WABASH COUNTY SOILS

UNIVERSITY OF ILLINOIS

Agricultural Experiment Station

SOIL REPORT No. 61

WABASH COUNTY SOILS

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

URBANA, ILLINOIS, JULY, 1937

"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 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 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 D. C. Maxwell, G. D. Smith and J. E. Gieseking who surveyed the soils of the county and constructed the soil map.

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WABASH COUNTY SOILS

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

GEOGRAPHICAL FEATURES

WABASH COUNTY lies in the southeastern part of Illinois, being bounded on the east by Wabash river and on the west by Bon Pas creek. It is a relatively small county, occupying a total of only 217.9 square miles.

The first settlement in the county was established by the French at Rochester in 1800. The first English settlers came in 1802, and a German by the name of Enoch Greathouse was the first settler on the site now occupied by Mt. Carmel, establishing his residence there in 1804.

Palmyra, established in 1815 and abandoned in 1821, situated near the mouth of Crawfish creek was the county seat of Edwards county before Wabash county was organized. In 1821 the county seat was moved to Albion and because of bitter feeling against the English who occupied Albion an agreement was made

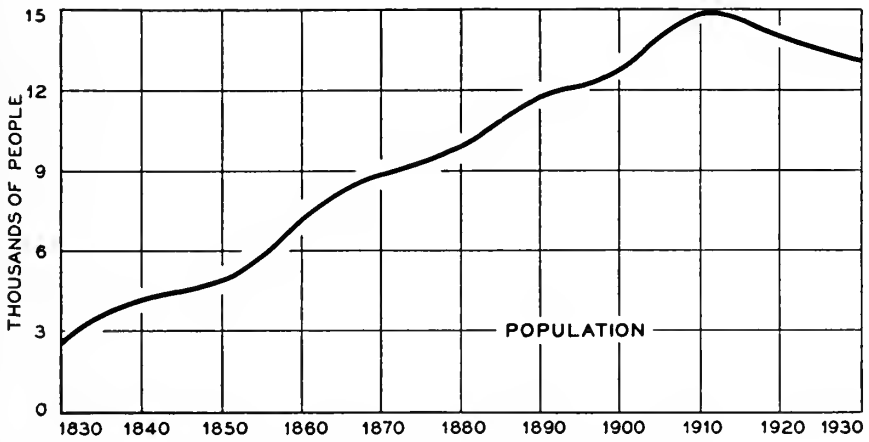


Fig. 1.—Growth of Population in Wabash County

The population of Wabash county increased steadily from the time of the first U. S. Census in 1830, when it was about 3,000, until 1910, when it reached about 15,000. Following a general trend at that time, when many rural people were attracted to cities, the population began to decline, so that by 1930 only about 13,000 persons were enumerated.

to divide Edwards county into east and west halves using Bon Pas creek as the dividing line. In 1824 Wabash county was established by the Illinois legislature and Centerville, located in Section 35, Friendsville township, was chosen as the county seat. For some unknown reason this location proved unsatisfactory and Mt. Carmel was chosen as the county seat in 1829. A courthouse was built which was destroyed by fire in 1857, rebuilt, and again destroyed in 1877 by a tornado. The first steamboat arrived at Mt. Carmel in 1819 and the first train pulled into the town in 1872.

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

The total population of Wabash county increased at a fairly uniform rate from 2,700 in 1830 to 14,900 in 1910, when it began to decline. By 1930 it had decreased to 13,200 (Fig. 1).

The eastern and southern parts of the county are served by two railroads and by a thru highway. The nearest railroad from the northwestern part of the county is about ten miles distant; however, the county is well provided with all-weather secondary roads.

Agricultural Production the Chief Interest

Agriculture is the chief economic interest in Wabash county. Corn and wheat are the chief crops grown, the average corn area exceeding that of wheat by about 10,000 acres a year. The corn area averages about 35,000 acres and the wheat

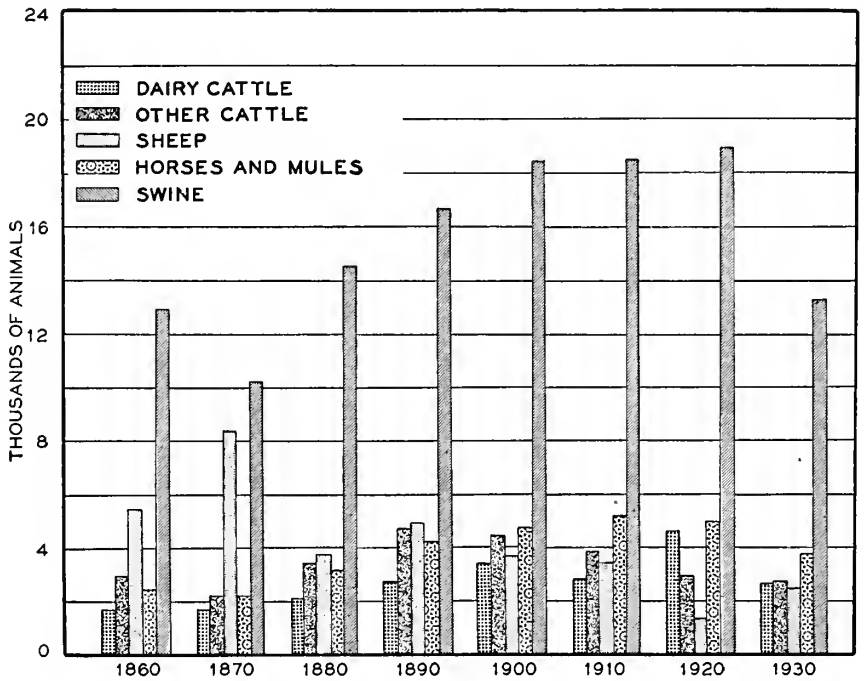


FIG. 2.—PRODUCTION OF PRINCIPAL CLASSES OF LIVESTOCK IN WABASH COUNTY

Swine have always occupied a prominent place in the agriculture of Wabash county, the number fluctuating around 12,000 to 17,000 head during the past sixty years. Beef production, until recent years, was represented roughly by about 4,000 head. By 1930 the number had dropped to about 2,700 head. Dairy cattle have declined from 4,600 head in 1920 to about 2,000 in 1930. Sheep production reached its low point in 1920. The decline in horses and mules in recent years is in line with the general trend thruout the country. *(Figures from U. S. Census)*

about 25,000 acres, altho there are wide annual fluctuations in the acreage devoted to these crops. Hay, including both legume and nonlegume, occupies about 12,000 acres each year. The volume of potatoes grown fluctuates widely; in 1930 about 13,000 bushels were produced, in 1910 over 45,000 bushels. Apples are declining in importance, having dropped from 90,000 bushels in 1900 to 4,700 bushels in 1930. Other fruits are of little commercial importance.

The number of dairy cattle, other cattle, sheep, horses and mules, and swine are shown in the accompanying graph (Fig. 2) by ten-year intervals beginning with 1860. Dairy cattle increased rather steadily to a maximum of 4,600 head in 1920, and then declined about 2,000 head between 1920 and 1930. Other cattle reached their maximum of 4,700 head in 1890; since which time they have declined until they numbered only 2,700 in 1930. Sheep have not been of much importance since 1870, when they reached their high point of 8,300 head. Some revival of interest occurred between 1920 and 1930, when the number of sheep increased from 1,300 to 2,400. Horses and mules increased steadily from 1870 to 1910, when they reached a maximum of 5,200 head, but by 1930 they had declined to 3,800 head. Swine reached their maximum in 1920, when they numbered 18,800 head; by 1930 they had declined to 13,200 head. Poultry and egg sales amounted to about a quarter of a million dollars in 1930.

Temperatures and Rainfall

Wabash county has a humid temperate climate with a wide range in temperature between the extremes of winter and summer and a rather irregularly distributed rainfall. The mean summer temperature for the fourteen-year period 1923 to 1936 as recorded at the weather station located at Mt. Carmel was 77.8° F. and that for winter was 36.7° F. The highest temperature recorded for this fourteen-year period was 112° F. in July, 1936, and the lowest 16° F. below zero in January, 1930.

The average date of the last killing frost in spring was May 25, and the earliest in the fall was October 23, giving an average growing season of 190 days. The shortest growing season recorded was 147 days and the longest 227 days.

The average rainfall during the fourteen-year period 1923 to 1936 was 43.62 inches and varied from a minimum of 33.09 inches in 1924 to a maximum of 62.80 inches in 1927. There was also a great variation in the distribution of rainfall during the growing season. During the above fourteen years there were 34 periods of 21 days or longer with no rain of more than .5 inch in 24 hours, and there were 12 such periods of 30 days or longer. The longest period unbroken by a rainfall exceeding .5 inch was 60 days during June and July, 1926, and this was preceded by an almost rainless May. The rainfall records indicate that during at least seven of the fourteen years the distribution of rainfall during the growing season was unfavorable to the best growth of crops, particularly corn.

Topography and Drainage

The land surface of Wabash county is generally moderately rolling. The altitudes of a few locations in the county are as follows: Mt. Carmel, 465 feet above sea level; Allendale, 557 feet; Bellmont, 431 feet; Cowling, 397 feet, and Keensburg, 430 feet.

Wabash county lies within the Wabash drainage basin, the western part of the county draining into Wabash river through Bon Pas creek. Surface drainage is good to excessive on most of the upland. Much of the bottomland is too nearly level to have good surface drainage but most of it tiles well. The larger bottoms are subject to overflow unless protected by levees and for this reason are generally used for summer crops.

FORMATION OF WABASH COUNTY SOILS

Origin of the Soil Material

A little over 49 percent of the total area of Wabash county is occupied by bottomland and terrace formations the sediment of which has been deposited largely by Wabash river and Bon Pas creek. Bon Pas creek and other bottoms tributary to Wabash river has received back-water sediment from Wabash river during periods of very high water. This sediment is good parent material for soils because it is brought in from regions that are young geologically and therefore is not strongly leached at the time it is deposited. The upland portion of the county is covered by a loess blanket deposited as dust following the retreat of the Illinoian ice sheet which covered this portion of the state during the Glacial period.

The climate during the Glacial period was 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. Aided by further accumulations of snow and ice at their margins, these glaciers advanced, chiefly southward, until they reached a region where either the climate was warm enough to melt the ice as rapidly as it advanced or else its force had been spent. 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 was, however, derived from the loose surface mantle and old bed-rock 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, the features of the surface over which the ice passed being greatly changed and the previous topography completely hidden. The deposit of rock material left by the glacier is known as glacial till, glacial drift, or boulder clay—terms which frequently appear in descriptions 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 Wabash county, the later one 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. This material was also blown about when dry and it, together with that from the river valleys, collected as a blanket on the upland. The loess deposited in Wabash

county came from the Wabash river valley, as is indicated by a thinning out of the material from east to west away from that bottomland. The thickness of the loess in Wabash county, except where it has been removed by erosion, varies from a minimum of about 30 inches in the northwestern part of the county to a maximum of about 10 feet in the eastern part immediately adjacent to the river valley.

Altho the last glaciation, known as the Wisconsin, did not move far enough south to reach Wabash county, it did cover the headwaters of Wabash river and furnished the sediment to Wabash river and the tributary valleys from which the most recent portion of the loess covering of Wabash county was derived.

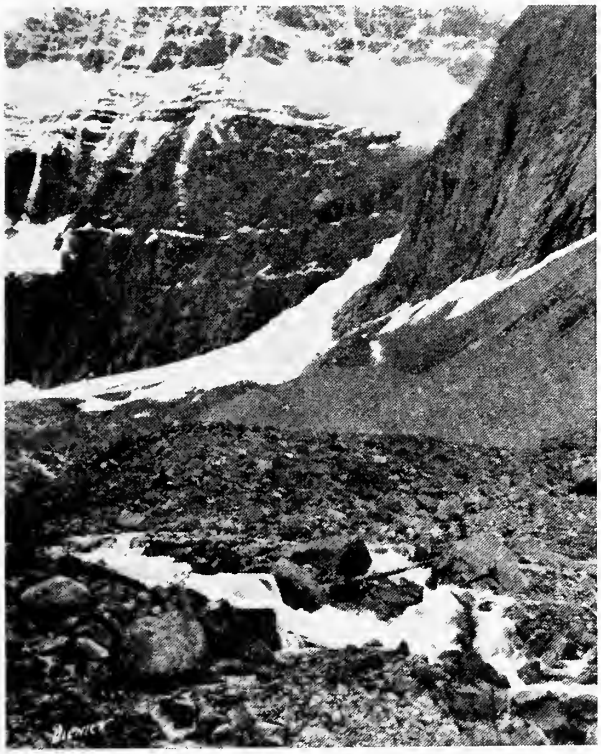


FIG. 3.—A PRESENT-DAY GLACIER

Compared with the glaciers of the ice age, which covered large portions of a continent, this one confined to a mountain top in the Rockies, might be considered almost a miniature. It displays, however, the outstanding features of a glacier. The vast expanse of flowing ice, the melting edge, the streams of water running off with their loads of silt and sand, the rocks of all sizes which have been transported and deposited, all are represented in the scene.

It is well known locally that the soils in the southern two-thirds of the county and within a few miles of Wabash river in the northern part of the county are more productive than those in the northwestern part of the county. Decreasing productivity is associated with decreasing depth of loess.

How the Soil Was 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 a

pale-yellowish color, open, porous, 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 Wabash county vary from young to

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

old. Bottomland soils and those receiving frequent deposition, as well as those subject to rapid erosion, are very young because the material has either just recently been deposited or else recently uncovered, and in either case the weathering processes have not had long to act. The upland soils, except those which have been eroded, vary in age from immature to old, owing to differences in the intensity of the action of the weathering forces and also to differences in the age of the soil material from which they have developed.

The changes which have taken place in the development of soils from the loess deposited in Wabash county have been exceedingly complex. Numerous processes have been at work breaking down the minerals in the soil material and freeing elements of plant food. Thru the solution and leaching of the more-or-less soluble constituents, including the limestone particles, an acid condition is developed and the soil becomes impoverished. 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 known locally as "hardpan."

Early in the history of the weathering of the soil material plant seeds were distributed by 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; but as streams were extended and drainage improved, forests began to encroach on the prairie. The extension of the forest continued until nearly the entire upland portion of Wabash county was covered by timber.

The grass vegetation, with its enormous quantity of surface roots, together with the original high lime and moisture content of 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 Wabash 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.

The loss of organic matter, together with the movement of the very fine clay particles out of the surface soil, results in a decline in soil productivity because it is in these two materials that most of the available elements of plant food are held in the soil.

Another factor to be considered in the decline of soil productivity is the gradually decreasing rate at which the complex minerals break down and release the plant-food elements as the soil approaches maturity.

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" (Fig. 4).

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

THE SOIL MAP

The accompanying soil map gives the location and boundary of each soil type in Wabash county in areas of five acres or more. It also indicates the position of streams, roads, railroads, and towns, as well as the location of country dwellings and public buildings. A list of the soil types as mapped in Wabash county, the area of each in square miles and in acres, and the percentage that each type constitutes of the total area of the county are shown in Table 1.

A number, as well as a color, is assigned to each type. These numbers are not only a convenience in referring to the respective types but they are especially useful in designating small areas on the map.

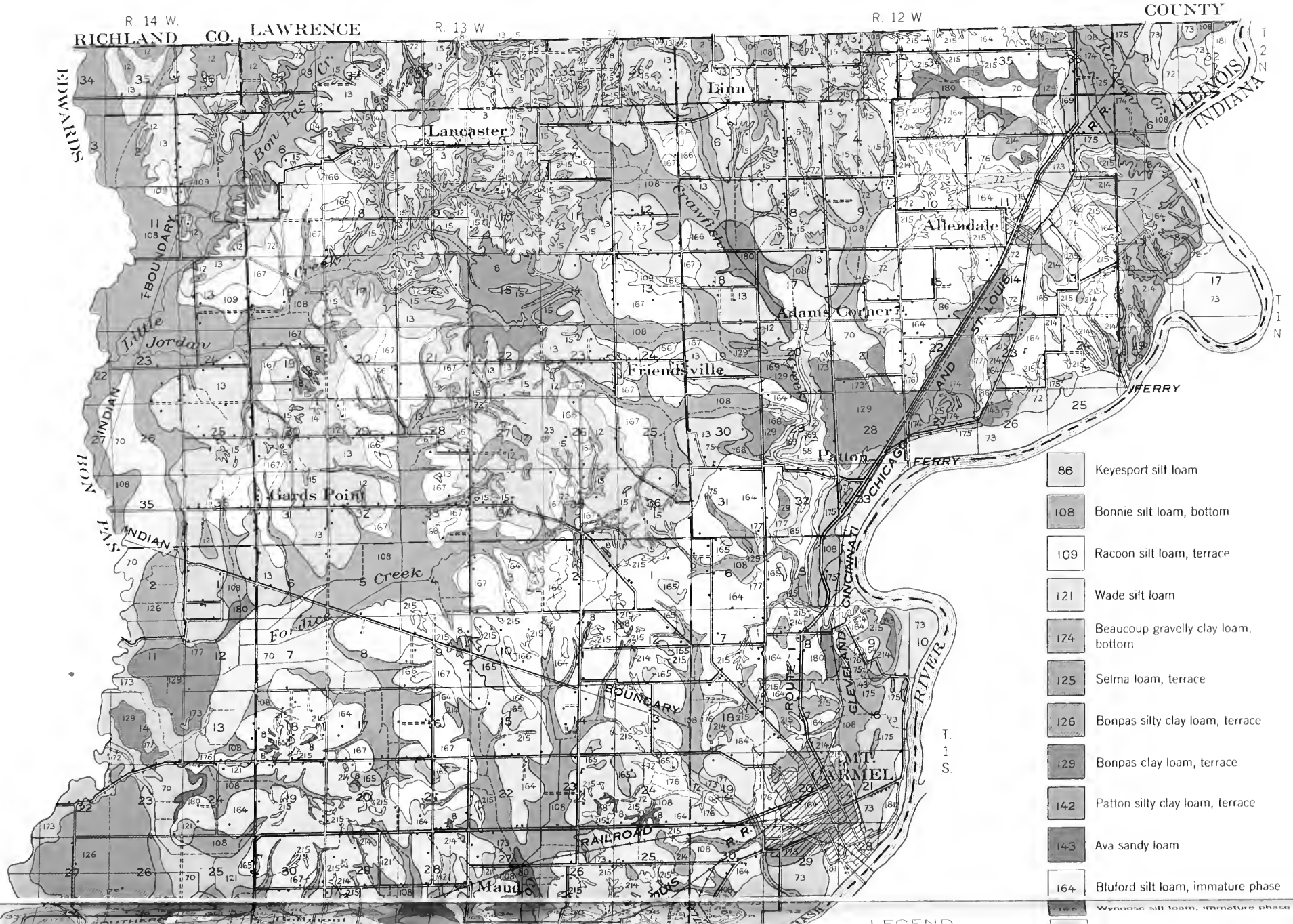
TABLE 1.—WABASH COUNTY SOILS: AREAS OF THE DIFFERENT SOIL TYPES

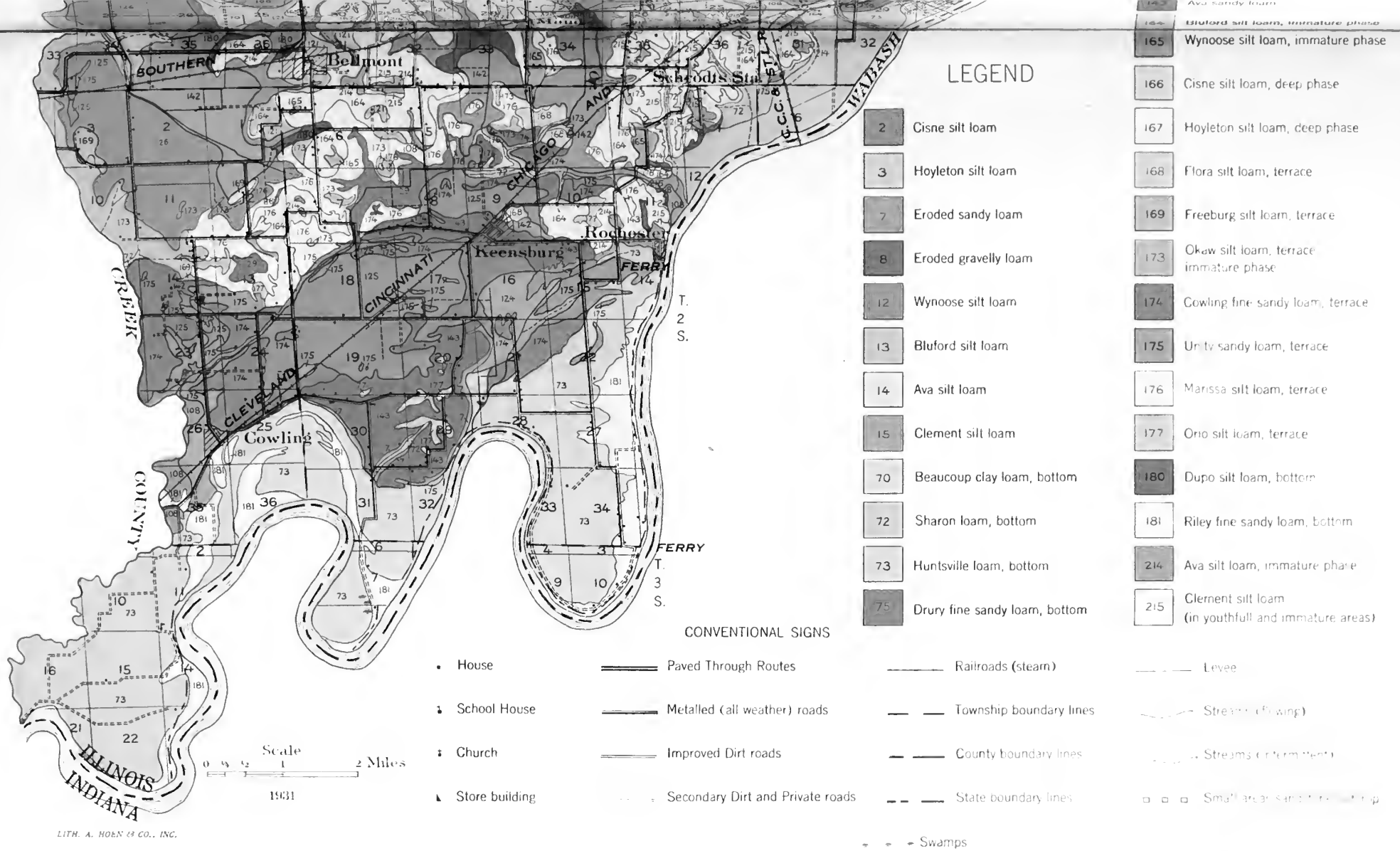
Type No.	Type name	Area in square miles	Area in acres	Percent of total area
2	Cisne silt loam	.46	294	.21
3	Hoyleton silt loam	1.53	979	.70
7	Eroded sandy loam	.55	352	.25
8	Eroded gravelly loam	3.34	2 138	1.53
12	Wynoose silt loam	2.04	1 306	.94
13	Bluford silt loam	31.41	20 096	14.41
14	Ava silt loam	.10	64	.05
15	Clement silt loam	4.93	3 155	2.26
70	Beaucoup clay loam, bottom	6.17	3 949	2.83
72	Sharon loam, bottom	3.98	2 547	1.83
73	Huntsville loam, bottom	19.25	12 320	8.84
75	Drury fine sandy loam, bottom	.40	256	.19
86	Keyesport silt loam	.31	198	.14
108	Bonnie silt loam, bottom	28.77	18 413	13.20
109	Racoon silt loam, terrace	.82	525	.38
121	Wade silt loam	1.49	954	.69
124	Beaucoup gravelly clay loam, bottom	.74	474	.34
125	Selma loam, terrace	5.00	3 200	2.29
126	Bonpas silty clay loam, terrace	5.90	3 776	2.71
129	Bonpas clay loam, terrace	4.88	3 123	2.24
142	Patton silty clay loam, terrace	4.30	2 752	1.97
143	Ava sandy loam	3.28	2 099	1.50
164	Bluford silt loam, immature phase	36.99	23 674	16.98
165	Wynoose silt loam, immature phase	1.49	954	.69
166	Cisne silt loam, deep phase	1.20	768	.55
167	Hoyleton silt loam, deep phase	11.58	7 411	5.31
168	Flora silt loam, terrace	.52	332	.23
169	Freeburg silt loam, terrace	.69	442	.32
173	Okaw silt loam, terrace, immature phase	4.48	2 867	2.05
174	Cowling fine sandy loam, terrace	5.22	3 341	2.40
175	Unity sandy loam, terrace	4.15	2 656	1.93
176	Marissa silt loam, terrace	4.80	3 072	2.20
177	Orio silt loam, terrace	.79	506	.36
180	Dupo silt loam, bottom	2.21	1 414	1.01
181	Riley fine sandy loam, bottom	4.47	2 861	2.05
214	Ava silt loam, immature phase	5.51	3 526	2.52
215	Clement silt loam in youthful and immature areas	4.16	2 662	1.90
	Total	217.90	139 456	100.00

WABASH COUNTY
SOIL MAP

THE LOCATION of each soil type in Wabash county is indicated on this map. 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 26, consulting *Contents,* page 2, for precise page references.


R. 14 W.
RICHLAND CO.
LAWRENCE
R. 13 W
R. 12 W
COUNTY
EDWARDS
Bon Pas Cr.
Lancaster
Linn
Raccoon Cr.
ILLINOIS
INDIANA
T 2 N
T 1 N
Allendale
Crawfish Creek
Adams Corner
Little Jordan
Friendsville
Patton
Gards Point
Bon Pas Cr.
Creek
Fordice
BOUNDARY
CLEVELAND CINCINNATI AND ST. LOUIS R.R.
CHICAGO
FERRY
ROUTE 1
WABASH RIVER
MT. CARMEL
RAILROAD
Maud
T. 1 S.
86 Keyesport silt loam
108 Bonnie silt loam, bottom
109 Racoon silt loam, terrace
121 Wade silt loam
124 Beaucoup gravelly clay loam, bottom
125 Selma loam, terrace
126 Bonpas silty clay loam, terrace
129 Bonpas clay loam, terrace
142 Patton silty clay loam, terrace
143 Ava sandy loam
164 Bluford silt loam, immature phase
Wynoose silt loam, immature phase
LEGEND



LEGEND

2	Cisne silt loam
3	Hoyleton silt loam
7	Eroded sandy loam
8	Eroded gravelly loam
12	Wynoose silt loam
13	Bluford silt loam
14	Ava silt loam
15	Clement silt loam
70	Beaucoup clay loam, bottom
72	Sharon loam, bottom
73	Huntsville loam, bottom
75	Drury fine sandy loam, bottom
165	Wynoose silt loam, immature phase
166	Cisne silt loam, deep phase
167	Hoyleton silt loam, deep phase
168	Flora silt loam, terrace
169	Freeburg silt loam, terrace
173	Okaw silt loam, terrace immature phase
174	Cowling fine sandy loam, terrace
175	Unity sandy loam, terrace
176	Marissa silt loam, terrace
177	Orio silt loam, terrace
180	Dupo silt loam, bottom
181	Riley fine sandy loam, bottom
214	Ava silt loam, immature phase
215	Clement silt loam (in youthfull and immature areas)

CONVENTIONAL SIGNS

- House
- School House
- Church
- Store building
- Paved Through Routes
- Metalled (all weather) roads
- Improved Dirt roads
- Secondary Dirt and Private roads
- Railroads (steam)
- Township boundary lines
- County boundary lines
- State boundary lines
- Swamps
- Levee
- Streams (flowing)
- Streams (intermittent)
- Small areas sandy to gravelly

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SOIL SURVEY MAP OF WABASH COUNTY

UNIVERSITY OF ILLINOIS AGRICULTURAL EXPERIMENT STATION

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

Surveyed by
C. C. Mann, In Charge
G. D. Smith
E. E. Gardner

SOIL TYPES OF WABASH COUNTY, THEIR USE, CARE, AND MANAGEMENT

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 Wabash county are given on the following pages. This information is summarized in Table 2, pages 27-28.

What Is Meant by Soil Type.—In studying descriptions of soil types it is of the utmost importance to get a clear mental picture of what is meant by "type" and of the outstanding features of each type. Not the surface alone, but the entire soil section, or "soil profile," is of importance, for two types with practically the same surface characteristics may be widely different in character as well as in agricultural value. The color, structure, texture, and chemical composition of each zone, or "horizon," that makes up the soil profile are some of the characteristics that must be observed.

Topography, as well as the kind and character of the vegetation growing on an area, are easily observable features of the landscape that are very useful indicators of soil character. Also a knowledge of the geological origin and the formation of the soil material of a region helps one to understand the general soil conditions of the region.

Scope of "Use and Management" Recommendations.—The recommendations made for the use and management of the respective soil types are based on their inherent capacity for efficient production. Such matters as the growing of special crops, the location of the land with respect to markets, and certain other economic considerations have not been taken into account.

In order 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 the present report 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 Wabash county is so different from that of upland soils developed on rolling surfaces that the management program is altogether different in the two situations. In the improvement of the upland soils developed on nearly level topography, the first consideration is to remove the excess surface water which, because of an almost impervious subsoil, cannot be removed by underdrainage; whereas in the management of the upland soils developed on rolling surfaces the main problem is to retard the rate of surface runoff and increase water absorption, thereby reducing erosion.

Simple Soil Tests Useful in Improvement Programs.—As an aid in determining differences in the degree of acidity in soils and in their content of some of the essential plant-food elements, certain relatively simple chemical tests for the rapid examination of soils 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 others that may be mentioned later, may be obtained free of charge on request to the Agricultural Experiment Station, University of Illinois, Urbana, Illinois.

Cisne silt loam (2)

Cisne silt loam is a minor type in Wabash county, occupying less than half a square mile. It occurs only in the northern part of the county, the largest area being just north of Linn. Cisne silt loam is an old prairie soil and is found only on nearly level-lying areas. It is low in organic matter and nitrogen and in the mineral elements of plant food, and has a very slowly pervious claypan subsoil locally known as "hardpan."

The surface soil 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 material beneath the claypan subsoil is less heavy and plastic than the claypan.

Use and Management.—When drained by furrows and open ditches and well farmed but not given any kind of soil treatment, the productive capacity of Cisne silt loam is low. The average yield of 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, 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 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.

Hoyleton silt loam (3)

Hoyleton silt loam occupies a total of only about 1½ square miles in Wabash county. It is found only in the northern part of the county, the larger area being

at Lancaster. This soil, like Cisne silt loam, Type 2, is an old prairie soil, tho it is likely that with the grass that grew here in remote times there was a scattering of timber and brush also. It occurs on gentle slopes, is low in organic matter and nitrogen and in the mineral elements of plant food, and has a slowly permeable claypan subsoil.

The surface soil, which is 5 to 6 inches thick, is a brownish-gray friable silt loam. The upper subsurface is yellowish gray and the lower subsurface is a light-gray, orange-mottled, friable silt loam. The subsoil begins at 16 to 18 inches and is a compact and plastic yellowish-gray clay. Below 32 inches the material is more friable.

Use and Management.—The productivity of this soil when untreated is about the same as that of the soils occurring on the nearly level topography in this region, but because it is developed on gentle slopes there is a possibility of treating it so that it will produce reasonably satisfactory yields.

When drainage has been provided, each field should be tested for its lime requirement, as directed in Circular 346, and lime applied as the test indicates. Experiments on the Ewing experiment field, a part of which is located on this same soil type, have demonstrated that this soil can be built up to produce an average of 20 to 25 bushels of wheat and 35 to 40 bushels of corn an acre when sweet clover is grown and turned under and regular applications of animal manure made. 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. Altho this soil does not occur on slopes exceeding about a 3.5-percent grade, and most of it is on slopes of about a 2-percent grade, sheet erosion is active. An effort should be made to keep vegetation on these slopes as much of the time as possible. Terracing is probably of limited usefulness because of the shallowness of the surface horizons and the presence of a claypan subsoil.

Eroded sandy loam (7)

Eroded sandy loam is a minor type in Wabash county, occupying a total of 352 acres and occurring on steep, gullied slopes between the Wabash bottom and the upland. This soil is coarse textured, reddish yellow in color, and shows little or no horizon development.

The steep slopes on which Eroded sandy loam occurs make it unsuitable for any use other than timber.

Eroded gravelly loam (8)

Eroded gravelly loam occupies a total of about 3⅓ square miles in Wabash county and occurs, for the most part, in small areas north and west of Mt. Carmel. One larger area of a little over 1½ square miles occurs about a mile northwest of Friendsville.

This type is found only on steep slopes where erosion has removed the silty surface material, exposing the 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 unsuited to anything but timber.

Wynoose silt loam (12)

Wynoose silt loam occurs in the northern third of Wabash county and occupies a total of about 2 square miles. This is a timber soil, occurring on nearly level areas, the slope being between .5 and 1.5 percent. It is low in organic matter and nitrogen and is underlain by a slowly pervious claypan subsoil. The surface soil 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 about 18 inches, is a mixed gray and pale yellow with dark reddish-brown spots and splotches. It is a compact and plastic clay.

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.

Use and Management.—Both surface and underdrainage are slow on this soil, but surface drainage can be provided by furrows and open ditches. The producing capacity of the type is low when no treatment is applied. Crops grown on it are sensitive to unfavorable climatic conditions, the unfavorable soil conditions causing shallow rooting. It is strongly acid and not well supplied with the elements of plant food. Following the application of limestone (the exact amount to be determined by test) and the growing of sweet clover fairly satisfactory grain crops are produced. It is necessary, however, to use potash in addition to limestone and legumes or the initial increase in yield following the growing of sweet clover will not be maintained.

This is not a corn soil and probably its best use is for meadow, pasture, cow-

peas, and wheat. Whatever crops are grown, the soil must be treated if satisfactory yields are to be secured even during very favorable years.

Bluford silt loam (13)

Bluford silt loam occurs extensively in the northern part of Wabash county, occupying a total of about 31.5 square miles. It occurs on gently rolling topography and is now, or was formerly, covered by timber. It has moderately rapid surface drainage but, owing 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 yellowish-gray friable silt loam 6 to 7 inches thick except where sheet erosion has removed some of the soil material. The subsurface is pale yellow in the upper part and gray in the lower part. The subsoil, beginning at 15 to 18 inches, is a medium-compact and plastic grayish-yellow clay. Below 32 to 36 inches the material becomes less compact, and sand and grit appear at about 40 inches.

Use and Management.—An efficient soil-management program for Bluford silt loam must take into consideration the improvement of drainage and the check-

FIG. 6.—ALFALFA ON BLUFORD SILT LOAM

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

ing of sheet erosion. 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.

Sheet erosion is very harmful on this soil. It may be largely controlled by the use of vegetation, as above indicated. This measure should be supplemented by contour tillage and, in some places, by constructing diversion ditches and terraces, tho the advisability of terracing a soil of this character is not fully established.

This soil, while relatively unproductive when untreated and farmed in the

way common to the region, responds well to good treatment and management. It should be tested for degree of acidity, as explained in Circular 346, and limestone applied as indicated by the test. With sufficient limestone a thrifty growth of sweet clover should be obtained. 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 with phosphorus and potassium has brought the yield of corn to 48 bushels and wheat to 28 bushels an acre.

Ava silt loam (14)

Ava silt loam is a minor type in Wabash county, occurring in a few small areas in the northwestern part and occupying a total of only 64 acres. It was developed under forest vegetation from loess and is found on slopes with grades of 3.5 to 7 percent.

The surface soil, which is 4 to 5 inches thick, is a brownish-yellow friable silt loam. The subsurface is a yellow friable silt loam. The upper subsoil, which begins at 12 to 14 inches, is a reddish-yellow, slightly compact, nonplastic, silty clay loam. The lower subsoil begins at 18 to 22 inches and is a compact, slightly plastic, yellow clay loam. The soil material below 26 to 28 inches is friable.

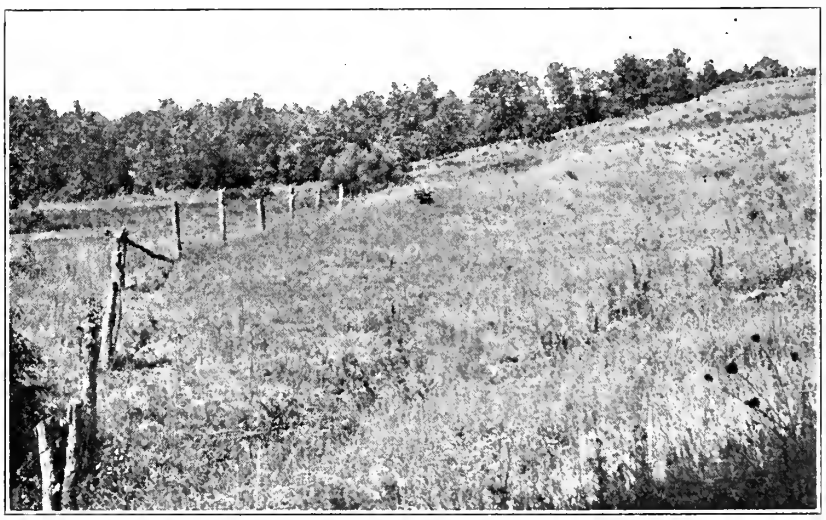

FIG. 7.—A HILLSIDE SPOILED BY EROSION RESULTING FROM CULTIVATION

Much of the sloping land which has been put under cultivation has been badly damaged by erosion. Such land might better not be used for cultivated crops.

Use and Management.—Ava silt loam is low in nitrogen and organic matter and is strongly acid. It absorbs water readily and has good underdrainage but is subject to severe erosion because of slope and lack of erosion-resisting properties. Limestone should be applied in sufficient amount to grow alfalfa and sweet clover, and phosphate should be applied particularly for alfalfa.

This is a good fruit soil, and its best use appears to be for meadow, pasture, and fruit.

Clement silt loam (15)

A total of nearly 5 square miles of Clement silt loam occurs in the northwestern part of Wabash county. It occupies slopes with grades of 7 to 15 percent and is subject to destructive erosion. It was developed from loess under forest vegetation, and where it has been cleared and farmed is seriously injured by erosion. The surface soil is shallow, never exceeding 4 inches, and may be entirely absent. No distinct horizons have developed. The material beneath the surface is a yellowish-red silt loam.

Use and Management.—Clement silt loam should, for the most part, be kept in timber. The less steep portions may be used for orchard and, following the application of limestone, may be used for alfalfa or grasses. A soil such as this, which is prone to destructive erosion, would seem, however, to be better for timber unless there are special reasons for putting it to some other use.

Beaucoup clay loam, bottom (70)

Beaucoup clay loam, bottom, occupies a total of a little over 6 square miles in Wabash county. It is found in the large bottoms of the streams tributary to Wabash river.

The surface soil, which is 6 to 8 inches thick, is a drab-colored heavy clay loam. The subsoil is a grayish-drab plastic clay. With increasing depth the soil becomes lighter in color but still retains its tough, plastic nature.

Use and Management.—Beaucoup clay loam, bottom, is a productive soil but is difficult to farm because of its heavy nature. Drainage has been taken care of by well-maintained dredge ditches, but overflow in the spring and fall limit the use of this land to summer crops. No treatment other than the plowing down of crop residues to help maintain the organic-matter supply is suggested for the present. Great care must be used in tilling this land to avoid getting it in bad physical condition.

Sharon loam, bottom (72)

Sharon loam, bottom, is found in the small bottoms and occupies a total of nearly 4 square miles in Wabash county. It is subject to frequent overflow, and during each period of overflow sediment from the adjacent upland is deposited. This soil shows but little profile development because of the frequent deposition of sediment. The surface soil is yellowish gray to dark gray and varies in texture from fine sandy loam to silt loam. With increasing depth the color gradually takes on a more grayish cast, but the texture remains essentially the same.

Use and Management.—Most of this land drains well. No treatment is suggested because the land is subject to frequent overflow. Winter and early spring crops are often lost on account of flooding but summer crops, such as corn and soybeans, yield well.

Huntsville loam, bottom (73)

Huntsville loam, bottom, is found in the Wabash river bottom and occupies a total of a little over 19 square miles. The surface soil, which is 6 to 8 inches thick, is a light-brown, friable silt loam. The subsurface is a brownish-yellow,

slightly compact, slightly plastic, silty clay loam. There is but little change with increasing depth because the deposits of sediment from Wabash river, from which this soil was derived, have not been in place long enough to permit profile development.

Use and Management.—Huntsville loam, bottom, is a productive soil and will grow sweet clover without the addition of limestone. It is subject to overflow unless protected by a levee, and for this reason unprotected portions are commonly used for corn. No soil treatment is suggested except where overflow no longer occurs. Such areas should be tested for acidity and sufficient limestone applied to grow sweet clover.

Drury fine sandy loam, bottom (75)

Drury fine sandy loam, bottom, occupies less than half a square mile in Wabash county. It is found chiefly north of Allendale and consists of sediment washed from and deposited alongside the adjacent upland. It is grayish yellow in color and has developed no distinct horizons.

Use and Management.—Drury fine sandy loam, bottom, altho low in nitrogen and organic matter, is productive. It is subject to overflow, and for this reason is used for summer crops. No soil treatment is suggested.

Keyesport silt loam (86)

Only about a third of a square mile of Keyesport silt loam occurs in Wabash county. One area is found southwest of Allendale and two small areas about 2 miles south of Bellmont. This soil is derived from sediment accumulated on terraces or on low upland from adjacent high upland. It is similar in formation to Drury fine sandy loam, Type 75, described above except that it does not occur in bottoms and is not subject to overflow. Like Drury, it has very little profile development. It varies somewhat in texture from a fine sandy loam to silt loam.

Use and Management.—Keyesport silt loam is a fairly productive soil but is low in organic matter and nitrogen. It is usually medium acid, and should be tested for acidity and sufficient limestone applied to grow legumes. No other soil treatment is suggested for the present.

Bonnie silt loam, bottom (108)

Bonnie silt loam, bottom, occurs extensively in Wabash county, occupying nearly 29 square miles, or a little over 13 percent of the total area of the county. The topography of this soil is nearly level, making surface drainage slow. In many areas, however, the drainage lines have been dredged, thus providing good outlets for tile. The surface soil, which is 8 to 12 inches thick, is a gray friable silt loam. With increasing depth the color becomes lighter but there is little change in texture.

Use and Management.—Bonnie silt loam, bottom, is used chiefly for corn. It overflows, but the flood water runs off quickly thru the dredged drainage lines. As this soil shows slight to medium acidity, it should be tested for acidity and then limed if clovers are to be grown. No other soil treatment is advised until several crops of clover have been grown.

Racoon silt loam, terrace (109)

Racoon silt loam, terrace, is a minor type in Wabash county, occurring in association with Bonnie silt loam, bottom, Type 108, in the northern part of the county. It differs from Bonnie chiefly in having a well-developed subsoil. The surface soil is light yellowish-gray silt loam; the subsurface is light gray; and the subsoil, which begins at 22 to 24 inches, is a pale-yellow and gray, compact, plastic clay loam.

Use and Management.—Racoon silt loam, terrace, has slow surface and underdrainage. Excess water has to be removed by means of furrows and open ditches, as tile will not draw. It is strongly acid and low in organic matter. It does not respond to good treatment as well as do Hoyleton silt loam and Bluford silt loam.

Wade silt loam (121)

Wade silt loam occurs in the region of Bellmont and occupies a total area of about 1½ square miles. It is similar to the immature phase of Wynoose silt loam, Type 165, but is a better soil because the distance to the claypan subsoil is greater.

The surface soil is 7 to 8 inches thick and is a drabbish-gray friable silt loam. The subsurface is light yellowish gray in the upper portion and ashy in the lower portion. The subsoil begins at 24 to 26 inches and is a pale drabbish-gray, compact, plastic clay loam. Below 40 inches the material is lighter and more friable.

Use and Management.—Wade silt loam occurs on nearly level flats. Surface drainage is therefore slow, and underdrainage is slow because of the claypan subsoil. Tile draw if placed only 28 to 30 inches deep, but it is a question whether such an installation would pay. Since this soil responds satisfactorily to good treatment and management, it is suggested that the drainage be taken care of by open ditches and furrows and that sufficient limestone be applied to grow sweet clover. After one or two clover crops, tests should be made to determine the need for phosphate and potash fertilization.

Beaucoup gravelly clay loam, bottom (124)

Beaucoup gravelly clay loam, bottom, occurs in one area of about ¾ of a square mile a mile south of Keensburg. This soil has the same profile as Beaucoup clay loam, bottom, Type 70, previously described, excepting that it has gravel thruout the profile.

Use and Management.—The same management and treatment suggestions apply to this type as to Beaucoup clay loam, bottom. Drainage has been taken care of by the construction of dredge ditches.

Selma loam, terrace (125)

Selma loam, terrace, occurs chiefly in the southern part of Wabash county and occupies a total of 5 square miles. It has slow surface drainage, because of its nearly level topography, but good underdrainage. The surface soil varies from about 7 to 10 inches in thickness and is a grayish-black sandy silt loam or fine sandy silt loam. The subsurface is dark-drab fine sandy silt loam and there is no subsoil development. With increasing depth the color becomes gradually lighter.

Use and Management.—Selma loam, terrace, will grow alfalfa and sweet clover without the application of limestone. It is a productive soil, and no soil treatment is suggested at present other than making provision for fresh organic matter by the growing of legumes and the use of manure.

Bonpas silty clay loam, terrace (126)

Bonpas silty clay loam, terrace, occurs as a low terrace along Bon Pas creek and occupies a total of about 6 square miles. Surface drainage is slow because of the nearly level topography, but underdrainage is good.

The surface soil is about 8 inches thick and is a grayish-black silty clay loam. The subsurface is a dark grayish-drab silty clay loam and the subsoil, which begins at 18 to 20 inches, is a mixed gray-and-yellow somewhat-plastic clay loam. Below about 30 inches the material is friable.

Use and Management.—Bonpas silty clay loam, terrace, is highly productive if well drained and well farmed. Drainage must be provided by means of tile, as there is not enough slope for adequate surface drainage. No soil treatment is suggested for the present other than the growing of legumes and the use of whatever manure is available.

Bonpas clay loam, terrace (129)

Bonpas clay loam, terrace, which occupies a total of nearly 5 square miles in Wabash county, differs from Bonpas silty clay loam, terrace, Type 126, previously described, in being heavier. The heavier texture has considerable agricultural significance, for it slows down underdrainage and makes it necessary to lay lines of tile closer together. It also makes this soil somewhat harder to work.

This soil type is, however, a highly productive soil and needs no treatment for the present other than regular additions of fresh organic matter.

Patton silty clay loam, terrace (142)

Patton silty clay loam, terrace, occurs in the southern part of Wabash county and occupies a total of a little over 4 square miles. It has slow surface drainage but drains well when tile and good outlets have been provided by dredge ditches. This soil is similar to Bonpas silty clay loam, terrace, Type 126, previously described, but differs from it in being lighter colored thruout the profile and in having a less plastic subsoil.

The surface soil is about 7 inches thick and is a drab-colored silty clay loam. The subsurface is a grayish-drab, plastic, silty clay loam. The subsoil, which begins at about 18 to 20 inches, is a light grayish-drab sandy clay loam which is less plastic than the subsurface.

Use and Management.—This soil needs frequent additions of organic matter to improve its physical condition. The use and management suggestions made for Bonpas silty clay loam, terrace, apply to this soil also.

Ava sandy loam (143)

Ava sandy loam occupies a total of about 3¼ square miles in Wabash county and occurs for the most part in the region of and south of Keensburg. It is

higher than the surrounding soils and was formed from wind-blown material. Both surface and underdrainage are rapid. Horizons are not well defined, but there are color and texture differences which make it possible to distinguish surface, subsurface, and subsoil.

The surface soil is 6 to 7 inches thick and is a reddish-brown sandy loam. The subsurface and subsoil are reddish yellow, the subsoil differing from the subsurface in being a little finer textured and slightly compacted.

Use and Management.—Ava sandy loam is not a good corn soil because it does not resist drouth well. It is a good orchard soil, and where limestone and phosphate are applied will grow good alfalfa and sweet clover. Small grains do

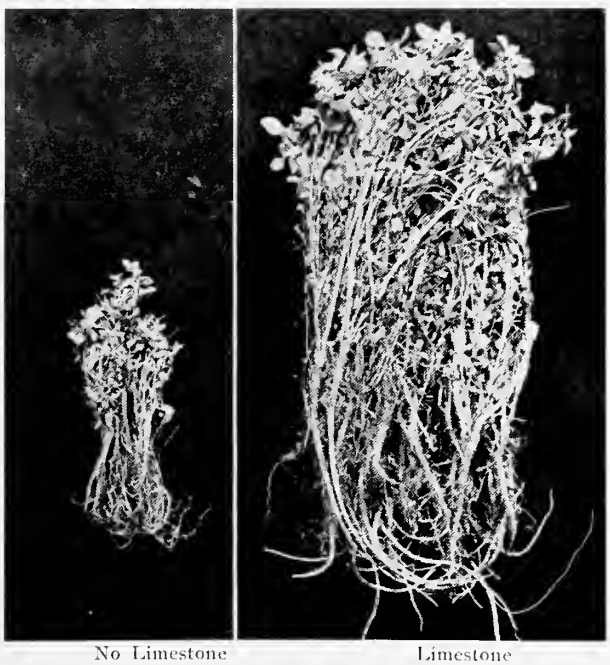

FIG. 8.—SWEET CLOVER DEMANDS LIMESTONE

These plants are from a second-year spring growth of sweet clover. 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.

well, as they mature before the hot, dry weather of July and August, provided the nitrogen and organic-matter deficiencies are taken care of by a good rotation.

Bluford silt loam, immature phase (164)

Bluford silt loam, immature phase, is an important soil in Wabash county because it occupies a relatively large total area, about 37 square miles, and also because it is responsive to good treatment and management. It occurs on the same kind of topography as Bluford silt loam, Type 13, and is similar in appearance tho a better soil. It is acid and low in organic matter, and the more rolling portions are subject to harmful erosion.

The surface soil, which is about 6 inches thick, is a brownish yellow-gray friable silt loam. The upper subsurface is yellow; the lower subsurface, pale

yellow and somewhat ashy. The upper subsoil, which begins at about 18 inches, is a drabbish-yellow, medium-compact, medium-plastic clay loam. The lower subsoil below 28 to 32 inches becomes more friable.

Use and Management.—Bluford silt loam, immature phase, is a soil which does not show its real worth unless given proper treatment. Following the application of limestone at the rate indicated by the acidity test and the growing of sweet clover, satisfactory grain crops may be produced. A short rotation should be used, thus providing for a legume at frequent intervals. It will soon become necessary to use a potash fertilizer unless an abundance of manure is available, and it may be advisable to use phosphate, particularly if alfalfa is grown. With the above treatments yields similar to those secured on the Ewing experiment field can be expected (see Bulletin 425 of this Station).

Wynoose silt loam, immature phase (165)

Wynoose silt loam, immature phase, occupies a total of about 1½ square miles in Wabash county. It occurs as small areas in association with the preceding type, No. 164. Its occurrence is limited to the nearly level areas in this region. Both surface and underdrainage are slow. This soil, like Type 12, is acid and low in nitrogen and organic matter.

The surface soil is 6 to 7 inches thick and is a drabbish-gray friable silt loam. The subsurface is a light yellowish-gray friable silt loam in its upper part and light gray and ashy in its lower part. The subsoil, which begins at 18 to 20 inches, is a compact, plastic clay of a pale drabbish-gray color mottled with yellow. At about 38 inches in depth the material is more friable.

Use and Management.—The management suggestions made for Wynoose silt loam, Type 12, apply to this soil also. It differs from the mature type in that it responds better to good soil treatment and management.

Cisne silt loam, deep phase (166)

Cisne silt loam, deep phase, occupies a total of a little over one square mile in Wabash county and occurs in association with the deep phase of Hoyleton silt loam, the next type to be discussed. It is very similar to Type 2, previously described, differing from it in depth to the claypan subsoil. In Type 2 the subsoil is 18 to 20 inches deep, while in this deep phase it is 24 to 26 inches deep. This difference in depth to the subsoil makes this deep phase a better soil.

Use and Management.—The suggestions as to use and management of Cisne silt loam, Type 2, apply to this deep phase also.

Hoyleton silt loam, deep phase (167)

Hoyleton silt loam, deep phase, occurs in the north-central part of Wabash county and occupies a total of about 11.5 square miles. It is found on slopes with grades of 1.5 to 3.5 percent and was developed from loess under a grass vegetation. It is low in nitrogen and organic matter and is acid. It is similar to Type 3, previously described, but differs from it in that the depth to the subsoil is 20 to 22 inches instead of 16 to 18 inches.

Use and Management.—The use and management suggestions made for Hoyleton silt loam, Type 3, apply to the deep phase of this type also. This deep phase, however, responds somewhat better to good treatment tho both of these Hoyleton types respond more consistently than do the associated Cisne silt loams, Types 2 and 166.

Flora silt loam, terrace (168)

Flora silt loam, terrace, occurs in small areas northwest of Patton and northeast of Keensburg. The total area is only about half a square mile.

Use and Management.—This soil is similar, except in formation, to Wynoose silt loam, Type 12, and requires the same management and treatment.

Freeburg silt loam, terrace (169)

Freeburg silt loam, terrace, is a minor type in Wabash county, occupying a total area of less than ¾ of a square mile. It occurs in narrow strips as a terrace formation just to the northwest of Patton and about a mile northeast of Allendale.

Use and Management.—This soil is similar to Bluford silt loam, immature phase, Type 164, except in formation, and requires the same management and treatment as suggested for that soil, page 21.

Okaw silt loam, terrace, immature phase (173)

Okaw silt loam, terrace, immature phase, occurs for the most part along Bon Pas creek in the west-central part of Wabash county. It occupies a total area of about 4½ square miles. This soil is found only on nearly level topography and is characterized by slow surface drainage, because of insufficient slope, as well as by slow underdrainage because of its heavy, slowly permeable subsoil.

The surface soil is shallow, rarely exceeding 5 inches, and is a yellowish-gray friable silt loam. The subsurface is light gray with some yellow mottling. The subsoil, which begins at 12 to 14 inches, is a thick, light drabbish-gray, yellow-mottled, compact, plastic clay loam. Lime concretions are frequently found at depths below 30 inches. The soil is medium acid in the surface but will grow red clovers without lime in favorable years. The organic-matter content is low.

Use and Management.—Okaw silt loam, terrace, immature phase, is not easily farmed, because of difficulty in draining it properly. Furrows and open ditches have to be depended on to remove surplus water, as tile will not draw. Roots do not penetrate the heavy subsoil freely, and crops growing on this soil are therefore sensitive to dry weather. Limestone should be applied in sufficient amount to make the growth of sweet clover possible, and good surface drainage should be established. It is probably better to use this soil for wheat, grasses, and soybeans than for corn.

Cowling fine sandy loam, terrace (174)

Cowling fine sandy loam, terrace, occupies a total area of about 5¼ square miles, chiefly in the southern part of Wabash county. It is found on nearly level

to undulating topography and has good surface drainage and underdrainage. The surface soil is 6 to 10 inches thick and is a yellowish-gray fine sandy loam. The subsurface is pale yellow, and the subsoil, which begins at 18 to 20 inches, is a mixed pale-yellow and gray, medium-compact, medium-plastic, fine sandy clay loam.

Use and Management.—Cowling fine sandy loam, terrace, responds well to good soil treatment and management. A medium application of limestone is required for sweet clover or alfalfa and for a good growth of red clover. This soil is particularly well adapted to alfalfa and vegetable crops and produces good small grains after the nitrogen deficiency has been taken care of by growing legumes.

Unity sandy loam, terrace (175)

Unity sandy loam, terrace, occupies a total of a little over 4 square miles in the southern and eastern parts of Wabash county. It is found on undulating to gently rolling topography and has good surface drainage and underdrainage.

The surface soil varies from a reddish-yellow to a yellowish-gray sandy loam. The subsurface is yellow sandy loam and the subsoil, which varies in depth from 12 to 20 inches, is a reddish-yellow medium-compact sandy loam. The material below about 30 inches is a loose reddish-yellow sand. This soil is low in organic matter and nitrogen and is acid.

Use and Management.—Unity sandy loam, terrace, tends to be drouthy and is not adapted to corn. Limestone should be applied in the amount indicated by the acidity test, and sweet clover should be grown in order to supply fresh organic matter and nitrogen. The small grains may then be grown. Alfalfa does well, tho phosphate should be applied where alfalfa is to be grown.

Marissa silt loam, terrace (176)

Marissa silt loam, terrace, occupies a total of nearly 5 square miles in the southern and eastern parts of Wabash county. It is a slightly acid grassland soil.

This type has developed far enough to show a grayish cast in the surface and heavy gray specking in the subsurface. The subsoil, which begins at about 17 inches, is brownish yellow, medium compact, and medium plastic.

Use and Management.—While this soil is not well understood, it can be said that it is productive if well managed. Good management includes the application of enough limestone to grow sweet clover. The amount to apply should be determined by careful tests. It is likely that additional soil treatment will be needed after a limestone-legume program has been followed a few years, but no other treatment is suggested for the early stages of a soil-improving program.

Orio silt loam, terrace (177)

Orio silt loam, terrace, is a minor type in Wabash county, occupying a total area of less than a square mile. It has developed under a grass vegetation, occurring chiefly in the southern part of the county on nearly level-lying areas that originally were poorly drained.

The surface soil is a grayish-brown silt loam about 7 inches thick. The subsurface is darker and heavier than the surface and has the appearance of being specked with gray rather than being dark brown with a grayish cast. The subsoil begins at a depth of 16 to 18 inches and is drabbish-brown clay loam mottled with gray. It is moderately plastic and compact but will drain with tile. Below about 30 inches the material is very friable and at about 50 inches is commonly calcareous.

Use and Management.—This soil is well adapted to corn, and if well drained and well farmed, including the use of legumes, it is very productive. It is not an alfalfa soil but will grow any of the other ordinary crops well. A medium application of limestone is needed, but before applying limestone, acidity tests should be made to determine the rate of application required.

Dupo silt loam, bottom (180)

Dupo silt loam, bottom, occupies a total of about 2¼ square miles in Wabash county and occurs in some of the bottoms tributary to the Wabash river bottom. This soil consists of recently deposited silty material resting on previously deposited clay or clay loam. The recent sediment varies in thickness from about 6 to 16 inches and has little or no profile development. It is dark drab in color, and the underlying heavier material is drab or gray.

Use and Management.—When protected from overflow and well drained, this soil produces well, particularly the areas with the deeper recent deposits of sediment. No soil treatment is suggested unless overflow protection has been provided, in which case acidity tests should be made and limestone applied as needed to grow legumes.

Riley fine sandy loam, bottom (181)

Riley fine sandy loam, bottom, occurs in the Wabash bottom and occupies a total of about 4½ square miles. It is subject to overflow but has good surface drainage and underdrainage.

The surface soil is a light-brown fine sandy loam 8 to 10 inches thick. The subsurface is light yellowish brown, and the subsoil is a grayish-yellow fine sand of variable thickness resting on somewhat coarser sandy material.

Use and Management.—Riley fine sandy loam, bottom, will grow alfalfa and sweet clover without lime and is well adapted to these crops except for the difficulties resulting from overflow. It is not a good corn soil because of a tendency to be drouthy but it is productive for all other ordinary crops.

Ava silt loam, immature phase (214)

Ava silt loam, immature phase, occupies a total of 4½ square miles in Wabash county and occurs chiefly east of Allendale and also near Mt. Carmel. It occurs on rolling upland that is now, or was formerly, timbered. The surface and subsurface drainage are rapid.

The surface soil, which is 6 or 7 inches thick, is a brownish-yellow friable silt loam. The subsurface is a friable yellow silt loam. The subsoil, which begins at

12 to 14 inches, is a slightly compacted, slightly plastic, reddish-yellow silty clay loam. This soil type has a somewhat thicker and darker colored surface soil, a more open subsoil, and is less leached than Ava silt loam, Type 14, which occupies similar topography farther inland from Wabash river.

Use and Management.—This soil is particularly well adapted to the growing of vegetables and fruit, and when properly treated produces good crops of small grains. Altho it is not considered a good corn soil, under a good crop rotation it will produce good yields in favorable seasons. Erosion is very harmful, as this soil type occurs on slopes with grades of about 3 to 7 percent and runoff is heavy. Terraces, if accompanied by proper soil treatment, are advisable, and full use should be made of vegetative protection and contour farming. Limestone should be used as indicated by the acidity test, and legumes should be grown at frequent intervals to take care of the nitrogen and organic-matter deficiencies.

Clement silt loam in youthful and immature areas (215)

Clement silt loam in youthful and immature areas is a type which occurs on the rolling to steep upland along the eastern side of Wabash county. It occupies a total of a little over 4 square miles.

The surface soil varies from 0 to 4 inches in thickness and is a yellow friable silt loam. The subsurface and subsoil are reddish yellow in color and friable in texture.

This type differs from Clement silt loam No. 15 in being less thoroly leached and is consequently more productive, but because of the steep slopes it should not be cultivated. It should be kept in timber, particularly where it occurs on the steeper slopes. The slopes that are not so steep might be devoted to permanent pasture.

SUMMARY OF CHARACTERISTICS OF WABASH COUNTY SOILS

The agriculturally more important characteristics and properties of the soil types occurring in Wabash county are summarized in Table 2. Topography, drainage, reaction with respect to acidity, the contents of organic matter and of available phosphorus, all are indicated, together with an index of the inherent productivity of each type whether used for field crops, for pasture, or for forest.

A large majority of the soil types in this county it will be noted are acid, therefore in need of limestone. Most of them are also low in phosphorus as well as in organic matter. The general topography of the county and its drainage have already been discussed (page 5).

The information in this table should not be taken to mean that every farm or field of a given soil type will necessarily exhibit the same characteristics as 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 such test or tests.

TABLE 2.—WABASH 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 indexes[4]		
				Surface	Under				Field crops	Pasture	Forest
2	Cisne silt loam	12	Nearly level	Slow	Slow	Acid	Low	Low	9	C	C
3	Hoyleton silt loam	12	Gently rolling	Moderate	Slow	Acid	Low	Low	8	B	B
7	Eroded sandy loam	13	Steep	Rapid	Moderate	Acid	Low	Low	10	C	B
8	Eroded gravelly loam	13	Steep	Rapid	Moderate	Acid	Low	Low	10	C	C
12	Wynoose silt loam	14	Nearly level	Slow	Slow	Acid	Low	Low	9	C	C
13	Bluford silt loam	15	Gently rolling	Moderate	Slow	Acid	Low	Low	8	B	B
14	Ava silt loam	16	Rolling	Rapid	Moderate	Acid	Low	Low	8	C	A
15	Clement silt loam	17	Steep	Rapid	Moderate	Acid	Low	Low	10	C	B
70	Beaucoup clay loam, bottom	17	Nearly level	Slow	Slow	Neutral	Medium	Medium	4	..	..
72	Sharon loam, bottom	17	Nearly level	Moderate	Moderate	Neutral	Medium	Medium	6	B	A
73	Huntsville loam, bottom	17	Nearly level	Moderate	Moderate	Neutral	Medium	Medium	5	A	A
75	Drury fine sandy loam, bottom	18	Nearly level	Moderate	Moderate	Neutral	Medium	Low	5	A	A
86	Keyesport silt loam	18	Gently sloping	Moderate	Moderate	Acid	Low	Low	7	B	A
108	Bonnie silt loam, bottom	18	Nearly level	Slow	Moderate	Neutral	Low	Low	5	A	A
109	Racoon silt loam, terrace	19	Nearly level	Slow	Slow	Acid	Low	Low	8	B	C
121	Wade silt loam	19	Nearly level	Slow	Slow	Acid	Low	Low	7	B	B
124	Beaucoup gravelly clay loam, bottom	19	Nearly level	Slow	Moderate	Neutral	Medium	Medium	6	C	B
125	Selma loam, terrace	19	Nearly level	Slow	Moderate	Neutral	Medium	High	4	..	..
126	Bonpas silty clay loam, terrace	20	Nearly level	Slow	Moderate	Neutral	High	High	2	..	..
129	Bonpas clay loam, terrace	20	Nearly level	Slow	Moderate	Neutral	High	High	2	..	..
142	Patton silty clay loam, terrace	20	Nearly level	Slow	Moderate	Neutral	Medium	Medium	5	B	A
143	Ava sandy loam	20	Rolling	Rapid	Rapid	Acid	Low	Low	8	B	A
164	Bluford silt loam, immature phase	21	Gently rolling	Moderate	Slow	Acid	Low	Low	7	B	A
165	Wynoose silt loam, immature phase	22	Nearly level	Slow	Slow	Acid	Low	Low	8	B	B
166	Cisne silt loam, deep phase	22	Nearly level	Slow	Slow	Acid	Low	Low	8	C	C

(Table is concluded on page 28)

TABLE 2.—WABASH COUNTY SOILS—*Concluded*

167	Hoyleton silt loam, deep phase	22	Gently rolling	Moderate	Slow	Acid	Low	Low	7	B	B
168	Flora silt loam, terrace	23	Nearly level	Slow	Slow	Acid	Low	Low	9	C	C
169	Freeburg silt loam, terrace	23	Gently rolling	Moderate	Slow	Acid	Low	Low	8	B	A
173	Okaw silt loam, terrace immature phase	23	Nearly level	Slow	Slow	Acid	Low	Low	7	B	A
174	Cowling fine sandy loam, terrace	23	Nearly level	Moderate	Moderate	Acid	Low	Low	7	B	A
175	Unity sandy loam, terrace	24	Gently rolling	Moderate	Moderate	Acid	Medium	Low	8	B	A
176	Marissa silt loam, terrace	24	Gently rolling	Moderate	Moderate	Acid	Medium	Medium	5	A	A
177	Orio silt loam, terrace	24	Nearly level	Slow	Slow	Acid	Medium	Medium	5	A	A
180	Dupo silt loam, bottom	25	Nearly level	Moderate	Moderate	Neutral	Medium	Medium	6	A	A
181	Riley fine sandy loam, bottom	25	Nearly level	Moderate	Rapid	Neutral	Medium	Low	7	B	A
214	Ava silt loam, immature phase	25	Rolling	Rapid	Moderate	Acid	Low	Low	7	B	A
215	Clement silt loam in youthful and immature areas	26	Steep	Rapid	Moderate	Acid	Low	Low	9	C	A

[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 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. The indexes for pasture and forest are indicated by A, B, and C, with A signifying the best and C the poorest.

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