UNIVERSITY OF ILLINOIS

Agricultural Experiment Station

SOIL REPORT No. 58

WASHINGTON 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 the most advantageous utilization of the land a definite knowledge of the existing kinds or types of soil is a first essential, and for any comprehensive plans for the improvement and the maintenance of our agricultural soils this knowledge is likewise necessary. 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 of improvement of his land. At the same time the Experiment Station is furnished an inventory of the soils of the state upon which intelligently to base plans for those fundamental investigations so necessary for solving the problems of practical soil improvement.

This county soil report is one of a series reporting the results of a 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 materials in it represent the contributions 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. In this connection special recognition is due Mr. D. C. Maxwell, who had charge of the field party in Washington county, and to Mr. E. A. Norton, inspector for the region in which this county is located.

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WASHINGTON COUNTY SOILS

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

GEOGRAPHICAL FEATURES

WASHINGTON COUNTY lies in the southwest part of Illinois with its center about 55 miles southeast of St. Louis, Missouri. It is rectangular in shape, with the exception of the northwest corner, where the boundary line is determined by the winding course of Kaskaskia river. The county is about 30 miles long and 20 miles wide and embraces about 550 square miles.

The first settlers in Washington county are reported to have founded their homes near the junction of Crooked creek and Kaskaskia river in about 1810.

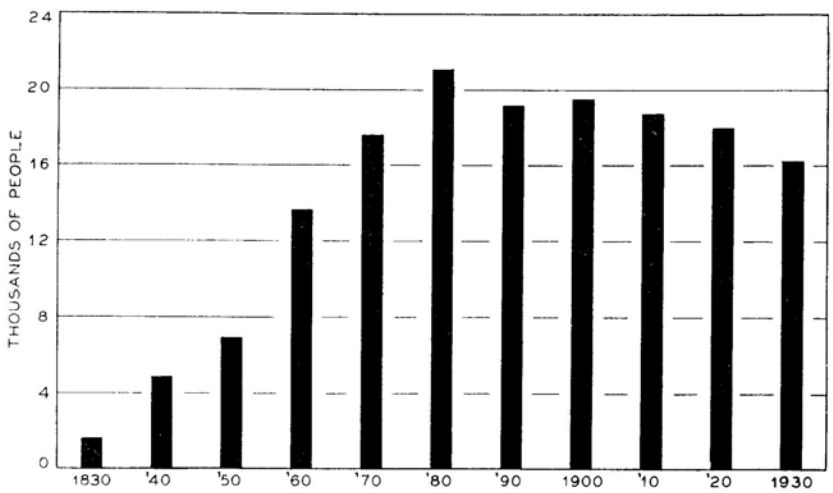

Fig. 1.—Growth of Population in Washington County

At the time of the first U. S. Census in 1830, Washington county had about 1,700 inhabitants. A hundred years later the number had increased to about 16,000. Altho it had reached its peak fifty years earlier, like other counties in Illinois that are predominantly rural there has been a material decline in population during the past several years coincident with the increases taking place in urban centers. *(Graph is based on figures from the U. S. Census)*

What is now Washington county was set off from Clinton county in 1827 and after considerable controversy the county seat was located at Nashville.

By 1830, according to the U. S. Census, there were about 1,700 inhabitants in the county. The number gradually increased until 1880, when more than 21,000 were reported. Since that time, however, the population has diminished, so that the 1930 Census shows only 16,286 inhabitants in the county (Fig. 1). The

[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 is dominantly rural and a large proportion of the people are of German descent.

Facilities for marketing agricultural products are well established. Two railroad trunk lines traverse the county diagonally, crossing at Nashville, and a north-south line cuts across the east side of the county. In addition to the railroads a paved highway providing trucking facilities runs thru the county direct to the St. Louis markets. The dirt roads are for the most part kept in fairly good condition.

Agricultural Production

Agriculture was the first, and has continued to be, the chief occupational interest of Washington county. The following information concerning agricul-

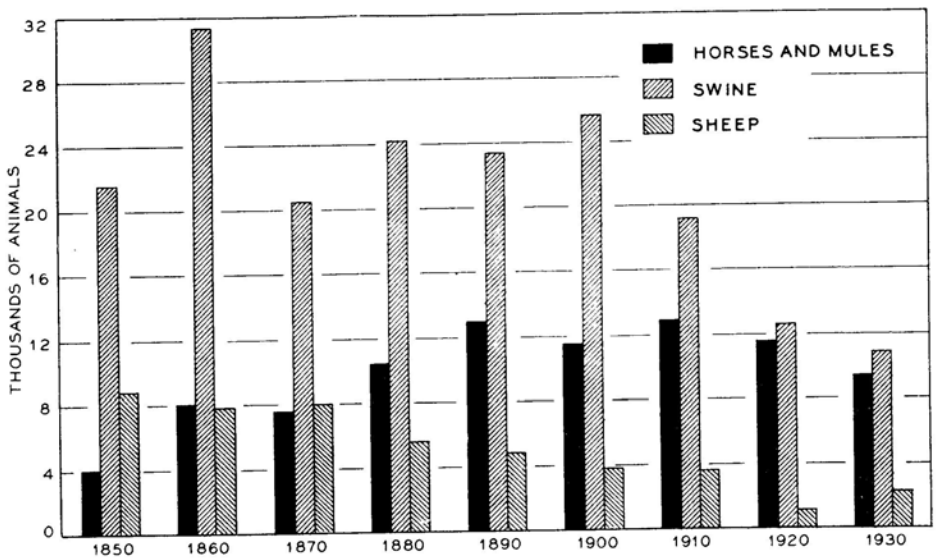

FIG. 2.—PRODUCTION OF PRINCIPAL CLASSES OF LIVESTOCK IN WASHINGTON COUNTY

The decline in sheep production since 1850, in horses and mules since 1910, and the marked decline in swine production since 1900 are to be noted. In animal production the dairy industry has become of chief interest, the number of cattle (not shown on the graph) being placed at 18,500 in 1936, of which 12,000 were reported as milking cows. *(Graph is based on figures from the U. S. Census)*

tural production is derived from reports in *Illinois Crop and Live Stock Statistics,* issued by the Illinois Department of Agriculture cooperating with the U. S. Department of Agriculture.

Winter wheat is the outstanding field crop from the standpoints of both acreage and value. The area given over to wheat production averages about 80,000 acres, altho the acreage fluctuates widely from year to year. The rate of yield is likewise extremely variable, ranging in a ten-year period from 7 bushels an acre to 23 bushels, with the average at 12.6 bushels.

About 38,000 acres, on the average, are devoted to corn production, and the average annual yield for a ten-year period has been 21.8 bushels an acre. This figure also fluctuates widely, one year in this period the average yield running as

high as 32 bushels an acre, while in two other years the yield went down to 8 bushels. These figures illustrate the great seasonal climatic variations in this region. About 36,000 acres are given over to oat production, and the average annual yield is about 24 bushels an acre. Very little of either barley or rye is seeded.

The acreage of legume crops has expanded remarkably during the past dozen or fifteen years. Washington county is now seeding each year about 15,000 acres of sweet clover. Approximately a thousand acres of alfalfa are being cut annually for hay. As a ten-year average, cowpeas have occupied about 15,000 acres, and now the more recently introduced soybean crop is grown on about 1,000 acres. These crops are especially valuable in dairy farming, but aside from this they might well take an important place in the cropping program where the soil type will permit their economic production.

A considerable acreage is devoted to the production of fruit. In 1929 there were produced, according to the Census report, about 30,000 bushels of apples, 80,000 bushels of peaches, and 20,000 bushels of pears. Grapes and strawberries were the most important small fruits marketed. Vegetable crops are given so little attention as to be of no commercial importance.

Some conception of the livestock interests of Washington county, both past and present, may be gained from Fig. 2, in which the numbers of horses and mules, sheep, and swine are represented graphically at ten-year intervals beginning with the year 1850.

The decrease in the number of horses and mules since 1910 reflects the rapid replacement of animal power by motor power, that has taken place on farms as well as in cities and towns during these later years. Few sheep have been kept in Washington county at any time, but the number reported in the early years was about four times that given for 1930.

The interest in swine production appears likewise to be diminishing when the number of swine in recent years is compared with that of former times. On account of an unexplainable discrepancy in the data on cattle in the earlier Census reports, it was considered not worth while to try to include in the livestock graph anything concerning cattle. However, estimates from the Illinois Crop Reporting Service for 1936 place the number of cattle at 18,500, of which 12,000 are enumerated as milking cows. On account of the proximity of the St. Louis market, the dairy industry in this section of the state has become one of chief interest. Nearly 4 million gallons of whole milk went to market from Washington county in 1929.

In considering the livestock resources of this county, poultry and egg production should not be overlooked, for these form a very important source of income.

Climate

The humid, temperate climate of Washington 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-year period from 1916 to 1935 inclusive, as taken from the records of the DuQuoin Weather Station located some 15 miles south of Washington county,

was 76.5° Fahrenheit, while that of winter was 31.7°. The highest temperature recorded during this period was 113°, observed in August, 1930, and the lowest was 19° below zero, in January of that same year, thus giving a spread within a single year of 132 degrees.

The average date of the last killing frost in spring during the twenty-year period was April 21; the earliest in the fall, October 18, giving an average frost-free season of 180 days. The shortest growing season recorded was 138 days in 1925 and the longest, 217 days, in 1933. The average length of growing season in this region gives ample time to mature the crops commonly grown, but occasionally, when the spring is wet and planting delayed, early frosts catch such crops as corn and soybeans before they have fully matured.

The average annual rainfall recorded at the DuQuoin Weather Station during the above mentioned twenty-year period was 35.75 inches. The yearly rainfall varied from a minimum of about 28 inches to a maximum of slightly more than 50 inches. Likewise there is a great variation in the rainfall for the growing season, April thru September, the amounts for the different years ranging from less than 10 to more than 32 inches. The total seasonal rainfall, however, is perhaps no more significant as a factor of moisture supply for growing crops than is its distribution over the season. Other important factors to be considered in this connection are the moisture requirements of the crop, the moisture absorbing and holding capacity of the soil, and the rate of evaporation.

The records at the different weather stations in this section of Illinois show numerous protracted rainless periods of a month or longer in which no single rain occurred that amounted to as much as half an inch.

At the DuQuoin Weather Station only one year in fifteen was free from at least one such drouth period. In 1930 an extreme case occurred when the entire season from April 1 to September 6 had only 2 rainfalls that measured as much as an inch. These few facts concerning the climate of the county will serve to indicate something of the uncertainty of the weather with which one living in this region must deal.

Topography and Drainage

The land surface of Washington county, altho somewhat diversified, exhibits no very great differences in elevation. This fact is brought out by the following figures showing altitudes taken at various places in the county: Nashville lies 503 feet above sea level; Plum Hill, 500 feet; Addieville, 467 feet; Okawville, 450 feet; Cordes, 514 feet; Ashley, 560 feet; and Richview, 547 feet.

The drainage of the greater portion of the county takes place thru numerous streams flowing either northward or westward into Kaskaskia river. Then about one-fourth of the area in the southeast part drains thru streams headed southward for Big Muddy river. Altho these streams are well distributed over the county and provide numerous outlets for the removal of excess surface water, yet on account of the nearly level topography, together with the impervious nature of much of the upland soil and some of the bottomland, a large portion of the land is poorly drained. Methods employed for improving the drainage are considered in the discussions of the respective individual soil types which follow.

FORMATION OF WASHINGTON COUNTY SOILS

Origin of Soil Material

The nature of the soils of a given region can be more readily understood if one has a knowledge of the formation and composition of the material from which they have been derived. The mineral material from which the soils of Washington county were developed was deposited during the Glacial epoch, and it was thru action in glacial times and subsequent erosion that the present topography was determined. The underlying bedrock, now exposed in a few places along the streams, served as a foundation for the loose, unconsolidated surface mantle but was only indirectly the source of the soil material.

The climate during the Glacial period was much colder than at present. Snow and ice collected in regions to the north in such an amount that the mass pushed outward from centers of accumulation, forming glaciers. These glaciers advanced chiefly southward, aided by further accumulation of snow and ice at their margins, 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 from the far north, the ice gathered up all sorts and sizes of materials, including clay, sand, gravel, boulders, and even immense masses of rock. Some of these materials were carried hundreds of miles frozen in the ice. They rubbed against surface rocks and against each other until much of the material was ground into powder. The great bulk of material carried, however, was derived from the loose surface mantle and old bedrock material and deposited within a few miles of its origin. Under the enormous pressure of the ice, hills were leveled off and old valleys filled in, thus greatly changing the features of the surface over which the ice had passed. The few knolls and ridges which appear prominent on the otherwise nearly level surface were made by glacial deposition. The deposit of rock material left by the glacier is known as glacial till, glacial drift, or boulder clay—terms which frequently appear in the description of soils.

There were four great periods during which ice sheets moved down from the north. The movements were separated by long intervals of time during which the climate was warm enough for the country to become clothed with vegetation. Probably only two glaciers covered Washington county, the later one, the Illinoian, which was the third great ice advance, completely burying or destroying the deposits left by an earlier invasion.

Associated with the oncoming and withdrawal of an ice sheet was the accumulation of a silty, wind-blown deposit known as loess. This material was derived largely from the fine sediment deposited from the immense volumes of water which flowed from the melting ice. This water filled the drainage channels and overflowed adjacent lowlands. Following each flood stage, the water would recede and the sediment which had been deposited would dry and be picked up by the wind, blown over and redeposited on the upland as dust. Undoubtedly some fine material was also left directly on the surface by the receding ice, and more accumulated as weathering broke down the larger particles.

The thickness of the loess in this county, except where it has been removed by erosion, varies from a minimum of about 4 feet in the eastern part to a maximum of 12 feet in the western part of the county. Altho the last glaciation,

known as the Wisconsin, did not move far enough south to reach Washington county, it did cover the headwaters of both Mississippi and Kaskaskia rivers and it must have furnished the sediment to these valleys from which the most recent portion of the loess covering was derived.

It is generally recognized locally that the soils become progressively more productive from east to west across the county. The explanation for this is found in the greater depth of loess, as well as in the larger amount of more recently deposited loess, in passing from east to west. As a result of these two conditions the prairie soils especially contain more organic matter and are better supplied with plant-food elements in the western part of the county than are those in the eastern part. The timber soils, represented chiefly by Types 13 and 14, are likewise somewhat better in the western than in the eastern part of the county, altho the difference is not so pronounced as in the prairie types and is much more difficult to see.

How the Soils Were Developed

Immediately upon the deposition of the soil material the soil-forming processes began to change it into soil. When first deposited, the raw loess was pale yel-

FIG. 3.—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, displaying the arrangement of these horizons from the surface down, is called the "soil profile."

lowish in color, of an open, porous structure, high in carbonates, and amply supplied with the mineral elements of plant food. The weathering processes did not act alike everywhere, because of differences in the slope of the land, in amounts of moisture present, in vegetation, and in certain other factors. The effect of these differences became more and more pronounced as the weathering

action continued, until finally soil "individuals" or soil types, each with its own peculiar characteristics, were evolved.

During the early stages in the life history of soils their distinguishing features are not clearly developed and such soils are said to be young or to be in an early stage of development. The soils of Washington county vary greatly in stages of development. Bottomland soils receiving frequent deposition, as well as those subject to rapid erosion, show little development because the material has either just recently been deposited or else recently uncovered so that in either case the weathering processes have not had long to act. The upland soils, except those which have been eroded, vary in stage of development from those not having distinct horizons to those with strongly developed surface, subsurface, and subsoil zones. These differences are due to differences in the intensity of the action of the weathering forces and also to the differences in the age of the soil material from which the soils have developed.

The changes which have taken place in the development of soils from the loess deposited in this region are exceedingly complex. Numerous processes have been at work breaking down the minerals in the soil material, thus freeing elements of plant food. The dissolving and leaching of the more or less soluble constituents, including the limestone particles, results in the development of acidity and an impoverished condition of the soil. The very fine clay particles, formed as the soil material weathers, move downward and, under conditions of slow subsurface drainage, accumulate in the subsoil forming an almost impervious claypan, locally known as "hardpan."

Early in the history of this weathering process plant seeds were distributed by various natural agencies and vegetation spread over the land. The simpler forms of vegetation came first, followed by the higher plants as rapid chemical decomposition made an abundance of plant nutrients available. The growth of plants and the slow decay of their tissues resulted in the incorporation of more or less organic matter in the surface soil.

The original nearly-level surface was more favorable for the development of grass vegetation than for forest, but as streams were extended and drainage improved, forests began to encroach on the prairie. The extension of the forests continued until stopped by the clearing and tillage operations of the white man.

The grass vegetation, with its enormous quantity of surface roots, together with the original high lime and moisture content in the soil material, soon resulted in the accumulation of organic matter and the development of a dark-colored surface soil. At this early stage the soils of Washington county were probably as productive as any now existing in the state. As weathering continued and acidity developed, the supply of available plant nutrients diminished so that the soil was no longer able to support a luxuriant vegetation and organic-matter destruction overtook accumulation, reducing the once dark-brown surface color to brownish gray and gray. The soils on areas covered by timber became even lighter colored than those on the prairie because the growth of trees produced conditions which accelerated organic-matter destruction and the forest residue decayed too fast to add much organic matter to the soil to replace that lost by decomposition.

One of the most pronounced and universal effects of the weathering of soil material is the production of layers, or zones, in the soil, each zone having more

or less definite characteristics. From a practical standpoint these various zones can be grouped into surface, subsurface, and subsoil. The subsoil often has two major divisions. The upper subsoil is the most compact and plastic zone in the soil, the lower subsoil is usually more friable than the upper. These layers or zones taken together constitute the "soil profile."

Differences in the arrangement, in the thickness, and in the nature of the features of the respective zones constitute the basis upon which soil types are differentiated and the soil map constructed.

SOIL CLASSIFICATION AND MAPPING

In the soil survey the "type" is the unit of classification. Each soil type has definite characteristics upon which its separation from other types is based. These characteristics are inherent in the strata or horizons which constitute the soil profile in all mature soils. Among them may be mentioned color, structure, texture, and chemical composition. Topography, as well as kind and character of vegetation, are easily observable features of the landscape which are very useful indicators of soil character. A knowledge of the geological origin and formation of the soil material of a region often makes possible an understanding of the soil conditions that exist.

Failure to appreciate the fact that soil types are differentiated on the basis of the character of the entire soil section, and not of the surface alone, often makes it difficult to understand what is meant by "soil type." It frequently happens that the surface stratum of one soil type is no different from that of another soil type, and yet the two types may be widely different in character as well as in agricultural value. It is of utmost importance in studying soil-type descriptions to get a clear mental picture of the outstanding features of each type.

Each soil type is given a name and also a number, the number being used on the map and both the number and name being given in the legend on the map.

Table 1 gives the list of soil types as mapped in Washington county, the area of each in square miles as well as in acres, and also the percentage that each type constitutes of the total area of the county. The accompanying soil map, shown in two sections, gives the location and boundary of each soil type and indicates the position of streams, roads, railroads, and towns.

DESCRIPTION OF SOIL TYPES

A brief description of the outstanding characteristics, together with some general recommendations on the use, care, and management of each soil type as mapped in Washington county, are given in the following pages. This information is summarized in Table 2 (page 25).

The recommendations made for the utilization of soils is based on their capacity to produce the crops common to the region, as determined by the inherent characteristics of the soil.

To outline a complete soil-improvement and management program for a field or farm, one would need to know not only what soil types are involved, but also what cropping and management practices have been followed in the past, as well

as what type of farming is intended to be followed in the future. Obviously, all these details are not available. The purpose of this report, however, is to furnish the necessary information about soil types and to indicate the main factors that should be considered in developing a soil-treatment and management program for a given type. For example, the necessity of recognizing the soil type as a basis for working out a soil-improvement program may be illustrated by the fact that the drainage of upland soils developed on nearly level surfaces in Washington county is so different from that of upland soils developed on rolling surfaces that the management program is altogether different in the two cases. In the improvement of the upland soils developed on nearly level topography, the first considera-

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

Type No.	Type name	Area in square miles	Area in acres	Percent of total area
1	Rinard silt loam	1.18	755.2	.2
2	Cisne silt loam	81.77	52 332.8	14.7
3	Hoyleton silt loam	98.79	63 225.6	17.8
4	Walton silt loam	10.47	6 700.8	1.9
8	Eroded gravelly loam	20.44	13 081.6	3.7
11	Loy silt loam	.86	550.4	.2
12	Wynoose silt loam	67.65	43 296.0	12.2
13	Bluford silt loam	103.58	66 291.2	18.6
14	Ava silt loam	5.96	3 814.4	1.1
26	Wagner silt loam (terrace)	3.09	1 977.6	.6
48	Ebbert silt loam	2.88	1 843.2	.5
72	Sharon silt loam (first bottom)	21.43	13 715.2	3.9
84	Okaw silt loam (terrace)	4.34	2 777.6	.8
108	Bonnie silt loam (first bottom)	47.18	30 195.2	8.5
110	Venedy silt loam (terrace)	.57	364.8	.1
112	Putnam silt loam	72.67	46 508.8	13.1
113	Cox silt loam	8.73	5 587.2	1.5
127	Harrison silt loam	.88	563.2	.2
128	Douglas silt loam	1.94	1 241.6	.3
	Water	.20	128.0	.1
	Total	554.61	354 950.4	100.0

tion is to remove the excess surface water which, because of an almost impervious subsoil, cannot be removed by underdrainage, while on the upland soils developed on rolling surfaces the main problem is to retard the rate of surface run-off and to increase water absorption, thereby reducing erosion.

As an aid in determining differences in the degree of acidity in soils and in the amounts of some of the essential plant-food elements present in them, certain relatively simple and rapid chemical tests have been devised. It is recommended that these tests be made on fields where treatment to increase productivity is being planned. These tests are explained in the following publications of this Experiment Station:

Circular 346—"Test Your Soil for Acidity."
Circular 421—"Testing Soil for Available Phosphorus."
Mimeographed folder—"The Illinois Potash Test."

These publications, as well as any others which may be mentioned, can be obtained, free of charge, on request to the Agricultural Experiment Station, University of Illinois, Urbana, Illinois.

Rinard silt loam (1)

Rinard silt loam occurs in shallow, basin-like depressions at the heads of drainage and on the nearly level uplands. It occupies 1.18 square miles and is found in small isolated areas in different parts of the county. The surface material of this soil is mostly silt which has accumulated by sheet erosion from surrounding higher land. It has developed under high moisture conditions and still drains very slowly because of the slow permeability of the subsoil and because of its topographic position.

The surface soil is a light brownish-gray friable silt loam about 6 to 8 inches thick. Small, hard, rounded, black pellets or concretions are abundant on the surface and throughout the profile. The thick subsurface layer is a light-gray silt loam. The lower part is ash-like and almost white. The subsoil begins at depths of 22 to 28 inches, depending on the amount of silt accumulated on the surface. The subsoil is a pale yellowish gray, very compact and plastic in its upper part and more friable in the lower part. Small slick spots, or scalds, the characteristics of which are described under Type 2, frequently occur in this type.

Rinard silt loam is strongly acid both in the surface and subsoil except in the above-mentioned slick spots, where the subsoil usually has an alkaline reaction. The amounts of phosphorus and potassium available for plant growth are insufficient for good crop yields. The organic-matter and nitrogen contents of the surface soil are low.

Use and Management.—Rinard silt loam produces moderate yields in seasons of well-distributed but not excessive rainfall. That partial or total crop failures are likely to be frequent should be kept in mind when the adoption of a soil-improvement program is being considered. If good furrow and open-ditch drainage can be provided, the next step is to test for the lime requirement as directed in Illinois Circular 346. Following the application of limestone, sweet clover should be seeded, and this crop may be followed with corn for one year, after which a small grain and sweet clover should again be seeded. After sweet clover has been grown two or three times, the use of potash and possibly a phosphate fertilizer is likely to be advisable.

Cisne silt loam (2)

Cisne silt loam occurs on nearly level prairie land and is well distributed thruout the county except in the northwest portion. It is one of the more prevalent soil types, covering altogether more than 80 square miles, or nearly 15 percent of the total area of Washington county. This type has developed under a prairie-grass vegetation and is characterized by an almost impervious subsoil. The soil drains very slowly and is often wet and cold in the spring. Slick spots frequently occur in conjunction with this soil type, and where they are so abundant as to occupy over 50 percent of the area, this condition is indicated on the soil map by crosshatching. This soil is strongly leached, and the amount of plant food available to crops each year is relatively small.

The surface soil is 5 to 7 inches thick and is a light brownish-gray friable silt loam. The upper part of the subsurface is light gray and the lower part

almost white and ash-like. Numerous small, hard, rounded, black pellets of iron and manganese are present in the surface and subsurface. The subsoil begins at 18 to 22 inches and is a pale yellowish-gray very compact and plastic clay. Below 40 to 42 inches it is less compact and plastic and more yellowish in color. The material becomes somewhat sandy and gravelly below 48 to 55 inches.

Slick Spots.—The slick spots, commonly known as scalds or alkali spots, can be recognized by their lighter colored surface soil, the pale yellowish or greenish-gray color of their subsoil, and the poor plant growth or absence of plant growth on them. Rounded gray pellets or concretions of calcium carbonate about the size of a marble are present in places in the subsoil. The subsoil is very tough and is exposed on the surface in places where sheet erosion has been active. In many other places the true surface soil is very thin. Underdrainage is extremely slow.

FIG. 4.—COLUMNAR STRUCTURE IN THE SUBSOIL OF A SLICK SPOT

This distinctly columnar formation occurs just beneath the surface horizons in slick-spot areas. The subsoil is very tough and, where sheet erosion has been active, it is exposed on the surface. In many other places the surface soil is very thin. Underdrainage is extremely slow.

When dry, slick spots are very hard; they resist the penetration of water and, when the land is being worked, they tend to throw the plow out of the ground. When thoroly soaked with water they offer little resistance to pressure and form many of the bad mud holes in the roads. The surface soil of slick spots is commonly acid, but in correcting this condition a minimum amount of lime should be used, for the lower strata are likely to have a highly alkaline reaction.

Use and Management.—Even when drained by furrows and open ditches and well farmed, but without soil treatment of any kind, the producing capacity of Cisne silt loam is low. Under these conditions the average yield of corn cannot be expected to exceed about 15 bushels an acre and 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 yield of corn should be about 30 to 35 bushels and wheat 15 to 20 bushels an acre. There are reasons for thinking that the best use of this

soil might be for meadow and pasture, tho even when used for these purposes the need for limestone should be recognized.

The improvement of this soil, which is low in organic matter and nitrogen, strongly acid, and will not underdrain, 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 suggested in Illinois Circular 346, and limestone applied in accordance with the results of the tests. 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 in farming this soil. These spots vary in size, abundance, and in harmfulness. When they occupy 50 percent or more of the surface, they are shown on the soil map by crosshatching. It is suggested that where a slick spot is large enough to warrant separate treatment, enough limestone be applied to grow sweet clover, and that the sweet clover be allowed to reseed itself for a number of years before cultivation is attempted.

Hoyleton silt loam (3)

Hoyleton silt loam occurs extensively thruout Washington county excepting in the northwest part, occupying nearly 100 square miles, or about 18 percent of the total area of the county. It has good surface drainage but very slow underdrainage and will not tile. Slick spots occur in conjunction with this soil, altho they are not so numerous nor so large as in the preceding type, Cisne silt loam.

The surface soil 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 mottling. 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 the subsoil becomes more friable and is brighter colored.

Use and Management.—The productivity of this soil when untreated is about the same as that of the preceding type, Cisne silt loam, but because it is developed on slight slopes, thus providing good surface drainage, it is more responsive to soil treatment than is Cisne.

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, when supplemented either by manure or potash fertilizer, should build up this soil so that an average of 20 to 25 bushels of wheat and 35 to 40 bushels of corn an acre can be expected, according to the results from the Ewing experiment field, a part of which is located on this same soil type. The results from the Ewing field indicate clearly that unless manure is available for use, it is necessary 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.

Walton silt loam (4)

Walton silt loam is found mainly in the eastern half of Washington county on rolling knolls which stand out above the surrounding flat land, and occupies a little over 10 square miles. Altho this is considered to be a grassland soil, most of these knolls were at one time covered with a growth of brush and scattering

trees such as locust, elm, and wild cherry. This soil has good surface drainage and fair underdrainage.

The thin surface soil is a yellowish-gray silt loam. The subsurface is yellow with dull red splotches. The subsoil, beginning at 11 to 13 inches, is a medium-compact, slightly plastic, reddish-yellow clay loam, becoming friable below 21 inches.

Use and Management.—In cultivating this soil precaution must be observed to prevent sheet erosion and gullying because of the rapid surface-water run-off. When cultivated it 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. This soil is not well adapted to terracing because of its shallowness. The organic-matter content should be increased by plowing under animal manure or green manuring crops. The soil is acid and if a legume, such as sweet clover, is 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 a test indicates the need, would be advisable if wheat and legumes are grown. After proper treatment, including phosphate as well as limestone, this soil will grow alfalfa successfully. It is also adapted to small grains, orchard crops, small fruits, and vegetables. The yield of corn is often cut by summer drouths.

Eroded gravelly loam (8)

Eroded gravelly loam occupies over 20 square miles, or 3.7 percent of the total area of Washington county. It occurs along stream courses on the short, steep slopes between bottom and upland. The wind-blown silt that originally covered these slopes has been eroded away and the weathered, sandy, gravelly glacial till forms the present soil material. Eroded gravelly loam shows no soil development because erosion removes the surface material faster than soil is developed.

Use and Management.—On account of erosion this type cannot be successfully cultivated. Neither does it make good pasture land because it not only erodes but is also low in organic matter and available plant-food elements. It is likely that with proper treatment some areas of this soil may be successfully used for pasture but in the main they should be kept in timber. Information about the planting and care of a woodlot and the harvesting of its growth can be obtained by writing to the Illinois Agricultural Experiment Station.

Loy silt loam (11)

Loy silt loam is a type found in small patches in different parts of Washington county in association with Wynoose silt loam. It occupies, all told, somewhat less than a square mile. The soil is very poorly drained and unproductive. It is now, or has been, largely occupied by timber, mainly post oak and hickory.

The thin surface soil varies in color from gray to light brownish gray and in texture it is a friable silt loam. The subsurface is a light-gray, ashy, friable silt loam. The subsoil, encountered at about 20 inches, is a highly plastic, almost impervious tight clay the color of which is a yellowish slate-gray mottled with pale yellow. The lower subsoil, below 34 inches, is light yellowish gray in color with yellow mottling, and in texture, it is a silty clay loam.

Use and Management.—The difficulty of establishing drainage, the prevalence of slick spots, the low organic-matter content, and the high degree of acidity make a discouraging combination in considering any soil-improvement program for this soil type, and it is questionable how much expense should be incurred in attempting such a program. The soil gives fair response to limestone if sweet clover is grown and plowed under as a green manure. The land can be kept in grass to serve as pasture or it can be replanted to timber.

Wynoose silt loam (12)

Wynoose silt loam occurs on the nearly level, slowly drained upland that is now, or was formerly, covered by oak and hickory timber. It is found on the outer timber belt along the streams in all parts of Washington county, and occu-

FIG. 5.—CORN ON THE RALEIGH FIELD WITH AND WITHOUT SOIL TREATMENT

At the right no treatment has been applied; at the left, manure, limestone, and phosphate have been used. The major effect has been produced by the limestone and manure. The Raleigh experiment field is located on a soil type similar to Wynoose silt loam, mature phase.

pies a total area of about 68 square miles. It is characterized by an almost impervious subsoil. Small slick spots are commonly found in association with this type, and in many other respects the type closely resembles Cisne silt loam, already described.

The surface soil is a light brownish-gray friable silt loam having a pale yellow cast and is 4 to 6 inches thick. The subsurface is pale yellowish gray in the upper part and light gray and ash-like in the lower part. The subsoil, beginning at 17 to 21 inches, is a pale yellowish-gray, very compact and plastic clay,

becoming less compact below 40 to 42 inches. Sandy, gravelly material is present below 50 to 55 inches.

Use and Management.—The productivity of this soil when untreated is very low for grain crops. The untreated plots at the Raleigh soil experiment field, which is located on soil similar to this type, have averaged only about 4 bushels of wheat and less than 14 bushels of corn an acre a year. The lack of sufficient slope to carry away surface water and the impervious nature of the claypan subsoil make the drainage problem difficult. However, the fact that most of the areas of this type in Washington county are within a short distance of an established drainage channel makes it possible to secure satisfactory surface drainage in most cases by means of open ditches and furrows. All attempts to tile this land have been unsuccessful because of the slowly pervious subsoil. Not only does the subsoil impede the downward movement of moisture, but it also restricts the penetration of roots, thus causing shallow rooting.

Wynoose silt loam is low in organic matter and nitrogen and furthermore it is strongly acid. 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 soil type have proved lime to be the basic treatment for soil improvement. Satisfying the lime requirement will make it possible to grow and turn under sweet clover, and thus increase the organic-matter and nitrogen contents. Limestone and sweet clover have increased the yields on the Raleigh experiment field to an average of about 12 bushels of wheat, 22 bushels of oats, and 35 bushels of corn an acre a year. The use of the mineral fertilizers, phosphorus and potassium, in addition to legumes and lime, has raised the yield of wheat, as an average of 10 crops, to 18 bushels an acre, while the yield of 12 consecutive crops of corn has been raised to 47 bushels an acre.

In the absence of soil treatment, the growing of redtop for seed has, in recent years, proved the best way to utilize this land. Corn is an uncertain crop on untreated land. Because of poor drainage, alfalfa usually fails even after the lime requirement has been satisfied and phosphorus has been applied. Perhaps untreated land might be used to the best advantage as pasture.

Bluford silt loam (13)

Bluford silt loam is found along the stream courses thruout Washington county. It occurs on gently rolling topography and is now, or was formerly, covered by timber. It is the most extensive soil type in the county, covering more than 100 square miles, or nearly one-fifth of the total area. It has moderately rapid surface drainage but due to a compact subsoil underdrainage is relatively slow. Sheet erosion on the more rolling slopes in cultivated fields is a serious problem and there are many places where small gullies have already become established.

The surface soil is a brownish-gray friable silt loam. It is 6 to 7 inches thick except where sheet erosion has removed some of the material. The subsurface is yellowish gray in the upper part and pale yellow to almost gray in the lower part. The subsoil, beginning at 15 to 18 inches, is a medium-compact and plastic, grayish-yellow clay loam. Below 40 to 44 inches the material becomes less compact, and some sand and gravel appear at 50 to 55 inches.

Use and Management.—An efficient soil-management program for Bluford silt loam must take into consideration the improvement of drainage and the checking of sheet erosion. The application of limestone and fertilizers according to the needs as indicated by the proper tests will make possible the vigorous growth of vegetation, including legumes. This soil has good surface drainage but underdrainage is slow because of the slowly pervious subsoil. This characteristic makes it necessary to remove surplus water by means of furrows and open ditches. Tile will work if placed shallow and close together.

Sheet erosion on this soil is very harmful. It may be largely controlled, however, by a good vegetative growth, as above indicated. The establishment of such a protective covering should be supplemented by contour tillage and, in some cases, by constructing diversion ditches and terraces.

FIG. 6.—ALFALFA ON BLUFORD SILT LOAM

This thrifty field of alfalfa was found in a neighboring county growing on Bluford silt loam. The pictures shows the possibility of successful production of this valuable crop on this soil type where the land has been properly treated.

This soil, while relatively unproductive when untreated and farmed in the way common to the region, does respond well to good management. It should be tested for degree of acidity, as explained in Circular 346, and then limestone should be applied as indicated by the test. With sufficient limestone, a thrifty growth of sweet clover should be obtained. For example, on the Ewing experiment field on plots, where the soil responds in a manner similar to Bluford silt loam, the limestone-legume treatment in a long-time test has raised the annual acre-yield of corn from 13 bushels to 27 bushels and of wheat from 4 bushels to 21 bushels. Additional treatment in which phosphorus and potassium have been used has brought the yield of corn to 48 bushels and of wheat to 28 bushels an acre.

Ava silt loam (14)

Ava silt loam is found on the knolls and low ridges of glacial origin scattered in rather small tracts about Washington county. It occupies nearly 6 square miles in total area. This soil is characterized by an open, reddish-yellow subsoil. It

has excellent surface drainage and good underdrainage but is subject to severe erosion when cultivated. It was originally covered with forest vegetation, most of which has been cleared off for farming.

The surface soil is a brownish-yellow friable silt loam varying from 4 to 6 inches in thickness depending on the amount of material removed from the surface by sheet erosion. The subsurface is friable and yellow. The subsoil begins at 12 to 14 inches below the surface. Its upper part is a reddish-yellow, slightly compact, nonplastic silty clay loam which, upon rupture, breaks into large granules. The lower subsoil, beginning at 22 to 28 inches, is more compact than the upper and the particles have a thin gray coating. Below 38 to 42 inches the material becomes friable and loose.

Use and Management.—When Ava silt loam is used for farming, the first concern should be to protect it from erosion. Terraces can be built, as suggested in Circular 290, to check the runoff, and all farming operations should be done on the contour. To be effective, however, these measures must be supplemented by soil treatment, in order to make vigorous plant growth possible. Turning under animal manures and green manuring crops will lessen the tendency to erode.

This soil is medium to strongly acid both in the surface and in the subsoil. If red clover or sweet clover is to be grown, each field should be tested for acidity, as explained in Circular 346, and limestone applied as the test indicates. These legumes, especially sweet clover, are good green manuring crops to use in building up the producing capacity of this soil. The addition of a phosphate fertilizer will probably give a good return, particularly if legumes or wheat are grown. It would be advisable, however, to test for available phosphorus, as explained in Circular 421 of this Station, "Testing Soil for Available Phosphorus," before applying a phosphorus fertilizer. Alfalfa will do well on this soil following liming and phosphating, altho exceptionally dry summers are likely to reduce the yields somewhat.

On this soil winter grains and grass crops should predominate in the crop rotation. Corn will yield satisfactorily except in dry summers, but corn should not be grown more than once in four years. Because it dries out early in spring and has good air drainage, this soil is well adapted to vegetable, small fruit, and orchard crops.

Wagner silt loam (terrace) (26)

Two areas of Wagner silt loam (terrace), covering in total about 3 square miles, are found in the northwest corner of Washington county along the Kaskaskia valley. This type represents a second bottomland formation. The land, for the most part, is not subject to frequent overflow, altho when the floods are high most of it is covered with water for a short time.

The surface soil is a dark-gray friable silt loam. The subsurface is light gray with a yellowish cast. The subsoil begins at 14 to 28 inches and is a pale drabbish-gray, compact and plastic clay.

Use and Management.—Drainage is the most important consideration in the management of this land. Drainage, however, is difficult to obtain not only on account of the level surface, but also because of the impervious nature of the substratum. Unless drainage is possible, no attempt should be made in the way

of soil treatment. Suggestions for management given in the discussion of Type 1 (page 12) will apply also to this type.

Ebbert silt loam (48)

Ebbert silt loam is found in shallow depressions in the uplands that were formerly somewhat swampy. Several isolated tracts in the western part of Washington county make up a total area of nearly 3 square miles. This soil is naturally poorly drained altho the drainage can be improved by artificial means. Numerous slick spots occur in association with this soil.

The surface soil is a grayish-drab friable silt loam varying from 7 to 10 inches in thickness. The subsurface is a light drabbish-gray, spotted-with-yellow, friable silt loam. The subsoil, beginning at about 18 inches, is a medium-compact and plastic silty clay loam, gray in color, spotted with yellow. Below about 28 inches the material becomes more friable and is pale yellowish in color.

Use and Management.—This soil 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 most soils in this county. 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, should be on a trial basis. This soil when treated is adapted to the growing of the grain crops common to the region. Corn yields on slick spots are unsatisfactory. In fields where slick spots predominate corn should probably be excluded from the rotation.

Sharon silt loam (first bottom) (72)

Sharon silt loam (first bottom) is found in small stream bottomlands thruout Washington county and is subject to frequent overflow following heavy rains. Almost every overflow brings a deposit of new material. The soil is therefore young and consequently has little or no profile development. It is a mixture of sand, silt, and clay materials. About 21 square miles of this soil type have been mapped in the county.

Use and Management.—In view of its frequent overflow, no soil treatment is suggested for this type, since new material is constantly being brought in and deposited. The addition of this new soil material serves to keep up the productive level. Unless the land can be protected from overflow, corn, soybeans, and other short-season summer crops should be grown.

Okaw silt loam (terrace) (84)

Okaw silt loam (terrace) occurs in the northwest part of the county along Kaskaskia river. The type has been formed by the deposition of a silty layer over a heavy clay. It is subject to overflow during flood times and drains very slowly. Somewhat over 4 square miles in Washington county are included in this type.

The surface soil is a pale yellowish-gray silt loam 2 to 4 inches thick. The

subsurface is an ashy-gray silt loam varying from 2 to 18 inches in thickness. The subsoil is a heavy, plastic, pale yellowish-gray clay varying from 5 to 12 feet or more in thickness.

Use and Management.—The value of this soil for farming is very low because of the impossibility of securing adequate drainage. It is doubtful whether any efforts should be spent in improving this land as there is no indication that they would be successful. The areas should be devoted to the growing of timber or they may serve as pasture or meadow.

Bonnie silt loam (first bottom) (108)

Bonnie silt loam (first bottom) constitutes one of the more extensive soil types in Washington county, occupying about 47 square miles or more than 8 percent of the total area. This type is found in the larger bottomlands along the major streams. These bottomlands are nearly level. They flood frequently, drain out slowly, and are often swampy. The material which forms this soil is

FIG. 7.—A TYPICAL PIECE OF BONNIE SILT LOAM

This is one of the more extensive soil types in Washington county, occupying the broad bottoms of the principal streams. It is usually covered by alternating swamp and timber, with here and there a small patch of cultivated ground.

largely silt brought down from upstream and surrounding uplands. The soil is youthful because it is continually receiving new deposits from the overflow waters.

The surface soil is a dark-gray friable silt loam varying from 6 to 10 inches in thickness. In places sand and a few small pebbles are mixed with the silty material. Numerous small, hard round pellets of iron and manganese are frequently found scattered thruout the soil. The material becomes lighter in color below the surface and runs silty to a considerable depth. No true subsoil has developed.

Use and Management.—Frequent overflows and slow drainage limit the use of this soil type mainly to pasture and timber, except in those areas protected by levee. Unless the soil can be adequately drained it probably is best to leave it in timber or, if already cleared, to replant it with trees. Where a good outlet can be obtained and there is sufficient slope for water to flow, surface ditches will

drain this soil so that corn, cowpeas, soybeans, and other short-season crops can be successfully grown. The average loss of a summer crop by flooding is about one out of five. If adequate drainage can be established, so as to justify soil improvement, the land should be tested for acidity, as explained in Circular 346, and limestone applied according to the test. Sweet clover or some other legume can then be grown and plowed under in order to increase the organic-matter and nitrogen contents.

Venedy silt loam (terrace) (110)

A single area of Venedy silt loam (terrace) is mapped in Washington county. This tract of 365 acres lies close to the north border, midway between the east and west sides of the county. This land is subject to overflow during flood times as it lies but slightly higher than the adjacent bottom, but fortunately the water does not stand on the soil for long periods. Natural drainage is slow because of the lack of an outlet for the water, but the soil can be satisfactorily drained if an outlet is established.

The surface soil is a friable drabbish-brown silt loam 7 to 9 inches thick. It has a grayish cast when dry. The subsurface is dark gray in color and friable tho slightly heavier in texture than the surface. In a few places the lower subsurface is grayish yellow and silty in texture. The subsoil, beginning at about 18 inches, is a drabbish-yellow, slightly compact, medium-plastic clay loam. The lower subsoil is lighter in color and more friable. Concretions of calcium carbonate are frequently found in the subsoil.

Use and Management.—Where adequate drainage has been provided, either by open surface ditches or by tile, this soil returns moderately good crop yields without soil treatment. It will be found to vary in acidity from slight to medium and will not need as much limestone to grow clovers as do most soils in this region. The growing and turning under of legume crops or the frequent addition of animal manure will increase the organic-matter and nitrogen contents of the soil.

Putnam silt loam (112)

From the standpoint of its extent, Putnam silt loam is one of the major soil types of Washington county, for it covers, all told, nearly 73 square miles. This soil occupies the nearly level, slowly drained prairie land in the northwestern part of the county. It is characterized by an impervious subsoil which makes underdrainage very slow. It resembles the Cisne silt loam described on page 12 but has a darker colored surface soil, a less gray subsurface, and is naturally more productive. Slick spots are very prevalent.

The surface soil is a grayish-brown friable silt loam 6 to 7 inches thick. The upper subsurface is brownish gray and the lower subsurface is gray and in some places ashy. Hard, rounded, black pellets of iron and manganese are present in both the surface and subsurface strata. The subsoil, beginning at 17 to 21 inches, is a very compact and plastic clay, grayish yellow in color and splotched with reddish brown. Below 34 to 36 inches the subsoil becomes less compact and has a pale yellowish color.

Use and Management.—The recommendations made for the improvement of Cisne silt loam, page 12, apply in general also to this type. Better response,

however, should be obtained in treating this type than in treating Cisne, altho only moderate yields, on the average, can be expected even under the best of treatment because of slow drainage and the prevalence of so many unproductive slick spots. Corn is not recommended as a frequent crop in the rotation, but when it is used a trial application of a potassium fertilizer is suggested. Alfalfa does not grow successfully on this soil type but after proper soil treatment some of the other legumes such as sweet clover, soybeans, and lespedeza do well. Putnam silt loam is primarily a wheat soil and when well farmed, under good surface drainage, produces satisfactory yields of this crop.

Cox silt loam (113)

Cox silt loam is mapped on the gently sloping prairie land in association with Putnam silt loam in the northwestern part of Washington county. The type covers altogether nearly 9 square miles. The surface drainage is moderately rapid but underdrainage is slow. This soil resembles Hoyleton silt loam described on page 14, but differs from it in having more organic matter in the surface stratum, in having a somewhat less compact and a brighter colored subsoil, and in being more productive.

The surface soil is a brownish-gray friable silt loam 5 to 7 inches thick. The subsurface is yellowish gray, the lower part of which is splotched with orange or dull red. The subsoil is a compact, plastic, drabbish-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.

Use and Management.—Drainage should be provided by means of a system of surface ditching that will quickly remove the excess surface water with as little erosion as possible. The organic-matter content must be built up and maintained by frequent additions of manure or by the growing of clover. The soil should be tested for its need of limestone and available phosphorus, and limestone and phosphate should be applied according to the indications of the tests. Following the increase in organic matter, trial applications of a potassium fertilizer should be made. This soil will return moderate yields if properly managed, but it will not produce satisfactorily under poor farming practices.

Harrison silt loam (127)

Harrison silt loam is a dark-colored soil found on gently sloping prairie land principally in the western part of Washington county. It has moderately rapid drainage. There is, all told, less than one square mile of this soil in the county, and it exists mainly in very small tracts with the exception of a relatively large area just northwest of Nashville.

The surface soil is a grayish-brown friable silt loam 7 to 9 inches thick. The subsurface is brownish gray, the lower 2 or 3 inches often becoming gray and slightly ashy. The subsoil begins at about 18 inches and is a moderately compact, slightly plastic, brownish-yellow clay loam. The lower subsoil below 26 to 28 inches becomes more friable.

Use and Management.—Harrison silt loam is one of the most productive soils in the county. When adequate drainage has been established, attention

should be given to providing a continuous supply of fresh organic matter. The soil should be tested for its need of limestone and available phosphorus, and these materials applied where needed. The soil will respond well to a limestone-sweet-clover treatment and is adapted to the growing of alfalfa and to other farm crops common to the region. Under good management this soil should produce good yields consistently.

Douglas silt loam (128)

Douglas silt loam occurs in small spots on the rolling, rapidly drained prairie areas, principally associated with Putnam silt loam, in the northwestern part of Washington county. It covers, all told, nearly 2 square miles.

The surface soil is a thin, light-brown silt loam with a gray cast. The subsurface is friable and yellow in color. The subsoil begins at 9 to 13 inches and is a reddish-yellow, slightly compacted, silty clay loam. Below 21 to 24 inches the material becomes friable and silty and is bright yellow in color.

Use and Management.—Practically the same treatment is recommended for this type as was suggested for the preceding type, No. 127. More attention, however, must be given to maintaining the organic-matter and nitrogen contents in this soil and to controlling erosion than in Type 127. Vegetation should also be kept on the land as much as possible as an erosion-control measure. Corn yields are frequently reduced by summer drouths. Legumes, including alfalfa and small grain, together with orchard crops and small fruits, are adapted to this soil.

SUMMARY OF CHARACTERISTICS OF WASHINGTON COUNTY SOILS

For convenience in comparing the soils of the county, Table 2, giving a summarized statement of their more important characteristics, is presented. In the main, the implications of the various index terms employed in the table are self-explanatory. The columns headed "productivity indexes" are intended to convey an idea of the relative economic value of the various soil types.

The system here employed for rating land for field crops consists of a scale running from 1 to 10 in which No. 1 represents the soil which will produce, without fertilization, the highest yields of field crops common to the region. There are soils, however, even among those of lower natural fertility, which, with proper treatment, can be definitely improved in an economical manner. For such soils an economic rating expressed in a single index number fails to represent the whole truth regarding their value. This statement applies particularly to Washington and neighboring counties, where much of the land has been effectively improved thru soil treatment. Particular attention, therefore, is called to the supplementary column adjoining the index numbers and headed "Response to economical treatment."

For more complete information than is possible to give in this table, the detailed descriptions of the individual soil types should be consulted, references to which are supplied in the third column.

TABLE 2.—WASHINGTON COUNTY SOILS: SUMMARIZED STATEMENT OF CHARACTERISTICS

Type No.	Type name	See page[1]	Topography[2]	Drainage[3]		Re-action	Available phos-phorus	Organic matter	Productivity indexes[4]			
									Field crops		Pasture	Forest
				Surface	Under				With-out treat-ment	Response to eco-nomical treatment		
1	Rinard silt loam	12	Nearly level	Slow	Slow	Acid	Low	Low	9	Medium	Poor	Poor
2	Cisne silt loam	12	Nearly level	Slow	Very slow	Acid	Low	Low	9	Medium	Poor	Poor
3	Hoyleton silt loam	14	Gently rolling	Moderate	Slow	Acid	Low	Low	8	Good	Medium	Medium
4	Walton silt loam	14	Rolling	Rapid	Slow	Acid	Low	Low	8	Poor	Medium	Good
8	Eroded gravelly loam	15	Steep	Rapid	Rapid	Acid	Low	Low	10	Poor	Poor	Poor
11	Loy silt loam	15	Nearly level	Slow	Very slow	Acid	Low	Low	10	Poor	Poor	Poor
12	Wynoose silt loam	16	Nearly level	Slow	Slow	Acid	Low	Low	9	Medium	Poor	Poor
13	Bluford silt loam	17	Gently rolling	Moderate	Slow	Acid	Low	Low	8	Good	Medium	Medium
14	Ava silt loam	18	Rolling	Rapid	Moderate	Acid	Low	Low	8	Good	Medium	Good
26	Wagner silt loam (terrace)	19	Nearly level	Slow	Slow	Acid	Low	Low	9	.....	.....	.....
48	Ebbert silt loam	20	Nearly level	Moderate	Moderate	Acid	Low	Medium	7	Medium	Medium	Good
72	Sharon silt loam (first bottom)	20	Nearly level	Moderate	Moderate	Acid	Low	Low	6	.....	Medium	Good
84	Okaw silt loam (terrace)	20	Nearly level	Slow	Very slow	Acid	Low	Low	10	Poor	Poor	Poor
108	Bonnie silt loam (first bottom)	21	Nearly level	Slow	Slow	Acid	Low	Low	7	Medium	Medium	Good
110	Venedy silt loam (terrace)	22	Nearly level	Slow	Moderate	Acid	Medium	Low	6	Good	Medium	Medium
112	Putnam silt loam	22	Nearly level	Slow	Slow	Acid	Low	Low	8	Medium	Medium	Poor
113	Cox silt loam	23	Gently rolling	Moderate	Slow	Acid	Low	Low	7	Good	Medium	Medium
127	Harrison silt loam	23	Gently rolling	Moderate	Moderate	Acid	Low	Medium	5	Good	Good	Good
128	Douglas silt loam	24	Rolling	Rapid	Moderate	Acid	Low	Low	6	Good	Medium	Good

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

[2]Topography is expressed by the following terms based upon 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 character of drainage, "moderate" indicates the most desirable drainage.

[4]The index number assigned to a soil type for production of field crops is based on its ability 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.

Soil Reports Published

1 Clay, 1911
2 Moultrie, 1911
3 Hardin, 1912
4 Sangamon, 1912
5 LaSalle, 1913
6 Knox, 1913
7 McDonough, 1913
8 Bond, 1913
9 Lake, 1915
10 McLean, 1915
11 Pike, 1915
12 Winnebago, 1916
13 Kankakee, 1916
14 Tazewell, 1916
15 Edgar, 1917
16 DuPage, 1917
17 Kane, 1917
18 Champaign, 1918
19 Peoria, 1921
20 Bureau, 1921
21 McHenry, 1921
22 Iroquois, 1922
23 DeKalb, 1922
24 Adams, 1922
25 Livingston, 1923
26 Grundy, 1924
27 Hancock, 1924
28 Mason, 1924
29 Mercer, 1925
30 Johnson, 1925
31 Rock Island, 1925
32 Randolph, 1925
33 Saline, 1926
34 Marion, 1926
35 Will, 1926
36 Woodford, 1927
37 Lee, 1927
38 Ogle, 1927
39 Logan, 1927
40 Whiteside, 1928
41 Henry, 1928
42 Morgan, 1928
43 Douglas, 1929
44 Coles, 1929
45 Macon, 1929
46 Edwards, 1930
47 Piatt, 1930
48 Effingham, 1931
49 Wayne, 1931
50 Macoupin, 1931
51 Fulton, 1931
52 Fayette, 1932
53 Calhoun, 1932
54 Ford, 1933
55 Jackson, 1933
56 Schuyler, 1934
57 Clinton, 1936
58 Washington, 1937

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WASHINGTON COUNTY
SOIL MAP

THE LOCATION of each soil type in Washington county is indicated on this map (consisting of two sections). The positions of streams, roads, railroads, and towns also are shown in order to help one in locating a particular farm or region. A distinctive color and a number are used to identify each soil type.

For a description of each type and a statement of its best use and recommended management, see pages 12 to 25, consulting *Contents,* page 2, for precise page references.

EAST SHEET

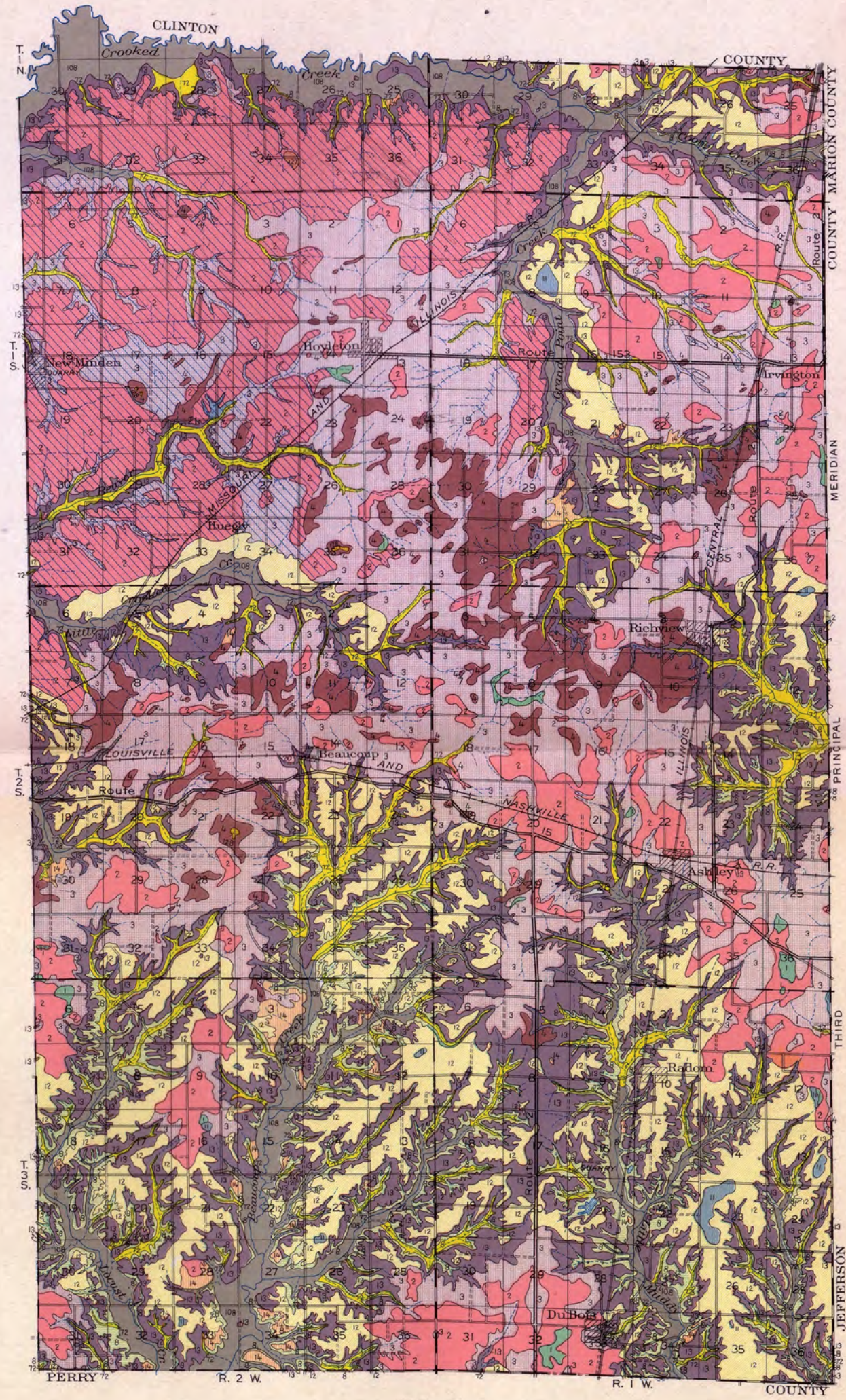
LEGEND

- 1 Rinard silt loam
- 2 Cisne silt loam
- 3 Hoyleton silt loam
- 4 Walton silt loam
- 8 Eroded Gravelly Loam
- 11 Loy silt loam
- 12 Wynoose silt loam
- 13 Bluford silt loam
- 14 Ava silt loam
- 26 Wagner silt loam (terrace)
- 48 Ebbert silt loam
- 72 Sharon silt loam (first bottom)
- 84 Okaw silt loam (terrace)
- 108 Bonnie silt loam (first bottom)
- 110 Venedy silt loam (terrace)
- 112 Putnam silt loam
- 113 Cox silt loam
- 127 Harrison silt loam
- 128 Douglas silt loam
- Slick spots occupy over 50 per cent of area

CONVENTIONAL SIGNS

- Public roads
- Paved roads
- Private roads
- Railroads (steam)
- Township boundary lines
- County boundary lines
- Streams (flowing)
- Streams (intermittent)
- Lakes or ponds
- Swamps
- Small areas limestone outcrop

Scale
0 ¼ ½ 1 2 Miles
1927



LITHO EASTERN OFFSET INC., BALTO

SOIL SURVEY MAP OF WASHINGTON COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION

CONVENTIONAL SIGNS

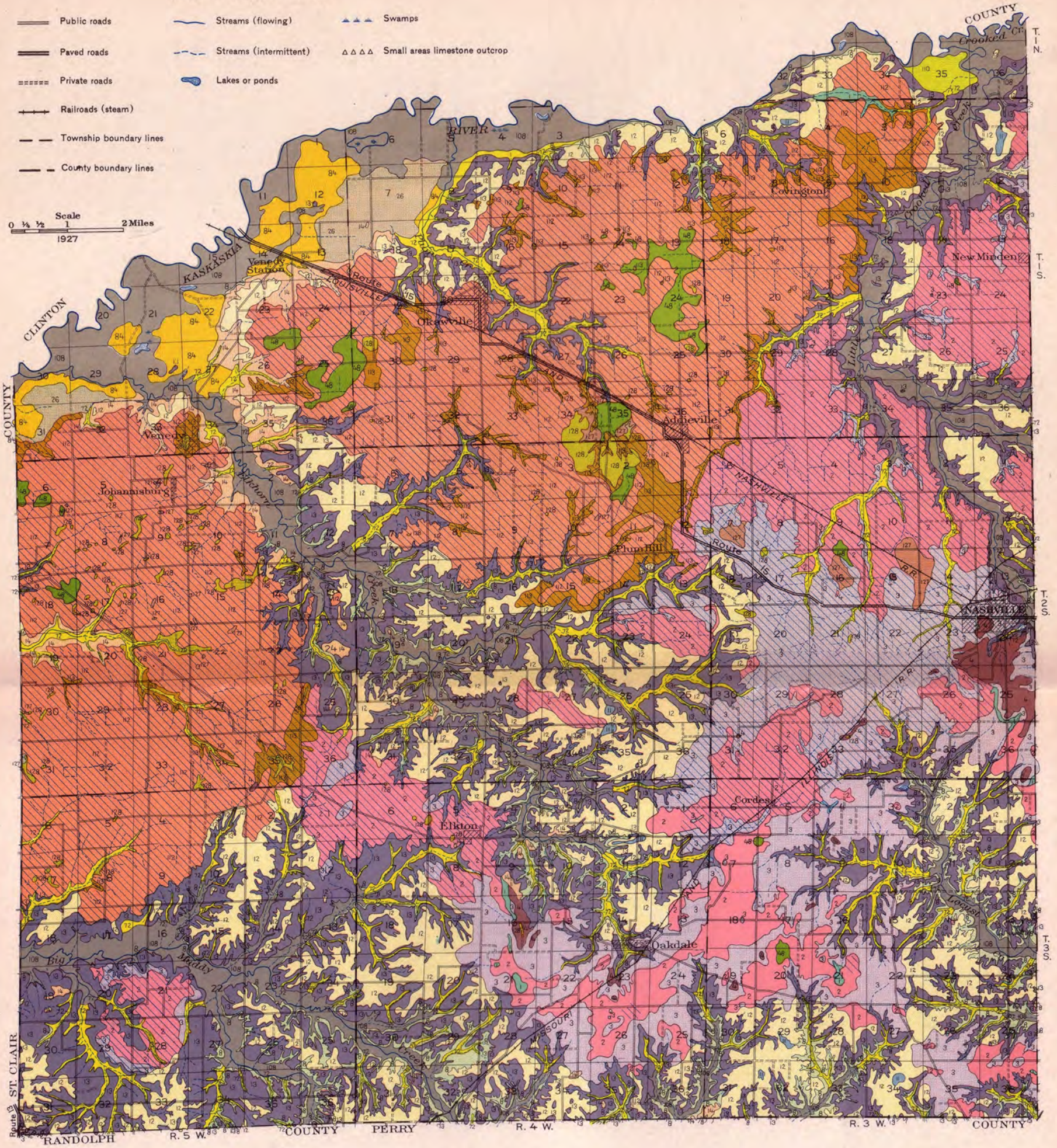
Public roads
Paved roads
Private roads
Railroads (steam)
Township boundary lines
County boundary lines

Streams (flowing)
Streams (intermittent)
Lakes or ponds

Swamps
Small areas limestone outcrop

Scale
0 ¼ ½ 1 2 Miles
1927

WEST SHEET



LITHO EASTERN OFFSET INC., BALTO

LEGEND

1 Rinard silt loam	8 Eroded Gravelly Loam	14 Ava silt loam	84 Okaw silt loam (terrace)	113 Cox silt loam
2 Cisne silt loam	11 Loy silt loam	26 Wagner silt loam (terrace)	108 Bonnie silt loam (first bottom)	127 Harrison silt loam
3 Hoyleton silt loam	12 Wynoose silt loam	48 Ebbert silt loam	110 Venedy silt loam (terrace)	128 Douglas silt loam
4 Walton silt loam	13 Bluford silt loam	72 Sharon silt loam (first bottom)	112 Putnam silt loam	Slick spots occupy over 50 per cent of area

SOIL SURVEY MAP OF WASHINGTON COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION