more sharply defined, and the soil gradually enters what is considered a mature stage of development.

Prolonged weathering results in extensive decomposition of the primary soil minerals and the movement of a large amount of clay from the surface soil into the subsoil. As these processes continue, the soil becomes progressively older or more thoroly developed and finally an old soil is produced. This advanced stage of development is illustrated by the soil type called Cisne silt loam, found in many parts of Cumberland county. Thus it will be seen that the soils of this county differ widely in their stages of development tho the total area of the younger soils is small.

The soils developed on the Wisconsin till plain north of Bradbury under a grass vegetation have been leached of their free lime to a depth of about 50 to 60 inches, and they vary in their stage of development from youthful to mature. In contrast, the soils developed on similar topography on the Illinoian till plain south of Bradbury and under a similar vegetation vary in stage of development from mature to old and are usually leached of free lime to a depth of 10 feet or more.

As soon as the physical and chemical agencies of weathering began acting on the parent materials—forming, among other things, available plant nutrients—vegetation spread over the land. Two types of vegetation—the grass type and the tree and brush type—have exerted important influences on these soils during the time they have been developing; for grass, thru its extensive fibrous root system, adds much organic matter to the soil, whereas under forest conditions little organic matter accumulates.

Drainage also influences soil development. Impeded drainage tends to retard the decomposition of organic matter but favors mineral decomposition and the formation of impervious claypan subsoils. Drainage has been very restricted in many places on the Illinoian till plain, and it is here that we find "scalds," or "slick spots," whose presence is supposed to be due to the accumulation of sodium salts as a result of slow underdrainage.

SOIL CLASSIFICATION AND MAPPING

Each of the soil types shown on the accompanying map has a definite set of characteristics upon which its separation from other types is based. These characteristics are inherent in the strata, or horizons, of each type, which taken together constitute the soil profile in mature soils. Among these characteristics may be mentioned texture, structure, color, and chemical composition.

Failure to appreciate that soil types are differentiated on the basis of the character of the *entire* soil section, and not on the surface alone, often makes it difficult to understand exactly what is meant by the term "soil type," for the surface horizon of one may be no different from that of another, yet the two may

FIG. 4.—STUDYING THE SOIL PROFILE

One of the very pronounced characteristics observed in most soils is that they are composed of more or less distinct layers, or strata, often spoken of in soil literature as "horizons." The vertical section of the soil showing the arrangement of these horizons from the surface down is called the "soil profile."

be widely different in character as well as in agricultural value. It is of utmost importance, therefore, in studying descriptions of soil types, to get a clear mental picture of *all* the outstanding features of each soil type.

It is likewise important to understand that a given type must of necessity include a range in properties. The boundaries between soil types are seldom sharp, there frequently being a transitional band which includes some of the properties of each type. Also, many small isolated spots of one or more distinct types must, upon occasion, be included with the prevailing type in the area in order to avoid undue confusion and to simplify the printed map as much as possible. One of the most difficult problems of the soil surveyor is to determine the limits of variability in a given soil type.

Besides the natural range in properties that is found within a given soil type,

there are other variations that have been brought about by differences in the management of the soil since it has been under cultivation. For example, the productive capacity of soils developed on rolling topography may be easily and permanently impaired by management practices which permit unchecked soil erosion and thus cause permanent soil differences. Differences of a temporary nature may be induced by poor rotations; these are difficult, if not impossible, to show on a soil map.

TABLE 1.—CUMBERLAND COUNTY SOILS: AREAS OF THE DIFFERENT TYPES

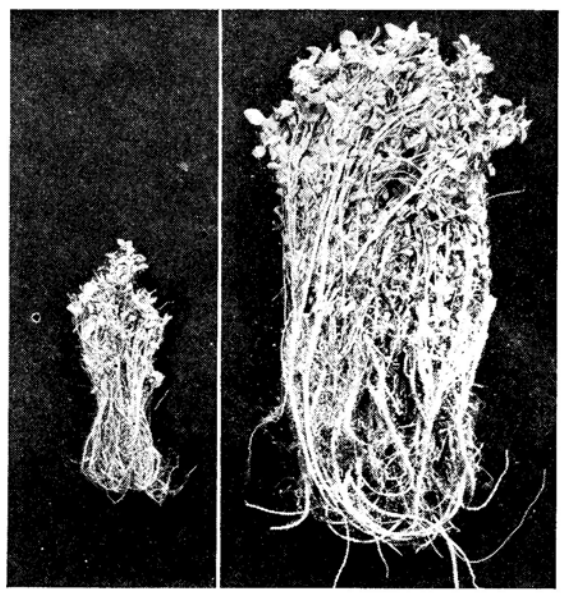
Type No.	Type name	Area in square miles	Area in acres	Percent of total area
2	Cisne silt loam	103.86	66 470	30.01
3	Hoyleton silt loam	15.04	9 620	4.35
4	Walton silt loam	.11	70	.03
8	Hickory gravelly loam, eroded	28.40	18 180	8.20
11	Loy silt loam	.19	120	.05
12	Wynoose silt loam	31.79	20 350	9.18
13	Bluford silt loam	45.92	29 390	13.27
14	Ava silt loam	.65	420	.18
22	Westville silt loam	8.70	5 570	2.51
25	Hennepin gravelly loam, eroded	.92	590	.27
46	Edina silt loam	.65	420	.18
48	Ebbert silt loam	24.59	15 740	7.10
51	Kern silt loam, terrace	.07	40	.02
58	Osceola silt loam	5.06	3 240	1.47
70	Beaucoup clay loam, bottom	.16	100	.05
72	Sharon loam, bottom	13.34	8 540	3.85
73	Huntsville loam, bottom	21.69	13 880	6.27
81	Littleton silt loam, terrace	.24	150	.07
108	Bonnie silt loam, bottom	6.90	4 420	1.99
112	Putnam silt loam	6.08	3 890	1.76
113	Cox silt loam	1.65	1 060	.48
134	Camden silt loam, terrace	2.69	1 720	.78
138	Shiloh clay loam	1.58	1 010	.46
143	Ava sandy loam	.23	150	.07
149	Brenton silt loam	.02	10	.01
152	Drummer clay loam	1.47	940	.42
158	Vance silt loam	4.71	3 010	1.36
207	Ward silt loam	1.37	880	.40
208	Sexton silt loam	2.85	1 820	.82
211	Tamms silt loam	.53	340	.15
212	Thebes silt loam	2.90	1 860	.84
213	Stolle fine sandy loam	.33	210	.10
218	Newberry silt loam	11.43	7 310	3.30
	Total	346.12	221 520	100.00

Thirty-three soil types are shown on the Cumberland county soil map, of which six account for 75 percent of the total land area in the county. The types are listed in Table 1, which shows the area of each in square miles and in acres and indicates the percentage that each type constitutes of the total area of the county. The accompanying colored map shows the location and boundary of each type.

GENERAL SUGGESTIONS FOR SOIL IMPROVEMENT

A full discussion of the principles of soil fertility is beyond the scope of this report, but it would seem worth while at this point to comment briefly on some of the more important principles. The following discussion is based on the assumption that adequate drainage has been established.

Liming.—Usually the first step in soil improvement, assuming adequate drainage has been provided, is the application of sufficient limestone to grow the crops which it is desired to grow. This involves the testing of each field for acidity and the application of limestone as indicated by the tests. Detailed instructions for collecting samples and making tests are given in Circular 346, "Test Your Soil for Acidity."[1]



No limestone Limestone

FIG. 5.—SWEET CLOVER DEMANDS LIMESTONE

These plants are from a second-year spring growth of sweet clover on the Kewanee experiment field. Each bundle is the growth from 4 square feet, the small one at the left having grown on unlimed soil and the large one at the right on soil given a 2-ton application of limestone.

Organic Matter and Nitrogen.—The correction of the soil acidity paves the way for the second step in a soil-improvement program, that is, provision for an adequate supply of organic matter and nitrogen. Under a livestock system, where the major portion of the grain and hay grown on the farm is fed to livestock and the manure returned to the fields, a satisfactory nitrogen level can be maintained without additional treatment provided crop residues are plowed under instead of being burned and a good rotation is used. Circular 465, "Pasture Improvement

[1]Any Illinois publication mentioned in this report may be obtained free of charge by addressing the Illinois Agricultural Experiment Station, Urbana (*see page 36*).

and Management," contains much information of value to the livestock farmer. When a grain system of farming is being followed, it is necessary to grow and plow under green-manure crops if the nitrate level is to be maintained. This problem is more completely outlined in Circular 326, "A Nitrogen Factory on Every Farm." Probably the most effective green-manure crop for this purpose is sweet clover. Bulletin 394, "Sweet Clover in Illinois," will prove helpful in understanding the requirements of this crop.

Phosphate and Potash.—Having taken care of any need for lime and nitrogen, the next step is to test for phosphate and potash deficiencies. Instructions for taking samples and making the phosphate tests will be found in Circular 421, "Testing Soil for Available Phosphorus." The results of this test are sometimes difficult to interpret properly, and it is therefore suggested that the county farm adviser be consulted for assistance in making this test. The test for available potash is more difficult to make than the available phosphorus test, and consequently it is not recommended that anyone attempt to make his own potash tests unless he is willing to spend some time and money in acquiring the proper equipment and learning the proper operating technic. A method for making this test is explained in a mimeographed folder, which can be obtained on request.

When both phosphate and potash are low, the application of either one by itself usually gives disappointing results. However, as a rule it can reasonably be expected that wheat will show the most response to phosphate applications and corn to potash. For maximum yields of all crops, however, it is essential to maintain adequate supplies of available nitrogen, phosphorus, and potassium in the soil thruout the growing season. If any one of these three elements is not present in sufficient amounts, crop yields will be reduced no matter how ample the supply of the other elements may be.

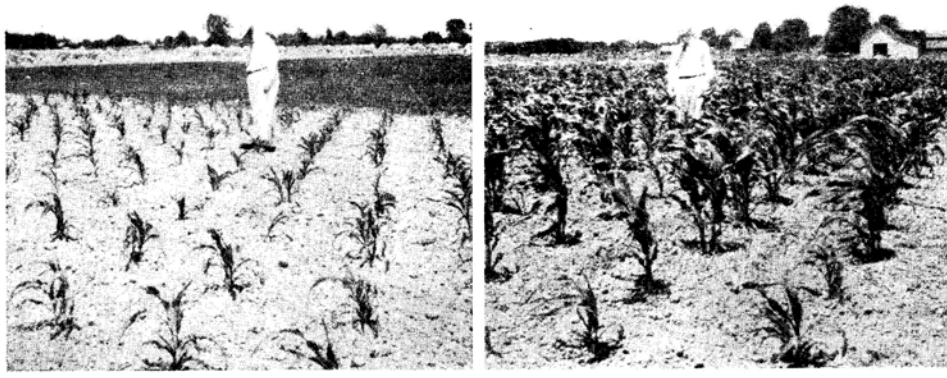
Systems of Farming.—In general, a farmer who keeps enough livestock to consume all his grain and roughage can maintain the productivity of his soil by using lime and manure and growing legumes for hay and pasture. Where the soil is deficient in phosphorus or potassium, these elements may need to be applied in order to bring the yielding power of the soil up to a satisfactory level. If a grain system of farming is followed, best yields are obtained by plowing under sweet clover at regular intervals and applying phosphate and potash fertilizers whenever these plant foods become deficient.

Erosion Control.—Finally, the long-time effects of soil erosion must be given serious consideration even on moderately sloping land. The best and most economical method of reducing erosion losses is to keep a good cover of vegetation on the land as many months of the year as possible but particularly during the winter and early spring. Since this cannot be done effectively on poor soils, the application of lime, phosphate, and potash as needed must be a part of any permanent program of erosion control. Suggestions for methods to use on specific types of soil are given in the *Use and Management* paragraph under each soil type needing such protection. If more information is desired, Farmers' Bulletin 1795, "Conserving Corn Belt Soil," should be studied. This bulletin may be obtained from the U. S. Department of Agriculture, Washington, D. C.

SOIL TYPES OF CUMBERLAND COUNTY: THEIR USE, CARE AND MANAGEMENT

A brief description of the outstanding characteristics of each soil type as mapped in Cumberland county, together with some general recommendations as to its use, care, and management, is given on the following pages. Some of this information is summarized in Table 2, pages 37 and 38.

The recommendations made for the management of each soil type are based on its requirements for the efficient production of the crops common to the region. Such matters as the growing of special crops, the location of the land



No treatment LPK and legumes

FIG. 6.—TWO PLOTS OF CISNE SILT LOAM ON THE TOLEDO EXPERIMENT FIELD

When not given any kind of soil treatment, Cisne silt loam will not yield more than about 15 bushels of corn an acre. When limestone, phosphorus, and potassium have been applied, as was done on the plot on the right, the yield of corn has been about 30 to 35 bushels.

with respect to markets, and other economic considerations have not been taken into account here.

In order to outline a complete soil-improvement and management program for a single field or farm, it would be necessary to know not only what soil types are involved but also what cropping and management practices have been followed in the past and what type of farming is to be followed in the future. Obviously not all this information is easily available. The major purpose of this report is, therefore, to furnish such basic information about the various soil types as will enable a farmer to lay out his own program of management and improvement for the soils that occur on his farm.

Cisne silt loam (2)

Cisne silt loam is a light-colored soil found on nearly level topography over much of Cumberland county. It was developed under a grass vegetation from thin loess over Illinoian till. The total area covered by Cisne silt loam in the county is about 66,470 acres.

The surface horizon is 6 to 7 inches thick and is a gray-colored friable silt loam with many reddish-brown concretions commonly called buckshot. The subsurface is 8 to 12 inches thick and is light gray in its upper part and nearly white in its lower. It is an ash-like material, a silt loam in texture, without any discernible arrangement of soil particles, and contains numerous reddish-brown concretions. Immediately beneath the subsurface, at a depth of 18 to 20 inches, the claypan subsoil occurs. It is heavy and plastic, mixed gray and pale yellow in color, contains reddish-brown concretions and is 8 to 12 inches thick. The movement of water thru the claypan subsoil, or "hardpan" as it is known locally, is very slow. Below 30 to 35 inches the material becomes somewhat more friable. "Slick spots," or "scalds," are commonly present.

Use and Management.—Cisne silt loam is acid and low in organic matter, nitrogen, phosphate, and potash. Natural drainage is poor. Surface water runs off slowly, if at all, and percolation to underground outlets is very slow. Tile will not draw, and the only practical method of providing drainage is by means of furrows and open ditches.

When not given any kind of soil treatment, the productive capacity of Cisne silt loam is low even tho farmed under a good rotation. The average yield of

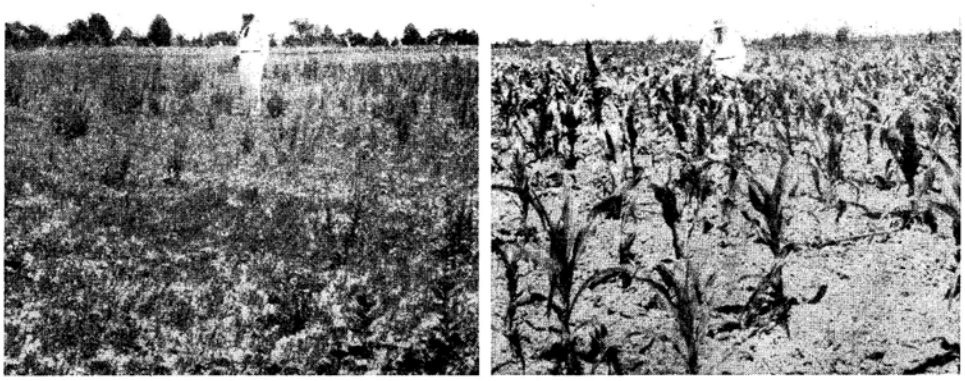


FIG. 7.—TWO AREAS OF CISNE SILT LOAM ON PRIVATE FARMS

Such variation in productivity within a soil type as shown here is usually the result of neglecting to apply proper soil treatments. The field at the right has evidently received better treatment than the one at the left, which has only a scattering growth of lespedeza and weeds.

corn under these conditions cannot be expected to exceed about 15 bushels an acre and the yield of wheat about 6 bushels. With good surface drainage and with soil treatment that includes limestone in addition to legumes or manure or that includes limestone, legumes, potash, and probably phosphate—the average yield of corn should be about 30 to 35 bushels an acre and wheat 15 to 20 bushels. There are reasons for thinking that the best use of this soil may be for meadow

or pasture; but even when used for these purposes, the need for limestone should be recognized.

The improvement of this soil should start with provision for adequate surface drainage and the use of sufficient limestone to grow sweet clover. The soil should be tested for degree of acidity, as directed in Circular 346, and limestone applied in accordance with the results of the test. After the limestone-legume program has become established, it will be necessary to use a potash fertilizer unless manure is available.

The presence of slick spots adds to the difficulties of farming this soil. The spots vary in size, abundance, and harmfulness, but where a slick spot is large enough to warrant separate treatment, or where the spots are abundant, it is suggested that a rotation of small grains and clover be adopted and that corn be omitted.

Slick spots. These spots, commonly known as "scalds" or alkali spots, can be recognized by their lighter-colored surface, the shallowness of the claypan subsoil, and a relatively poor plant growth or the complete absence of plant growth. Slick spots are very common in Cisne silt loam, but are not confined to that type.

The surface horizon of these spots is a light brownish-gray to gray silt loam 2 to 6 inches thick. The subsurface is a light-gray ashy silt. The subsoil, which begins at a depth of 6 to 15 inches, is a pale yellowish-gray clay loam, very tough when dry but rather friable when wet. Rounded gray pellets, or concretions of calcium carbonate (lime), are present in the subsoil in many of these spots. The subsoil is extremely resistant to water penetration. If a slick spot is worked when dry, the subsoil tends to throw the plow out of the ground, particularly if there has been any erosion of the surface.

The surface of slick spots is acid, but in correcting this condition a minimum amount of lime should be used, for the lower strata already have a highly alkaline reaction.

Slick spots will produce satisfactory yields of small grains in most years if given proper treatment, but in those spots where the subsoil is shallow—from 6 to 10 or 12 inches thick—summer crops such as corn and soybeans rarely produce any grain. Where the subsoil is deeper than 10 or 12 inches, fair yields of corn can be produced in favorable years if sweet clover or manure has been plowed under. Crops growing on these spots are, however, very sensitive to either an excess or a deficiency of moisture.

Hoyleton silt loam (3)

Hoyleton silt loam is a light-colored soil found on gently rolling topography in the southeastern part of Shelby county, where it covers nearly 10,000 acres. It was developed under grass or grass and scattered timber vegetation from thin loess on Illinoian till. Slick spots are commonly found in association with this type. A description of these spots will be found in connection with Cisne silt loam, above.

The surface horizon is a brownish-gray friable silt loam 6 to 7 inches thick. The upper subsurface is yellowish gray and the lower, ashy gray with orange-colored mottlings. The subsoil, which begins at a depth of 15 to 18 inches, is an

orange-mottled pale yellowish-gray compact and plastic clay. Below 33 to 35 inches it becomes more friable and is brighter in color.

Use and Management.—The productivity of this soil when untreated is somewhat less than that of the soils occurring on the nearly level topography in this region, but because it is developed on slight slopes there is a possibility of treating it so that it will produce reasonably satisfactory yields. Surface drainage may be easily obtained by means of furrows, altho on the more rolling topography care is sometimes needed to prevent erosion.

When drainage has been provided, each field should be tested for its lime requirement, as suggested in Circular 346, and lime applied as the test indicates. Sweet clover grown and turned under, plus regular additions of animal manure, should build up the land so that an average of 20 to 25 bushels of wheat and 35 to 40 bushels of corn an acre a year can be expected, according to tests on the Ewing experiment field in Franklin county, a part of which is located on this soil type. The results from those plots on the Ewing field that are on this type of soil indicate clearly that unless manure is available it is necessary sooner or later to fertilize with potash in addition to using limestone and legumes; however, potash need not be used until the limestone-legume program has become well established.

Satisfactory corn yields should not be expected where slick spots are abundant or where erosion has removed most of the silty surface.

Walton silt loam (4)[1]

Walton silt loam, a very minor soil type in Cumberland county, is found on rolling topography in Sections 29 and 32 in the southwestern corner of the county, where it covers less than 100 acres. Altho it is considered a grassland soil, most of the knolls on which it occurs were at one time covered with brush and a scattering of such trees as locust, elm, and wild cherry.

The thin surface horizon is a yellowish-gray silt loam. The subsurface is yellow with dull red splotches. The subsoil, beginning at 11 to 13 inches, is a reddish-yellow medium-compact and slightly plastic clay, becoming friable below 30 inches.

Use and Management.—In cultivating this soil, precaution must be observed to prevent sheet erosion and gullying because of the rapid runoff of surface water. Cultivated land should be kept under a vegetative cover as much of the time as possible, particularly in winter and early spring, and all tillage should be on the contour. Because of its shallowness, this soil is not well adapted to terracing. The active organic-matter content should be increased by plowing under animal manure or green manuring crops. The soil is acid and if legumes, such as sweet clover, are to be seeded, it should be tested for degree of acidity and limestone should be applied according to the indication of the test. An application of phosphorus, if the test indicates that this material is needed, would be advisable in case wheat and legumes are to be grown.

After proper treatment, including phosphate as well as limestone, this soil will

[1]After the printing of this soil report, the name Walton will be changed to Jasper, and all references to this type in future publications will be found under the latter name.

grow alfalfa successfully, and it is also adapted to small grains, orchard crops, small fruits, and vegetables. The yield of corn is often cut by summer drouths.

Hickory gravelly loam, eroded (8)

Hickory gravelly loam, eroded, occupies a total of about 18,000 acres in Cumberland county. It is found only on steep slopes within the Illinoian till region where erosion has removed the silty surface material and exposed the

FIG. 8.—A HILLSIDE OF HICKORY GRAVELLY LOAM

Hickory gravelly loam occurs only on hillsides such as shown here and is rarely suited to anything but timber. The level land is Sharon loam, bottom, which is subject to frequent flooding and is therefore best suited to summer crops.

underlying glacial till. The removal of soil material by erosion has been so rapid that little or no profile development has taken place, and consequently areas of this type are rarely suited to anything but timber. A few of the strongly rolling slopes will produce some pasture if care is used to prevent overgrazing.

Loy silt loam (11)

Loy silt loam is a very minor type in Cumberland county, occupying a total of a little over 100 acres. The largest area is found in Section 25, south of Jewett. This soil occurs only on nearly level low-lying areas which were formerly covered with timber.

The surface soil, which is 7 or 8 inches deep, is a light-gray silt loam with very faint structural development. This weak structure tends to cause a crust to form on the soil during and following rains. The subsurface is an almost white ashy silt loam; and the subsoil, which begins 20 to 24 inches below the surface, is

a very compact and plastic dark-gray clay. The entire profile is very slowly permeable to water, strongly acid, low in organic matter and all the elements of plant food, and contains numerous "buckshot."

This soil is so poor that it is questionable whether its improvement is practicable.

Wynoose silt loam (12)

Wynoose silt loam is found bordering the rough land along most of the streams in Cumberland county, where it occupies a total of about 20,000 acres. It is a timber soil, occurring on nearly level areas, the slope being between ½ and 1½ percent. It is low in organic matter, nitrogen, phosphorus, and potash, is strongly acid, and is underlain by a slowly pervious claypan subsoil.

The surface horizon is about 5 inches thick and is a yellowish-gray silt loam with a brownish cast. The subsurface is light yellowish gray in the upper part and light gray and ashy in the lower part. The subsoil, which begins at a depth of about 18 inches, is a mixed gray and pale yellow with dark reddish-brown spots and splotches. It is a compact and plastic clay. Below 35 inches it becomes somewhat friable, and between 45 and 60 inches weathered Illinoian till is found. Small slick spots sometimes occur in association with this type. For a discussion of these spots, see Cisne silt loam, page 16.

Use and Management.—The productivity of Wynoose silt loam when untreated is very low. Lack of sufficient slope to carry away surface water and the impervious nature of the claypan subsoil make the drainage problem very difficult. Fortunately many of the areas of this type occur within a short distance of an established drainage channel, and open ditches and furrows are often effective in carrying away surplus water. All attempts to tile this land have been unsuccessful because of the slowly permeable subsoil. Not only does the subsoil impede the movement of moisture, but it also restricts the penetration of roots, thus causing shallow rooting.

FIG. 9.—AN EARLY GROWTH OF SOYBEANS ON WYNOOSE SILT LOAM

Untreated Wynoose silt loam is unproductive, but satisfactory yields of most farm crops suitable to this area may be expected after the application of the right soil treatments. Within a few weeks the young soybeans shown here will have so grown that the bare ground now so conspicuous will be entirely covered. The wheat in shock in the distance is on Bluford silt loam.

After drainage has been properly established, each field should be tested for its lime requirement, as explained in Circular 346. Experiment fields located on this type have proved lime to be the basic treatment for soil improvement. Satisfying the lime requirement will make it possible to grow sweet clover, which when turned under will provide a supply of nitrogen and fresh organic matter. Heavy manure applications, if the soil has been limed, will also supply nitrogen and active organic matter and, in addition, will contribute small amounts of phosphorus and potash.

Tests should be made both for available phosphate and for potash, as explained on page 13, and trial applications of these materials made before investing heavily in them. Wheat is responsive to a phosphate fertilizer, whereas corn is responsive to potash. Because of its unfavorable physical condition no fertilizer can make this soil highly productive; however, satisfactory yields may be expected following the adoption of good soil-treatment and management practices.

Bluford silt loam (13)

Bluford silt loam is found on undulating to gently rolling topography between the steep slopes bordering the bottomlands and the nearly level uplands back from the stream courses. It is now or was formerly covered by a mixed stand of hardwood timber. It covers a total area of about 29,000 acres in Cumberland county.

FIG. 10.—A GOOD STAND OF ALFALFA ON BLUFORD SILT LOAM

Good stands of vegetation on Bluford silt loam can be obtained by the use of the correct soil practices. In the foreground is a crop of alfalfa, at the left in the distance is a vigorous growth of sweet clover.

Surface drainage is moderately rapid; but owing to a compact subsoil underdrainage is slow, forcing a high percentage of the rainfall to run off. This high runoff has created a serious problem of sheet erosion on the more-rolling cultivated slopes. In many places much of the surface horizon has already been removed and small gullies are becoming established.

The surface is a brownish-gray friable silt loam 6 to 7 inches thick in the virgin condition. The subsurface is yellow in the upper part and pale yellow to almost gray in the lower part. The subsoil, beginning at 14 to 18 inches, is a grayish-yellow medium-compact and plastic clay. Below 40 inches the subsoil

becomes less compact, and below 40 to 60 inches weathered Illinoian drift is present.

Use and Management.—An effective soil-management program for Bluford silt loam must take into consideration the checking of sheet erosion. As previously mentioned, underdrainage is slow, and a large part of the rainfall runs off, thus creating an opportunity for erosion.

Basic soil-treatment and management practices include the application of limestone, the use of stable manure and green-manure crops to supply nitrogen and organic matter, the application of phosphate and potash as needed, and the maintenance of protective vegetation on the land as much of the time as possible.

Good soil treatment will make possible a vigorous growth of vegetation, including legumes, thereby making erosion control possible. In order to control sheet erosion, a vigorously growing crop should be kept on the land and contour farming practiced. Well-maintained grass waterways will permit the surface water from other parts of the farm to drain over areas of Bluford silt loam without erosion. In some places diversion ditches may be desirable to direct runoff from other areas and permit the establishment of a good sod.

This soil, while relatively unproductive when untreated, responds well to good treatment and management. On the Enfield experiment field in White county, on Series 100, where the soil is classified as Bluford silt loam, the following yields per acre have been secured as long-time averages from different soil treatments:

	Corn	*Wheat*
	bu.	*bu.*
No treatment	11.2	7.9
Manure	21.4	10.2
Manure and lime	28.2	19.5
Manure, lime and rock phosphate	31.0	24.1
Residues	14.7	9.9
Residues and lime	22.7	20.8
Residues, lime and rock phosphate	24.9	23.9
Residues, lime, rock phosphate and potash	34.5	28.7

These data indicate the need for lime on this soil under either a livestock or grain system of farming. It is also apparent that both phosphate and potash are able to produce significant crop increases, and this is particularly true under a grain system, where animal manure is absent. However, before either phosphate or potash is applied, the need for both should be determined, for if both are low and only one is applied, the results may be disappointing. In general, phosphate should be applied for wheat and potash for corn.

On areas where erosion has already removed the surface soil, exposing the clay subsoil, the treatments just discussed are of questionable value and should be made on a trial basis before being applied extensively. Perhaps the best use for the eroded areas of this type is pasture. In order to establish a pasture on such areas, both lime and phosphate will be needed.

Ava silt loam (14)

Ava silt loam, a minor soil type in Cumberland county, is found on rolling topography chiefly in the southern part of the county, south of Walla Walla, where it occupies a total of about 400 acres.

The surface is a brownish-yellow friable silt loam varying from 0 to 6 inches in thickness, depending on the amount of material removed from the surface by erosion. The subsurface is friable and yellow. The subsoil begins at 6 to 12 inches and in its upper part is a reddish-yellow slightly compact non-plastic silty clay loam which breaks, upon rupture, into large nut-like granules. The lower subsoil is more compact and the particles have thin gray coatings. Below 36 to 50 inches weathered Illinoian drift is found.

Use and Management.—Ava silt loam, if used for cropping, must be protected against soil erosion. An erosion-control program for this soil, to be successful, must make use of various erosion-control devices. In such a program it is basic to so treat the soil that a vigorous growth of vegetation is secured and to so plan the cropping that a protective vegetative cover is on the ground as much of the time as possible. These practices should be supplemented by the use of terraces and other mechanical structures where called for. Fall plowing should be avoided unless it is in preparation for a fall-seeded crop which will give effective protection. Unless a vigorous erosion-control program can be undertaken and carried thru, Ava silt loam should not be used for cultivated crops. Under any system of management not more than one cultivated crop in four years should be grown, and all cultivation should be on the contour. Soybeans, which leave the soil in a loose condition, should be avoided altogether.

The basic soil treatment needed for vigorous vegetative growth includes the application of limestone, the use of stable manure or green-manure crops to supply nitrogen and organic matter, and the application of phosphate and potash as needed. Applications of these materials should be based on tests for acidity and available phosphate and potash. If it is desirable to hold down the initial investment in phosphate, light applications of this element in a readily available form, such as superphosphate, should be made for the most responsive crops—wheat and alfalfa. This soil is well adapted to vegetable, small-fruit, and orchard crops.

Westville silt loam (22)

Westville silt loam is a light-colored soil derived from thin loess on leached Wisconsin till and developed on rolling topography under deciduous forest vegetation. It occurs on the rolling morainal area north of Bradbury and occupies a total area of about 50,000 acres in Cumberland county.

The surface horizon averages about 5 to 7 inches thick and is a yellowish-gray silt loam low in organic-matter content and medium acid in reaction. In undisturbed forested areas the upper 2 or 3 inches is brownish gray owing to the higher content of organic matter. The subsurface is 6 to 8 inches thick and is a grayish-yellow silt loam. The subsoil is 12 to 14 inches thick and is a yellow to reddish-yellow medium-plastic silty clay loam that breaks into ¼- to ¾-inch subangular aggregates which have a faint brownish-gray coating. At a depth of 28 to 30 inches a few inches of yellowish clayey silt sometimes occurs but more often the subsoil grades directly into reddish-brown sandy gravelly leached till which may become calcareous at a depth of 45 to 70 inches. A scattering of pebbles is often noticeable on the surface and thruout the profile.

As this type occurs on slopes having a gradient of about 4 or 5 to 12 or 15 percent, surface drainage is rapid. Underdrainage is moderate.

Use and Management.—Much of the Westville silt loam in Cumberland county has been badly managed in the past and consequently its present producing capacity is lower than is common for the type. Some areas of this soil have been permanently damaged by the removal of all or nearly all of the thin blanket of loess which at one time covered this region.

This soil should not be fall-plowed but should always be protected by a cover of vegetation as much of the year as possible, particularly during the winter and early spring months. Contour tillage should be practiced; and strip cropping, where it can be used successfully, will reduce erosion losses.

Altho Westville silt loam is a relatively infertile soil, it will respond to good treatment and much of it can be made to produce satisfactory crop returns. Erosion can be reduced to a minimum by improving the general productivity level, which is accomplished by applying limestone and manure and by introducing a good system of crop rotation. If large amounts of barnyard manure are not available for frequent and regular application, some provision should be made for plowing under a leguminous green-manure crop once each rotation period.

This land is well adapted to the growing of alfalfa after the acidity of the soil has been corrected, but a phosphatic fertilizer will be needed before maximum yields of this legume can be secured. If the land is used for permanent pasture, close grazing should be avoided and a good growth of grass encouraged by proper fertilizer treatment.

Hennepin gravelly loam, eroded (25)

Hennepin gravelly loam, eroded, occurs in Cumberland county only in the morainal area north of Bradbury. It is similar in topography to Hickory gravelly loam, eroded, Type 8, but differs from it in that the till material is calcareous within 2 or 3 feet of the surface. It occupies an area of only about 600 acres in Cumberland county.

Destructive erosion always follows the removal of the natural forest cover from this soil; consequently a part or all of the soil horizons may be absent wherever the tree and brush vegetation has been cut. In badly eroded areas, such as those occupied by freshly cutting gullies, the calcareous pebbly till is often exposed. However, in an uncleared virgin area the yellowish-gray surface is usually 3 to 5 inches thick and includes 1 or 2 inches of dark decaying leaf mold. The subsurface is yellow or reddish yellow and is usually 2 to 4 inches thick. The subsoil is 8 to 10 inches thick and is a yellow to reddish-yellow pebbly clay loam.

Use and Management.—Because this type usually occurs on slopes of 25 percent or greater and is so easily damaged by erosion, its best use is for growing timber. On areas already cleared and therefore injured, the problem is to get some sort of protective vegetative growth started. Bluegrass and young locust trees are probably two of the most satisfactory plant species that can be used for this purpose, tho the hazard of getting either started is considerable, especially if the cutting back by the gullies is not at least partially stopped. A diversion

terrace along the brow of the slope may sometimes be used to advantage to prevent this kind of damage, or temporary check dams are sometimes advisable. After erosion has been checked, permanent plantings of desirable forest trees can be made.

Edina silt loam (46)[1]

Edina silt loam is a dark soil found on nearly level topography in the northwestern part of Cumberland county where it occupies only about 400 acres. It was originally poorly drained, but all areas have been artificially drained since they have come under cultivation.

The surface horizon is dark brown when moist but has a grayish cast when dry. It is about 8 inches thick, friable, and cultivates easily. The upper subsurface is darker and slightly heavier than the surface. There is a thin brownish-gray silty layer at the base of this zone. The subsoil, beginning at a depth of 16 to 18 inches, is a dark grayish-yellow moderately compact and plastic clay. The subsoil becomes friable below 32 to 36 inches and is grayish yellow in color. Concretions of lime are present in the subsoil in some places. At about 40 to 50 inches weathered Illinoian till is found.

Edina silt loam varies from slightly acid to medium acid in the surface and from sweet to slightly acid in the subsoil. The available phosphorus and potassium supplies vary between low and medium. Organic matter is present in moderate amounts, but the nitrogen content of the cultivated soil is low.

Slick spots are sometimes found associated with Edina silt loam. For a discussion of these spots see Cisne silt loam, page 16.

Use and Management.—To increase or maintain the productivity of Edina silt loam regular additions of organic matter should be made either by applying liberal amounts of manure or by growing and plowing under legumes at least once in the rotation. In either case the soil should be tested for acidity, as explained in Circular 346, and limestone applied as indicated by the test, for if the soil is acid, clovers are likely to fail and the full benefit of the manure is likely not to be realized.

Edina silt loam should produce satisfactory crops when properly fertilized. If it does not, then in all probability better drainage should be provided. Tile should be placed not more than 4 rods apart, and a good outlet must be obtained if the excess water is to be carried away promptly.

Results from the Lebanon experiment field in St. Clair county, which is located on this soil type are of interest. Here the untreated soil has given a long-time average yield of 21.7 bushels of wheat, 29.7 bushels of corn, and 33.7 bushels of oats. The limestone-manure treatment has brought these yields up to 30.2 bushels of wheat, 46.6 bushels of corn, and 45.5 bushels of oats. Neither phosphorus nor potash has given profitable response on this field. It is believed, however, that there may be portions of this type which would respond to these two fertilizing materials, and it is therefore recommended that both phosphorus and potash tests be made and applications of these elements be added as needed.

[1]After the printing of this soil report, the name Edina will be changed to Herrick, and all references to this type in future publications will be found under the latter name.

Ebbert silt loam (48)

Ebbert silt loam is found on nearly level and in depressional areas thruout the prairie portions of the upland. Its total area is about 16,000 acres.

The surface horizon is a dark-gray friable silt loam varying from 7 to 10 inches in thickness. The subsurface is a gray silt loam splotched with pale yellow. The subsoil, which begins at a depth of 18 to 24 inches, is a medium-compact and plastic clay loam, gray in color and faintly mottled with pale yellow. Below 36 to 40 inches the material becomes more friable. Weathered Illinoian till is usually found at a depth of 40 to 50 inches.

Use and Management.—Ebbert silt loam can be made moderately productive by proper treatment. Drainage must be provided, first by establishing an outlet for the water and then thoroly surface-ditching the area. Tile can be used, but because of the compact nature of the subsoil they will not draw water very far, and to be effective they must be placed not more than 4 rods apart. The soil is sour but does not need so much lime to grow sweet clover as do the adjacent soils. It is suggested that each field be tested for acidity, as explained in Circular 346. After the soil has been limed, sweet clover should be grown and turned under. Further treatments, other than adding all available animal manure and drilling superphosphate with wheat, should be made on a trial basis.

This soil when treated is adapted to the growing of the grain crops common to the region.

Kern silt loam, terrace (51)

Kern silt loam, terrace, is a light-colored soil derived from a thin covering of silty wash over coarse stratified sandy and gravelly material. It is found on nearly level topography under deciduous forest vegetation. It is a very minor type in Cumberland county, occupying a total area of less than 50 acres. It is found in Section 36, Township 9 North, Range 7 East.

The surface horizon is 6 to 8 inches thick and is a gray to dark-gray silt loam low in organic matter and nitrogen and medium acid in reaction. In undisturbed forested areas the upper 2 or 3 inches is brownish gray owing to a higher organic-matter content. The subsurface is a gray or pale yellowish-gray silt loam about 7 to 9 inches thick. The subsoil is a yellowish-gray to grayish-yellow medium-plastic clay loam varying from 12 to 20 inches in thickness. Below 35 or 40 inches the subsoil becomes coarse, sandy, and pebbly, more yellowish or reddish, and more friable.

Use and Management.—Both surface drainage and underdrainage are relatively slow in this type of soil, and erosion is not a problem; otherwise the treatment for it may be much the same as that recommended for the Camden silt loam, terrace, page 30.

Osceola silt loam (58)

Osceola silt loam, occupying a total area of about 3,000 acres, is found in the north-central part of Cumberland county on the outwash plain bordering the morainal region north of Bradbury. It is underlain by sand or gravel, but in spite of this fact its underdrainage is slow because of a claypan subsoil. It occurs on

nearly level to gently undulating topography and was developed under a grass vegetation.

The surface is a grayish-brown silt loam, acid in reaction and low to medium in organic matter and nitrogen. The subsurface, starting at a depth of about 7 inches, is a dark or slaty gray, and the subsoil is a yellowish-gray plastic clay or clay loam. The sand or gravel substratum commonly occurs at a depth of 40 to 50 inches.

Use and Management.—Osceola silt loam is not a highly productive soil, but under good management it will produce satisfactory yields. Good drainage by means of furrows and open ditches should first be established, and limestone should then be applied as indicated by approved acidity tests. Clover, preferably sweet clover, should be grown. After this program has been followed for a few years, the need for phosphate and potash fertilizers should be investigated.

Beaucoup clay loam, bottom (70)

Beaucoup clay loam is a very minor soil type in Cumberland county. The only areas lie southeast of Jewett and occupy about 100 acres.

The surface soil is a dark-gray plastic clay loam neutral to slightly acid in reaction. It shows little horizon development but becomes grayer with depth.

This soil is wet and has little agricultural value because of its swampy condition. If adequately drained it should be moderately productive, but it will always be somewhat difficult to work because of its heavy nature.

Sharon loam, bottom (72)

Sharon loam, bottom, occurs in the small stream bottoms of Cumberland county, covering a total area of about 8,500 acres. It is variable in color and

FIG. 11.—PROMISE OF A GOOD CORN CROP ON SHARON LOAM, BOTTOM

Sharon loam, bottom, is a productive soil, but crops on it are rather uncertain because of its frequent flooding. It is found scattered along the small streams of Cumberland county, occupying an area of about 8,500 acres.

texture, having developed from sediments brought down from the adjacent upland where tributary creek beds and gullies of varying depth expose different materials to erosion. Frequent flooding and the deposition of sediments have prevented profile development. The most prevalent color of the surface soil is yellowish gray, and a yellowish cast persists thruout the imperfectly developed profile, tho gray becomes more pronounced with depth.

Use and Management.—Frequent flooding makes it necessary to use this soil for summer crops. It is but slightly acid and the floodwaters deposit nutrient elements as well as sediment. No fertilizer treatment is suggested on any area of this soil which is subject to overflow.

Huntsville loam, bottom (73)

Huntsville loam, bottom, is a dark-colored bottomland soil occupying about 14,500 acres in Cumberland county. It was developed from sediments, a portion of which came largely from the dark-colored soil regions lying north of the

FIG. 12.—PART OF THE EXTENSIVE BOTTOM ALONG THE EMBARRASS RIVER

The corn shown here is on Huntsville loam, bottom, a soil type which occupies more than 14,000 acres in Cumberland county. This soil is very productive, but frequent flooding restricts its use to the raising of summer crops.

county. Much of it is subject to overflow and therefore is used for summer crops, but where not subject to flood it produces good yields of any of the crops commonly grown in the region.

The surface is brown, the soil becoming gradually grayer as the depth increases. Very little and frequently no subsoil development can be distinguished.

Use and Management.—Huntsville is neutral to slightly acid and will grow clover or alfalfa without limestone being applied. However, these crops are not commonly grown on this soil because of flooding. Corn is the most commonly grown crop, and no soil treatment should be necessary so long as flooding continues.

Littleton silt loam, terrace (81)

Littleton silt loam, terrace, is a minor soil type in Cumberland county. An area of about 150 acres occurs on the west side of Embarrass river two miles south of the Coles county line.

The surface is normally 6 to 8 inches thick and varies from a brown silt loam to a brown sandy silt loam. The subsurface, also 6 to 8 inches thick, is usually lighter brown than the surface, tho sometimes it is rather grayish. The subsoil varies from a yellowish-gray to a yellowish-brown medium-plastic silty clay loam that may be somewhat gravelly in the lower part. Below 35 or 40 inches the material becomes brownish yellow to grayish yellow and ordinarily is a friable silt or a loose, incoherent, stratified silt, sand, or gravel.

Use and Management.—Both surface drainage and underdrainage of Littleton silt loam, terrace, are moderate. Erosion is not serious and the soil ordinarily is not drouthy, but portions of it may be subject to overflow in extremely high floods. This soil is productive if good farming is practiced, including the use of limestone and legumes, and phosphate and potash when tests show these two materials are needed.

Bonnie silt loam, bottom (108)

Bonnie silt loam, bottom, occupies a total area of about 4,500 acres in Cumberland county and is found chiefly along Cottonwood and Range creeks. It was developed from sediments coming mainly from the adjacent uplands. It differs from both the Huntsville and Sharon bottom types previously described, in color and in other features, as well as in agricultural value. It is predominantly gray thruout the entire profile rather than brown, as is Huntsville, or yellowish, as is Sharon.

The surface soil is gray to light gray. It grades gradually into the subsurface, which is lighter gray than the surface soil. The separation between surface and subsurface, while not distinct, may be placed at a depth of 6 to 10 inches. There is no subsoil development.

Use and Management.—This soil, because of overflow, is used for summer crops. It is slightly to strongly acid in reaction and low in nitrogen and organic matter, but applications of fertilizer and limestone are probably not worth while because of frequent overflow. Fairly satisfactory yields of corn and other short-season crops can be grown on this soil where it is not too wet. As long as flooding continues, fair yields may be expected without soil treatment.

Putnam silt loam (112)[1]

Putnam silt loam occurs only in the northwestern corner of Cumberland county, where it occupies a total of about 4,000 acres. It occurs on nearly level-lying prairie uplands and resembles to some extent Cisne silt loam, differing from it chiefly in having a darker surface soil, a less pronounced gray subsurface, and a claypan subsoil not quite so well developed. It is hard to drain, for it will not

[1]After the printing of this soil report, the name Putnam will be changed to Cowden, and all references to this type in future publications will be found under the latter name.

tile and its nearly level topography makes the removal of excess water by means of furrows and open ditches difficult on some areas.

The surface soil is a brownish-gray friable silt loam 6 to 8 inches thick. The subsurface is gray in its upper part and light gray and ashy in its lower part. The subsoil, which begins at a depth of 18 to 20 inches, is a dark-gray compact and plastic clay with some yellow mottling. Brownish red to black pellets of iron and manganese occur thruout the profile. Below 34 to 38 inches the material is more friable and is pale yellowish gray. Slick spots, too small to be shown on the map, occur thruout the type.

Use and Management.—The first need of Putnam silt loam is drainage. Tile will not draw in this soil, but the water can usually be carried off by the use of open ditches and furrows.

Putnam silt loam is acid and requires limestone to produce satisfactory yields of most crops. Heavy applications of limestone are not needed on slick spots and should not be applied on them. If, in addition to a small amount of limestone, heavy applications of animal manure can be made, no further treatment is likely to prove advisable unless wheat is grown, in which case superphosphate should probably be used. If only a small amount of manure is available, sweet clover can be plowed under to furnish nitrogen, and phosphate and potash can be applied as needed by drilling or broadcasting them on wheat.

The type of crops to be grown on Putnam silt loam should be mainly determined by the number of slick spots present. Where these spots are abundant, corn and soybeans should be held to a minimum in the rotation, and such crops as wheat, winter barley, lespedeza, and sweet clover should be grown. Where the slick spots are infrequent, corn can be made to produce fair yields in the rotation. For a discussion of slick spots see Cisne silt loam, page 16.

Cox silt loam (113)[1]

Cox silt loam, covering about 1,000 acres, is mapped on the gently sloping prairie land in the northwestern part of Cumberland county in association with Putnam silt loam. The surface drainage is moderately rapid but underdrainage is slow. Sheet erosion is serious on some areas of this type, and gully erosion is common.

The surface is a brownish-gray friable silt loam 5 to 7 inches thick. The subsurface is yellowish gray; the lower part is ashy and splotched with orange or dull red. The subsoil is a compact and plastic brownish-yellow clay often splotched with dull red. Below 30 to 32 inches the material becomes more friable.

Slick spots occur in association with this soil and, in some areas, materially lower its agricultural value. For a discussion of these spots see Cisne silt loam, page 16.

Use and Management.—On Cox silt loam drainage should be provided by means of a system of surface-ditching that will remove the excess surface water with as little erosion as possible. Where the slope is very gentle, the furrows

[1]After the printing of this soil report, the name Cox will be changed to Oconee, and all references to this type in future publications will be found under the latter name.

may run down the slope; but where the slope is steep enough to erode, the furrows should be plowed across it in a way that will give sufficient fall to carry off the water and at the same time cause as little washing as possible.

The soil-treatment problems of Cox silt loam are the same as those of Putnam silt loam, page 28, tho it is more difficult to manage because of its tendency to erode. This is particularly true of the slick spots, which erode badly even on very slight slopes. Contour farming, together with good soil treatment and cropping practices, will take care of the erosion problem on most areas of this soil type. In some places the diversion-ditch type of terrace may be effective.

Camden silt loam, terrace (134)

Camden silt loam, terrace, is a light-colored soil developed on undulating to gently rolling topography under forest vegetation. It occupies a total area in Cumberland county of about 1,900 acres and occurs along Embarrass river and near Johnstown along Muddy creek.

The surface is a yellowish-gray silt loam varying to a sandy silt loam. It is low in organic matter and medium acid in reaction. It varies from 6 to 14 inches in thickness, depending upon the amount of slope wash deposited from the adjacent higher land. In undisturbed forested areas the upper 2 or 3 inches of the surface horizon is brown owing to the accumulation of leaf litter and the consequent higher content of organic matter. The subsurface is 6 to 10 inches thick and is a pale grayish-yellow silt loam to sandy silt loam. The subsoil is 10 to 14 inches thick and is a yellow to reddish-yellow medium-plastic silty to sandy clay loam that breaks into ¼- to ½-inch subangular aggregates. At a depth of 30 to 35 inches the material is usually a brownish-yellow leached clayey sand or clayey gravel which changes to loose, incoherent, stratified sand and gravel below 40 or 50 inches and which may be calcareous at a depth of 5 or 6 feet. The stratified sand and gravel may vary in thickness from a few feet to many feet.

Use and Management.—If properly handled, Camden silt loam should produce fairly good crops. The surface slope ordinarily is such that erosion is negligible but underdrainage is good, thus giving to the type a well-drained profile. When this type is cultivated, the natural supply of organic matter is rapidly depleted, and the first item, therefore, in raising its productive level is frequent and regular applications of barnyard or green manure. Sweet clover is one of the best sources of green manure, but usually some limestone must be applied before a satisfactory growth of this crop can be secured.

When sufficiently thick, the coarse underlying material of this and other terrace types has considerable value as a source of commercial sand and gravel.

Shiloh clay loam (138)

Shiloh clay loam is a dark soil found in depressional areas thruout the western and southern parts of Cumberland county, where it occupies a total area of about 1,000 acres.

The surface, which is 8 or 10 inches thick, is a black silty clay loam when moist but has a grayish cast when dry. The subsurface is a dark-gray silty clay

or clay loam. The subsoil, which begins at a depth of 16 to 20 inches, is a dark-gray plastic clay loam or clay faintly mottled with pale yellow and showing a weak prismatic structure.

Use and Management.—Shiloh clay loam is neutral or only slightly acid and is relatively well supplied with nitrogen, phosphorus, and potash. It puddles easily, however, if worked when too moist, and this tendency toward poor physical

FIG. 13.—SHILOH CLAY LOAM IS A PRODUCTIVE SOIL

This soil type is naturally well supplied with the essential elements of plant food, as is shown by these fields of thriving corn and alfalfa.

condition is its most serious defect. Frequent addition of fresh organic matter in the form of barnyard manure or green-manure crops such as sweet clover will help keep the soil in good physical condition. Some limestone may occasionally be needed for sweet clover.

If satisfactory crops are not secured following the use of manure or sweet clover, it is probable that the drainage is inadequate. Tile laterals should be not much more than 4 rods apart, and a good outlet must be secured. Because this soil type is found in depressional areas, outlets are sometimes difficult to obtain.

Heavy applications of phosphate and potash should not be made until tests reveal the need for these fertilizers.

Ava sandy loam (143)

Ava sandy loam, occupying a total area of only about 150 acres in Cumberland county, is a light-colored soil found on rolling topography of the upland. It occurs only in small areas, chiefly near Embarrass river, where sand was blown onto the upland from sediment deposited by the river.

The profile of this soil resembles that of Ava silt loam, Type 14, except that it is a sandy loam instead of a silt loam.

Use and Management.—The suggestions made for the handling of Ava silt loam, page 21, apply to Ava sandy loam also. This soil is well adapted to alfalfa if limestone and phosphate are applied.

Brenton silt loam (149)

Only one small area of Brenton silt loam occurs in Cumberland county. This one area of only about 15 acres occurs in Section 32, Township 11 North, Range 9 East. It is a dark-colored soil underlain at a depth of 50 or 60 inches by outwash sand and gravel, which gives good natural drainage.

Use and Management.—This is one of the best soils in Cumberland county and is adapted to all of the crops common to the corn belt. A moderate application of limestone is needed where sweet clover and alfalfa are to be grown.

Drummer clay loam (152)

Drummer clay loam, which occupies a total area of about 1,000 acres in Cumberland county, occurs only in the morainal region north of Bradbury.

The surface horizon is a well-granulated black clay loam 8 to 10 inches thick. It is high in organic matter and in plant nutrients and is usually neutral in reaction. Other soil horizons are not well developed, the soil material changing gradually from black to grayish black to dark gray, often showing some pale-yellow spotting. Beneath about 30 to 35 inches it becomes more friable and silty and usually is calcareous and more brightly colored with yellow. Layers of coarser sandy wash often occur at varying depths.

Except possibly along some of the small and more recently established drainage ways, this soil type has a surface slope of less than ½ percent. Surface runoff is usually slow, and underdrainage is moderate thruout the type.

Use and Management.—Drummer clay loam is a productive soil following the introduction of good drainage. It is high in organic matter, and being nonacid it needs only good farming, including a good rotation, to maintain a high productive level for many years.

Unfortunately, in Cumberland county much of this type occurs as narrow strips along drainage lines and for this reason its full value is difficult to realize. Some of the statements which follow do not apply to these narrow strips but rather to the larger areas which are not cut thru by a drainage channel.

Corn may be grown as the principal crop on this type provided a leguminous green-manure crop appears once each rotation period. Barnyard manure may replace the green-manure crop if regular applications are made. This soil is better adapted to corn than to small grains, as there is a tendency for the small grains to lodge.

Fall plowing is a practice not often advisable on the more rolling silt-loam soils, but Drummer clay loam is a soil that may be fall-plowed to advantage. If plowed when too wet or too dry, this soil tends to clod badly. However, if plowed in the fall, the freezing and thawing of the winter and spring will melt or loosen the clods so that a good seedbed can be prepared. If a crop of sweet clover is to be plowed under, it is best to do it in the spring after the young sweet-clover

shoots are several inches high, thus more easily preventing the regrowth of the clover plants in the crop that follows.

Vance silt loam (158)

Vance silt loam is a light-colored soil derived from a thin silty covering over glacial outwash and developed on undulating to rolling topography under a deciduous hardwood forest. It occupies a total of about 3,000 acres in Cumberland county and occurs only in the morainal area north of Bradbury and in the northwestern corner of the county.

The surface horizon is 5 to 7 inches thick and is a yellowish-gray silt loam low in organic matter and medium acid in reaction. In undisturbed forested areas the upper 2 or 3 inches is more brownish in color owing to the accumulation of forest litter. The subsurface is 6 to 8 inches thick and is a grayish-yellow to yellow silt loam. The subsoil is 12 to 16 inches thick and is a brownish-yellow to reddish-yellow medium-plastic silty clay loam that breaks into ¼- to ¾-inch subangular aggregates with dark-grayish coatings. At 30 to 35 inches the lower subsoil usually grades into a thin layer of yellowish silt, below which brownish-yellow leached sandy-gravelly material occurs. Sometimes, especially on slopes of 4 to 6 percent, the silty layer is absent and the upper soil horizons appear to have been developed directly on the coarse sandy-gravelly material.

The slopes on which this soil occurs vary from 1 percent or less to 5 or 6 percent. Surface drainage is moderately slow to moderately rapid and underdrainage is moderate.

Use and Management.—If well farmed, this soil produces satisfactory yields. Particular attention must be given to providing a supply of fresh organic matter because of the deficiency of this material and of nitrogen. To accomplish this object, sufficient limestone must be applied to grow sweet clover. After one or two crops of sweet clover, tests should be made for available phosphorus and potash. Erosion control should be given attention on the more sloping portions of the type, and underdrainage may be needed on the nearly level areas.

Ward silt loam (207)

Ward silt loam is a light-colored soil derived from a silty covering over permeable calcareous Wisconsin till and developed on nearly level to undulating topography under deciduous hardwood-forest vegetation. It occupies an area of a little less than 900 acres in Cumberland county and occurs only in the morainal region north of Bradbury.

The surface is 6 to 8 inches thick and is a yellowish-gray silt loam low in organic matter and medium acid in reaction. In undisturbed forested areas the upper 2 or 3 inches of soil is of a brownish color owing to an accumulation of forest litter. The subsurface is 6 to 8 inches thick and is a yellowish-gray to gray almost-ashy silt loam. The subsoil is 12 to 16 inches thick and is a yellowish-gray medium-plastic silty clay loam that breaks into ¼- to ¾-inch subangular gray-coated aggregates. A few inches of yellowish silt usually occurs beneath the subsoil but this is absent in some places and the subsoil grades directly into

yellowish leached pebbly till that becomes calcareous at a depth of 4 to 5 feet. Small gritty brownish-black iron-manganese pellets occur on the surface and thruout the soil profile, being particularly noticeable in the subsurface.

The slopes on which this soil occurs vary from about ½ to 1 percent. Both surface and underdrainage are moderately slow to slow.

Use and Management.—Ward silt loam is not a very productive soil unless well farmed. It responds well to good soil treatment and good cropping practices after underdrainage has been provided by tiling. Limestone should be applied in amounts indicated by the test, and sweet clover should be grown in a short rotation. After two or three crops of clover have been grown, tests should be made for available phosphorus and potash.

Sexton silt loam (208)

Sexton silt loam is a light-colored soil derived from glacial outwash material and has developed on nearly level to gently undulating topography under deciduous forest vegetation. It occupies an area of about 1,800 acres in Cumberland county, occurring in the morainal area north of Bradbury and in the northwestern corner of the county.

The surface is a pale brownish-gray to yellowish-gray silt loam low in organic matter and medium to strongly acid in reaction. In undisturbed forested areas the upper 2 or 3 inches of soil is brownish gray or dark gray owing to an accumulation of forest litter. The subsurface is a yellowish-gray silt loam. The subsoil is a yellowish-gray plastic clay loam 12 to 16 inches thick, that breaks into ¼- to ¾-inch almost angular aggregates arranged in fairly good prismatic form. Below 35 to 40 inches lies a mixture of clayey, silty, sandy, and gravelly leached wash material. Brownish-black iron-manganese concretions are scattered on the surface and are noticeable thruout the profile.

The slopes on which this soil occurs have gradients of no more than 1 percent. Surface drainage is slow but the profile is sufficiently permeable so that tile will draw satisfactorily.

Use and Management.—The suggestions given for the treatment of Ward silt loam, page 33, apply to Sexton silt loam also.

Tamms silt loam (211)

Tamms silt loam is a minor soil in Cumberland county, occupying a total area of only a little over 300 acres in the county. It is a light-colored soil found near Greenup.

The profile to a depth of 40 inches resembles that of Wynoose silt loam, altho the subsoil is less compact and plastic. Below 40 inches a stratum of sand is found which furnishes a good underground outlet for such water as passes thru the subsoil.

Use and Management.—The suggestions made for the management of Wynoose silt loam, page 19, apply equally well to Tamms silt loam, tho Tamms should respond somewhat better than Wynoose to good soil treatment and management.

Thebes silt loam (212)

Thebes silt loam is found on undulating to rolling topography in association with Tamms silt loam, described above. The total area of Thebes in Cumberland county is about 1,850 acres and is located along the east bank of Embarrass river and Hurricane creek.

Thebes silt loam, to a depth of about 40 inches, is very similar to Ava silt loam, Type 14. Below about 40 inches a layer of sand, varying from one to several feet thick, occurs. Immediately beneath the sand weathered Illinoian till occurs.

Use and Management.—The suggestions made for the handling of Ava silt loam, page 21, apply equally well to Thebes silt loam.

Stolle fine sandy loam (213)

One area of Stolle fine sandy loam, a little over 200 acres in size, occurs in Cumberland county about two miles south of Greenup. This soil is found on nearly level land and was formerly covered with timber. Surface drainage is slow but underdrainage is moderate and tiling can be used effectively.

The surface soil is a dark-gray friable fine sandy loam. The subsurface is a pale-yellow fine sandy loam; and the subsoil, beginning at a depth of about 18 inches, is a moderately compact and slightly plastic sandy clay loam. Below about 30 inches the material is sandy loam in texture. This soil is medium acid and low in organic matter.

Use and Management.—Stolle fine sandy loam when properly treated and managed is a very satisfactory general farm soil. Erosion is not a problem, but special attention should be given to increasing the supply of fresh organic matter and nitrogen by growing clovers. Tests for acidity and for available phosphorus should be made and lime and phosphorus applied as needed. After a few crops of sweet clover have been grown, potash is likely to be needed. This is a good alfalfa soil.

Newberry silt loam (218)

Newberry silt loam occupies a total of about 7,300 acres in Cumberland county. It occurs in small tracts in depressional areas thruout much of the upland. Both surface drainage and underdrainage are slow, as the topography is nearly level and the soil profile is slowly permeable to water. This soil is medium to strongly acid and low in available phosphorus and potassium. While higher in nitrogen and organic matter than Cisne silt loam, with which it is associated, it is low in both these constituents.

Use and Management.—Newberry silt loam, when well surface-drained and properly treated and managed, produces higher yields than the adjoining Cisne silt loam under an equally good treatment and management program. Drainage should be provided as the first step in its improvement. Tests for acidity and for available phosphorus should then be made, and limestone and phosphate applied where the tests indicate they are needed.

SUMMARY OF IMPORTANT CHARACTERISTICS OF CUMBERLAND COUNTY SOILS

A summarized statement of some of the agriculturally more significant characteristics of the soil types shown on the soil map of Cumberland county is presented in Table 2, pages 37 and 38. Topography, drainage, acidity, and the contents of organic matter and available phosphorus are all indicated, together with an index of the productivity of each soil type, in untreated condition, for crops, pasture, and forest.

The information in this table is necessarily general and should not be taken to mean that *every* farm or field of a given soil type will exhibit the exact characteristics indicated here. As already pointed out, acidity and productivity may vary markedly within areas of the same type; and for that reason every field should be tested as recommended in the more detailed discussion of the type, and treatments should be based on the results of the tests.

It must also be remembered that soils differ in adaptation and in their response to soil treatment, and that these differences are not always definitely indicated by the productivity indexes. Since it would be impracticable to present such differences in terms of simple index numbers, readers must depend on the management discussion under each soil type for those details.

THE FOLLOWING PUBLICATIONS mentioned in this report may be obtained free of charge by addressing the UNIVERSITY OF ILLINOIS, COLLEGE OF AGRICULTURE, URBANA, ILLINOIS.

A Nitrogen Factory on Every Farm. C-326.
Test Your Soil for Acidity. C-346.
Testing Soil for Available Phosphorus. C-421.
Pasture Improvement and Management. C-465.
Sweet Clover in Illinois. B-394.

Farmers' Bulletin 1795, "Conserving Corn Belt Soil," may be obtained from the U. S. Department of Agriculture, Washington, D. C.

TABLE 2.—CUMBERLAND COUNTY SOILS: SUMMARY OF CHARACTERISTICS, PROPERTIES, AND ADAPTATION

Type No.	Type name	See page[1]	Topography[2]	Drainage[3]		Reaction	Available phosphorus	Organic matter	Productivity index[4]		
				Surface	Under				Field crops	Pasture	Forestry
2	Cisne silt loam	14	Nearly level to depressional	Slow	Very slow	Strongly acid	Low	Low	9	B	B
3	Hoyleton silt loam	16	Gently rolling	Moderate	Very slow	Strongly acid	Low	Low	8–9[5]	C	C
4	Walton silt loam	17	Rolling	Rapid	Slow	Medium to strongly acid	Low	Low	8–9[5]	C	B
8	Hickory gravelly loam, eroded	18	Steep	Excessive	Slow	.....	.....	Low	10	C	C
11	Loy silt loam	18	Nearly level	Very slow	Very slow	Strongly acid	Low	Low	10	C	C
12	Wynoose silt loam	19	Nearly level to undulating	Slow	Very slow	Strongly acid	Low	Low	9	C	C
13	Bluford silt loam	20	Gently rolling	Moderate	Slow	Strongly acid	Low	Low	8–10[5]	C	B
14	Ava silt loam	21	Rolling	Rapid	Moderately slow	Medium to strongly acid	Low	Low	8–10[5]	C	A
22	Westville silt loam	22	Undulating to rolling	Moderately rapid	Moderate	Acid	Low	Medium to low	5–7[5]	A	A
25	Hennepin gravelly loam, eroded	23	Steep	Excessive	Moderate	Neutral to slightly acid	.....	Low	10	C	A
46	Edina silt loam	24	Nearly level	Slow	Moderately slow	Medium acid	Medium to low	Medium	5	A	B
48	Ebbert silt loam	25	Nearly level	Slow	Moderately slow	Medium acid	Low	Low	7	B	A
51	Kern silt loam, terrace	25	Nearly level	Slow	Moderately slow	Medium acid	Low	Low	7	B	A
58	Osceola silt loam	25	Nearly level	Slow	Slow	Medium acid	Low	Low	6	B	B
70	Beaucoup clay loam, bottom	26	Nearly level to depressional	Slow	Slow	Medium to slightly acid	Medium	Medium	6	B	B
72	Sharon loam, bottom	26	Nearly level	Slow	Moderate	Medium acid to neutral	Medium	Low	4–6[6]	A	A
73	Huntsville loam, bottom	27	Nearly level	Slow	Moderate	Slightly acid	Medium	Medium	3–5[6]	A	A
81	Littleton silt loam, terrace	28	Undulating	Moderate	Moderate	Medium acid	Medium	Medium	3	..	..
108	Bonnie silt loam, bottom	28	Nearly level	Slow	Moderate	Medium acid	Low	Low	6–10[6]	B	A
112	Putnam silt loam	28	Nearly level	Slow	Slow	Acid	Low	Medium low	8	B	C
113	Cox silt loam	29	Gently rolling	Moderate	Slow	Acid	Low	Low	7	B	B

[1]For description of soil type turn to page indicated.

[2]Topography is expressed by the following terms based on the respective slopes: *nearly level*, less than .5 percent slope; *undulating*, .5 to 1.5 percent; *gently rolling*, 1.5 to 3.5 percent; *rolling*, 3.5 to 7 percent; *strongly rolling*, 7 to 15 percent; *steep*, greater than 15 percent.

[3]Of the terms used to express drainage, *moderate* expresses the most desirable drainage.

[4]The index number assigned to a soil type for production of field crops is based on the ability of the type to produce the major crops grown in the region, without soil treatment but with the soil in a cleared and drained condition. The scale used is 1 to 10, the *most productive soil* in the state being rated as 1 and the *least productive* as 10. The indexes for pasture and forest are indicated by A, B, and C, A signifying the best and C the poorest.

[5]Given variable rating because of differences in degree of erosion.

[6]Given variable rating because of variation in character of sediments and in drainage.

(Concluded on next page.)

TABLE 2.—CONCLUDED

Type No.	Type name	See page[1]	Topography[2]	Drainage[3]		Reaction	Available phosphorus	Organic matter	Productivity index[4]		
				Surface	Under				Field crops	Pasture	Forestry
134	Camden silt loam, terrace	30	Gently rolling	Moderate	Moderate	Medium acid	Low	Low	5–6[6]	B	A
138	Shiloh clay loam	30	Nearly level	Slow	Moderately slow	Slightly acid to neutral	Medium	High	3–4[6]	..	..
143	Ava sandy loam	31	Rolling	Rapid	Rapid	Acid	Low	Low	8	C	B
149	Brenton silt loam	32	Undulating	Moderate	Moderate	Slightly acid	Medium	Medium high	2	..	..
152	Drummer clay loam	32	Nearly level	Slow	Moderate	Neutral	Medium	Medium high	1	..	..
158	Vance silt loam	33	Gently rolling	Moderate	Moderate	Medium acid	Low	Low	5	B	A
207	Ward silt loam	33	Nearly level	Slow	Moderate	Medium acid	Low	Low	6	B	A
208	Sexton silt loam	34	Nearly level	Slow	Moderately slow	Acid	Low	Low	8	C	B
211	Tamms silt loam	34	Nearly level	Slow	Slow	Acid	Low	Low	8	C	B
212	Thebes silt loam	35	Undulating to rolling	Moderate	Moderate	Acid	Low	Low	7	C	A
213	Stolle fine sandy loam	35	Nearly level	Slow	Moderate	Acid	Low	Low	7	B	A
218	Newberry silt loam	35	Nearly level	Slow	Slow	Acid	Low	Low	7	B	C

[1]For description of soil type turn to page indicated.

[2]Topography is expressed by the following terms based on the respective slopes: *nearly level*, less than .5 percent slope; *undulating*, .5 to 1.5 percent; *gently rolling*, 1.5 to 3.5 percent; *rolling*, 3.5 to 7 percent; *strongly rolling*, 7 to 15 percent; *steep*, greater than 15 percent.

[3]Of the terms used to express drainage, *moderate* expresses the most desirable drainage.

[4]The index number assigned to a soil type for production of field crops is based on the ability of the type to produce the major crops grown in the region, without soil treatment but with the soil in a cleared and drained condition. The scale used is 1 to 10, the *most productive soil* in the state being rated as 1 and the *least productive* as 10. The indexes for pasture and forest are indicated by A, B, and C, A signifying the best and C the poorest.

[5]Given variable rating because of differences in degree of erosion.

[6]Given variable rating because of variation in character of sediments and in drainage.

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4 Sangamon, 1912
5 LaSalle, 1913
6 Knox, 1913
7 McDonough, 1913
8 Bond, 1913
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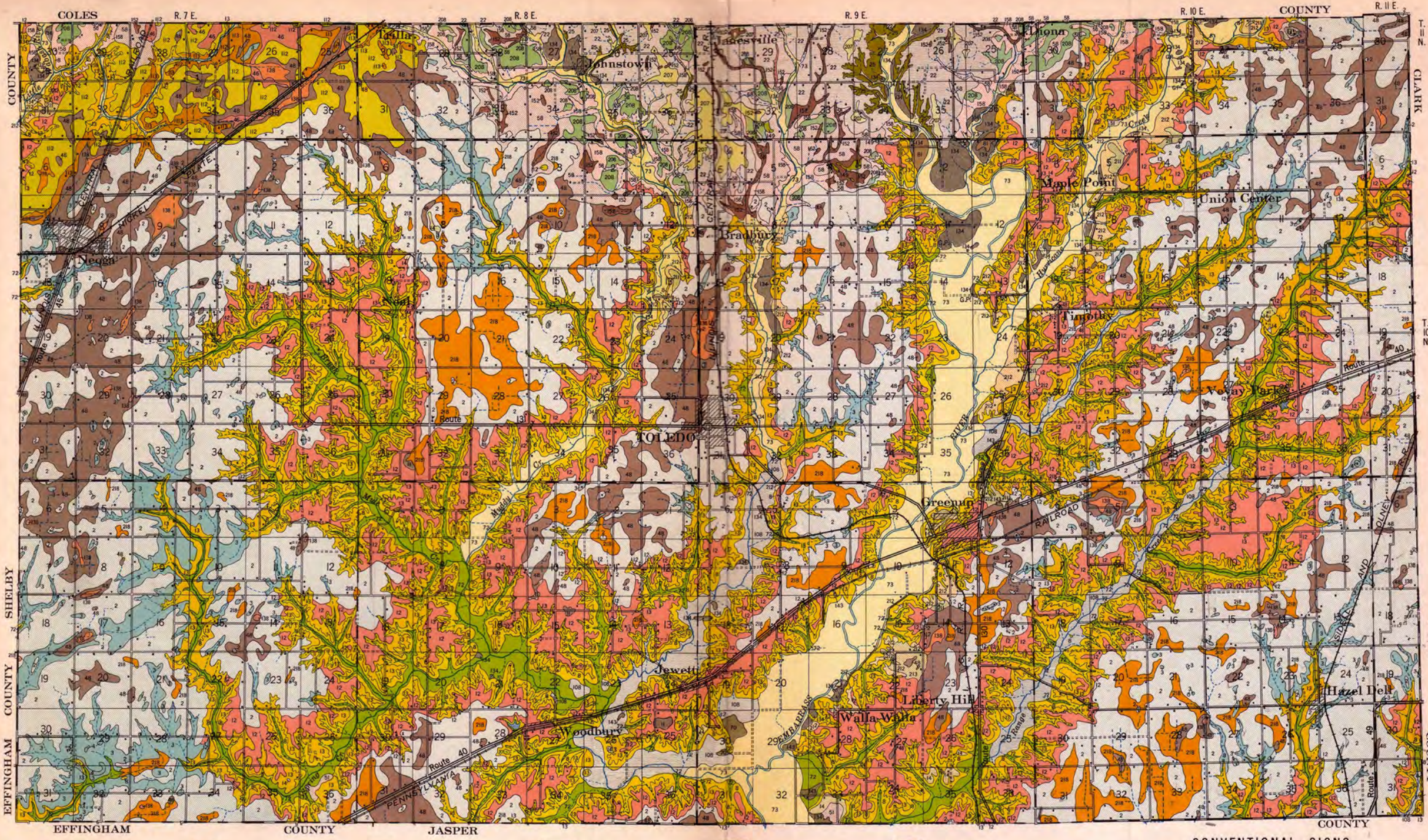
CUMBERLAND COUNTY SOIL MAP

THE LOCATION of each soil type in Cumberland county is shown on this map by a distinctive color and number. To help in locating a particular farm or region, various other identifying features such as streams, roads, railroads, towns, and even rural residences, schoolhouses, and churches are also indicated.

For a description of each soil type and a statement of its best use and recommended management, see pages 14 to 35, consulting *Contents,* page 2, for exact page references.



LEGEND

2	Cisne silt loam
3	Hoyleton silt loam
4	Walton silt loam
8	Hickory gravelly loam, eroded
11	Loy silt loam
12	Wynoose silt loam
13	Bluford silt loam
14	Ava silt loam
22	Westville silt loam
25	Hennepin gravelly loam, eroded
46	Edina silt loam
48	Ebbert silt loam
51	Kern silt loam, terrace
58	Osceola silt loam
70	Beaucoup clay loam, bottom
72	Sharon loam, bottom
73	Huntsville loam, bottom
81	Littleton silt loam, terrace
108	Bonnie silt loam, bottom
112	Putnam silt loam
113	Cox silt loam
134	Camden silt loam, terrace
138	Shiloh clay loam
143	Ava sandy loam
149	Brenton silt loam
152	Drummer clay loam
158	Vance silt loam
207	Ward silt loam
208	Sexton silt loam
211	Tamms silt loam
212	Thebes silt loam
213	Stolle fine sandy loam
218	Newberry silt loam

Scale

0 ¼ ½ 1 2 Miles

1933

CONVENTIONAL SIGNS

- House
- School house
- Church
- Store building
- Paved Through Routes
- Metalled (all weather) roads
- Improved Dirt Roads
- G. P. Gravel Pit
- Secondary Dirt and Private Roads
- Railroads (steam)
- Township boundary lines
- County boundary lines
- Streams (flowing)
- Streams (intermittent)
- Lake or Pond

R. S. Smith, In Charge Soil Survey
E. A. Norton, Inspector

SOIL SURVEY MAP OF CUMBERLAND COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION

Soils Surveyed by
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G. D. Smith
Herman Wascher, in Charge
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