How to Use THE SOIL SURVEY REPORT

FARMERS who have lived in one locality for a long time come to know about the soil differences on their own farms and on those of their immediate neighbors. What they do not know, unless a soil survey has been made, is how nearly their soils are like those on experiment fields or farms from which higher yields are reported. They do not know whether these higher yields are from soils like their own or so different that they could not hope to get equally high returns, even if they adopted the practices followed in these other places. The similarities and differences among soils are known only after a map of the soils has been made. Knowing what kind of soil one has and comparing it with soils on which new developments have proved successful will prevent some of the risk in trying new methods and varieties.

SOILS OF A PARTICULAR FARM

To find what soils are on any farm or other land, locate the tract on the soil map, which is in the envelope inside the back cover. This is easily done by finding the locality the farm is known to be in and locating its boundaries by such landmarks as roads, streams, villages, and other features.

Each kind of soil is marked with a symbol on the map; for example, all soils that are marked Dsr are of the same kind. To find the name of the soil so marked, look at the legend printed near the margin of the map and find Dsr. The color of the symbol as it appears in the legend will be the same as the color in which it appears on the map. Dsr stands for Dewey silt loam, slightly eroded undulating phase. A section of this report tells what this phase is like, for what it is mainly used, and some of the uses to which it is suited.

Suppose one wishes to know how productive is Dewey silt loam, slightly eroded undulating phase? Find the soil name in the left-hand column of table 7, and in the columns to the right note the expected acre yields for important crops. Compare the yields given for this soil with those listed for other soils in the county.

Or suppose one wants to know what is good use and management for Dewey silt loam, slightly eroded undulating phase. This information is given in the section on Soil Use and Management. The soils are grouped according to similarity in management, and the management requirements in each soil group are discussed.

SOILS OF THE COUNTY AS A WHOLE

If a general idea of the soils of the county is wanted, read the introductory part of the section on Soils. This tells where the principal kinds are found, what they are like, and how they are related to one another. Then study the soil map and notice how the different kinds of soils tend to be arranged in different localities. These patterns are likely to be associated with well-recognized differences in type of farming and land use.

A newcomer who considers purchasing a farm in the county will want to know about the climate as well as the soils; the types and sizes of farms; the principal farm products and how they are marketed; the kinds and conditions of farm tenure; kinds of farm buildings, equipment, and machinery; availability of schools, churches, highways, railroads, and telephone and electric services; water supplies; industries; and towns, villages, and population characteristics. This information will be found in the sections on General Nature of the Area and on Agriculture.

Students and others interested in how the soils of the county were formed and how they are related to the great soil groups of the world should read the section on Morphology, Genesis, and Classification of Soils.

This publication on the soil survey of Limestone County, Ala., is a cooperative contribution from the—

SOIL CONSERVATION SERVICE

ROBERT M. SALTER, *Chief*

CHARLES E. KELLOGG, *Chief, Soil Survey*

ALABAMA DEPARTMENT OF AGRICULTURE AND INDUSTRIES

JOE N. POOLE, *Commissioner*

L. G. BRACKEEN, *In Charge Soil Survey*

ALABAMA AGRICULTURAL EXPERIMENT STATION

M. J. FUNCHESS, *Director*

and the

TENNESSEE VALLEY AUTHORITY

Series 1941, No. 5 Issued March 1953

SOIL SURVEY OF LIMESTONE COUNTY, ALABAMA

By A. H. HASTY, in Charge, K. V. GOODMAN, and ROBERT WILDERMUTH, Division of Soil Survey,[1] Bureau of Plant Industry, Soils, and Agricultural Engineering, Agricultural Research Administration, United States Department of Agriculture, and HOYT SHERARD, Alabama Department of Agriculture and Industries, and E. D. McCALL, H. R. BENFORD, and H. J. WESSON, Alabama Agricultural Experiment Station

Area inspected by J. W. MOON, Principal Soil Scientist, Division of Soil Survey

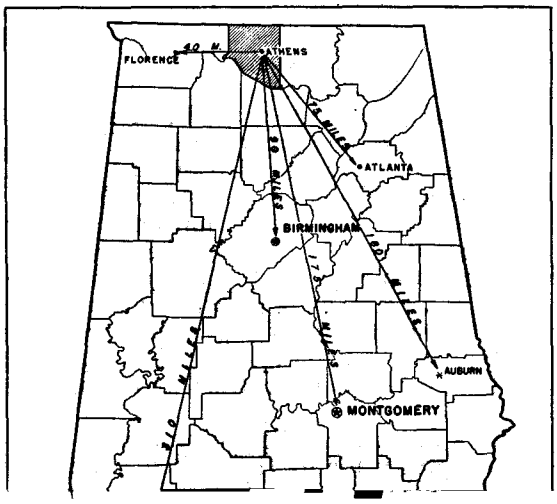
United States Department of Agriculture in cooperation with the Alabama Department of Agriculture and Industries, Alabama Agricultural Experiment Station, and Tennessee Valley Authority

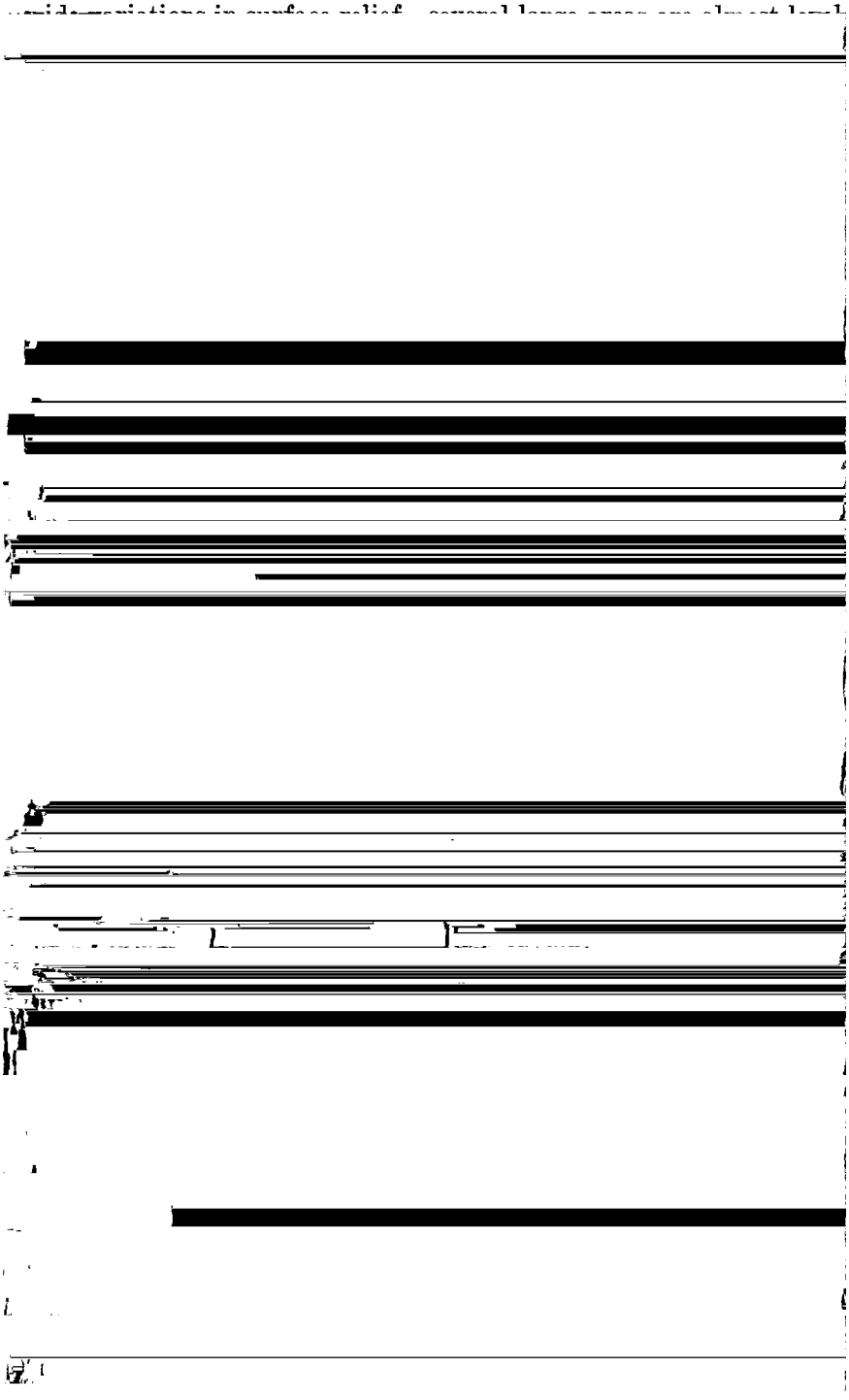
CONTENTS

LIMESTONE COUNTY forms the central part of the most north-

physiographic subdivisions: The Limestone Valleys, the Plateau, and the Alluvial Plains (fig. 2). The first two of these subdivisions cover most of the county, whereas the Alluvial Plains occur along the rivers and creeks throughout the area.

The Limestone Valleys, locally called the red lands, include the southeastern quarter of the county, or practically all the part south of township 3, south, as well as other smaller areas along the Elk River and the eastern border of the county. This section ranges from about 12 miles in width in the eastern part to about 1 mile in the western. The area has an undulating to rolling relief, the elevation





The Alluvial Plains section includes nearly level to undulating first bottoms and stream terraces along the Tennessee and the Elk Rivers and along some of the larger creeks. The areas in this physiographic subdivision are from a few feet to more than a mile wide. The first bottoms are subject to overflow from streams where they are not protected by the system of dams upstream on the Tennessee River and its tributaries. In addition to the areas of general alluvium there are some large shallow depressions, or sinks, throughout the county that consist of local alluvium. Most of these depressions are subject to at least temporary inundation during periods of heavy rainfall. The stream terraces are often as much as 100 feet above overflow.

The Tennessee River and its tributaries comprise the drainage system of the county. Some drainage is through subterranean outlets in sinks, and in localities where most of the drainage is through these underground passages the surface drainage system is not developed. Surface drainage is adequate for agriculture, except in parts of the first bottoms and in some of the sinks and depressions.

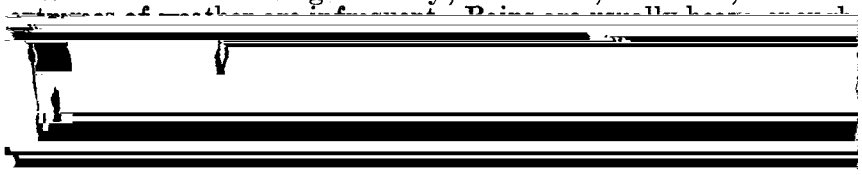
Water for farm use is obtained chiefly from wells, springs, and streams. Some farmers depend on cisterns for drinking water, and artificial ponds are sometimes the source of water for livestock. Springs are numerous in the gray lands section. The entire water supply for Athens is piped from a group of springs in a valley in that part of the county. Water is obtained from wells in the Plateau section at depths of 25 to 40 feet. Springs occur much less frequently in the Limestone Valleys section, and well water is at a depth of 60 to 120 feet.

CLIMATE

The county has a temperate and continental climate. Winters are moderate, the cold periods being short and erratic. Summers are warm but maximum temperatures of 100° F. are rare. The difference between the average summer and winter temperatures is 35.2°. The highest temperature on record is 108°, and the lowest, −12°. The average total precipitation is 48.72 inches; the total precipitation for the driest year is 34.70 inches; and that for the wettest, 68.75 inches. Snowfall averages 2.3 inches.

Moisture conditions are favorable for crop growth through spring and early summer, but late in summer and early in fall there is relatively little precipitation. In July and August the rainfall is about as heavy as in any of the spring months, but the high prevailing rate of evaporation nullifies its effectiveness to a considerable extent, and reserve moisture from earlier months is also reduced by transpiration and evaporation. Consequently, tillage late in summer and early in fall is not favorable for optimum growth of pasture or for winter wheat, crimson clover, vetch, or similar fall-sown crops. The dry period, however, is favorable for harvesting.

Wind is of low average velocity; hailstorms, tornadoes, or other



The average frost-free season extends from March 27 to November 7, a period of 224 days. This is sufficient time for practically all field crops grown in this part of the United States to mature. Late spring frosts occasionally damage fruit crops, but early fall frosts are seldom if ever harmful to any but susceptible late-planted truck crops. In winter, field work is greatly reduced but many outside farm activities can be continued. The ground is rarely frozen to a depth of more than a few inches, and it usually thaws in a few days. Alfalfa and fall-sown crops are sometimes damaged slightly by the recurrent periods of freezing and thawing, which is characteristic of late fall, winter, and early spring. Frost also increases the erosion hazard by loosening the soil.

Normal monthly, seasonal, and annual temperature and precipitation data representative of weather conditions in the county are given in table 1. These data are compiled from records at the United States Weather Bureau station at Decatur, which is just across the Tennessee River, in Morgan County, Ala.

TABLE 1.—*Normal monthly, seasonal, and annual temperature and precipitation at Decatur, Morgan County, Ala.*

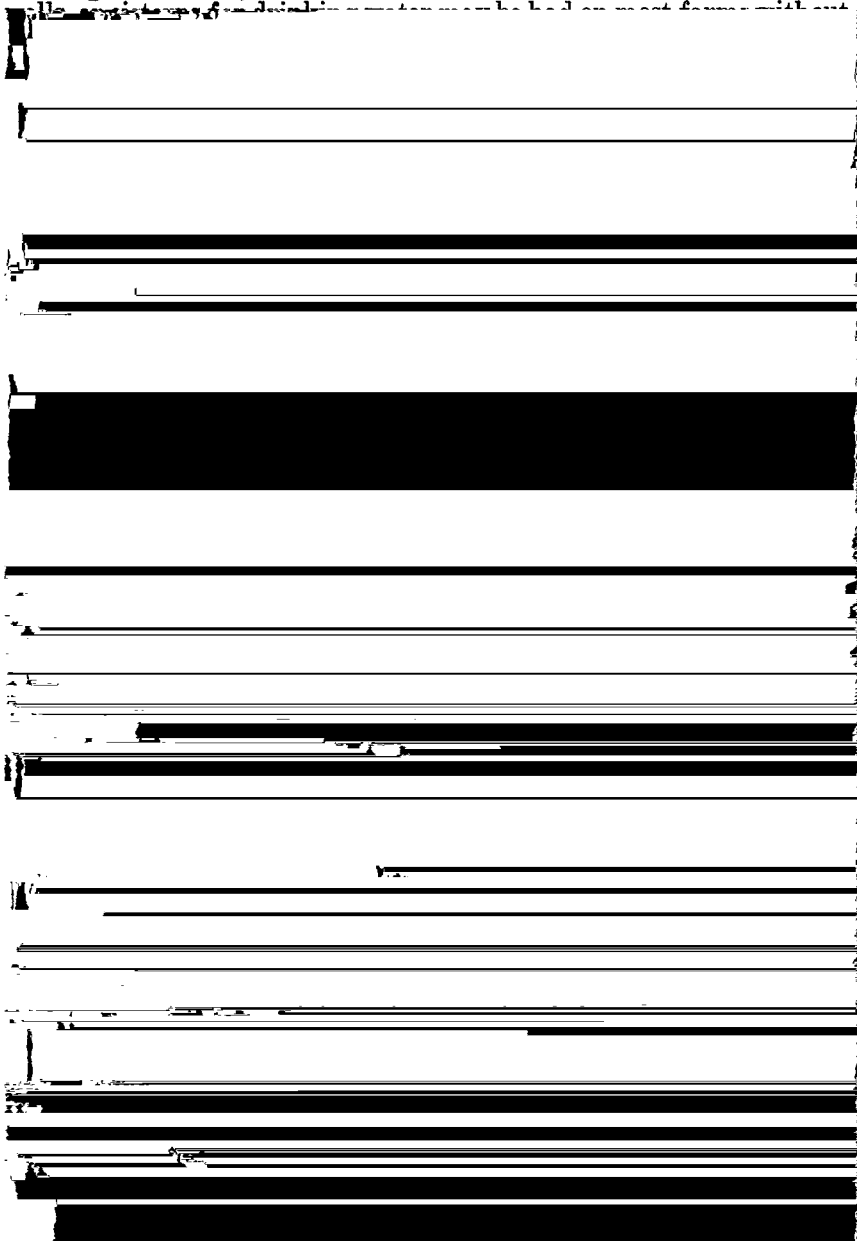
[Elevation, 573 feet]

Month	Temperature			Precipitation			
	Mean	Absolute maximum	Absolute minimum	Mean	Total for the driest year	Total for the wettest year	Average snowfall
	° *F.*	° *F.*	° *F.*	*Inches*	*Inches*	*Inches*	*Inches*
December	45.5	76	0	5.04	4.50	9.68	0.6
January	42.4	79	−5	4.63	1.90	8.46	.6
February	44.0	84	−12	4.43	1.25	6.91	.9
Winter	44.0	84	−12	14.10	7.65	25.05	2.1
March	53.1	93	4	5.62	7.60	3.89	.1
April	61.8	92	26	4.48	2.78	4.25	(1)
May	70.0	100	34	3.83	3.04	1.97	0
Spring	61.6	100	4	13.93	13.42	10.11	.1
June	77.9	108	47	3.79	1.51	6.53	0
July	80.3	107	54	4.35	5.39	4.05	0
August	79.3	106	52	3.91	2.91	8.09	0
Summer	79.2	108	47	12.05	9.81	18.67	0
September	74.1	104	36	2.37	1.60	2.37	0
October	62.2	100	27	3.07	.30	8.83	0
November	50.9	85	10	3.20	1.92	3.72	.1
Fall	62.4	104	10	8.64	3.82	14.92	.1
Year	61.8	108	−12	48.72	[2] 34.70	[3] 68.75	2.3

[1] Trace. [2] In 1904. [3] In 1932.

WATER SUPPLY

The water supply is generally good for all purposes. Springs are numerous along many of the larger streams, especially in the northwestern part of the county, and consequently there is a good supply of running water for cattle and livestock on many farms. Where running water is not available, artificial ponds for cattle, work stock, and hogs can usually be constructed with little effort or cost. Springs,



[redacted]ervoir, approximately 30,000 acres of which is in Limestone County, affords considerable fishing and recreation.


A


B

ment was on the more elevated areas along Limestone Creek and other creeks in the eastern part of the county.

The population of the county has shown a fairly steady increase, and in 1950 there were 35,766 inhabitants. Athens, the largest town and county seat, had a population of 6,309; Ardmore, 408; Elkmont, 179; and Mooresville, 101. Most of the present population is native-born, and settlement is fairly uniform throughout the county. The Negro population is confined almost entirely to the red lands section.

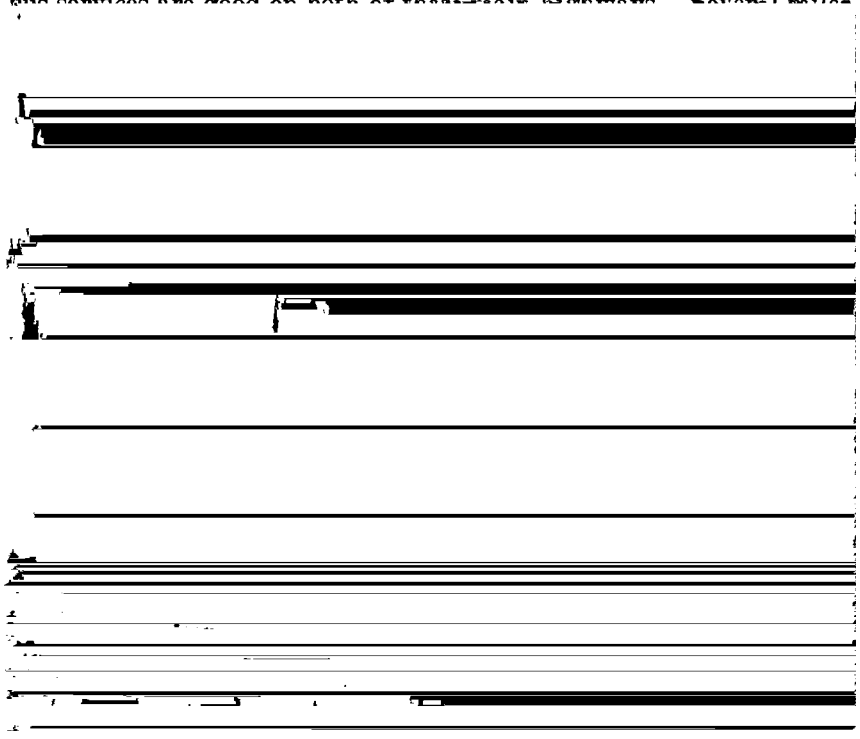
INDUSTRIES

Except for the cheese factory at Ardmore and a few small scattered sawmills, there is little industrial employment in the county. A large percentage of the agricultural products produced in the county are shipped out for processing and manufacture.

TRANSPORTATION AND MARKETS

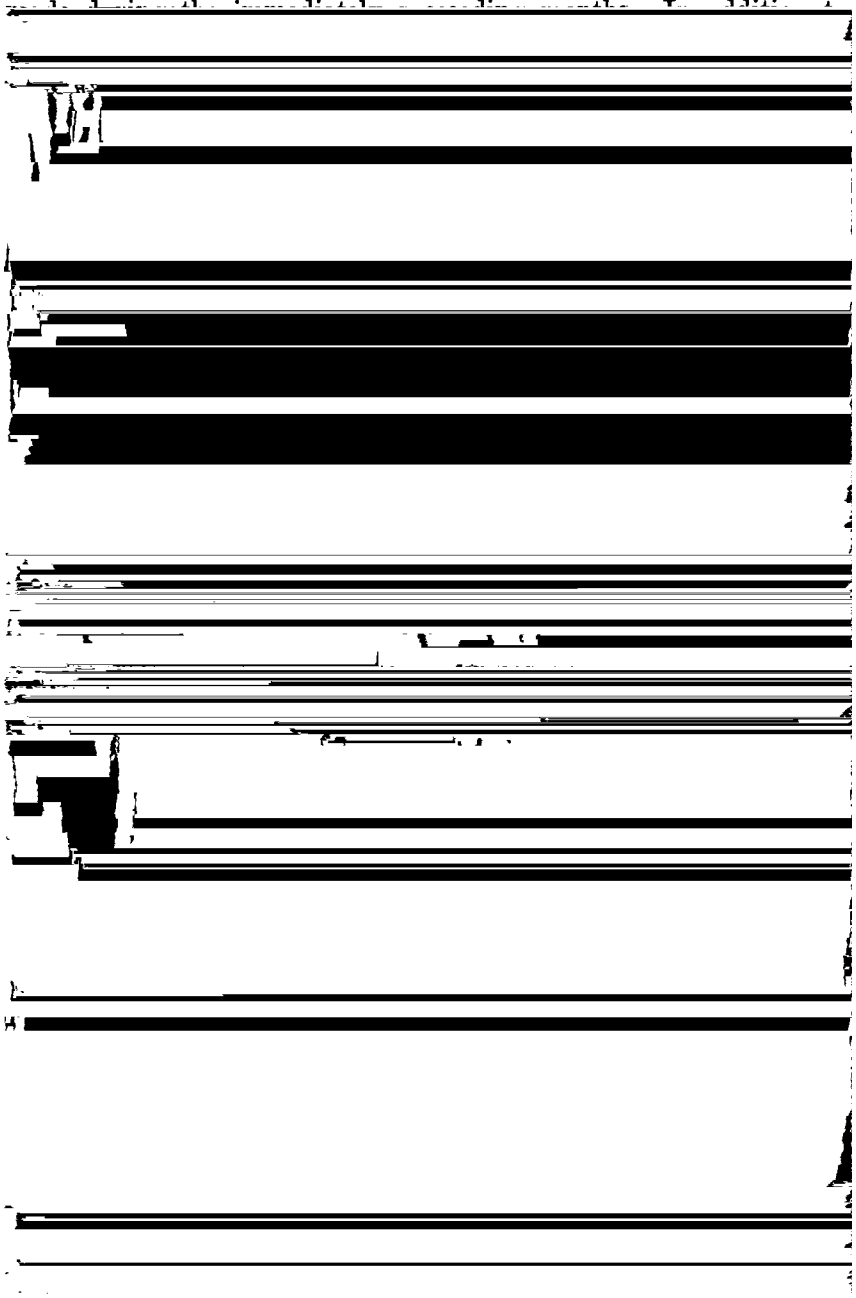
Two main-line railroads cross the county. The Louisville and Nashville Railroad (Nashville to Birmingham) crosses north to south through the central part of the county. From Athens southward this is a double-track road; northward from Athens to Nashville are two single-track routes, one through Ardmore and the other through Elkmont. The Chattanooga to Memphis division of the Southern Railway crosses the southeastern corner of the county.

United States Highway No. 31, extending north to south across the county, intersects east-west Highway No. 72, at Athens. Freight and bus services are good on both of these main highways. Several miles



Churches of various denominations accommodate practically all communities.

Rural electrification lines are being extended to nearly all parts of the county, and on May 1, 1941, there were a few more than 1,100 users in the rural sections. Numerous additions were expected to be



the Tennessee River. Cotton Port, an abandoned town a little southwest of Mooresville, was the chief shipping point for the county. Some supplies were brought down the Tennessee River and sold to early settlers.

Because rapid shipping facilities were lacking, and for other reasons, agriculture was somewhat retarded at first, but each farmer grew crops ample for home consumption. The first rapid transportation was furnished by the Southern Railway, which was constructed across the southern part of the county about 1856.

CROPS

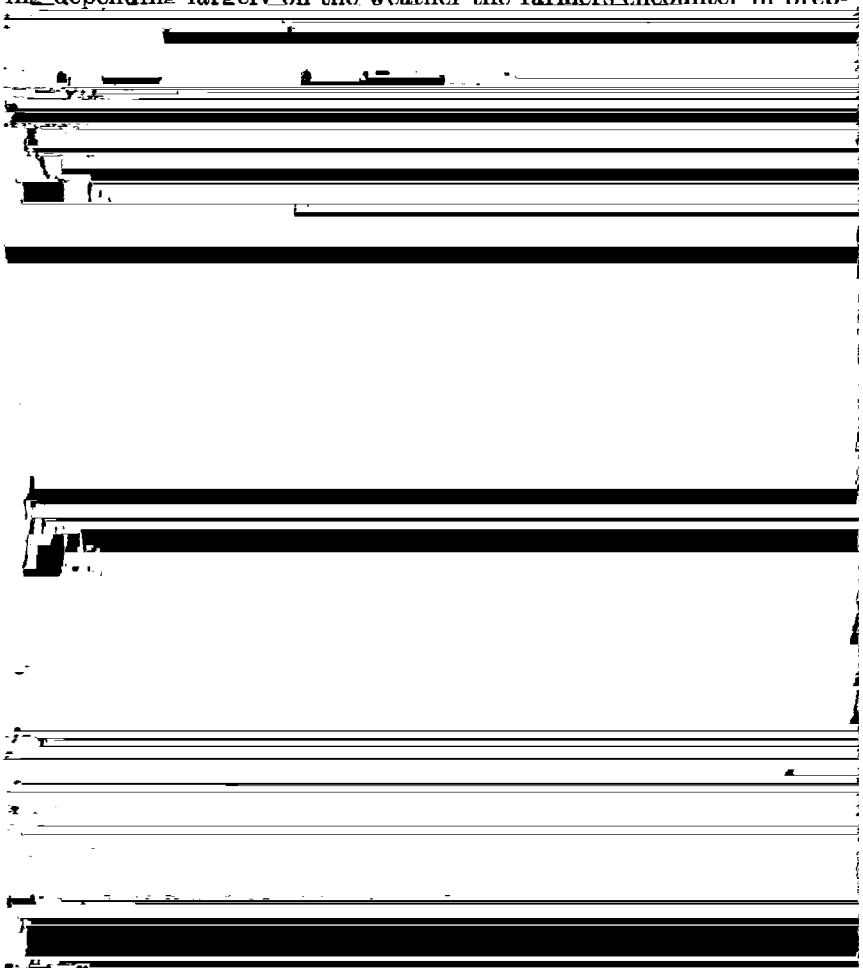
Cotton was planted on more land than any other single crop until

COTTON

Cotton is the chief cash crop, and on a large percentage of the farms the farming program is built around its production. Limestone County usually ranks among the first six or eight counties of the State in cotton production. Cotton has been planted on a greater acreage than any other crop in the county for recent census years except 1939, when corn exceeded this crop.

In 1929 the cotton acreage almost doubled that of corn, the crop of second importance. Since then cotton acreage has greatly decreased, largely because of Federal control, while that of corn has increased. In 1944 the total cotton acreage was only 60,589, as compared with the 106,844 acres planted in 1929. Though the acreage has decreased almost 50 percent since 1929, the total yield has not been reduced in proportion because there has been a better selection of land and the use of improved management practices.

Nearly all the cotton is planted in April and May, the time of planting depending largely on the weather the farmers encounter in prep-

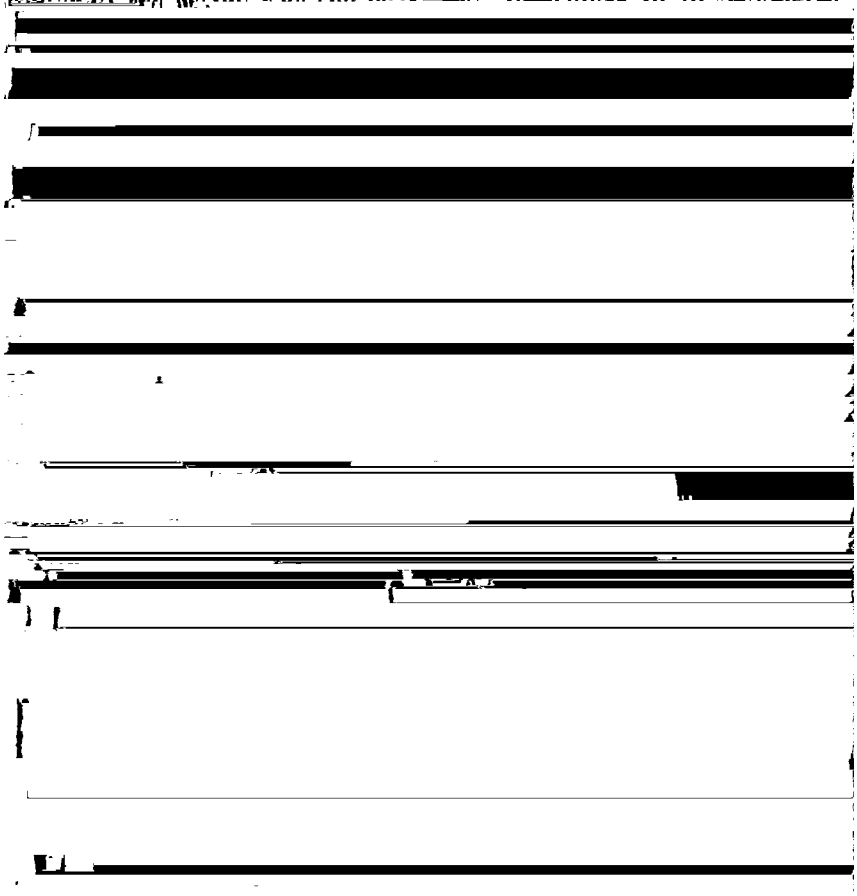


CORN

Corn has ranked a close second to cotton throughout most of the history of the county. In 1939 corn for grain exceeded cotton by more than 7,000 acres, but in 1944 it reverted to second place again. The acreage of hybrid corn is increasing rapidly. The county produces somewhat more corn than is consumed on the farms, and the greater part of the surplus is shipped by truck to markets in Decatur, Florence, and Huntsville, or sold to feed mills in Athens where it can be ground and shipped in mixed feeds. Most of the surplus is produced on the bottom lands along the rivers and larger creeks.

The average long-term yield has been slightly less than 17 bushels an acre for the county. The shift of corn from bottom lands to uplands as a result of flooding large parts of the bottom land along the Tennessee and Elk Rivers and larger creeks is probably reflected in the somewhat lower than average acre yield reported for 1939. Many farmers feel that they can increase the acre yield considerably through careful choice of land and better management practices. In 1944 the yield was 20.8 bushels per acre.

Many farmers plant vetch or some other winter cover crop in the cotton or the corn row the latter part of August or in September



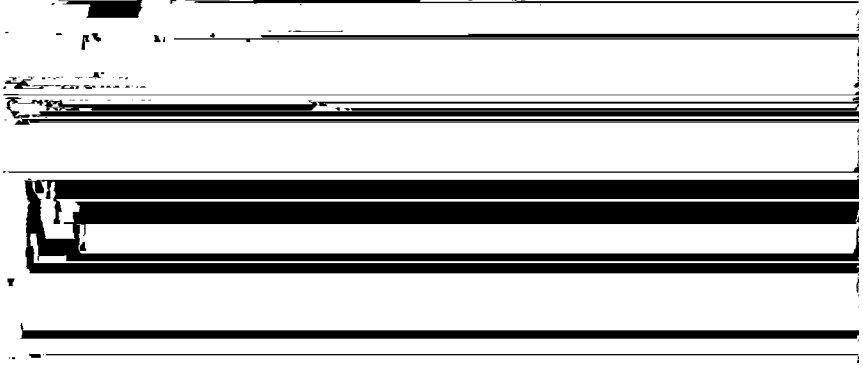
Much of the hay planted in past years has been cowpeas and soybeans, with some red clover and timothy. Lespedeza, sericea lespedeza, and alfalfa are becoming more important. Most of the alfalfa acreage is on red soils, because little is known about its growth on the gray soils. A large part of the hay produced is consumed on the farms. Though many work animals have been replaced by tractors, the increase in dairy and beef cattle has tended to maintain or increase the need for hay. A moderate quantity of hay is used in mixed feeds and some is shipped by truck.

Lespedeza is sown on a large acreage, mostly for hay but to some extent for seed. Yields of ½ to 1½ tons of hay an acre are obtained, some of which is sold on outside markets. The crop is generally planted during March, either in a small-grain field or alone on a freshly prepared seedbed. In some instances the seed is broadcast on unplowed land and the soil is then scarified. For hay, 25 to 50 pounds of seed an acre is sown. The seed is broadcast by various hand-operated blowers and covered lightly or planted by small grain drills with a lespedeza attachment. Little fertilizer is applied directly under lespedeza, but in some instances a moderate quantity of phosphate may be used. Only one planting is needed, as lespedeza reseeds itself.

Unless care has been exercised in previous years to keep down weeds on the land, there are likely to be many weeds on the lespedeza field. To prevent these weeds from interfering with harvesting, many farmers prefer to eradicate them by going over the field once or twice during summer with a mowing machine set to cut high. The weeds are then raked off so that the hay will be as clean as possible.

Sericea lespedeza is an important hay and grazing crop. In preparing for seeding, the land is plowed in fall or early in spring and then harrowed a few times to kill weeds and grass. From 30 to 40 pounds an acre of seed is planted during March, April, May, or July. If covered, the covering should be extremely light. During the first year little if any hay is expected, because the stands are irregular and the growth is not vigorous enough to keep down weeds, but during successive years yields are good. The crop is cut once or twice each year when the stems are 15 to 18 inches high. The use of 600 to 1,000 pounds of basic slag or the equivalent in phosphate per acre is recommended (*6*). Sericea lespedeza, being a perennial, will probably continue to produce hay for at least 4 years or more (*2*).

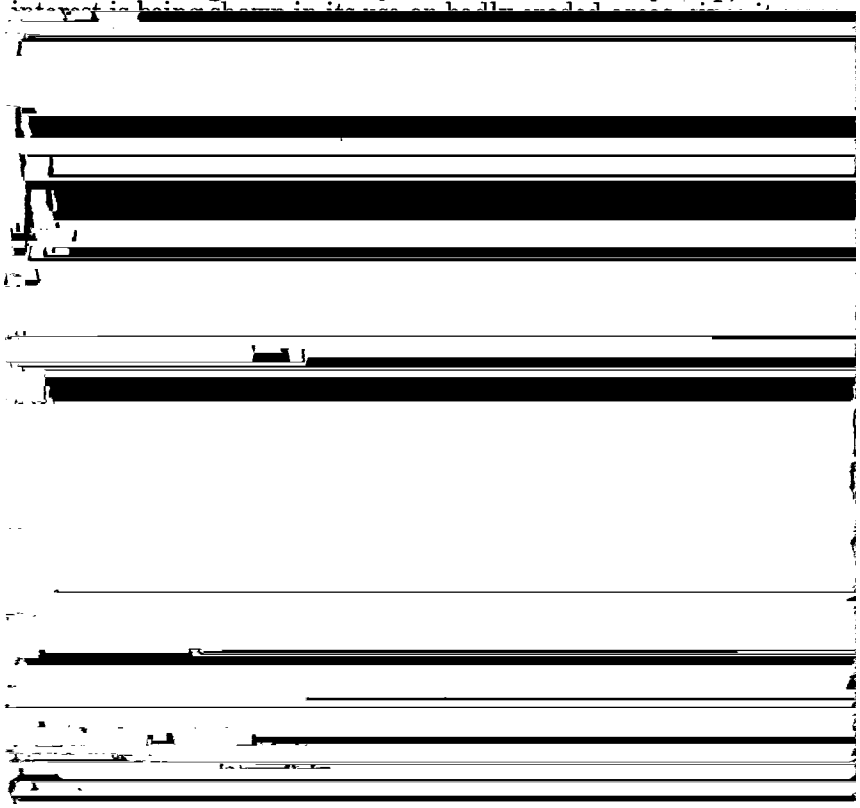
Cowpeas and soybeans for hay are sown broadcast by grain drill or by hand, usually during June or early in July. In some instances



harrowed often enough to keep down or kill the weeds. A few weeks before seeding, 3 to 4 tons of ground agricultural limestone, about 50 pounds of muriate of potash (potassium chloride), and 500 pounds of superphosphate or 1,000 pounds of basic slag an acre are applied and thoroughly worked into the soil. An annual top dressing of about 50 pounds of muriate of potash and 500 pounds of superphosphate or 1,000 pounds of basic slag an acre is recommended (*6*). The top dressing is usually applied in spring after the first hay cutting or in fall after the last cutting. After top dressing is broadcast, the land is harrowed with a disk harrow set at a very slight angle and then cross-harrowed with a section harrow.

Seeding is done in August or September with a wheelbarrow seeder, a cyclone seeder, or by hand. Twenty-five pounds or more of seed an acre are planted. After the stand has become well established, hay is cut two or three times a year, depending on the rapidity of growth. A good sod of alfalfa will remain 4 to 6 years or more. The length of time alfalfa will remain on a given field is dependent on the type of soil, the fertilization, the care of the sod, and the effort used to eradicate weeds. Some fairly good alfalfa fields have been established in the county, and more interest is being shown in the crop each year. Annual yields of 2, 3, or more tons an acre are obtained. Some of the hay is sold for shipment out of the county, but a large part is fed on the farms.

Kudzu is being tried on only a few farms as a hay crop, but some

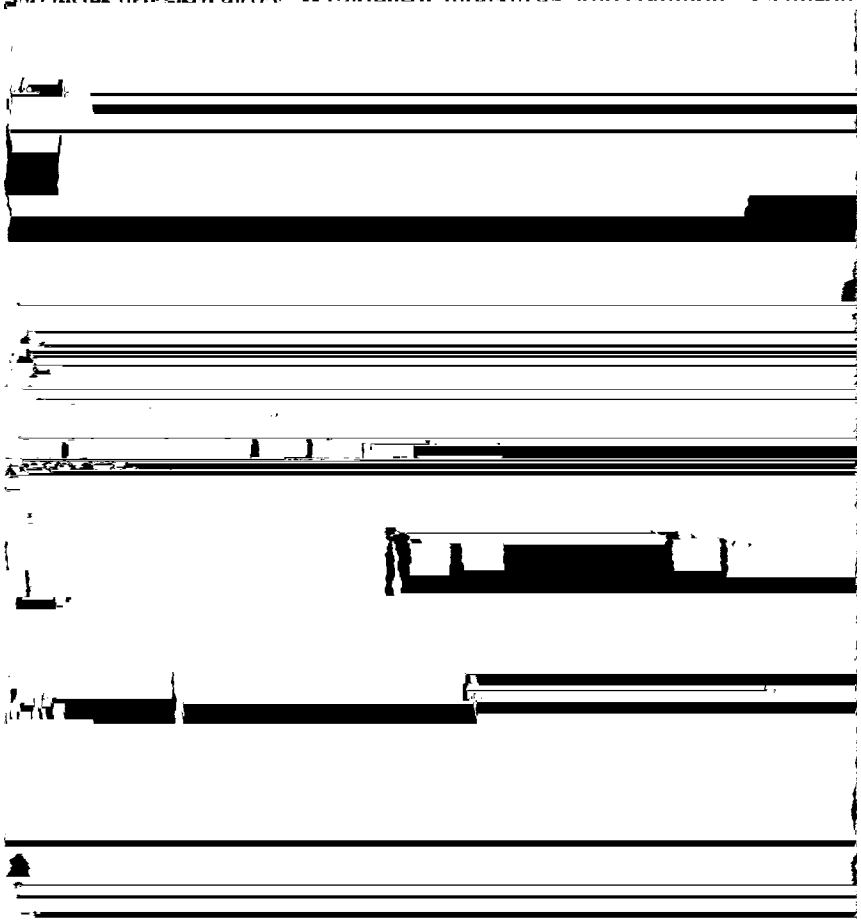


60 bushels an acre. For the best crop, a rust-resistant variety is chosen and the seed is treated to prevent smut. Oats sown during September or the first part of October usually average nearly twice as large a yield as the spring-seeded crop. Where oats are seeded after a well-fertilized crop of cotton, fertilizer is generally not applied except as a top dressing. From 100 to 300 pounds of nitrate of soda an acre is applied late in February or in March. Oats are used as feed for work stock, hogs, and poultry; but some are shipped, used in the preparation of mixed feeds, or planted for spring and early summer grazing.

Rye and barley are planted mainly for spring and summer grazing. A small acreage of both crops is harvested for seed, but the county probably produces less seed from these two crops than is used in sowing the following year (*8*).

WINTER COVER CROPS

Vetch and crimson clover are the chief winter cover crops, but Austrian winter peas are used to a limited extent. Some of the vetch varieties used are hairy, Willamette, monanthe, and common. Crimson



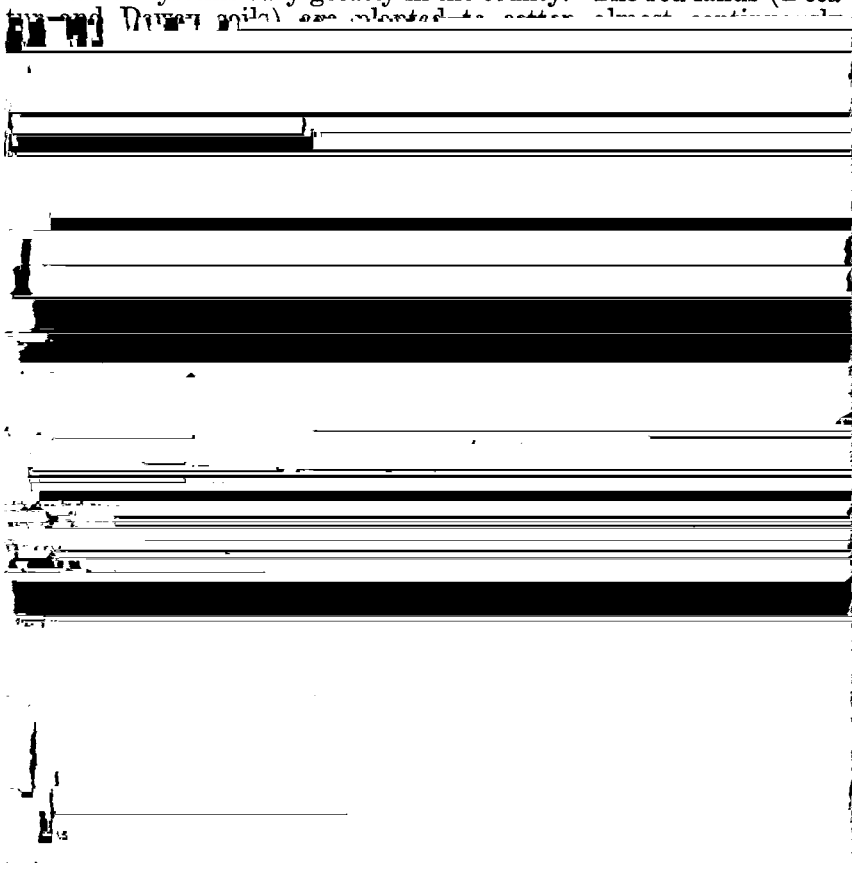
15 or the latter part of February. A smooth firm seedbed is desirable, and just before seeding the surface is scratched lightly with a harrow. From 5 to 10 pounds of seed an acre is broadcast and then covered only lightly, if at all. The ground is kept exceptionally clean in order that harvesting machinery can be used safely. Harvesting is done with a mowing machine and rake, as in hay harvest, or by use of a small grain combine. Yields of 100 to 200 pounds an acre have been obtained.

OTHER CROPS

Potatoes, sweetpotatoes, and other vegetables and fruits are grown largely for home consumption and local markets. Nearly all farmers owning homes have a few fruit trees, including peaches, apples, pears, and cherries, but many of the trees are not kept well pruned and sprayed. Some grapes are grown by many farmers, but few are produced for other than home use. Many farmers produce sorghum for family consumption. Few special crops are grown; burley tobacco is grown in a few small fields, most of which are north of Elkmont.

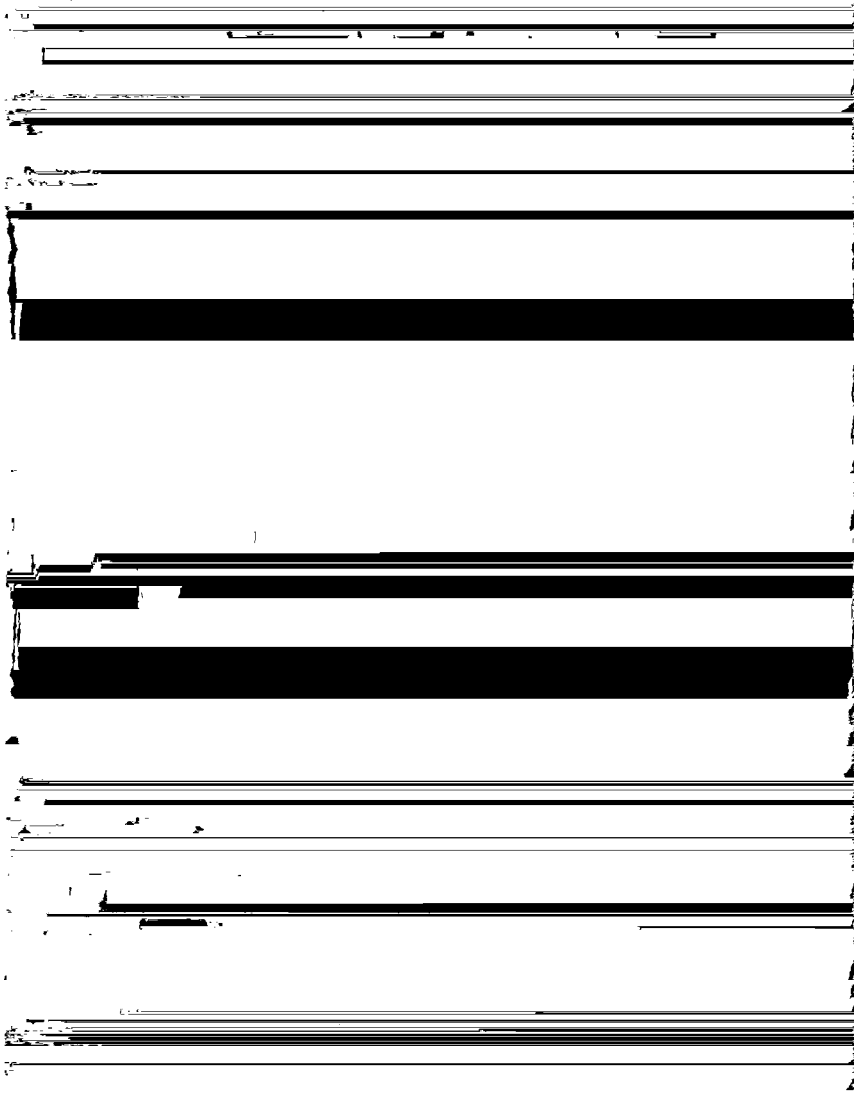
ROTATIONS AND FERTILIZERS

Rotation systems vary greatly in the county. The red lands (Decatur and Dewey soils) are planted to cotton almost continuously



Only a few farmers plant vetch as a cover crop ahead of cotton, because this makes the cotton crop rather late and its cultivation somewhat difficult. There is much difference in the kinds and quantities of fertilizer used on various farms (*4*).

For corn, many farmers plant vetch early in fall as a cover crop, especially on farms in the red lands. The vetch is turned under in spring when it has formed about 15 pounds of green weight per 100 square feet. Superphosphate or basic slag is often used with the vetch to encourage better growth (*5*). When the phosphate is used with vetch, none is applied to the following crop of corn. If acid phosphate is not used on vetch, 100 to 200 pounds of 16-percent acid



A, Meager tenant quarters in the red lands.
B, Typical home on an owner-operated farm in the gray lands.
C, Good yields of alfalfa on Decatur, Dewey, and Abernathy soils.

A, Seed crop of common white clover on Decatur silty clay loam, eroded undulating phase.
B, Sheep on closely grazed pasture on Melvin silt loam.
C, Landscape showing Abernathy silt loam, level phase, in foreground and Decatur silty clay loam, eroded undulating phase, in background.

grass, 5 to 10 pounds of orchard grass, and 3 to 10 pounds of Dallis grass. Many variations and combinations of these seed are used,

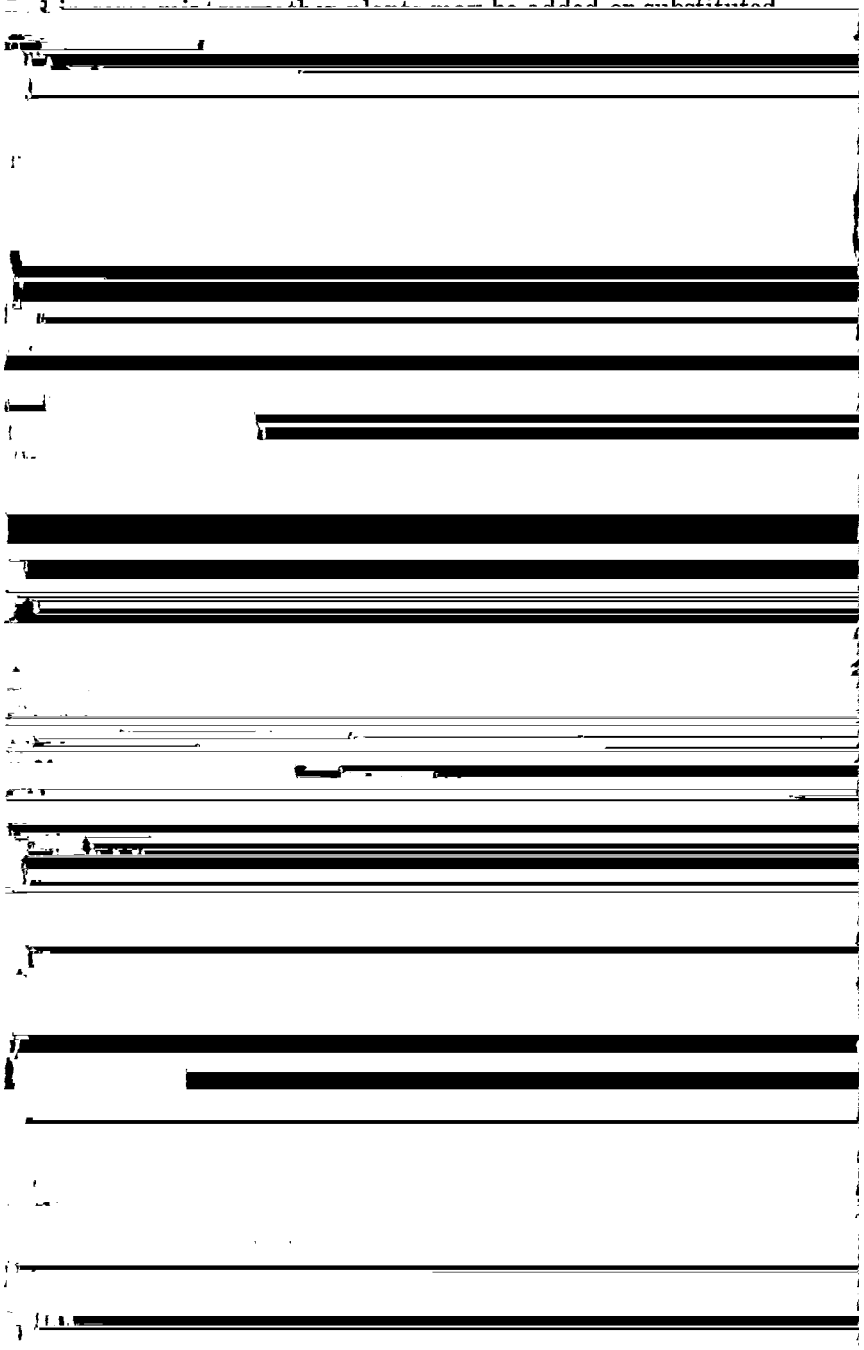


TABLE 3.—*Livestock on farms in Limestone County, Ala., for stated years*

Livestock [1]	1919	1929	1939	1944
	Number	*Number*	*Number*	*Number*
Horses	4, 584	2, 528	2, 124	1, 849
Mules	6, 958	9, 119	7, 585	6, 393
Cattle	14, 908	10, 991	12, 301	17, 401
Sheep	781	461	665	539
Goats	1, 083	771	1, 044	1, 425
Swine	22, 364	10, 415	13, 327	13, 822
Chickens	133, 505	119, 635	122, 772	163, 434
Other poultry	8, 291	[2]	6, 286	[2]
Beehives	1, 783	792	717	[2]

[1] Figures for 1919, 1929, and 1944 give the total number of livestock of all ages, except for 1929 only chickens over 3 months old are reported and for 1944 only those over 4 months old are reported. Figures for 1939 are for all horses, mules, and cattle over 3 months old; hogs, goats, and chickens over 4 months old; and sheep and lambs over 6 months old.

[2] Not available.

TABLE 4.—*Specified livestock products produced and sold in stated years, Limestone County, Ala.*

Product	1919	1929	1939	1944
Milk produced—gallons	1, 467, 129	2, 745, 313	2, 893, 640	3, 510, 764
Milk sold—do	13, 494	85, 761	352, 423	987, 777
Cream sold—do	323	2, 459	[1]	[1]
Butterfat sold—pounds	3, 581	47, 957	72, 171	56, 296
Butter churned—do	560, 890	826, 458	697, 442	[1]
Butter sold—do	36, 082	55, 468	43, 368	24, 230
Wool shorn—do	1, 841	1, 193	2, 532	2, 296
Honey produced—do	14, 586	5, 326	7, 163	[1]
Chickens raised—number	168, 726	252, 913	225, 811	253, 686
Chickens sold—do	30, 584	72, 273	69, 145	[1]
Chicken eggs produced—dozen	477, 958	738, 140	631, 785	850, 928
Chicken eggs sold—do	217, 949	342, 461	[1]	[1]

[1] Not available.

TYPES OF FARMS

Classified by total value of farm products in 1944, there were 611 farms producing products primarily for farm household use; 113 general farms; 61, livestock; 49, dairy; 10, poultry; 5, fruit and nut; 2, horticultural specialty; 1, vegetable; 1, forest products; and 3,514 farms producing other crops. Some part-time farmers live near Athens and in some of the villages.

SIZE OF FARMS

The farms of the county range in size from 3 to more than 1,000 acres, but most of them are from 30 to 99 acres. In 1944 there were

1,188 farms less than 30 acres in size, of which 985 were from 10 to 29 acres; 2,432 farms in the 30 to 99 acre range; 779 farms from 100 to more than 1,000 acres or more, of which 514 ranged from 100 to 179 acres and 9 were more than 1,000 acres. A slow trend toward smaller farms at the expense of the larger ones has been evident through most of the history of the county.

The larger farms are along the rivers in the red lands area, mainly on the Decatur, Dewey, and Cumberland soils; whereas the smaller farms are in the northern and northwestern parts of the county and near towns and villages, usually on the Cookeville and Dickson soils. Many of the large farms are used for cotton production, but some are being converted for raising either dairy or beef cattle.

LAND USE

In 1945, 316,055 acres, or 90.6 percent of the county, was in farms. The total number of farms was 4,399, the average size being 71.8 acres. The percentage of improved land in farms has increased from 65.1 percent in 1919 to 71.8 percent in 1944. In the same period the percentage of improved land per farm increased from 36.3 percent to 51.6 percent.

In 1944, 227,015 acres were in cropland, of which 164,928 acres were used for crops. The cropland is mostly on smooth, rolling, or hilly lands. Pasture occupies wet or imperfectly drained lands, and the woodland (63,335 acres in 1944) is most frequently on the steep slopes or the wet areas. The red lands tracts are nearly all in crops or pasture because they were first settled, and consequently nearly all of the smooth to rolling areas remaining in woodland are in the gray lands section.

The tendency through most of the history of the county has been toward conversion of more and more forest land to cropland. Until recently, the figures indicated a gradual change from small-grain to clean-tilled crops. Recently, however, farmers have shown much interest in soil improvement, which they are accomplishing partly by growing more pasture, hay, winter cover, and various other close-growing crops. During the past 15 years farmers have turned more land to pasture, the acreages of all land pastured being 67,133 in 1944 as compared with a total of 55,226 acres in 1929.

FARM TENURE

In 1944, 1,538 farms were operated by full owners; 279, by part owners; 2,575, by tenants; and 7, by managers. Of the tenants, croppers numbered 1,060; cash tenants, 169; share-cash tenants, 6; share tenants, 1,176; and other tenants, 164. In 1919 the percentage of owner-operated farms was 39.0, but in 1944 it had increased to 41.5 percent.

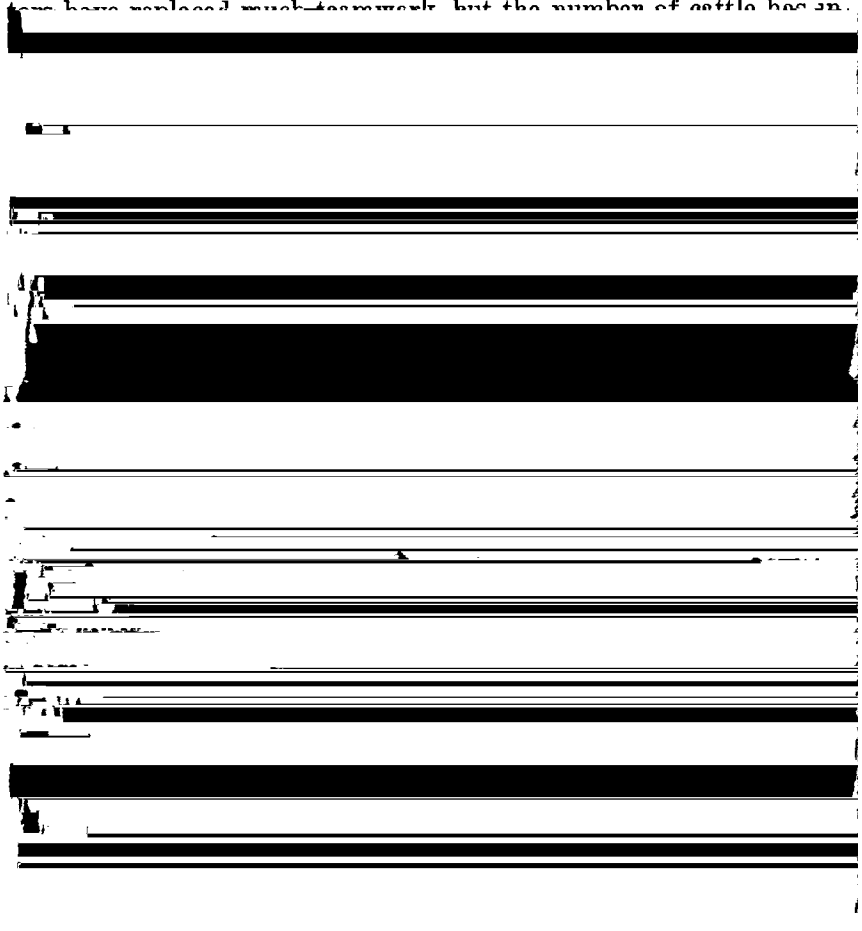
Several rental systems are practiced. Some tenants in the red lands furnish labor and half the fertilizer and receive 40 percent of the crop. Another system, probably the one most commonly used, requires that the owner furnish land and buildings and one-fourth of the

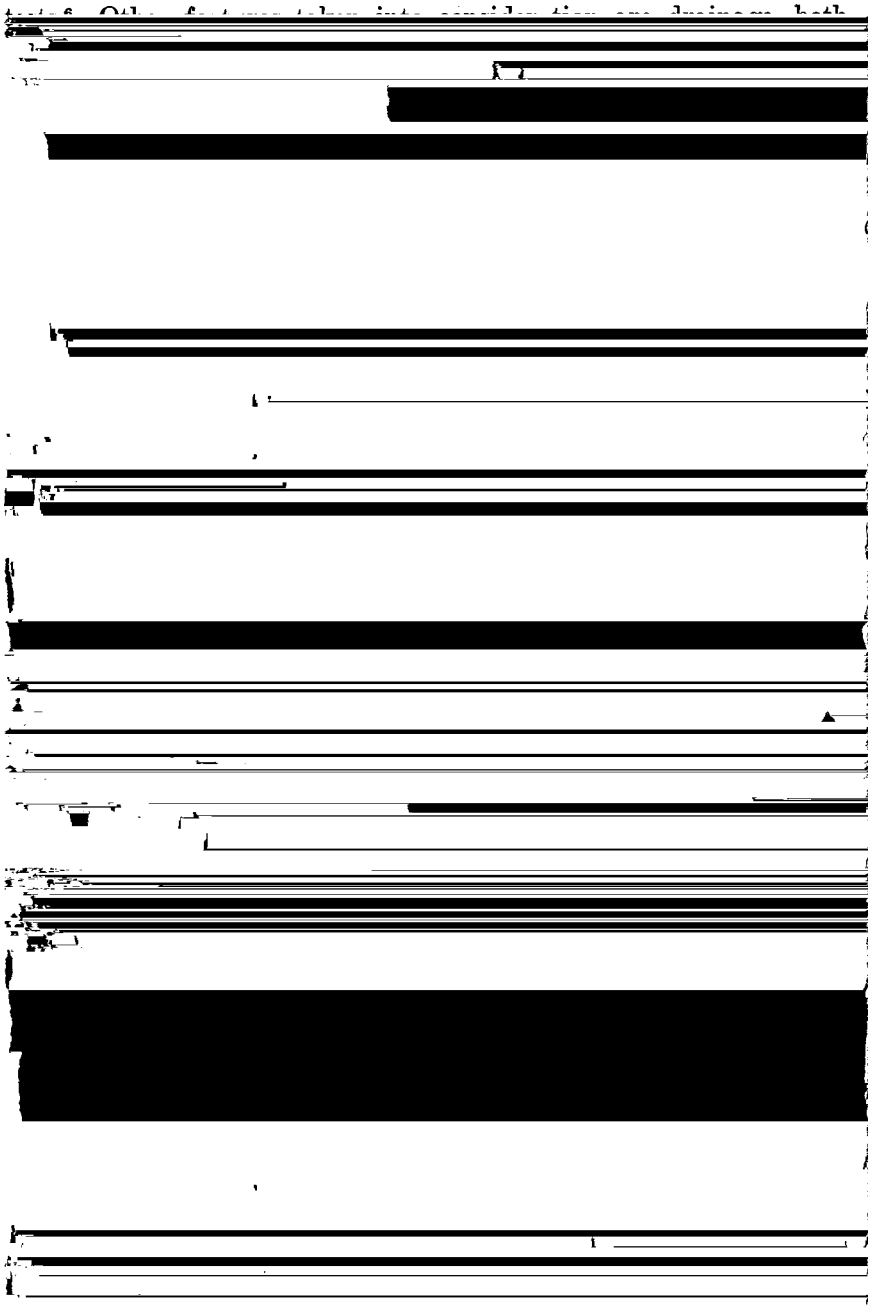
corn crop. When farms are rented for a specified cash sum, the tenant furnishes everything except land and buildings, but he receives all of the crops. The extensive use of tractors is causing a readjustment of rentals in some parts of the county.

FARM INVESTMENT AND EXPENDITURE

A great number of tractors and some combines were purchased in the period 1935–40, and in 1945 there was an increase of 329 tractors over 1940. The majority of the combines and tractors are used on the larger fields of the red lands, though many are used in the gray lands. Plows and other equipment have been purchased for use with the tractors. In 1940, $67,567 was spent for gasoline, distillate, kerosene, and oil. Much of the fuel and oil was used in tractors and other farm engines. The expenditure for fuel was not reported in 1945, but it was probably increased by the greater number of tractors.

The number of work animals has decreased, probably because tractors have replaced much teamwork, but the number of cattle has in-





that allow the use of machinery and the growth of cultivated crops and others may not. Differences in relief and degree of accelerated erosion may be shown as phases. Even though no important differences may be apparent in the soil profile or in its capability for the

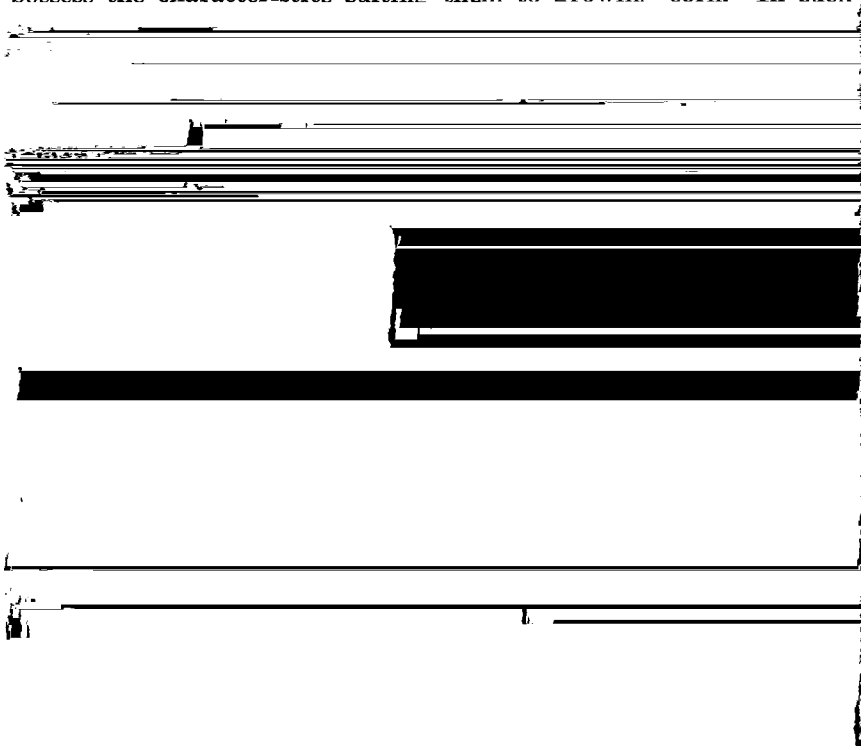
ity, plasticity, stickiness, hardness, compactness, toughness, and cementation. Permeability and perviousness connote the ease with which water, air, and roots penetrate the soil.

Ordinarily surface soil refers to the lighter textured surface layer, which is usually 6 to 12 inches thick. The subsoil, which is usually of uniform color in well-drained soils, indicates the heavier and thicker layer immediately below the surface soil. The substratum, or soil material layer, is beneath the subsoil and is characteristically splotched or mottled with two or more colors. Bedrock, as used here, is consolidated rock on which the substratum rests.

Workability refers to the ease with which tillage, harvesting, and other farming operations can be accomplished, and conservability, to the ease with which soil can be kept productive and workable. Major factors in rating soil conservability are the ease of preventing loss of soil material and plant nutrients and the ease of maintaining good tilth. Productivity indicates the capacity of a soil to produce crops under prevailing practices of farming.

SOILS

The soils of Limestone County have had a great influence on the kind of farming. For example, most of the bottom-land soils are fairly well supplied with lime, organic matter, and plant nutrients and possess the characteristics suiting them to growing corn. In such



cold or late to warm up in spring. Many of them contain a siltpan or semisiltpan at a depth of 15 to 30 inches that prevents free movement of moisture through the subsoil. The more rolling and hilly areas are often cherty enough to hinder tillage to some extent, and on the steeper areas drainage is excessive. The mantle of soil is usually not more than 6 to 10 feet thick, and in many places it is less. The reaction is ordinarily strongly acid unless the soil has been limed. The soils respond fairly well to applications of proper fertilizer and good management.

Farms in the gray lands are smaller and more often owner-operated than those in the red lands. Most of the produce needed for home consumption is grown on these farms because more attention is given to the production of garden and orchard crops, and a larger percentage of the families have cows, chickens, and hogs. Many crops common to the county are grown, but alfalfa, vetch, and crimson clover not so much as on the red soils. Fewer tractors and other heavy farm machinery are used than on the red soils, but more 1- and 2-horse equipment is used. The homes are usually fair to good and rather well maintained.

Two distinct topographic divisions occur in the gray lands—in the area near the Elk River and the larger creeks of the northwestern part of the county the land is hilly and steep, whereas the part north of Athens and toward Ardmore is level to rolling.

The soils of the county differ widely in color, texture, consistence, depth, reaction, fertility, relief, and conditions of stoniness, erosion, and moisture, all of which are factors having a close bearing on productivity, workability, conservability, or use. In color they range from nearly white through gray, yellow, and brown to dark and deep red, the shades of red and yellow predominating in the subsoil. The texture of the surface soil ranges from fine sandy loam to tenacious clay, but soils of silt loam texture predominate.

Even in the virgin state the soils vary widely in fertility. The nature of the material from which the soils are developed is strongly reflected in the degree of natural fertility as well as in other characteristics. In spite of the fact that the majority of the soils suited to cultivation are derived from material weathered from rocks rich in calcium carbonate, most of the upland soils are deficient in lime. Practically all the lime originally contained in the rocks has been lost by leaching during the processes of weathering and soil development. In many of the upland soils the organic content was not high when they were in the virgin state, and during cultivation much of the original quantity has been oxidized, lost in drainage water, or otherwise dissipated. The quantity and nature of the organic matter differed widely when soils were in the virgin state, and the difference has been greatly increased by cultivation.

The natural tilth is generally favorable for all the surface soils except some of the silty clay loams, which are subject to puddling, surface baking, and cloddiness when they are tilled under adverse moisture conditions. Such soils are exacting in regard to moisture conditions favorable for tillage. With only a few exceptions, these refractory surface soils are really subsoil exposed through erosional loss of the original surface material.

TABLE 5.—*Characteristics of the soil series of Limestone County, Ala.*

Series	Position	Relief	Internal drainage [1]	Parent material	Surface soil: Color [2]	Surface soil: Consistence [3]	Surface soil: Thickness [4]	Subsoil: Color [2]	Subsoil: Consistence [3]	Subsoil: Texture [5]	Subsoil: Depth of profile [6]	Productivity
SOILS OF UPLANDS												
				Residual material weathered in place from—			*Inches*				*Inches*	
Decatur	Smooth low upland of the Limestone Valleys.	Nearly level to rolling.	Moderate or slow.	High grade limestone.	Light brown to reddish brown.	Friable or firm	6–10	Yellowish red or brownish red.	Firm	Silty clay	48–180	Good.
Dewey	do	Nearly level to hilly.	Moderate	do	Brown or light brown	Friable	8–12	Yellowish red	Friable or firm	do	42–180	Good to very good.
Mimosa	Hilly Highland Rim	Gently rolling to hilly.	Slow	Argillaceous limestone	Grayish brown to yellowish brown.	do	8–12	Yellowish brown grading to mottled material.	Firm	Clay	18–72	Fair to poor.
Maury	Rolling Highland Rim	Undulating to hilly.	Moderate	Phosphatic limestone	Brown	do	10–15	Yellowish brown	Friable	Silty clay loam or silty clay.	48–100	Fair.
Cookeville	Undulating and rolling land of the gray lands.	Undulating or rolling.	do	Mixed high-grade and cherty limestone.	Grayish brown	do	6–12	Light yellowish red	Friable or firm	Silty clay loam	44–70	Good to fair.
Baxter	Rolling and hilly land of the gray lands.	Undulating to steep.	Moderate or rapid.	Cherty limestone	do	do	6–10	do	Friable	do	38–54	Fair.
Dickson	Smooth to rolling land of the gray lands.	Nearly level to rolling.	Moderate or slow.	do	Pale yellow or grayish yellow.	do	12–22	Light yellowish brown grading to mottled material.	Friable or firm	do	36–60	Do.
Bodine	Hilly to steep land of the gray lands.	Hilly and steep	Rapid	do	Light gray or very pale brown.	do	6–10	Light yellowish brown	Firm or friable	Clay loam	16–36	Poor.
Sango	Smooth land of the gray lands.	Nearly level	Slow	do	Light gray or yellowish gray.	do	8–20	Mottled yellow, orange, and gray.	Firm	Silty clay	36–60	Poor to fair.
Lawrence	do	Nearly level or depressional.	Very slow	do	Light gray (2-inch surface layer).	Friable or firm	2–6	Mottled yellow, orange, and gray; gray increasing with depth.	Firm or very firm.	do	36–60	Poor.
Hollywood	Rolling Highland Rim	Very gently sloping.	Slow or very slow.	Argillaceous limestone	Dark grayish brown underlain by very dark gray to black.	Firm or very firm.	10–20	Light gray to gray mottled with yellow and brown.	Very firm	Clay	12–60	Poor to fair.
SOILS OF COLLUVIAL SLOPES AND DEPRESSIONS												
				Transported material from uplands underlain chiefly by—								
Dellrose	Rolling to steep colluvial slopes.	Hilly	Moderate or rapid.	Cherty limestone with phosphatic influence.	Grayish brown to brown.	Friable	6–12	Yellowish brown to brownish yellow.	Friable	Silty clay loam	24–125	Fair to good.
Greendale	Gently sloping foot slopes and depressions.	Gently sloping or nearly level.	Moderate	Cherty limestone	Grayish brown or light yellowish brown.	do	6–10	Yellowish brown	do	Silt loam or silty clay loam.	36–60	Fair.
Abernathy	Depressions	Nearly level or slightly depressional.	do	Limestone and cherty limestone.	Surface layer dark reddish brown or brown over yellowish red or reddish brown grading to mottled gray; yellow and brown silty clay below 36 inches.							Very good.
Ooltewah	do	do	Slow or very slow.	do	Reddish brown or brown friable surface layer grading to light-gray or gray mottled with yellow and brown silty clay below 13 to 18 inches.							Fair to good.
Guthrie	do	do	Very slow	Cherty limestone	Light gray lightly mottled with yellow.	Friable	2–8	Mottled gray, brownish yellow, and yellowish brown.	Firm	Clay loam or clay	18–60	Very poor.
SOILS OF STREAM TERRACES												
				Transported material from uplands underlain chiefly by—								
Cumberland	Smooth high terraces	Nearly level to hilly.	Moderate	Limestone with some shale and sandstone.	Reddish brown	Friable	6–10	Red	Friable or firm	Silty clay loam	24–180	Good.
Etowah	Smooth moderately high terraces.	Nearly level to undulating.	do	do	Brown to grayish brown	do	8–12	Yellowish red or yellowish brown.	Friable	do	24–80	Very good.
Humphreys	Smooth moderately low terraces.	Nearly level	do	Cherty limestone	Grayish brown	do	8–14	Yellowish brown or light yellowish brown.	do	do	36–90	Good.
Wolftever	do	do	Moderate or slow.	Limestone, cherty limestone, and shale.	Grayish brown or light yellowish brown.	do	12–16	Pale brown or light yellowish brown.	Firm or friable	Silty clay	48–80	Good to fair.
Capshaw	do	do	do	Limestone with some shale and sandstone.	Grayish brown	do	8–12	Light yellowish brown grading to mottled material.	do	Fine sandy clay loam.	40–60	Good.
Taft	Smooth low terraces	do	Slow or very slow.	Cherty limestone	Light brownish gray	do	10–18	Pale yellow or grayish yellow grading to mottled material.	Firm	Silty clay loam or clay loam.	36–72	Poor to fair.
Robertsville	do	do	Very slow	Limestone with some shale and sandstone.	Gray to light gray mottled with yellow and brown.	Friable or firm	2–4	Mottled gray, yellow, and brown.	Firm or very firm	do	24–42	Poor.
SOILS OF FIRST BOTTOMS												
				Transported material from uplands underlain chiefly by—								
Huntington	High first bottoms	Nearly level	Moderate	Limestone with some shale and sandstone.	Brown to yellowish brown, becoming lighter colored with depth; below 40 inches, brown mottled with gray and yellow silty clay loam.							Good to very good.
Egam	Medium-high to high first bottoms.	do	Slow	do	Brown to yellowish brown, friable, grades to dark grayish-brown moderately compact silty clay; below 36 inches the material is mottled gray, yellow, and brown, and generally a little coarser in texture.							Fair.
Ennis [7]	Low first bottoms	do	do	Cherty limestone and limestone.	Brown to yellowish-brown silt loam to 12 to 20 inches; grades to heavier texture and with depth is increasingly mottled with gray, yellow, and brown.							Do.
Lindside	do	do	do	Limestone and cherty limestone.	Brown to yellowish brown to 10 to 18 inches; below this is brown silty clay loam mottled with gray and yellow							Fair to good.
Melvin	do	do	Very slow	do	Grayish-brown to yellowish-brown silt loam becoming mottled gray, yellow, and brown below 5 inches; mottling increases with depth and the texture generally grades to silty clay.							Poor.
Bruno	Medium or high first bottoms.	do	Moderate or rapid.	Sandstone, limestone, and shale.	Brown to light yellowish brown, sandy; mottled with gray, yellow, and brown below depth of 26 to 30 inches; texture becomes finer in the lower part.							Fair.

[1] The term moderate indicates optimum internal drainage for most crops grown in the county.

[2] Color prevailing when the soil is air dry; color of surface soil is that shown by air-dry samples taken from a plowed field, or in forested areas, from immediately below a layer of leafmold; color nomenclature is that defined in COLOR MEASUREMENT AND ITS APPLICATION TO GRADING AGRICULTURAL PRODUCTS, Misc. Pub. 580, U. S. Dept. Agr., 62 pp., illus., 1946.

[3] Consistence of soil when moist, not dry.

[4] Thickness of uneroded surface layer; in moderately eroded areas, 3 to 6 inches of the original surface soil generally remains and in severely eroded areas, usually less than 2 or 3 inches.

[5] Most of the soils become very gradually finer in texture with increasing depth; the shallow phase of the Ennis series, however, has a gravelly subsoil in most places.

[6] Depth of soil profile over bedrock, partly weathered rock, gravel beds, or other material distinctly different from that parent to the soil.

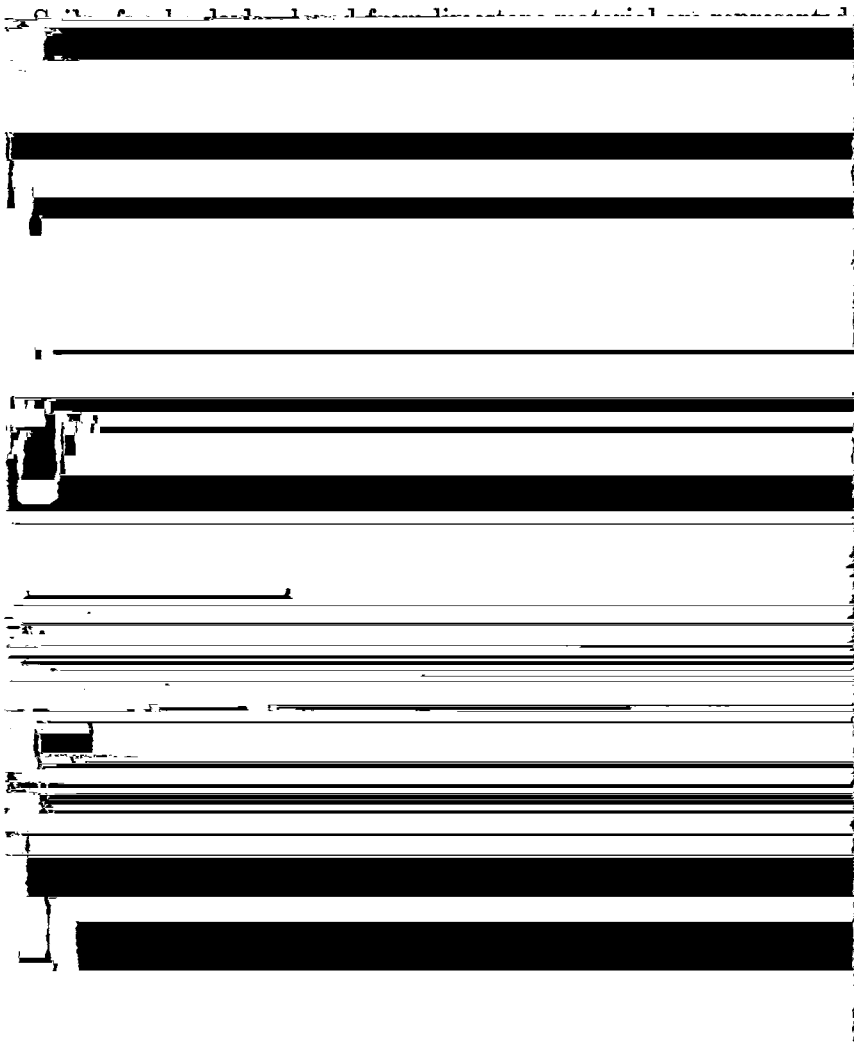
[7] Ennis soils in this county have a slightly developed B horizon in places, and the subsoil is mottled at a depth shallower than that normal for the series.

849450—53 (Face p. 27)

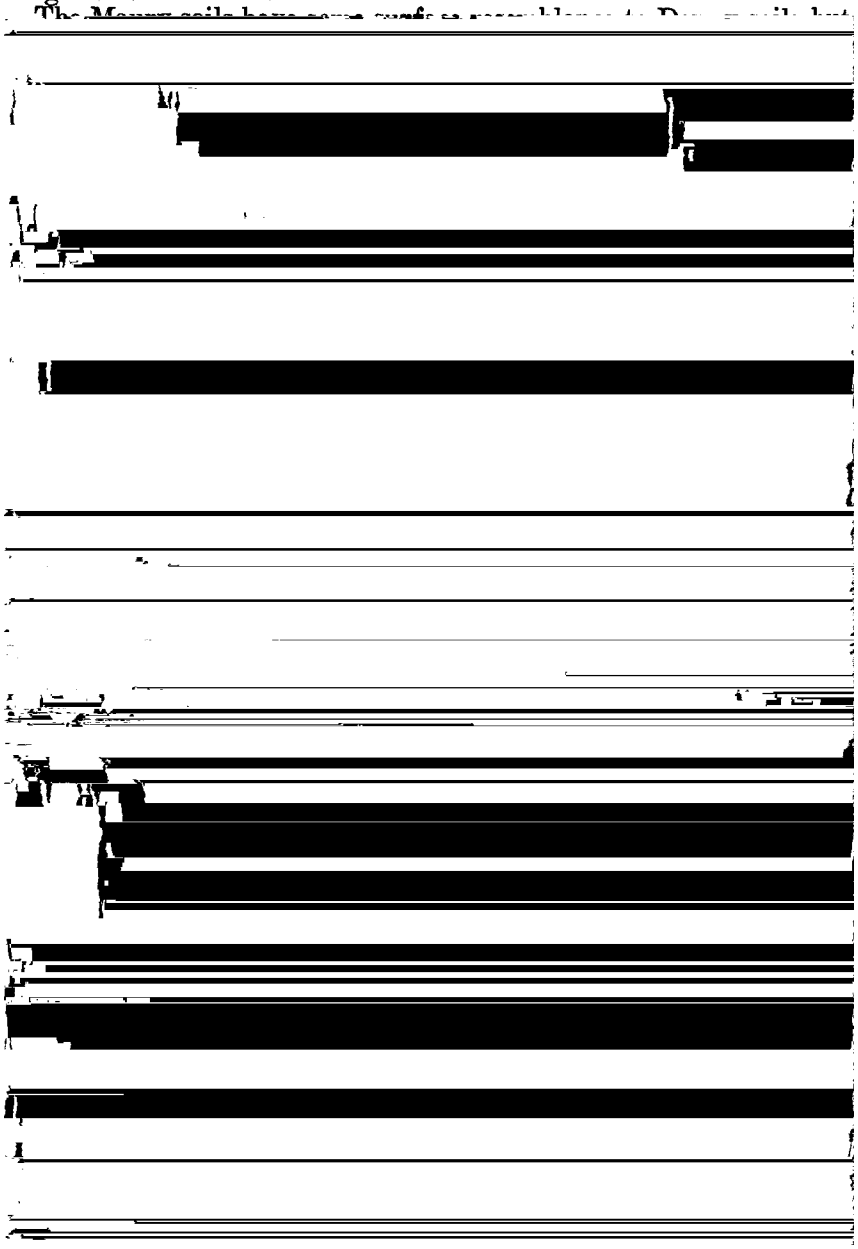
SOIL SERIES AND THEIR RELATIONS

On the basis of a great number of widely differing characteristics, the soils of Limestone County have been placed in 29 soil series and 3 miscellaneous land types. Familiarity with the important soils in the different series is necessary for the most advantageous use of this survey, and this can be achieved more readily when the major characteristics of the soil series are associated with prominent land features. Therefore, the series are presented according to prominent land features of the county in table 5 and the text following.

SOILS OF UPLANDS



yellow silty clay, which is tough and plastic but lower in chert content. The layer following is clay, which is tough and plastic when wet but very hard when dry. This is intensely mottled with lemon yellow, orange, brown, and gray, and it contains some soft brown concretions. Below 40 inches this layer becomes very tough and plastic, with yellow, gray, and dark-brown mottlings, and a few chert fragments.



become mottled yellowish red, but the red is not so pronounced as in the Cookeville and it occurs at a lower depth.

The Bodine soils are somewhat similar to the Dickson in color but have more chert at the surface, are on steeper slopes, are shallower over bedrock, and contain no pronounced siltpan. Many of the areas are still in forest or in pasture, but some are cultivated. The crops planted suffer for lack of moisture in dry weather, however, and the soils are susceptible to rapid erosion.

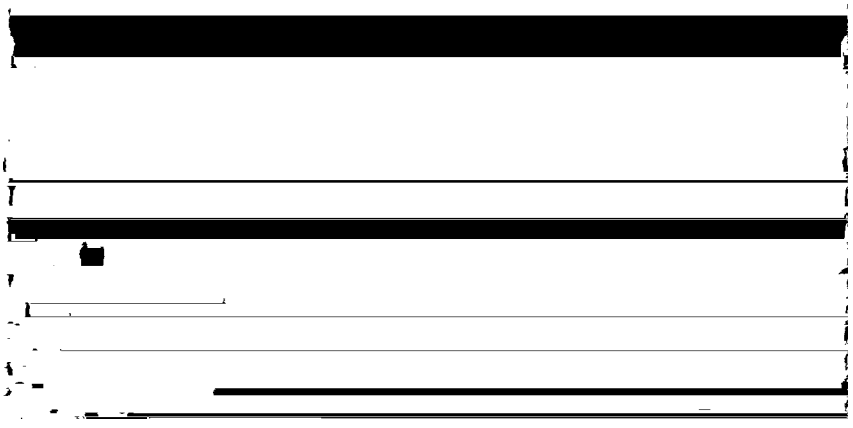
In plowed fields the Sango soil is light-gray silt loam to about 3 inches. Yellowish-gray silty clay loam continues from 3 to about 15 inches without appreciable change, but it becomes mottled yellow, orange, and gray from 15 to 20 inches. From 20 to 33 inches the soil is an intensely mottled gray, yellow, and light-brown compacted and hard layer containing many brown iron concretions. At about 33 inches there is an abrupt change to mottled yellow, gray, and brown, the yellow being more pronounced and the layer being less compact than the one above. At 47 inches the material becomes heavier, is mottled yellowish gray and rust brown, and contains some chert fragments.

The Lawrence soil occupies low imperfectly drained bodies of land within Dickson areas. It has a light-gray surface soil; a mottled yellow, orange, and gray subsoil; and a compact hard layer at 18 to 22 inches. Water often stands on the soil after heavy rains, and the water table is usually near the surface until late in spring.

The Hollywood soil is the darkest, toughest, most plastic, and least acid soil in the county. It is derived mainly from weathered argillaceous limestone material, but in places some of the surface soil consists of colluvial and alluvial materials. This soil generally borders Limestone rockland, from which some of its material is derived. In forested areas the first 2 or 3 inches is dark-gray heavy silty clay. Below this thin layer and continuing to a depth of about 25 inches is tough plastic black clay that grades into steel-gray or pale-yellow mottled heavy clay. This material rests on bedrock at various depths.

SOILS OF COLLUVIAL SLOPES AND DEPRESSIONS

Soils of colluvial slopes and depressions occur at the base of eroded slopes; they consist of both local alluvium and colluvium. Fine soil



most other soils. These soils consist of colluvial materials accumulated at the base of slopes in areas of Cookeville, Baxter, and Dickson soils. They occupy positions similar to Abernathy silt loam, undulating phase, but differ in being lighter in color throughout the profile and in having somewhat more mottling in the subsoil. The 6- to 10-inch surface layer is light grayish-brown mellow silt loam. From this layer downward to about 30 inches is yellowish-brown firm silt loam. Below about 30 inches is mottled rust-brown, ocherous yellow, and gray friable silty clay loam. In some areas many chert fragments, up to 5 inches in diameter, are on the surface and throughout the profile. A cherty phase is mapped where chert fragments are present in quantities sufficient to interfere with tillage.

The Abernathy, Ooltewah, and Guthrie series occur in upland depressions. All are developed from similar limestone and cherty limestone materials. They are distinguished from each other mainly by differences in color resulting from differences in drainage. Drainage, least impaired in the Abernathy, becomes progressively more deficient in the Ooltewah and Guthrie.

The Abernathy soils have developed in depressions and near the heads of drainageways in the uplands, where they are associated with Dewey and Cumberland soils. They are well drained, usually through subterranean channels. Their suitability for use is similar to that of the Huntington soil. The dark reddish-brown or brown mellow silt loam surface soil is 12 to 16 inches thick. The heavy silt loam or silty clay loam subsoil is yellowish red or reddish brown to a depth of 24 to 36 inches, but below that depth the material tends to become gray mottled with yellow, rust brown, and light gray.

The Ooltewah soil is less well drained in the subsoil than is the Abernathy and is somewhat more subject to ponding in times of heavy rains. In suitability for use, the soils of the two series are not much different, but those of the Abernathy are suited to a little wider range of crops and are more reliable crop producers in wet years. Most of the Ooltewah soil is planted to corn, and though the yields are good the returns are usually somewhat lower than on the Abernathy soils. The Ooltewah surface layer is a 10- to 14-inch reddish-brown or brown mellow friable silt loam. The subsoil is grayish or brownish-gray silty clay loam splotched with yellow, brown, rust-brown, and some black spots. With depth, the grayish color increases and the material usually becomes heavier.

The Guthrie soil occurs in positions similar to those of the Ooltewah but is not so well drained. In even moderately wet seasons it is often under water, and this, together with its lack of available fertility, makes it unsuited to crop cultivation. Under proper management, however, it can produce very good pasture or hay crops. The first 1 or 2 inches of the surface soil is light-gray friable silt loam that generally contains only a small quantity of organic matter. Light-gray to almost white smooth and mellow silt loam continues from 2 to 10 inches. From 10 to 20 or 30 inches is mottled light-gray, yellow, or rust-brown silty clay loam. The subsoil of mottled rust-brown or yellow silty clay or heavy clay occurs at depths between 30 and 48 inches. At 48 to 60 inches the soil is underlain by limestone residuum. In a few places the soil profile may be only 24 to 36 inches thick over limestone bedrock, and in a few instances bedrock comes to the surface.

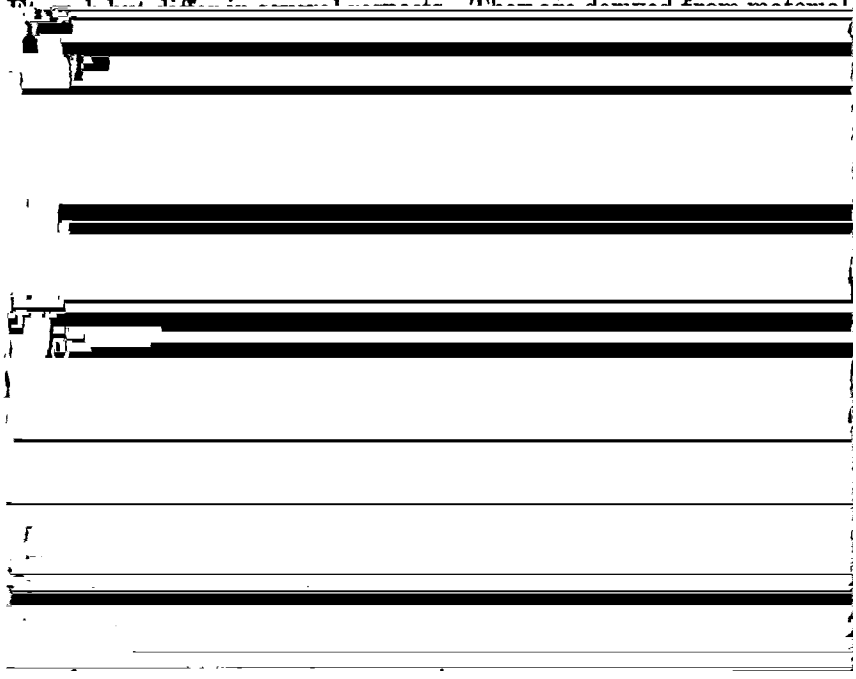
SOILS OF STREAM TERRACES

Soils of stream terraces comprise the Cumberland, Etowah, Humphreys, Wolftever, Capshaw, Taft, and Robertsville series. The first five of this group are well drained or at least adequately drained for the crops common to the area. The Taft soil is imperfectly drained, though drainage is sufficient for late corn and soybeans in all except unusually wet seasons. It produces pasture except during very dry seasons. The Robertsville soil is poorly drained but in most areas can be drained sufficiently for pasture.

The Cumberland soils have developed on old high to fairly high terraces. The reddish-brown mellow silt loam surface soil is 6 to 10 inches thick, and in uncleared areas considerable organic matter is incorporated. Beneath this layer and to a depth of 48 to 60 inches is firm but friable red clay loam or clay. This layer becomes lighter red or yellowish red with depth, and it finally grades into a mottled yellow, gray, and rust-brown clay loam. In places the underlying residual material is at a depth of 48 to 72 inches.

The Etowah soils are developed on younger terraces than the Cumberland, and their transported material has been derived largely from limestone. In some respects their profile resembles that of the Dewey. The surface soil is brown to grayish-brown mellow silt loam to a depth of 8 to 12 inches. The subsoil, a friable yellowish-red or yellowish-brown very fine sandy clay to silty clay, extends to a depth of about 40 inches. The material beneath the subsoil is variable, but in most places it is friable somewhat brown fine sandy clay splotched with gray and yellow.

The Humphreys soils occur in about the same positions as the [illegible] but differ in several respects. They are derived from material

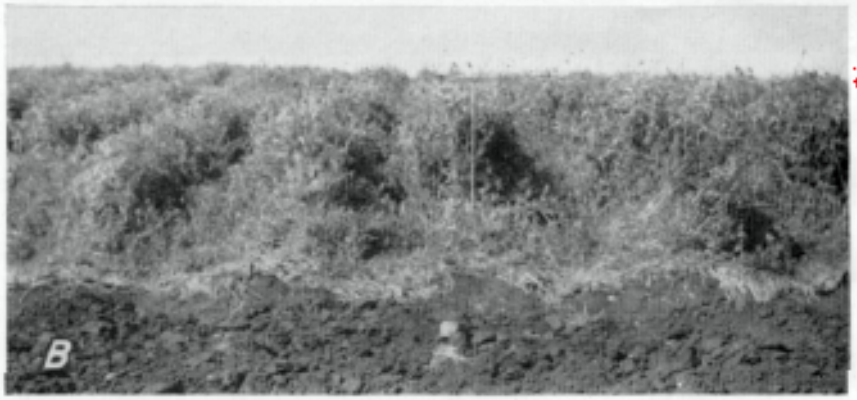


heavy friable fine sandy clay loam. Grading down from about 32 inches the subsoil is light yellowish-brown to brownish-yellow sandy loam to clay loam in which there are varying quantities of water-worn sandstone fragments. Considerable water-worn sandstone may occur in places.

The Taft soil is derived to a large extent from material washed from soils underlain by cherty limestone. In forested areas the 5-inch surface layer is dark-brown to yellowish-brown silt loam that grades to a grayish-yellow silty clay loam. Below about 16 inches is mottled gray, rust-brown, and yellow silty clay loam to clay loam that contains some chert fragments in most places. Between 24 and 42 inches the material is gray mottled with rust brown and yellow, and it is compacted almost to a hardpan. Below this layer is mottled yellowish-gray and rust-brown clay containing some chert fragments.

The Robertsville soil occurs on stream terraces in the slight depressions and low-lying areas that have poor external and internal drainage. The material from which it is derived has been washed from uplands underlain by high-grade and cherty limestone. From the surface downward the soil is mottled gray, with a compact layer beginning at a depth of about 20 inches. The compactness increases to

A, Landscape showing the very productive, easily worked, and easily conserved Dewey, Decatur, and Abernathy soils of the red lands.
B, Sever Cumberland soil used for growing cotton.
C, Bluegrass pasture on Baxter cherty silt loam, eroded hilly phase.

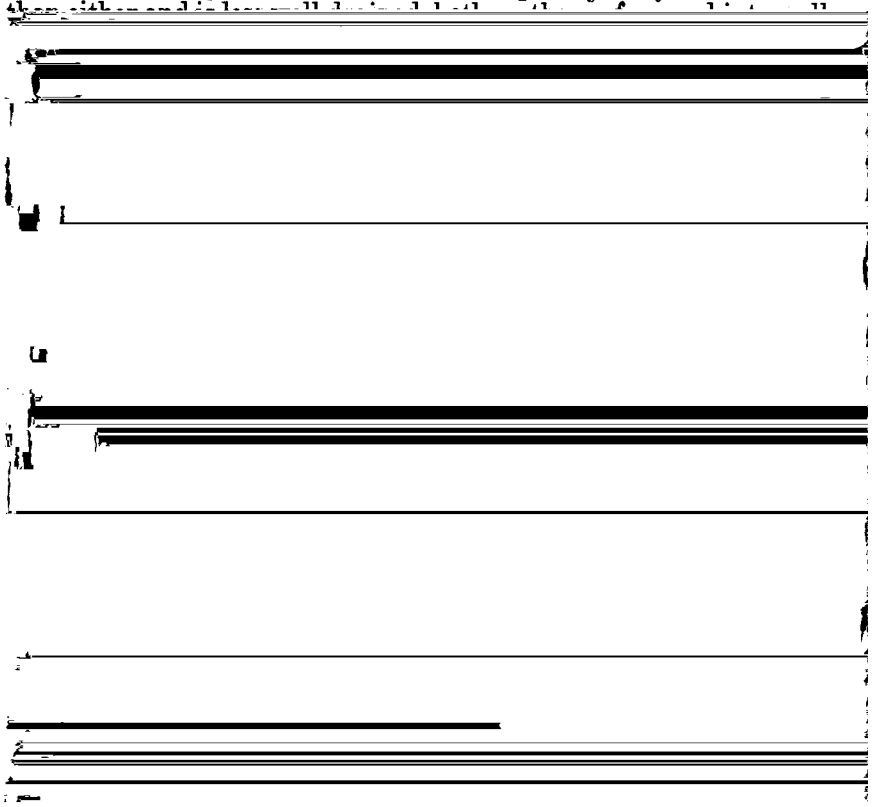


A, Early spring grazing of a winter cover crop of rye, oats, and vetch on smooth Cookeville and Dewey soils.
B, Winter cover crop of vetch on Decatur silty clay loam, eroded undulating phase, ready to be turned under in preparation for corn.
C, Long rotations or permanent pasture are well suited to the strong slopes of Dellrose cherty silt loam, eroded hilly phase.

loam or silty clay loam. This is underlain by compact and relatively impervious grayish-brown clay loam that in most places is more or less splotched with gray. Though moisture moves slowly through this soil, it is fairly well to well drained.

The Ennis soils are similar to the Huntington, but they are grayer or paler brown throughout because they are derived from cherty limestone material. They are somewhat poorer than the Huntington in organic matter, lime, and probably other plant nutrients. They are also more imperfectly drained, being splotched at a depth of 24 to 30 inches in many places. Some imperfectly drained areas have been included that have a 10- to 12-inch surface layer of brown to yellowish-brown mellow silt loam underlain by brown mellow silt loam to light silty clay loam. The lower layer continues to a depth of 32 to 46 inches and in places shows some splotching in the lower part. The Ennis soils are rather consistently underlain by a gravelly substratum at a depth of 48 to 60 inches.

The Lindside soil is derived from much the same material as the Huntington and Egam and often occurs in close association with them. The material making it up, however, is somewhat more local in origin and in places may be more influenced by cherty limestone than the two associated series. This soil is about equal to the Egam in productivity but is somewhat less productive than the Huntington. In time of heavy rainfall it is more frequently subject to overflow



SOIL TYPES AND PHASES

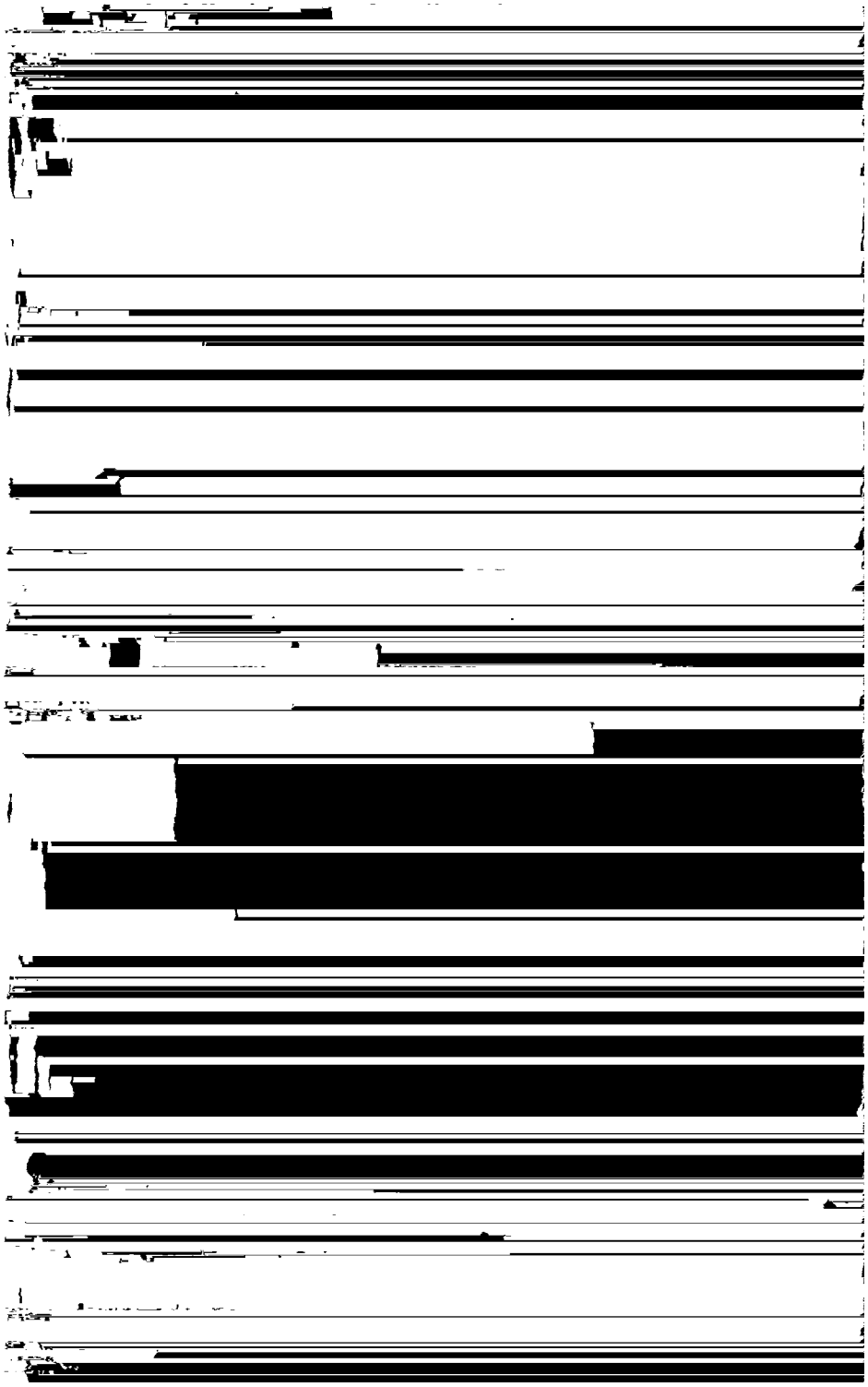
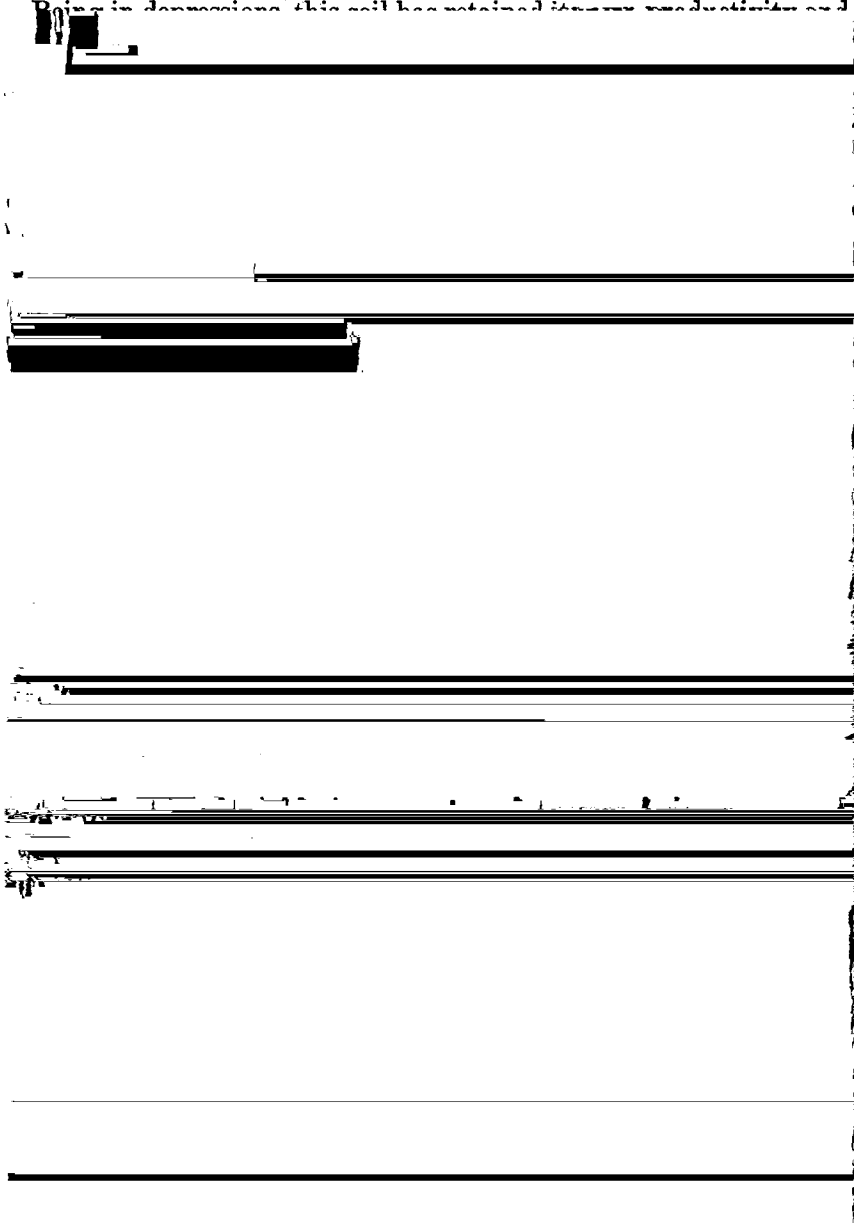


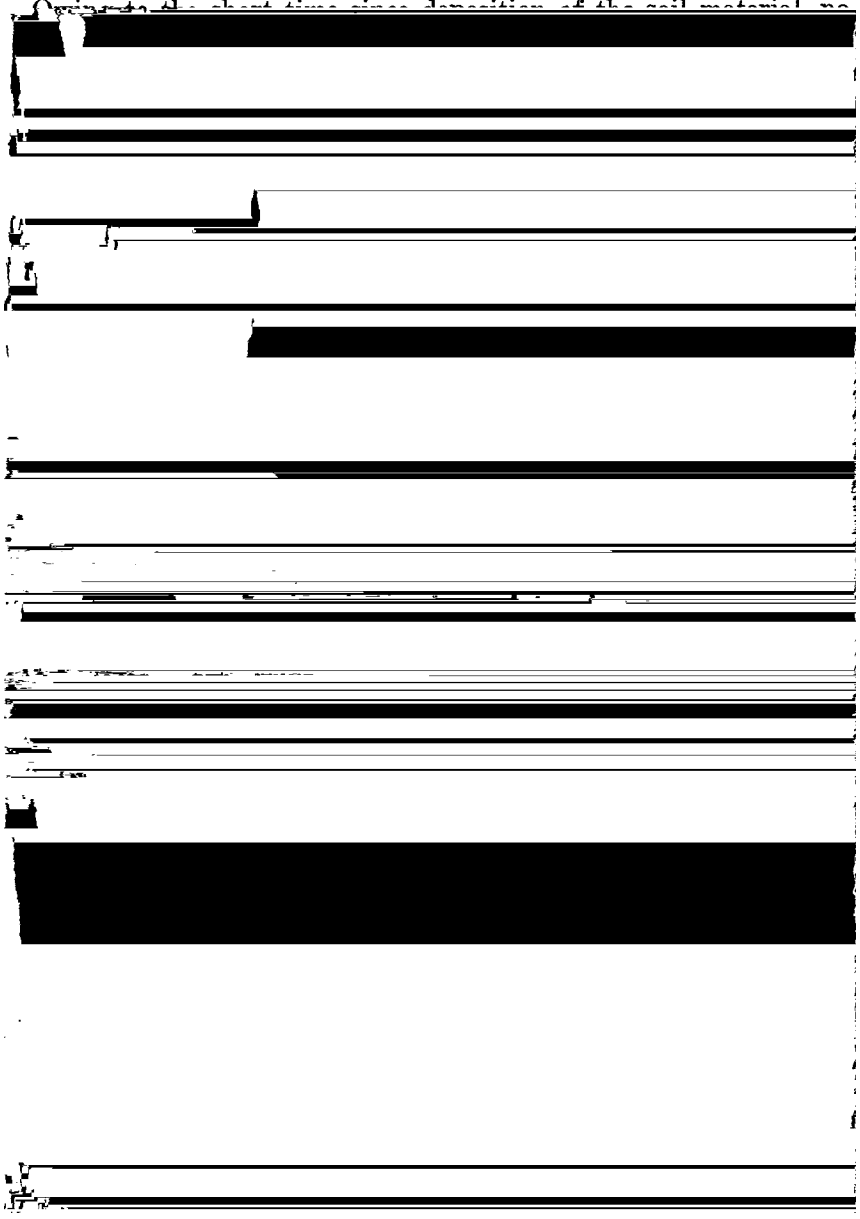
TABLE 6.—*Acreage and proportionate extent of the soils mapped in Limestone County, Ala.*—Continued

Soil	Acres	Percent
Dewey silty clay loam:		
Eroded hilly phase	139	(1)
Eroded rolling phase	1, 639	0. 5
Eroded undulating phase	16, 082	4. 4
Severely eroded rolling phase	2, 344	. 6
Dickson cherty silt loam:		
Eroded rolling phase	3, 531	1. 0
Eroded undulating phase	2, 532	. 7
Rolling phase	961	. 3
Undulating phase	1, 266	. 3
Dickson cherty silty clay loam, severely eroded rolling phase	307	. 1
Dickson silt loam:		
Eroded rolling phase	1, 215	. 3

Abernathy silt loam, level phase.—This soil occupies mainly basins or depressions in the southeastern, or red lands, part of the county. It has developed from material washed from surrounding soils of high-grade limestone. Though there is little surface runoff, the soil is well drained. Water may stand on some areas for a brief time after heavy rains, but it soon disappears, largely through subterranean passages in the limestone bedrock or by way of surface ditches. Few crops are lost because of inadequate drainage.

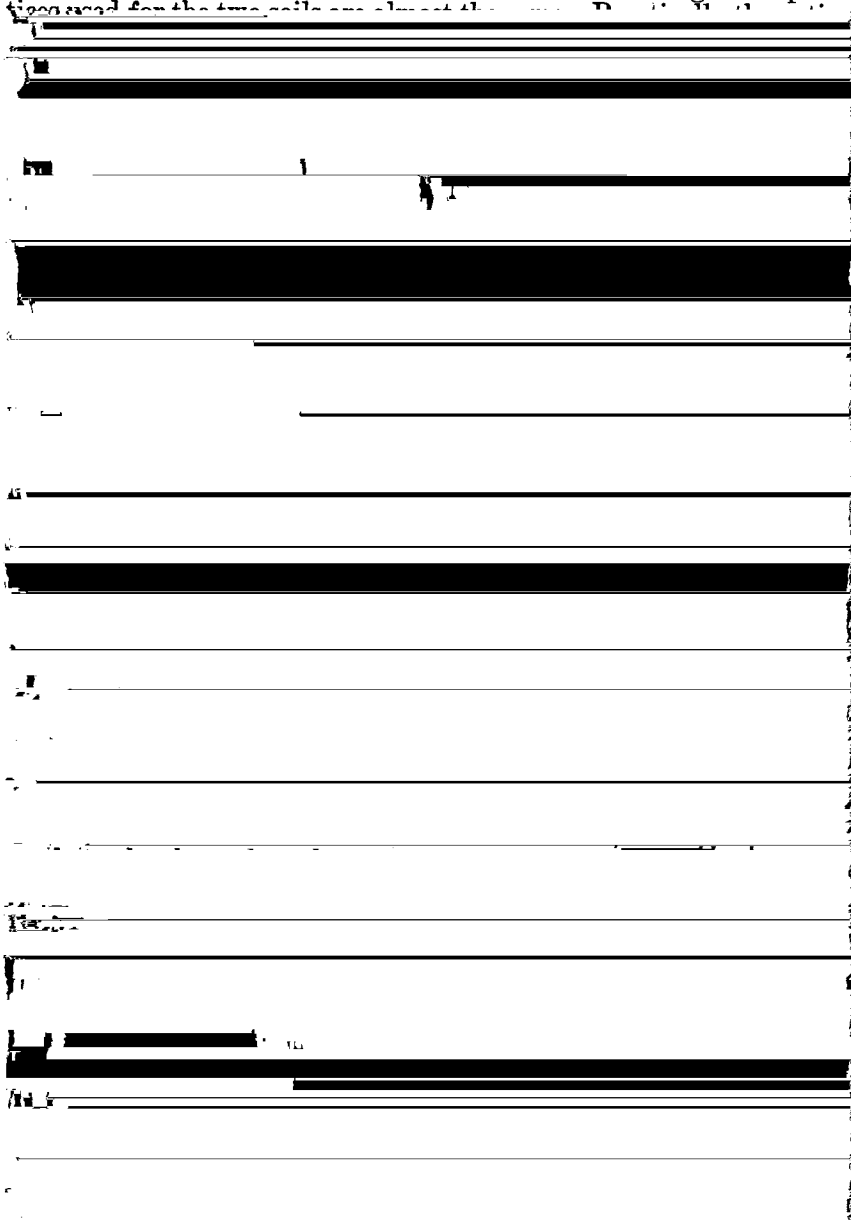


nearly all parts where the red soils occur. The soil is constantly receiving fertile material not only from the surface wash but also from seepage waters that bring material from higher ground. Relief ranges from 2 to 4 percent, and surface drainage is good for practically all crops common to the area. The nitrogen content is so high in some places that stalk growth in some crops is excessive. Little erosion takes place, but the soil is sometimes injured by deposits washed from adjacent deeply eroded areas.



areas are being damaged by inwash of sand or, in places, by subsoil material washed from the severely eroded tracts of surrounding soil. Erosion is being checked in some degree, however, by the extensive control program carried on in the county.

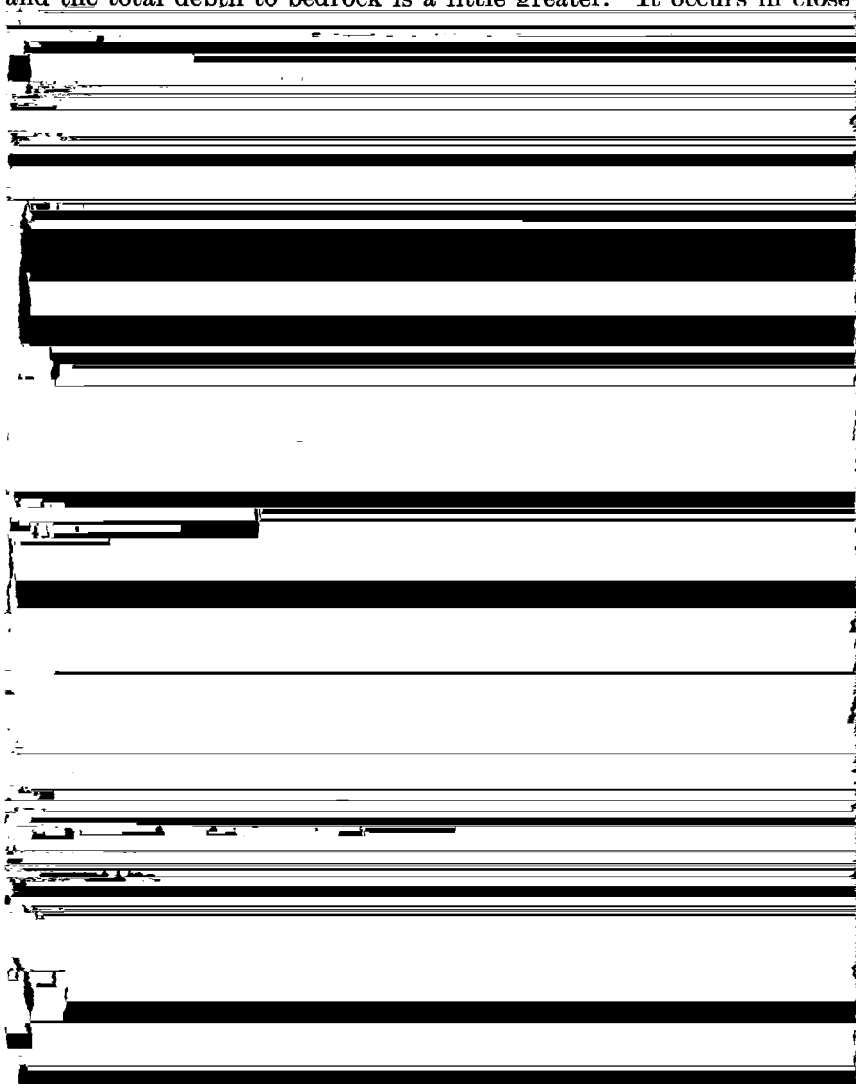
Use and management.—Cotton, corn, hay, and pasture are among the crops planted on Abernathy fine sandy loam. Under similar management, the average yields are somewhat lower than on Abernathy silt loam, level phase. The fertilization and other management prac-



parts. The chertiness and porosity of this phase probably allows more leaching than in the Cookeville soils and therefore care in conserving fertility and moisture is more important.

Baxter cherty silt loam, eroded rolling phase.—This phase occurs rather widely in the more broken part of the gray lands section of the county, largely in the northwestern part, on 5- to 12-percent slopes. It differs from the rolling phase mainly in being more eroded. In only a few places is there enough chert present to interfere materially with tillage.

Baxter cherty silt loam, undulating phase.—The profile of this phase is much like that of the rolling phase but its various layers average somewhat thicker. In many places the chert is less abundant, and the total depth to bedrock is a little greater. It occurs in close



stronger slopes (12 to 30 percent) and in being a little shallower over bedrock.

This soil has not been affected by accelerated erosion, because nearly all of it is forested. If it were cleared, erosion would be rather rapid unless special care were exercised, since the slope is too great to permit clean tillage for a long period under average conditions. Should this phase be cleared, it would be best used in most places for permanent sod pasture, with possibly an occasional cultivated crop.

Baxter cherty silt loam, eroded hilly phase.—Stronger slopes (12 to 30 percent) and a shallower depth to bedrock are the chief differences

Sericea lespedeza for pasture or kudzu for temporary grazing may be suitable uses for this soil, but most areas will possibly revert to forest.

Baxter cherty silty clay loam, severely eroded hilly phase.—In its original state this soil was Baxter cherty silt loam, hilly phase, but it lost most of its surface soil through severe erosion when it was cleared

moderately eroded. The slope range is from 12 to 30 percent, and most of the bodies are in the more broken northwestern part of the county. Crop yields are generally low and are rapidly declining. Quantities of chert and the strong slopes make harvesting of hay crops difficult, but pasture might do reasonably well under proper management practices (*14*). Erosion control is one of the main management problems. This far, the soil is only sheet eroded in most places, but if cropping is continued without special precautions for control, gullying will be severe. A good management practice is the incorporation of as much organic matter as possible in the soil to control erosion and to conserve moisture.

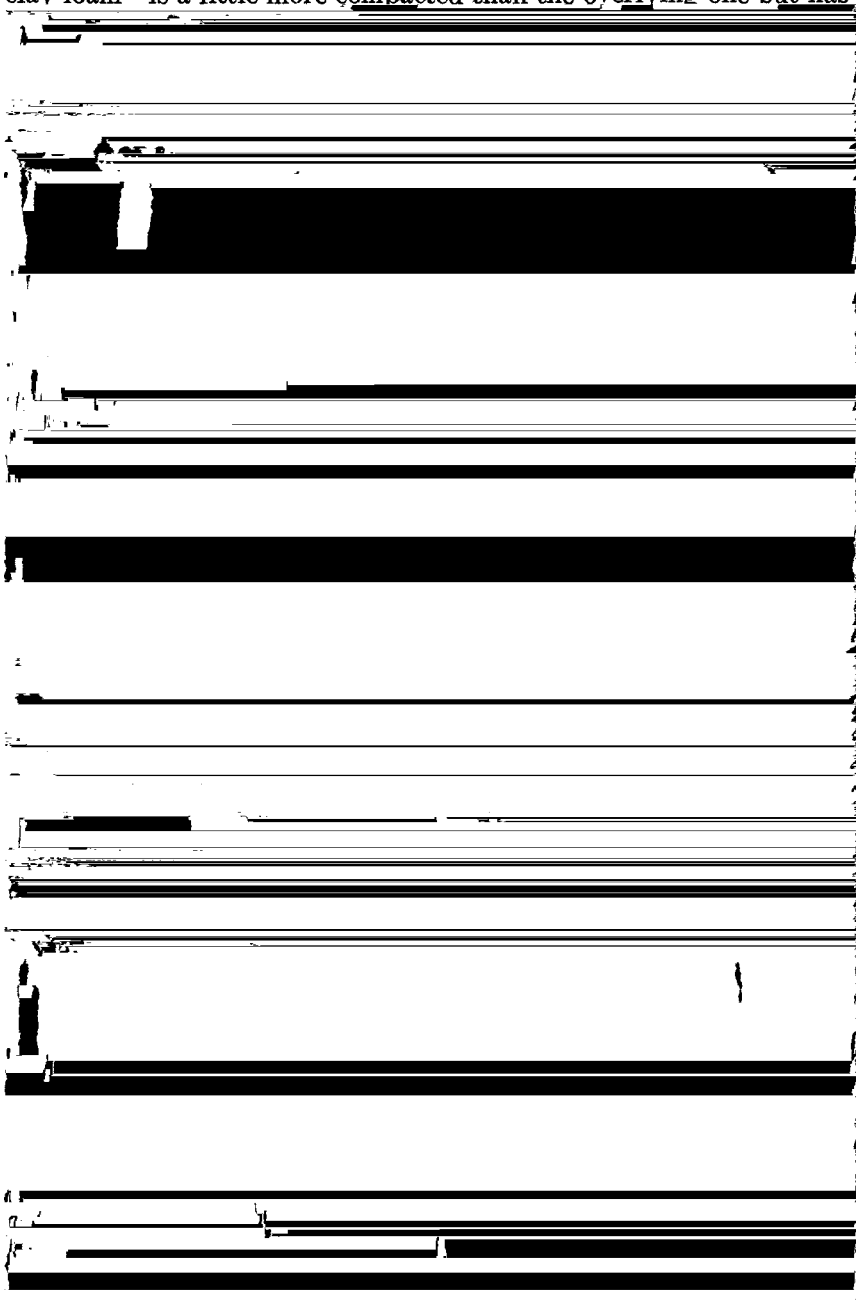
Bruno fine sandy loam.—This soil occupies narrow strips along the stream banks where fine sand has been dropped by floodwaters. In many places it forms a natural levee. Nearly all areas occur east of the Athens-Decatur Highway on the old Tennessee River bank and on the Elk River bank above Buck Island Bridge. The soil is formed of recent alluvium washed from upland soils underlain by high-grade limestone, shale, sandstone, and other rock. Usually there is little slope (0 to 2 percent), but some areas have a gradient of as much as 3 percent. Drainage is good throughout the profile. Huntington silt loam, Egam silty clay loam, Lindside silt loam, and Melvin silt loam are associated with this phase in the first bottoms.

Except for more fine sand in the profile, especially in the upper part, this soil does not differ greatly from Huntington silt loam. The surface 24 to 28 inches is brown to light yellowish-brown fine sandy loam. Below this is mottled gray, yellow, and brown sandy clay loam that grades with depth to fine-textured material.

Use and management.—Practically all of Bruno fine sandy loam has been cleared for many years. The principal crops are corn, pasture, or hay. Corn yields 20 to 40 bushels an acre; soybeans, 1½ to 2 tons; and lespedeza, ¾ to 1½ tons of hay. Cotton and vegetables are grown to a small extent, and pasture would no doubt do fairly well under proper management (*14*). Fertilizer is seldom used, and management practices are about the same as those for Huntington silt loam.

Capshaw loam.—This loam occupies 0- to 2-percent slopes on stream terraces in association with Etowah, Wolftever, and Humphreys soils, which are also on terraces, and the Huntington, Egam, and Lindside soils of the first bottoms. A large part of this soil is along the Elk River near the point where it enters the county. Areas lie above normal floodwaters but are subject to overflow during heavy floods. Drainage is good on the surface and throughout the profile. Lack of a tight compacted subsurface layer and its more sandy profile differentiate this soil from the Wolftever, and it is sandier and browner both in the surface and the subsoil than the Humphreys. The profile is [redacted] than that of first bottom soils. The original [redacted]

firm brownish-yellow fine sandy loam. The following layer of pale-yellow friable clay loam extends to a depth of 35 inches. The layer between 35 and 44 inches—a mottled gray, yellow, and brown silty clay loam—is a little more compacted than the overlying one but has

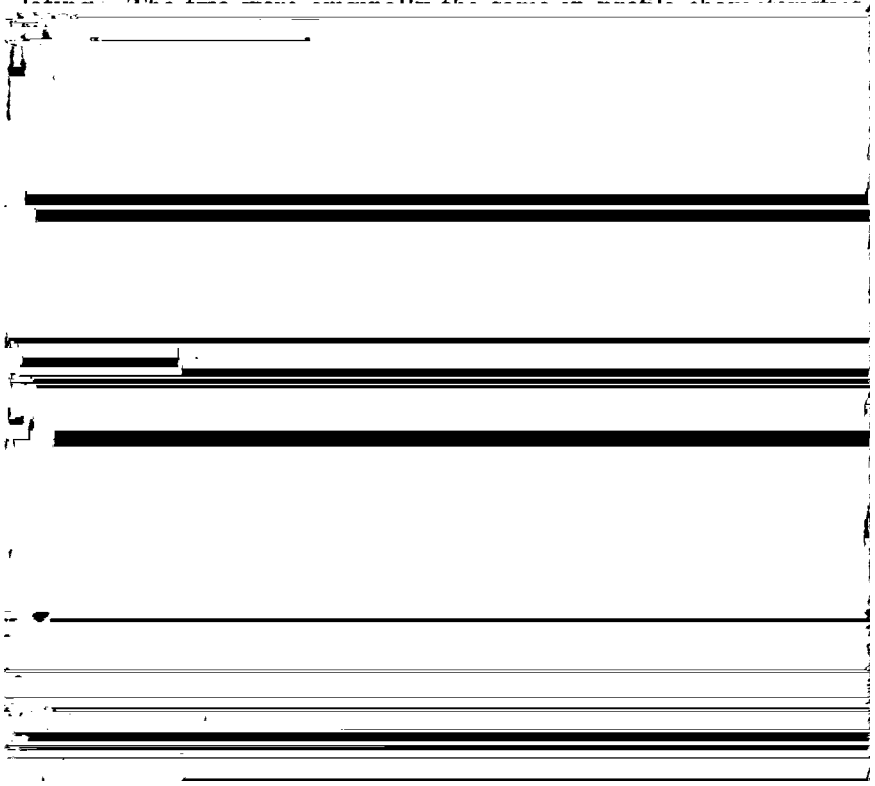


it produces fair to good yields. Cotton produces 200 to 500 pounds of lint an acre; corn yields 15 to 35 bushels; wheat, 10 to 20 bushels; oats, 15 to 40 bushels; lespedeza, ¾ to 1½ tons; soybeans, 1 to 2 tons; and alfalfa, 1 to 3 tons of hay. Other crops produce fair to good yields.

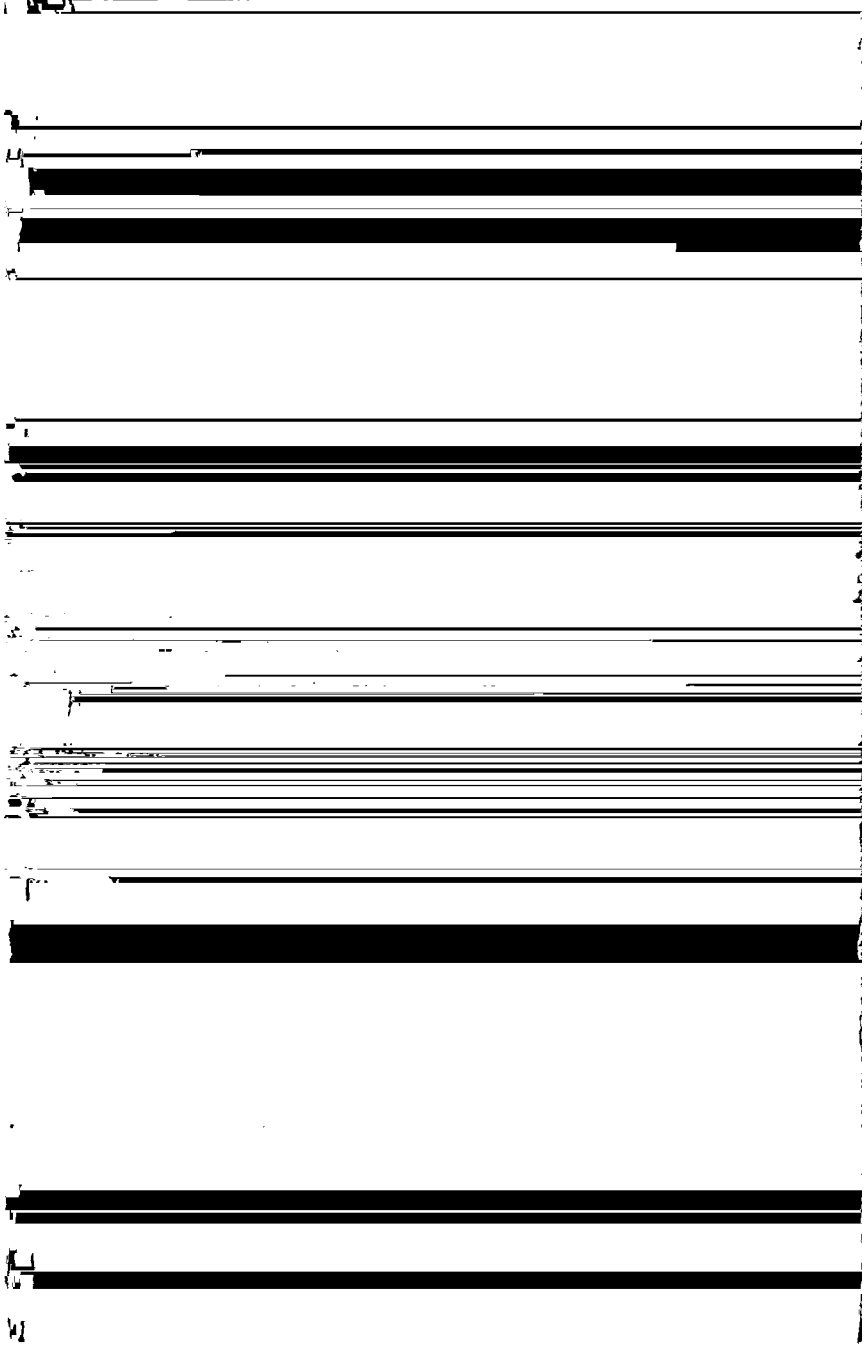
The fertilization used is about the same as that for the phases of Dewey silt loam (*4*, *5*, *17*, *19*). Winter cover crops are being used more and more, and the growing of these crops determines to some extent the quantity and kind of fertilizers used (*5*, *7*, *9*). In most areas, the use of proper crop rotations is a considerable aid in retaining soil fertility. In general, excellent response can be expected from this soil if good management is practiced.

Cookeville silt loam, eroded undulating phase.—Probably 50 to 75 percent of the original surface soil of this phase has been removed by erosion. Ordinary tillage practices have mixed subsoil material with the surface soil, and over approximately half the area the color of the soil has been altered to plow depth. Drainage is good, both externally and internally, and the moisture-holding capacity is good in areas where sufficient organic matter has been incorporated.

Areas occur in close association with the undulating phase and occupy very similar positions. Though both occupy 2- to 5-percent slopes, most of the undulating phase is on the milder slopes; whereas, this soil is predominantly on slopes of nearly 5 percent. There is more variation in the relief of this phase than there is in the undu-



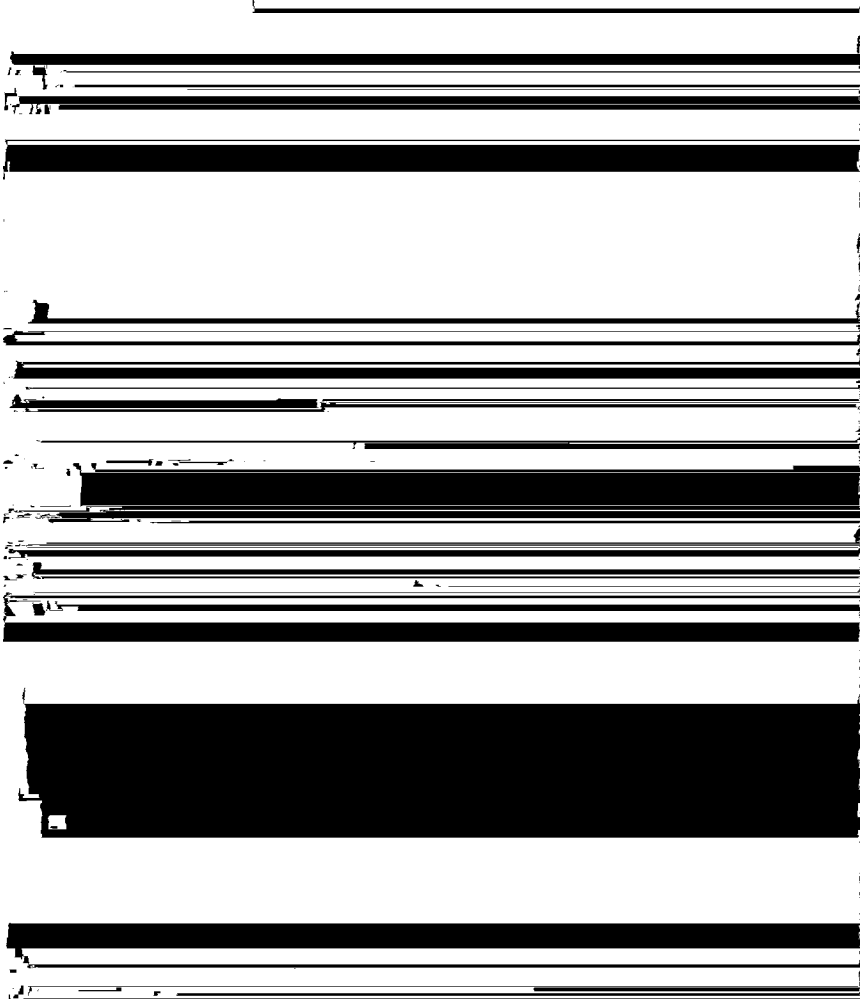
seed are grown by some farmers. Practically all the land has been cleared and has been tilled for 25 to 40 years. It responds readily to good management. Winter cover crops, as vetch, are proving their



particles. Bright-red slightly yellowish-tinged silty clay loam continues from 39 to 66 inches, and it contains some fine mica particles, a little sand, a few small concretions, and a few fine rock fragments. This material is friable and crushes easily, especially when well moistened.

As cultivation and weathering continue, the surface soil becomes lighter in color unless the organic content is maintained or increased. The tilth generally remains good until the original organic matter is gone. The absorption of moisture and its movement through the soil are good, but the more sloping areas are easily eroded unless care is taken to control runoff. Included with this phase, but designated on the map by gravel symbol, are several small areas of Cumberland gravelly silt loam, undulating phase.

Use and management.—Practically all of Cumberland silt loam, undulating phase, has been cleared for many years. Cotton, corn, hay, and small grains are grown. This soil is well adapted to cultivated



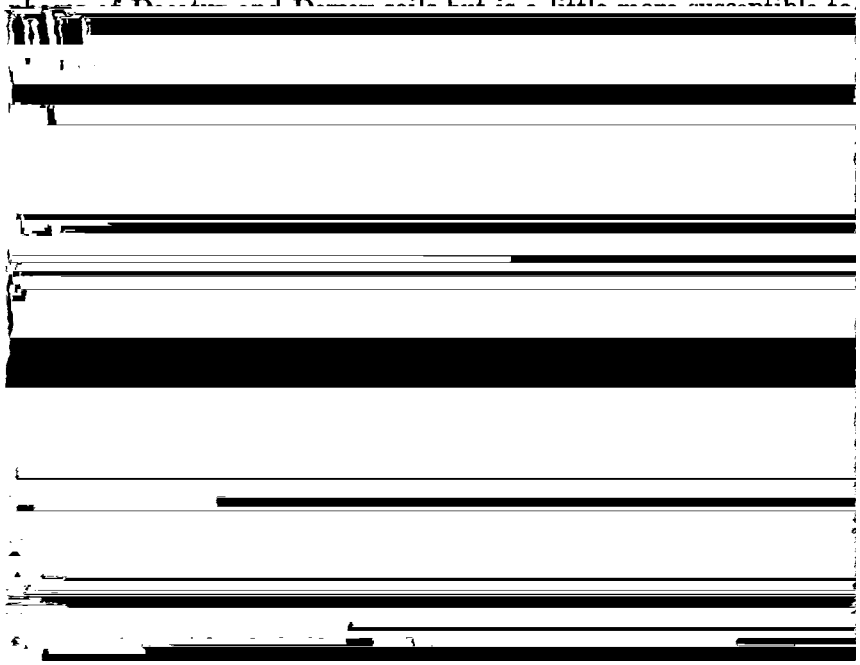
it a heavier consistence and a brighter red color. The profiles of the two are otherwise similar.

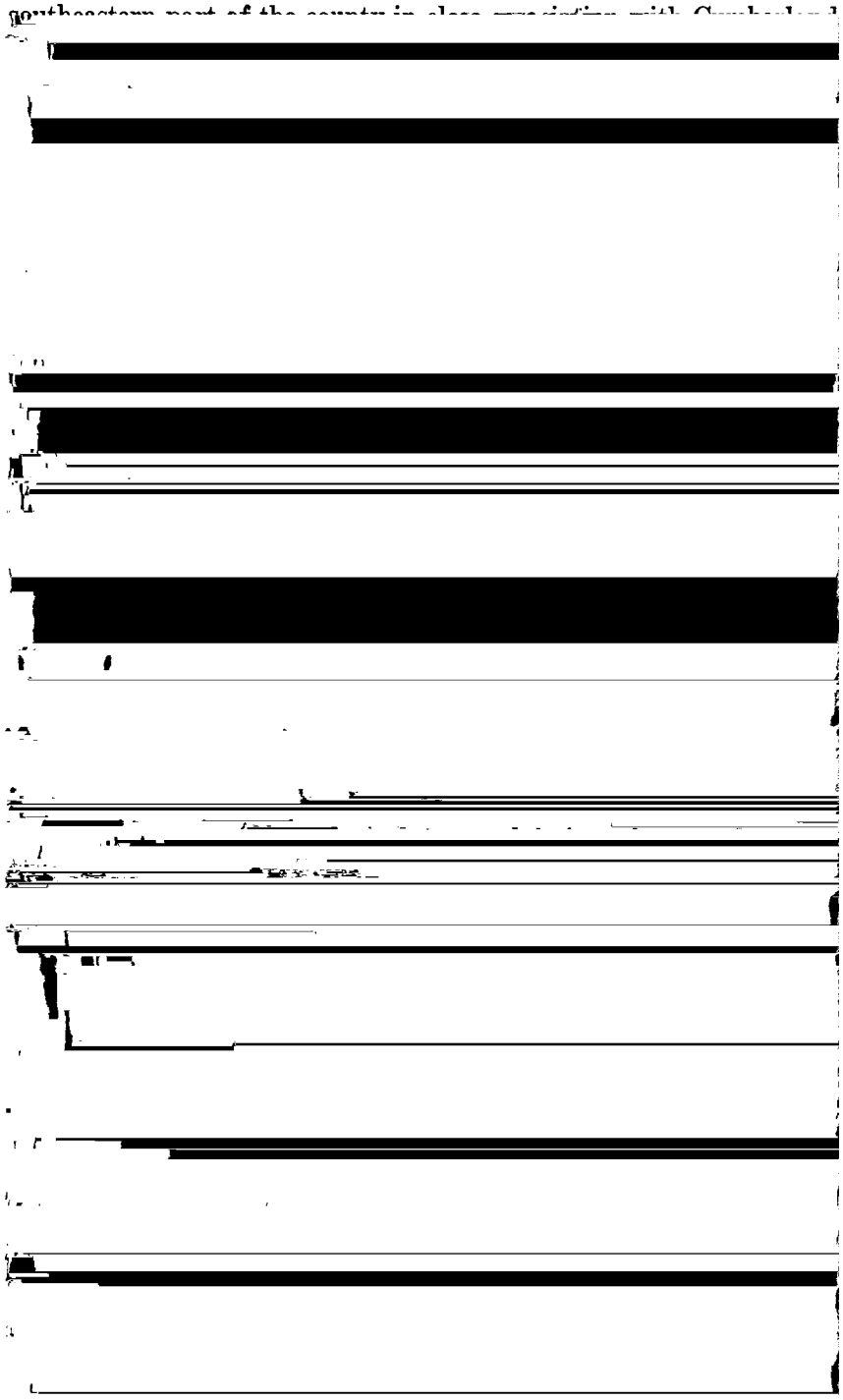
Use and management.—Owing to its good workability, high productivity, and proximity to transportation, the eroded undulating phase of Cumberland silty clay loam was one of the first soils cleared in the county. Much of it was undoubtedly cleared about 100 years ago, and since that time it has been in almost continuous cultivation. For a greater part of the time it has been planted to cotton or other clean-tilled crops. Fertilization and other management practices are much like those for the eroded undulating phase of Decatur silty clay loam; the crops grown and yields produced are closely similar.

Cumberland silty clay loam, eroded rolling phase.—Areas of this soil occur near the southern boundary of the county on slopes of 5 to 12 percent. Except for its steeper relief, it differs but little from the eroded undulating phase. The rather strong slopes allow rapid runoff during heavy rains, and consequently erosion is increased and the soil is prevented from absorbing as much moisture as crops need.

Use and management.—The crops grown and the fertilization practices used on the eroded rolling phase of Cumberland silty clay loam are about the same as those for Decatur silty clay loam, eroded undulating phase. Additions of organic matter, the use of close-growing crops, and the planting of winter cover crops are management practices needed.

Cumberland silty clay loam, severely eroded rolling phase.—This phase occurs in the southern part of the county and also near the bridge that spans the Elk River on the Athens-Florence Highway. It is mapped in close association with other Cumberland phases and is derived from the same material. It is similar to the severely eroded





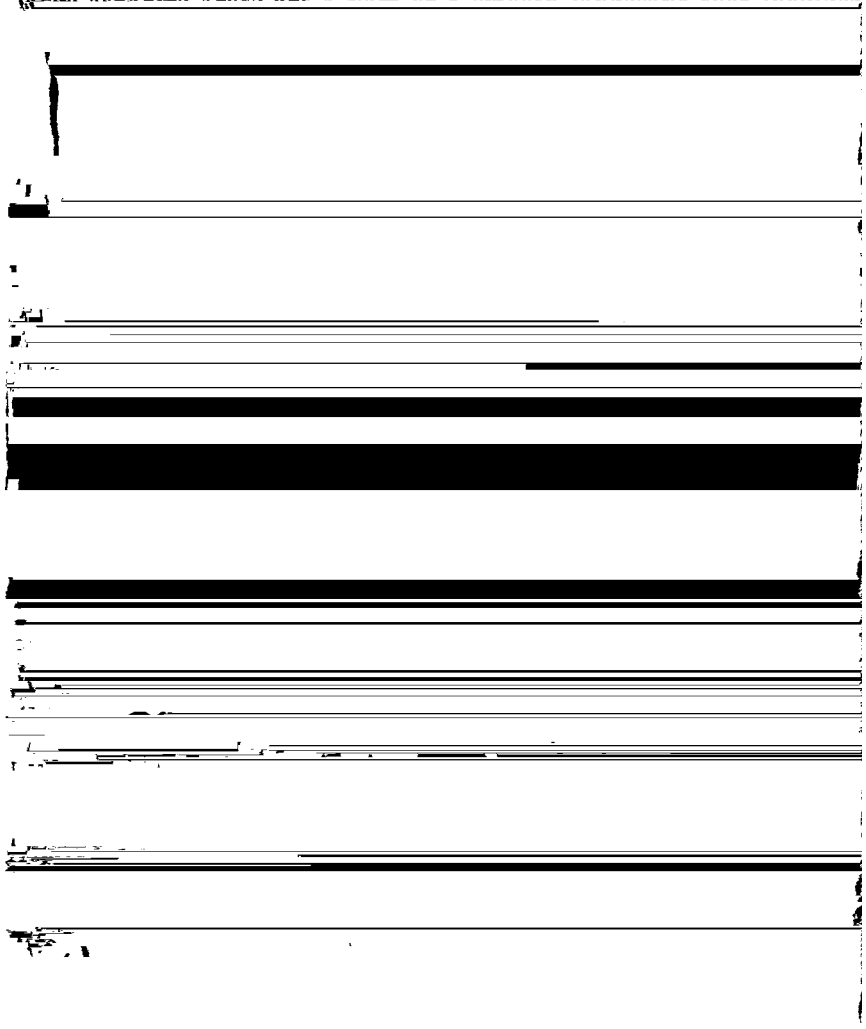
The surface is level to very gently undulating, the gradient rarely exceeding 2 percent. Moisture is not absorbed rapidly, and surface and internal drainage are good. During extended dry seasons the soil dries out and becomes very hard. Though this dryness and hardness is unfavorable for corn, lespedeza, soybeans, and other similar crops, it does not interfere materially with the growth of cotton.

In virgin or unplowed areas the first 5 inches is light-brown to reddish-brown friable silt loam that crushes to a granular mass. A considerable content of organic matter is well incorporated with the min-

drainage is good, runoff is relatively slow though somewhat more rapid than on the level phase, and natural fertility is high. The soil is not especially difficult to work and conserve, but erosion is somewhat hazardous on the more sloping parts.

Practically all this phase has been under cultivation for a long time. In management practices farmers make no special distinction between this and the level phase. Fertilizers used on the two are practically the same, but crop yields are a little lower on this soil. Because this phase is a little more subject to erosion, runoff control by use of contour plowing and close-growing crops is more essential.

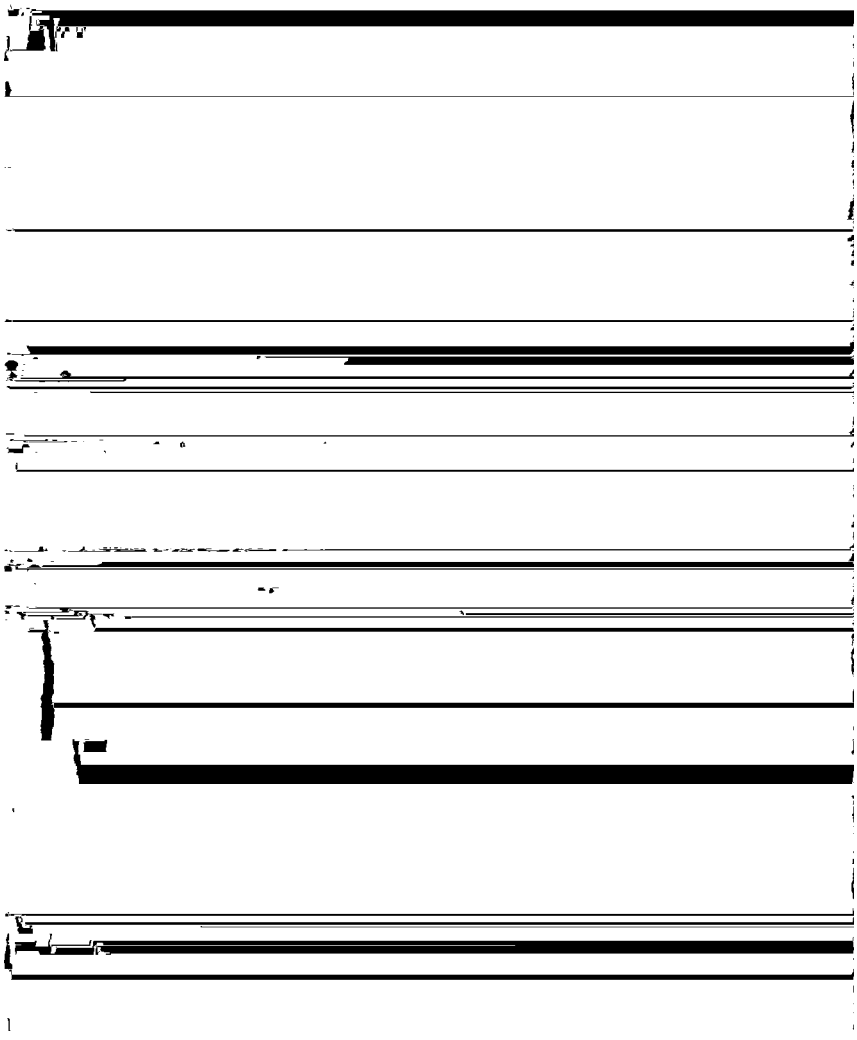
Decatur silty clay loam, eroded undulating phase.—This well-drained dark-red soil of the red lands has developed over high-grade limestone, chiefly of the Tuscumbia (St. Louis and Warsaw) formation, in the southern part of the county. The surface is undulating to gently rolling, the gradient being from 2 to 5 percent. The fairly



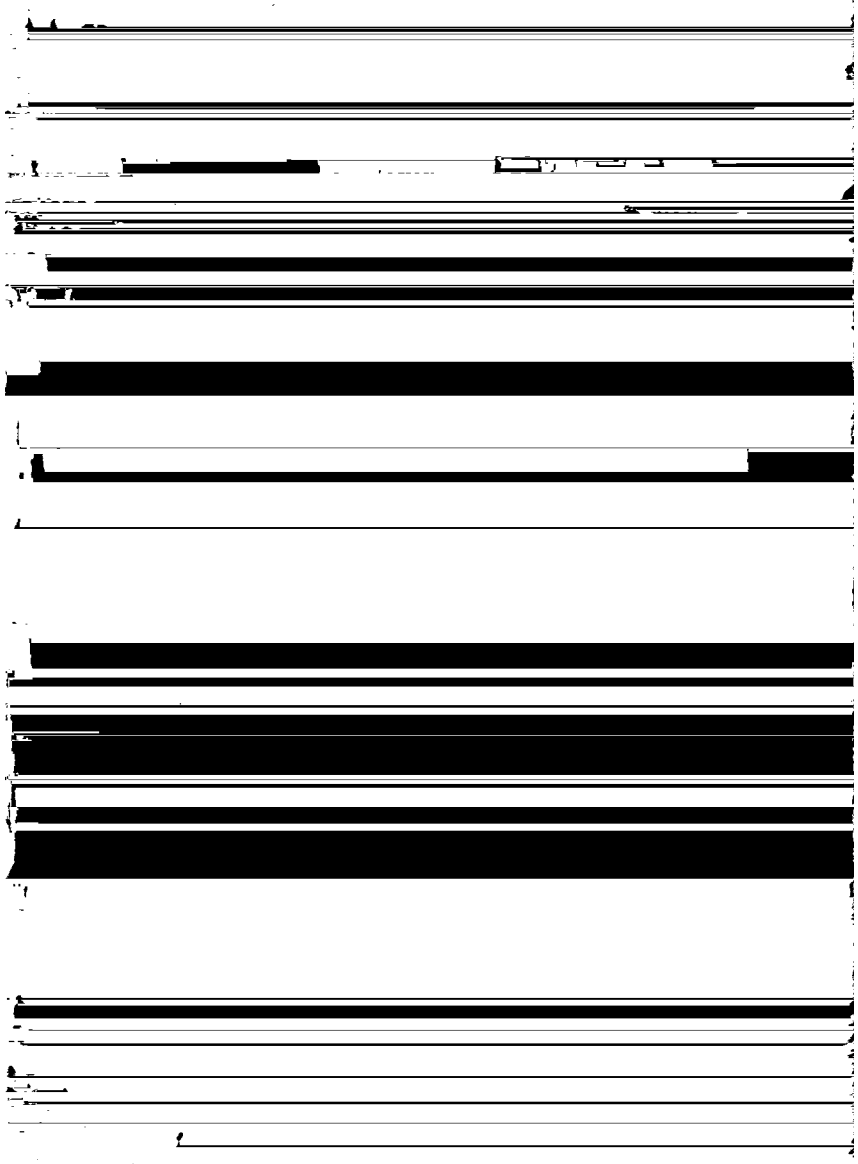
heavily and the areas have been under good management, the yields are about 50 percent higher. Wheat and oats are ordinarily harvested before the summer dry season begins. Neither crop is grown extensively.

Some alfalfa, cowpeas, lespedeza, and soybeans are grown for hay. Alfalfa is commonly grown under a high level of management that includes the consistent control of runoff, the use of rotations limiting the frequency of row crops, and the use of soil amendments, chiefly lime and phosphorus. Alfalfa yields about 4 tons an acre under such management.

Winter legumes as vetch (pl. 6, *B*), planted as cover crops and turned under the following spring, have given excellent results, and their use is becoming increasingly common, (*5*, *7*, *9*). Cover crops, along with contour cultivation and adequate fertilization, are im-

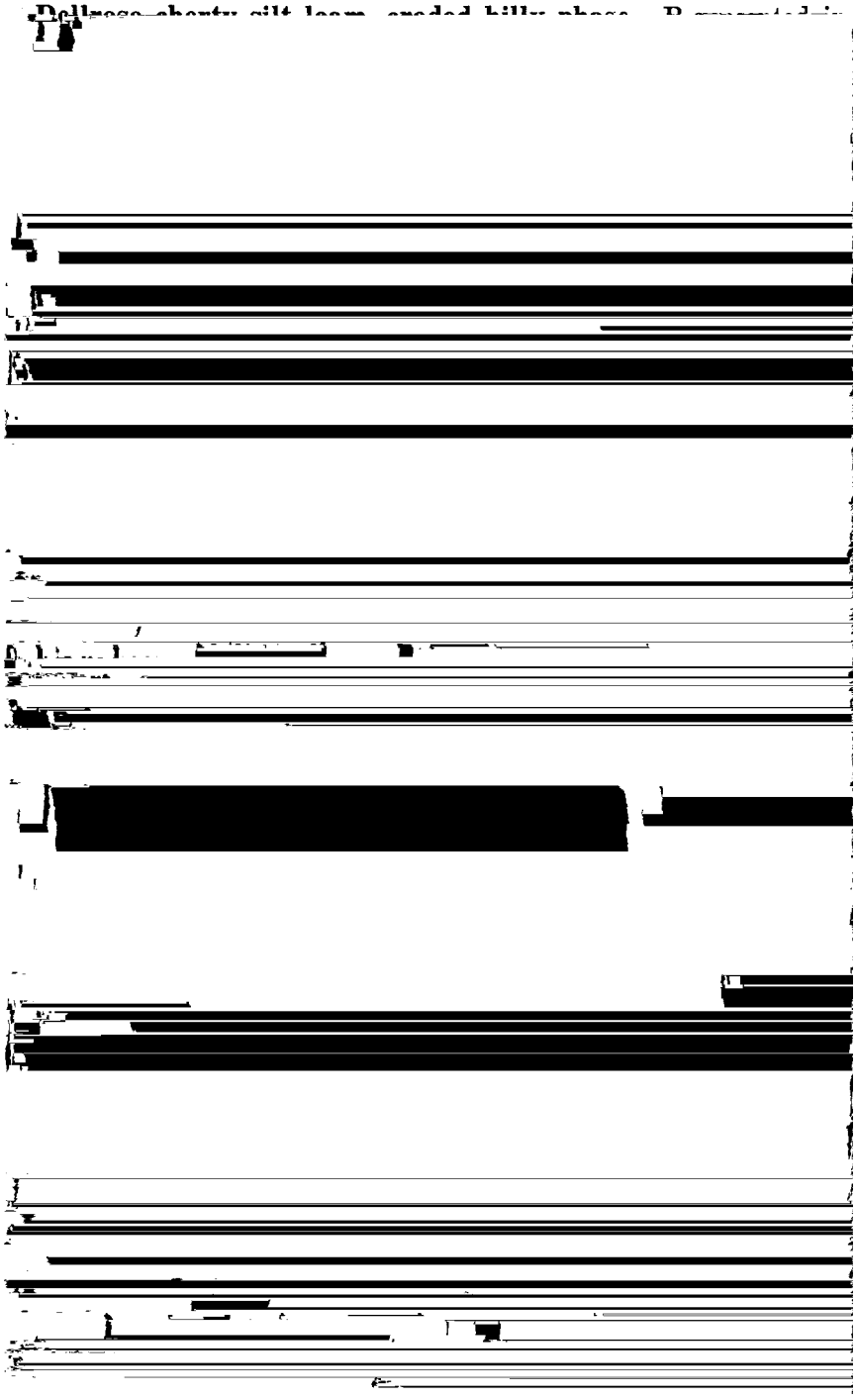


and seeded. In places kudzu or sericea lespedeza is a well-suited crop



use as pasture.

Dellrose cherty silt loam, hilly phase.—Cherty material drifted down the slopes from the associated Dickson, Baxter, and Bodine soils and deposited on the moderately phosphatic limestone common to the outer part of the Central Basin is parent to this soil. This phase occupies strong slopes (12 to 30 percent) below the associated soils, and the drifted material varies considerably in thickness from place to place. There is no well-developed profile. One of the larger areas



Management requirements, crop yields, and the response of the soil to good management are approximately the same as those of Decatur silty clay loam, eroded undulating phase. Being less dry late in summer and being in general more permeable and less erosive, this soil probably has somewhat better moisture relations than the slightly eroded undulating Decatur soils for all crops except cotton. Its natural fertility is apparently slightly less than equal to that of those soils. This phase is suited to moderately short rotations, but inasmuch as erosion is somewhat hazardous, some care is required in handling runoff water.

Dewey silt loam, level phase.—This soil has developed from high-grade limestone in the red lands. In extremely few places does the gradient exceed 2 percent. Practically no erosion has taken place, and the surface layer therefore is a little thicker than that of the slightly eroded undulating phase from which it differs chiefly in having a more nearly level surface. This difference is of little or no significance agriculturally.

The top 6-inch layer is brown to light-brown mellow silt loam in which there is a fair quantity of organic matter. From 6 to 11 inches is brown to light reddish-brown friable silt loam or silty clay loam. Below 11 and continuing to 27 inches is yellowish-red firm silt loam or silty clay loam subsoil that crushes readily to small partly rounded particles. Below 27 inches the mass is more compact, and it breaks away to a layer in which the fragments are more angular, the pieces

This soil is associated with other Dewey phases and with the Decatur and Abernathy soils. A few areas are associated with Baxter soils, and in these is a little more chert than average. Most of the acreage lies where the red lands part of the county joins the gray lands. Other areas are along Limestone Creek, near Hays Mill, near Elkmont, West Limestone School, and in the vicinity of Elk River Mills Bridge. Some areas are large, and in these are included small patches of other phases of the Dewey as well as of the Decatur and Cookeville soils.

Use and management.—Nearly all of Dewey silty clay loam, eroded undulating phase, has been cleared and cultivated for many years. It is a desirable soil for crop production. Cotton and corn are the most common crops, with small acreages of oats, wheat, alfalfa, soybeans, and lespedeza being grown. Legume winter cover crops are becoming increasingly common and are now recognized as important in maintaining the high productivity. Management is about the same as on the slightly eroded undulating Dewey and Decatur soils, but crop yields are lower and tilth and moisture relations are less favorable because of the eroded condition. Management requirements are more exacting because a luxuriant vegetative cover is more difficult to maintain, and runoff tends to be higher because of the slower percolation of water.

Dewey silty clay loam, eroded rolling phase.—This phase differs from the eroded undulating phase chiefly in having a stronger slope (5 to 12 percent). The surface soil is generally thinner, and small patches of exposed subsoil are common though not abundant. Chert fragments occur a little more frequently. Moderately strong slopes and moderately slow permeability cause a fairly high volume of runoff, and therefore the soil erodes quickly where the plow layer is loose and unprotected by vegetative cover. The thinner, less friable surface soil is not so fertile as that of the smoother, less eroded Dewey soils, and quantity of moisture available to plants is less. Bodies of this soil are widely distributed over the county, but the aggregate area is less than that of some of the other Dewey soils or that of the Decatur. Occurring in association with this phase are other Dewey soils and Decatur and Abernathy soils.

Use and management.—The eroded rolling phase of Dewey silty clay loam has been cleared and cropped for many years. Cotton and corn are the prevailing crops, with some small grains and hay. The fertilizer practices commonly used are similar to those for the smoother Dewey and Decatur soils, but crop yields are lower. The management requirements necessary to build and maintain a high level of production are more exacting. Close-growing crops—especially legume hay, pasture, and cover crops—and adequate fertilization are a part of good management. Contour tillage aids in restraining runoff, and terracing may be suitable for some sites.

Dewey silty clay loam, severely eroded rolling phase.—Erosion has removed practically all the surface soil from this phase and, in places, part of the subsoil. The plow layer, a yellowish-red firm silty clay or silty clay loam, is hard when dry, lower in organic matter and available plant nutrients than the original surface soil, and low in its capacity for holding water available to plants. Percola-

tion of moisture is slow, and runoff is high. The soil is very erosive in places where the plow layer is cultivated.

This phase differs from Dewey silt loam, eroded undulating phase, chiefly in being more severely eroded and in having a more sloping surface (5 to 12 percent). The aggregate acreage is not great, and the separate areas are small. Areas are widely distributed over the county in association with other Dewey soils, with the Cookeville series, and occasionally with Decatur and Dickson soils.

Use and management.—Crop yields are generally low on the severely eroded rolling phase of Dewey silty clay loam. The soil is difficult to maintain and is therefore poorly suited to crops requiring tillage. If properly fertilized, limed, and seeded, most areas probably can be made to produce much grazing of good quality. Long-time rotations are generally preferable to short rotations. Sericea lespedeza is suitable for quick establishment of soil-building and protective vegetation.

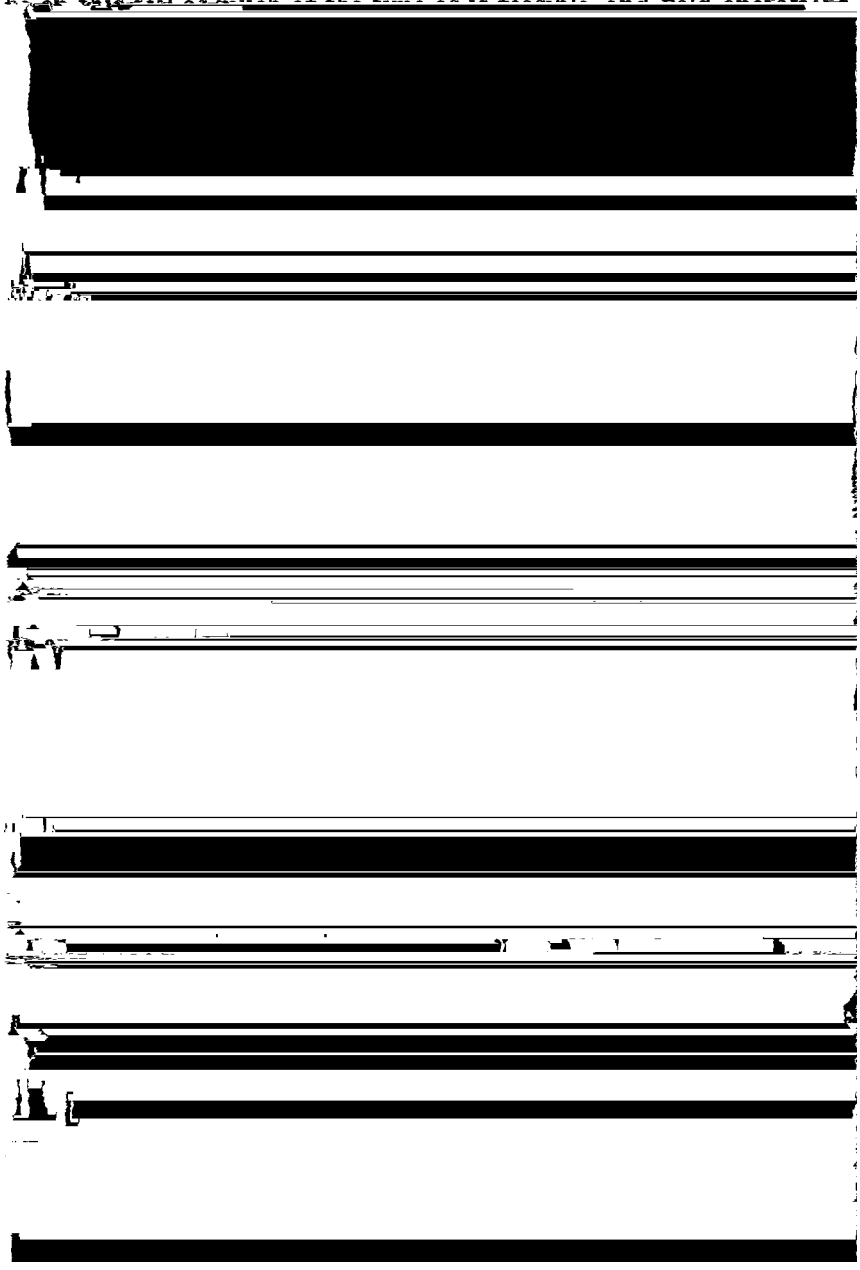
Dewey silty clay loam, eroded hilly phase.—This phase represents those hilly areas of Dewey silt loam that are moderately eroded. The slope range is 12 to 30 percent, and 50 to 75 percent of the surface soil has been lost by erosion. The plow layer is a mixture of surface soil and subsoil, generally a reddish-brown firm silty clay loam. Of common occurrence are patches where all the surface soil has been lost, and on these the plow layer may be yellowish-red compact silty clay. Some areas are cut by an occasional small gully. Runoff is high and percolation is moderately slow.

Use and management.—All the eroded hilly phase of Dewey silty clay loam has been cleared and cultivated, and much of it is used for crops. The yields are much lower than on the smoother Dewey soils. It is not well suited to crops requiring tillage because it is difficult to control runoff and carry on field operations. If properly fertilized and seeded, this land is capable of producing well when planted to pasture. Some areas, those less eroded and less hilly, are probably well suited to long rotations comprised chiefly of alfalfa or similar crops.

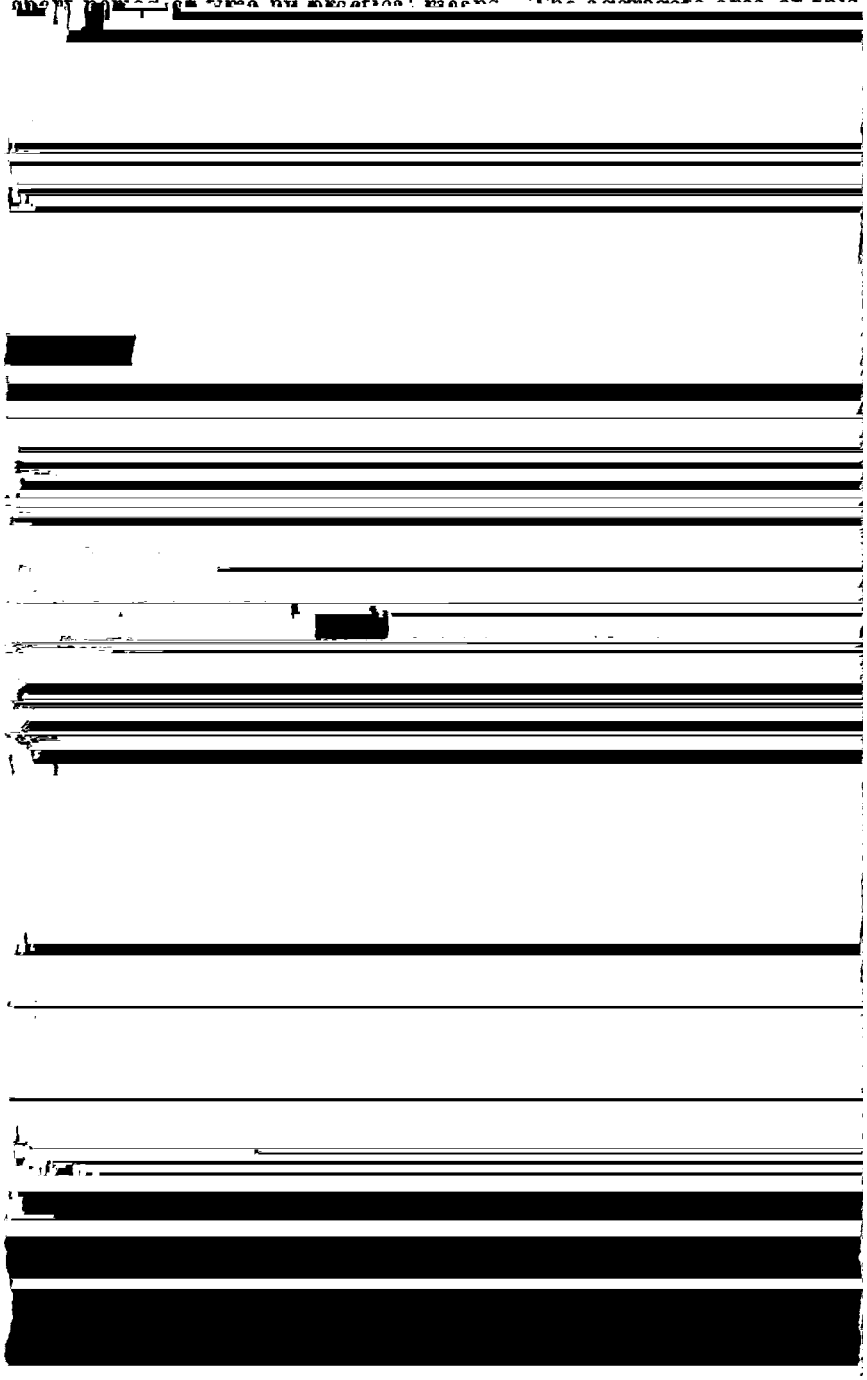
Dewey cherty silty clay loam, eroded rolling phase.—Except for its chertiness and notably shallower depth to bedrock, this phase resembles the noncherty Dewey soils in general characteristics. It is a red moderately cherty soil, developed over relatively high-grade cherty limestone. Runoff is moderate and the chert apparently retards sheet erosion to some extent. Internal drainage is retarded but a little more rapid than that of the noncherty Dewey soils. The aggregate area of this soil is not great, and the separate bodies are small, most of them occurring as narrow strips on sharp slopes of 5 to 12 percent in association with smoother Dewey, Decatur, and Baxter soils. Most of this phase is in the vicinity of West Limestone School and Elkmont.

The 6-inch surface layer is light reddish-brown cherty silt loam or cherty silty clay loam. The subsoil is yellowish-red firm cherty silty clay loam, grading at 40 inches to yellowish-red cherty silty clay, which is somewhat streaked and splotched with gray and yellow in the lower part. Bedrock cherty limestone is at a depth of 4 to 10 feet. The entire profile is moderately acid.

Use and management.—All the eroded rolling phase of Dewey cherty silty clay loam is cleared and most of it is cropped in about the same manner as the smooth and rolling noncherty Dewey soils. Chert interferes somewhat with tillage operations. Runoff is a decided hazard and requires careful management. Close-growing crops, especially those that afford a growing cover through the winter, should

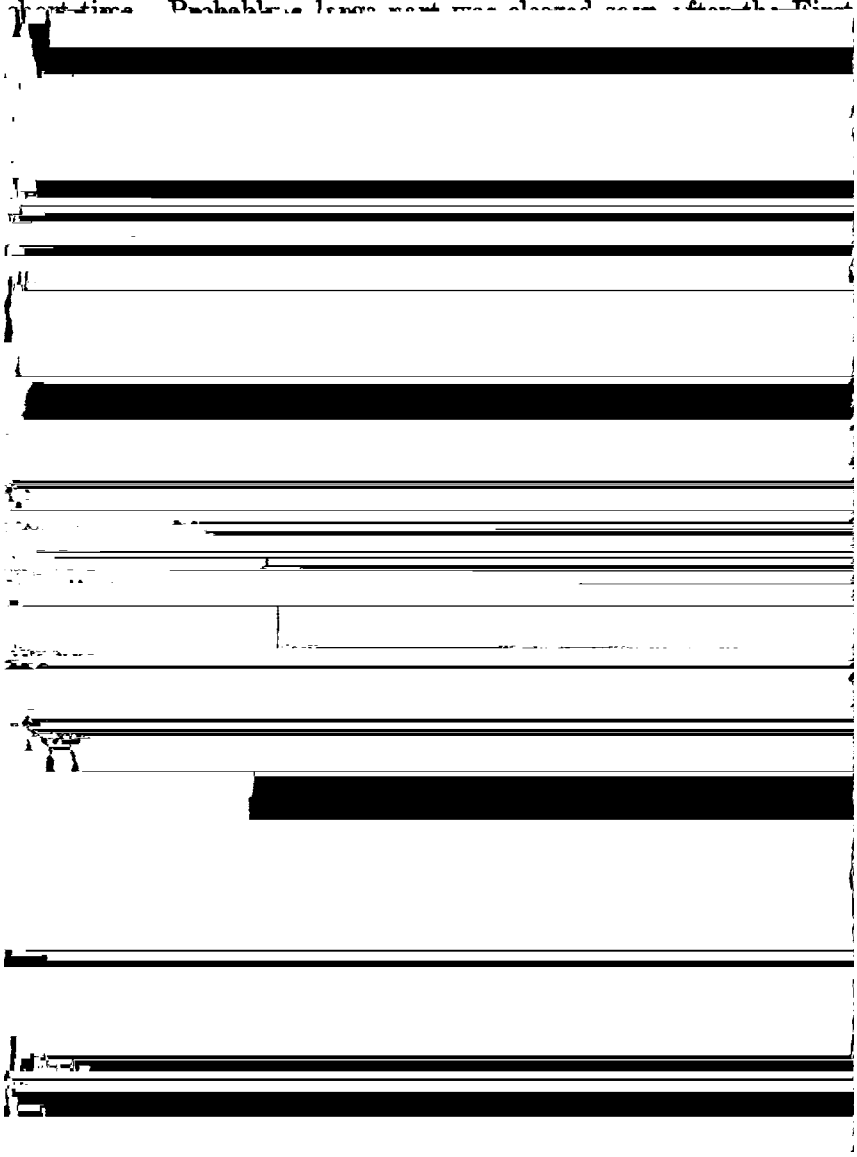


of either of the two series. Small to moderate gullies occur in places, but only a few are so large that they cannot be obliterated within a short period of time by mechanical means. The aggregate area of this



gum; post and other oaks; hickory; sourwood; dogwood; and chestnut, with some shortleaf pine intermixed. The timber stand probably was thin, and not many of the trees grew to a large size. The underbrush was light or almost absent in all except lower places where more organic matter and moisture accumulated.

Use and management.—Cotton, corn, oats, soybeans, and lespedeza hay are grown on Dickson silt loam, undulating phase, as well as vegetables and fruit crops for home use. On this cold soil the crops start growing later in spring, but they make rapid growth where proper management is practiced. From 80 to 90 percent of the land has been cleared, but much of it has been farmed for only a relatively

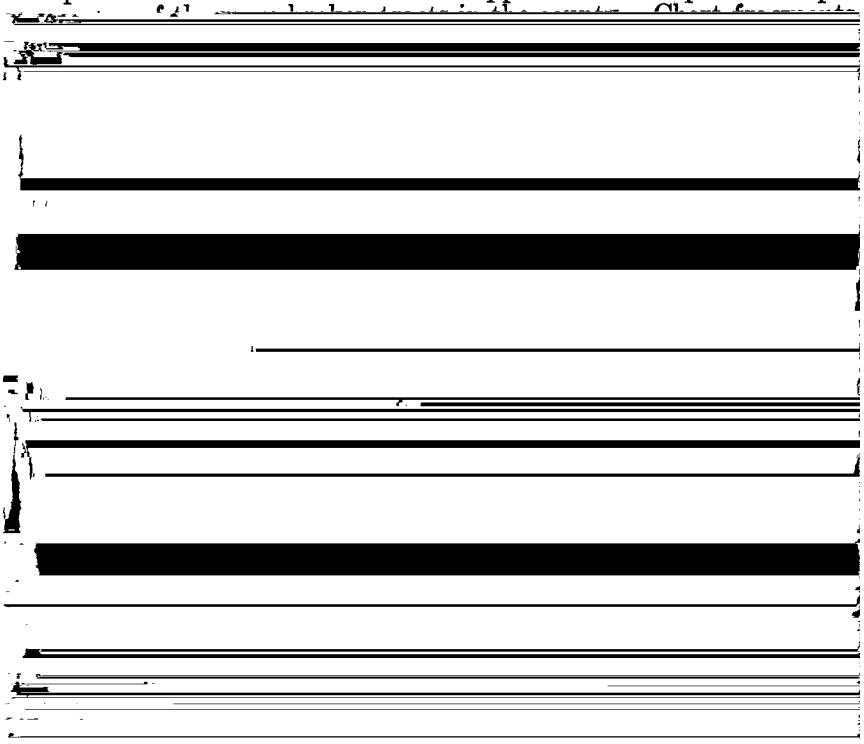


though more care is needed in controlling erosion on the undulating soil. Cotton yields are slightly lower on this soil, but corn and hay do nearly as well. No difference is made in the fertilization of the two soils.

Dickson silt loam, eroded rolling phase.—This phase is distributed over nearly all parts of the gray lands section of the county, especially on the slopes that lead down to streams from the broad ridge tops occupied by the undulating phase. The soil occurs in association with other phases of Dickson silt loam, and differs from the eroded undulating phase in having stronger slopes of 5 to 12 percent. These steeper slopes cause more rapid runoff of heavy rainfall, more severe erosion, and a greater loss of needed moisture. Included with this soil are small areas of the inextensive severely eroded rolling phase of Dickson silt loam.

Good management practices apparently would include the use of strip cropping, the frequent planting of close-growing crops, and the use of winter cover crops as often as possible. A good response generally can be expected from the soil under these practices.

Dickson cherty silt loam, undulating phase.—Except for only a moderate siltpan and many chert fragments up to 5 inches in diameter on the surface and in nearly all parts, the profile of this soil is similar to that of Dickson silt loam, undulating phase. It occurs in the same general area as that phase, is associated with the same soils, and is derived from much the same materials, but generally occupies less extensive areas. It is mapped on 2- to 5-percent slopes



tically all this soil has been cleared for many years. As erosion advances, more rocks appear on the surface and tillage becomes more difficult and expensive.

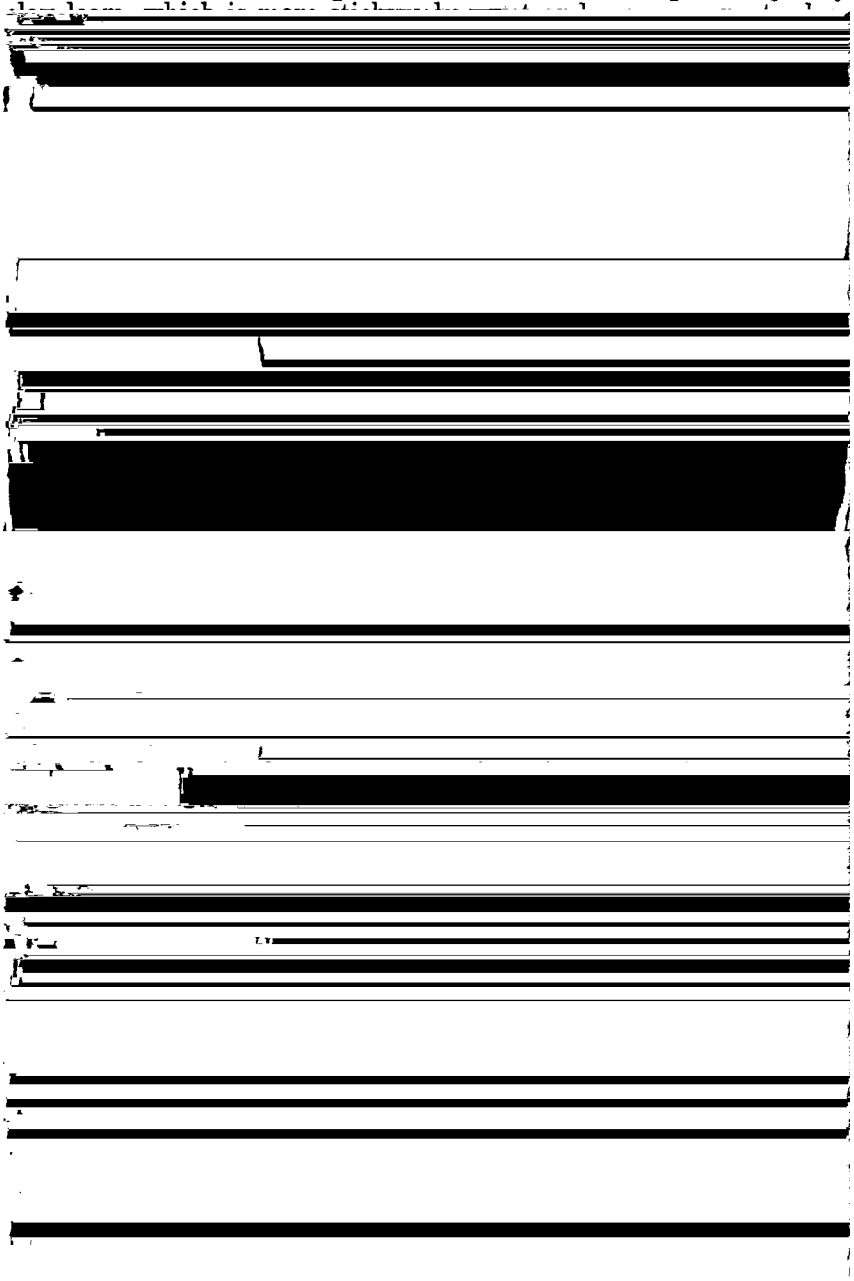
Dickson cherty silt loam, rolling phase.—The main features differentiating this soil from Dickson silt loam, undulating phase, are stronger slopes of 5 to 12 percent, many chert fragments on the surface and in the profile, a shallower profile over bedrock, and a less distinct hardpan. About the same crops are grown as on Dickson silt loam, undulating phase, but the yields are generally a little lower although the soil receives the same fertilization and other management. Only a small part of the land is cleared. It is easily eroded when cleared and special care is required to control erosion.

Dickson cherty silt loam, eroded rolling phase.—Stronger slopes (5 to 12 percent), chert of the surface and in the profile, moderate erosion, a shallower depth to bedrock, and the absence of a distinct siltpan are characteristics differentiating this soil from the undulating phase of Dickson silt loam. The bodies of this phase occur in areas that are between the streams and the broad ridges occupied by the undulating phase. The chert fragments on and in the soil aid in checking erosion and absorbing moisture during heavy quick showers.

Use and management.—Though the chert in some places interferes with tillage, crops on the eroded rolling phase of Dickson cherty silt loam yield about the same as on the associated undulating phase, if management is similar. Some fairly high crop yields have been noted in areas where management has been good over a period of years. The most common crops are cotton, corn, and soybeans grown for seed. [illegible] crops grow fairly well, but owing to the many chert fragments

during wet seasons, but they generally dry in time for planting and growing corn.

To a depth of about 5 inches the surface soil is brown to yellowish-brown mellow silt loam that differs but little from the surface soil of Huntington silt loam. From 5 to 12 inches the material is darker and the texture finer. After a gradual transition this is replaced by silty



tremely wet during wet seasons. Below 50 inches is a fairly large quantity of gravel. A layer of gravel is almost always present at some depth, perhaps at 4 to 10 feet. The soil is strongly acid throughout.

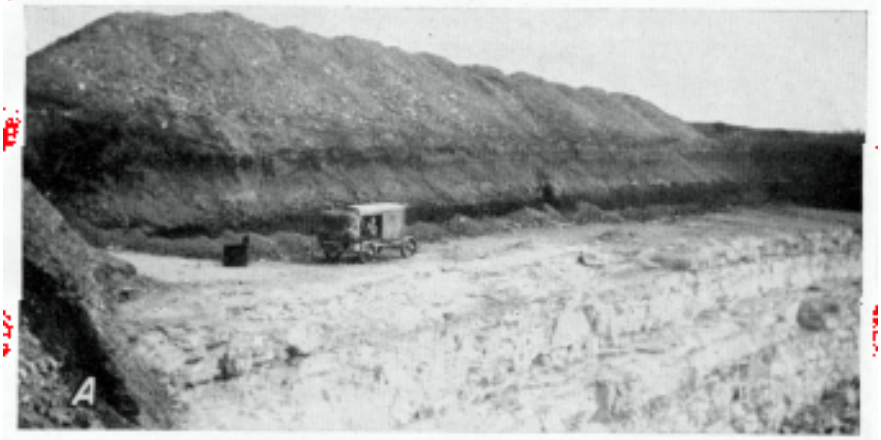
Use and management.—Corn is the principal crop grown. Pasture and hay crops are also important, and a few small areas are used for cotton. Corn yields 15 to 40 bushels an acre; oats, 15 to 45 bushels; cotton, 200 to 400 pounds of lint; soybean hay, 1¼ to 2¼ tons; lespedeza, ¾ to 1¼ tons; and cowpeas, ½ to 1 ton. Pasture provides 60 to 95 cow-acre-days of grazing.

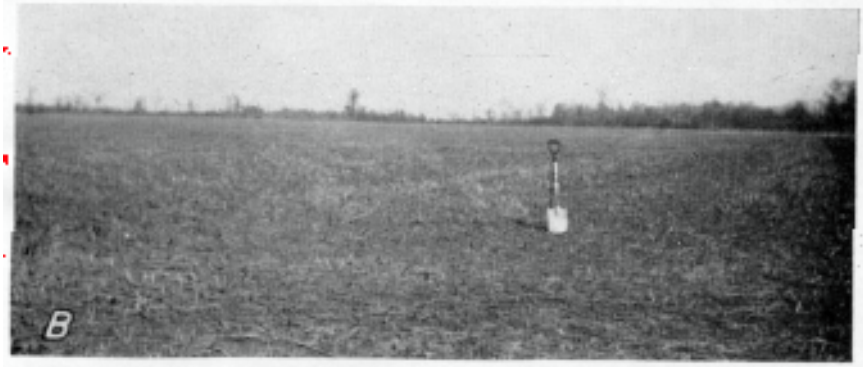
Little fertilizer is used on this soil for any crop except cotton. Under common practice, cotton receives 300 to 400 pounds of 6–8–4 an acre at the time of planting. In areas where pasture is to be established, farmers are beginning to use lime and phosphorus in larger quantities than usual. Two of the principal management requirements for this soil are better drainage and improved protection from flooding. The growing and turning under of cover crops will increase the organic-matter content and aid much in improving productivity. Owing to its low position near streams, the soil usually cannot be plowed and planted until fairly late in spring.

Ennis silt loam, shallow phase.—Areas of this soil occur on 0- to 2-percent slopes on the broad, fairly low, nearly flat bottoms along the larger creeks flowing from the gray lands. The material from which it is formed is the same as that giving rise to the normal phase. The upper 24 to 36 inches of these two soils are nearly everywhere much the same. In places, however, this phase has chert fragments on the surface and in the profile, and below 24 to 36 inches it becomes

of 40 inches and more, the material is mottled yellowish and gray gritty to cherty silty clay loam. More chert fragments are in this layer than in the one overlying, but the quantity varies from place to place. This soil is strongly to medium acid in all parts of the profile.

Use and management.—From 50 to 80 percent of Ennis cherty silt loam has been cleared, some for a long time, but most of it for only a comparatively short period. The land is used chiefly for corn, but some areas are planted at times to hay and sorghum. Corn yields 10 to 30 bushels; soybean hay, ¾ to 2 tons; and lespedeza, ½ to 1 ton of hay an acre. Some areas are used for pasture (pl. 7, *C*), which afford 15 to 70 cow-acre-days of grazing. Lespedeza hay is difficult





A, Excavation in Dewey silty clay loam, eroded undulating phase; the 10- to 16-foot soil mantle is underlain by level-bedded high-grade limestone.
B, Ennis silt loam on high bottoms along the larger creeks.
C, Fertilizing and seeding permanent pasture on a partly cleared area of Ennis and Etowah soils.

A, Landscape of nearly level to undulating Etowah soils planted to vetch.
B, Permanent pasture on Lindside silt loam.
C, Breaking Taft silt loam preparatory to fertilizing and seeding for permanent pasture.

acre; corn, 35 to 60 bushels or more; wheat, 15 to 25 bushels; and oats, 35 to 70. Alfalfa yields up to 4½ tons an acre, annual hay 1 to 3 tons, and lespedeza hay up to 2 tons. Vetch does well as cover crop or for seed production on this and other Etowah soils (pl. 8, *A*).

Considerable variation occurs in the kinds and quantities of fertilizer used under crops planted on this phase. Recommendations are about the same as for Decatur silt loam (*4*, *5*, *19*, *20*).

Etowah silt loam, level phase.—This soil occupies level to very gently undulating areas on 0- to 2-percent slopes along the river and larger creek bottoms. It usually lies slightly above flood stage, but occasionally some of it may become flooded. Except for the more level lay of the land, slightly deeper surface layer, and almost complete absence of erosion, it differs but little from the undulating silt loam. Some areas of Etowah loam, level phase, have been included. It is very similar to Dewey soils of the uplands.

Use and management.—Nearly all of the level phase of Etowah silt loam has been cleared for many years and continued in crops. This and the undulating phase are usually planted to the same crops, though there may be a little less cotton grown on this phase and somewhat more corn. Crop yields are practically the same on both soils, and practically no difference is made in the kinds and quantities of fertilizer used. Management practices are also much the same, though somewhat greater care is necessary to prevent erosion on the undulat-

[redacted]

Etowah silty clay loam, eroded undulating phase.—Most of the material making up this soil has been washed from the red soils of the uplands, including the Decatur, Dewey, and Cookeville series. It occurs in association with other Etowah soils on the river and creek terraces, most of it being above the flood plains of the streams but parts being covered by exceptionally high floods. This soil differs from Etowah silt loam, undulating phase, in that a considerable part of its surface layer has been removed by erosion. A few areas with slopes of more than 5 percent have been included, but nearly everywhere the slopes are 2 to 5 percent. Drainage is good throughout, and moisture conditions are favorable for crop production. Reaction is medium to strongly acid.

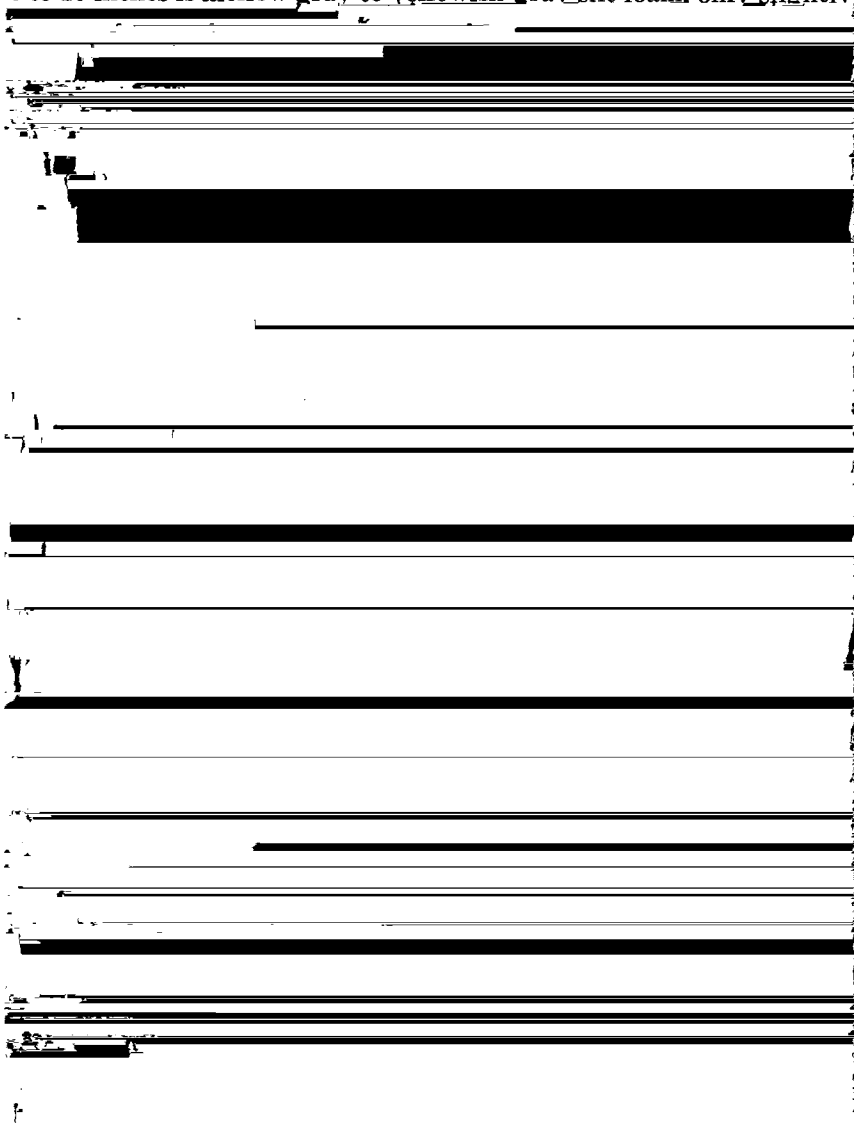
The crops planted are about the same as those on the undulating silt loam, but yields are generally slightly lower. The use of winter cover crops and terracing are being recognized as important in management. Practically all this soil was cleared and cultivated soon after the county was settled.

Greendale silt loam, undulating phase.—This soil consists of local alluvial or colluvial material accumulated at the base of slopes of the Baxter and Dickson series. The material originated from weathered Fort Payne chert and similar rock and has washed chiefly from the surface layers of Baxter and Dickson soils, since they were cleared and put into farm use. Material is being brought down from the soils on the slopes above, both in suspension and in solution, and deposited on this and other phases of Greendale silt loam.

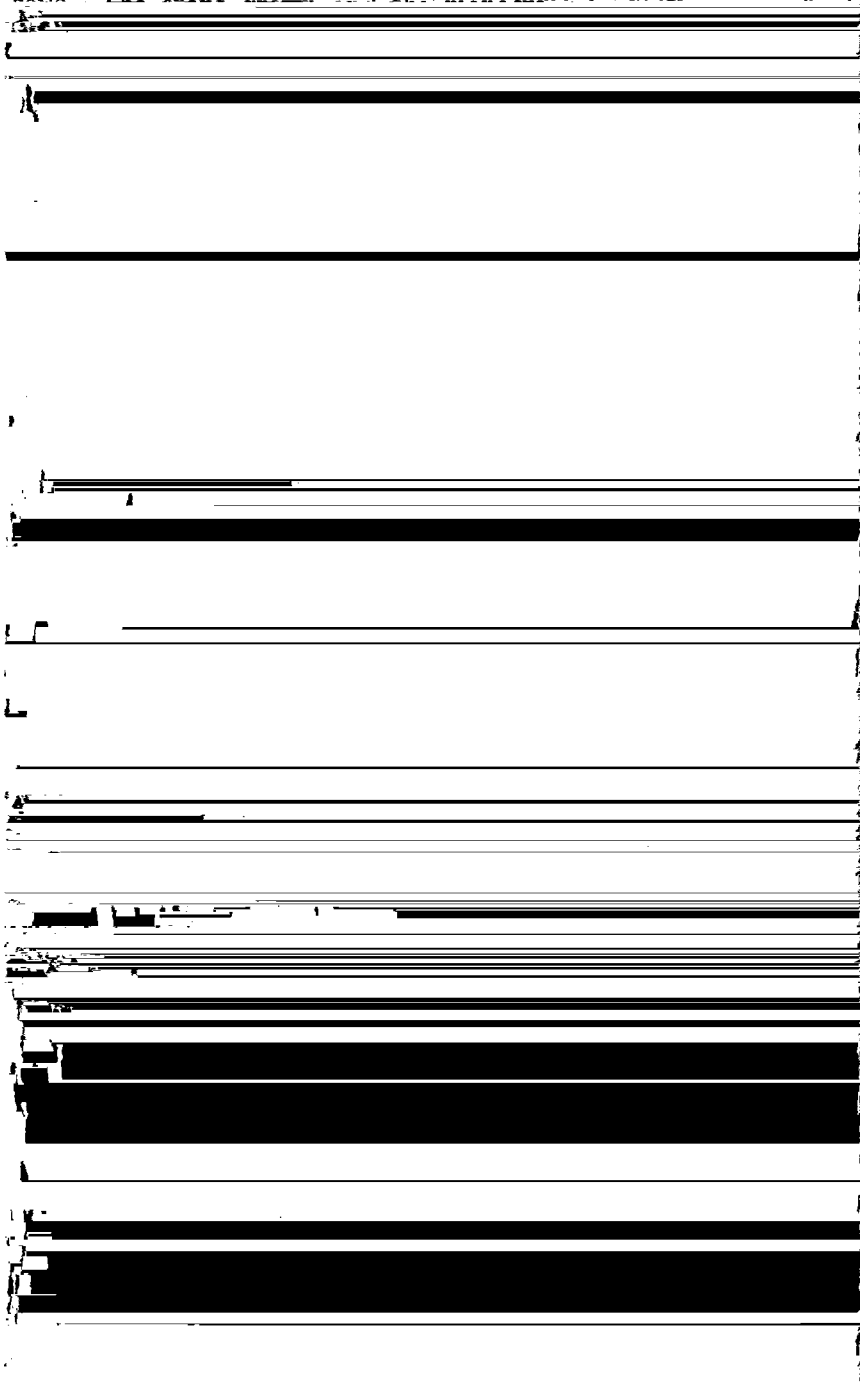
areas with slopes of less than 2 percent have been included. Through most of the year drainage is good both on the surface and through the subsoil. During wet seasons, however, water may stand high in the subsoil of some areas.

The profile of this phase is somewhat variable from place to place, but in an open field where the land has been cleared for possibly 30 or 40 years, one like the following may occur.

The surface 6 inches is grayish-brown or light yellowish-brown mellow silt loam that crushes readily to a crumblike mass. It contains a few chert fragments in places. A good moisture supply is usually at this depth, even in dry seasons. The layer extending from 6 to 10 inches is mellow gray to yellowish-gray silt loam, only slightly



in some places by deposition of materials washed from the adjacent



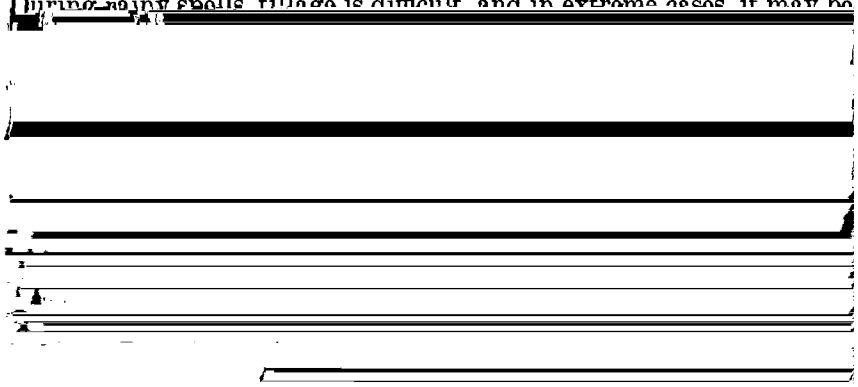
this soil for crops. If properly limed, fertilized, drained, and managed, good pastures can be developed as has been shown by work at the State Farm on the southeast edge of Athens.

Hollywood silty clay, level phase.—This soil, known as "black waxy land," occurs on 0- to 2-percent slopes west of the Elk River, near Shoals Creek, and along Sugar Creek. Most of the acreage is in the northern part of the county, but a few small areas occur elsewhere. The soil is a combination of local alluvial, colluvial, and residual material closely associated with areas of Limestone rockland. It is derived from the same limestone that outcrops in the rockland and in many places includes materials washed from it. The soil undoubtedly contains a fairly good quantity of phosphate, but it is not known just how readily available the phosphate is. Reaction is weakly acid to neutral in most parts.

Areas of this phase are relatively level in most places, and they extend benchlike from the base of slopes. Surface and internal drainage are slow. Cedars occur on a few areas and on the associated Limestone rockland. Included with this phase are small areas of somewhat poorly drained soils.

In a cultivated field the surface 7 inches is dark grayish-brown silty clay loam, very sticky when wet, that contains an occasional chert or lime rock fragment. From 7 to 20 inches it is very dark-gray to black clay, tough and sticky when wet but hard when dry. This layer contains some chert and limestone fragments. It grades rather sharply to the light-gray to gray clay layer below, which is mottled with yellow and brown and extends from 20 to 26 inches. This becomes very sticky and plastic when wet but is hard when dry. It contains many small rock fragments that show a brown color when cut. Below 26 inches the material is mottled gray, yellow, and rust-brown clay. This is also tough and plastic when wet, and it becomes hard and dense on drying. A few small rock fragments are present.

Use and management.—Nearly all of Hollywood silty clay, level phase, has been cleared for many years, but some has been abandoned for crop use and is now idle or in pasture. Corn, cotton, soybeans, oats, and pasture crops are grown. Corn produces 25 to 50 bushels an acre; oats, 20 to 45 bushels; and soybeans, 1 to 2½ tons of hay. Pastures do well in spring but tend to thin out during dry seasons. Because cotton matures slowly on this soil, it is often injured by frost. During rainy spells tillage is difficult, and in extreme cases it may be



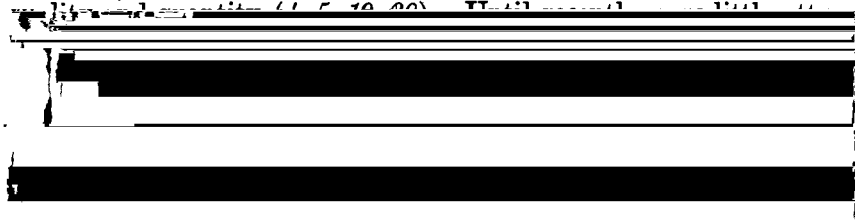
and the adjacent first-bottom soils, it has positions similar to the Etowah. Areas are usually on slopes of less than 2 percent just above normal overflow and are flooded only by the higher waters. Surface and internal drainage are both good, but some areas are flooded for a short time.

The soil is associated with the Huntington, Wolftever, Greendale, and Lindside soils. Some of the larger and more representative areas are in the Elk River and Sugar Creek Valleys; smaller ones occur along Piney and Limestone Creeks. This phase resembles Wolftever soil in a great many respects, the chief difference being the much more compacted layer in the Wolftever subsoil. This soil is more yellow and less reddish brown in the subsoil than is the Etowah. The original cover included elm, willow oak, yellow-poplar, sweetgum, hackberry, sycamore, hickory, and cedar, and a dense and varied growth of underbrush.

In a field cleared and cultivated for many years, the first layer is grayish-brown weakly granular and friable silt loam that extends to a depth of 6 inches. The organic content is low in most places. From 6 to 11 inches is yellowish-brown mellow silt loam that blends rather gradually to the layers above and below. Worm and root holes are common. The subsoil, below 11 inches and continuing to 26 inches, is yellowish-brown heavy silt loam to silty clay loam, somewhat fragmentary in structure. It is not difficult to spade when medium moist. A few pores and some small brown concretions are present. Light yellowish-brown heavy silt loam to silty clay loam extends from 26 to 38 inches. It is a little more packed than layers above and breaks to fragments of various sizes and shapes if spaded when moderately moist. The fragments are easily crushed, and the material becomes grayer on drying. The material extending from 38 to 72 inches is gray or grayish-olive slightly compacted silty clay loam. Some platiness is in this layer. At about 72 inches is a variable mixture of sand, silt, clay, and gravel, which in most places grades downward to sand and gravel that is usually high in moisture content, even during dry periods.

Use and management.—Nearly all of Humphreys silt loam, level phase, is cleared and has been cleared for the past 25 to 75 years. Corn, cotton, oats, and annual hay are the crops most frequently planted. Cotton yields 250 to 600 pounds of lint an acre; corn and oats, 20 to 40 bushels; soybean hay, 1½ to 2¾ tons; and lespedeza hay, ¾ to 1½ tons. There are also some exceptionally good yields of soybean and lespedeza seed.

Management is much the same as for the level phase of Etowah silt loam, and the fertilizer used on the two are about the same in



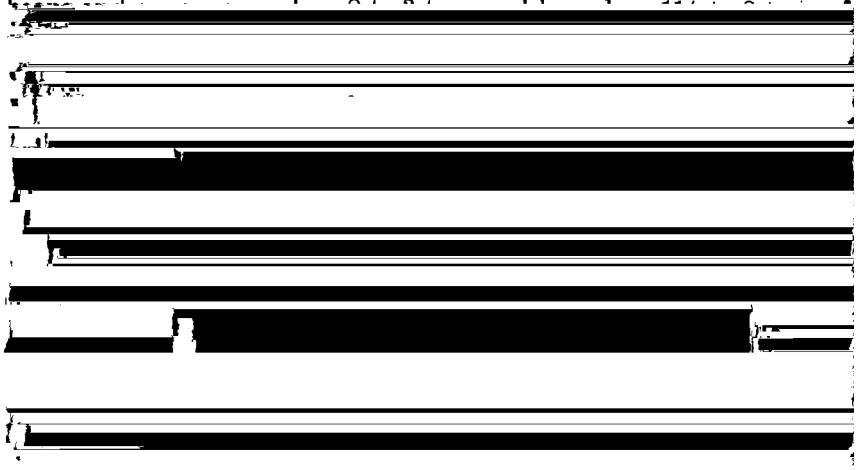
county. It has formed from old cherty silty alluvium similar to that parent to the cherty Greendale soils.

This soil is somewhat less productive than Humphreys silt loam because it contains so much chert. Like Greendale cherty silt loam, it is more difficult to cultivate and crops are more readily harmed by lack of moisture in dry seasons. As to use, management, and suitability, this phase is similar to the undulating phase of Greendale cherty silt loam.

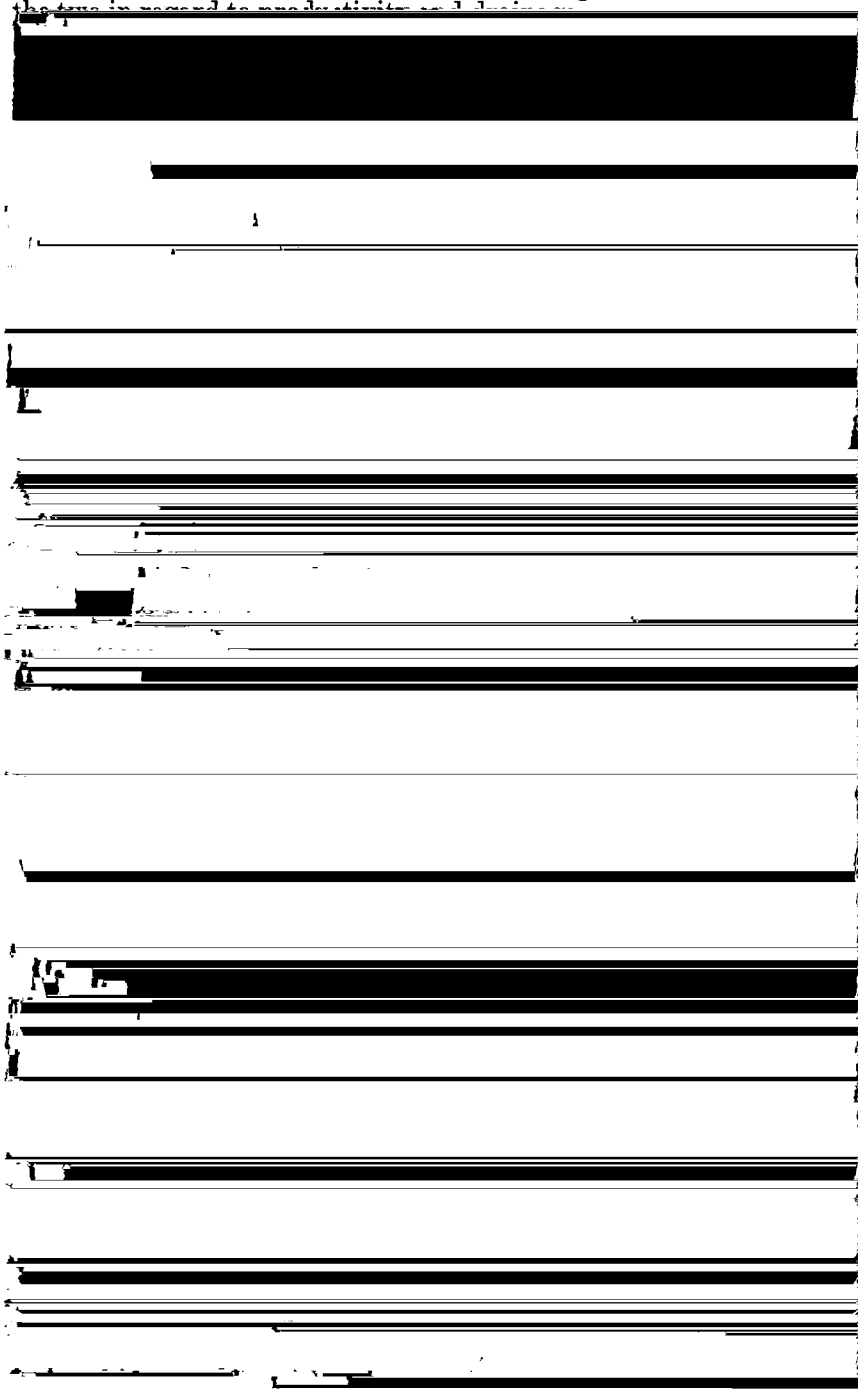
Huntington silt loam.—This is a highly productive soil of the flood plains on slopes of about 2 percent. It consists of young alluvium washed chiefly from the red upland soils formed from limestone. It receives fresh sediment when streams overflow periodically and this tends to maintain its high fertility. Except for occasional floodings, drainage is good throughout. During winter the soil remains wet much of the time; in summer no difficulty is encountered from too much moisture, except when the season is wet, and then there may be infrequent flooding. The material has not been in place long enough for the development of distinct soil layers and consequently there is not much difference between the surface and subsoil.

To a depth of about 11 inches the soil is brown to yellowish-brown mellow silt loam, containing in many places a good quantity of organic matter. Dark-brown to faintly yellowish-brown heavy silt loam extends from 11 to 19 inches. This also contains fairly good quantities of organic matter in most places. Below 19 and continuing to 32 inches is faintly yellowish-brown heavy silt loam to silty clay loam. This layer is just a little lighter in color than the layers above, and it becomes a little harder on drying. From 32 to 43 inches the material is a little more compact, a little more grayish or slightly yellowish, and faintly mottled. It grades to deeper materials that differ extremely in general character from place to place.

Use and management.—Nearly all of Huntington silt loam has been cleared. Corn is planted every year in many places, and yields of 40 to 75 bushels an acre are common with little or no fertilizer. Some hay crops, as soybeans, cowpeas, and lespedeza, are grown. Soy-



is closely associated with the Guthrie and Sango soils and is between



Lindside silt loam.—Areas occur on the flood plains of the Tennessee and the Elk Rivers and along some of the larger creeks. The soil is associated with Huntington, Egam, and Melvin soils, and with the Etowah, Wolftever, and Humphreys, which lies on adjacent stream terraces. The surface is nearly level, the slope being not in excess of 2 percent. Internal drain is slow, and most areas are subject to flooding. Excessive moisture restricts field operations and crop suitability, but the soil is productive of many of the important crops. It is slightly acid to medium acid.

The 7-inch surface layer is grayish-brown mellow silt loam that crushes to medium to fine granules. Following is grayish-brown mellow silt loam with fine gray lenses. This continues to a depth of 14 inches. From 14 inches downward to 21 is brown, dark-brown, and gray mottled silty clay loam, sticky when wet. Below 21 inches is mellow silt loam or silty clay loam, very mottled with light yellow, dark brown, gray, and brown. This is grayer at lower depths, may contain a variable quantity of grit and small gravel, and is wet most of the time.

Use and management.—Most of Lindside silt loam is cleared, and

Use and management.—Nearly all of the eroded undulating phase of Maury silt loam was cleared during the early days of the county, and, except for the rest periods usually given the upland soils, it has been farmed ever since. Almost all crops common to the general area are grown. Cotton yields 200 to 600 pounds of lint an acre; corn, 25 to 45 bushels; wheat, 10 to 18 bushels; oats, 30 to 50 bushels; soybeans and cowpeas, 1 to 1½ tons; and lespedeza, 1 to 1½ tons of hay. The fertilizers used are usually about the same as those applied on Decatur soils, though some farmers feel that they get little benefit from the use of phosphate on this soil.

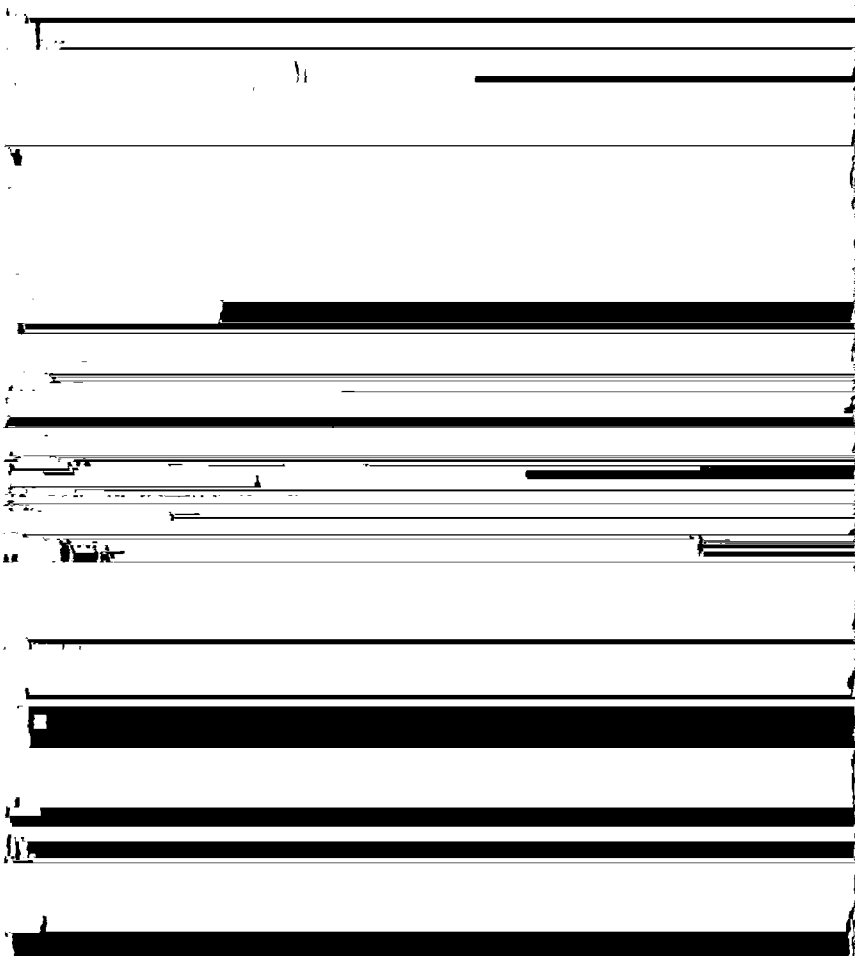
This productive soil is suited to crops requiring tillage. It erodes readily when not protected by a close-growing cover, and therefore intertilled crops should not be grown in succession. Moderately long rotations consisting chiefly of legume hay crops, as red clover and alfalfa, and fall-sown small grains should be used. Cultivation should be along the contour. Terracing is practical under some conditions.

Maury silt loam, eroded rolling phase.—A greater slope (5 to 12 percent) is the chief difference between this soil and the eroded undulating phase with which it is associated. Other differentiating

under careful management including the use of long rotations in which close-growing crops predominate. It is well suited to pasture, however, and where pasture plants are well established, it furnishes grazing of good quality. Chiefly because of its eroded condition, the cost of establishing good pasture may become expensive.

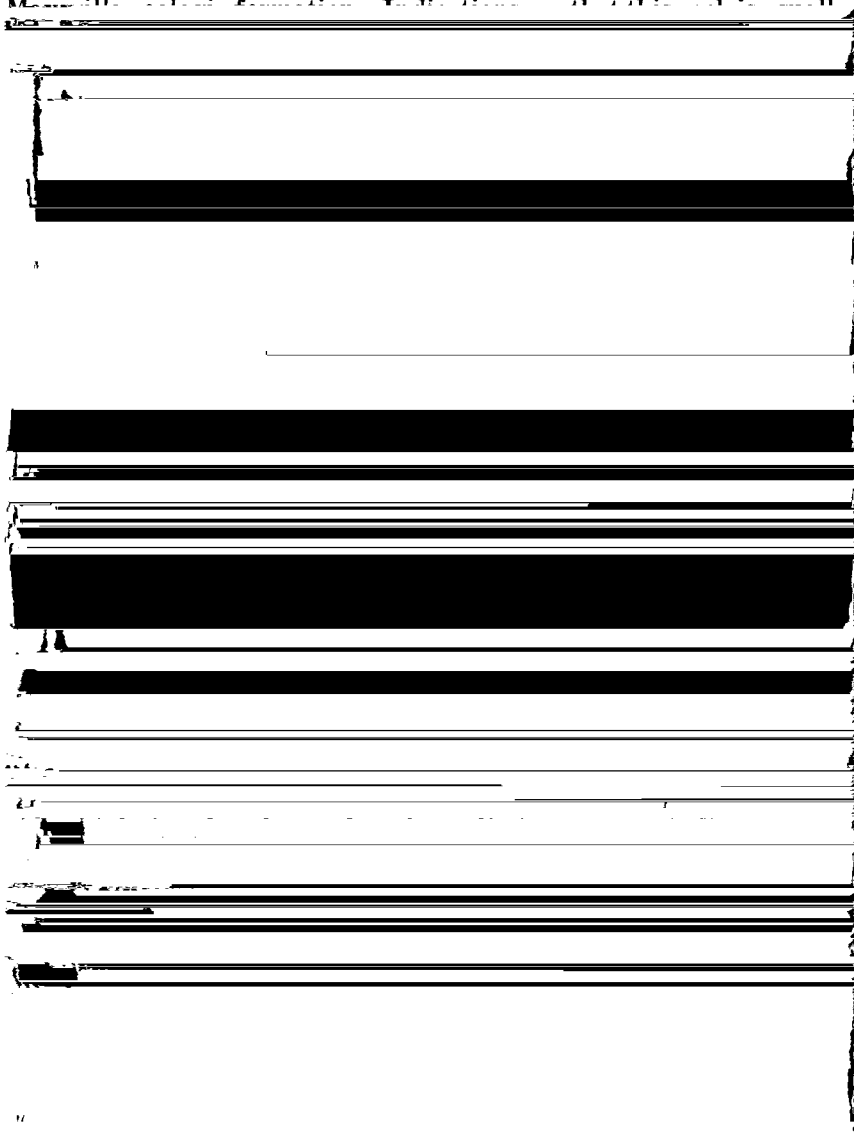
Maury clay loam, severely eroded hilly phase.—This soil occurs in close association with the eroded hilly phase of Maury silt loam and differs mainly in having lost almost all of its original surface soil by erosion. The slope range is 12 to 30 percent. The surface 20 to 25 inches is yellowish-brown firm but friable silt loam or silty clay loam. Below this is lighter colored more friable silt loam. Bedrock phosphatic limestone is at a depth of 25 to 50 inches. Drainage is good throughout, and surface runoff is rapid.

Use and management.—All the areas of Maury clay loam, severely eroded hilly phase, have been cleared and planted to crops for many years, and management much of the time has been careless. The eroded condition and strong slope are the main factors making this



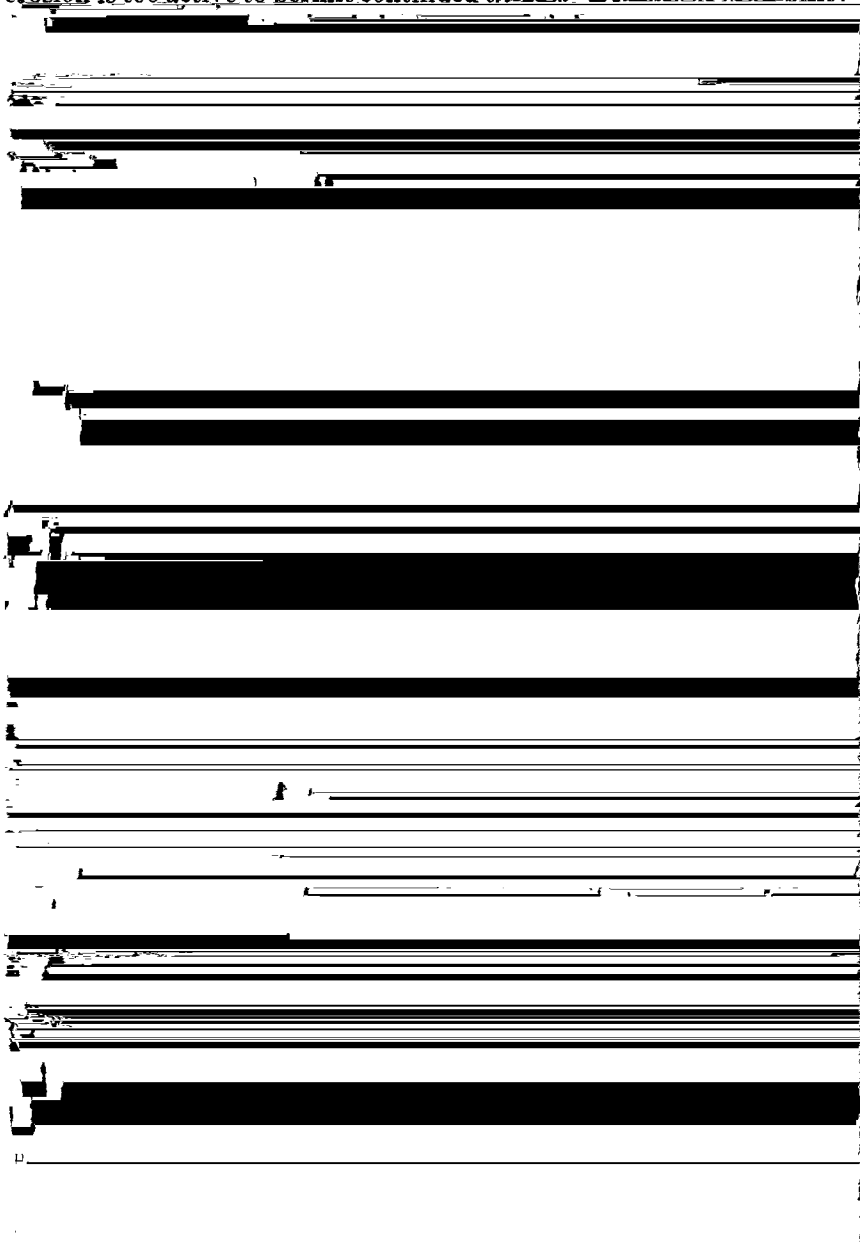
drowning makes the production of tilled crops hazardous in most places. Pastures, on the other hand, may be only temporarily damaged by floods, and less complete artificial drainage is required to bring them close to maximum productivity. Corn may produce 5 to 25 bushels an acre; lespedeza hay, ½ to 1 ton; soybean hay, ¾ to 1½ tons; and pasture, 40 to 130 cow-acre-days of grazing, depending on degree of drainage. The use of lime, phosphate, and potash is often very beneficial in developing pastures.

Mimosa cherty silty clay loam, eroded rolling phase.—The material making up this soil is residual from high-grade limestone of the



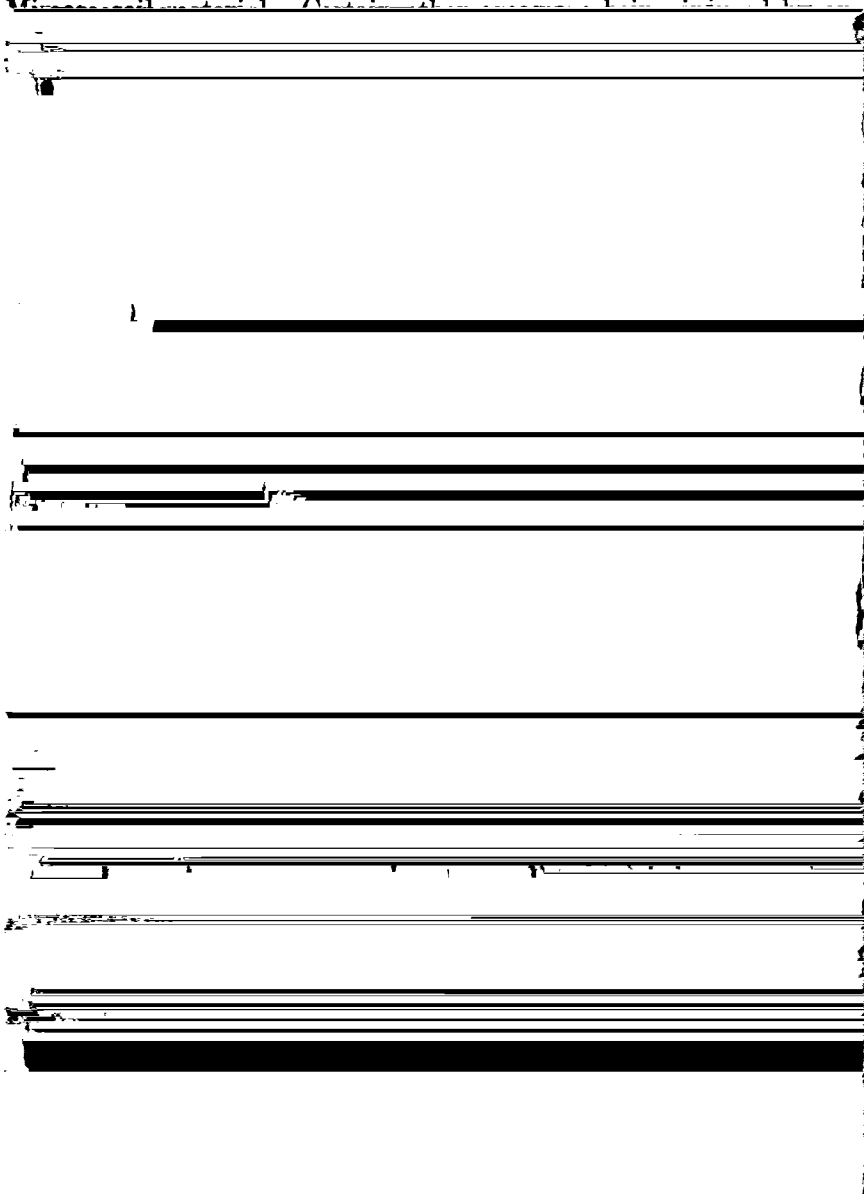
the eroded rolling phase. It is associated with the other Mimosa soils and its aggregate area is small. Included are a few areas of Colbert silty clay loam, eroded phase, which is tough plastic clay, shallow in depth to limestone bedrock.

Use and management.—Practically all of the eroded hilly phase of Mimosa cherty silty clay loam has been cleared and farmed for some time, but owing to its steep slope and slowly permeable subsoil, erosion is too active to permit continued tillage. Because of erodibility

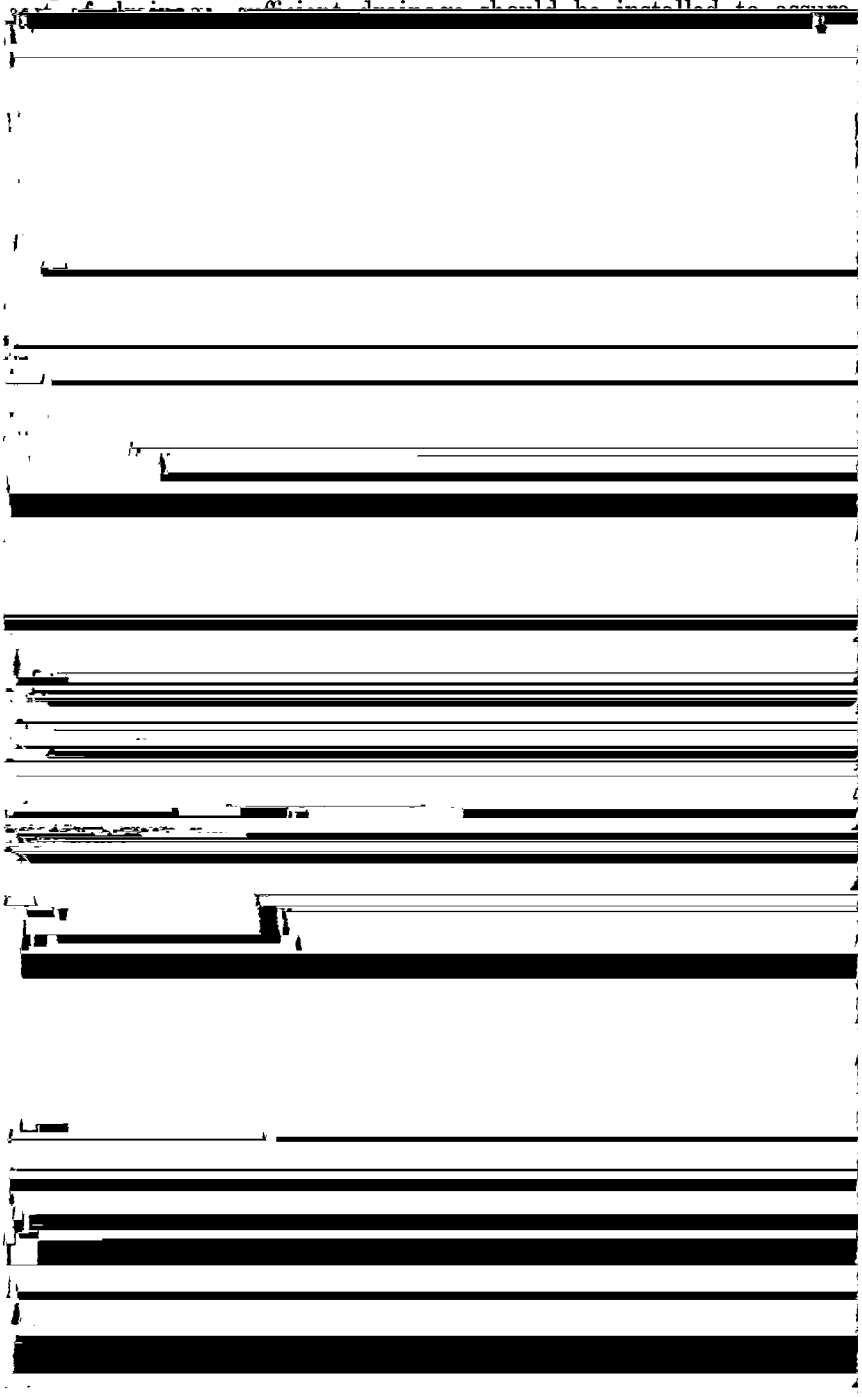


In cleared areas the 10- to 14-inch surface layer is reddish-brown or brown mellow silt loam. The organic content is moderately high. Below this is light-gray or gray silty clay loam or silty clay mottled with yellow and brown. This is easily spaded when moist, but it becomes sticky when wet. Below 24 inches the material grades to more compact mottled silty clay, and at 36 inches it becomes decidedly gray very sticky clay. The depth to bedrock is usually several feet.

A few small areas of this soil in the vicinity of Veto have a silty clay texture throughout the profile. These consist, at least in part, of

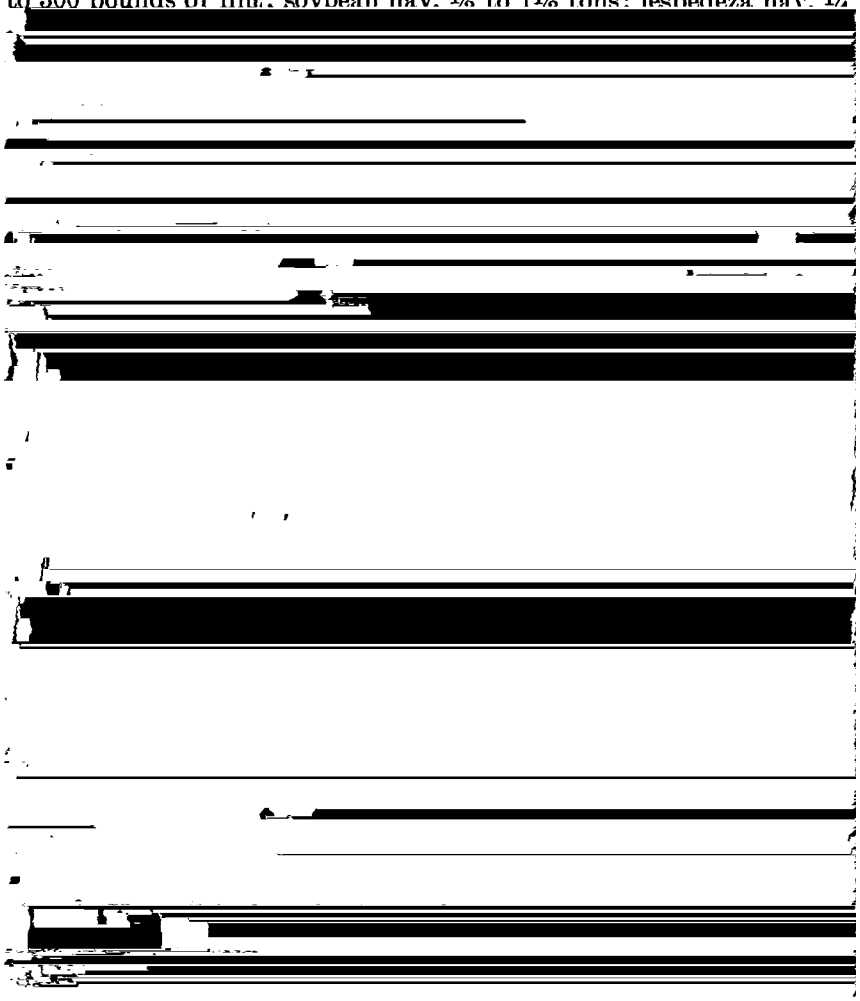


be produced in all but the wetter years. Considering the high



friable silty clay loam, slightly sticky when wet. At a depth of about 15 inches this grades with moderate abruptness to mottled yellow, orange, and gray moderately brittle silty clay, that contains some cherty fragments and concretions. The siltpan, consisting of very mottled gray, yellow, and light-brown compact brittle silt loam or silty clay loam, lies at a depth of about 20 inches. It contains many brown or reddish-brown concretions. The compactness or hardness diminishes below a depth of about 33 inches, and the gray is less predominant over the yellow. Below 47 inches is mottled yellow, gray, and rust-brown cherty silty clay. The soil is strongly acid throughout.

Use and management.—Drainage on Sango silt loam is usually sufficient for planting and cultivating crops late in spring, as corn, grain sorghum, sorghum, or soybeans. The soil is exceptionally wet in wet seasons. Corn, soybeans, cotton, hay, and pasture are the crops most frequently planted. Corn yields 8 to 22 bushels an acre; cotton, 100 to 300 pounds of lint; soybean hay, ½ to 1½ tons; lespedeza hay, ¼



crops each year. Much of it has been cleared fairly recently. Erosion is not a management problem, but proper drainage and incorporation of organic matter are of major importance. Crops grown include principally corn, oats, hay, and pasture. Pasture is one of the best uses. When seeded early and properly fertilized (pl. 8, *C*), good winter cover crops of vetch are obtained by some farmers. Corn produces 5 to 20 bushels an acre; oats, 5 to 25 bushels; soybean hay, ½ to 1¼ tons; and lespedeza hay, ¼ to ¾ ton. Pasture yields 20 to 70 cow-acre-days of grazing.

Wolftever silt loam.—This soil is associated with and similar to Huntington soils. Though its position is a little higher than that of the first bottoms, most areas are inundated occasionally by the highest floods. Surface drainage is good; internal drainage is moderately slow. The material making up the soil has been washed from soils underlain chiefly by Fort Payne chert and high-grade limestone. Some material from other rock, as sandstone, is intermixed. A few small areas of silty clay loam have been included because of their small extent.

In cultivated fields the first 7 inches is light yellowish-brown mellow silt loam having a crumb structure. A few chert fragments occur in places. The layer extending from 7 to 16 inches is yellowish-brown firm silt loam. At 16 inches this grades to pale-brown or light yellowish-brown silty clay loam, fragmentary in structure, that contains many dark concretions and a few small chert fragments. From 28 to 38 inches, the subsoil is pale brown or light yellowish-brown streaked with gray very tight or compact silty clay loam. It is very hard when dry, and the compactness of this layer is the chief characteristic distinguishing this soil from the Humphreys. The mottled yellowish-brown, gray, and dark-brown tight or compact silty clay loam following becomes grayer with depth.

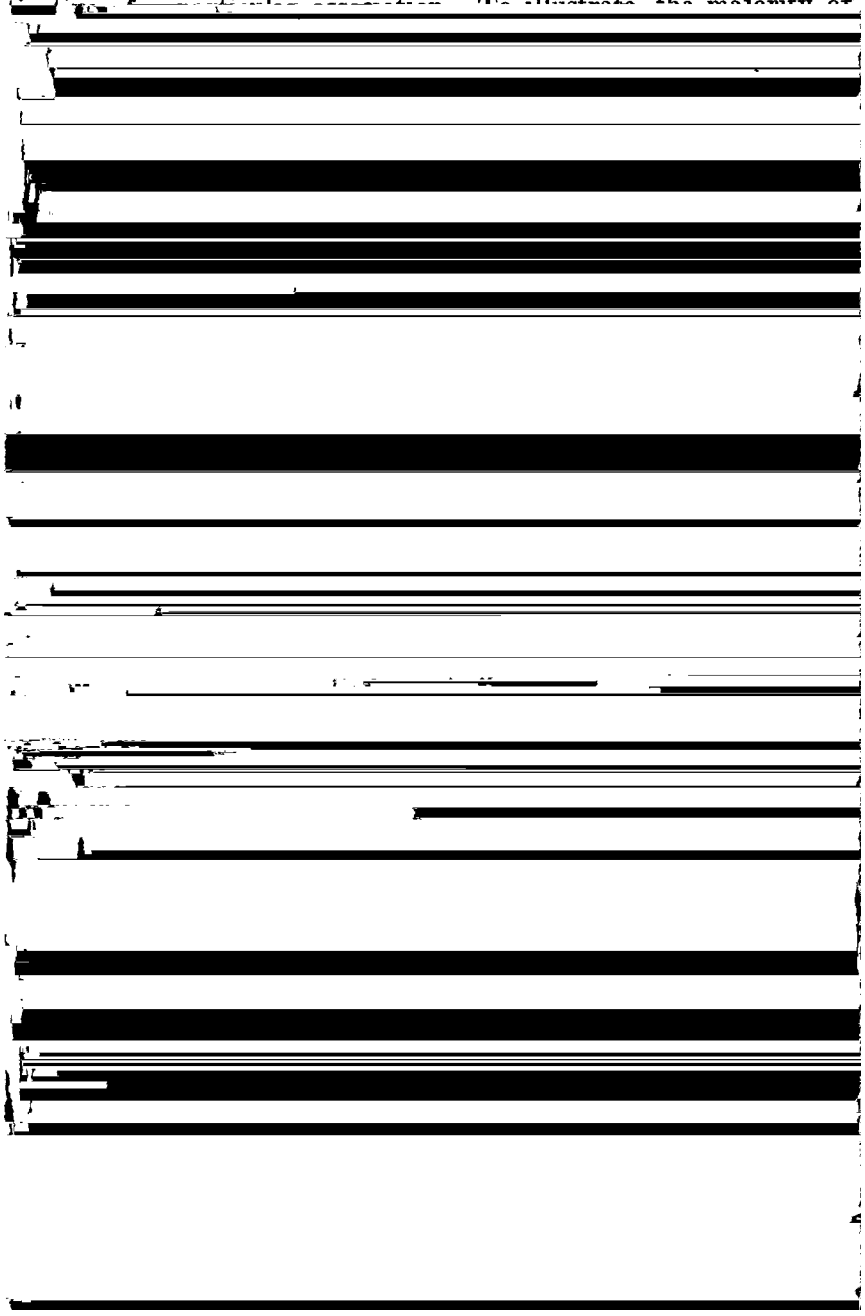
Use and management.—Practically all of Wolftever silt loam has been cleared for many years. The present use, yields, and management requirements are similar to those of Humphreys silt loam, level phase. The Wolftever soil has somewhat impaired internal drainage, and it is more droughty because of its compact subsoil.

SOIL ASSOCIATIONS

Two, three, or more soils are likely to occur in geographic association with one another. Usually a different set of soils is associated in one part of the county, as in the red lands, than in another. Study of the detailed soil map (cover page 3) makes it possible to recognize the different soil associations. For example, by observing the location of the soils in the county as indicated on the detailed soil map, it becomes obvious that the Dickson, Cookeville, and Baxter soils, with some others less important, are generally located near one another, and thus form a soil association. By placing these and other geographically associated soils in groups, it is possible to prepare a generalized map showing the areas dominated by each association. Such a map is an inset on the detailed soil map.

The soils of each association generally manifest a characteristic pattern of distribution that can be determined by study of the detailed map. For example, the distribution of the soils in the Dickson-Cooke-

ville-Baxter association can be determined in this manner. Moreover, if maps are made to show the distribution of specified soil characteristics in an association, as slope, drainage, or suitability for use, the map delineating each characteristic will tend to show a pattern rather dis-

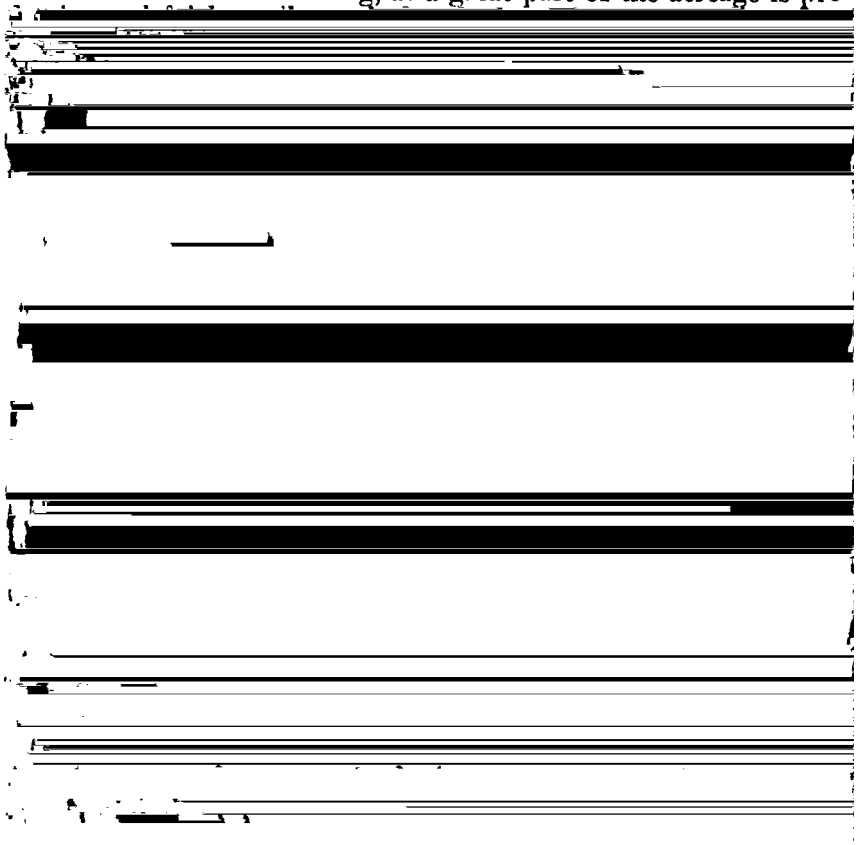


Practically all this association has been cleared of its original forest, and in some sections practically all of it is used for either crops—chiefly cotton, corn, and hay—or pasture. In the area in the southeastern corner of the county, south of Wall Street, there is a notable acreage that has been abandoned chiefly because of its depleted fertility and eroded condition.

In general, the management level is not so high as on some other associations, as depletion of fertility and erosion appear to be more active. Many of the farms in this association are operated under absentee ownership. A great part of the acreage is capable of responding well to good management, the chief requirements of which are increased fertility, improved tilth, and the use of more close-growing crops in rotation, as winter legumes, cover crops, small grains, and hay crops. Under proper management a great part of the acreage is capable of producing high yields of a wide variety of crops, including cotton, corn, small grains, and the more desirable grasses and legumes for hay and pasture.

DECATUR-ABERNATHY ASSOCIATION

A relatively large area of the southeastern part of the county is occupied by the Decatur-Abernathy association. It is one of the most desirable sections for farming, as a great part of the acreage is pro-

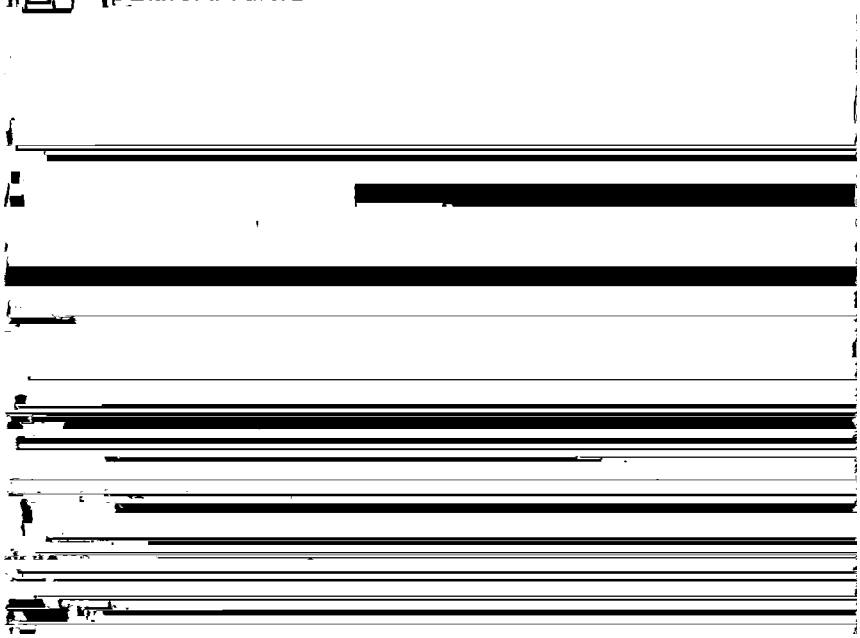


small grains, and pasture are important. More of the farms are owner operated than in the Decatur-Abernathy and Cumberland-Etowah-Decatur association. In general, the farms are smaller, tractors are less common, and horses and mules are more common and accordingly lighter farming equipment is used. From 5 to 8 percent of the land is idle.

The somewhat more irregular surface than that of the Decatur-Abernathy association causes management requirements to be a little more exact and apparently has favored the development of smaller farms. The natural fertility of some of the soils is a little lower, but a very great part of the acreage is capable of responding well to good management, especially to adequate fertilization.

DICKSON-COOKEVILLE-BAXTER ASSOCIATION

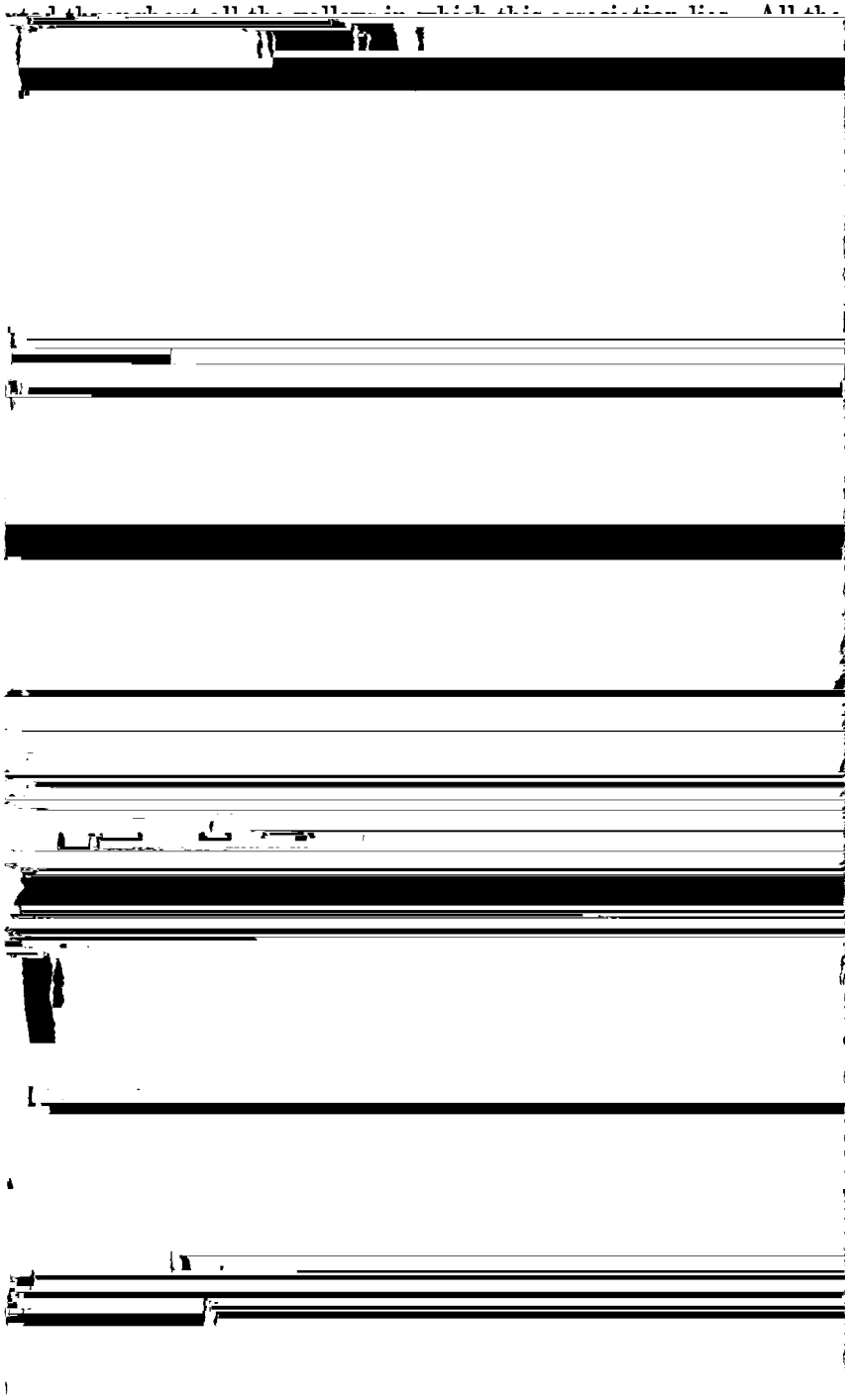
The Dickson-Cookeville-Baxter association occurs in several broad bodies in the central part of the county, with more irregular areas distributed in the northwestern corner. The areas are predominantly undulating, although some have a rolling relief or else are nearly level along the drains and gentle sinks in the uplands. Most of the nearly level areas consist of poorly drained soils chiefly of the Guthrie and Melvin series. The greater part of the landscape is occupied by the undulating Dickson and Cookeville soils, the Dickson usually predominating. Drainage conditions on this major part of the landscape are generally adequate for most of the crops commonly grown, although internal drainage of the Dickson soils is notably restricted by the hardpan. Natural fertility of the Dickson soils is moderately low and that of the Cookeville is moderately high, being somewhat less, however, than that of the Decatur and Dewey soils. The general lay of the land of this association is somewhat more irregular or broken than is that of the Decatur-Abernathy and the



Guthrie and Melvin soils, with small areas on the Sango and Lawrence soils. From 6 to 8 percent is idle land. A subsistance type of agriculture predominates in which a great many of the farms are small owner-operated ones.

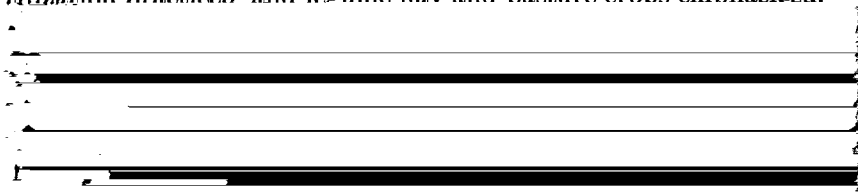
The general low fertility and impaired internal drainage limits the productivity and range of suitability of most of the soils of this association. A diversified type of agriculture producing small grains, hay, and pasture crops, together with some row crops, is suited. Substantial fertilization and organic matter and lime are required to maintain a fairly high level of production, and, unless the fertility is high, the more desirable legumes and grasses for hay and pasture cannot be expected to yield well.

ENNIS-TAFT-MELVIN ASSOCIATION



fertilization is not at a high rate. Some livestock, chiefly hogs and cattle, are raised by most farmers.

The general low fertility and hilly relief make this association poorly suited to a farming system in which row crops predominate, especially cash crops. Systems of farming in which the needs of the farm family are met and in which relatively long rotations consisting of close-growing crops predominate are better suited. Systematic rotations are not commonly practiced, but on some of the acreage row crops are grown for 2 or 3 years, followed by a period of 2 to 5 years of pasture. If a relatively high level of productivity is to be maintained, the row crop acreage needs to be restricted, adequate fertilization practiced, and legume hay and pasture crops emphasized.



COOKEVILLE-BAXTER ASSOCIATION

The Cookeville-Baxter association consists of relatively small areas of undulating moderately reddish soils, which are moderately fertile. The relief in general is smooth, with small moderately and strongly sloping areas along the drains. A large part of the acreage is well drained.

Soils of this association are desirable for crops. Most of the acreage is cleared and used for crops, chiefly cotton, corn, and hay, with fruits and vegetables grown for home use. Crop yields in general are fair to good. Some of the farms are owner-operated but the larger ones are operated by tenants.

Management requirements are not particularly exacting except on the limited acreage of the stronger slopes. All the soils respond well to proper fertilization, and legume grass hay and pasture crops under good management are of good quality.

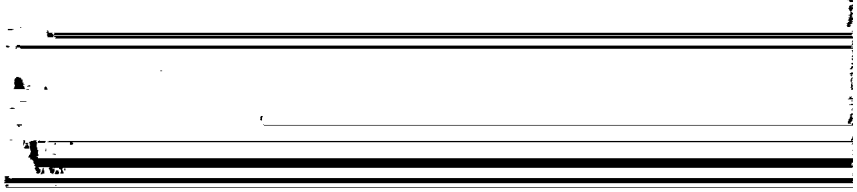
USE, MANAGEMENT, AND PRODUCTIVITY OF THE SOILS

The use, management, and relative productivity of the soils of Limestone County are discussed in this section. The soils are grouped in 5 classes according to their similarity of general suitability for crops, pasture, or forest and in 19 groups on the basis of their general suitability for different uses and their management requirements. Better management practices are discussed for the soils of each group. The expected crop yields for each of the soils under two levels of management are given in table 7.

LAND CLASSIFICATION

The soils are grouped in five classes on the basis of their relative physical suitability for agricultural use under present conditions. Productivity, workability, and conservability are the factors considered in this classification. The classes, in the order of their decreasing desirability for agricultural use, are First-, Second-, Third-,

but they differ widely in the degree of shortcoming and may fall short for different reasons. For example, a soil may be highly productive and easy to conserve but extremely difficult to till. The productivity of the soils is expressed in terms of yields in table 7. This table also shows the workability and conservability of the soils and their land



Under present conditions of agriculture in this county, the soils only moderately well suited to crops requiring tillage and to pasture are better soils for farming than are those poorly suited to crops but well suited to pasture. This assumption was made because soils well suited to crops are more limiting to agriculture on a greater number of farms than are those well suited to pasture. If livestock should become more important in the agriculture of the area, this assumption might become invalid.

The soils are divided in two groups. In one group, the productivity, workability, and conservability of the soils are sufficiently good to permit considering them at least fairly well suited to both crops and pasture. In the other group, one or more of the factors of productivity, workability, and conservability is sufficiently poor to make the soils poorly suited to crops requiring tillage.

The first group is subdivided into three subgroups, the limits between them being chosen to approximate the concept of fair and good cropland, respectively. These three subgroups, in decreasing order of suitability for agriculture, are First-, Second-, and Third-class soils. The second group, consisting of soils poorly suited to the production of crops that require tillage, is subdivided into two subgroups. The Fourth class comprises soils at least fairly well suited to the production of permanent pasture, and the Fifth class, soils poorly suited to permanent pasture and probably best suited to forest.

Information obtained from the experience of farmers, soil surveyors, extension and experiment station workers, and others who work with the soil was used in placing the soils in the five physical land classes. Comparisons were made among the soils, considering productivity, workability, and conservability. For example, a farmer knows that some soils on his farm are better suited physically to agriculture than are others. By comparisons within farms and among farms, the soils were placed in the approximate order of their physical suitability for agriculture. Descriptions of the land classes follow.

FIRST-CLASS SOILS

First-class soils are very good for agriculture—they are good to excellent for crops requiring tillage and for permanent pasture. All are relatively well supplied with plant nutrients when compared with other soils of the county, but even the most fertile is responsive to amendments for some crops. All are well drained, yet their phys-

for soil conservation and tillage. None is severely eroded or highly susceptible to erosion. The productivity is high for many crops, and the problem of conserving soil fertility and soil material is relatively simple under common farming practices. All are well suited physically to most of the exacting and intensive crops commonly grown in the locality.

The First-class soils have an aggregate area of 33,609 acres, or 9.2 percent of the county.

SECOND-CLASS SOILS

Second-class soils are good for agriculture as it is practiced in the county. They are fair to good for the production of crops requiring tillage and fair to excellent for permanent pasture. These soils are at least moderately productive of most of the crops commonly grown in the county. Their physical properties are at least moderately favorable for tillage, maintenance of good tilth, and normal circulation and retention of moisture. None occupies slopes greater than 12 to 15 percent, is severely eroded, or is sufficiently stony to interfere seriously with tillage operations.

Each soil is moderately deficient in one or more characteristics that contribute to productivity, workability, or conservability, but none is so seriously deficient in any characteristics that it is poorly suited physically to use for crops requiring tillage. The deficiencies vary widely among the soils. Some are fertile but sloping and moderately eroded; others are almost level and uneroded but relatively low in content of plant nutrients. Management requirements range widely among the soils because of the many different kinds of soils included in the class. The soils of this class are relatively similar in their suitability for agriculture, but the benefits of their suitability depend on management practices, which may vary greatly from soil to soil.

The Second-class soils have an aggregate area of 187,785 acres, or 51.7 percent of the county.

THIRD-CLASS SOILS

In the Third class are soils considered fair for the agriculture practiced in the county. They are poor to fair for crops that require tillage and fair to very good for permanent pasture. Each soil is characterized by workability, conservability, or productivity, one of which, or a combination of which, is sufficiently poor to definitely limit suitability of the soil for crops requiring tillage. No condition is so limiting, however, that the soil can be considered poorly suited to tilled crops. The soils are better suited to crops requiring tillage than are those of the Fourth class, but they are less well suited to such crops than Second-class soils.

One or more unfavorable conditions limit suitability of the soils for tilled crops. Among these are low content of plant nutrients; low content of organic matter; low water-holding capacity; undesirable texture, structure, or consistence; strong slope; stoniness; or inadequate natural drainage. Management requirements range widely because of the diversity of characteristics among the soils of this group.

The Third-class soils have an aggregate area of 48,383 acres, or 13.3 percent of the county.

FOURTH-CLASS SOILS

Fourth-class soils are poorly suited to crops that require tillage and are poor to very good for permanent pasture. Mainly because of the limited number of uses to which they are well suited, they are the poor agricultural soils of the county. Nonetheless, some of them may be most important on farms where soils well suited to permanent pasture are in great demand. On farms where acreages of soils better suited to crops are too small to satisfy the needs of the farm unit, a considerable acreage of Fourth-class soils is used for crops. In this county, the intensity of management practiced on the areas of Fourth-class soils used for crops is generally inadequate for good soil conservation. Management requirements vary widely among the Fourth-class soils, as they do for soils of the Third class. The variation is evident both in use for crops requiring tillage and in use for pasture.

Each soil of this group is so difficult to work or conserve, or both, that the management necessary to its successful use for crops requiring tillage is not usually feasible. On some farms, however, soils well suited to crops requiring tillage may be so limited that it is good farm practice to employ the intense soil management necessary to produce successfully tilled crops on Fourth-class soils.

The Fourth-class soils have an aggregate area of 77,613 acres, or [redacted] of the county.

FIFTH-CLASS SOILS

Fifth-class soils are very poorly suited to the agriculture of the county. For crops requiring tillage, they are very poor and for permanent pasture, poor to very poor. Under present conditions they are apparently best suited to forest or similar use. Conditions in the locality or on a particular farm unit may require the use of some of the soils of this class for pasture or crops, in spite of the fact that they are poorly suited to such use. Some farmers who have applied special systems of management have successfully used a few soils, as Dickson cherty silty clay loam, severely eroded rolling phase, for crops.

Each soil of this class is so difficult to work or conserve or so low in productivity that it is generally not feasible to apply the intensity of management necessary to assure its successful use for tilled crops. All are sufficiently low in content of plant nutrients or to such an [redacted]

Because management requirements vary among crops grown on the same soil, the discussions are in terms of crop rotations well suited to the soils. The management requirements for each crop are dependent, therefore, not only on the characteristics of the soil and of the crop, but also on the management already practiced for other crops in the rotation.

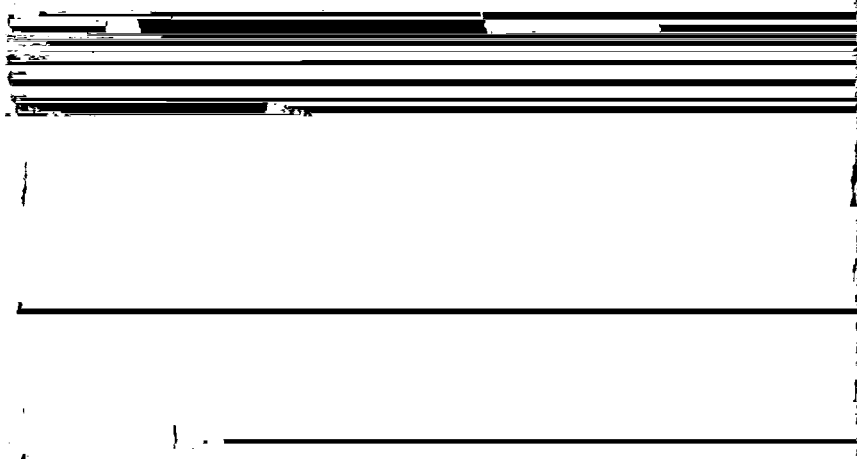
Little experimental data are available on which to base recommendations for the use or management of many soils of the county. The best use and management of a soil on a particular farm involves consideration of many factors besides the soils on that farm. General recommendations for use and management of a soil will not always fit the needs of a given farm, and consequently this discussion is limited primarily to a consideration of the deficiencies of the soils and possible ways of correcting them.

The management practices suggested are those considered good under conditions prevailing on many farms in the county and are to be used in defining management in columns C of the table on expected yields. The practices given represent one or more particular kinds of management considered to be good, but many different combinations of management practices, applied in various intensities, can be used in most instances to attain the same objective of production.

The proper choice of management depends upon the farm as an operating unit. For example, the nitrogen content of a soil can be maintained by use of legumes, manure, commercial fertilizer, or combinations of the three. The best method for maintaining nitrogen therefore depends on the farms as a business, as well as on soil conditions and the preference of the individual farmer.

SOILS GROUPED ACCORDING TO SIMILAR MANAGEMENT REQUIREMENTS

Each soil of the county probably has some individuality in regard to its management, but certain groups of soils have many similar management requirements. On the basis of this similarity they are grouped in this section for convenience in discussion and reference. Under each group are given the uses to which the soils are suited and



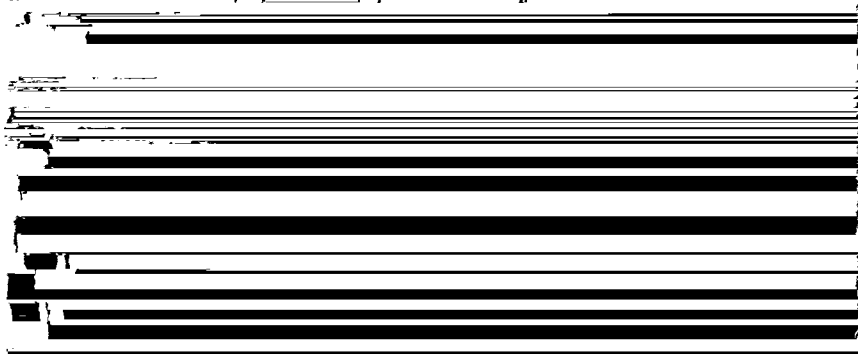
of alluvial material periodically and are relatively high in content of organic matter and plant nutrients because these constituents are deposited on the surface either by floods or by inwash from the higher surrounding areas.

In physical condition the soils are very good for the maintenance of good tilth and for the normal retention and movement of water in the upper parts of the profile. External drainage is slow on Abernathy silt loam, level phase, and Huntington silt loam, and some areas are subject to inundation in spring and during periods of high rainfall. External drainage is relatively rapid on Abernathy silt loam, undulating phase, and this soil is not usually flooded. Internal drainage is fairly rapid in all these soils. The flooded soils are not so well suited to perennial and winter-annual crops as those of the well-drained uplands.

Soils of this group are exceptionally well suited to corn, and they produce good yields of alfalfa, red clover, lespedeza, and similar hay crops. The hay tends to become rank, however, and it may be a little difficult to cure in wet seasons. These soils are excellent for pasture, and they often occur close to permanent streams that can be used as a source of water for animals. They are not so well suited to small grains because the grain tends to lodge and become diseased.

Abernathy silt loam, undulating phase, is the first of the group to become suitable for tillage in spring, and it has the widest range of suitability. A few areas of Abernathy silt loam, level phase, would be benefited if drainage were established to remove excess surface water more quickly after heavy rains. Some areas of Huntington silt loam could be greatly improved by dikes or other means of controlling the floodwaters.

The soils can be used for intertilled crops each year. They will maintain a high level of productivity for considerable time without amendments, but precautions taken to maintain the content of plant nutrients and organic matter are generally rewarded by increased production. Corn followed in fall by crimson clover, hairy vetch, or a similar cover crop, is one crop system favorable for these soils. The cover crop is plowed under as a green manure in spring. Another good system is corn interplanted with crotalaria as a manure crop. Production can be maintained at a relatively high level without amendments under either of these systems of cropping; light or moderate applications of potassium and phosphorus to the cover crop are usually reflected in an appreciably increased yield of corn.



is turned under in spring. Experience in other areas indicates that vegetable crops respond well to heavy applications of commercial fertilizer.

No special practices of tillage or cropping are necessary to control too rapid runoff. On the Huntington soil there is some danger of scouring during floods, and where the surrounding soil is poorly managed, excessive erosion brings down deposits of less productive subsoil material that cover the Abernathy. To help prevent scouring on the Huntington, spring rather than fall plowing is advisable.

Permanent pastures are good to excellent without special management practices. In most instances phosphorus is the principal plant nutrient that limits productivity. Pastures should be grazed or clipped closely periodically to encourage the growth of leguminous pasture plants at the expense of the grasses. On these soils, heavy grazing is generally less harmful to pastures than undergrazing. Pastures hold up well, even in dry seasons.

GROUP 2

In group 2 are the undulating and level phases of Etowah and Cumberland silt loams, the level and slightly eroded undulating phases of Dewey and Decatur silt loams, and the undulating phase of Cumberland fine sandy loam. These are relatively fertile, nearly level or undulating, medium-textured, uneroded to moderately eroded soils of the uplands and terraces. Though relatively fertile, they are less well supplied with plant nutrients than the soils of group 1. All are medium to strongly acid. They are not subject to rapid loss of plant nutrients by leaching and are only moderately affected by accelerated erosion. Physical conditions for normal retention and movement of water are good. The soils are well aerated, and they have surface layers in which good tilth is relatively easy to obtain and maintain.

The soils are well suited to most crops commonly grown in the county. Provided other management requirements are met, they can be conserved in a rotation that includes a clean-cultivated crop once in 2 or 3 years. A suitable rotation is cotton or corn, 1 year; small grain seeded to a leguminous hay crop, 1 year; and hay or pasture, 1 or more years. Alfalfa or red clover can be grown for hay with good results, but red clover is the better hay crop if a short rotation is desired. If hay is wanted for 3 or 4 years, alfalfa would probably be better. Other intertilled crops can be substituted for cotton or corn. The rotation can be shortened safely to allow growing an intertilled crop every other year, provided a winter legume green-manure crop is grown in the intervening years.

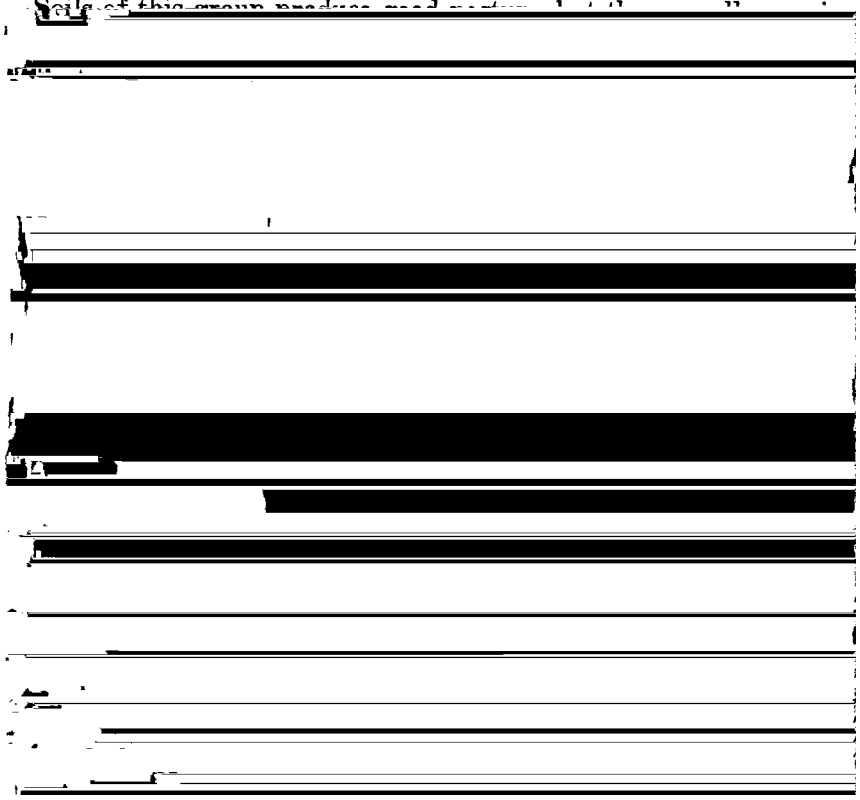
Phosphorus is probably the nutrient most frequently limiting plant growth, but maintenance of nitrogen content requires constant attention. In the rotations suggested, leguminous crops can be depended on for maintenance of most of the nitrogen, but if need for nitrogen becomes apparent, it is advisable to plow under a leguminous crop

Good results are obtained when most of the fertilizer is applied to the legume at seeding. For red clover, the equivalent of 1 ton of ground limestone, 300 pounds of 20-percent superphosphate, and 25 pounds of potash an acre is satisfactory in most places, and for alfalfa, 2 tons of ground limestone, 500 pounds of 20-percent superphosphate, and 25 to 50 pounds of potash an acre. The quantity needed of each will vary with the past management of the soil. Although potash is necessary in some areas, it can be left out of the fertilizer mixture if manure is used. Boron is the limiting element in some areas, but a light application of borax will correct the deficiency if the soil has not been overlimed. Insufficiency of boron is generally apparent on land in alfalfa.

Vegetables do well on these soils, but they require heavy applications of phosphorus, potash, and nitrogen. Barnyard manure is highly beneficial for these and most other crops and is especially useful on the small eroded spots in some fields. It can be used to replace part of the potash and nitrogen in fertilizer mixtures.

The soils can be tilled through a relatively wide range of moisture conditions without destruction of good tilth. Tillage is best on the contour, where feasible, and the soils should not be left bare of vegetation for extended periods. Terracing and other engineering methods of controlling runoff are generally not necessary if other management requirements are met.

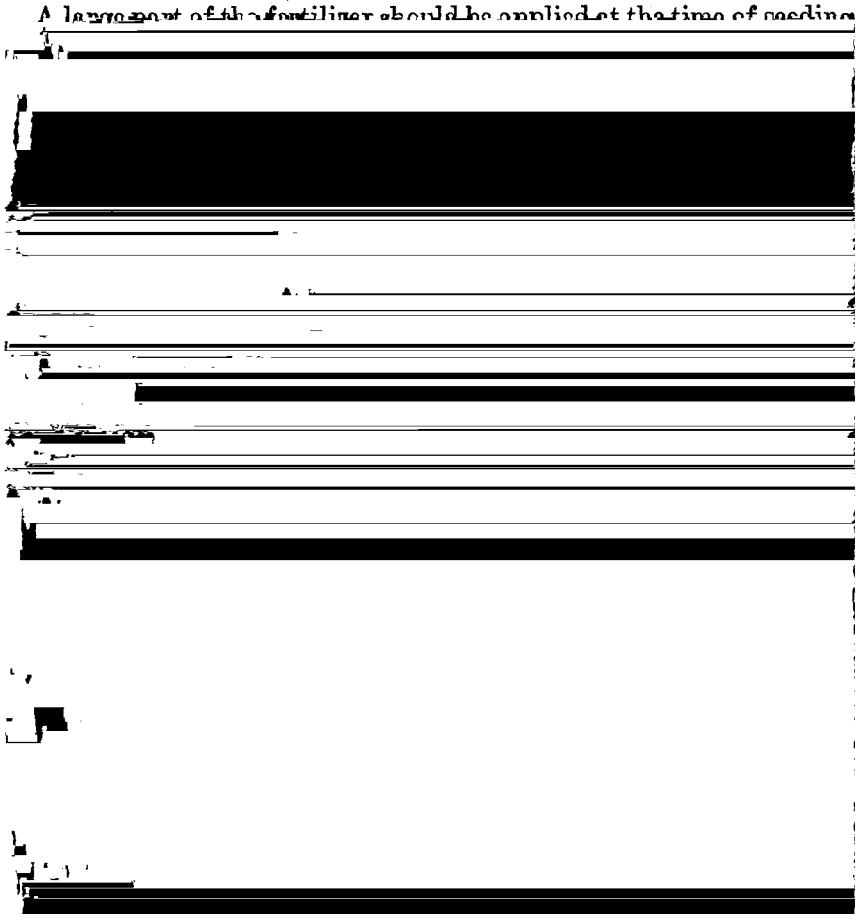
Soils of this group produce good [illegible]

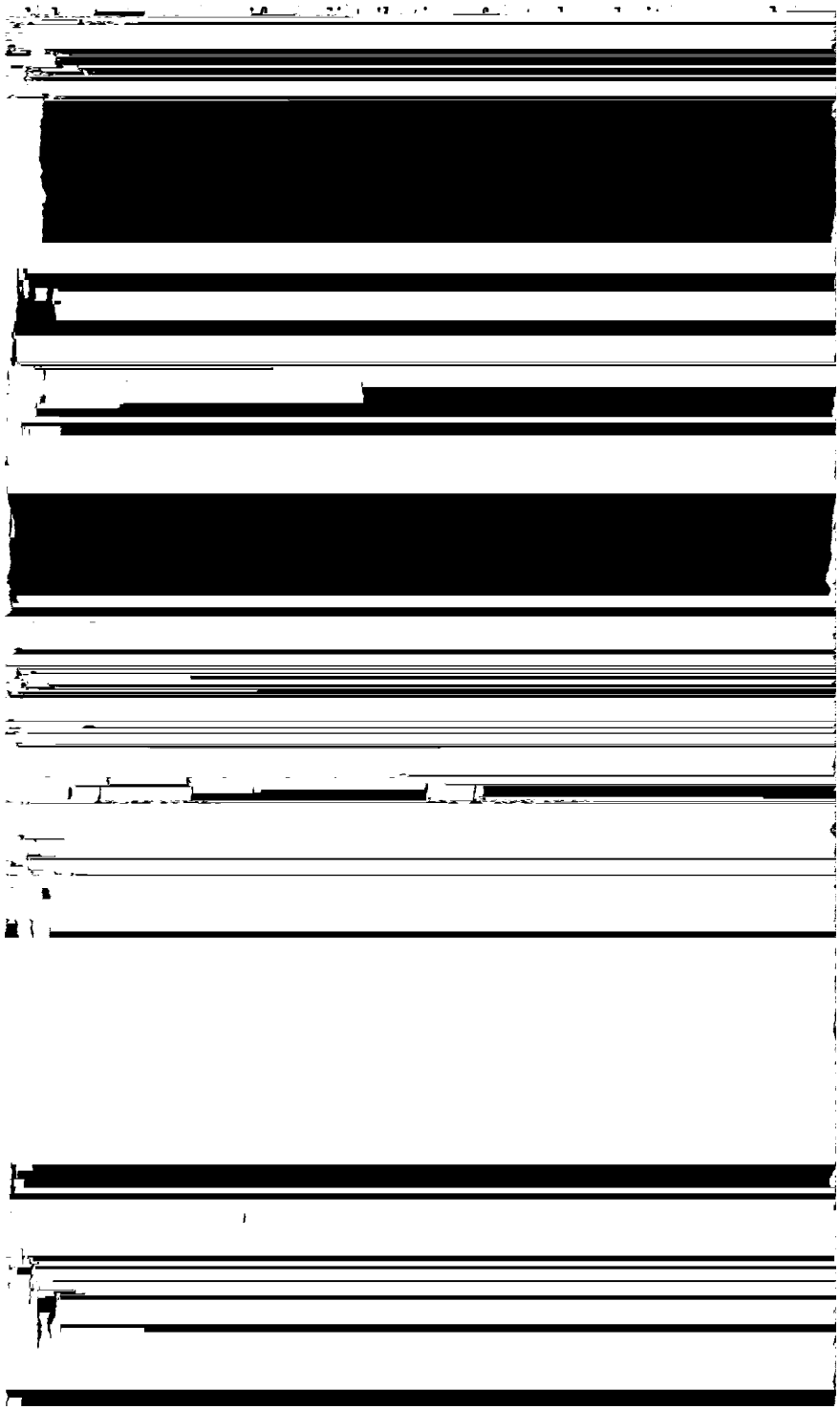


Soils of this group are fairly well suited to nearly all the crops ordinarily grown in the county. A rotation that includes a clean-tilled crop once in 3 or 4 years is adequate to conserve them if other management requirements are met. A suitable rotation includes cotton, 1 year; small grain seeded to a leguminous hay crop, 1 year; and hay or pasture, 2 years or more. Alfalfa, red clover, lespedeza, or sericea lespedeza can be used for hay with good results. When a short rotation is desired, lespedeza or red clover is better, but alfalfa or sericea lespedeza is preferable when hay is wanted for 3 or 4 years. Corn, peanuts, soybeans, or other intertilled crops might be substituted for cotton. Where a winter legume is grown as a green-manure crop, the rotation can be shortened a little.

Phosphorus and nitrogen are the nutrients most generally limiting, but some additional potassium is also needed. In the rotations suggested, the leguminous crops can be depended on for maintenance of a large part of the nitrogen, especially after the nitrogen content of the soil has been built up to a fairly high level. Turning under a few leguminous crops is an aid in building the nitrogen and organic content to the desired level.

A large part of the fertilizer should be applied at the time of seeding

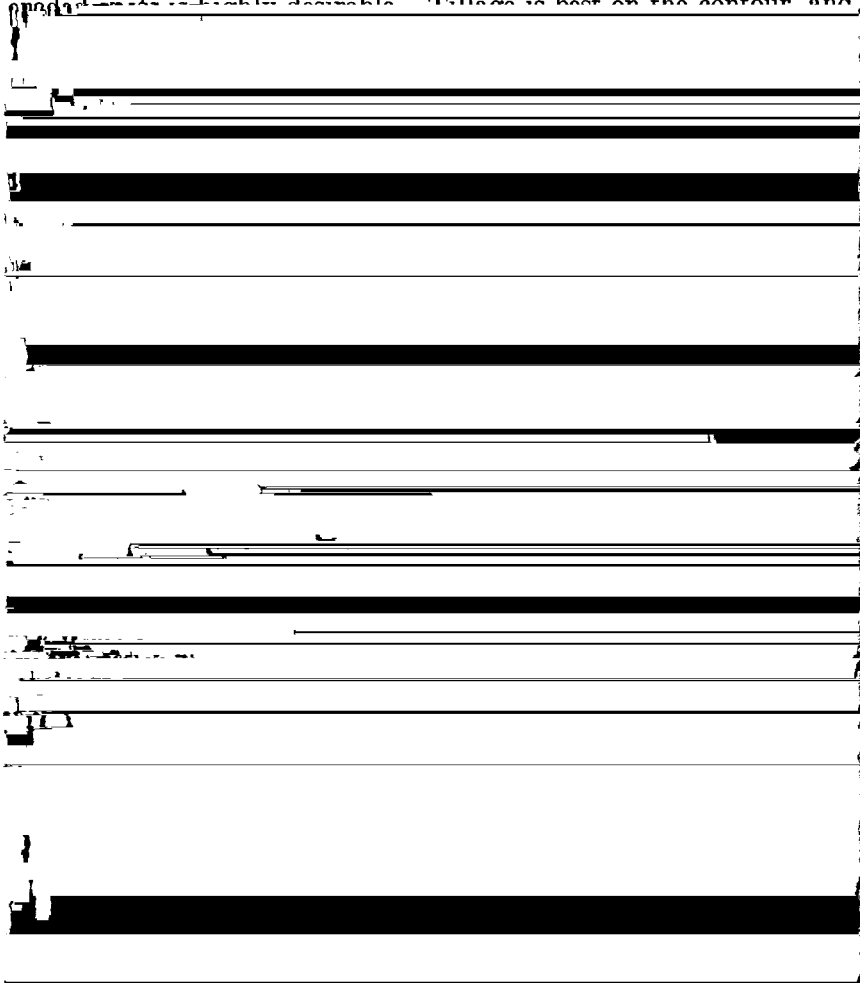




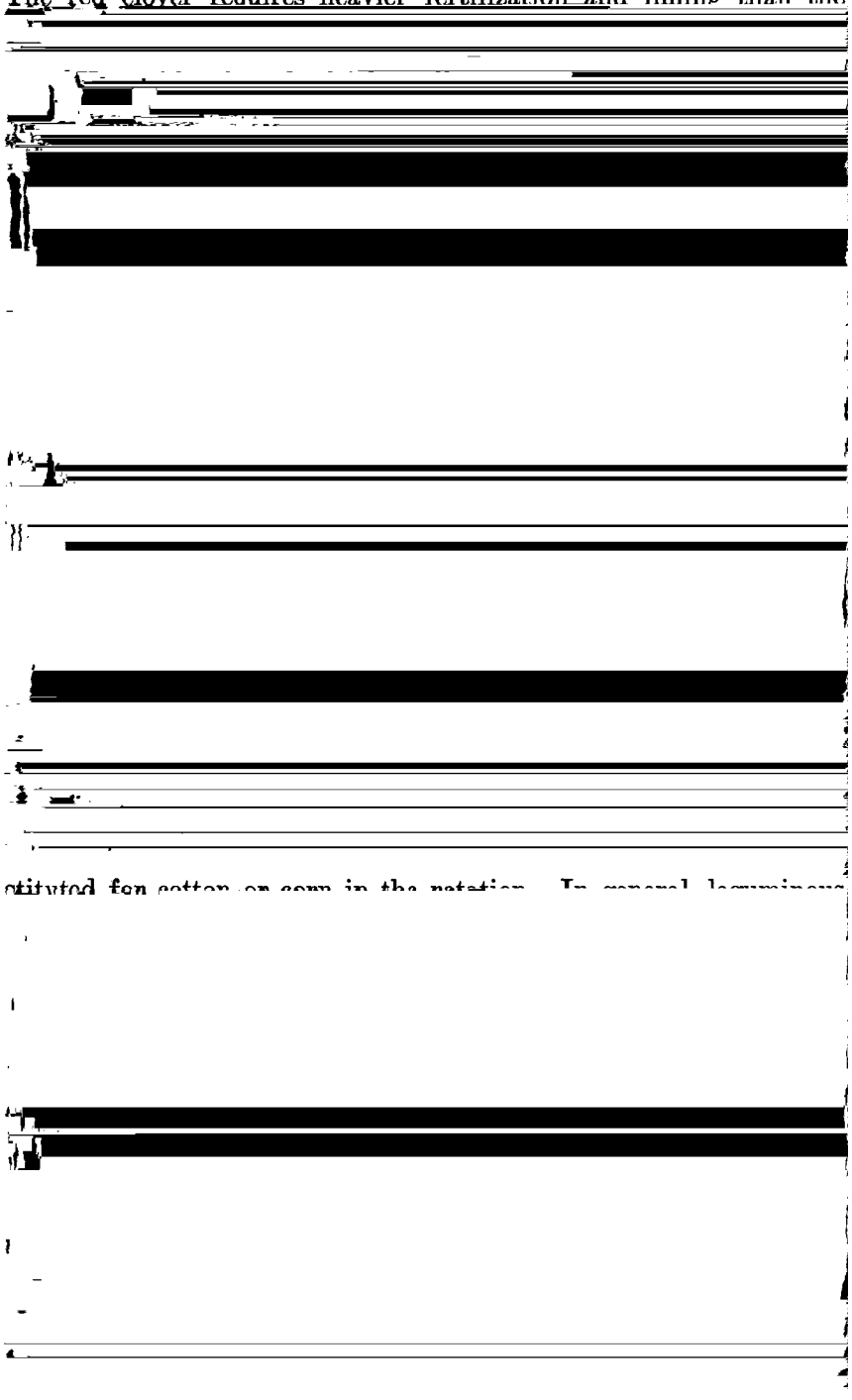
Nitrogen and potash are the elements limiting good plant growth, and apparently the soils need additions of organic matter. Management practices should be those favorable to the maintenance or increase of nitrogen, potash, and organic matter. Practices that regulate the runoff of rainfall are included.

The crop rotations chosen provide a leguminous crop at moderately short intervals. The time between intertilled crops should be slightly longer than the minimum considered good for the soils of group 3. Rotations similar to those suggested for group 4 are well suited, provided other management requirements are met. A suitable 4-year rotation is cotton or corn; small grain, clover and grass; and clover for hay or rotated pasture. As many pasture crops as feasible should be included because bluegrass and clovers grow as well, if not better, on these soils than on most soils of the county.

Generally these soils are slightly more eroded than the soils of group 3, and the application of manure or other organic matter to [illegible] is highly desirable. Tillage is best on the contour, and



pedeza, red clover, or a mixture of red clover and grass can be used. The red clover requires heavier fertilization and liming than the



stituted for cotton or corn in the rotation. In general, leguminous

fertilization. It is advisable to fertilize the small grain and lespedeza or the small grain and clover with moderate to light applications of potash and, in addition, supply some potash to the cotton or corn crop. Phosphorus and lime are probably best applied just before the leguminous crop.

So far as the operating limitation of the individual farms will permit, crops and rotations should be planned to increase fertility. The rotation should include leguminous crops frequently, and as much of the vegetation as feasible should be returned to the soil directly, or indirectly, as manure. The quantity returned will vary, of course, depending on the requirements of practical farm management.

A 2-year rotation of cotton or corn followed by small grain and lespedeza is satisfactory. A longer rotation of cotton or corn, small grain, and red clover and grasses would also be satisfactory, but a considerably heavier application of fertilizer and lime would be required for the red clover than for the lespedeza used in the shorter rotation first suggested. Alfalfa has not proved a highly desirable crop.

In a 3- or 4-year rotation the requirements of most of the crops included will be satisfied by applying the equivalent of 300 pounds of 20-percent superphosphate and 1½ to 3 tons of ground limestone per acre just before the legume is planted. Probably 100 pounds of potash an acre, divided between the hay crop and corn or cotton crop, is adequate. A quantity less than that may be sufficient in many places; the requirement will vary with the past management of the soils. Light applications of soluble fertilizer at frequent intervals are more desirable than heavy applications at long intervals.

These soils can be tilled over a moderate range of moisture conditions, and special practices of tillage are generally not necessary for the control of runoff. Cultivation on the contour is advised where feasible, and the soil should not be left bare during winter. Terracing and strip cropping are usually unnecessary if other desirable management practices are employed.

Pastures are generally poor unless they are well managed. Moderate quantities of lime should be applied at relatively short intervals after an initial heavy application has been made. Phosphorus should be supplied in relatively large quantities. An application of potash may aid in the establishment of a good pasture; once established the plants are usually able to derive sufficient potash from the scattered droppings. Pastures are harmed more by very close grazing than those on soils of groups 2 or 3, but undergrazing is equally harmful. Uneaten herbage should be clipped, and droppings should be scattered.

GROUP 8

Soils of group 8—the eroded hilly and hilly phases of Dellrose cherty silt loam—differ from those of group 7 in occupying steeper slopes (12 to 30 percent) and in having a higher content of phosphatic materials. They are well drained and receive a good supply of seepage water that tends to prevent their becoming droughty in dry seasons. The seepage water probably brings in the added phosphate from adjoining formations. The soils are cherty in most places, and, in a few spots, very cherty. Erosion is less severe than that normally expected on soils of similar slopes.

Because these soils are rather high in plant nutrients and not so readily eroded as some soils on similar slopes, they can be used more

safely for clean-tilled crops. A rotation permitting the use of a clean-tilled crop every 3 or 4 years is considered fairly satisfactory. Reasonably well suited is a rotation similar to that suggested for soils of group 3, but wider intervals between clean-tilled crops is desirable. Corn is grown more frequently than cotton. Because of the steepness and chertiness, it is more desirable to plant soils of this group in pasture rather than hay. Determination of this point will depend on the relative desirability of the two crops in the method of farming being used.

Potassium and nitrogen are the nutrients that generally limit productivity of these soils, but some phosphate may be needed on certain areas. When the nitrogen content has been built up in the soils, the leguminous crops in the rotation can be depended on to maintain it fairly well. The turning under of a few leguminous crops would aid in building the nitrogen and organic content to a relatively high level. In favorable positions, the phosphorus content is maintained by seepage water coming in from adjoining formations high in that nutrient. Fertilizer should be added at about the time and in approximately the same quantities as suggested for group 3, but the quantity of phosphate can be reduced somewhat, especially on areas where its addition produces little response.

GROUP 9

The soils of group 9 are well-drained or moderately well-drained soils of first bottoms, low terraces, and depressions. These seven soils are the level phase of Humphreys silt loam, Capshaw loam, Wolftever silt loam, the undulating and level phases of Greendale silt loam, and Abernathy and Bruno fine sandy loams. They are not subject to appreciable accelerated erosion, except by scouring during floods, but the Greendale, Abernathy, and Bruno receive depositions periodically and may at times receive heavy deposits of materials that are lower in fertility. All have physical conditions highly desirable for the maintenance of good tilth.

The management problems presented by the soils of group 9 differ from those of group 1, principally because of the greater difficulty in maintaining the content of plant nutrients at a high level. In comparison with that group, all are moderately low in nitrogen, phosphorus, and potash, and all except the Bruno are relatively low in lime.

Most of these soils are at least moderately well suited physically to vegetables, corn, and hay crops. They are generally not so well suited to perennials or winter annuals as they are to corn or hay, but small grains are moderately productive under good management. Management practices for first consideration are those that aid in maintaining organic matter and plant nutrients at levels adequate for good production. Intertilled crops, as corn, vegetables, and, to some extent, cotton, can be grown successfully year after year on most of these soils if the necessary management requirements are met. Crimson clover, hairy vetch, or a similar winter-legume cover crop should usually be grown after each intertilled crop to aid in the maintenance of organic matter and nitrogen.

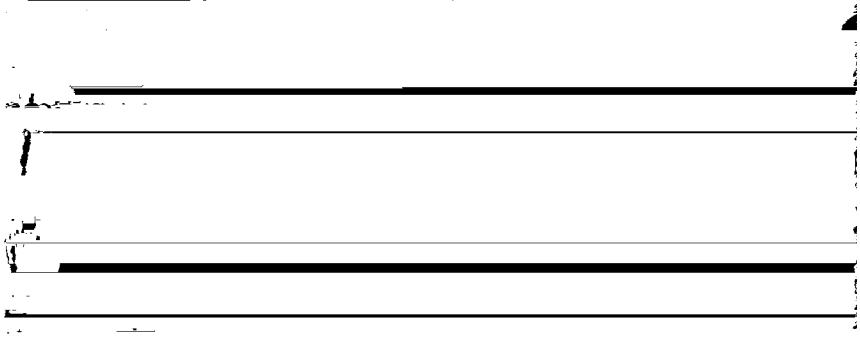
The soils are acid and, for good results in a cropping system such as that mentioned, moderate applications of lime should be made at relatively short intervals. In other areas, vegetable crops have given

The rotations of commonly grown field crops suggested for soils of group 1 are well suited to this one. Lime is usually not needed for the common crops, but it may benefit clover in some areas. A slight or moderate response to phosphorus applications can be expected from most crops. Potash is limiting in some areas, especially in the Hollywood soil.

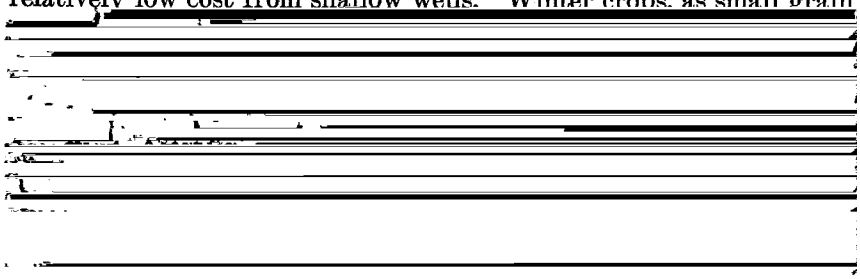
No special practices are necessary to control runoff, but because of the danger of scouring, areas subject to flooding are not to be plowed in fall unless an early winter cover crop is planted. To prevent destruction of good tilth, the soils should not be tilled when too wet or dry. Greater care is necessary to increase and maintain a high organic-matter content on these soils than is needed for group 1. Permanent pasture is well suited and good management practices are similar to those described for group 1.

GROUP 11

In group 11 are Ooltewah, Lindside, and Ennis silt loams. The management problems differ from those of soils in group 1 chiefly in drainage and in the greater difficulty with which plant nutrients are maintained at a high level. Surface drainage is slow because the land is very level and low, and internal drainage is somewhat retarded because of low position. Except in dry seasons, imperfect drainage necessitates late plowing and planting in spring. All the soils are fairly high in plant nutrients, and they are not subject to appreciable



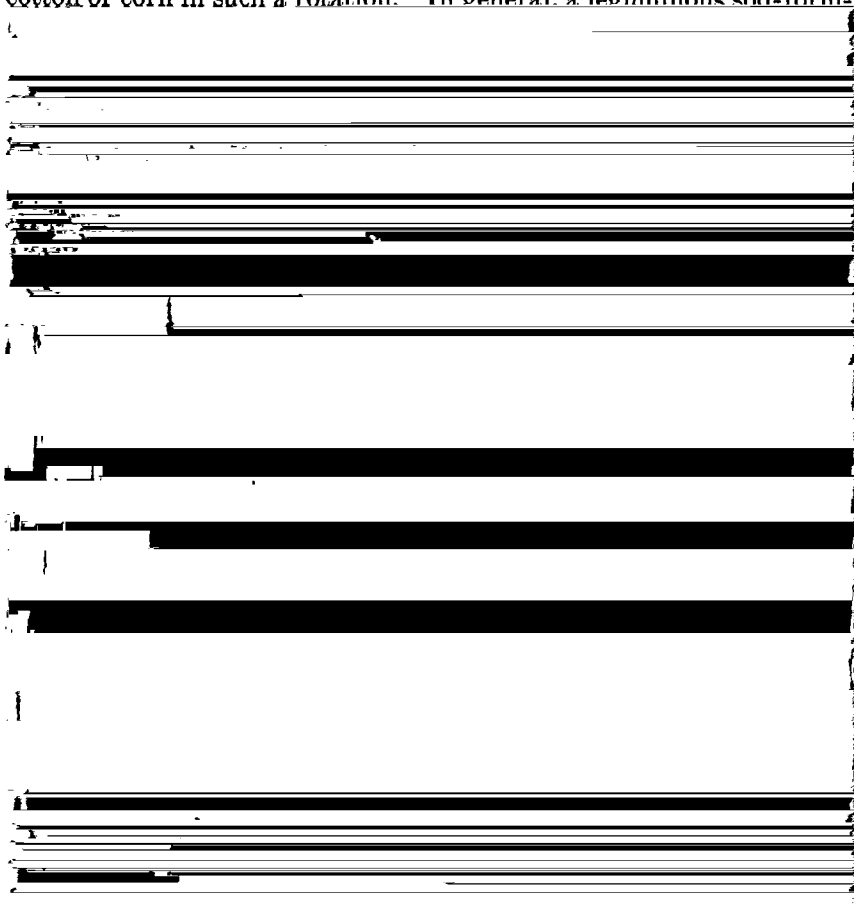
The soils are better suited to corn and hay than to most crops commonly grown in the county. They are relatively poorly suited to cotton, vegetables, and alfalfa, but, like soils of group 1, are excellent for pasture. In many instances they are near permanent streams or in such a low position that water for livestock can be obtained at relatively low cost from shallow wells. Winter crops, as small grain



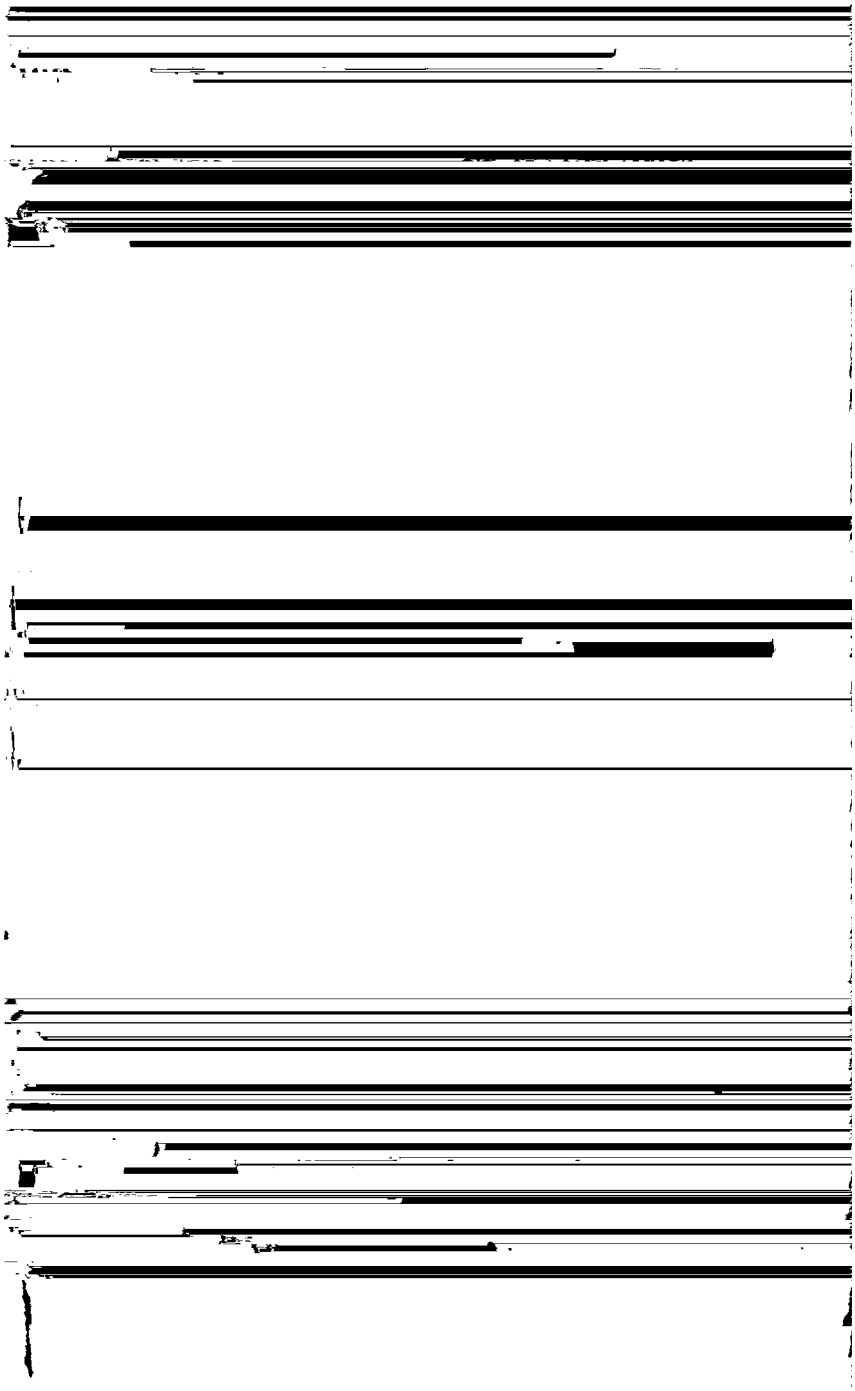
eroded, well-drained, medium-textured, moderately fertile upland soils on slopes of 5 to 12 percent.

To the extent that good farm management will permit, practices should concern the maintenance or increase of the content of nitrogen, phosphorus, and organic matter and the regulation of the rate of runoff. The soils present a moderate to serious problem in the control of runoff. Their susceptibility to erosion is generally less than that of soils on similar slopes developed from high-grade limestone material, but erosion is sufficient to justify close attention to runoff control measures. Certain areas might be improved by removal of the larger chert fragments, especially if the land is to be used for hay.

The choice and rotation of crops should be such that a leguminous crop is included at moderately short intervals. The time between intertilled crops is slightly longer than the minimum considered good for the soils of group 7. Considered satisfactory is a rotation as follows: Cotton or corn, 1 year; small grain, then lespedeza and grass, 2 years. Sericea lespedeza or red clover can be used instead of red clover and grass, but both of these require heavier fertilization and liming than the lespedeza. Vegetable crops can be grown in place of cotton or corn in such a rotation. In general, a leguminous sod-form-



by these soils can be solved largely by practices that aid in the estab-



races. Much of the material making them up is underlain by cherty limestone or has been washed from soils underlain by cherty limestone. The soils are strongly acid throughout.

Soils of this group are probably best used for pasture, hay, corn, and soybeans. Some small grain can be produced, but generally the soils are not so well suited to perennials or winter annuals. Management practices that aid in maintaining organic matter and plant nutrients at levels adequate for good production should receive first consideration.

The following rotation is considered satisfactory: Corn interplanted with a manure crop of soybeans; small grain and lespedeza; and soybeans for seed and grass for hay or pasture, 2 or 3 years. A longer period of pasture or lespedeza hay can be substituted for the short rotation. Winter legumes make slow start on these soils and are winterkilled to some extent. Sericea lespedeza is a satisfactory perennial hay crop on areas where the claypan is fairly deep and the ground is not too wet in winter.

The content of nitrogen and organic matter is especially limiting to plant growth, and the supply of lime, phosphorus, and potash is also limiting. Moderate applications of lime for the combined seeding of small grain and lespedeza benefit the crops of the rotation, and moderate to heavy applications of potassium and phosphorus in the rotation are beneficial. Manure is highly beneficial, and it can replace part of the potash in the commercial fertilizer. Frequent moderate applications of fertilizer are more desirable on these soils than heavy applications at long intervals.

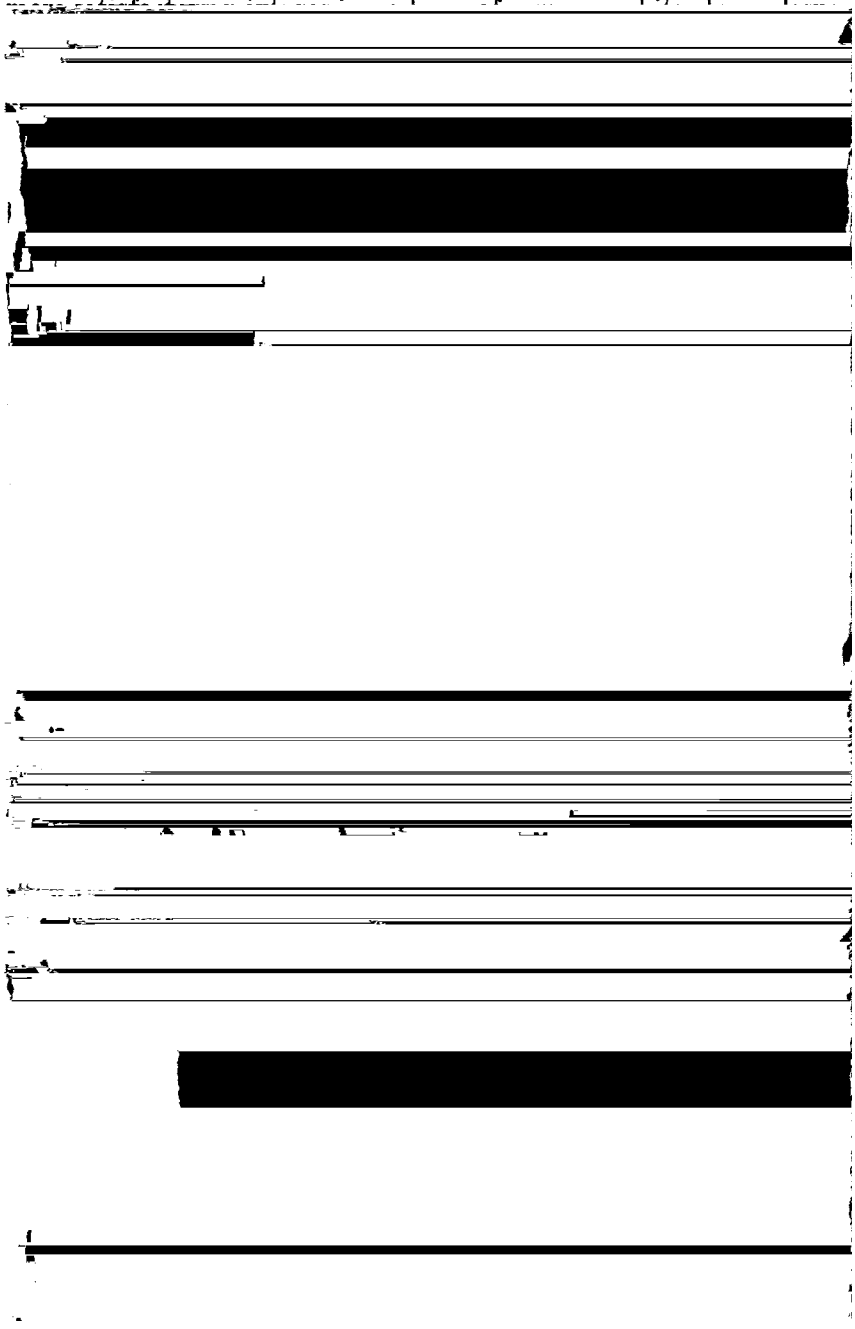
Pastures on these soils usually grow up to relatively undesirable plants unless they are adequately fertilized. A moderate application of lime and phosphorus every 3 or 4 years is desirable. If cattle droppings are properly scattered, they may supply sufficient potassium, but if a potassium deficiency develops, it can be supplied in the form of commercial fertilizer. Clipping pastures is important in controlling weeds and encouraging the growth of white clover.

These soils require no special tillage practices for the control of runoff. In some instances it is helpful to provide drainage for removal of excess water in rainy seasons. These soils can be tilled through a relatively wide range of moisture conditions, but special precautions should be taken to prevent puddling and clodding. As a rule, the soils cannot be tilled early in spring because they are late in drying out. Fall plowing can be done safely because the soils are not subject to appreciable accelerated erosion.

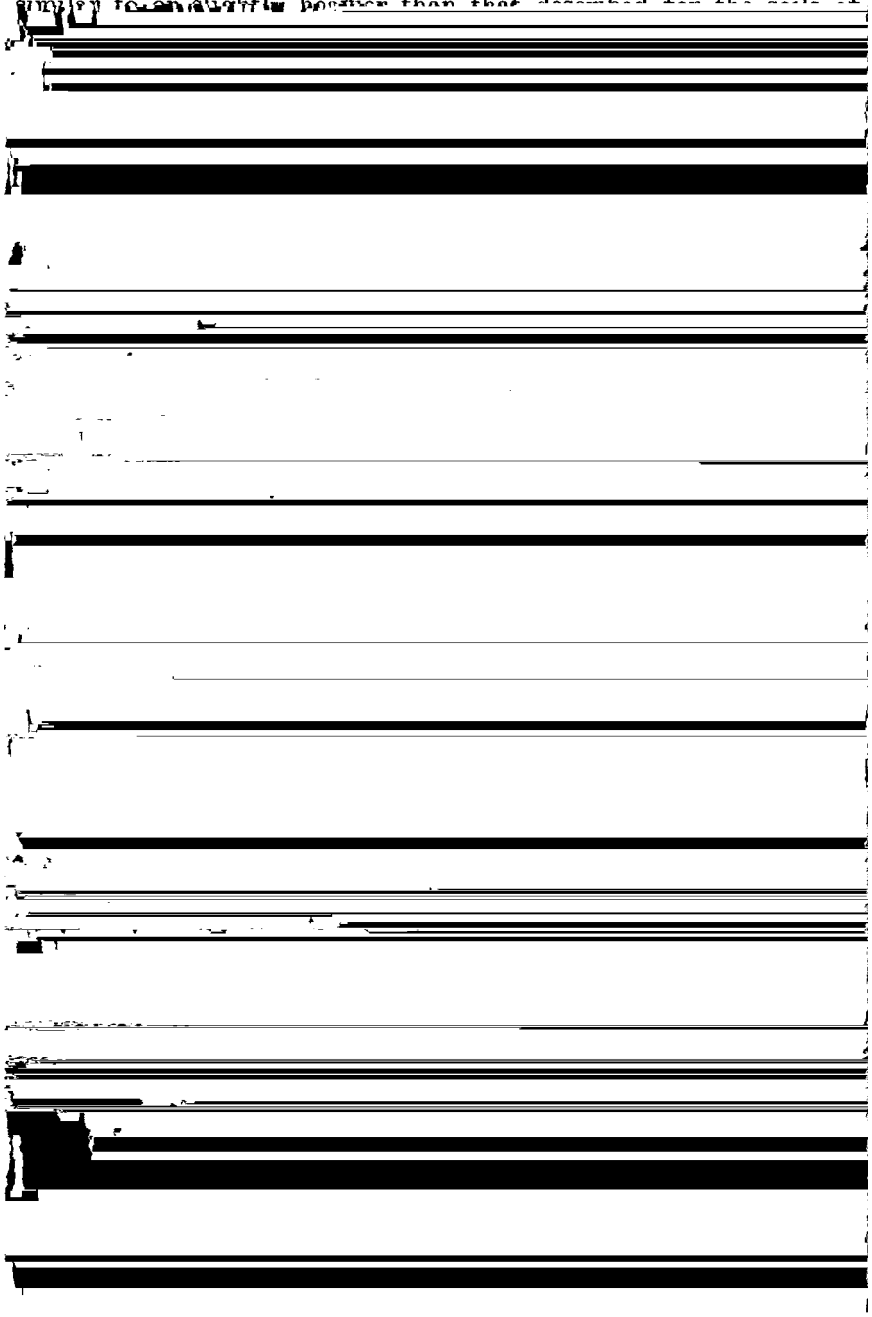
GROUP 15

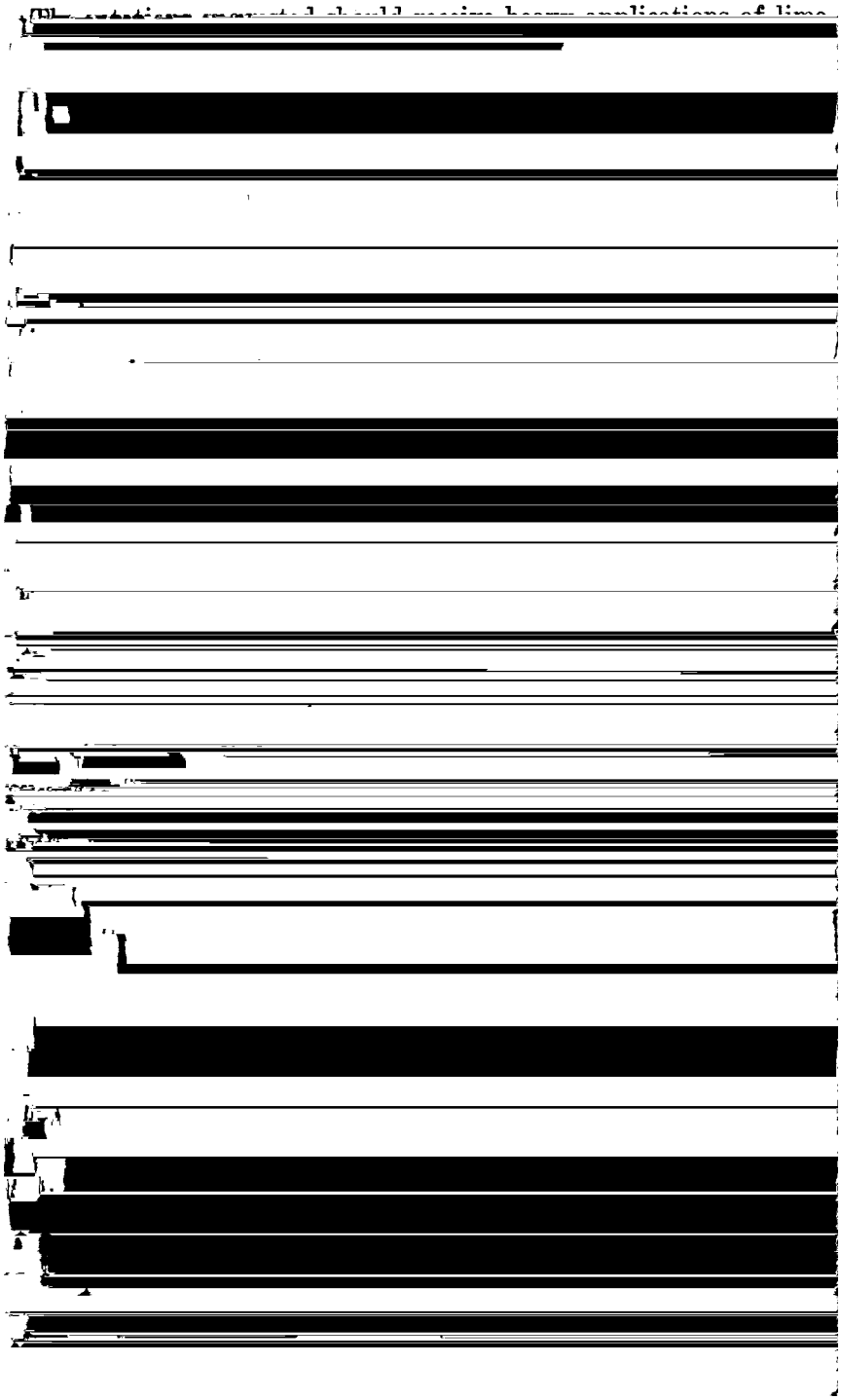
Soils of group 15 are usually fairly steep, cherty, or severely eroded. These soils are Mimosa cherty silty clay loam, eroded rolling phase; the eroded hilly phases of Maury silt loam and Mimosa cherty silty clay loam; the severely eroded rolling and severely eroded hilly phases of Maury clay loam; and Mimosa cherty silt loam, hilly phase. With the exception of Mimosa cherty silty clay loam, eroded rolling phase, they are generally unsuited to clean-tilled crops. They are fairly high in phosphorus, and if properly managed can be made to produce good pasture. In some instances, Mimosa cherty silty clay loam, eroded rolling phase, produces fairly good crops, but its high chert content makes tillage difficult.

Applications of lime and potash are necessary to establish good permanent pasture. The lime and possibly a part of the potash should be applied at the time the land is being prepared for seeding. The pasture mixture should include both grass and legumes. One of the



seeding of alfalfa and similar legumes. Legume crops are difficult to establish the first time and in rotations probably should receive heavy applications of lime, phosphorus, and potassium until the soil fertility has been somewhat restored. Once this is accomplished, fertilization similar to or slightly heavier than that described for the soils of





Soils of this group are well suited to permanent pasture. Good pasture management is obtained largely by improving drainage, applying moderate quantities of phosphorus every 3 or 4 years, grazing moderately close, scattering droppings, and mowing excess herbage. If the soils are not drained, water-tolerant plants dominate the pasture at the expense of more desirable legumes and grasses. Undergrazing favors the growth of undesirable pasture plants at the expense of such plants as bluegrass and white clover, and it is probably more harmful than exceptionally close grazing. Where the Guthrie soil is used for pasture, moderate applications of lime will be helpful.

Drainage is highly beneficial to most crops grown on these soils, but it is difficult to establish. The chief difficulty is lack of fall for drainage outlets. For pasture, the drainage necessary in most places is only that needed for the quick removal of excess surface water after rains. Open ditches are generally used for field crops, but tile drains can be used to advantage in some instances. Diversion ditches at the base of adjacent slopes are especially beneficial in some areas.

Good tilth is difficult to maintain if these soils are used for crops requiring tillage. They should be tilled at the proper moisture condition, and rotations and amendments should provide for the maintenance of a high content of organic matter in the plowed layer. In general, these soils are better suited physically to permanent pasture than to crops, but under careful management, including drainage, fair to good yields of corn and hay can be produced. At times, soybeans grown for seed produce unusually good crops.

GROUP 19

The soils of group 19 are the steep and eroded steep phases of Baxter cherty silt loam; Dickson cherty silty clay loam, severely eroded rolling phase; Limestone rockland; Rough gullied land (Decatur, Dewey, and Cumberland soil materials); and Made land. These soils are not well suited to crops or pasture and are best used for forest. Slopes are steep, fertility is low, and moisture relations are poor. The soils are difficult to work, low in productivity, and very subject to erosion. Where better soils are not available on the farm, limited areas may be used for pasture or very long rotations.

A suitable forest cover will establish itself in places if it is properly protected against fire and grazing, but sometimes planting will be necessary. Shortleaf or loblolly pines are among the species more suitable for the exposed or otherwise less favorable growing sites. On the better growing sites where moisture relations are more favorable for plant growth, black locust, yellow-poplar, and certain other deciduous trees are suitable for planting.

Most of the management practices employed in the production of forest can be grouped as follows: (1) Maintenance of a full stand of the species, (2) systematic cutting and weeding of trees, (3) harvesting mature trees in such manner that desirable species may succeed them, and (4) the control, so far as possible, of fires, browsing, trampling, and damage from use of harvesting machinery or from other causes.

The soils of this group cover a total area of approximately 22 square miles, and all but about 3 square miles of this is now in cut-over forest. The individual tracts are chiefly along the steep slopes adjacent to

SOIL SURVEY

Limestone County, Alabama

Errata Sheet

For SOIL GROUPS in the map legend substitute:

Management Groups 7 and 12 for Management Group

Management Groups 9, 11, and 14 for Management Group 9

Management Group 13 for Management Group 11

Management Group 15 for Management Group 12

Management Group 16 for Management Group 13

Management Group 18 for Management Group 14

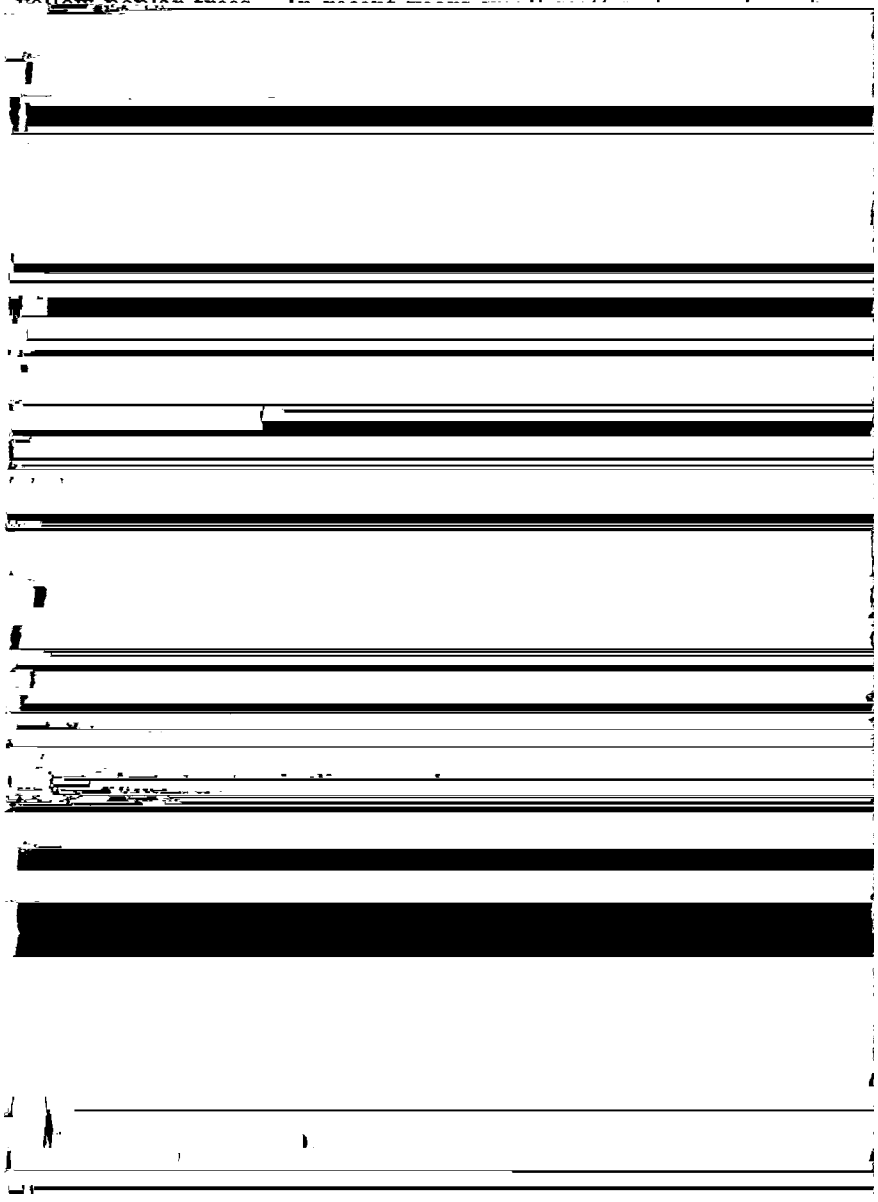
Management Groups 17 and 19 for Management Group 15

TABLE 7.—*Expected average acre yields of the principal crops on Limestone County, Ala., soils*

[In columns B—yields under management practices followed by majority of farmers in county; in columns C—yields under management considered the best the majority of farmers could feasibly follow]

Soil	Cotton (lint)		Corn		Wheat		Oats		Lespedeza hay		Soybean hay		Cowpea hay		Alfalfa		Potatoes		Sweet-potatoes		Pasture (cow-acre-days) [1]		Workability	Conserv-ability [3]	Land class [4]
	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C			

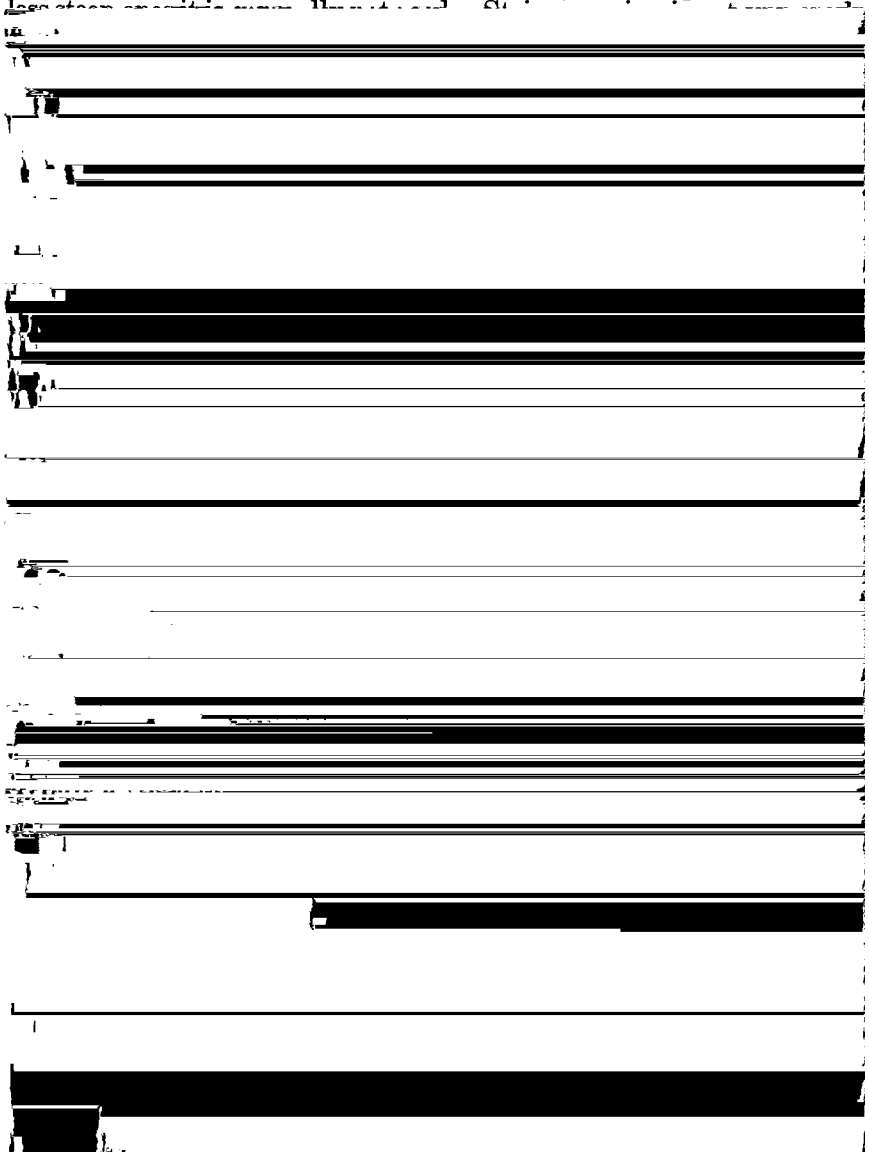
stream valleys. These cut-over areas need more protection from fires, and greater attention should be paid to improving stands. The remaining areas are scattered over the county, mainly in the rough uplands. They are potential forest land, though some of them are not especially good for that use. Some areas support a few dogwood, red and post oaks, hickory, redcedar, and black locust trees, with a growth of brush, principally persimmon, sassafras, wild plum, and sumac. Most of this land should be planted to black locust, pine, oak, and



some of the less productive bottom lands, hay or small grain crops are introduced at relatively long intervals.

On upland soils cotton or corn crops are grown 1 to 3 years or more in succession, and then followed for 1 or 2 years by small grain and lespedeza, soybean, or similar hay crops. A few upland areas have been planted to cotton year after year for long periods, but farmers are following this practice less and less, and now the cotton is more often followed by a winter crop of vetch, which is followed in spring by corn.

Tillage is ordinarily on the contour for hilly and steep soils, but on



specified soil and yields below the goal for another crop on the same soil. An idea of the response to be expected from crops under a feasibly good level of management can be obtained by comparing the yields in columns C with those of columns B.

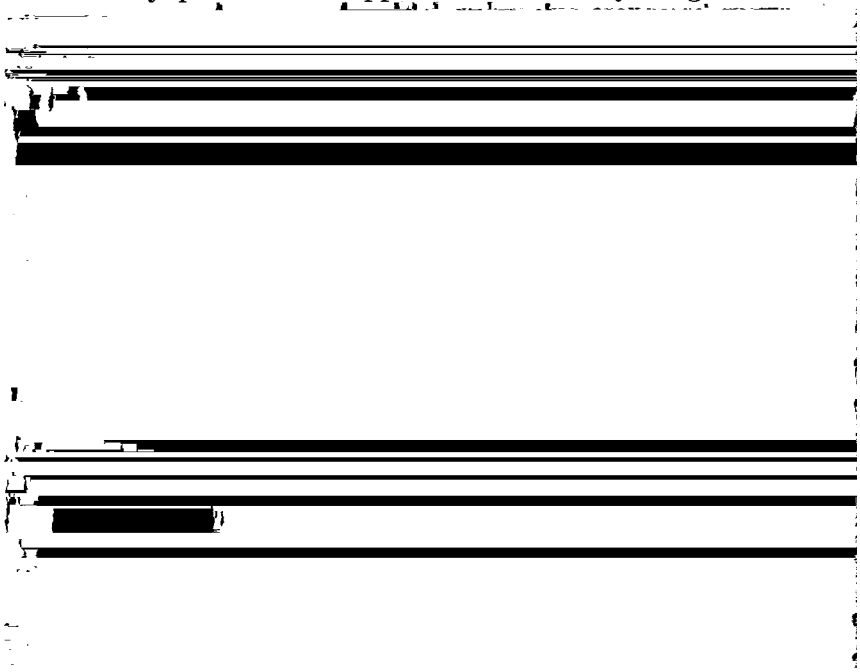
WATER CONTROL ON THE LAND

Water control on the land consists of those practices concerned with the regulation of runoff and the maintenance of moisture conditions in the soil that are favorable for the growth of a particular crop or group of crops. These practices are (1) control of runoff, (2) protection from floods, (3) drainage, and (4) irrigation. Many soils could be improved in such way that absorption and retention of moisture would be increased.

Protection of lands from floods has been limited to some straightening and clearing of stream channels and the building up of a few small dikes to protect bottom lands. Considerable damage is still done at times by floodwaters, resulting in considerable scouring of soils and also delay in planting. Since floods usually occur early in spring before crops are planted, the crops are not greatly damaged.

Drainage could be improved by greater use of open ditches and tile drains, which would be especially useful for the quick removal of surface water from potential pasture land. Only a limited amount of tile drainage has been done in the county.

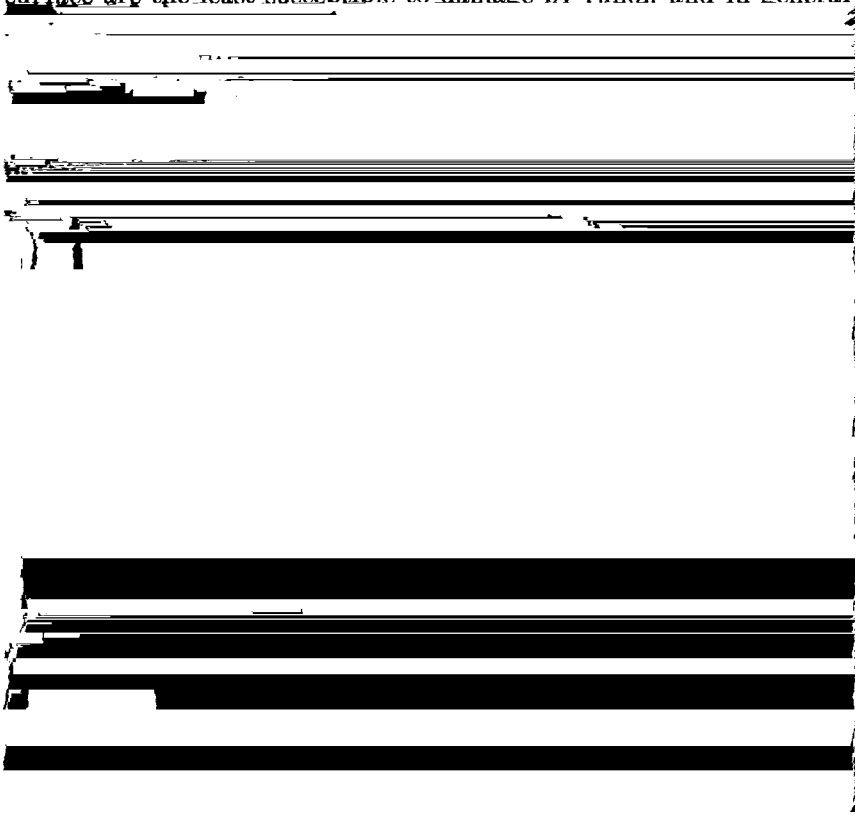
Irrigation would doubtless increase crop production on many soils in dry seasons, but it is now of little or no importance. It might be economically practical to supplement rainfall by irrigation where



Water is absolutely necessary in the growth of plants, and even in a region having as high an annual rainfall as this county, lack of water at the critical time of the year is frequently a limited factor. Any measure that results in a more nearly adequate and even supply of water on the land during the growing season will encourage increased production of the plants on which the people depend for their livelihood. Water is a natural resource that can be exploited profitably both on the land and in the streams.

Runoff is retarded by vegetation in proportion to the density of the cover and its ability to induce a soil condition that favors the absorption and retention of water. In addition, the vegetative cover, its root system, and its debris reduce the rate of runoff and bind the soil particles so that the loss of soil material is decreased in the runoff that does occur. Forests are effective in controlling runoff, as are also hay, pasture grasses, legumes, and other sod-forming plants. Small grains and other close-growing crops are somewhat less desirable in runoff control, and intertilled crops are generally the least desirable.

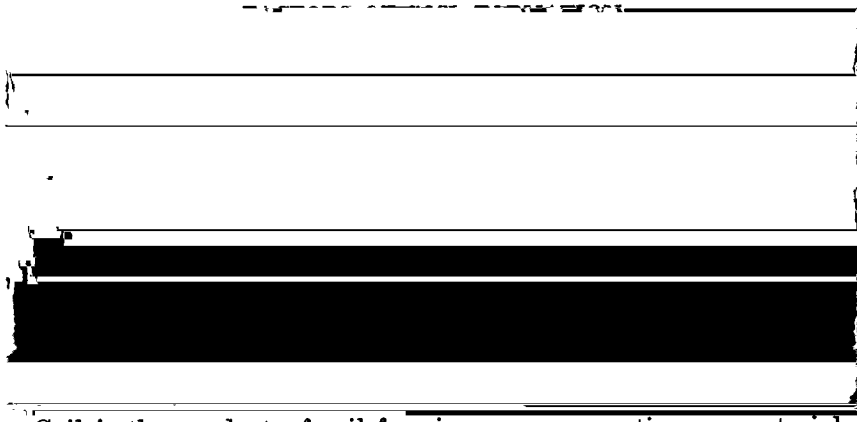
Several soil characteristics have a direct bearing on the problem of runoff control, but slope is of outstanding importance. Other characteristics being similar, steeply sloping soils are the most susceptible to damage by runoff and have the most restricted suitability for agricultural use. Those soils having a smooth or nearly level surface are the least susceptible to damage by runoff and in general



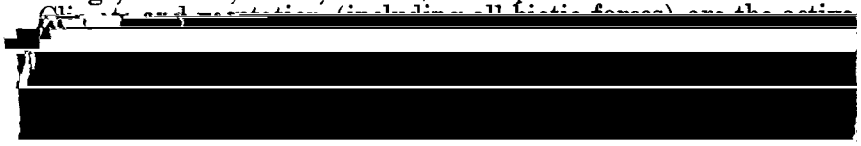
maintained, they may cause more damage than if the land were left unterraced. Engineering methods have a place in water control, but as a rule they are to be resorted to only where runoff cannot be controlled by those methods of good soil management that are essential for good production.

Control of water is not an isolated problem, but one involving all the practices of good soil management that would ordinarily be employed. It is a part of successful crop production and can be accomplished largely through good farming practices, including proper choice and rotation of crops, proper fertilization and tillage, the control of insects, pests, and diseases, and, in some places, application of engineering methods.

MORPHOLOGY, GENESIS, AND CLASSIFICATION OF SOILS



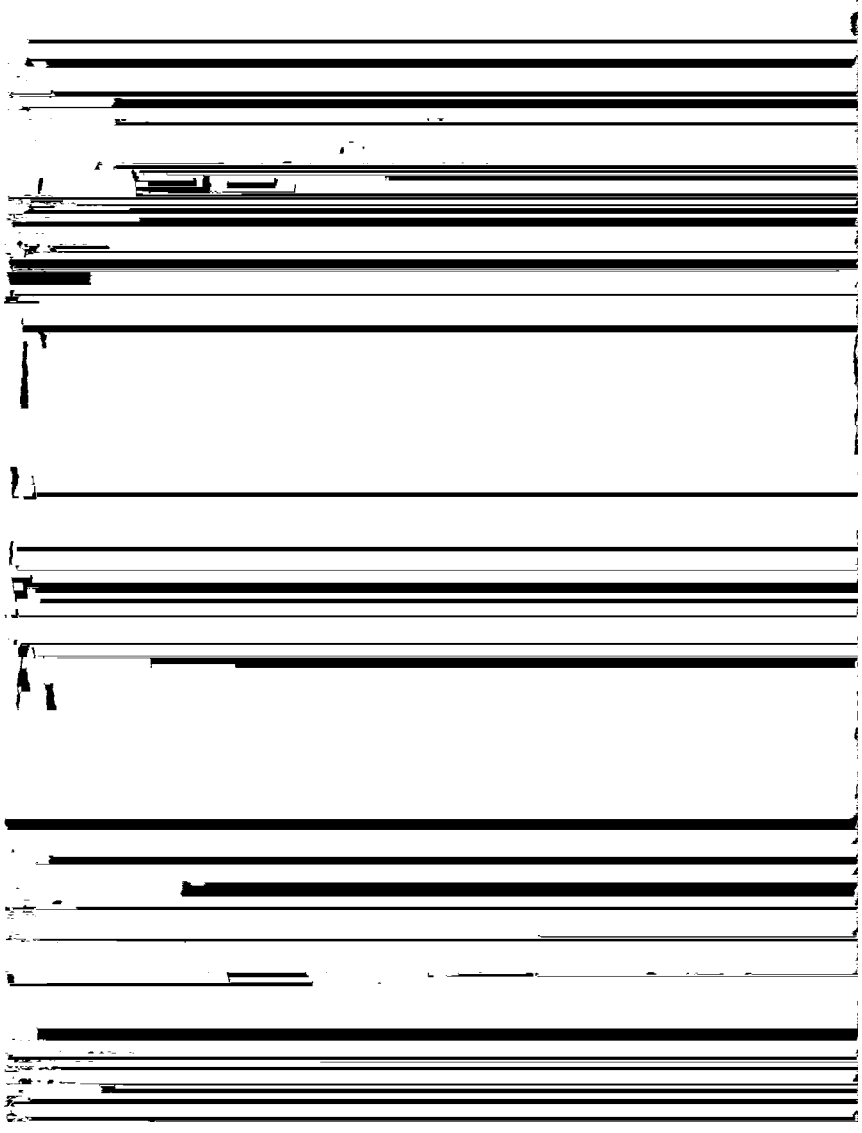
Soil is the product of soil-forming processes acting on materials deposited or accumulated by geologic agencies. The characteristics of the soil at any given point depend on (1) the physical and mineralogical composition of the parent material; (2) the climate under which the soil material has accumulated and existed since accumulation; (3) the plant and animal life on and in the soil; (4) the relief, or lay of the land; and (5) the length of time the forces of soil development have acted on the soil material. The effect of climate on soil development depends not only on such factors as temperature, rainfall, and humidity, but also on the physical characteristics of the soil or soil material and the relief, which in turn strongly influences drainage, aeration, runoff, erosion, and exposure to sun and wind.



ENVIRONMENT AND GENERAL CHARACTERISTICS OF SOILS

The parent material of the soils can be considered in two broad classes: (1) Material residual from the weathering of rock in place, and (2) material transported by water or gravity and laid down as unconsolidated deposits of clay, silt, sand, and larger rock fragments. Material in the first class is related directly to the underlying rocks from which it was derived, and material of the second class, to the soils or rock from which it has washed or fallen.

The residual parent material has its source in residuum weathered from consolidated sedimentary rocks—limestone and cherty limestone;



bring about depend, among other things, on the kinds of life present and the life processes peculiar to each. The kinds of plants and animals living on and in the soil are determined by many factors of environment, including climate, parent material, relief, age of the soil, and other organisms in or on the soil. The influence of climate is most apparent but not always most important in determining the kinds of higher plants that grow on the well-drained, well-developed soils. Because climate does exert this influence on higher plants, it has a powerful indirect influence on the morphology of soils. Climate and vegetation acting together are the two active factors of soil genesis.

At the time of early settlement, an oak-pine-hickory-chestnut forest association covered the well-drained, well-developed red soils. Except for the lack of pine, the association was the same for the gray soils. The density of the stands, the relative proportions of species, and the associated ground cover probably differed. Among the well-drained, well-developed soils of the county, however, few marked differences in morphology are the direct result of differences in the vegetative cover.

The trees that commonly grow in this area feed moderately deep to deep on the plant nutrients in the soil. To a large extent they are deciduous trees. According to species, the leaves differ considerably in their content of various plant nutrients, but in general the leaves of deciduous plants return to the soil a high quantity of bases and phosphorus in comparison with that returned by coniferous trees. In this area the essential plant nutrients are therefore returned to the upper part of the soil from the lower, and the depleting action of percolating waters is retarded.

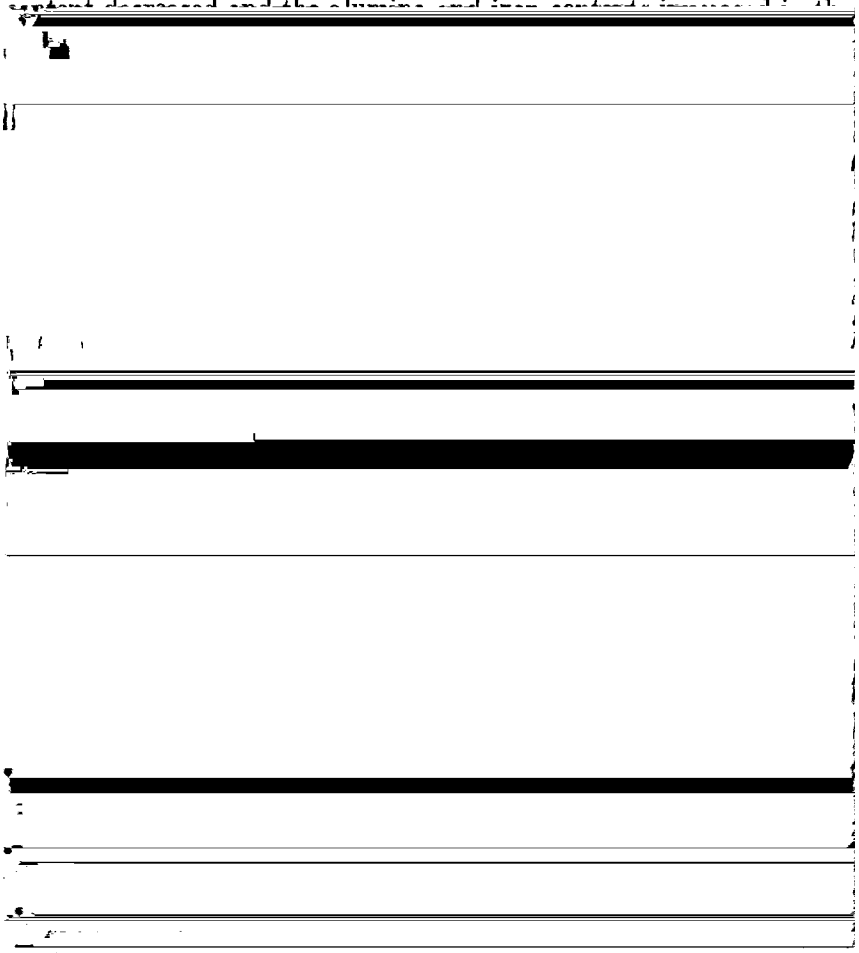
Considerable organic litter is added to the soil in the form of leaves, twigs, roots, and entire plants. Practically all of this is added to the upper soil layers. There it is acted upon by micro-organisms, earthworms, and other forms of life, and changes also occur by direct chemical reactions. Little is known of the micro-organisms, earthworms, and other population of the soil, but their importance in soil development is probably no less than that of the higher plants. Organic material decomposes rather rapidly in this area because temperature and moisture conditions are favorable to the maintenance of the micropopulation. Organic material does not accumulate on well-drained sites in this county to the extent that it does on sites of equally good drainage in cooler regions.

The well-drained, well-developed soils have been formed under relatively similar conditions of climate and vegetation. Climate and vegetation have had the maximum of influence, and there has been a minimum modification by relief and age. As a result, soils developed from various kinds of parent material have many characteristics in common.

In the virgin condition all the well-drained, well-developed soils have on their surfaces a layer of organic debris in varying stages of decomposition. All have dark-colored A_1 horizons and A_2 horizons lighter in color than either the A_1 or B. The B horizon, heavier than the A_1 or A_2, is generally a uniform yellow, brown, or red. Among the different soils, the C horizon is variable in color and texture but is usually light red or yellow mottled with gray or brown.

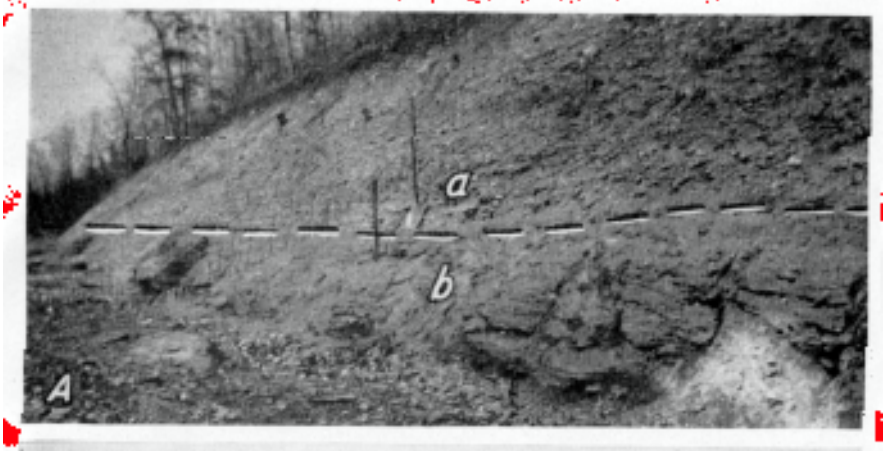
Analyses of soil samples were not included in this survey, but the analyses of a number of comparable soils from Jefferson County, Tenn.,

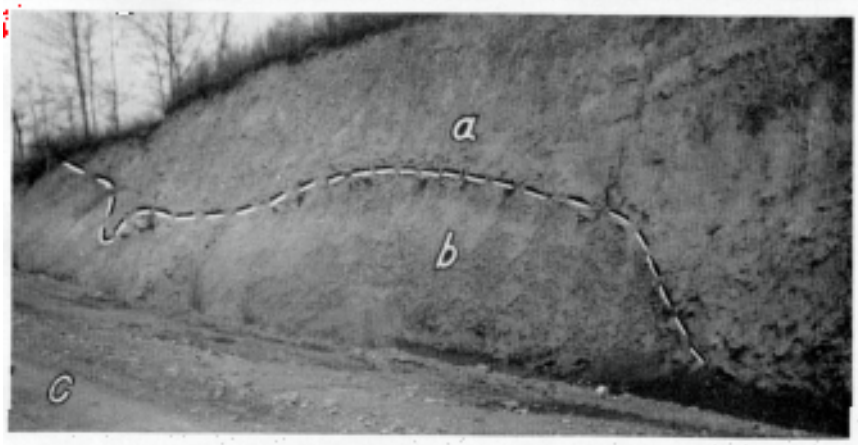
can be expected to apply to these (*13*). In those analyses, the silica



profile with depth. The content of organic matter was moderate in the A_1 horizon, less in the A_2, and very low in the B and C horizons. The soils were low in bases and phosphorus within the solum. In general, the loss on ignition was low, indicating a low content of very tightly held water. The soils were medium, strongly, or very strongly acid throughout. The quantity of silt usually decreased with depth, and from the A_1 horizon through the C the quantities of clay and colloid increased with depth. The colloid content of the B horizon was much higher than that of the A_2 horizon.

The foregoing characteristics are common to the profiles of all well-developed, well-drained soils that have been subjected to similar climate and vegetation. They are therefore common to soils of zonal extent and can be called zonal soils. Zonal soils, members of one of the classes of highest category in soil classification, are defined as any one of the great groups of soils having well-developed soil character-





A, Cut through Bodine cherty silt loam, hilly phase, showing the cherty residuum (*a*) from the Fort Payne chert formation and the massive rock (*b*) of Chattanooga shale along the base of the cut.

B, Severely eroded area of hilly Maury and Mimosa soils in which bedrock has been exposed by accelerated erosion owing to poor management.

C, Cut in Dellrose cherty silt loam, eroded hilly phase, showing the depth of the cherty colluvial material (*a*) over residuum in place and (*b*) from argillaceous limestone.

istics that zonal soils do not have. Such soils are associated geographically with the zonal soils and are called intrazonal (*12*). They are defined as soils with more or less well-developed soil characteristics that reflect the dominating influence of some local factor of relief, parent material, or age over the normal effect of the climate and vegetation (*18*). The characteristics of intrazonal soils in this county are generally those resulting from a level relief, and they have been influenced greatly by the kind of parent material and vegetation.

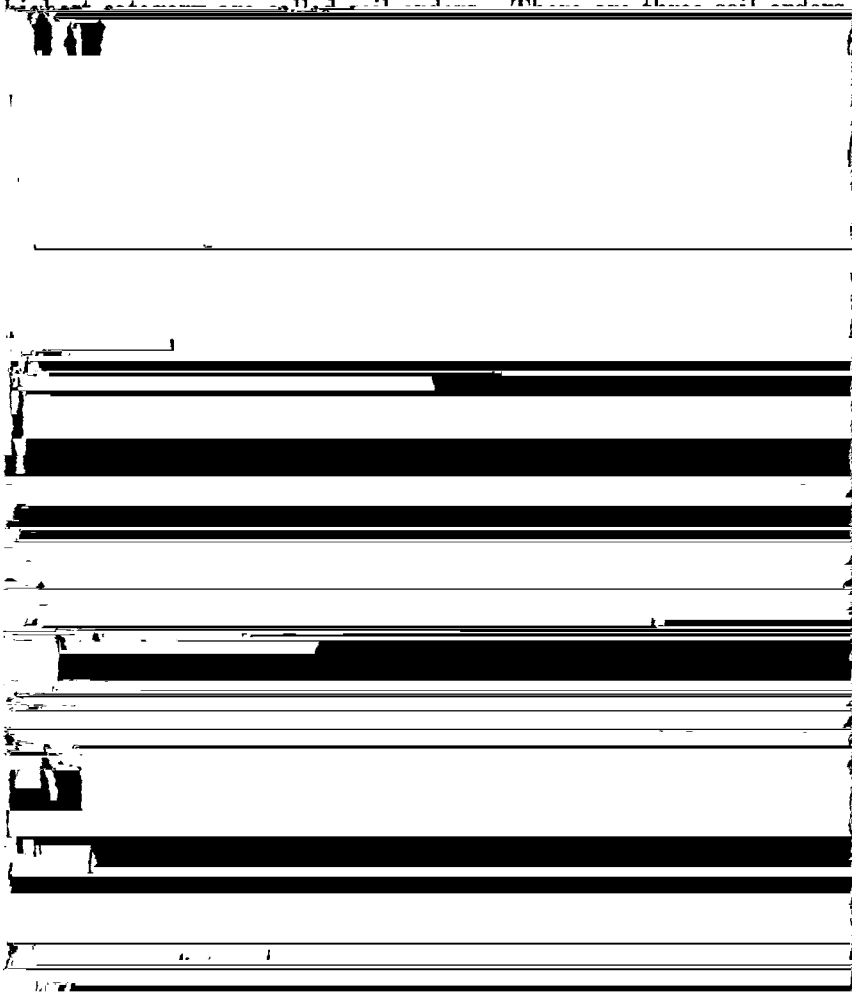
Soils of each of the three broad classes—zonal, azonal, and intrazonal—may be derived from similar kinds of parent material. The major differences among the soils in any one of these classes is closely related to differences in the kinds of parent material from which they have been derived. The soils developed from residual material vary in thickness over the rock from which they have formed. This variation is caused partly by the resistance of the rock to weathering, by the volume of the residue after weathering, and by the rate of geologic

phase, which has the narrowest range of all observable characteristics, both external and internal. It is the unit about which the greatest number of statements can be made most precisely.

A soil type has a wider range in characteristics, and fewer and less specific statements can be made about it than about the soil phases that constitute the type, unless there is only one soil phase in the type.

Soil types having layers, or horizons, similar in such characteristics as color, thickness, and arrangement but different in texture and associated characteristics, as consistence, are grouped in series. In general, differences in texture among soil types of the same series are reflected in all layers, but the types are defined in terms of the texture of the surface layer. Fewer and less specific statements can be made about the soil series as a whole than about any of its types, unless there is only one soil type in the series.

Soil series may be grouped in higher categories. Members of the



Soils of the Baxter series are residual from cherty limestone or limestone interbedded with thin layers of chert. The material from which the soil is derived is relatively high in insoluble matter, particularly silica, which occurs in the form of chert. Generally the quantity of insoluble material in the parent rock increases from the Decatur through the Dewey and Cookeville soils to the Baxter, and the colors of the A and B horizons become lighter in the same progression, those of the Baxter being lightest.

The Baxter soils occur mainly on rolling to steep lands, but some areas have undulating relief. In general the soils occupy areas that break down from broad tracts of the Dickson, where better oxidation has taken place. Judging by the relatively thin layer of Baxter soil over bedrock, the parent material breaks down rather slowly. Erosion is relatively slow in forested areas but rather rapid in cultivated ones.

These soils are developed in a warm-temperate moist climate under a deciduous cover of post, red, and white oaks; elm; sweetgum; hickory; yellow-poplar; dogwood; and other associated trees. The timber growth has been rank on the Decatur and Dewey soils, slightly lighter on the Cookeville and Baxter, and still lighter on the Dickson soils.

The following is a profile description of Baxter cherty silt loam, rolling phase, in a virgin forested area having a slope range of 5 to 12 percent and no apparent erosion.

A_0. 2 to 0 inches, dark brown forest litter underlain by fine granular cherty silt loam.

A_1 A_2. 0 to 10 inches, grayish-brown cherty silt loam; chert present in hard flintlike fragments or porous and very light fragments.

B_1. 10 to 16 inches, yellowish-brown friable silty clay loam; contains many angular chert fragments of various sizes and shapes.

B_2. 16 to 30 inches, bright brownish-yellow very cherty clay loam.

B_3. 30 to 40 inches, yellowish-red very cherty clay loam or silty clay loam.

C. 40 to 48 inches, light brownish-red, mottled with yellow and gray, very cherty clay loam to silty clay loam; more intensely mottled with

TABLE 8.—*Classification of the soil series of Limestone County, Ala., in higher categories, and three factors that have contributed to differences* [1] *in soil morphology*

ZONAL SOILS

Great soil group and series	Relief	Parent material	Time [2]
Red Podzolic:			
Baxter	Undulating to steep	Residuum from weathering of cherty limestone	Medium to long.
Cookeville	Undulating to rolling	Residuum from weathering of mixed high-grade and cherty limestone.	Long.
Cumberland	Nearly level to hilly	Alluvium from limestone, shale, and sandstone	Do.
Decatur	Nearly level to rolling	Residuum from weathering of high-grade limestone.	Do.
Dewey	Nearly level to hilly	do	Do.
Etowah	Nearly level to undulating	Alluvium from limestone, shale, and sandstone	Medium.
Maury	Undulating to hilly	Residuum from weathering of phosphatic limestone.	Long.
Yellow Podzolic:			
Capshaw	Nearly level	Alluvium from limestone, shale, and sandstone	Do.
Dellrose (lithosolic)	Hilly	Colluvium from cherty limestone and overlying phosphatic limestone.	Short to medium.
Greendale	Gently sloping or nearly level	Colluvium from cherty limestone	Do.
Humphreys	Nearly level	Alluvium derived from cherty limestone	Medium.
Mimosa	Gently rolling to hilly	Residuum from weathering of argillaceous limestone.	Do.

Intrazonal Soils			
Planosols:			
Dickson	Nearly level to rolling	Residuum from weathering of cherty limestone	Very long.
Guthrie	Nearly level or slightly depressed	Residuum and local alluvium from limestone and shale.	Do.
Lawrence	Nearly level or depressional	Residuum from weathering of cherty limestone	Do.
Robertsville	Nearly level	Alluvium from limestone and shale	Do.
Sango	do	Residuum from weathering of cherty limestone	Do.
Taft	do	Alluvium from limestone and shale	Do.
Wolftever	do	do	Long.
Rendzina:			
Hollywood	do	Local alluvium from weathering of argillaceous limestone.	Short.
Azonal Soils			
Lithosols: [3]			
Bodine	Hilly and steep	Residuum from weathering of cherty limestone	Short to medium.
Alluvial:			
Abernathy	Nearly level or slightly depressed	Local alluvium from limestone	Very short.
Bruno	Nearly level	Alluvium from sandstone and to some extent from limestone.	Do.
Egam	do	Alluvium chiefly from limestone	Do.
Ennis	do	Alluvium from cherty limestone	Short.
Huntington	do	Alluvium chiefly from limestone	Very short.
Lindside	do	do	Do.
Ooltewah	Nearly level or slightly depressed	Local alluvium from limestone	Do.
With glei layer:			
Melvin	Nearly level	Alluvium from high-grade limestone and cherty limestone.	Very short to medium.

[1] Two factors, climate and vegetation, are relatively uniform throughout the county and therefore cannot account for the broad differences in the soils.

[2] The relative length of time that the material appears to have been in place, as manifested by the degree of profile development.

[3] Two miscellaneous land types—Limestone rockland and Rough gullied land (Decatur, Dewey, and Cumberland soil materials)—are also classified as Lithosols.

The following profile description of Cookeville silt loam, undulating phase, is in a virgin forested area having a slope range of 2.5 to 5 percent and no apparent erosion.

A_0. 1 to 0 inch, dark grayish-brown silt loam; contains a large quantity of organic litter and only a small quantity of mineral matter; apparently material has not been burned in many years.

A_1. 0 to 5 inches, grayish-brown friable to mellow silt loam; contains many small roots and root and insect holes; very gradual transition to layer below.

A_2. 5 to 11 inches, yellowish-brown friable silt loam with slightly reddish-brown feathering; crumb to nutlike structure; numerous root and insect holes stained by organic material from overlying layers; many medium-sized roots.

B_1. 11 to 20 inches, brownish- to reddish-yellow heavy silt loam with crumb structure; some pores caused by roots and insects through which some organic stains have filtered from above; material easily spaded.

B_2. 20 to 24 inches, light yellowish-red silty clay loam; contains some reddish soft rock fragments and a few small chert fragments; material is compact but shows crumb structure when broken; fewer roots in this layer than in those above.

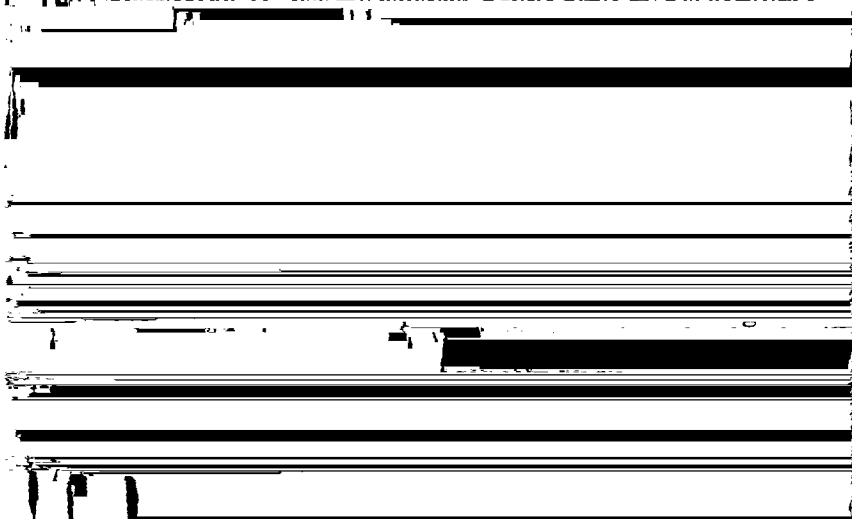
B_3. 24 to 28 inches, yellowish-red silty clay compact in place; nut to crumb structure when spaded; contains a few small chert fragments, a few live roots, and some root holes; faint yellow mottling in lower part.

C_1. 28 to 38 inches, compact and mottled yellowish-red, gray, and yellowish silty clay loam; appears to be a layer of hardpan; contains small chert fragments and only a few roots and worm holes; difficult to dig when dry but when dug breaks into irregular fragments.

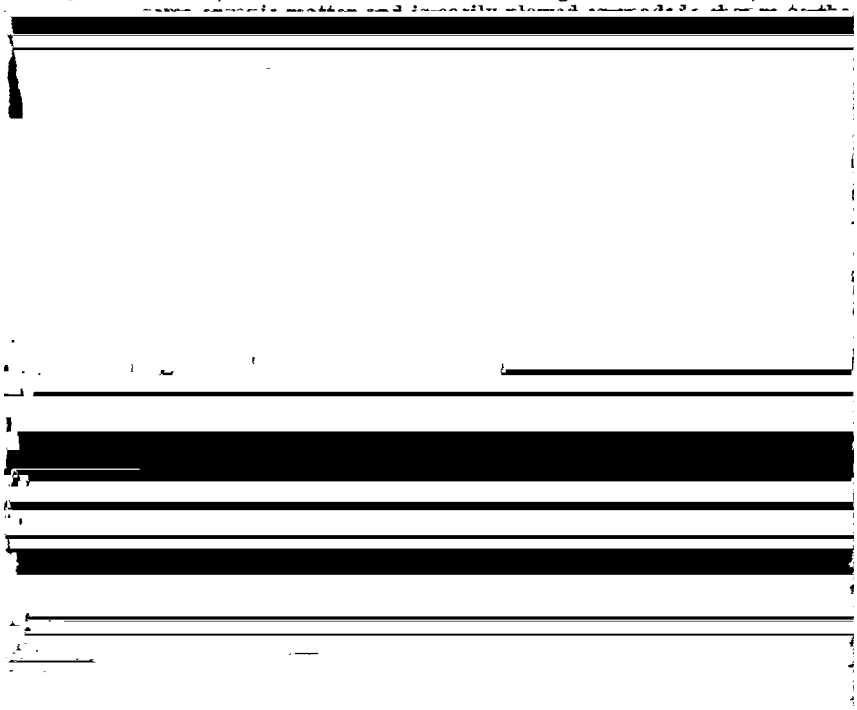
C_2. 38 to 66 inches +, brownish-red silty clay mottled in some places but free of mottling in others; material packed in places but not so much as that of layer above; breaks into fragments when dug out; some small chert fragments are in nearly all parts.

The profile just described is slightly deeper than it is in some places. The soil is strongly acid in all layers except the uppermost, which is medium acid. Undisturbed soil in forested areas generally has a 1- to 2-inch covering of forest litter.

The Cumberland are well-developed Red-Podzolic soils or high to-



A_2. 0 to 5 inches, brown to reddish-brown friable granular silt loam; contains



layer below is rather abrupt, as this one extends to plow depth.

A_3. 5 to 8 inches, reddish-brown to brown friable silt loam; darker in some spots, lighter in others; contains some sand and a few dark-brown ironlike concretions; some root and insect holes and roots present.

B_1. 8 to 15 inches, reddish-brown silt loam; slightly heavier than the layer above; contains a few sand particles, some fine mica flakes, water-worn gravel, ironlike concretions, and many pores caused by penetration of roots and insects; breaks into rather large fragments that crush to particles of medium-crumb size.

B_2. 15 to 21 inches, yellowish-red friable silt loam; less brown and more red than the layer above; contains many fine mica fragments, some fine sand, and an occasional water-worn piece of gravel; breaks into nutlike particles easily crushed to a crumbly mass; transition is gradual from layer above and to layer below.

B_3. 21 to 39 inches, red to slightly yellowish-red friable and firm silt loam to silty clay loam; contains a few purplish-red splotches, fine sand and mica particles, and many pores; granular to crumblike in structure and not difficult to spade.

C_1. 39 to 66 inches, bright-red friable silty clay loam slightly tinged with yellow; firm in place but fine sand and mica particles present tend to make spading easy; contains some small concretions and purplish rock fragments; lumps of material readily crushed to a granular mass.

In virgin areas a layer of forest litter ½ to 1 inch thick covers the surface, and the A_1 layer is 2 to 4 inches thick. The soil is medium acid in all parts of the profile when it occurs in such forested areas.

Soils of the Decatur series are characterized by their red subsoil horizons. The soil is friable when broken up but relatively tight in

C. 40 to 60 inches, more nearly yellowish-red silty clay loam than layer above; contains some grit and fine chert fragments in lower part; breaks into small fragments when dry.

Soils of the Dewey series are developed from the residuum of limestone higher in content of some insoluble materials, particularly silica, than is the rock underlying soils in the Maury or like series. On the average these soils are possibly less thick over bedrock than the Decatur. Thickness over bedrock varies from place to place in both soils, but variation is possibly greater in this series. As with the Decatur, the soil is developed under a deciduous to somewhat mixed forest vegetation and a warm-temperate moist climate, but it is somewhat lighter in texture and color and not so firm or compact in the subsoil. Before the land was cleared, the forest included red, black, Spanish, and white oaks; hickory; dogwood; sweetgum; other hardwoods; and, in places, some pine. Soils of this series are strongly acid throughout the profile.

The profile is rather deep compared to that in some other areas. The following is a profile description of Dewey silt loam, slightly eroded undulating phase, in a cultivated field:

A_2. 0 to 6 inches, brown to light-brown mellow silt loam; contains some organic matter and occasionally a chert fragment; rather abrupt change to lower layer, partly because this is at the plow depth.

A_3. 6 to 11 inches, brown to light reddish-brown friable silt loam to silty clay loam streaked with darker brown; material crushes to granular mass when fairly dry; occasional chert fragments; very gradual change to layer below.

B_1. 11 to 27 inches, yellowish-red heavy silt loam to silty clay loam; a few pores, fine roots, and worm holes appear; material crushes readily to a granular mass; some darker streaks and stains and fine roots extend down from layer above; not difficult to spade.

B_2. 27 to 37 inches, yellowish-red silty clay loam that breaks into angular fragments; material lightly compacted in place; hard when dry; a few pores and some dark stains on surface of fragments; gradual change to lower layer.

B_3. 37 to 42 inches, yellowish-red silty clay loam to silty clay; material compact and hard and breaks into fragments when spaded; contains an occasional chert fragment; rather abrupt change to layer below.

C_1. 42 to 52 inches, dark-red to slightly lighter red silty clay slightly feathered with gray; material tight in place but falls apart into angular fragments when broken loose; contains some chert fragments.

C. [illegible]

redcedar, sycamore, redbud, and numerous shrubs like huckleberry. The climate is warm-temperate and moist. In many characteristics, particularly color, the more nearly mature soils of this series resemble the Dewey, but they generally have a more friable subsoil.

The profile description following is that of Etowah silt loam, level phase, in a lightly forested newly prepared pasture area that had apparently received an application of some form of limestone a short time previous to examination.

A_1. 0 to 2 inches, grayish dark-brown mellow silt loam; contains many roots, stems, and leaves in all stages of decay; easily spaded and grades rather sharply into layer below.

A_2. 2 to 10 inches, brown to grayish-brown mellow silt loam; contains some organic stains from layer above and many live roots and root and insect holes; crushes easily to a granular-crumb mass when moderately moist and spades easily.

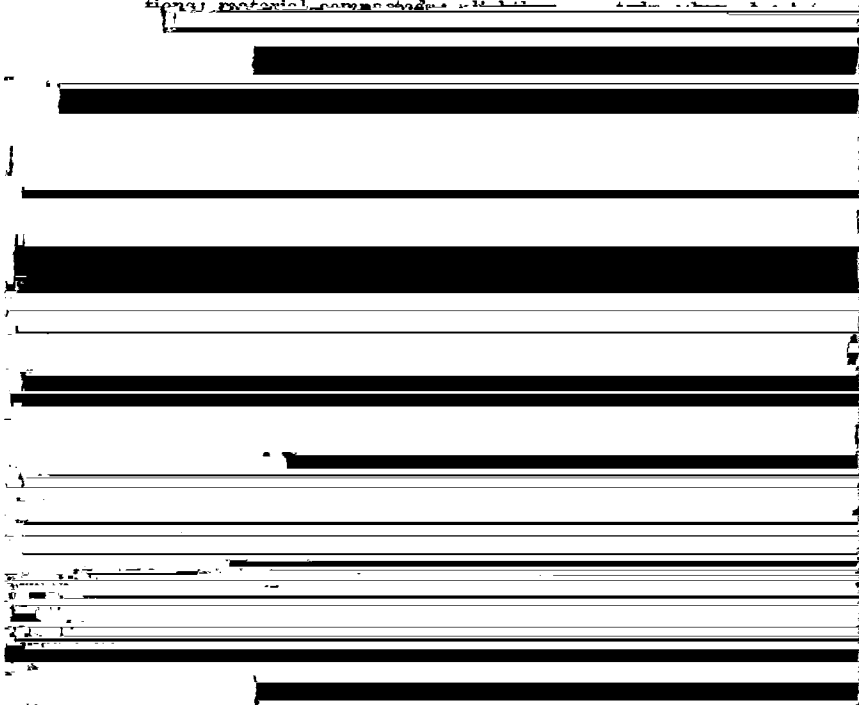
B_1. 10 to 23 inches, yellowish-red or yellowish-brown friable and granular silt loam; stained slightly with organic material from the overlying layer; roots, root holes, and insect holes not so numerous as in layer above.

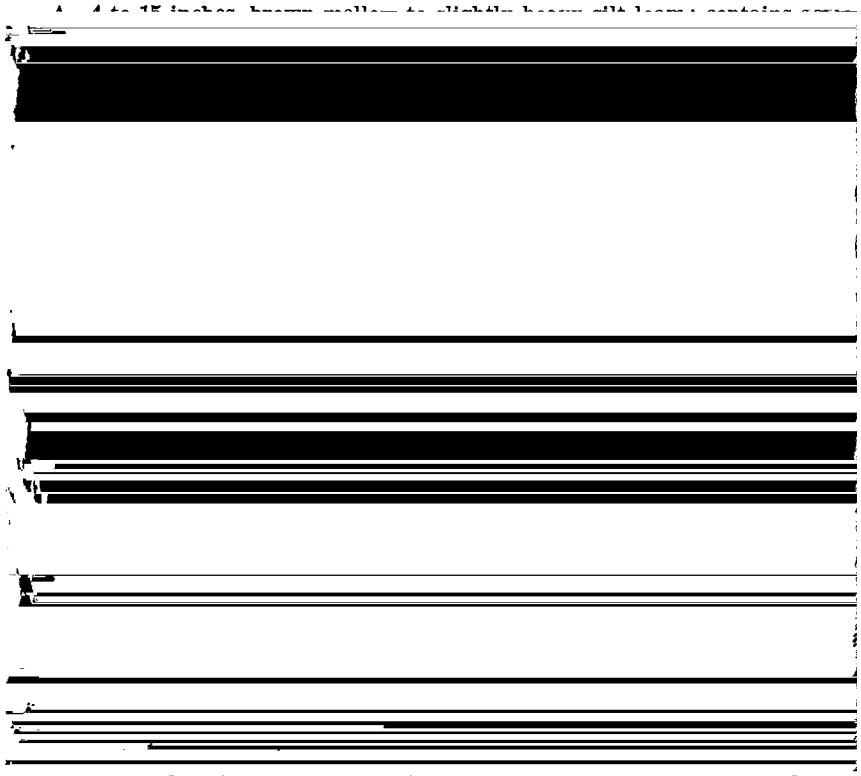
B_2. 23 to 32 inches, yellowish-red to yellowish-brown silt loam to silty clay loam; lightly compacted in place; easily spaded and falls into fragments; few roots or root and insect holes.

B_3. 32 to 41 inches, reddish-yellow lightly compacted silty clay loam; slightly sticky when wet; some pores but few live roots at this depth; a few brown ironlike concretions are present.

C_1. 41 to 52 inches, light reddish-yellow or brownish-yellow lightly compacted silty clay loam; spades easily and falls into a fragmentary mass; some feathering or mottling of gray in lower part; very gradual change to material below.

C_2. 52 inches +, silty clay loam to clay loam very mottled with dark brown, grayish yellow, and rust brown; contains some soft ironlike concre-





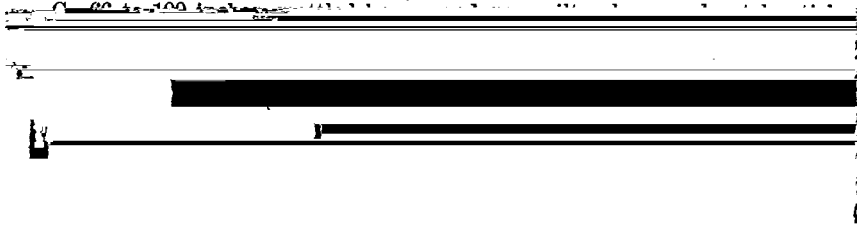
rodent holes through which dark organic matter has come down; material clings to spade when slightly wet but spading is not difficult; material becomes grayer on drying.

B_1. 15 to 28 inches, yellowish-brown compact silt loam containing a few small rocks weakly cemented in place; structure, mixed fragmentary and nut; material easily crushed to granular mass when moist but becomes hard when dry; layer contains some dark streaks like those made by manganese, a few roots, some grayish spots, and thin sand lenses.

B_2. 28 to 40 inches, yellowish-brown friable silt loam weakly compacted in place; contains a few dark-brown streaks, an occasional root, and a small quantity of fine sand in form of thin lenses; crumblike structure; material crushes to granules when moist; only an occasional rock fragment is present and spading is easy.

B_3. 40 to 54 inches, brownish-yellow silty clay loam of fragmentary structure; contains a few rock fragments; not difficult to spade.

C_1. 54 to 66 inches, mottled brown, yellowish, and gray silty clay loam; moderately sticky when wet; mixed mass has a color slightly lighter than that of layer above; a few sand lenses occur.



A_2. 0 to 7 inches, grayish-brown granular fine sandy loam; contains many fine roots and is exceptionally easy to plow or spade.

[redacted]

chert fragments; fairly sharp but regular change to layer below.

B_1. 12 to 20 inches, brownish-yellow friable fine sandy clay; contains chert fragments up to 1 inch thick and many worm holes; some dark streaks caused by material coming from above; easily spaded; no uniform transition to underlying layer.

B_2. 20 to 35 inches, pale-yellow fairly friable clay loam; sticky when wet; compact; contains small chert fragments; falls to a fragmentary to granular mass when spaded out; irregular gradation to the layer below.

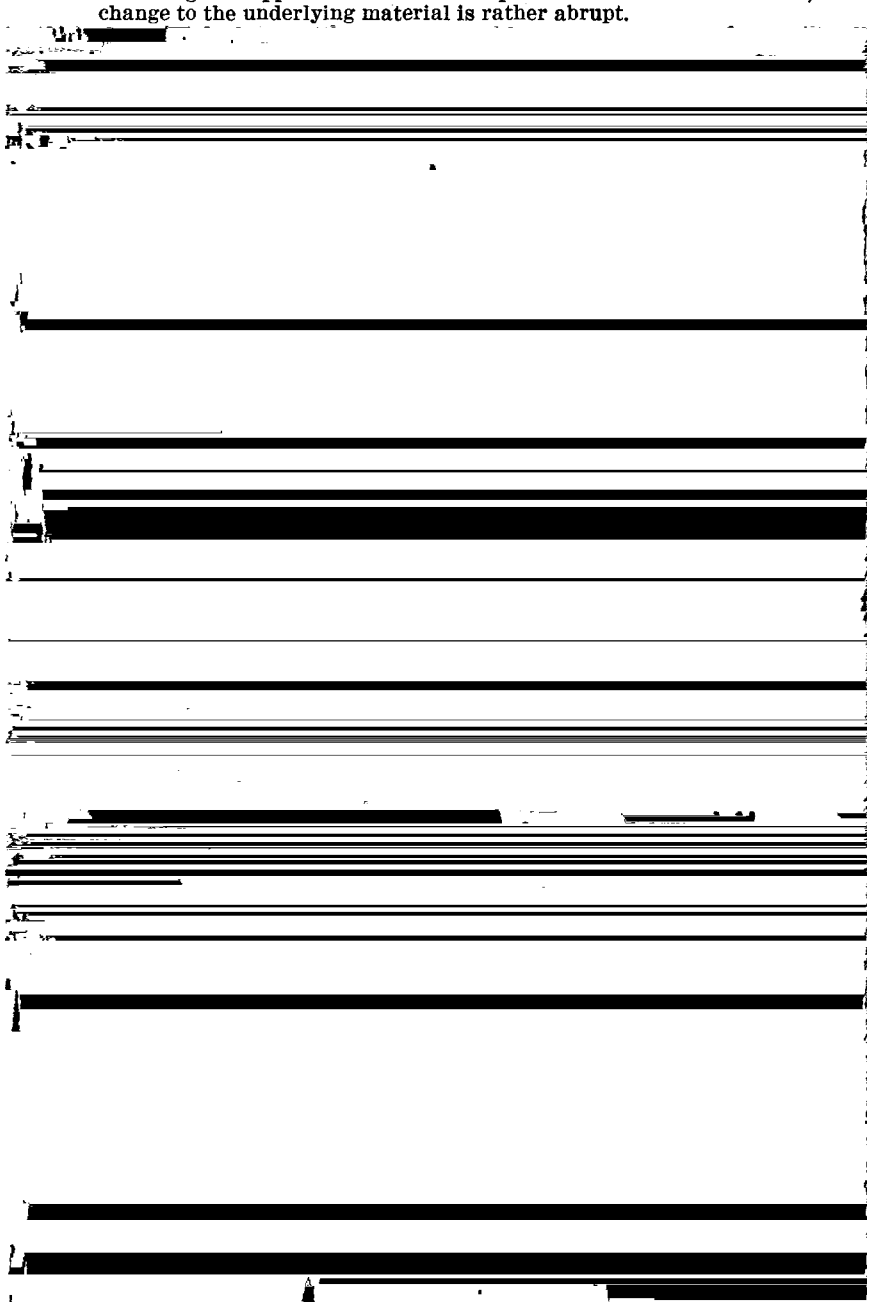
B_3. 35 to 44 inches, mottled gray, yellow, and brown silty clay loam; contains worm holes and some small chert fragments; material is a little more compacted than the overlying layer and yellower than the one below.

C_1. 44 to 51 inches, highly mottled gray, rust-brown, and orange compact silty clay loam; falls to fragments when spaded; contains insect

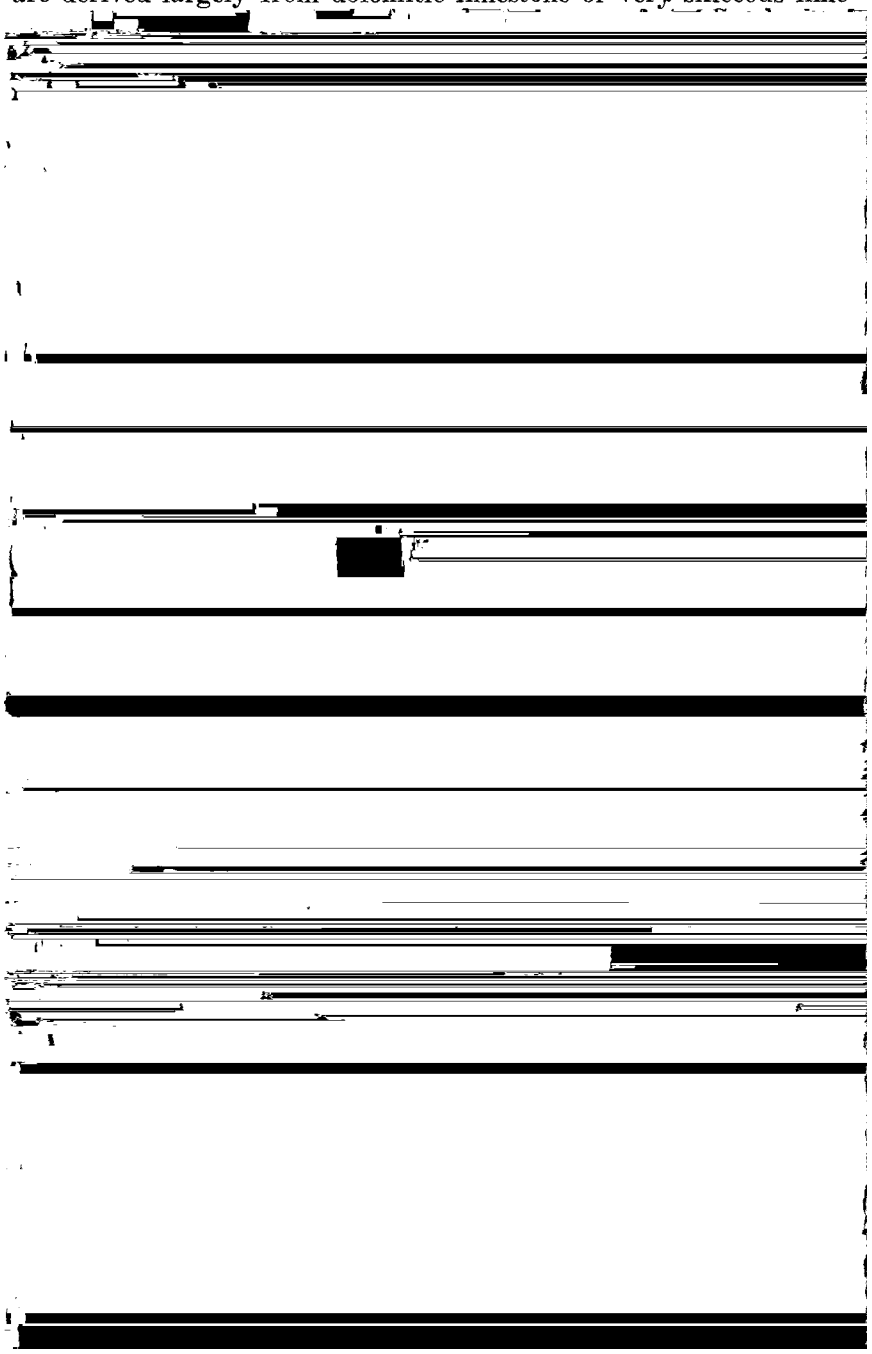
[redacted]

B_3. 24 to 36 inches, brownish-yellow somewhat mottled moderately friable cherty silty clay loam; slightly hard when dry; gradual transition to underlying layer.

C_1. 36 to 48 inches, mottled yellow, orange, and yellowish-gray silty clay loam; contains many pieces of chert; breaks into irregular fragments; when dug this appears to be the lower part of the colluvial material; the change to the underlying material is rather abrupt.



Dickson, Bodine, and the less-red Baxter soils. They are developed from material washed mainly from soils of the Highland Rim, which are derived largely from dolomitic limestone or very siliceous lime-



other trees appeared. This tree is now confined mainly to the areas of soil having a more shallow profile.

Areas for sampling are somewhat limited. The following profile was taken from a cotton field that had been in crops for several years:

A_1. 0 to 5 inches, grayish-brown to yellowish-brown friable cherty silt loam; contains many chert fragments up to 5 inches thick that probably tend to retard erosion.

A_2. 5 to 12 inches, dark yellowish-brown mellow cherty silty clay loam; contains sufficient chert to make spading difficult; gradual transition to underlying layer.

B. 12 to 18 inches, yellowish-brown cherty silty clay loam; slightly sticky when wet.

C_1. 18 to 24 inches, mottled light brown, yellow, and gray tough and plastic cherty silty clay; less chert than in layers above.

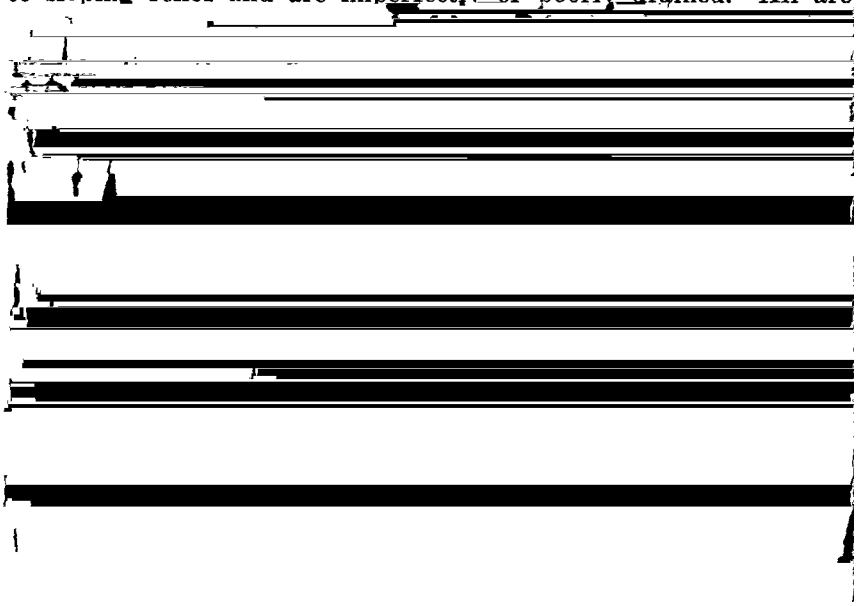
C_2. 24 to 56 inches, highly mottled yellow and brown very tough and plastic clay; contains a few dark-brown soft concretions but very little chert; yellow mottling decreases and brown motting increases with depth.

In forested areas there is generally a ½- to 2-inch layer of decaying leaves, stems, grass, and roots. All the phases and types of Mimosa soil mapped are cherty.

PLANOSOLS

Planosols are an intrazonal group of soils with eluviated surface horizons underlain by B horizons more strongly illuviated, cemented, or compacted than associated normal soils. These soils have developed upon nearly flat upland surface under grass or forest vegetation in a humid or subhumid climate (*18*).

Seven of the soil series in the county have been designated as Planosols—the Dickson, Guthrie, Lawrence, Robertsville, Sango, Taft, and Wolftever. The Wolftever and Guthrie soils are less definitely Planosols than the others. All these soils have level or depressional to sloping relief and are imperfectly or poorly drained. All are

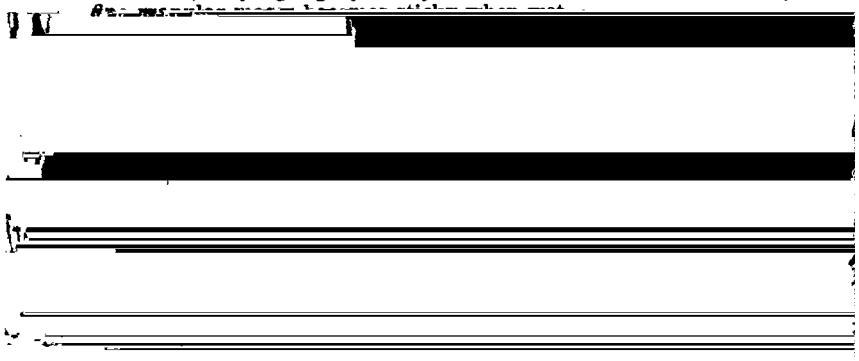


source of the parent material. External drainage is fair to good, but the siltpan hinders the movement of the soil moisture. Internal drainage is sufficient for most of the ordinary shallow-rooted crops but might prove somewhat deficient for alfalfa or similar deep-rooted crops.

These soils have developed in a warm-temperate moist climate. The forest cover consisted of thin stands of moderate-sized deciduous trees, as post, red, black, and white oaks; hickory; and possibly some pine. The underbrush has always been rather thin and stunted. The parent material is very much like that of the Baxter series, but the soils differ in several respects. Probably the siltpan in these soils results in part from their more level topography and attendant changes in the internal

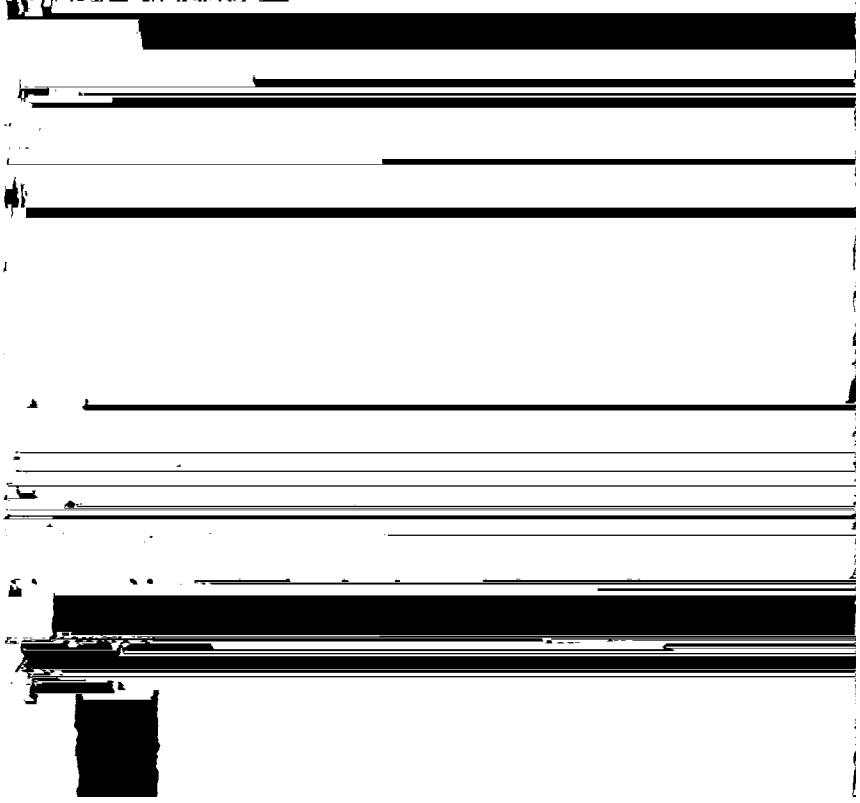
0 to 6 inches, light-gray mellow to mealylike silt loam mottled with yellowish streaks; crumb to granular structure.

6 to 14 inches, very light-gray mealylike silt loam that crushes readily to a



14 inches +, mottled gray, brownish-yellow, and yellowish-brown heavy clay loam to clay; very sticky when wet and very hard when dry.

The Lawrence series, represented in this county by Lawrence silt loam, occupies level to flat areas that have slow surface runoff and impeded internal drainage. Lawrence silt loam occurs in association with the Sango and Guthrie soils and is intermediate between the two in position on the land and in natural drainage. This series is a



to strongly acid; if cherty limestone is the source of the material, the reaction is strongly acid in all layers.

The Robertsville silt loam profile description that follows was taken from an area that very recently had been cleared and burned over. The material apparently was washed from both high-grade and cherty limestone.

A_1. 0 to ½ inch, gray to dark-gray silt loam that changes to a very light gray after a few years of tillage.

A_2. ½ to 12 inches, gray silt loam mottled with yellow and rust brown; contains a few chert fragments and nearly all the roots that occur in the profile.

B_2. 12 to 20 inches, mottled gray, yellow, and brown silty clay loam; contains a few chert fragments; tongues of dark-brown material reach upward into layer and in wet seasons crawfish are usually present.

B_3. 20 to 26 inches, highly mottled brown, yellow, and gray silty clay; material compact and hard but falls into fragments of various sizes and shapes when dug out; contains cemented ironlike concretions.

C. 26 inches+, gray very hard and cemented material lightly mottled with yellow and rust brown; contains many chert fragments and much ironlike cementation; spading almost impossible in some places but not extremely difficult in others.

The level or flat Sango soil is closely associated with the Dickson soils and is apparently from the same parent material. It differs from the Dickson in its lack of slope sufficient to permit good drainage and in having developed a siltpan closer to the surface. The soil has been developed under the same climatic conditions as the Dickson, but it is not so highly developed morphologically. It occupies positions between the Dickson and Lawrence soils.

Available plant nutrients are low. The timber cover apparently was a thin growth of rather small deciduous trees, as post, white, and red oaks; hickory; sweetgum; blackgum; and possibly a few willow or similar lowland trees. Very few of these trees reached sawtimber size.

The following profile of Sango silt loam was taken from a cut in a virgin forest where forest fires have been frequent and severe. In this profile, the surface layer is medium acid; to a depth of 33 inches, the other layers are strongly acid; and below 33 inches, medium acid.

A_1. 0 to 1 inch, dark grayish-brown silt loam; contains some organic matter and organic stains and many live roots.

A_2. 1 to 3 inches, light-gray friable silt loam; contains some chert fragments and brownish concretions; material slightly porous and of crumb structure; gradual transition to underlying layer.

A_3. 3 to 15 inches, yellowish-gray silty clay loam; sticky when wet but friable when dry; penetrated by many roots; spades into nutlike fragments that readily crush to fine granules; abrupt change to the lower layer.

B_1. 15 to 20 inches, mottled yellow, orange, and gray silty clay loam; contains small chert fragments; firm in place; rather sharp change to underlying layer.

B_2. 20 to 33 inches, highly mottled gray, yellow, and light-brown silty clay; compact and hard; contains many brown ironlike concretions; sharp transition to layer below.

C_1. 33 to 47 inches, mottled yellow, gray, and rusty-brown material containing some concretions and chert fragments and spots of clay and silt; material weakly cemented and becomes hard when dry.

C_2. 47 inches +, mottled yellowish-gray and rusty-brown material heavier than that in overlying layer; contains chert fragments and

The Taft soil occupies low or slightly depressional positions on terraces and is derived from limestone material similar to that giving rise to the Etowah and Wolftever soils. The general type of vegetative cover, relief, and climate are relatively similar for all three of these series, but internal drainage is slower in the Taft than in either of the other two. This soil has developed a heavy compact layer to a greater degree than the Wolftever series, and internal drainage is correspondingly slower.

The following profile description is of Taft silt loam under a forest cover including hickory, sweetgum, loblolly pine, and red, post, and water oaks. The pine had been cut recently for saw timber, and the area was heavily burned over.

A_1. 0 to 1 inch, dark grayish-brown silt loam mixed with leafmold and other organic materials; a few small chert fragments are scattered over the surface.

A_2. 1 to 5 inches, light brownish-gray silt loam slightly tinged with yellow in lower part; contains small chert fragments; has crumb structure and can be crushed to a granular mass.

A_3. 5 to 17 inches, pale-yellow or grayish-yellow friable silty clay loam having a crumb structure; contains some small chert fragments and in the lower part some faint splotches of gray and orange.

$B_{1\,2}$. 17 to 26 inches, mottled gray, rust-brown, and yellow silty clay loam to clay loam; contains some chert fragments and a few soft concretions that are apparently in the first stage of formation; material is tight but falls into fragments when spaded; rather abrupt transition to underlying layer.

$B_3\,C_1$. 26 to 42 inches, bluish-gray silty clay mottled with rust brown and yellow; material laminated, compact, and tight; breaks into irregular fragments; contains some chert fragments and a few weak concretions that are in process of formation; a heavy concentration of concretionary material similar to a bog-iron formation is in some places.

C. 42 to 52 inches, highly mottled yellowish-gray and rust-brown clay; contains pockets of heavy clay material; yellow mottlings tend to be slightly stronger yellow than those in overlying layer.

As determined with a quick test, using a single indicator, the surface layer of the profile just described is medium acid, but all the others are strongly acid. In cultivated land the A_1 layer is very light gray instead of the grayish brown common to forested areas.

The Wolftever soil occupies low-lying terraces and is closely associated with the Huntington and Egam soils on the first bottoms, in places being at a level only slightly higher than the Huntington. It is formed from alluvial material washed mainly from lands underlain by limestone, but to a lesser extent from shale and other rock. This material has been laid down comparatively recently but is considered rather old morphologically. The relief is nearly level to sloping, and external drainage is generally fair. Internal drainage is impeded by a compact layer in the subsoil but is generally adequate for [illegible]

The following profile description is of Wolftever silt loam planted to cotton, corn, and other common field crops for many years:

$A_{1\,2}$. 0 to 7 inches, grayish-brown or light yellowish-brown mellow and granular silt loam containing an occasional chert fragment.

A_2. 7 to 16 inches, yellowish-brown silt loam to heavy silt loam of crumb structure; material slightly packed and porous but spades out easily; gradual transition to layer below.

B_1. 16 to 28 inches, pale-brown or light yellowish-brown porous silty clay loam that falls into fragments; contains some small pieces of chert and brown concretions; concretions are disrupted when material is spaded and cause brown streaks or markings on the spaded surface; discoloring caused by concretion is very pronounced on nearly all cut surfaces.

B_2. 28 to 38 inches, pale-brown or light yellowish-brown silty clay loam with streaks of gray—the outstanding or characteristic layer in the Wolftever soil; very tight and compact but porous because of many root and insect holes; contains many soft ironlike concretions.

B_3. 38 to 53 inches, mottled yellowish-brown, gray, and dark-brown silty clay loam; porous and compact but falls into fragments when spaded; spaded fragments coated with gray to whitish material.

C. 53 inches +, mottled light-gray, brown, and yellow silty clay; hard and compact, but breaks into fragments, some coated with whitish material and others brownish on the inside; contains a few insect holes.

In forested areas there is generally a layer up to 1½ inches thick of decaying leaves, branches, roots, and other organic material. The upper 16 inches of the profile just described is apparently medium acid, and the rest, strongly acid.

RENDZINA SOILS

Rendzina soils are an intrazonal group of soils, usually with brown or black friable surface horizons underlain by light-gray or yellowish calcareous material. They have developed under grass vegetation or mixed grasses and forest in humid and semiarid regions from relatively soft, highly calcareous parent material (*18*). The soil-development process is calcification.

Hollywood silty clay, level phase, is the only Rendzina soil mapped in the county. It is imperfectly to poorly drained and has developed from local alluvium and colluvium. It occupies gently sloping, nearly level, or slightly depressional positions at the base of stony land or limestone outcrop areas and is affected by seepage water. When rain water falls on the higher stony lands or areas of limestone outcrop, it may spread over the adjacent areas of this soil and deposit a small quantity of freshly disintegrated limestone. The concentration of organic matter is relatively high in the mucky or peaty uppermost layer.

The following profile, neutral in reaction in all layers, is of Hollywood silty clay, level phase, in a cleared field that had been in crops for several years.

0 to 7 inches, dark grayish-brown silty clay loam; very sticky when wet; contains some small chert and limestone fragments; organic content is apparently rather high.

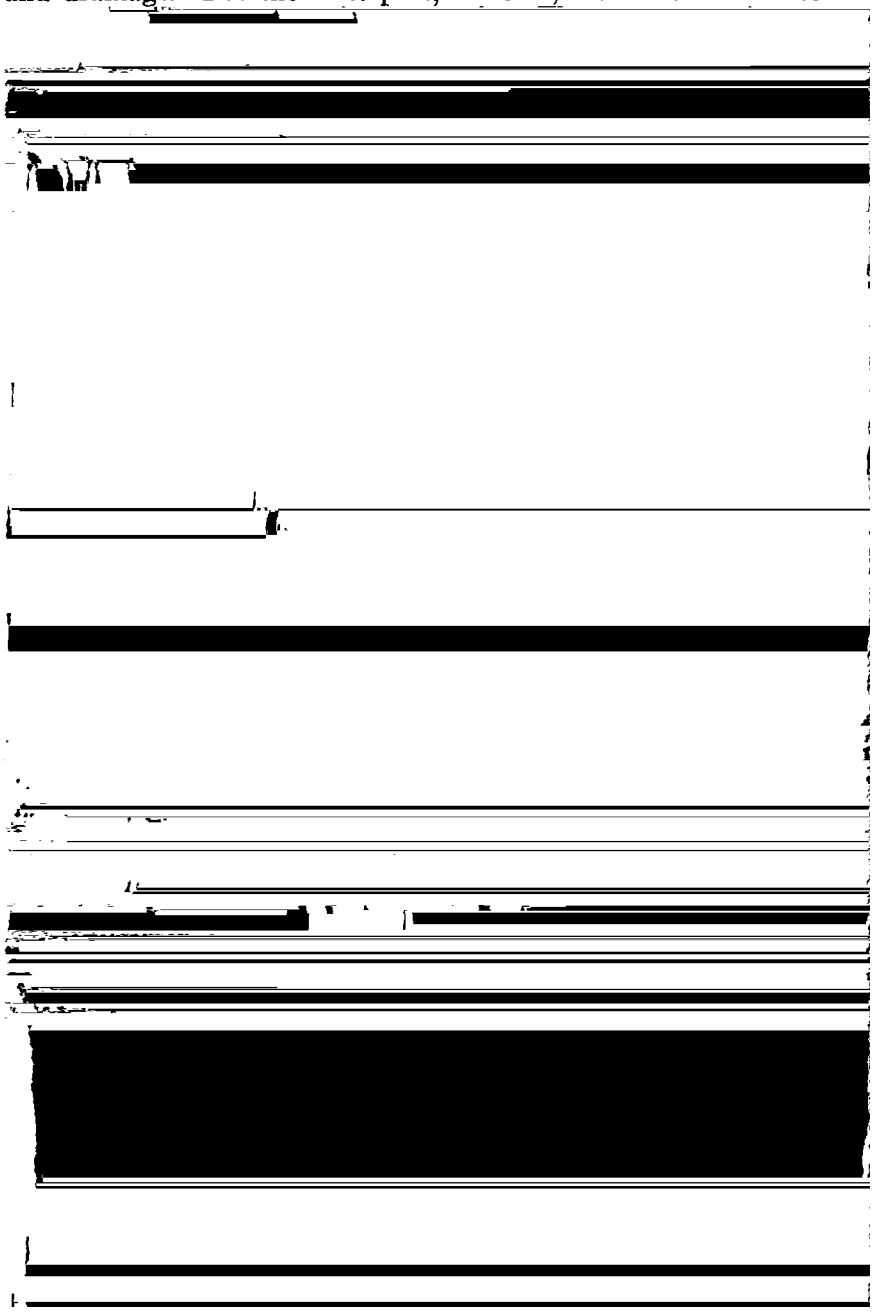
7 to 20 inches, very dark-gray to black clay of fragmentary structure; tough and plastic when wet.

20 to 26 inches, light-gray to gray mottled steel-gray, yellow, and brown clay; very sticky and plastic when wet and hard when dry; contains many small rock fragments that are brown on a cut surface.

26 inches +, highly mottled gray, yellow, and brown clay; very hard when dry; contains a few small rock fragments.

LITHOSOLS

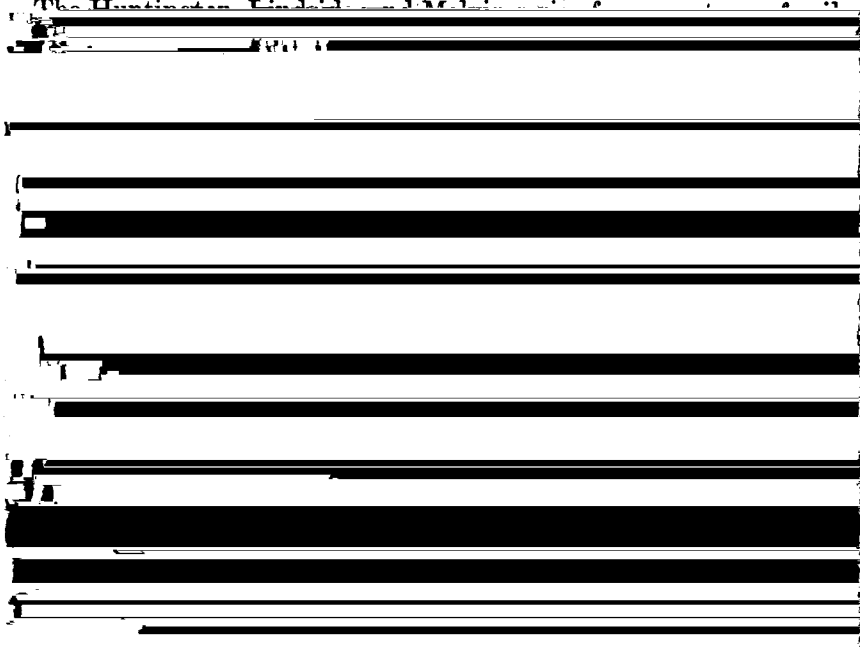
Lithosols include miscellaneous intrazonal and azonal soils varying greatly in character and degree of soil development, nature and depth of soil and soil material, and in external features of relief, stoniness, and drainage. For the most part, however, these are shallow soils



ordinarily associated with good, imperfect, or poor drainage. Collectively, the soils with these three degrees of drainage constitute a soil catena. A soil catena is defined as a group of soils within one zonal region developed from similar parent material but differing in characteristics of the solum, owing to differences in relief or drainage (*18*). To bring out relations among the alluvial soils of the county, they are discussed according to their catenary positions.

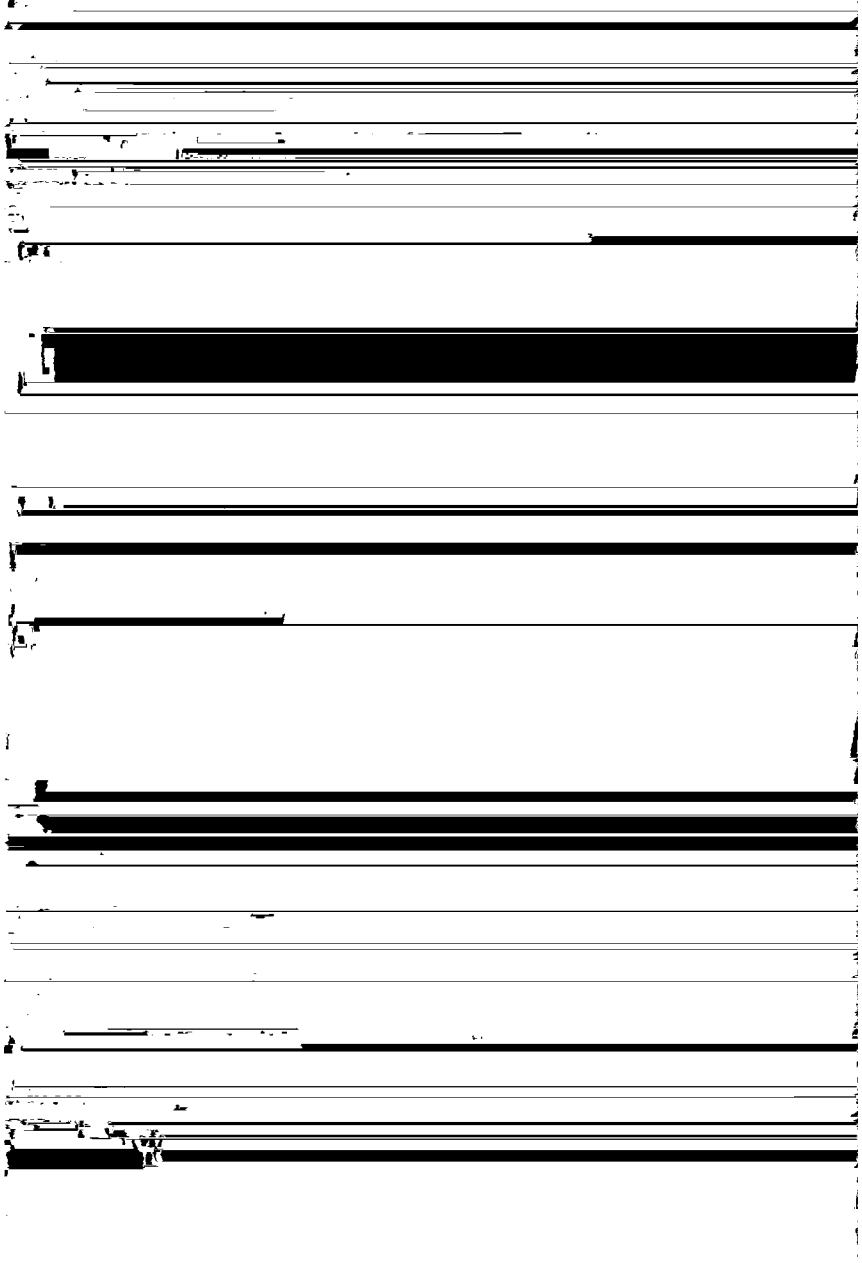
The soils of the Abernathy and Ooltewah series are well drained and imperfectly drained members, respectively, of a catena whose soils are derived from local alluvium washed mainly from soils underlain by limestone. The Abernathy is somewhat comparable with the Huntington, and the Ooltewah with the Lindside, but both differ in being derived from local rather than general alluvium. They are commonly not underlain by strata of sand and gravel, as are the Huntington and Lindside soils, and they are generally slightly more acid. External drainage is slow on both the Abernathy and Ooltewah soils, and most of the internal drainage is through cracks and crevices in the underlying limestone bedrock. Through Abernathy soils, internal drainage is rapid to medium rapid, but it is somewhat impeded in the Ooltewah.

Abernathy silt loam, level phase, is young and medium to strongly acid. It is dark reddish-brown to brown mellow silt loam to a depth of 32 inches or more. Ooltewah silt loam is generally reddish-brown mellow silt loam to a depth of 10 to 15 inches, but below that depth it is brownish-gray silt loam mottled with darker gray, brown, and yellow. It is generally slightly or medium acid. Considerable variation occurs in both these soils from place to place as a result of differences in the quantity of recently deposited material. In some places enough fine sand drifted into Abernathy silt loam, level phase, to make necessary the mapping of areas as Abernathy fine sandy loam.



of material but characterizing the Egam soil is a layer at a depth of 16 to 20 inches that is more heavy-textured and compact than the corresponding one in the Huntington.

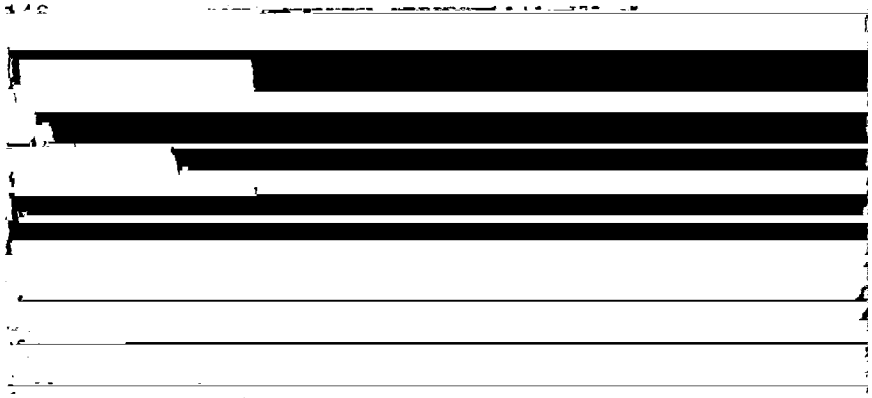
The Egam soil may be older morphologically or it may be the result of particular periods in which coarse and fine materials were deposited. In many places the compact layer characteristic of the soil is dark



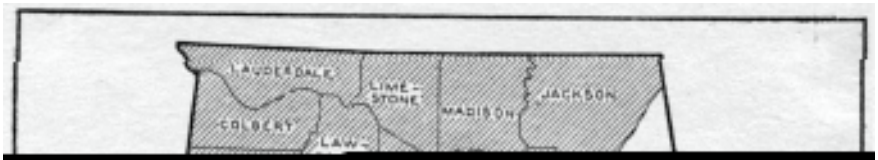
level natural levees along the larger streams in some places, but in others they spread out over parts of the fairly large bottoms and extend from the stream bank landward. Bruno fine sandy loam is the only type in the county. It is closely associated with the Huntington, Lindside, and Melvin soils and is neutral to slightly acid in reaction. It is well drained to excessively drained in a few places. In a few places the slope may range up to 2 or 3 percent. The surface 24 to 28 inches is brown to light yellowish brown. Below this is mottled gray, yellow, and brown fine sandy clay loam. The texture becomes finer with depth and mottling increases.

LITERATURE CITED

(1) ADAMS, G. I., BUTTS, C., STEPHENSON, L. W., and COOKE, W.
1926. GEOLOGY OF ALABAMA. Ala. Geol. Survey Spec. Rpt. 14, 312 pp., illus.
(2) ALABAMA AGRICULTURAL EXPERIMENT STATION.
1934. LESPEDEZA. Ala. Agr. Expt. Sta. Leaflet No. 6, 4 pp. (Rev. 1936.) (Reprinted, 1937.)
(3) ———
1934. SOYBEANS. Ala. Agr. Expt. Sta. Leaflet No. 2, 4 pp. (Rev. 1935 and 1937.)
(4) ———
[redacted]
Cir. 70, 14 pp. (Rev. 1936.)
(5) ———
1936. HAIRY VETCH AND AUSTRIAN WINTER PEAS FOR SOIL IMPROVEMENT. Ala. Agr. Expt. Sta. Cir. 74, 12 pp., illus.
(6) ALABAMA POLYTECHNIC INSTITUTE.
1941. HANDBOOK OF ALABAMA AGRICULTURE. Ed. 3, 414 pp., illus. Auburn, Ala.



(17) TIDMORE, J. W., and SIMMONS, C. F.
1934. THE USE OF LIMESTONE IN MIXED FERTILIZERS. Ala. Agr. Expt. Sta. Cir. 67, 88 pp. (Reprinted, 1936.)
(18) UNITED STATES DEPARTMENT OF AGRICULTURE.
1938. SOILS AND MEN. U. S. Dept. Agr. Yearbook 1938, 1232 pp., illus.
(19) WILLIAMSON, J. T.
1929. FERTILIZER EXPERIMENTS WITH COTTON. Ala. Agr. Expt. Sta. Bul. 228, 31 pp. (Reprinted, 1934.)
(20) ——— APPLETON, W. H., and HELMS, H. B.
1927. FERTILIZER EXPERIMENTS WITH CORN. Ala. Agr. Expt. Sta. Cir. 52, 12 pp. (Reprinted, 1931 and 1938.)


LAUDERDALE
LIME-
STONE
JACKSON
MADISON
COLBERT
LAW-

LIMESTONE COUNTY, ALABAMA, SOILS: SUMMARY OF IMPORTANT CHARACTERISTICS

Soil	Map symbol	Prevailing slope	Internal drainage	Parent material	Color of surface soil	Subsoil	
						Color	Consistence
Abernathy fine sandy loam	AF	*Percent* 0–2	Moderate	Local alluvium and colluvium from limestone and some sandstone.	Grayish brown to dark reddish brown.	Yellowish red to reddish brown, grading to mottled gray, yellow, and brown.	Friable.
Abernathy silt loam: Level phase	ASV	0–2	Moderate	Local alluvium and colluvium from limestone and cherty limestone.	Dark reddish brown to brown.	Yellowish red to reddish brown, grading to mottled gray, yellow, and brown.	Friable.
Undulating phase	ASU	2–4	Moderate	Local alluvium and colluvium from limestone and cherty limestone.	Dark reddish brown to brown.	Yellowish red to reddish brown, grading to mottled gray, yellow, and brown.	Friable.
Baxter cherty silt loam: Eroded hilly phase	BSH	12–30	Moderate to rapid	Residuum from cherty limestone.	Grayish brown to light yellowish red.	Light yellowish red	Friable.
Eroded rolling phase	BSN	5–12	Moderate to rapid	Residuum from cherty limestone.	Grayish brown to light yellowish red.	Light yellowish red	Friable.
Eroded steep phase	BSF	30–60	Moderate to rapid	Residuum from cherty limestone.	Grayish brown to light yellowish red.	Light yellowish red	Friable.
Eroded undulating phase	BSE	2–5	Moderate to rapid	Residuum from cherty limestone.	Grayish brown to light yellowish red.	Light yellowish red	Friable.

Bruno fine sandy loam	Br	0– 2	Moderate to rapid	Young stream alluvium washed from limestone, sandstone, and shale.	Brown to light yellowish brown.	Brown to light yellowish brown, grading to mottled gray, yellow, and brown.	Friable to firm.
Capshaw loam	Cl	0– 2	Moderate to slow	Stream terrace material	Grayish brown	Light brownish yellow,	Friable to firm.

Decatur silty clay loam: Eroded rolling phase	DMN	5–12	Moderate or slow	Residuum from high-grade limestone.	Light brown or brownish red.	Yellowish red or brownish red.	Firm.
Eroded undulating phase	DME	2– 5	Moderate or slow	Residuum from high-grade limestone.	Light brown or brownish red.	Yellowish red or brownish red.	Firm.
Severely eroded rolling phase	DMD	5–12	Moderate or slow	Residuum from high-grade limestone.	Brownish red or reddish brown.	Yellowish red or brownish red.	Firm.
Dellrose cherty silt loam: Eroded hilly phase	DEH	12–30	Moderate or rapid	Local alluvium and colluvium from cherty limestone.	Grayish brown or light yellowish brown.	Yellowish brown to brownish yellow.	Friable.
Hilly phase	DEL	12–30	Moderate or rapid	Local alluvium and colluvium from cherty limestone.	Grayish brown to brown	Yellowish brown to brownish yellow.	Friable.
Dewey cherty silty clay loam: Eroded hilly phase	DRH	12–30	Moderate	Residuum from high-grade limestone.	Brown or yellowish red	Yellowish red	Friable.
Eroded rolling phase	DRN	5–12	Moderate	Residuum from high-grade limestone.	Brown or yellowish red	Yellowish red	Friable.
Severely eroded rolling phase	DRD	5–12	Moderate	Residuum from high-grade limestone.	Brown or yellowish red	Yellowish red	Friable.
Dewey-Decatur silty clay loams, severely eroded hilly phases.	DDR	12–30	Moderate	Residuum from high-grade limestone.	Brown or reddish brown	Yellowish red or bright red	Friable to firm.
Dewey silt loam: Level phase	DSV	0– 2	Moderate	Residuum from high-grade limestone.	Brown to light brown	Yellowish red	Friable to firm.
Slightly eroded undulating phase	DST	2– 5	Moderate	Residuum from high-grade limestone.	Brown to yellowish red	Yellowish red	Friable to firm.
Dewey silty clay loam: Eroded hilly phase	DWH	12–30	Moderate	Residuum from high-grade limestone.	Brown to yellowish red	Yellowish red	Friable to firm.
Eroded rolling phase	DWN	5–12	Moderate or rapid	Residuum from high-grade limestone.	Brown to yellowish red	Yellowish red	Friable to firm.
Eroded undulating phase	DWE	2– 5	Moderate or rapid	Residuum from high-grade limestone.	Brown to yellowish red	Yellowish red	Friable to firm.
Severely eroded rolling phase	DWD	5–12	Moderate or rapid	Residuum from high-grade limestone.	Brown to yellowish red	Yellowish red	Friable to firm.
Dickson cherty silt loam: Eroded rolling phase	DCN	5–12	Moderate or slow	Residuum from cherty limestone.	Pale yellow or yellowish brown.	Light yellowish brown, grading to mottled material.	Friable to firm.
Eroded undulating phase	DCE	2– 5	Moderate or slow	Residuum from cherty limestone.	Pale yellow or yellowish brown.	Light yellowish brown, grading to mottled material.	Friable to firm.
Rolling phase	DCO	5–12	Moderate or slow	Residuum from cherty limestone.	Pale yellow or grayish brown.	Light yellowish brown, grading to mottled material.	Friable to firm.
Undulating phase	DCU	2– 5	Moderate or slow	Residuum from cherty limestone.	Pale yellow or grayish yellow.	Light yellowish brown, grading to mottled material.	Friable to firm.
Dickson cherty silty clay loam, severely eroded rolling phase.	DKD	5–12	Moderate or slow	Residuum from cherty limestone.	Pale yellow to yellowish brown.	Light yellowish brown, grading to mottled material.	Friable to firm.

Dickson silt loam: Eroded rolling phase	DLN	5–12	Moderate or slow	Residuum from cherty limestone.	Pale yellow to yellowish brown.	Light yellowish brown, grading to mottled material.	Friable to firm.
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Lawrence silt loam	Ln	0–2	Very slow	Residuum from cherty limestone.	Light gray in 2-inch surface layer.	Mottled yellow, orange, and gray; gray increases with depth.	Firm or very firm.
Limestone rockland	L	12–60	Slow	Residuum from limestone and cherty limestone.	Light gray, reddish brown, and very dark gray.	Light gray and reddish brown; mottled with shades of yellow and brown.	Friable to very firm.
Lindside silt loam	Ll	0–2	Slow	Alluvium from limestone, with some shale and sandstone.	Brown to grayish brown	Brown, mottled with shades of gray and yellow.	Firm.
Made land	Md						
Maury clay loam: Severely eroded hilly phase	Mrr	12–30	Moderate	Residuum from phosphatic limestone.	Yellowish brown to brown.	Yellowish brown	Friable.
Severely eroded rolling phase	Mrd	5–12	Moderate	Residuum from phosphatic limestone.	Yellowish brown to brown.	Yellowish brown	Friable.
Maury silt loam: Eroded hilly phase	Msh	12–30	Moderate	Residuum from phosphatic limestone.	Brown to yellowish brown.	Yellowish brown	Friable.
Eroded rolling phase	Msn	5–12	Moderate	Residuum from phosphatic limestone.	Brown to yellowish brown.	Yellowish brown	Friable.
Eroded undulating phase	Mse	2–5	Moderate	Residuum from phosphatic limestone.	Brown	Yellowish brown	Friable.
Melvin silt loam	Ml	0–2	Very slow	Alluvium from limestone, with some shale and sandstone.	Grayish brown to yellowish brown.	Mottled gray, yellow, and brown.	Firm.
Mimosa cherty silt loam, hilly phase	Mtl	12–30	Slow	Residuum from phosphatic limestone.	Grayish brown	Yellowish brown, grading to mottled material.	Firm.
Mimosa cherty silty clay loam: Eroded hilly phase	Mch	12–30	Slow	Residuum from phosphatic limestone.	Grayish brown to yellowish brown	Yellowish brown, grading to mottled material.	Firm.
Eroded rolling phase	Mcn	5–12	Slow	Residuum from phosphatic limestone.	Grayish brown to yellowish brown.	Yellowish brown, grading to mottled material.	Firm.
Severely eroded hilly phase	Mcr	12–30	Slow	Residuum from phosphatic limestone.	Yellowish brown to grayish brown.	Yellowish brown, grading to mottled material.	Firm.
Ooltewah silt loam	Os	0–2	Slow or very slow	Colluvium from limestone and cherty limestone.	Reddish brown or brown	Light gray or gray; mottled with shades of yellow or brown.	Firm.
Robertsville silt loam	Rl	0–2	Very slow	Alluvium from limestone with some shale and sandstone.	Gray to light gray; mottled with yellow and brown.	Mottled gray, yellow, and brown.	Firm.
Rough gullied land (Decatur, Dewey, and Cumberland soil materials).	RgD	5–60	Slow to moderately rapid	Residuum from limestone or cherty limestone.	Reddish brown to light gray.	Reddish brown to red mottled with yellow, gray, and brown.	Friable to very firm.
Sango silt loam	Ss	0–2	Slow	Residuum from cherty limestone.	Light gray or yellowish gray.	Mottled yellow, orange, and gray.	Firm.
Taft silt loam	Ts	0–2	Slow or very slow	Alluvium from limestone, with some sandstone and shale.	Light brownish gray	Pale yellow or grayish yellow, grading to mottled material.	Firm.
Wolftever silt loam	Ws	0–2	Moderate or slow	Alluvium from limestone, with some sandstone and shale.	Grayish brown or light yellowish brown.	Pale brown or light yellowish brown.	Firm or friable.