

A Key to Kentucky Soils

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Agricultural Experiment Station
University of Kentucky
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By W. S. Ligon¹
and P. E. Karraker²

Nature of Soils

Soils are unique among the formations of the earth. They are not just static masses of debris left from the weathering of rocks and decomposition of organic matter. Soils are dynamic. They develop slowly through constructive as well as destructive processes. They contain many compounds not found in their parent materials—these and the others are arranged in orderly fashion by definite soil-forming processes. Soils are complex systems in contact with the atmosphere above and the rocks below, and in and on which all land life originates and exists. Lithosphere, atmosphere, flora, and fauna contribute to their make-up. Soils change very slowly in general character but rapidly in numerous respects important to plant and animal life.

Soils differ greatly, not only from place to place but from top to bottom. All soils are products of the five soil-forming factors: (1) climate, (2) living organisms, (3) parent materials, (4) topography, and (5) time. The many differences in soils arise from differences in one or more of these factors. Thus, soils in the Great Plains region developed under grass vegetation and subhumid or semiarid climate would be vastly different from the soils in Kentucky developed under forest and a humid climate, even though they were of the same age, from identical rocks, and occupied comparable topography. Since virtually all soils in Kentucky (except very recent alluvial deposits) have been developed under forest cover and essentially the same climate, the differences in and among them are the result chiefly of differences in parent materials, the topography which the parent materials occupy, and the length of time the materials have been exposed to soil-forming processes.

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Classification of Soils

In soil science, as in any other, an adequate system of nomenclature and classification is essential. General differentiations or descriptive names often used, such as "bluegrass soil," "red limestone soil," and "buckshot land" are not precise enough for scientific study—no more so than "white chickens," "Missouri mules," or "cooking apples" would be in other fields of work. The system in general use for classifying and naming the soils of the United States is that of the Division of Soil Survey, Bureau of Plant Industry, Soils, and Agricultural Engineering, U. S. Department of Agriculture. This system is based on the many relatively permanent characteristics of the soils themselves, as it should be, rather than on one characteristic such as color or on factors outside the soils, such as their principal crop use at the moment.

As pointed out, soils are not the same from top to bottom. With age, they develop definite layers, or "horizons," one beneath another. The three principal horizons of most soils are the A horizon, or surface soil, the B horizon, or subsoil, and the C horizon, or parent material. In most cases subhorizons of one or more of these develop, and under certain conditions (such as the presence of a high water table during soil formation) hardpan layers or other rather special types of horizons form. The "soil profile" is a vertical section of a soil through all its horizons and extending into the unweathered parent material. The thickness and depth of the various horizons, together with the physical and chemical properties of each, profoundly affect the agricultural value of a soil; hence, the nature of the soil profile is a most important consideration in classifying soils for use and management as well as for detailed scientific study.

The unit of soil classification is the soil type. The name of a soil type is composed of two parts: the soil series and the soil class. Soils closely similar in origin and profile characteristics except texture (relative proportion of different-sized mineral particles) of the surface soil belong to the same series. Series usually are named for a town, school, church, or stream near which, or the county in which the soil was first identified. The class name merely gives the texture of a soil within the series. For example, Muskingum silt loam is a soil type. "Muskingum" denotes a series of soils first identified in Muskingum county, Ohio, and "silt loam" identifies the individual soil of the Muskingum series. Muskingum loam and Muskingum sandy loam are other soil types of the Muskingum series.

Frequently subdivisions of soil type are necessary, particularly to show differences in such external soil features as slope and stoni-

ness, which may be extremely important in using the land. Such subdivisions are called phases. Thus, we may have Muskingum silt loam, steep phase, and Muskingum silt loam, rolling phase.

Identification, mapping, and classification of soils by this system was begun about 1900. Results have been published throughout the years in the form of soil survey reports, usually of individual counties.³ Each report consists of (1) a soil map showing the geographic location of each of the soils, and (2) text material describing the characteristics of each soil unit mapped and evaluating the individual soils for farming, forestry, and other purposes. In the earlier work, the soil series name represented a much broader range of soil conditions than now. With the development of soil science came a growing appreciation of the importance of variations in soils and a need for finer distinctions among them. As a result, many new soil series names have been assigned to soils once considered merely as variations within a series, and the old series names have been restricted in application, changed, or in some cases discarded altogether.

The Soils Key Explained

This key presents in a brief and logical arrangement the soil series that are known or thought with reasonable certainty to occur in Kentucky. It should be highly valuable to all workers in the state dealing with soil and land problems, in view of the fact that only a relatively small number of detailed soil surveys have been made in Kentucky and most of these are so old that many of the soils involved have been reclassified since the surveys were made.

The key consists of three main parts: (1) a set of four key charts in which the principal relationships of the various soil series to each other in the different Physiographic Regions (see map, page 8) of Kentucky are set forth (2) identification descriptions of representative types of the soil series, arranged alphabetically, and (3) an appendix

³ Kentucky counties surveyed by the system of nomenclature described above and the dates of publication of the reports are: Union (1902), Scott (1904), Mason (1904), Madison (1906), Warren (1905), McCracken (1906), Rockcastle (1910), Christian (1914), Jessamine (1916), Shelby (1916), Logan (1922), Muhlenberg (1924), Garrard (1924), Mercer (1930), Fayette (1931), Calloway (1945), Marshall (in press), and Graves (in press). The earlier reports are now out of print. Copies of reports still available may be obtained for a nominal fee from the Superintendent of Documents, Washington, D. C.

The Kentucky Agricultural Experiment Station has surveyed Webster (1912), Graves (1915), and Franklin (1915) Counties, using a different system of nomenclature. All of these are now out of print.

An evaluation of the soil report for each Kentucky county surveyed is given in the Appendix of this publication.

in which all surveys of Kentucky counties are evaluated in terms of present soil nomenclature.

Significance of the Key Charts

As previously mentioned, the differences in Kentucky soils are due largely to differences in parent material, topography, and age. Since this is true, a soil series chart in which the various parent materials are listed down one side and different topographic positions are listed across the top offers an excellent means of showing quickly and easily certain major relationships of individual series to each other and to two of the three principal factors accounting for the series differences. (The time or age factor is also reflected to a considerable extent in the other two since, for example, soils from recently deposited alluvial materials and soils of steeper slopes are younger and lack the developed profiles of soils from materials long in place and on gentle slopes.) Such an arrangement is used in the key charts. By it, two important relationships among the series are brought out, as follows:

Horizontally, the soils in one line form a "catena," a grouping in which all the soils are from similar parent material but differ in degree of drainage and kind of profile development (reflecting differences in topography and soil age).⁴

Vertically, the soils in each column are roughly comparable in kind of profile development and degree of drainage but are derived from different parent materials. The columns are numbered VI-a, VI-b, IV, IV-III, III, II, I, and VII, VIII, the numbers roughly representing general types of profiles as follows:⁴

VI Profile. Soils of this profile number have little or no B horizon development, the surface soil resting more or less directly upon weathered parent materials. They normally occupy steep slopes. Some of these soils are developed from hard dense rocks or compact shales, are shallow in depth, and often stony. They have high or very high surface runoff, and internal drainage may be moderate to very slow. Others are developed from loose, porous materials such as chert beds, gravels, or sands which cause them to have much lower surface runoff and very rapid internal drainage. These are low in water-holding capacity and therefore drouthy. To differentiate these two types of skeletal soils in the key charts, the column heading VI-a is used for the former and VI-b for the latter.

⁴Soils of young alluvial or colluvial deposits have color profile only; that is, horizons of heavier texture have not developed in them beneath the surface soils, but they do have color differences similar to those of the upland and terrace soils in accordance with the profile classification given.

IV Profile. Soils with a IV profile are the mature soils developed on moderate slopes. They have well-developed B horizons and are well drained. The surface soil color is usually some shade of brown and that of the subsoil is some shade of red or brown with little or no mottling (evidence of impeded drainage) within 36 to 42 inches of the surface.

IV-III Profile. Soils of this designation are intermediate in major profile characteristics between soils of IV profile and those of III profile. They are similar in color and B horizon development to the former, but at a depth of 30 to 40 inches a mottled zone occurs. The soil in this horizon may be rather compact or heavy textured and difficult for water to penetrate.⁵

III Profile. Soils with a III profile generally have grayish-yellow to light grayish-brown surface soils underlain by yellow subsoils. Internal drainage is only slow to moderate, as indicated by the presence, at a depth of 18 to 30 inches, of a compact or heavy layer⁵ highly mottled with light yellow, gray, bluish-gray, or brown, and which may contain considerable concretionary material. Soils with III profiles occur typically on gentle slopes.

II Profile. Soils of II profiles have gray surface soils and predominantly pale yellow to yellowish-gray subsoils mottled with gray, bluish-gray, orange, or brown at less than 18 inches depth. A compact or heavy layer⁵ occurs, usually at shallow depth, and concretions generally are common throughout the profile. Such soils occupy practically level areas; runoff is low and internal drainage is slow.

I Profile. Soils with a I profile have gray or whitish surface soils and predominantly gray or bluish-gray subsoils. Mottlings of various shades may occur, and concretions commonly are abundant throughout the profile, giving rise to the common term "buckshot land." The subsoils contain a compact or heavy layer⁵ usually at shallow depth. Such soils occupy level areas or slight depressions; surface runoff is very low or ponded, and internal drainage is very slow.

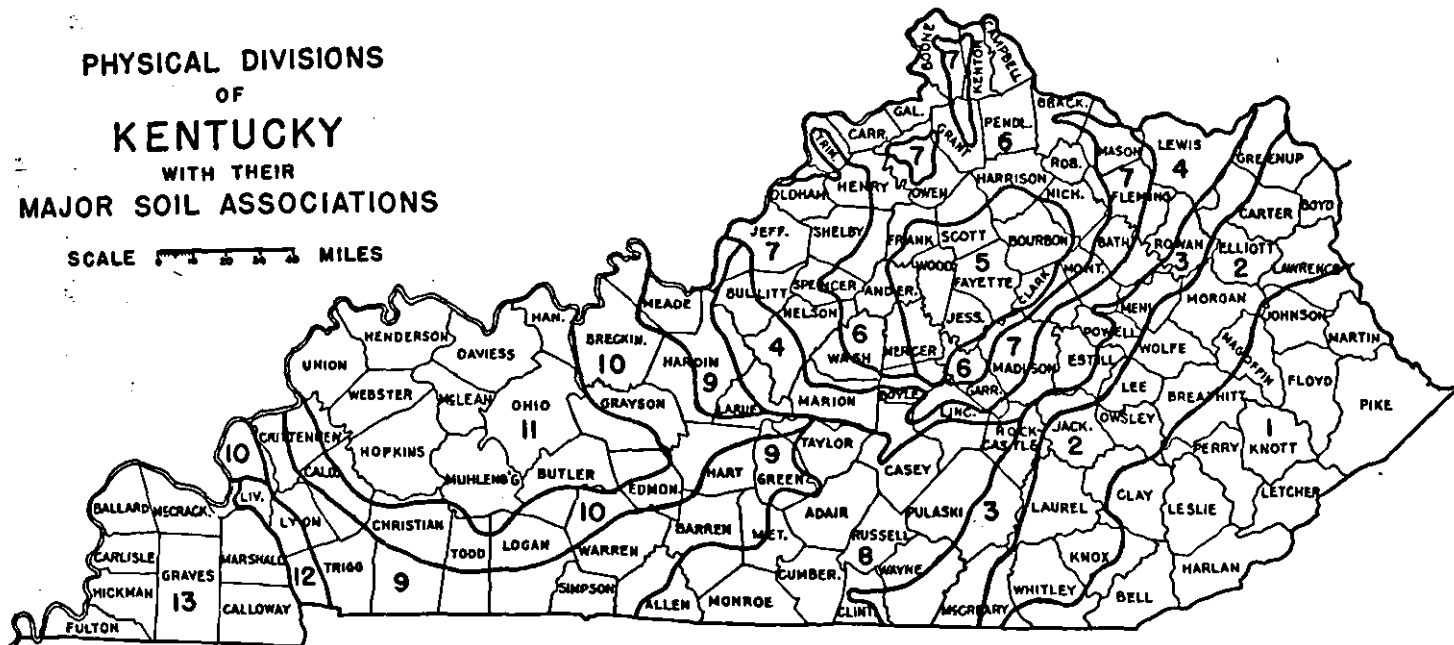
*VII and VIII Profiles.*⁶ Soils of VII or VIII profiles occur in depressions. They have dark surfaces (due to an accumulation of organic matter in them) underlain by a gray or bluish-gray clayey subsoil layer generally sticky and plastic and mottled with various shades of yellow and brown. Soils with a VII profile are dark gray in the surface, and those with an VIII profile very dark gray to black,

⁵Such a layer developed in a soil through soil-forming processes is commonly called a "hardpan" or "claypan."

⁶To save a column in the key which would be occupied by only one soil, the Berea muck is listed in the VII, VIII column.

PHYSICAL DIVISIONS
OF
KENTUCKY
WITH THEIR
MAJOR SOIL ASSOCIATIONS

SCALE 0 5 10 15 20 25 MILES



LEGEND

- | | |
|---|--|
| 1 Eastern Coalfield - Eastern Belt (Muskingum-Hartsells) | 9 Western Pennyroyal - Limestone Predominant
(Hagerstown-Decatur-Baxter) |
| 2 Eastern Coalfield - Central Belt (Muskingum-Tilsit) | 10 Western Pennyroyal - Sandstone Predominant
(Tilsit-Westmoreland-Christian) |
| 3 Eastern Coalfield - Western Belt (Muskingum-Westmoreland) | 11 Western Coalfield (Tilsit-Memphis-Muskingum) |
| 4 The Knobs (Rockcastle-Colyer-Westmoreland) | 12 Cumberland-Tennessee River Section
(Brandon-Lax-Mountview) |
| 5 Inner Bluegrass (Maury-Loradale-Mercer) | 13 Jackson Purchase (Grenada-Loring-Memphis) |
| 6 The Hills of the Bluegrass (Eden-Fairmount) | |
| 7 Outer Bluegrass (Shelbyville-Lowell-Nicholson) | |
| 8 Eastern Pennyroyal (Dickson-Baxter-Westmoreland) | |

the organic matter content being higher in the latter. They are combined in the same column in the key because of their small number. These soils are fertile and, if properly drained, are productive, in contrast with the soils of number I profile, which are also poorly drained but inherently poor agriculturally.

Identification Descriptions and Appendix

The second and more expansive section of the key consists of brief identification descriptions of representative soil types of all soil series appearing in the key charts. They are in alphabetical order. These descriptions are not complete detailed soil profile descriptions. Their purpose is two-fold: (1) to describe the soil series sufficiently for their identification and (2) to give a brief evaluation of each series for agricultural use.

The material in the appendix is to aid in understanding and interpreting the soil survey maps and reports of all Kentucky counties that have been surveyed.

How to Use the Soils Key

(Key charts are folded in pocket at back of circular.)

The principal ways in which the soils key may be used are illustrated in the following examples:

A. To identify and name a particular soil type in the field.

1. Refer to the Physical Divisions map to determine in which Physical Division the soil occurs. Suppose it is Division 9.
2. Consult Key Chart C, in which the soil series of Physical Divisions 8, 9, and 10 are listed.
 - (a) Choose the applicable column by means of the topography and drainage designations or the profile number designations across the top of the chart. Suppose the soil occupies gently rolling topography and is well drained or has IV profile (profile number descriptions are given in the Introduction under "Significance of the Key Charts").
 - (b) Choose the applicable line in the Parent Material column at the left.⁷ Say the soil in question is an upland soil from high-grade limestone.

⁷ This step may be difficult if the reader is unfamiliar with Kentucky geology. If so, having determined the applicable column, the series may be determined, though somewhat laboriously, by trial and error using the Identification Descriptions to test those series in the applicable column that are most likely to be the correct one. For example, if column IV is the applicable column of Key Chart C and the upland soil to be identified overlies limestone and is not cherty the reader would consult the descriptions of the Fleming, Talbott, Hagertown, Decatur, Crider, and Cookeville series. Statements in the "Remarks" column may also be helpful in identifying the series.

- (c) Note the series name (or names) appearing in the block where the applicable parent material line intersects the applicable profile number column. In the example chosen, the names Hagerstown and Decatur appear.
3. Consult the alphabetical list of Identification Descriptions to check the description (or descriptions) given there against the observed characteristics of the soil to be identified. In the example, the soil to be identified will belong to the Hagerstown or Decatur series. The class name (that is, silt loam, silty clay loam, etc.) is estimated by rubbing some of the surface soil between the thumb and fingers.
- B. To determine the other catena members associated with a particular soil series.**
1. If unfamiliar with the soil series the name of which is known, refer first to the alphabetical list of Identification Descriptions for information concerning it and its likely location.
 2. Proceed as in Example A until the series in question is located in the applicable key chart. All other catena members appear on the same line in the key chart. For example, in Chart C the members of the Hagerstown or Decatur catena are: Hagerstown or Decatur (IV profile), Russellville (IV|III profile), Bedford (III profile), Lawrence (II profile), Guthrie (I profile), and Burgin (VIII profile).
- C. To determine the terrace, colluvial, or bottomland soils associated with a particular upland series or catena.**
1. Proceed as in Example A until the upland series or catena is located on the proper key chart.
 2. In the parent material column at the left, under the applicable section (COLLUVIAL, STREAM TERRACES, or STREAM BOTTOMLANDS) select the proper descriptive line. For example, the bottomland soils associated with the Hagerstown series or catena, would be shown in Chart C on the line entitled: "Limestone predominant, moderate to high grade." As shown on the chart, these are: Huntington, Bruno, and Egam (IV profile), Lindside (III profile), Melvin (I profile), and Dunning (VII profile).
- D. To determine present nomenclature and concepts of soil series mapped and described in the soil survey reports.**
- Consult the Appendix, in which all soil surveys of Kentucky counties are evaluated, in alphabetical order, in terms of present nomenclature.
- E. To learn some important profile characteristics, the general extent and distribution, and agricultural significance of a particular soil series.**
- Consult the alphabetical list of Identification Descriptions.

IDENTIFICATION DESCRIPTIONS OF KENTUCKY SOILS⁶ (Alphabetically Arranged)

ABERNATHY silt loam

Brown to reddish-brown friable silt loam, slightly acid, 18-36 inches thick; underlain by brown to reddish-brown silt loam or light silty clay loam, more or less spotted with gray, yellow, and brown, particularly in the lower part, slightly acid, 12-24 inches thick.

Abernathy soils occupy the floors of limestone sinks and basins, and depressions around the heads of local streams. They are derived from local alluvium and colluvium from such upland series as Hagerstown, Decatur, and Crider. Compared with the Hermitage soils, they have little profile development, are less acid, and in some cases are subject to ponding.

The Abernathy soils are well drained and productive for corn and hay, and in the larger basins with less danger from ponding, they produce good tobacco and small grain crops. They are rather widely distributed as small areas, principally in the limestone part of the Western Pennyroyal and to a less extent in the Eastern Pennyroyal and along the border of the Outer Bluegrass and Knobs.

ALLEN fine sandy loam

Brownish-gray to brown friable fine sandy loam, moderately acid, about 7 inches thick; underlain by red or brownish-red heavy fine sandy clay, firm but friable and becoming more silty with depth, moderately acid, about 24 inches thick; underlain by dark red stiff but brittle fine sandy clay faintly mottled or streaked with yellow and containing stone fragments.

Allen soils occupy footslope and fan positions and are derived from materials washed and rolled from slopes of such upland series as Hanceville, Hector, and Muskingum, of sandstone and shale origin. They differ from the Jefferson soils, of like position and origin, in having

⁶These descriptions are not complete, detailed soil-series descriptions. Their purpose is three-fold: (1) to describe the soils sufficiently for their identification, (2) to indicate their general distribution and extent, and (3) to give a brief evaluation of each for agricultural use. Only the dominant soil type of each series is described, and it is the chief one evaluated for the series. Due allowances must be made for different types and phases within the series, involving variations in such characteristics as soil depth, texture, slope, degree of erosion, and stoniness.

Approximate pH values for the terms used to express soil acidity are as follows: strongly acid (below pH 5.5), moderately acid (pH 5.6 to 6.0), slightly acid (6.1 to 6.5), near neutral (6.6 to 7.3), and alkaline (above 7.3). These pH values follow soil survey usage and differ slightly from the values usually assigned in Kentucky Agricultural Experiment Station publications. The term "acid" is used when a closer approximation cannot be given, and the term "calcareous" to indicate presence of free carbonates.

Statements regarding soil fertility and productivity refer to natural or inherent fertility and to productivity without fertilization.

red rather than yellow subsoils. Both have well-developed profiles and are well drained.

The Allen soils are of small total acreage. Although of only fair productivity, they may be important locally in steep country where cropland acreage is greatly limited. The steeper slopes are best used for pasture and hay crops. Small areas occur in the Eastern Coalfield, Knobs, Western Coalfield, and sandstone portions of the Western Pennyroyal.

ALMO fine sandy loam

Light gray friable fine sandy loam with a few yellow and rust-brown specks and iron concretions, strongly acid, 6 or 8 inches thick; underlain by mottled light gray, yellow, and brown silty clay loam or fine sandy clay loam, with pan development at 20 to 28 inches below the surface, strongly acid, 14-30 inches thick; underlain by gray, brown, and yellow mottled very fine sandy loam increasing in sand content with depth.

Almo soils are poorly drained soils of flat stream terraces developed from mixed alluvium of loess and coastal-plain origin. Their sand content distinguishes them from the Calhoun soils, derived from loessial sediments. They are associated with such upland series as Lexington, Brandon, and Providence.

Undrained, the Almo soils are too wet for cultivation in most years, and are best used for pasture and woodland. If drained, fair yields of corn, cowpeas, lespedeza, sorghum, and redtop are possible. They occur in the Purchase and Cumberland-Tennessee river section. Total acreage is small.

ALVA very fine sandy loam

Grayish-brown friable very fine sandy loam, moderately to strongly acid, 3-30 inches thick; underlain by yellowish-brown silt loam to fine sandy loam containing a few soft dark concretions, moderately to strongly acid, 10-30 inches thick; underlain by gray, brown, and yellow mottled silt loam, strongly acid.

The Alva soils are well-drained local alluvial-colluvial accumulations from mixed loess and Coastal Plain materials. They occupy gentle slopes along incipient drainageways and are subject to temporary flooding by surface runoff from associated uplands such as the Lexington, Brandon, and Providence soils. Their sand content distinguishes them from the Tigrett soils which contain no Coastal Plain materials.

The Alva soils are very inextensive, generally occurring as small areas in the Purchase and Cumberland-Tennessee river section. They

produce moderately good yields of corn, soybeans, sorghum, cowpeas, and lespedeza, and are especially prized for tomatoes and other truck crops.

ARTEMUS loam

Dark gray or dark brown mellow or friable loam, slightly acid to neutral, 3-18 inches thick; underlain by brownish-yellow or yellowish-brown very friable fine sandy clay or clay loam, strongly acid, 10-20 inches thick; underlain by predominantly brownish-yellow friable fine sandy clay or clay loam spotted with gray and yellowish-brown, moderately to strongly acid, several feet thick.

Artemus soils are derived principally from old alluvium of sandstone and shale origin on stream terraces. They have much darker surface soils and less profile development than Holston soils.

The Artemus soils are very inextensive. Small areas occur in the Eastern Coalfield and possibly in the Knobs. Their high productivity for these parts of the state makes them valuable soils for corn, small grain, and various hay crops, particularly in the rougher sections where agricultural land is limited.

ASHBURN cherty silt loam

Yellowish-brown friable cherty silt loam, moderately acid, 7-14 inches thick; underlain by red cherty silty clay loam to silty clay, strongly acid, 10-24 inches thick; underlain by red firm cherty silty clay spotted and streaked with yellow and brown, strongly acid, depth variable to partially decomposed cherty, but high-grade, limestone.

Ashburn soils typically occupy karst (sinkhole) topography or rolling slopes. They differ from the Decatur soils chiefly in containing large quantities of chert, and from the Baxter soils in being browner in the surface, redder and heavier in the subsoil, usually shallower to bedrock, and more fertile.

The Ashburn soils are extensive in the Pennyroyal, particularly in Hart, Metcalfe, Barren, and Warren counties, and are productive for corn, small grain, hay, and pasture. However, their irregular topography prohibits contour operations in most cases, reducing their usefulness for row crops, and their high content of chert impedes cultivation and mowing operations to some extent.

ATKINS silt loam

Grayish moderately friable silt loam usually mottled with yellow, reddish-brown, and brown, strongly acid, 10-15 inches or more thick; underlain by predominantly gray but mottled stratified or mixed acid sands, silts, and clays.

Atkins soils are poorly drained first bottom soils composed of alluvium from such associated sandstone and shale upland series as Muskingum, Wellston, Tilsit, Hanceville, and Hector. In the Western Coalfield wash from shallow acid loess uplands is also a component of the alluvium.

The Atkins soils are too wet for cultivation and are used principally for pasture, wild hay, and forest. With drainage, they may produce fair to moderately good yields of corn and hay crops. Although the total acreage is relatively small, these soils are widely distributed in the Eastern Coalfield and may be of considerable agricultural significance in the more hilly areas where cropland is scarce. They occur to some extent in parts of the Western Coalfield and Knobs also.

ATWOOD loam

Yellowish-gray very friable loam or very fine sandy loam, strongly acid, about 8 inches thick; underlain by reddish-yellow friable heavy loam, strongly acid, about 3 inches thick; underlain by reddish-brown firm to friable fine sandy clay or clay loam with structural units redder than the crushed material, strongly acid, about 20 inches thick; underlain by reddish-yellow fine sandy loam or fine sandy clay spotted with gray, yellow, brown, and red in the lower part, strongly acid, 24 inches or more thick.

Atwood soils are well-drained soils derived from sandy clay marine deposits. They lack the silty, loess-derived upper solums of the Lexington soils which they resemble. They are very inextensive and are found chiefly in the Cumberland-Tennessee river section. A few small areas occur in the Purchase. Atwood soils produce fair yields of dark tobacco, corn, lespedeza, redtop, and pasture.

AVONBURG silt loam

Gray or light yellowish-gray silt loam spotted and streaked with brown and yellow, containing small rounded concretions, moderately to strongly acid, 20-30 inches thick; underlain by heavy compact mottled gray and yellow silty clay containing soft brown concretions, very strongly acid; 8-12 inches thick; underlain by mottled gray, yellow, and brown relatively friable glacial till, strongly acid, becoming less acid with depth.

Avonburg soils are somewhat poorly drained, occupying nearly flat uplands in association with the poorly drained Clermont, the rolling well-drained Cincinnati, and the gently rolling, moderately well-drained Rossmoyne soils, all derived from Illinoian glacial till.

The Avonburg soils are very inextensive in Kentucky, being confined largely to small areas in Trimble and Boone counties. They

are best used for hay or pasture, but can be cultivated to corn with fair success, using dead furrows for drainage improvement.

BARBOURVILLE loam

Brown friable loam, moderately acid, 10-14 inches thick; underlain by yellowish-brown friable loam or light clay loam, moderately acid, 1-3 feet thick; underlain by variable material usually brownish-yellow clay loam more or less spotted with gray, yellow, and brown, friable, moderately acid, and extending to sandstone and shale bedrock.

Barbourville soils are well drained. They occupy footslopes or alluvial fans in association with Muskingum, Wellston, and similar upland soils from acid sandstones and shales. They lack the B-horizon development of the Jefferson and Allen soils, have browner surfaces, and are more productive.

The Barbourville soils are rather widely distributed in the Eastern Coalfield and parts of the Knobs and Western Coalfield, but are of rather small total acreage. Locally, they are important agriculturally for the production of corn, small grain, hay crops, and pasture, particularly in steeper areas where agricultural land is limited. Crop yields are moderately good.

BAXTER cherty silt loam

Grayish-brown to grayish-yellow cherty silt loam, moderately acid, 6-10 inches thick; underlain by light red or slightly yellowish-red friable cherty silty clay loam, moderately acid, 20-40 inches thick; underlain by light red cherty silty clay loam, in most places streaked and spotted with a yellowish partly weathered chert and becoming more blocky, more clay-like, and usually more cherty with depth.

Baxter soils occupy karst topography and hillside slopes, usually in association with Dickson or Cookeville soils on the ridges. They also occupy rolling ridges above steep Westmoreland slopes. Compared with the Ashburn soils, they have lighter colored surface soils and lighter red subsoils, are from lower grade limestones, are deeper to bedrock, and are less fertile. They are much more cherty than the Cookeville soils.

The Baxter soils are extensive and important, particularly in the Pennyroyal section. Their high content of chert interferes with cultivation and mowing operations to some extent and where they occupy karst topography contour operations are difficult or impossible, reducing their value for row crops. In places they are somewhat drouthy. In general, they produce fair to moderate yields of tobacco, corn, small grain, hay, and pasture.

BEASLEY silt loam

Grayish-brown, dark gray, or gray friable silt loam, slightly or moderately acid, 6-8 inches thick; underlain by yellowish-red, yellowish-brown, or drab heavy silty clay loam to silty clay grading into tough, brittle silty clay, slightly or moderately acid, 12-36 inches thick; underlain by light-colored soft granular calcareous shales (marls).

Beasley soils occur typically on gently sloping ridges at the contact of Ordovician marls with Silurian limestones above. The upper layers of the profile are from materials overlying the marls and from place to place resemble those of the Hagerstown, Talbott, and Lowell soils. The Beasley soils are usually associated with Otway soils on the slopes, from which they differ in having well developed subsoils above the calcareous zone.

The Beasley soils are important only locally along the inner border of the Knobs with the Outer Bluegrass. Productivity is fair, corn, burley tobacco, and hay being the chief crops. Some of the acreage is eroded and idle, with marl outcrops exposed.

BEDFORD silt loam

Light grayish-brown smooth silt loam, moderately acid, 4-8 inches thick; underlain by yellow heavy silt loam or silty clay loam, the clay content increasing with depth, moderately acid, 14-18 inches thick; underlain by pale yellow, light gray, and brown mottled silty clay loam or silty clay, strongly acid, about 12 inches thick; over limestone bedrock.

Bedford soils occupy smooth upland areas in association with Hagerstown, Decatur, and similar soils from high-grade limestones. Compared with the Sango soils of similar drainage from low-grade limestones, they are browner in the surface, more plastic in the lower subsoil, shallower to bedrock, and essentially chert-free.

The Bedford soils are rather inextensive but fairly productive for the common field crops. Restricted drainage in the lower subsoil reduces their value for burley tobacco. They occur chiefly in the Eastern and Western Pennyroyal sections and in the Outer Bluegrass bordering the knobs.

BEECHY loam

Gray friable loam faintly mottled with yellowish-brown, 8-10 inches thick; underlain by grayish stratified sandy loam and sandy gravelly loam with a few splotches of brown and yellowish-brown, 24-50 inches thick; underlain by stratified materials, sandy or gravelly with grayish silts and clays. The entire profile is strongly acid.

Beechy soils are poorly drained first-bottom soils of mixed loess

and coastal-plain alluvium. Their sand content distinguishes them from the Waverly soils of loess alluvium.

The Beechy soils are important locally in the Purchase Region and the Cumberland-Tennessee river section. They are subject to stream overflow and swampy conditions and are best used for forest and pasture. With bedding, or other drainage practices, they can be used to some extent for corn, redtop, lespedeza, soybeans, cow-peas, and sorghum, though yields are likely to be rather low.

BELLEVUE loamy fine sand

Brown loose loamy fine sand, near neutral, 10-14 inches thick; underlain by pale yellowish-brown loose loamy fine sand, near neutral, 6-12 inches thick; underlain by light yellowish-brown loose loamy fine sand, near neutral, usually more than 5 or 6 feet thick.

Bellevue soils occupy dune-like benches, hummocks, knobs, and ridges on Ohio river terraces in association with the Wheeling catena. They have "color profiles" but little or no textural profile development.

The Bellevue soils are important locally along the Ohio river. They are suitable and fairly productive for orchard crops but too drouthy for good yields of general farm crops.

BEREA muck

Black rather firm well-decomposed muck, acid, 10-18 inches thick (appreciable quantities of mineral matter, chiefly silt and clay, may occur particularly along the edges of the muck area); underlain by yellow, gray, olive, or mottled heavy plastic silty clay with iron stains and concretions at 20-28 inches and increasing in number with depth, slightly acid.

Berea muck is a shallow bog soil probably derived from the remains of a wide variety of aquatic herbaceous plants. Its occurrence is limited to a few small areas in Madison county, in the vicinity of Berea. These are probably best used for pasture.

BEWLEYVILLE silt loam

Light grayish-brown friable silt loam, moderately acid, 9-12 inches thick; underlain by yellowish-brown very friable heavy silt loam to light silty clay loam, in places with gray mottling and slight pan development in the lower part, acid, 18-24 inches thick; underlain by predominantly red firm brittle silty clay containing appreciable quantities of angular chert fragments.

Bewleyville soils occur on gently sloping or karst topography in association with the Ashburn, Cookeville, and similar soils. Loess has contributed to the silty solum in many if not all cases. Com-

pared with the Crider and Russellville soils, the Bewleyville soils have lighter colored solums and the lower part of the profile is composed of residuum from cherty moderately high-grade limestones rather than chert-free high-grade limestones. They are more productive than the Mountview soils derived from shallow loess overlying low-grade cherty materials, such as give rise to the Bodine and Nixa soils.

The Bewleyville soils are inextensive but important locally in the Western Pennyroyal. They produce fair to moderate yields of corn, small grain, hay, and pasture.

BODINE cherty silt loam

Light grayish-brown friable cherty silt loam, strongly acid, 5-6 inches thick; underlain by yellowish-brown friable cherty clay loam with faint splotches of red, yellow, and gray, particularly in the lower part, strongly acid, 20-24 inches thick; underlain by chert beds and clay loam soil materials, splotched with yellow, red, and brown, strongly acid, several feet thick.

Bodine soils occupy rather steep slopes and narrow ridges and are developed from very cherty low-grade limestones. They are associated with the Baxter soils from which they differ in having lighter colored surface soils, yellowish rather than reddish subsoils, and in being much less productive. They lack the B-horizon development of the Nixa soils.

The Bodine soils are rather widely distributed in the Eastern Pennyroyal and in and adjacent to the Cumberland-Tennessee river section, but the total acreage is not large. Agriculturally, they are poor and drouthy and generally best adapted to forest or pasture.

BORDLEY silt loam

Light yellowish-brown silt loam, containing a few fine brownish-black concretions, moderately acid, 9-15 inches thick; underlain by yellowish-brown to light olive-brown firm moderately plastic silty clay with fine mottlings of dark yellowish-brown, containing numerous dark fine concretions, strongly acid, 12-20 inches thick; underlain by friable mottled materials grading from silty clay loam to silt loam and from slightly acid to alkaline with depth.

Bordley soils occupy moderately high terraces underlain by alkaline or calcareous silty sediments washed primarily from deep loess. Compared with the Richland soils they have somewhat thinner heavier B horizons and alkaline or calcareous rather than acid C horizons.

The Bordley soils are inextensive and occur principally in Union, Henderson, and Daviess counties and the counties bordering the Mississippi river. They are moderately productive for dark tobacco, corn, small grain, and hay.

BRANDON silt loam

Grayish-brown very friable silt loam, strongly acid, 5-8 inches thick; underlain by yellowish-brown friable heavy silt loam, strongly acid, 3-6 inches thick; underlain by yellowish-brown friable silty clay loam, slightly tinged with reddish-brown and commonly containing rounded quartz gravel in the lower part, strongly acid, 15-30 inches thick; underlain by light brown to reddish-brown gravelly materials, generally loose and somewhat stratified, strongly acid, several feet thick.

Brandon soils occur on rolling to hilly uplands chiefly in association with the Lexington, Lax, Providence, and Guin soils. They are comparable in the solum to the Lexington soils but are dominantly gravelly rather than sandy beneath the shallow loess mantle.

The Brandon soils are among the principal upland soils in and adjacent to the Cumberland-Tennessee river section. They produce relatively low yields of dark tobacco, corn, wheat, and hay. The hillier areas are somewhat shallow and drouthy and best suited for forest or pasture.

BRASHEAR silt loam

Light brown friable heavy silt loam, moderately acid, 10-12 inches thick; underlain by pale yellowish-brown moderately tough silty clay, strongly acid, 12-18 inches thick; underlain by tough plastic silty clay highly splotched with yellow, brown, and gray, extending to limestone and calcareous shale bedrock.

Brashear soils are developed on footslopes from local alluvial-colluvial accumulations washed from heavy soils such as those of the Eden series. They are lighter colored, more acid, usually more eroded, and less productive than the Woolper soils.

The Brashear soils are very minor soils of the Bluegrass Hills, chiefly in the wider valleys. They are subject to considerable gully erosion by water from adjacent hillsides. Generally, they are best suited for pasture.

BRAXTON silt loam

Grayish-brown rather compact silt loam which may contain some small chert pieces, moderately acid, 6-8 inches thick; underlain by brown or reddish-brown slightly cherty heavy silty clay loam, modera-

tely acid, 4-10 inches thick; underlain by similar material with noticeable quantities of chert fragments, acid, 10-12 inches thick; underlain by rather tough plastic brown clay loam or silty clay containing angular chert fragments, slightly acid, 15-20 inches thick, extending to massive phosphatic cherty limestone bedrock.

Braxton soils are closely associated with Maury, McAfee, and Salvisa soils in the Inner Bluegrass. They differ from the Maury soils chiefly in having a significant content of chert and more plastic lower subsoils. They are of minor occurrence but are productive for burley tobacco, corn, small grain, and hay.

BRIENSBURG silt loam

Light yellowish-brown friable silt loam, moderately to strongly acid; 5-16 inches thick; underlain by mottled light yellowish-brown, light gray, and brown friable silt loam commonly containing small soft brownish-black concretions, moderately to strongly acid, 20-30 inches thick; underlain by light gray silt loam mottled with light yellowish-brown and brown, moderately to strongly acid.

Briensburg soils are moderately well drained. They occur in local drainageways and depressions, and on toe slopes in association with upland soils of the Memphis catena derived from loess. Compared with the Eupora soils of like position and drainage but partly from Coastal Plain materials, they contain little or no sand throughout the profile.

The Briensburg soils are widely distributed, largely as small narrow areas, in the Purchase and in the northwestern half of the Western Coalfield. They are productive for corn, hay, and pasture, and especially desired for tomatoes and other truck crops.

BRUNO loamy sand

Light brown friable loamy sand, near neutral, 8-12 inches thick; underlain by brown friable fine sandy loam or loamy sand, near neutral, 20-30 inches thick; underlain by gray and brown mottled often stratified layers of sandy loam, loamy sand, gravelly sandy loam, or beds of gravel.

Bruno soils are somewhat excessively drained, occupy first bottom positions, and consist of alluvium from various limestone, sandstone, and shale uplands. They contain more sand and coarser material throughout than the Huntington or Staser soils, and are browner and less acid than the Pope soils.

The Bruno soils are widely distributed in association with the Huntington soils, but their total acreage is rather small. They are suitable for many truck crops but are too drouthy to produce high yields of corn and hay.

BURGIN silty clay loam

Dark brown to black silty clay loam, granular in the upper part, near neutral, 15-20 inches thick; underlain by gray sticky and plastic clay mottled with yellow and olive, near neutral to alkaline, 12-16 inches thick; underlain by a similar layer with much brown mottling and calcareous in many places, 2-12 inches thick, extending to limestone bedrock.

Burgin soils occur in upland depressions and along incipient drainageways in association with Hagerstown, Maury, and similar upland soils from high-grade or moderately high-grade limestones. In association with the Maury and McAfee soils, they are highly phosphatic.

The Burgin soils are very inextensive and are found principally as small areas in the Inner Bluegrass and the Eastern and Western Pennyroyal. They are very poorly drained and without artificial drainage are not suitable for cultivated crops, but with drainage they are highly productive for corn, legume and grass hay, and pasture. Small grains on the Burgin soils are apt to lodge.

BYBEE fine sandy loam

Light grayish-brown smooth fine sandy loam, strongly acid, 9-14 inches thick; underlain by yellowish-brown or reddish-brown friable sandy clay loam, slightly compact or cemented in places, strongly acid, 9-15 inches thick; underlain by a similar yellowish-brown layer more noticeably cemented into large structural units, about 1 foot thick; underlain by yellowish-brown to slightly reddish-brown very friable sandy loam to loamy sand that may be splotched with yellow or gray, strongly acid, 1-2 feet thick; underlain by very old alluvium materials predominantly yellow and sandy but which may be extremely variable and contain clay lenses or laminations, concretions, sand and gravel pockets or layers strongly acid.

Bybee soils are developed from very old river alluvium weathered from sandstones, quartz conglomerates, limestones, and shales deposited at elevations of several hundred feet above present river courses and in places at considerable distance from them. They are well drained, sandy, acid, and highly leached, and they occur commonly in areas of productive residual soils of limestone origin to which they bear little resemblance.

The Bybee soils are widely scattered in small areas along larger streams principally the Licking, Kentucky, and Cumberland rivers. The total acreage is small and crop yields are relatively low.

BYINGTON silt loam

Yellowish-gray friable silt loam, strongly acid, 6-8 inches thick; underlain by pale yellowish-brown friable light silty clay loam containing black shale fragments in places, strongly acid, 8-12 inches thick; underlain by predominantly pale yellowish-brown silty clay loam spotted with yellow and gray, usually plastic, commonly containing black shale fragments and extending to dark colored shale bedrock usually at a depth of 2 to 4 feet.

Byington soils occupy undulating upland slopes in association with the steeper Colyer soils derived from black shale. The upper parts of the solum in places are partly derived from the weathering of layers immediately above the black shale and may contain small sandstone or chert fragments. The Byington soils are moderately well drained and resemble the Tilsit and Sango soils but are distinguished from them by the presence of black fissile shale at shallow depths.

The Byington soils are minor soils of the Knobs and scattered small areas occur in the Eastern Pennyroyal where dissection has cut into the underlying black shale. Total acreage is small. They are poor soils agriculturally, and much of their acreage is in scrub pasture or idle.

CALHOUN silt loam

Gray friable silt loam, medium to strongly acid, 1-3 inches thick; underlain by light gray friable silt loam faintly mottled with gray and brown and containing a few dark concretions, strongly acid, 6-14 inches thick; underlain by light gray firm silty clay loam mottled with various shades of yellow and brown and containing a few small black concretions, strongly acid, 22-30 inches thick; underlain by olive-gray clay, strongly plastic and slightly mottled with yellow and brown, strongly acid, 12-30 inches thick.

Calhoun soils are poorly drained soils occupying stream terraces from alluvium of loess origin. They differ from the Almo soils of like drainage and position in having sand-free profiles and from the Carroll soils in having a claypan at about 22 to 30 inches rather than 10 to 14 inches.

The Calhoun soils are inextensive and occur principally in the Purchase Region. They are best suited for pasture. Even with drainage they produce only fair yields of the cultivated crops common to the Purchase.

CALLOWAY silt loam

Yellowish-gray or brownish-gray silt loam faintly mottled in the

lower part with gray and light brown, strongly acid, 6-12 inches thick; underlain by pale yellow firm silty clay loam usually mottled with gray, strongly acid, 6-12 inches thick; underlain by gray very firm silty clay loam mottled and spotted with yellow and brown, strongly acid, 16-24 inches thick; underlain by brownish-yellow silty clay loam mottled with gray and light brown, strongly acid, 20-80 inches thick.

Calloway soils are somewhat poorly drained. They occupy flat to undulating uplands of loess origin, usually in close association with the Grenada and Henry soils. They are extensive in Calloway and Graves counties, and occur to less extent elsewhere in the Purchase, in the Cumberland-Tennessee river section, and in parts of the Western Coalfield. During favorable seasons they produce fairly good crops of dark tobacco, strawberries, lespedeza, redtop, and cowpeas. Corn and small-grain yields are only fair. Drainage improves yields and reduces the hazard for row crops and small grains.

CANEYVILLE stony silty clay loam

Brown friable silty clay loam, usually with some loose stone and limestone outcrop, slightly or moderately acid, about 7 inches thick; underlain typically by brown, reddish-brown, or red rather tough plastic silty clay but varying greatly in texture and thickness, slightly or moderately acid, 3-18 inches thick; underlain by widely variable materials, predominantly brownish-yellow tough plastic clay spotted with yellow, gray, and brown, near neutral, and shallow to bedrock.

Caneyville soils are shallow soils residual from irregularly mixed limestones, sandstones, and shales. They are well drained, occurring on gentle, rolling or hilly slopes in association with Christian and Westmoreland soils from like materials and, in places, Talbott and Colbert soils of limestone origin. They are stonier and shallower than the Christian soils. In contrast to Westmoreland soils, they have definite, usually reddish, subsoils and occupy less steep slopes. Many variations may occur within short distances in conformity with changes in parent materials.

The Caneyville soils are fairly extensive in the sandstone part of the Western Pennyroyal and along the junction of the Eastern Pennyroyal with the Eastern Coalfield. Agricultural use is considerably restricted because of stoniness and shallowness to bedrock. They produce fairly good pasture.

CAPTINA silt loam

Light brown or grayish-brown silt loam, moderately acid, 5-6 inches thick; underlain by yellow friable silty clay loam, moderately

acid, 16-20 inches thick; underlain by compact mottled yellow and gray silty clay loam hardpan, strongly acid, 10-12 inches thick; underlain by rather compact yellowish-brown silty clay, with streaks of light gray, and containing dark brown splotches, coatings, and concretions, strongly acid, 5 or 6 feet thick; underlain by stratified old alluvium.

Captina soils are moderately well drained, occupy gently sloping terrace positions, and are derived from old alluvium from uplands of limestone or mixed origin. They are associated with the well-drained Elk, and somewhat poorly drained Taft and poorly drained Robertsville soils.

The Captina soils are widely distributed along most streams in Kentucky that carry sediment originating wholly or partly in limestone country. They produce fair to moderately good yields of corn and hay, but are less desirable for small grain and much less for burley tobacco.

CARROLL silt loam

Whitish-gray floury silt loam somewhat splotched with yellow and containing some small soft dark concretions, strongly acid, about 10-12 inches thick; underlain by very tough compact gray to pale olive silty claypan, splotched with yellow and brown, very sticky and plastic when wet, strongly acid, 18-24 inches thick; underlain by a similar layer less heavy and impervious.

The poorly drained Carroll soils occupy level stream terraces derived from loessial sediments. They differ from the Calhoun soils of like position, origin, and drainage chiefly in that the tough claypan layer is at less depth and the surface soil is probably even lighter in color.

The Carroll soils are inextensive and unimportant except locally in the Purchase region. They are poor soils agriculturally and are mostly in forest. A small acreage is used for sorghum, soybeans, cow-peas, corn, and pasture, but yields are low and some areas formerly cropped are now idle or in brush.

CASEYVILLE silt loam

Yellowish-gray silt loam faintly mottled with yellowish brown in the lower part, near neutral, 6-10 inches thick; underlain by very friable olive-gray or light brownish-gray silt loam with many fine mottles of yellowish brown, near neutral, 8-14 inches thick; underlain by friable slightly plastic pale olive to yellowish-gray silt loam or silty clay loam mottled with yellowish brown, near neutral, 12-30 inches thick.

The poorly drained Caseyville soils occupy first bottoms from sediments of calcareous loess origin. The Memphis soils from deep loess are their principal upland associates, but other members of the Memphis catena may occur with them also. They are near neutral, whereas the Falaya and Waverly soils, also from loessial sediments, are strongly acid.

The Caseyville soils occur principally in Union, Henderson, and Daviess counties of the Western Coalfield and in the Purchase counties that border the Mississippi river. Their total extent is not large but they are of important occurrence locally. With drainage they produce good yields of corn, cotton, soybeans, and hay. Undrained, they are less suitable for row crops and probably are best used for pasture or forest.

CHILO silty clay loam

Dark brownish-gray heavy granular silty clay loam, plastic when wet, near neutral, 7-10 inches thick; underlain by brown, yellow, and dark gray spotted heavy plastic clay, alkaline or calcareous.

Chilo soils occupy flat or slightly depressed positions on stream terraces of the Ohio river in association with other members of the Wheeling catena. They are characterized by their dark surface and very poor drainage.

The Chilo soils are very inextensive. Undrained, their principal use is pasture but with drainage they are good soils for corn and the better hay crops. Small grains on them are apt to lodge.

CHRISTIAN silt loam

Light brown or grayish-brown friable silt loam, strongly acid, 6-10 inches thick; underlain by yellowish-brown or yellowish-red firm silty clay, strongly acid, 20-30 inches thick; underlain by irregularly mixed red, yellow, brown, and purple clay, sandy clay, or sandy loam, the color and texture differing with differences in parent rock; moderately to strongly acid, 6-24 inches thick; underlain by irregularly mixed limestones, sandstones, and shales.

Christian soils differ from the Talbott, Cookeville, and Wellston soils in being derived from mixed materials which give rise to wide variability in the lower part of the solum and in the substrata. They have thicker solums than the Caneyville soils of the same catena.

The Christian soils are rather extensive in the sandstone part of the Western Pennyroyal, particularly in Grayson county, and occur to some extent in Adair and other counties of the Eastern Pennyroyal. They are well drained and fairly productive for all the common field crops in these parts of the state.

CINCINNATI silt loam

Pale yellowish-brown smooth silt loam, moderately acid, 3-5 inches thick; underlain by light yellowish-brown silt loam, strongly acid, 8-12 inches thick; underlain by brownish-yellow light silty clay loam with reddish-brown colloidal coatings on structure units, and dark concretionary material in the lower part, strongly acid, 24-36 inches thick; underlain by coarsely mottled brownish-yellow and light yellowish-gray silty clay containing abundant dark concretions, strongly acid, 14-18 inches thick, grading into yellowish-brown clay loam, near neutral, containing many fragments of various stones, 40-60 inches thick; underlain by olive to bluish-gray calcareous Illinoian glacial till. A few quartz gravel may occur in any of the horizons.

Cincinnati soils are well drained, occupy gently rolling slopes in association with other members of the catena, and grade toward the Loudon and Edenton soils from shallow till over interbedded limestones and calcareous shales. Their solums resemble those of the Nicholson series derived from siltstones and loess, or either, from which they differ in being much thicker, somewhat heavier textured, deeper colored, and in containing a sprinkling of quartz gravel.

The Cincinnati soils occur very inextensively in a few counties along the Ohio river in northern Kentucky, principally in Trimble and Boone counties. They produce fair to moderate yields of corn, small grain, and hay.

CLEBURNE fine sandy loam

Grayish-brown to brownish-gray fine sandy loam, moderately acid, 3-4 inches thick; underlain by grayish-yellow fine sandy loam, moderately or strongly acid, 12-15 inches thick; underlain by yellow or brownish-yellow fine sandy clay loam slightly mottled with gray and reddish brown in the lower part, moderately or strongly acid; 10-15 inches thick; underlain by mottled yellow, gray, and reddish-brown fine sandy clay containing partially weathered sandstone fragments, grading into gray, yellow, or brown acid sandstone at a depth of 4-6 feet.

Cleburne soils are associated with the Hector, Hanceville, Linker, Hartsells, Muskingum, and similar soils derived from sandstones. They most closely resemble the Hartsells and Tilsit soils, differing from the former in having distinct textural profile differences within the solum and being somewhat less well drained, and from the latter in containing much sandy material throughout the solum and lacking a well-developed siltpan layer in the mottled zone of the lower subsoil.

The Cleburne soils are common on the broader ridges of the

Eastern Coalfield. They are low in fertility and produce poor to fair yields of corn and the less desirable hay and pasture species.

CLERMONT silt loam

Light gray weakly platy silt loam, strongly acid, 10-18 inches thick; underlain by mottled gray, yellow, and brown heavy silt loam, strongly acid, 22 inches thick; underlain by dark bluish-gray silty clay mottled with brown, extending 76 inches, or more, to grayish calcareous Illinoian glacial till.

The poorly drained Clermont soils occupy flat upland areas in association with other members of the Cincinnati catena. They are extremely inextensive, being confined to very small areas chiefly in Boone and Trimble counties. Crop yields are poor, and forest or pasture is the most suitable use.

CLEVELAND very fine sandy loam

Light gray very fine sandy loam, strongly acid, 4-8 inches thick; thick; underlain by light yellowish-brown plastic sandy clay containing some brown concretionary material, strongly acid, 3-4 inches thick; underlain by light yellowish-brown plastic sandy clay containing dark brown concretionary splotches and some gray mottling, strongly acid, 8-10 inches thick; underlain by a mottled sandy clay or claypan, strongly acid, 6-8 inches thick; grading through mottled clay or sandy materials into acid sandstone with some inter-bedded shale in places.

Cleveland soils occupy poorly drained flat areas in association with Cleburne and other soils of the same catena. They are sandier throughout and lack the high silt content of the Johnsborg and Mullins soils and are derived chiefly from sandstone.

The Cleveland soils are inextensive and occur as small flat areas principally in the Eastern Coalfield. They are best suited for forest and pasture.

COLBERT silt loam

Gray friable silt loam with limestone outcrops common in places, strongly acid, 1-3 inches thick; underlain by yellow friable heavy silt loam, strongly acid, 4-8 inches thick; underlain by yellow firm massive silty clay, plastic when wet, hard when dry, strongly acid, 2-6 inches thick; underlain by mottled pale yellow, gray, and reddish massive clay, strongly plastic when wet, very hard when dry, strongly acid, 12-24 inches thick over argillaceous limestone.

Colbert soils are shallower, have less horizon differentiation, are more plastic, and lighter colored than the Talbott soils with which they are associated.

The Colbert soils occur in scattered small areas chiefly in the Western Pennyroyal and to a less extent in the Eastern Pennyroyal. Their total extent is not large. Much of the acreage is in forest or has been cultivated and is now idle. Because of their poor physical make-up, shallowness, impeded drainage, and strong acidity, these soils are rather poor for crop production and are best suited for pasture or forest.

COLLINS silt loam

Grayish-brown to brownish-gray silt loam containing small brown concretions, moderately acid, 3-6 inches thick; underlain by brownish-gray friable silt loam containing small concretions, moderately acid, 8-12 inches thick; underlain by mottled light gray, yellow, and brown friable silt loam, moderately or strongly acid, extending to 40 inches or more, with brown stains and splotches increasing in number with depth.

Collins soils are moderately well drained, occupying stream floodplains in association with loess-derived uplands. They differ from the Hitesville soils in being more acid, and they lack the noticeable sand content of the Hyman soils, which are derived from mixed loess and Coastal Plain alluvium.

The Collins soils are widespread in the Purchase and in parts of the Western Coalfield. They are productive bottomland soils, particularly for corn, cowpeas, lespedeza, redtop, and other pasture and hay crops.

COLYER silt loam

Grayish-brown heavy silt loam containing numerous small weathered black shale fragments, moderately to strongly acid, 8-12 inches thick; underlain by disintegrated black highly fissile acid shale, the fragments acquiring a reddish tinge upon weathering; underlain immediately by unweathered black highly fissile acid shale. A deep phase is recognized in which the depth to shale bedrock is 2½ feet or more, and the solum contains a definite yellowish-brown silty clay loam B horizon. This phase is in reality an A-B-C soil which should be in a separate series.

Colyer soils (except the deep phase) are shallow skeletal soils derived from black Devonian shale. They are frequently associated with the Rockcastle soils derived from gray Mississippian (Waverly) shales.

The Colyer soils are of wide occurrence in the Knobs, particularly along the border of the Outer Bluegrass. They occur also in the Eastern Pennyroyal as small bands toward the base of steep slopes

in deeply dissected areas. They are best used for forest or pasture. When cultivated, they are unproductive and quickly erode down to the unweathered black shale, greatly reducing their original value for pasture or forest. The deep phase of the Colyer soils may be cultivated more safely, but yields of the common crops are only poor to fair.

COOKEVILLE silt loam

Pale yellowish-brown friable silt loam, moderately acid, 8-10 inches thick; underlain by yellowish-brown or pale reddish-brown heavy friable silt loam, moderately acid, 8-12 inches thick; underlain by bright red or bright yellowish-red moderately friable silty clay containing much very finely divided chert, moderately acid, 2 or 3 feet thick; underlain by moderately compact silty clay predominantly reddish but mottled with yellow, gray, and brown containing much very finely divided chert, moderately acid, several feet thick.

Cookeville soils are associated principally with the Baxter, Dickson, Ashburn, Bewleyville, and Christian soils. Compared with the Baxter and Ashburn soils, they are essentially free of sizeable chert fragments. They lack the variability of the Christian soils in the lower horizons and are more reddish and are heavier in the subsoil than the Bewleyville soils.

The Cookeville soils are important agricultural soils in the Eastern Pennyroyal and eastern part of the Western Pennyroyal, particularly in Simpson county. They are well drained and produce fair to moderately good crops of corn, tobacco, small grain, clovers, lespezea, and grasses.

COOLVILLE silt loam

Light grayish-yellow friable silt loam, strongly acid, 5-7 inches thick; underlain by yellowish-brown heavy silt loam or silty clay loam mottled with gray in the lower part, strongly acid, 14-20 inches thick; underlain by mottled yellow, gray, and red silty clay, strongly acid, 6-10 inches thick, grading into mottled gray, red, and yellow heavy stiff plastic clay, underlain by clay shale at a depth of about 4 feet.

The Coolville soils occupy rolling uplands from heavy acid Pennsylvanian shales in association with the Rarden soils, from which they differ in having much lighter textured and less mottled upper subsoils.

The Coolville soils are important locally in the northeastern part of the Eastern Coalfield, particularly in Boyd and Lawrence counties. They are moderately productive for pasture, their best and principal use.

COTACO fine sandy loam

Light brown to light grayish-brown friable fine sandy loam, moderately acid, about 10 or 12 inches thick; underlain by light yellowish-brown friable fine sandy loam or loam splotched with gray, moderately acid, 1-2 feet thick; underlain by variable but predominantly brownish-yellow loam or light clay loam, more or less splotched with gray, yellow and brown.

Cotaco soils are moderately well drained. They occupy local alluvial fans and benches in association with the well drained Barbourville soils, and are from accumulations washed chiefly from Muskingum and similar upland soils. They are of minor extent and occur principally in the Eastern Coalfield; however, they are important locally, particularly in the rougher areas in which cropland is limited. They are suitable and fairly productive for corn and hay.

CRAINTOWN silt loam

Grayish-brown heavy silt loam to light silty clay loam, near neutral, 8-10 inches thick; underlain by slightly reddish-brown rather tough silty clay, near neutral, 12-18 inches thick; underlain by blocky heavy silty clay splotched with bright yellow, light brown, and light red, moderately acid, 1-2 feet thick; underlain by splotched light brown and olive-gray heavy clay, strongly acid, variable in thickness.

Craintown soils occupy gently rolling or rolling areas in close association with the Lowell soils of the Outer Bluegrass. Apparently they are derived from acid shale lenses occurring in or just above the argillaceous limestone that gives rise to the Lowell soils. Their subsoils are more reddish, more acid, and more coarsely blocky than those of the Lowell soils. They resemble the Fleming soils in the lower subsoil but are much heavier textured and coarser structured in the upper subsoil.

The Craintown soils are very inextensive and probably occur only locally in parts of the Outer Bluegrass, particularly in Fleming county. They are well suited for pasture with occasional cultivation to tobacco or corn. Yields are fair to moderately good.

CRIDER silt loam

Brown, very friable silt loam, moderately acid, 6-10 inches thick; underlain by yellowish-brown friable silt loam, moderately acid, 4-8 inches thick; underlain by brown, friable silty clay loam becoming reddish with depth, strongly acid, 20-40 inches thick; underlain by reddish-brown or red firm silty clay.

The Crider soils are derived from shallow loess overlying high-

grade limestones. They are well drained and occupy undulating to gently rolling or smooth karst uplands in association with Hagerstown and Russellville soils and, less commonly, with Cookeville and Dickson soils. They are siltier throughout the solum and less red in the subsoil than the Hagerstown soils. They lack the faint brittle silt pan of the Russellville soils and are more reddish in the lower subsoil. Compared with the Cookeville and Dickson soils, they are chert-free, browner in the surface, and more productive.

The Crider soils are extensive in the Western Pennyroyal, particularly in Caldwell and Christian and to a less extent in Todd and Logan counties. They are likewise important in Jefferson, Oldham, and Bullitt counties of the Outer Bluegrass. They produce moderate to good yields of corn, tobacco, small grain, orchard grass hay and seed, clovers, and other crops adapted to Kentucky.

CROCUS silt loam

Brown or grayish-brown friable silt loam, moderately acid, 6-8 inches thick; underlain by yellow or light yellowish-brown hard sandy clay loam or silty clay loam, moderately acid, 10 or 15 inches thick; underlain by mottled yellow, gray, and brown silty or sandy hardpan layer containing numerous dark stains and concretions, strongly acid, 10 or 12 inches thick; underlain by variable alluvium of stratified sandy and silty materials with clay and water-worn gravel in places.

The Crocus soils are moderately well drained. They occupy low stream terraces or low-lying old colluvial deposits in association with Captina soils, which they resemble but from which they differ principally in having hard somewhat indurated subsoils. They are important locally along major streams and important tributaries in Cumberland county and possibly other counties of the Eastern Pennyroyal. Total acreage is probably small. They are suitable for corn and hay, but yields are only fair to moderate.

CROSSVILLE loam

Brown friable loam, strongly acid, 6-8 inches thick; underlain by yellowish-brown friable fine sandy clay faintly splotched with yellow, brown and red in the lower part, strongly acid, 20-24 inches thick; grading through yellow fine sand and partially weathered sandstone fragments into sandstone bedrock.

Crossville soils are well drained. They occupy gently sloping to rolling areas in association with Hartsells soils from which they differ in being browner throughout the profile, heavier textured in

the subsoil, and more shallow to rock. These soils are of minor occurrence in the Eastern Coalfield. They are suitable for general field crops, but yields are only fair.

CRUZE silt loam

Grayish-brown heavy silt loam containing weathered shale fragments in places, acid, 6-9 inches thick; underlain by a similar layer with much less organic matter and becoming somewhat heavier and blockier with depth, acid, 8-12 inches thick; underlain by mottled gray, yellow, and pale olive heavy silty clay containing more or less weathered shale fragments, acid, variable in thickness.

Cruze soils consist of young local accumulations on alluvial fans and footslope positions and adjacent to small streams, in association with the Fawcett, Colyer, and similar upland soils derived from heavy acid shale. They are better drained, have less profile development, contain more organic matter in the surface layers, and are more productive than the Leadvale soils which may occur in similar positions.

The Cruze soils are very minor soils of the Knobs. They occur in small areas which may be of considerable agricultural importance locally in the rougher sections where agricultural land is limited. They are used largely for corn and hay, of which they produce fair to moderately good yields.

CULLEOKA flaggy silt loam

Light brown or brown friable silt loam containing rock fragments varying from small shaly particles to slabs of limestone and porous sandstone a foot or more in length, slightly acid, 5-18 inches thick; underlain by brownish-yellow or yellow friable silt loam or silty clay loam containing rock fragments as above, slightly acid, 10-14 inches thick; underlain by porous fine-grained sandstone over interstratified soft calcareous shale and thin bedded limestone.

The Culleoka series includes moderately young soils occupying rolling to steep slopes in association with the Eden and Fairmount soils. The solum, composed largely of creep materials from leached calcareous sandstone, varies in thickness, becoming shallower toward the bottoms of the slopes.

Culleoka soils are important chiefly in Garrard, Madison, and Jessamine counties. They produce moderately high yields of tobacco, corn, hay, and pasture. Steepness of slope and stoniness reduce their value considerably for cultivation.

CUMBERLAND loam

Brown to dark reddish-brown friable loam, acid, 8-12 inches thick; underlain by red or reddish-brown firm friable clay loam, acid, several feet thick.

Cumberland soils are well drained. They occupy high terraces. They are older and have redder subsoils than the Etowah soils. Compared with the Waynesboro soils they are much less sandy throughout and show more influence of sediments washed from limestone materials.

The Cumberland soils occur at high elevation along major streams in central Kentucky and to a less extent in other parts of the state. They are well suited for agriculture and produce moderate to good yields of corn, tobacco, small grain, and hay.

DAWKINS silty clay loam

Brown or dark brown heavy silt loam to silty clay loam, near neutral, 6-10 inches thick (outcrop ledges of massive limestone are characteristic); underlain by brown, yellowish-brown reddish-brown, red, or olive silty clay loam to heavy silty clay, near neutral, 3 inches to 2 feet thick; underlain by limestone bedrock.

Dawkins soils, derived principally from siliceous Silurian limestone, occupy deeper drainage slopes in association with Hagerstown, Crider, Russellville, Talbott, and Fleming soils occurring geologically above areas of Beasley, Otway, Lowell, and Fairmount soils from Ordovician limestone. The solum is highly variable in thickness and other characteristics. The Dawkins soils resemble the Fairmount soils in some respects but differ from them in having more variable and more highly colored subsoils, and in the presence of frequent outcrop ledges of massive limestone.

The Dawkins soils are of important occurrence along the border of the Outer Bluegrass and Knobs and in deeply dissected areas within the Knobs, particularly in Nelson, Bullitt, Jefferson, Oldham, and Trimble counties. They are excellent pasture soils, but the steepness of slope and presence of limestone ledges make them unsuitable for cultivation.

DECATUR silt loam

Reddish-brown friable heavy silt loam, moderately acid, 10-14 inches thick; underlain by red or dark red heavy silty clay or clay, moderately acid, 36-40 inches thick; underlain by friable red clay, acid, about 2 feet thick; underlain by mottled and streaked reddish-brown and yellow friable material grading downward through limestone residuum to high-grade limestone bedrock.

Decatur soils are well drained. They occupy gently sloping or karsted (sinkhole) areas in association with Hagerstown, Crider, Russellville, Ashburn, and similar soils entirely or partly of high-grade limestone origin. They are redder and heavier textured in the subsoil than the Hagerstown, Crider, and Russellville soils and lack the high chert content of the Ashburn soils.

The Decatur soils are extensive and important in the limestone part of the Western Pennyroyal, particularly in Warren, Logan, Todd, and Hardin counties, and occur much less extensively in the Eastern Pennyroyal. They are excellent agricultural soils where un-eroded, and produce good yields of corn, tobacco, small grain, clover, orchard grass hay and seed, and other crops adapted to the region.

DEKOVEN silt loam

Dark brown to very dark gray, friable silt loam, near neutral, 10-20 inches thick; underlain by olive-gray or brownish-gray silty clay loam finely mottled with yellowish-brown, near neutral, 10-20 inches thick; underlain by pale olive to light olive-brown silty clay loam containing many fine and medium sized mottles of dark yellowish-brown, slightly plastic, near neutral to alkaline, 12-30 inches thick.

Dekoven soils are dark very poorly drained soils which occupy low areas of flood plains consisting of alluvium from calcareous loess uplands. They are of limited occurrence, but important locally in Union, Henderson, and Daviess counties, and in the counties bordering the Mississippi river. With adequate drainage, they produce high yields of corn and hay and excellent pasture.

DEXTER fine sandy loam

Brownish-gray friable fine sandy loam, moderately acid, about 8 inches thick; underlain by yellowish-brown or slightly reddish-brown friable silty clay loam or clay loam, moderately acid, 16-24 inches thick; underlain by predominantly brownish-yellow friable fine sandy clay loam with yellow, brown, and gray splotches becoming more prominent with depth, moderately acid, 2 feet or more thick.

Dexter soils are well drained. They occupy stream terraces composed of materials washed from mixed loess and coastal-plain uplands. They differ from the Lintonia soils, derived from old alluvium from loessial uplands, principally in the presence of sand throughout the profile.

The Dexter soils are of minor occurrence in the central and eastern portions of the Purchase, and in the Cumberland-Tennessee river section. They are well suited to the common field crops, including dark tobacco, corn, small grain, and lespedeza and other hay crops.

and produce moderate to high yields for the sections in which they occur.

DICKSON silt loam

Grayish-yellow or brownish-yellow friable silt loam, strongly acid, 10-13 inches thick; underlain by brownish-yellow friable silty clay loam, strongly acid, 15-20 inches thick; underlain by mottled yellow, gray, and brown compact silty clay hardpan layer, strongly acid, 10-12 inches thick; underlain by coarsely mottled light gray, yellow, and reddish silty clay. Small angular chert fragments are common throughout the profile; generally, they are much more numerous and larger in the lower layers.

Dickson soils are largely residual from low-grade cherty limestones but are influenced by shallow loess in places. They occupy undulating to gently rolling divides and broad ridges in association with Baxter, Bodine, Cookeville, Weon, Malt, and Sango soils. They are distinguished from the Bewleyville and Russellville soils by their chert content, their lighter-colored solums, and their lower productivity.

Dickson soils are among the most extensive and important soils of the Eastern and Western Pennyroyal sections and occur to some extent on the broader higher ridges in the Knobs. They are suitable for cultivation and are widely used for a large variety of crops but are only fairly productive. The principal crops grown on the Dickson soils are corn, burley tobacco, small grain, lespedeza, and redtop. These soils are also used extensively for pasture and a considerable acreage is in brush and woods.

DODDS fine sandy loam

Light yellowish-gray very friable fine sandy loam, strongly acid, 10-14 inches thick; underlain by pale yellow friable fine sandy clay loam, strongly acid, 18-24 inches thick; underlain by mottled yellow and gray compact fine sandy clay hardpan, strongly acid, 8-12 inches thick; underlain by variable old alluvial materials predominantly yellow and sandy but splotched and streaked with gray and containing heavy lenses and beds of water-worn gravel, strongly acid.

Dodds soils occupy old terraces in association with Bybee and Goodloe soils high above present stream courses, commonly in areas of residual soils to which they bear little resemblance. They are older and more leached and have paler subsoils and deeper hardpan layers than the Monongahela or Captina soils.

The Dodds soils are of very minor occurrence along the Kentucky and Licking rivers, and their major tributaries throughout central Kentucky. They are poor soils agriculturally and give low yields of corn, hay, and pasture.

DONERAIL silt loam

Grayish-brown or brown friable silt loam, moderately acid, 10-13 inches thick; underlain by yellowish-brown silty clay loam or silty clay splotched with gray, brown, and yellow, strongly acid, extending to level bedded phosphatic limestone at 3 to 5 feet.

Donerail soils occupy gently sloping topography in association with the Maury soils of the Inner Bluegrass. They are higher in phosphate, browner in surface and subsoil, and less heavy and plastic in the lower subsoil than the Mercer soils and less well drained than the Maury and Loradale soils.

The Donerail soils are fertile and productive but less desirable than the associated Maury soils because of their impeded drainage. In good seasons, they produce moderate to high yields of corn and hay crops but only fair yields of burley tobacco. They are good pasture soils and are used to considerable extent for this purpose.

DOWELLTON silt loam

Gray friable heavy silt loam, acid, 8-10 inches thick; underlain by predominantly whitish-gray sticky plastic silty clay splotched with yellow and brown, acid, extending to limestone bedrock at depths of 2 to 4 feet.

The Dowellton soils occupy flat areas or seepy areas on slopes in association with the Colbert soils from which they differ in being more poorly drained throughout the profile. These soils are of very minor occurrence as small scattered areas in the Western Pennyroyal and possibly in the Eastern Pennyroyal. They are ill-suited for cultivation but fairly well suited for pasture.

DUNNING silty clay loam

Dark gray silty clay loam, near neutral, 10-15 inches thick; underlain by olive-gray tough very plastic clay or silty clay mottled with yellow and brown, near neutral, 3 feet or more thick.

Dunning soils occur as small very poorly drained areas along streams throughout the limestone sections of Kentucky in association with other members of the Huntington catena. In their natural state, they are good pasture soils; when drained they produce good to excellent yields of corn and hay.

DYER silt loam

Gray friable silt loam which may be mottled with yellow or brown and contain small dark brown concretions, moderately or strongly acid, 4-8 inches thick; underlain by mottled gray, yellowish-gray, and pale brown friable silt loam containing an abundance of small dark concretions, moderately or strongly acid, 20-60 inches thick.

Dyer soils are poorly drained. They occur in upland drainage-ways, upland depressions, and along toe slopes bordering floodplains in the acid loess belt of the Purchase region, in the Cumberland-Tennessee river section, and in parts of the Western Coalfield. They lack the sand content throughout the profile which characterizes the Foltz soils on similar positions but derived partly from coastal-plain materials.

Total acreage of the Dyer soils is very small. They are poorly adapted to cultivation, and yields of corn, cowpeas, soybeans, red-top, lespedeza, and sorghum grown on them are generally low.

EDEN silty clay loam

Grayish-brown heavy silty clay loam or silty clay (contains subsoil material in practically all cultivated areas), near neutral, 4-6 inches thick; underlain by yellow to yellowish-brown heavy silty clay mottled in places in the lower part with pale yellow, gray, and olive-brown, near neutral, 6-30 inches thick; underlain by calcareous pale yellow, gray, and olive-brown shales interstratified with thin-bedded limestones and siltstones.

Eden soils occupy steep slopes throughout the Bluegrass Hills. Compared with the Fairmount soils, with which they are sometimes associated, the Eden soils are deeper to bedrock, less calcareous, have lighter colored surface soils, and their parent materials are higher in siltstone and calcareous shale but lower in limestone content.

The Eden soils are the principal soils of the Bluegrass Hills and are highly important to the agriculture of this section. They are high in potash, moderately high in phosphate, and in most places contain enough lime to grow alfalfa without liming. Corn and tobacco yields are only moderately good because of susceptibility of the soils to drouth. Their steep slopes limit their value for cultivation, and they are used principally for pasture (in long rotation) to which they are well adapted except during the midsummer drouth.

EDENTON silt loam

Light brown or grayish-brown friable silt loam, acid, 7-10 inches thick; underlain by yellowish-brown friable silty clay loam or silty clay mottled with gray, yellow, and brown in the lower part, acid, 10-12 inches thick; underlain by yellowish-brown friable slightly calcareous clay, about 15 inches thick; underlain by interbedded limestones and calcareous shales. Quartz pebbles and other erratics are common on the surface and throughout the profile.

Edenton soils are well-drained soils from shallow Illinoian till over interbedded calcareous shale and limestone. They occur on

ridges and upper parts of rolling to steep slopes in association with Eden and Fairmount soils near the edge of the Illinoian till belt. They are intermediate in profile characteristics between the Cincinnati and Fairmount soils.

The Edenton soils are very limited in extent, occurring in only a few counties bordering the Ohio river in northern Kentucky. They are well suited for pasture and hay crops but less suited for corn and burley tobacco.

ELBRIDGE silty clay loam

Dark gray friable heavy silt loam or silty clay loam, near neutral, 12-15 inches thick; underlain by moderately dark gray or olive-gray moderately tough silty clay mottled with pale yellow and gray, the mottling increasing in intensity with depth.

Elbridge soils are very poorly drained. They occupy flat or depressional upland areas derived from calcareous loess. They resemble the Dekoven soils of the first bottoms in color and reaction but have more profile development.

The Elbridge soils are very inextensive and occur principally in the Purchase counties bordering the Mississippi river. With drainage, they produce good yields of corn, hay, and pasture.

ELK silt loam

Brown or light brown friable silt loam, moderately acid, 8-12 inches thick; underlain by light brown or yellowish-brown friable silty clay loam or silty clay, moderately acid, 2 feet or more thick; underlain by stratified alluvial material, principally silt and clay, but in places gravel and sand.

Elk soils are widely distributed and important along major streams throughout all the limestone sections of the state. They are well drained but lack the reddish color of the Etowah soils with which they are associated. They are desirable agricultural soils which produce good yields of corn, tobacco, small grain, and hay.

ELLSBERRY silt loam

Brown to grayish-brown heavy silt loam, acid, 5-8 inches thick; underlain by yellowish-brown or brown heavy plastic silty clay with distinct small red mottles, acid, 10-15 inches thick; underlain by light yellow to olive heavy plastic clay with some reddish streaks and calcareous material in the lower part, grading into interbedded soft calcareous shale and thin limestone at 1½ to 3 feet.

The Ellsberry soils are extremely minor in importance, occurring as a few small areas on gently sloping ridgetops and upper slopes in northern Kentucky in association with Heitt and Fairmount soils.

They are less well drained and less red in the subsoil than Heitt soils and have considerably more profile development than the Fairmount soils. Their principal use is bluegrass pasture, to which they are fairly well adapted.

ENNIS cherty silt loam

Light brown to grayish-brown mellow cherty silt loam, moderately acid, 10-12 inches thick; underlain by brown to yellowish-brown cherty silt loam to silty clay loam splotched with brown and gray in the lower part, moderately acid, 30-40 inches thick; underlain by cherty stratified materials.

Ennis soils consist of well-drained first-bottom sediments from upland soils of cherty limestone origin, such as those of the Dickson, Baxter, Bodine, Weon, and Malt series. They are paler brown and more acid than the Huntington soils and typically contain a considerable quantity of chert fragments.

The Ennis soils are extensive along local streams in the Eastern Pennyroyal and to some extent in the Knobs and cherty limestone areas of the Western Pennyroyal. They are used principally for corn and forage crops, to which they are well adapted, but produce only fair to moderate yields.

ETOWAH silt loam

Light yellowish-brown very friable silt loam, moderately to strongly acid, 8-14 inches thick; underlain by yellowish-red firm silty clay loam, or clay loam, strongly acid, 10-24 inches thick; underlain by yellowish-red firm silty clay loam or clay loam with yellow mottlings and a few dark concretions, strongly acid, 4-10 inches thick; underlain by light yellowish-brown friable clay loam mottled with brownish-gray and reddish brown and containing some soft brown concretions, strongly acid, 10-30 inches thick.

Etowah soils are well drained. They occupy stream terraces in association with Cumberland, Elk, and Captina soils in all the limestone portions of Kentucky. They are younger and have less red subsoil than the Cumberland soils and are redder in the subsoil and somewhat older than the Elk soils.

Though rather widely distributed, the total acreage of Etowah soils is not large. They are well adapted to, and produce moderately good yields of, the common agricultural crops of the state.

EUPORA loam

Light-brown friable loam, moderately to strongly acid, 6-14 inches thick; underlain by mottled light brownish-gray, yellowish-brown,

and brown friable loam, moderately acid, 6-12 inches thick; grading into yellowish-gray loam or sandy loam with numerous brown stains and small concretions, moderately acid, thickness variable.

Eupora soils are moderately well drained. They occupy local draws, depressions, and stream heads in association with Lexington, Providence, Brandon, and similar upland soils. Compared with the Briensburg soils, of like drainage and position, they have a noticeable sand content throughout the profile, being derived from mixed loess and coastal-plain materials rather than loess materials only.

The Eupora soils are of considerable local importance in the Purchase and Cumberland-Tennessee river sections. They are prized for truck crops and are moderately productive of such field crops as corn, cowpeas, small grain, lespedeza, and redtop.

FAIRMOUNT silty clay loam

Dark brownish-gray to nearly black fine granular silty clay loam, near neutral, 4-10 inches thick; underlain by brownish-yellow or olive tough plastic clay, near neutral, 6-20 inches thick; underlain by thin-bedded limestone or thinly interbedded limestone and calcareous shale.

Fairmount soils occupy steep slopes in association with Lowell, Shelbyville, and Eden soils. They have darker surfaces, are shallower to bedrock, and contain a much larger portion of limestone than the Eden soils. Limestone slabs on the surface are characteristic of many areas.

The Fairmount soils are widely distributed and of considerable importance in the Outer Bluegrass Region and to a less extent in the Bluegrass Hills. They are excellent pasture soils but their steep slopes, shallow profiles, and stoniness make them ill-adapted for cultivation.

FALAYA silt loam

Light brownish-gray floury silt loam, strongly acid, 8-10 inches thick; underlain by pale yellow friable silty clay loam splotted with gray and yellow in the lower part, strongly acid, 6-10 inches thick; underlain by predominantly gray or brownish-gray tough silty clay profusely mottled with pale yellow and brown, the gray increasing with depth.

Falaya soils are somewhat poorly drained. They occur on first bottoms in association with other members of the Vicksburg catena. They lack the sand content of the Ina soils, being composed of loess sediments rather than sediments of mixed loess and coastal-plain origin.

The Falaya soils are of considerable importance and extent in

the Purchase Region and less so in parts of the Western Coalfield. They produce fairly good yields of corn, sorghum, and hay, but are poorly adapted to tobacco and small grain because of inadequate drainage and susceptibility to flooding.

FALMOUTH silt loam

Moderately dark brownish-yellow silt loam, near neutral, about 12 inches thick; underlain by dull yellowish-brown friable silty clay loam, slightly acid, 18-30 inches thick; underlain by predominantly yellowish-brown moderately friable silty clay loam splotched with yellow, gray, and brown, near neutral, 2 or 3 feet thick.

Falmouth soils occupy low stream terraces or high bottoms in association with soils of the Elk and Huntington catenas. They have less profile development and are not so acid in reaction as the Elk soils. Compared with the Huntington soils, they have definite profiles and lie above normal flood stage.

The Falmouth soils are of wide distribution, but the total acreage is small. They occur principally along the Licking, Kentucky, and Ohio rivers. They are well adapted to farming and produce good to high yields of corn, small grain, hay, other general farm crops, and pasture.

FAWCETT silt loam

Light grayish-brown moderately friable heavy silt loam, strongly acid, 8-10 inches thick; underlain by brownish-yellow plastic silty clay or silty clay loam, strongly acid, 10-12 inches thick; underlain by mottled red, gray, and yellow plastic silty clay, strongly acid, 12 inches thick; underlain by disintegrated acid gray shale.

Fawcett soils are moderately well drained and occupy gentle slopes in association with Rockcastle and Leadvale soils. They are much heavier in the subsoil than Tilsit or Byington soils. They differ from the Byington soils also in coming from soft light-colored acid shale rather than black fissile shale.

The Fawcett soils are of minor extent, principally in the Knobs. They are poor agriculturally, and many areas formerly cultivated have been abandoned and allowed to grow up in broomsedge, sassafras, and similar growth.

FLEMING silt loam

Brown mellow heavy silt loam, moderately acid, 10-12 inches thick; underlain by yellowish-red moderately friable silty clay loam with small yellow splotches in the lower part, moderately acid, 12-24 inches thick; underlain by yellow or grayish-yellow plastic sticky

silty clay with varying proportions of gray and brown splotches, moderately acid, depth variable to limestone bedrock.

Fleming soils are well drained. They occupy undulating to rolling slopes in association with Hagerstown, Talbott, and similar soils. They resemble Hagerstown soils in the A and upper B horizons but are much heavier and mottled in the lower B horizon.

The Fleming soils are of small total acreage. They occur chiefly along the inner border of the Knobs adjacent to the Outer Bluegrass. Small areas may also occur in the high-grade limestone portions of the Western and Eastern Pennyroyal. Practically all the acreage is used either for permanent pasture or for corn, small grain, or hay. Crop yields are fair to moderately good.

FOLTZ fine sandy loam

Gray to light brownish-gray fine sandy loam, strongly acid, 10-14 inches thick; underlain by grayish fine sandy loam or loam containing some yellow mottlings and concretions, strongly acid, variable in thickness.

Foltz soils consist of poorly drained local alluvial-colluvial deposits at the base of slopes, in depressions and stream heads, and along local draws in association with Lexington, Providence, Brandon, and Lax soils of the uplands. Compared with the Dyer soils of like position and drainage, they contain sand throughout the profile, being derived from mixed loess and coastal-plain materials rather than loess materials only.

The Foltz soils are of very minor occurrence, in the Purchase and Cumberland-Tennessee river section. Because of their wet condition they are poor agriculturally and are best used for pasture.

FREELAND fine sandy loam

Light yellowish-brown friable fine sandy loam, strongly acid, 7-10 inches thick; underlain by yellowish-brown friable sandy clay loam or sandy clay, strongly acid, 12-20 inches thick; underlain by yellowish-brown sandy clay loam hardpan, mottled with light gray, strongly acid, 12-20 inches thick; underlain by yellowish-brown fine sandy clay loam or silty clay loam mottled with light yellowish-brown and light gray, strongly acid.

Freeland soils are moderately well drained. They occupy stream terraces derived from sediments of mixed loess and coastal-plain origin in association with other members of the Dexter catena. Compared with the Richland soils, from essentially purely loess sediments, they contain sandy materials throughout the profile.

The Freeland soils are fairly widely distributed in small areas along streams in the Cumberland-Tennessee river section and the central and eastern portions of the Purchase. Total acreage is small. These soils produce fair to moderately good yields of corn, dark tobacco, lespedeza, soybeans, sorghum, small grain, forage crops, and pasture.

GINAT silt loam

Light gray friable silt loam spotted or mottled with yellow and brown, moderately acid, 10-12 inches thick; underlain by grayish silty clay loam, strongly acid, 12-15 inches thick; underlain by asorted water-laid acid sediments.

Ginat soils are poorly drained. They occupy terraces along the Ohio river and along the Cumberland and Tennessee rivers in western Kentucky. Total acreage is small. Crop yields are poor and pasture is the best use without drainage, but with drainage fair yields of corn and hay crops are possible.

GOEHAGAN silt loam

Brownish-gray to gray weakly platy silt loam, moderately acid, 3-5 inches thick; underlain by dark brown to olive-brown silty clay loam or silty clay, near neutral, 12-24 inches thick; underlain by olive to light brown heavy blocky calcareous silty clay or clay, commonly containing abundant calcareous concretions and quartz pebbles. Stratification of gray and yellow mottled or streaked silty layers with layers of various shades of brown may occur anywhere in this horizon; 2-25 or more feet thick.

The Goehagan soils are developed from heavy calcareous alluvial sediments and occupy undulating to steep slopes of dissected stream terraces. They are of extremely minor occurrence, toward the mouths of tributaries along the Ohio river. They are best used for pasture and hay crops, but will produce fair to moderate yields of corn.

GOODLOE very fine sandy loam

Light brownish-gray very fine sandy loam, strongly acid, 10-22 inches thick; underlain by yellow to pale yellowish-brown very fine sandy loam, strongly acid, 14 inches thick; underlain by yellow or yellowish-brown friable fine sandy clay loam, strongly acid, 2-2½ feet thick; underlain by spotted and streaked gray, yellow, and reddish-compact sandy clay hardpan, strongly acid, 2 feet or more thick; underlain by strongly acid old alluvial materials predominantly yellow and sandy, but extremely variable. Gravel, particularly quartz pebbles, may occur anywhere in the profile.

Goodloe soils occupy terraces high above present stream levels in association with Bybee and Dodds soils of the same catena. They are sandy, strongly acid, and highly leached and may differ markedly from the soils of the surrounding uplands. Although of very small total acreage, they are widely distributed as small areas along the Licking, Kentucky, and Cumberland rivers in central and eastern Kentucky. They produce poor to fair yields of corn, small grain, hay, and pasture.

GREENDALE silt loam

Light grayish-brown friable silt loam, moderately acid, 7-10 inches thick; underlain by brownish-yellow friable light silty clay loam, moderately acid, 20-25 inches thick; underlain by yellow, brown, and gray, friable silty clay loam of variable depth to residual material.

The Greendale soils are well drained. They occupy the bases of slopes in association with Westmoreland, Rockcastle, Dickson, and other upland soils from cherty limestones and shales. They are browner and more productive than the Tarklin soils but lack the red subsoil and freedom from chert characteristic of the Hermitage soils.

The Greendale soils are of considerable importance locally in the Eastern Pennyroyal and Knobs, particularly in the rougher portions where agricultural land is scarce. The steeper slopes are best suited for pasture and the gentler slopes produce fair yields of corn, tobacco, small grain, and hay.

GRENADA silt loam

Light grayish-brown smooth friable silt loam, moderately or strongly acid, 8-11 inches thick; underlain by brownish-yellow friable silty clay loam containing small iron concretions in the lower part, moderately or strongly acid, 12-16 inches thick; underlain by a compact siltpan, mottled and streaked yellow, light gray, and brown silty clay loam or silty clay, strongly acid, 12-15 inches thick; underlain by more friable mottled yellowish-brown and light gray silt loam or light silty clay loam, moderately acid, 2-4 feet thick grading into loess or other underlying materials.

Grenada soils are moderately well drained, occupying smooth loessial uplands in association with other members of the Memphis catena. Compared with the Loring soils, they are not so brown in the subsoil and have a more strongly developed hardpan at shallow depth. They differ from the Providence and Lax soils in containing no sand or gravel within the profile.

The Grenada soils are widespread and among the most important agricultural soils of the Purchase and parts of the Western Coalfield.

They produce fair to moderately good yields of dark tobacco, cotton, corn, lespedeza, cowpeas, Bermuda grass, soybeans, strawberries, and other crops adapted to these areas.

GUIN gravelly sandy loam

Yellowish-gray gravelly sandy loam, strongly acid, 4-7 inches thick; underlain by gravel beds mixed with some red or yellow soil material and indurated in places, strongly acid, extending to a depth of several feet in most places.

Guin soils are excessively drained, occupying rough broken areas derived largely from coastal-plain gravel beds. They are minor non-agricultural soils found chiefly in the Cumberland-Tennessee river section and areas immediately adjacent to it. They are best suited for forestry and wildlife.

GUTHRIE silt loam

Light gray floury silt loam, strongly acid, 8-10 inches thick; underlain by predominantly gray silty clay loam mottled with yellow and brown, strongly acid, 7-18 inches thick; underlain by gray heavy clay or silty clay mottled with yellow and brown, strongly acid, 1-3 feet or more thick.

Guthrie soils are poorly drained, occupying flat areas in association with Dickson, Sango, Bedford, Lawrence, and other soils of limestone origin. A depressional phase is recognized which occupies basins of limestone sinks and depressions.

The Guthrie soils are widespread throughout the Eastern Pennyroyal and to a less extent the limestone sections of the Western Pennyroyal. A few areas occur in central Kentucky. The presence of Guthrie soils is generally associated with flat, poorly-drained, wooded areas. These soils produce very poor yields of crops and are best suited for forest or pasture.

HAGERSTOWN silt loam

Brown, friable silt loam, moderately acid, 6-10 inches thick; underlain by light brown or yellowish-brown heavy friable silt loam, moderately or strongly acid, 4-8 inches thick; underlain by reddish-brown firm to friable silty clay becoming heavier and redder with depth, moderately acid, about 32 inches thick overlying high-grade limestone.

Hagerstown soils are well drained, occupying undulating to rolling slopes. They are residual from high-grade limestones, resembling

the Maury soils but lacking the high phosphate content of the Maury soils. They are less red and more friable in the subsoil than the Decatur soils. Compared with the Crider soils, they have heavier and redder subsoils.

The Hagerstown soils are widespread in the limestone part of the Western Pennyroyal, particularly in Christian, Todd, Logan, Hardin, and Larue counties, and are also rather extensive in parts of the Eastern Pennyroyal, adjacent to the Knobs in the Outer Bluegrass, and in the Inner Bluegrass. They are among the best agricultural soils of the state and produce good yields of burley tobacco, corn, wheat, orchard grass hay and seed, clover, bluegrass, and other important crops.

HAMBLEN silt loam

Grayish-yellow friable silt loam, near neutral, 8-10 inches thick; underlain by grayish-yellow friable silt loam to silty clay loam splotted with gray, yellow, and brown in the lower part, slightly acid, 10-20 inches thick; underlain by predominantly gray moderately friable silty clay loam or silty clay profusely splotted with gray, yellow, and brown, slightly acid, in places extending into sandy or gravelly layers.

Hamble soils are moderately well drained to somewhat poorly drained. They occupy first bottoms composed of sediments from upland soils of sandstone, acid shale, calcareous shale, and limestone origin, in places influenced by loess. They are less acid than the Philo soils and are less brown and less productive than the Lindsides soils.

The Hamble soils occur principally in the Knobs, Eastern Pennyroyal, and sandstone part of the Western Pennyroyal. They are very extensive and produce fair to moderately good yields of corn, hay, and pasture, and are particularly important to agriculture in rougher areas where suitable cropland is scarce.

HANCEVILLE fine sandy loam

Grayish-brown or brown fine sandy loam, strongly acid, 2-3 inches thick; underlain by yellowish-brown or reddish-yellow friable fine sandy loam, strongly acid, 6-10 inches thick; underlain by reddish-brown or yellowish-red firm to friable fine sandy clay, moderately or strongly acid, 15-30 inches thick; underlain by soft disintegrated reddish or yellow sandstone.

The Hanceville soils are well drained, occupying hilltops and upper slopes in association with Hartsells, Hector, and Linker soils. They have much better profile development than the Hector soils.

Compared with the Linker soils, they have brownish rather than grayish surfaces, and in contrast with the Hartsells soils, they are reddish rather than yellow in the subsoil and are also somewhat heavier in the subsoil.

The Hanceville soils are of limited occurrence in the Eastern Coalfield and the sandstone portions of the Western Pennyroyal. The more gently sloping areas can be cultivated, but crop yields are generally low. Pastures are commonly scrubby and brushy.

HARTSELLS fine sandy loam

Grayish-yellow or pale yellow loose fine sandy loam, strongly acid, about 8-10 inches thick; underlain by yellow or brownish-yellow, friable fine sandy clay loam, strongly acid, 18-24 inches thick; underlain by yellow slightly compact but friable fine sandy clay loam which may be mottled with reddish-brown, gray, or whitish-gray, grading into soft disintegrated sandstone at 20-40 inches depth.

Hartsells soils are derived from soft acid sandstones. They occupy broad smooth ridges or gentle slopes in association with Muskingum, Hector, Hanceville, and Linker soils. They have more profile development than the Muskingum and Hector soils, and compared with the Hanceville and Linker soils they have yellow rather than red subsoils and less textural horizon development.

The Hartsells soils are important locally in the Eastern Coalfield and sandstone portion of the Western Pennyroyal. They are fairly well suited physically for crop production but are very low in lime and plant nutrients and produce poor crop yields and scrubby pasture. Most areas are still in forest.

HATCHIE fine sandy loam

Light brownish-gray fine sandy loam, strongly acid, 7-10 inches thick; underlain by yellow friable fine sandy clay loam or clay loam with faint gray mottlings throughout, strongly acid, 10-16 inches thick; underlain by mottled light gray and yellowish-brown firm compact clay loam pan containing many soft concretions, strongly acid, 12-20 inches thick; grading into more friable materials with depth.

Hatchie soils are somewhat poorly drained. They occupy terraces derived from mixed loess and coastal-plain alluvium in association with Brandon, Lexington, Providence, and Lax soils of the uplands. They resemble the Olivier soils from loess sediments, but in contrast with them contain appreciable amounts of sand throughout the profile.

The Hatchie soils are of local importance along streams in the Purchase and Cumberland-Tennessee river section. They are best

suited for pasture and hay, though in favorable seasons they produce fair yields of corn.

HAYTER loam

Brown mellow loam, slightly to moderately acid, 10-12 inches thick; underlain by yellowish-brown or pale reddish-brown friable fine sandy clay, clay loam, or silty clay loam, slightly acid, 20-30 inches thick; underlain by predominantly yellowish-brown friable fine sandy clay, clay loam, or silty clay loam, spotted with yellowish brown and gray, slightly acid and variable in thickness.

Hayter soils are well drained. They are developed from local alluvial and colluvial accumulations on footslopes below uplands of Westmoreland, Caneyville, and Upshur soils. They are browner and more productive than Allen and Jefferson soils which occupy similar positions and differ from these series also in being influenced by limestone or other calcareous materials.

The Hayter soils are of minor occurrence, principally along the inner border of the Knobs, western border of the Eastern Coalfield, and the junction of the sandstone and limestone portions of the Western Pennyroyal. They are good pasture soils and the gentler slopes are suitable for cultivation. They produce moderately good yields of corn, burley tobacco, small grain, and hay.

HECTOR gravelly fine sandy loam

Grayish-brown fine sandy loam containing numerous small pebbles of sandstone or quartz, strongly acid, 6-8 inches thick; underlain by reddish-brown or brown fine sandy loam containing many small weathered sandstone fragments or quartz gravel, strongly acid, 18-22 inches thick; underlain by yellowish-brown or red soft sandstone or brown quartz conglomerate bedrock.

Hector soils are excessively drained. They occupy rolling or steep slopes in association with Hanceville, Hartsells, and Linker soils, from which they differ in having little or no textural profile development. They are minor soils of the Eastern Coalfield and the sandstone part of the Western Pennyroyal, particularly in Hart and Grayson counties and the northwestern tip of Taylor county. They are poor and drouthy, and are best suited for forest.

HEITT silty clay loam

Brown or dark brown friable silty clay loam, moderately acid, 5-8 inches thick; underlain by reddish-brown heavy silty clay loam, slightly to moderately acid; 10-18 inches thick; underlain by heavy yellow or brownish-yellow plastic clay, alkaline, 6-10 inches thick; underlain by thinly interbedded limestone and soft calcareous shale.

Heitt soils occupy steep to moderate slopes in association with Fairmount, Eden, Maddox, and Ellsberry soils. Their reddish-brown subsoils distinguish them from all of these series.

The Heitt soils are of very minor occurrence, chiefly in Pendleton and adjacent counties of the Bluegrass Hills. They are good to excellent pasture soils, and the lesser slopes are suitable for limited cultivation under careful management.

HENRY silt loam

Light gray floury silt loam, strongly acid, 7-9 inches thick; underlain by light gray tough silty clay loam or silty clay spotted with yellow and grayish brown, strongly acid, about 2 feet thick; underlain by yellowish-gray moderately compact silty clay loam spotted with yellow and brown, strongly acid, 2 or 3 feet thick.

Henry soils are poorly drained, occupying loessial upland flat areas and slight depressions in association with Calloway and Grenada soils. Compared with the Calloway soils, they are predominantly gray rather than pale yellow in the subsoil.

Henry soils are important locally in the Purchase, particularly in Calloway, Graves, and McCracken counties, and are likely to occur to a small extent in McLean, Henderson, Webster, and adjacent counties of the Western Coalfield. They are best suited for forest and pasture. In favorable seasons, they produce poor to fair yields of corn and dark tobacco and fair to moderate yields of strawberries, lespedeza, and redtop.

HERMITAGE silt loam

Brown to reddish-brown friable silt loam, moderately acid, 10-14 inches thick; underlain by yellowish-brown to reddish-brown moderately friable silty clay loam, moderately acid, 20-30 inches thick; underlain by light brown silty clay loam spotted with yellow, gray, and brown, moderately acid, 12-24 inches thick.

Hermitage soils occupy footslope positions in association with Decatur, Hagerstown, Talbott, and related soils. They are derived from local alluvial-colluvial materials washed from these upland soils. They have more profile development than the Abernathy soils which occupy sink basins, and are browner and less cherty than the Greendale soils which occupy footslopes and benches below Dickson, Baxter, Cookeville, and similar soils.

The Hermitage soils are of very minor extent, occurring principally in the limestone section of the Western Pennyroyal and to a less extent in the Eastern Pennyroyal. They produce good yields of corn, small grain, tobacco, and hay.

HITESVILLE silt loam

Yellowish-brown very friable silt loam, near neutral, 10-16 inches thick; underlain by light yellowish-brown to yellowish-gray friable silt loam with fine brown mottles, near neutral or alkaline, 12-30 inches thick; underlain by olive-gray silt loam or silty clay loam, with many fine brown mottles, near neutral or alkaline, 10-30 inches thick.

Hitesville soils are moderately well drained. They occupy wide level floodplains in association with upland soils derived from calcareous loess. They are less acid and more productive than Collins soils, which are composed of sediments washed from acid loess uplands.

These soils are extensive and important agricultural soils in Union, Henderson, and Daviess counties and the Purchase counties bordering the Mississippi river. They are suitable for cultivation and produce moderate to high yields of corn, the better hay crops, and pasture.

HODGENVILLE fine sandy loam

Grayish-brown very friable fine sandy loam, moderately acid, 8-10 inches thick; underlain by predominantly red friable sandy clay loam to silty clay loam splotched or streaked with yellow or gray, moderately acid, 1-2 feet thick; underlain by red to yellowish-red friable sandy clay loam or sandy clay containing, in most places, considerable quantities of small chert fragments, occasional quartz pebbles, and dark concretionary pebbles, moderately or strongly acid, several feet thick.

Hodgenville soils are well drained, occupying gently rolling to rolling topography, and are developed from mixed rock remnant or valley fill materials weathered from limestone, soft sandstone, and quartz conglomerates. They grade toward the Hagerstown, Cookeville, and Cumberland soils on the one hand and the Hanceville and Waynesboro soils on the other. They are deeper and have more uniform profiles than the Christian soils and contain no calcareous materials to a depth of many feet.

The Hodgenville soils are important locally in Larue, Taylor, Hart, Hardin, Pulaski, and Wayne counties and probably occur to a small extent elsewhere in the Eastern and Western Pennyroyal areas. They are well suited for cultivation and produce fair to moderately good yields of corn, tobacco, hay, and pasture.

HOLSTON very fine sandy loam

Gray or grayish-yellow very fine sandy loam, moderately acid, 6-10 inches thick; underlain by pale yellow very fine sandy loam, moderately to strongly acid, about 3 inches thick; underlain by yellow to brownish-yellow firm to friable clay loam, moderately acid, 10-24

inches thick; underlain by yellowish somewhat sandy material mottled with red and gray in places and usually containing some rounded sandstone fragments and quartz gravel.

Holston soils are well drained, occupying undulating to rolling slopes on terraces in association with Muskingum, Hartsells, Tilsit, and other upland soils of acid sandstone and shale origin.

The Holston soils are rather widely distributed in small areas along streams of the Eastern Coalfield, parts of the Western Coalfield, and sandstone portions of the Western Pennyroyal. They are important agriculturally, especially in the rougher sections where cropland is limited. Although the gentler slopes are well suited for cultivation, the soils are relatively low in lime and nutrients and produce only fair yields of the common farm crops.

HOOTEN silt loam

Gray floury silt loam, slightly acid, 3-5 inches thick; underlain by gray or pale yellowish-gray friable silt loam spotted with yellow, gray, and brown, slightly acid, 8-10 inches thick; underlain by pale yellow very friable heavy silt loam spotted with yellow and gray, slightly acid, 10-18 inches thick; underlain by very sticky plastic heavy silty clay or clay predominantly bluish-gray but spotted with yellow, brown, and light gray, near neutral, several feet thick.

Hooten soils are poorly drained. They occupy low terrace or high bottom positions, and are derived from calcareous loess sediments overlying heavy alluvium thought to be Mississippi river slackwater deposits. They are less acid and more productive than the Calhoun or Carroll soils.

The Hooten soils are very inextensive as small areas near the Mississippi river. Though poorly drained, they produce moderately good yields of corn, soybeans, and lespedeza and other hay crops, particularly in favorable seasons.

HUMPHREYS cherty silt loam

Light brown friable cherty silt loam, moderately acid, 6-8 inches thick; underlain by brownish-yellow to yellowish-brown friable cherty silty clay loam, strongly acid, 6-8 inches thick; underlain by brownish-yellow firm but friable cherty silty clay loam, strongly acid, about 2 feet thick; underlain by stratified alluvium including beds of sand and chert gravel.

Humphreys soils are well drained. They occupy relatively young stream terraces in association with the Ennis catena on the flood plains and with upland soils of cherty limestone origin. They are

browner and more productive than the Mobley soils which occupy similar positions but are derived from cherty alluvium of a poorer character.

Although the total acreage of Humphreys soils is small, areas are widely distributed throughout the Eastern Pennyroyal and occur to some extent in the Knobs. They are practically all in cultivation and produce fair to moderate yields of corn, small grain, and hay.

HUNTINGTON silt loam

Brown or dark brown mellow friable silt loam, near neutral, 8-12 inches thick; underlain by brown or light brown to very slightly reddish-brown silt loam or silty clay loam, near neutral, 20-30 inches thick; underlain by brown silt loam or layers of silt loam and very fine sandy loam, usually mottled with dark brown.

The well-drained Huntington soils occupy first-bottom positions along streams throughout all the high-grade limestone sections of the state and along many of the major streams elsewhere, including the Ohio, Cumberland, Tennessee, Licking, and Kentucky rivers. They are widespread and among the most important bottomland soils of the state. They are widely used for corn and the better hay crops, and producing good to excellent yields of these crops and of pasture. High phosphate phases of these soils are recognized in the Inner Bluegrass.

HYMON loam

Light brown friable loam, moderately acid, 12-24 inches thick; underlain by gray friable loam splotted with brown and yellow, moderately acid, 2-3 feet or more thick.

Hymon soils are moderately well drained. They occupy flood plains of alluvium washed from the upland Lexington, Lax, Loring, Brandon, and related soils developed from shallow loess deposits over coastal-plain materials. Sand content throughout the profile distinguishes them from the Collins and Hitesville soils, and they are also more acid than the Hitesville soils.

The Hymon soils are fairly extensive in the central and eastern portions of the Purchase and in the Cumberland-Tennessee river section. They are productive for corn, melons, soybeans, lespedeza, and redtop but are less desirable for small grain and tobacco because of their susceptibility to flooding.

INA fine sandy loam

Light grayish-brown friable fine sandy loam, strongly acid, 12-18 inches thick; underlain by pale yellow friable fine sandy clay or clay

loam spotted with yellow, gray, and brown, the gray content increasing with depth, strongly acid, 12-16 inches thick; underlain by mottled yellow, brown, and gray heavy fine sandy clay or silty clay and commonly containing thin strata of sand and gravel.

Ina soils are somewhat poorly drained, and occupying flood plains in association with Lexington, Brandon, Lax, and similar upland soils from shallow loess over coastal-plain materials. Their sand content throughout the profile distinguishes them from the Falaya and Caseyville soils, and they are more acid than the Caseyville soils.

The Ina soils are important locally in the central and eastern part of the Purchase and in the Cumberland-Tennessee river section. They produce fairly good yields of corn, cowpeas, sorghum, lespedeza, red-top, and pasture, but are unsuited to small grain and tobacco.

IOLA gravelly loam

Brown loose very gravelly loam, strongly acid, 6-8 inches thick; underlain by yellowish-brown loose loamy gravel, strongly acid, 5-20 feet thick, the amount of fine material decreasing with depth.

The Iola soils are excessively drained, occupying very gravelly mild ridges which resemble old abandoned lake beaches commonly between present terrace and first-bottom positions. They are of very minor occurrence, principally in the eastern part of the Purchase, and a few isolated areas occur in McLean county of the Western Coalfield. These soils are of little value agriculturally, and where they have been cleared they are largely idle. Some areas are used as gravel pits for road construction.

JEFFERSON fine sandy loam

Grayish-yellow to brownish-yellow friable fine sandy loam, moderately acid, 6-8 inches thick; underlain by yellow friable heavy fine sandy loam to clay loam, strongly acid, about 7 inches thick; underlain by yellow or brownish-yellow fine sandy clay, strongly acid, about 20 inches thick; underlain by mottled yellow, brownish-yellow, and light gray friable fine sandy clay of variable depth.

Jefferson soils are well drained, occupying gently or strongly sloping footslope positions. They are developed from colluvial materials from Muskingum, Hartsells, Wellston, and associated soils of sandstone and shale origin. They are not so brown nor productive as the Hayter soils, nor red in the subsoil as the Allen soils of like origin and position.

The Jefferson soils are widespread throughout the Eastern Coal-

field and occur less extensively in the Western Coalfield and the sandstone portions of the Western Pennyroyal and Knobs. The steeper slopes are best suited for pasture or forest, while the gentler slopes can be used for corn, small grain, and hay, but yields are relatively low.

JESSUP silt loam

Brown smooth silt loam, acid, 6-10 inches thick; underlain by brown heavy silty clay, slightly reddish along the structure interfaces, acid, 12-18 inches thick; underlain by yellow, olive, and brown heavy Illinoian till, the lower portion calcareous, 1-3 feet thick; underlain by thin-bedded limestone and calcareous shale bedrock.

Jessup soils occupy upland slopes and rolling ridge tops in association with the Loudon soils, are well-drained, and are developed from shallow Illinoian till deposits over interbedded limestone and calcareous shale of the Eden formation. They are of extremely minor occurrence within the glaciated section of the northern Kentucky counties bordering the Ohio river. They are fairly productive for burley tobacco, corn, small grain, hay, and pasture.

JOHNSBURG silt loam

Light grayish-yellow platy silt loam somewhat streaked with gray and containing small dark concretions, strongly acid, 15-24 inches thick; underlain by pale yellow silty clay loam usually mottled with gray and brown, strongly acid, 12-15 inches thick; underlain by gritty loam or silt loam strongly mottled yellow and gray, strongly acid, grading into disintegrated acid fine-grained sandstone and shale at variable depth.

Johnsburg soils are somewhat poorly drained, occupying nearly-level uplands in association with other members of the Wellston catena. Compared with the poorly drained Mullins soils, they are predominantly pale yellowish in the subsoil rather than gray. They are less sandy throughout than the Cleveland soils and in many areas contain considerable loess.

The Johnsburg soils are of important occurrence in the Western Coalfield and the central belt of the Eastern Coalfield. Agriculturally, they are poor soils. Yields of the common farm crops are low in most seasons. Pasture is probably their most suitable use.

KENTON silt loam

Grayish-brown smooth silt loam, moderately acid, 9-11 inches thick; underlain by dull yellowish-brown friable light silty clay loam, moderately acid, about 10 inches thick; underlain by mottled dull gray, yellow, and brown, brittle silty clay loam pan containing dark concretions in places, strongly acid, 12-16 inches thick; grading

through mottled plastic silty clay into thin-bedded limestone and calcareous shale bedrock at shallow depth.

Kenton soils are moderately well drained, occupying undulating to rolling broad ridges in association with Nicholson soils from which they differ in having a well-developed pan layer. These soils are derived from siltstone remnants, loess, or a combination of the two overlying thinly interbedded calcareous shale and limestone of the Eden formation.

The Kenton soils are in only a few counties in the Bluegrass Hills in northern Kentucky. They are suitable for cultivation and produce fair yields of burley tobacco, corn, small grain, and hay.

LARUE fine sandy loam

Grayish-brown fine sandy loam, moderately or strongly acid, 10-12 inches thick; underlain by yellowish-brown friable silty clay loam or fine sandy clay loam, moderately acid, 18-24 inches thick; underlain by a compact mottled sandy or silty pan, strongly acid, 6-10 inches thick; underlain by splotched yellow, red, and gray silty clay loam or fine sandy clay containing sandstone and chert fragments and in some places a scattering of quartz pebbles, strongly acid, several feet thick.

Larue soils are derived from mixed rock remnants or valley fill materials weathered from cherty limestone, soft sandstone, and quartz conglomerate. They resemble the Dickson soils but are sandier, have somewhat browner surfaces and subsoils, and are probably more productive. Compared with the Pearman soils, they have much thicker solums, deeper, harder, and more brittle pans, and contain no unweathered limestone or other calcareous material.

The Larue soils are extensive in Larue, Hart, Hardin, and Taylor counties and occur to some extent throughout the Eastern Pennyroyal. They are suitable for general farming and produce fair to moderately good yields of corn, tobacco, forage crops, and pasture.

LAWRENCE silt loam

Gray or yellowish-gray friable silt loam with brown splotches and streaks, moderately or strongly acid, 18-24 inches thick; underlain by a predominantly pale yellow compact silty clay pan mottled with light gray and brown and containing soft concretions, strongly acid, 15-20 inches thick; underlain by friable silty clay loam mottled yellow and gray, strongly acid, and extending to limestone bedrock at variable depth.

Lawrence soils are somewhat poorly drained, occupying very gentle slopes in old upland plains of limestone origin. Compared

with the poorly drained Guthrie soils, they are predominantly pale yellow rather than gray in the subsoil.

The Lawrence soils are of widespread occurrence in the more level portions of the Eastern Pennyroyal, the Western Pennyroyal, and in the Outer Bluegrass adjacent to the Knobs. They are rather poor agricultural soils, and crop yields fluctuate with the season, averaging low to fair. Pasture is a more reliable use.

LAX silt loam

Pale yellowish-gray floury silt loam, strongly acid, 7-9 inches thick; underlain by brownish-yellow friable silty clay loam, strongly acid, 12-14 inches thick; underlain by compact siltpan, predominantly brown splotched with gray and yellow, strongly acid, 8-10 inches thick; underlain by somewhat indurated mixture of silt, clay, and gravel, strongly acid, 10-14 inches thick; underlain by loose sand and gravel, containing various amounts of silt and clay.

Lax soils are moderately well drained. They occupy gentle uplands developed from thin loess over gravelly coastal-plain deposits in association with Lexington, Brandon, and Providence soils. Compared with the Providence soils, they are underlain by gravelly rather than sandy materials and are less productive.

The Lax soils are of important occurrence only in the eastern and southern portions of the Purchase, in the Cumberland-Tennessee river section, and the Western Pennyroyal counties bordering the Tennessee river. They are suitable for general field crops including dark tobacco, corn, lespedeza, and redtop, but yields are relatively low.

LEADVALE silt loam

Pale yellowish-gray floury silt loam, strongly acid, 8-10 inches thick; underlain by yellow, firm dense compact silty clay, strongly acid, 8-10 inches thick; underlain by tough dense silty clay, predominantly yellow but splotched with bright yellow, gray, and brown, strongly acid, 12 inches to 3 feet or more thick.

Leadvale soils are developed from local alluvial-colluvial accumulations at the foot of slopes in association with Rockcastle, Muse, and similar upland soils derived from heavy acid shale. They are of much importance locally in the Knobs and to a much less extent in the deeply dissected areas of the Eastern Pennyroyal. They are somewhat poorly drained. Though probably best suited for pasture, they are cultivated to a considerable extent, the yields being almost invariably low.

LEE cherty silt loam

Yellowish-gray floury cherty silt loam, mottled with yellowish-brown, strongly acid, about 6 inches thick; underlain by yellowish-gray cherty silt loam more heavily mottled than the layer above, strongly acid, 6-24 inches thick; underlain by yellowish-gray heavy silt loam, highly mottled, strongly acid, 2-4 feet thick; underlain by a mixture of sand, gravel, chert, and silt soil material, dominantly grayish and strongly acid.

Lee soils are poorly drained. They occupy first bottoms along streams carrying alluvium from uplands of low-grade cherty limestone origin. They are associated with the well-drained Ennis and moderately well-drained Lobelville soils of the first bottoms and Dixon, Bodine, Nixa, Weon, Rockcastle, and similar upland soils.

Total acreage of the Lee soils is small. These soils occur in the Eastern Pennyroyal and parts of the Knobs. Owing to their poor drainage, chertiness, and low fertility, they are best suited for pasture or wild grass hay.

LEXINGTON silt loam

Light brown or yellowish-brown friable silt loam, moderately acid, 8-12 inches thick; underlain by yellowish-brown to yellowish-red firm to friable silty clay loam, moderately acid, 6-18 inches thick; underlain by yellow or brownish-yellow silty clay becoming sandy and mottled with brown and gray at a depth of 3 or 4 feet.

Lexington soils are well-drained, occupying gently sloping to rolling uplands of shallow loess deposits over sandy coastal-plain materials. Associated with them are the Loring, Grenada, Brandon, Lax, and Providence soils. They most closely resemble the Brandon soils from which they differ in being more reddish in the subsoil and underlain and influenced by sandy rather than gravelly materials.

The Lexington soils are important locally in the Purchase, particularly in the southern part of Graves county. They are fairly productive where not eroded, but are especially susceptible to gully erosion which greatly reduces their agricultural value. Corn, dark tobacco, lespedeza and redtop hay and pasture are the principal agricultural uses. Many fields formerly cultivated are now idle or in brush.

LICKDALE loam

Gray to dark gray loam, acid, about 10 inches thick, underlain by mottled yellowish-gray and bluish-gray silty clay loam or silty clay, acid, about 20 inches thick; underlain by bluish-gray heavy silty clay mottled with black.

Lickdale soils occur principally as poorly drained hillside seep areas in association with Rockcastle soils. They are derived prin-

cially from heavy acid shale with fine-grained sandstones in places.

The Lickdale soils are of little agricultural significance and of very minor occurrence. They lie chiefly in the Knobs and are used almost exclusively for forest or pasture.

LINDSIDE silt loam

Grayish-brown friable silt loam, slightly acid, 10-18 inches thick; underlain by gray or bluish-gray heavy silty clay generally mottled with pale yellow and brown and containing small soft black concretions, slightly acid, 2 feet or more thick.

Lindside soils are moderately well drained. They occupy first bottoms in association with Huntington, Newark, and Melvin soils, all derived from alluvium strongly influenced by limestone or other calcareous rock. They are browner and more productive than the Hamblen soils, which they resemble in many respects.

The Lindside soils are extensive and important along the streams in central Kentucky, the high-grade limestone sections of the Western Pennyroyal, and along the Ohio river and other major streams except those of the Eastern Coalfield. They are well adapted to corn, hay, and pasture and produce good yields of these crops.

LINKER gravelly fine sandy loam

Gray loose gravelly fine sandy loam, containing fragments of loosely cemented sandstone on the surface and throughout the layer, strongly acid, 4-10 inches thick; underlain by reddish-brown to yellowish-red sandy clay loam containing a few sandstone fragments in places, moderately or strongly acid, 15-20 inches thick; underlain by splotched gray, red, and yellow slightly compact but friable clay loam, strongly acid, 15-25 inches thick; underlain by yellow, gray, or reddish soft sandstone.

Linker soils are well drained, occupying rolling plateau-like ridges in association with Hector, Hanceville, Muskingum, Cleburne, and similar soils derived principally from sandstone. They most closely resemble the Hanceville soils, from which they differ principally in having gray rather than brown surface soils.

The Linker soils are of limited occurrence in the Eastern and Western Coalfields and parts of the sandstone portion of the Western Pennyroyal. They are rather poor soils agriculturally and produce low yields of the common crops. Pastures are generally weedy and brushy.

LINTONIA silt loam

Grayish-brown floury silt loam, moderately acid, 6-10 inches thick; underlain by yellowish-brown friable heavy silt loam or light silty

clay loam, moderately acid, 6-8 inches thick; underlain by brown, yellowish-brown, or slightly reddish-brown silty clay loam or silty clay, moderately acid, grading into silty alluvial materials at 12-24 inches.

Lintonia soils are well-drained soils of stream terraces derived from alluvium washed from upland soils of loess origin, such as those of the Memphis, Loring, Grenada, and associated series. They resemble the Dexter soils in most respects but differ from them in containing no sandy coastal-plain sediments.

The Lintonia soils occur inextensively, principally in the Purchase. They are moderately productive for the general farm crops of the Purchase, including corn, dark tobacco, cotton, lespedeza, cowpeas, and redtop.

LOBELVILLE cherty silt loam

Light brownish-gray friable cherty silt loam, moderately to strongly acid, 12-15 inches thick; underlain by predominantly brownish-gray friable cherty silt loam or silty clay loam spotted with gray, yellow, and brown, moderately to strongly acid, 2 or 3 feet thick; underlain by predominantly brownish-gray cherty materials profusely spotted with gray, yellow, and brown, variable in texture, moderately to strongly acid and extending to variable depth.

Lobelville soils are moderately well drained. They occupy bottomlands in association with the well-drained Ennis and the poorly drained Lee soils, all composed of alluvium from upland soils of cherty low-grade limestone origin, such as Dixon, Baxter, Bodine, and Sango soils. They resemble the Lindside and Hamblen soils in position and drainage but are lighter colored, cherty, more acid, and less productive.

The Lobelville soils are rather extensive in the cherty limestone sections of Kentucky, particularly in the Eastern Pennyroyal and to a less extent in the Western Pennyroyal. They are adapted to corn, forage crops, and pasture, but yields are apt to be rather low.

LORADALE silt loam

Brown friable silt loam, moderately acid, 8 inches thick; underlain by yellowish-brown friable silt loam, moderately acid, 7-10 inches thick; underlain by yellowish-brown or slightly reddish-brown firm to friable light silty clay loam, moderately acid, 14-20 inches thick; grading into brownish-yellow plastic silty clay, smoothly spotted with yellow and gray in the lower part and containing dark concretions in places, moderately acid, 15-30 inches thick.

Loradale soils are well drained, occupying undulating to rolling and gentle karst (sinkhole) areas in association with the Hagertown, Maury, and Mercer soils of the Inner Bluegrass. They resemble the Hagerstown and Maury soils in the upper parts of the solum but are lighter colored and more plastic in the lower part.

The Loradale soils are restricted to the Inner Bluegrass Region, in which they are rather extensive. They are moderately high in phosphate and produce good yields of burley tobacco, corn, small grain, hay, and pasture.

LORING silt loam

Light brown friable silt loam, moderately acid, about 7 inches thick; underlain by yellowish-brown, friable light silty clay loam, moderately acid, 24-28 inches thick; underlain by predominantly brownish slightly to moderately compact heavy silty clay loam spotted with gray and yellow and containing small brown or black concretions and, in places, thin streaks or coatings of grayish silt; strongly acid, 10-12 inches thick; underlain by yellowish or brownish slightly compact but friable silt loam, in places spotted with gray, yellow, and brown.

Loring soils are well drained, occupying loessial uplands of undulating to rolling topography in association with Memphis, Grenada, and similar soils. They resemble the Memphis soils in many respects, but differ from them in having some compaction and mottling in the lower part of the solum. The subsoil of the Loring soils is browner and the hardpan is less well developed and at greater depth than that of the Grenada soils.

The Loring soils are extensive in the Purchase and parts of the Western Coalfield and occur to some extent in the Cumberland-Tennessee river section. Under good management they are well suited to the production of corn, dark tobacco, small grain, cowpeas, redtop, lespedeza, and other crops; but poor management causes sheet and gully erosion and greatly reduces crop yields.

LOUDON silt loam

Grayish-brown friable silt loam, acid, 7-13 inches thick; underlain by yellowish-brown rather plastic silty clay, acid, 8 to 12 inches thick; underlain by mottled yellow, brown, and gray heavy plastic clay containing concretions, small glacial pebbles, and small limestone fragments, slightly acid grading to calcareous with depth, 15-30 inches thick; underlain by thinly interbedded limestone and calcareous shale.

Loudon soils are moderately well drained, and with the well-drained Jessup soils they occupy undulating to rolling ridges in association with Eden, Fairmount, and Edenton soils on the slopes. They are derived from shallow glacial till over interbedded limestone and calcareous shale and are distinguished from the Kenton soils by their heavier subsoils and the presence of glacial erratic pebbles.

The Loudon soils are of very minor occurrence in a few Ohio river counties of northern Kentucky. They are moderately productive for corn, hay, and pasture but less so for burley tobacco.

LOWELL silt loam

Brown friable silt loam, moderately acid, 5-11 inches thick; underlain by yellowish-brown friable silty clay loam, moderately acid, 10-14 inches thick; underlain by brownish-yellow or yellowish-brown silty clay, strongly plastic and containing scattered dark concretions and concretionary splotches in places, slightly acid, 12-24 inches thick; underlain by predominantly brownish-yellow strongly plastic silty clay or clay splotched with brown, yellow, and gray with greenish or bluish colors in the deeper part, near neutral, 4-20 inches thick; underlain by highly argillaceous thin-bedded limestone.

Lowell soils are well drained, occupying gently to strongly rolling ridge slopes in association with Shelbyville, Fairmount, Eden, and Maddox soils. They are much heavier in the lower subsoil than the Shelbyville soils and lack the extreme development of a concretionary zone in the lower subsoil which characterizes the Shelbyville soils. In the upper subsoil they are less heavy and much more friable than the Maddox soils.

The Lowell soils are very extensive in the Outer Bluegrass and are among the more productive soils of the state, particularly for bluegrass pasture. Owing to their heavier-textured subsoils, they are less desirable for burley tobacco production than the associated Shelbyville soils.

MADDOX silt loam

Dark brown to brown friable silt loam, slightly acid, 7-12 inches thick; underlain by yellowish-brown heavy plastic silty clay loam or silty clay, slightly acid, 10-15 inches thick; underlain by yellow-olive heavy plastic clay, near neutral, which grades into thinly-bedded argillaceous limestone and soft calcareous shale at depths of 3-5 feet.

Maddox soils are well drained, occupying gently sloping ridgetops and upper slopes in association with Lowell, Fairmount, and

Eden soils. They resemble the Lowell soils in many respects but are heavier textured and less friable in the upper part of the subsoil.

The Maddox soils are very inextensive, appearing as scattered small areas in the Outer Bluegrass. They are best suited for pasture and produce very good bluegrass, orchard grass, alfalfa, and other forage crops.

MALT fine sandy loam

Grayish-brown nearly loose fine sandy loam, moderately acid, 8-10 inches thick; underlain by brown or reddish-brown moderately friable silty clay loam or sandy clay loam containing appreciable quantities of angular chert and yellow and red sandstone fragments and occasional quartz pebbles, moderately to strongly acid, 1-2 feet thick; underlain by reddish-brown or red sandy clay containing fragments as above, strongly acid, depth variable, grading into splotched red and yellow partly weathered sandy clay materials, chert fragments abundant, strongly acid, extending to a depth of many feet.

Malt soils are derived from mixed materials weathered from cherty limestone, soft sandstone, and quartz conglomerate. They are somewhat excessively drained, occupy rolling topography, and resemble the Baxter soils in most respects but contain quantities of sand, sandstone fragments, and quartz pebbles not characteristic of the Baxter soils.

The Malt soils occur principally in the Eastern Pennyroyal and in Larue, Green, Hardin, and Hart counties of the Western Pennyroyal. They are rather widely distributed in these areas, and their total extent is fairly large. The Malt soils are rather infertile and are mostly in woods and pasture with some cultivation to corn and hay, chiefly lespedeza, the yields of which are relatively low.

MANITOU silt loam

Grayish-brown to pale yellow very friable silt loam, moderately to strongly acid, 8-14 inches thick; underlain by yellowish-brown friable silty clay loam, strongly acid, 14-22 inches thick; underlain by mottled or streaked fine sandy clay loam hardpan, predominantly yellowish-brown but mottled with yellow and yellowish red, strongly acid, 10-18 inches thick; underlain by yellowish-brown loam mottled with yellow and reddish yellow and containing some sandstone fragments in places, strongly acid, 10-20 inches thick; underlain by acid sandstone, siltstone, and shale.

Manitou soils occupy undulating to gently rolling uplands in association with Muskingum, Wellston, Tilsit, and other soils of

the same catena. In many places the upper part of the solum is derived largely from loess, the lower part from mixed loess and residuum of siliceous rock. The Manitou soils resemble the Loring soils derived from loess but contain sandy materials not characteristic of the Loring soils. They are browner in the subsoil and have less pan development, and the pan is deeper than in the Tilsit soils.

Manitou soils are important and widely distributed in the Western Coalfield. A considerable acreage also occurs in the Eastern Coalfield; here the soils are not influenced by loess. About half the total area is cultivated, a small part is in pasture, and the remainder is in forest or is idle. Crops include corn, small grain, tobacco, and hay. Yields range from fair to moderate.

MANSE silt loam

Brown or dark brown friable heavy silt loam, slightly acid, 10-14 inches thick; underlain by brown or yellowish-brown friable heavy silt loam or light silty clay loam, slightly acid, 12-24 inches thick; underlain by moderately sticky or plastic silty clay predominantly yellowish brown but more or less splotched with gray and yellow, slightly acid, thickness variable.

Manse soils are young, well-drained soils of footslope accumulations from Shelbyville, Lowell, Fairmount, and other soils of the Bluegrass. They are browner and more productive than the Greendale soils of similar position, associated with low-grade cherty limestone uplands. They lack the well-developed profile of the Woolper soils from similar materials.

The Manse soils are widely distributed in small areas along the base of slopes throughout the Bluegrass Region. A phosphatic phase occurs in association with the Maury, McAfee, and Loradale soils. They are very productive of all the important crops of the region, including corn, a variety of hay crops, small grain, and burley tobacco.

MAURY silt loam

Dark brown to slightly reddish-brown mellow very friable silt loam, moderately acid, 10-14 inches thick; underlain by reddish-brown firm to friable silty clay loam to silty clay, moderately acid, about 13 inches thick; underlain by reddish-brown heavy friable silty clay which may be faintly mottled with yellow and mottled or streaked with black concretionary material, particularly toward the bottom of the layer, moderately acid, 1-4 feet thick; underlain by high-grade phosphatic limestone.

Maury soils are well drained, occupying undulating to rolling areas in the Inner Bluegrass. They differ from the Hagerstown soils

principally in having a very high content of phosphorus. They resemble the Loradale soils in the upper part of the solum but are redder and less plastic in the lower part.

The Maury soils are the principal soils of the Inner Bluegrass. They produce excellent bluegrass pasture, high-quality burley tobacco, and the better legume and grass hays. Corn yields vary considerably with rainfall distribution, but are generally good.

McAFEE silt loam

Dark brown to dark reddish-brown fine granular heavy silt loam, moderately acid, 8-10 inches thick; underlain by reddish-brown firm silty clay, moderately acid, 10-12 inches thick; underlain by heavy dark reddish-brown plastic silty clay specked with brown or black iron or manganese streaks or concretions, moderately acid, 8-12 inches thick; underlain by mottled plastic silty clay with brown, gray, and yellow colors predominating, 12-16 inches thick; underlain by massive highly phosphatic limestone.

McAfee soils occur on undulating to rolling uplands in association with Maury soils of the Inner Bluegrass, from which they differ in being somewhat darker in the surface and darker reddish-brown, heavier and more plastic in the subsoil. They are extremely high in phosphate. These soils are much less extensive than the Maury soils. They produce excellent bluegrass pasture, high-quality burley tobacco, and the better legume and grass hays. Corn yields vary with rainfall distribution, but are generally good.

MELVIN silt loam

Gray or light brownish-gray silt loam mottled in places with brown, slightly acid, 6-12 inches thick; underlain by gray or light brownish-gray silt loam to light silty clay loam, mottled in places with yellow or brown, slightly acid, 18 inches thick; underlain by stratified materials predominantly heavy silty clay or clay, chiefly gray in color, slightly acid and variable in thickness.

Melvin soils are poorly drained first bottoms of the Huntington catena from sediments partially or entirely of limestone origin. They are widely distributed, usually in small areas along the Ohio river and major streams throughout many parts of the state and minor streams in central Kentucky, the limestone portion of the Western Pennyroyal, and the high-grade limestone sections of the Eastern Pennyroyal.

The Melvin soils are best adapted for pasture and hay. With drainage, they produce moderately good yields of corn.

MEMPHIS silt loam

Grayish-brown smooth friable silt loam, moderately acid, 8-12 inches thick; underlain by yellowish-brown moderately firm silty clay loam, moderately acid, 20-30 inches thick; underlain by yellowish-brown or brownish-yellow friable silt loam, slightly acid, 8 or 10 feet thick; underlain by yellow smooth floury loessial silt, calcareous in places.

Memphis soils occupy gently rolling to hilly areas of deep or moderately deep loess. They are well drained throughout and lack the mottling or pan development of the Loring soils.

The Memphis soils occur mostly in the western third of the Purchase and in Union, Henderson, and Daviess counties of the Western Coalfield. They are moderately productive of corn, dark tobacco, cotton, small grain, and hay, but are highly susceptible to both sheet and gully erosion unless carefully managed. The steeper areas are best used for permanent pasture.

MERCER silt loam

Brownish-gray to grayish-yellow friable silt loam, moderately to strongly acid, 8-12 inches thick; underlain by brownish-yellow to slightly reddish-yellow silty clay loam, strongly acid, 8-10 inches thick; underlain by mottled gray, yellow, and brown silty clay loam hardpan containing many soft brown and black concretions, strongly acid, 12-15 inches thick; underlain by yellowish-brown tough plastic silty clay or clay with large concretionary splotches, moderately to strongly acid, 12 or 15 inches thick; underlain by mottled brownish-gray very tough plastic clay which extends to bedrock at 5 or 6 feet.

Mercer soils are derived from thin-bedded limestone and shale or highly argillaceous limestone in association with Maury, Loradale, Hagerstown, and Salvisa soils, on undulating to gently rolling ridge tops and slopes. They occur geologically above the Maury and Loradale soils, generally are not high in phosphate, and are characterized by yellowish plastic clay lower subsoils. They are moderately well drained and resemble the Lowell soils somewhat but are less brown in surface and subsoil, are more acid throughout, and occur only in the Inner Bluegrass; whereas the Lowell soils occur in the Outer Bluegrass.

The Mercer soils are fairly extensive along the outer rim of the Inner Bluegrass and as small patches or sizeable areas throughout the Inner Bluegrass. They are much less desirable than the phosphatic Maury and Loradale soils. They produce fairly good pasture and fair to moderately good yields of cultivated crops.

MOBLEY cherty silt loam

Yellowish-gray floury silt loam containing numerous geodes, chert and sandstone gravel, strongly acid, 8-12 inches thick; underlain by pale yellow silty clay loam containing coarse materials as in the layer above, strongly acid, 6-12 inches thick; grading into predominantly gray mottled silty clay loam containing large quantities of coarse materials and clay and sandy lenses or strata.

Mobley soils occupy smooth low-terrace positions in association with such upland soils as those of the Rockcastle, Bodine, Dickson, and Weon series. The terrace materials are largely from low-grade cherty or geodic limestones and acid shaly or sandy rocks of the Mississippian Plateau. The Mobley soils are lighter colored and considerably less productive than the Humphreys soils.

The Mobley soils are thought to be of rather wide distribution but of small total acreage in the Eastern Pennyroyal and parts of the Knobs. They are of little agricultural significance, except locally. They are best suited for pasture or forest, as they produce poor yields of cultivated crops.

MONONGAHELA silt loam

Grayish-brown mellow silt loam, moderately acid, about 7 inches thick; underlain by yellow friable silt loam, moderately acid, about 7 inches thick; underlain by yellow firm silty clay loam, moderately acid, about 6 inches thick; underlain by yellow heavy silty compact clay or silty clay pan, mottled with gray, strongly acid, about 8 inches thick; over stratified acid alluvial sediments, variable in texture and color.

Monongahela soils are developed on stream terraces from old alluvial sediments washed from uplands of sandstone and shale origin. They are moderately well drained, occupying gentle topography in association with other members of the Holston catena. They resemble the Captina soils in position and degree of drainage but lack their influence from limestone or other calcareous materials.

The Monongahela soils occur widely along streams in the Eastern Coalfield and parts of the Western Coalfield and Knobs. They are suitable for general farm crops and pasture, of which they produce fair yields.

MORGANFIELD silt loam

Yellowish-brown very friable silt loam containing flecks of yellow in the middle and lower parts, near neutral, 18-60 inches thick; underlain by brownish-gray friable slightly plastic silty clay loam containing specks of red or yellowish-red, near neutral, 10-20 inches thick.

Morganfield soils are well-drained first-bottom soils composed of sediments washed from calcareous loess uplands. They differ from the Vicksburg soils in being near neutral to alkaline rather than acid in reaction and are considerably more productive.

The Morganfield soils occur extensively in Union, Henderson, and Daviess counties and less extensively in the Purchase counties bordering the Mississippi river. They produce good to excellent yields of corn and hay.

MOUNTVIEW silt loam

Light yellowish-brown friable silt loam, strongly acid, 7-13 inches thick; underlain by yellowish-brown friable silty clay loam, strongly acid, 18-24 inches thick; underlain by yellowish-brown to yellowish-red firm heavy silty clay loam with a few light gray or pale yellow mottles, large irregular dark brown concretions, and chert pieces, strongly acid, 4-12 inches thick; underlain by red or yellowish-red firm cherty clay faintly mottled with shades of yellow, strongly acid, several feet thick.

Mountview soils are developed from shallow loess over low-grade cherty limestone residuum. They lack the distinct brittle pan of the Dickson soils. Compared with the Russellville and Bewleyville soils, they are grayer in the surface, less productive, and underlain by materials from much lower grade limestone.

The Mountview soils are of important occurrence only in and immediately adjacent to the Cumberland-Tennessee river section. They are suitable for corn, dark tobacco, hay, and small grain, but yields are relatively low. Many fields are idle and eroded and a considerable acreage is in forest or brush.

MULLINS silt loam

Gray friable silt loam with fine streaks or mottles of brown, strongly acid, 4-7 inches thick; underlain by light gray silt loam containing many small irregular brown concretions, strongly acid, 5-10 inches thick; underlain by compact yellow and light gray mottled light silty clay loam hardpan containing a few dark brown concretions, strongly acid, 2-3 feet thick; underlain by brownish-gray heavy silt loam mottled with yellow and brown, strongly acid, and grading into siltstone or shale at 4-8 feet or more.

Mullins soils are poorly drained, occupying flat areas in association with other members of the Wellston catena derived from acid sandstones, siltstones, and shales. They resemble the Guthrie soils in general profile characteristics but differ from them in origin.

The Mullins soils occur extensively as small areas in the Eastern

Coalfield, Western Coalfield, and Knobs, and acreage is small. They are best suited for forest or pasture.

MUSE silty clay loam

Grayish-yellow to light grayish-brown silty clay loam, moderately acid, 6-8 inches thick; underlain by yellow to yellowish-red or yellowish-brown friable silty clay loam, moderately acid, 18-24 inches thick; underlain by predominantly yellow heavy silty clay, in places variegated yellow and red, moderately acid, thickness variable.

Muse soils are colluvial, occupying footslope positions similar to those of the Jefferson and Allen soils. They differ from these soils principally in being much heavier throughout the profile. They occur in geographic association with the Colyer, Fawcett, Rockcastle, and Rarden soils of the uplands.

The Muse soils are very minor in extent, chiefly in the Knobs. They are used mainly for pasture or forest, but are important locally for cultivation in very hilly areas where cropland is scarce. Crop yields are generally low.

MUSKINGUM stony silt loam

Light grayish-brown very friable stony silt loam, strongly acid, 8-10 inches thick; underlain by disintegrated sandstone and shale materials generally yellow but variable in texture and color from place to place and containing shallow subsoil development in places, strongly acid, grading into unweathered acid sandstone, siltstones, and shales.

Muskingum soils occupy the steeper slopes in association with other soils of the Wellston catena, Hartsells, Hanceville, Rarden, and many other soils of acid sandstone, siltstone, and shale origin. Compared with the Rockcastle soils, they contain much less shale as a rule, are less grayish, and more productive.

The Muskingum soils are very extensive. They are the principal soils of the Eastern Coalfield, important soils of the Western Coalfield and sandstone part of the Western Pennyroyal, and occur to some extent in the Knobs and as scattered areas in the Eastern Pennyroyal. In general, they are suitable principally for forest, particularly the steeper areas. Under good management, the silt loam type produces fair pasture. Some areas are cultivated to corn, but yields are usually low.

NAIL silt loam

Brownish-gray silt loam, moderately to strongly acid, 6-10 inches thick; underlain by grayish silt loam, mottled with shades of brown,

moderately to strongly acid, 14-20 inches thick; underlain by gray to yellowish-gray massive clay mottled with shades of brown and yellow, moderately to strongly acid, 15 inches or more thick.

Nail soils are somewhat poorly drained, occurring in association with other members of the Pope catena composed of first-bottom alluvium derived from acid sandstone and shale upland. They resemble the Newark soils in position and degree of drainage, but are more acid and contain no alluvium of limestone or calcareous shale origin.

The Nail soils are widely distributed along local streams in the Eastern Coalfield and in head-water areas in parts of the Knobs and sandstone portion of the Western Pennyroyal. Undrained, they are suitable principally for forest and pasture. With drainage, they produce fair to moderately good yields of corn, sorghum, and hay crops.

NEBO silt loam

Dark brown to very dark gray friable silt loam, strongly acid, 8-12 inches thick; underlain by yellowish-brown silt loam streaked with dark brown, strongly acid, 5-8 inches thick; underlain by light brownish-yellow silty clay loam, containing yellow mottlings and streaks of brown and some iron concretions, strongly acid, 8-12 inches thick; underlain by mottled gray, yellow, and yellowish-brown silty clay loam pan containing iron concretions, strongly acid, 12-24 inches thick.

Nebo soils occupy gentle slopes in association with Tilsit and Johnsburg soils from which they differ principally in having dark surface soils. These are unusual soils found thus far only as small scattered areas in Hopkins county. They are of little agricultural significance and are used chiefly for pasture or hay, or are idle.

NEWARK silt loam

Grayish-brown to brownish-gray silt loam, containing a few soft black and brown concretions, near neutral, 6-8 inches thick; underlain by light brownish-gray silt loam, mottled with shades of gray and brown and containing numerous concretions, near neutral, 6-10 inches thick; underlain by gray silty clay loam containing numerous concretions, near neutral, 5-10 inches or more thick.

Newark soils are somewhat poorly drained. They occupy first bottoms in association with other members of the Huntington catena. They resemble the Nail soils of like position and degree of drainage, but are less acid and contain alluvium from uplands partly or entirely of limestone origin.

The Newark soils are extensive along the Ohio river and through-

out all of the medium to high-grade limestone sections of the state. They produce fair to good yields of corn and hay in favorable seasons, and are greatly improved by drainage.

NICHOLSON silt loam

Light brown mellow silt loam, moderately or strongly acid, 12-15 inches thick; underlain by yellowish-brown friable silty clay loam with a few concretions in many places, moderately or strongly acid, 18-20 inches thick; underlain by predominantly yellow silty clay loam, splotched with gray and brown, moderately acid, 40-60 inches thick; underlain in places by weathered siltstone, previously calcareous, 6-24 inches thick; underlain by thinly interbedded calcareous shale and limestone not related to the solum.

Nicholson soils are well drained, occupying smooth, broad watershed divides and narrower ridgetops of an old dissected peneplain above steep slopes of Eden, Fairmount, and Culleoka soils. The parent material appears to be weathered calcareous siltstone, easily crushed into loess-like material. Loess may have contributed to the solum in most places.

The Nicholson soils are extensive in parts of the Outer Bluegrass and Bluegrass Hills. Practically all areas are cleared and produce fair to moderate yields of burley tobacco, general field crops, and pasture.

NIXA silt loam

Grayish-brown cherty silt loam, moderately acid, about 7 inches thick; underlain by brownish-yellow friable cherty silt loam, strongly acid, about 5 inches thick; underlain by yellowish-brown friable cherty silty clay loam, moderately acid, 6-7 inches thick; underlain by mottled gray, yellowish-brown, and in places reddish-brown silty clay loam containing large quantities of chert fragments, moderately to strongly acid, 12-18 inches thick; grading into very cherty residuum from low-grade limestones.

Nixa soils are well drained or somewhat excessively drained and relatively shallow. They occupy smooth to gently rolling ridges in association with Bodine, Baxter, and similar soils. They lack the solum depth and pan development of the Dickson and Sango soils and in contrast to the Bodine soils, have definite, though shallow, B horizons.

The Nixa soils are inextensive, occurring principally in and adjacent to the Cumberland-Tennessee river section, and as small scattered areas in the Eastern Pennyroyal. Crop yields are low because of infertility and drouthiness, and cultivation is rather diffi-

cult on some areas because of the high chert content. They are probably best adapted to forest and pasture use.

OLIVIER silt loam

Light grayish-yellow floury silt loam, moderately acid, 8-12 inches thick; underlain by mottled yellow and gray silty clay loam, moderately acid, 15-20 inches thick; underlain by gray slightly compact silty claypan mottled with yellow and brown, moderately acid, 30-40 inches thick; underlain by silty sediments.

The moderately well-drained Olivier soils are developed on stream terraces from sediments of loess origin. They lack the sand content characteristic of the Hatchie soils of like drainage and position developed from sediments of mixed loess and coastal-plain origin.

The Olivier soils, of small total acreage, are distributed as small areas along some streams in the Purchase and parts of the Western Coalfield. Without drainage, they produce fair yields of corn, dark tobacco, and hay, principally lespedeza and redtop, in favorable seasons. Crop yields are considerably improved by drainage.

OOLTEWAH silt loam

Grayish-brown friable silt loam, moderately acid, 12-14 inches thick; underlain by grayish silty clay loam, profusely spotted with yellow and brown, generally becoming heavier textured with depth, moderately acid, thickness variable.

Ooltewah soils are moderately well drained. They occupy the floors of limestone sinks and depressions in association with the well-drained Abernathy soils and the poorly-drained Guthrie soils. Their occurrence as small areas is widespread throughout the limestone portions of the Eastern and Western Pennyroyal. Frequently, in smaller depressions, they are subject to ponding and are of little agricultural importance, but in the larger basins they produce fair yields of corn and forage crops.

OTWAY silty clay loam

Light grayish-brown to dark gray silty clay loam, near neutral, 5-8 inches thick; underlain by mottled gray, yellowish-brown and brownish-yellow alkaline to calcareous silty clay, 12-15 inches thick; underlain by grayish or yellowish massive or granular soft calcareous shale (marl).

Otway soils are shallow soils from marly materials on gently rolling to steep slopes below smoother slopes of Beasley, Hagerstown, and Lowell soils. They resemble the Fairmount soils somewhat, but Otway soils contain little or no limestone rock.

The Otway soils occur rather extensively along the border of the Outer Bluegrass and Knobs, particularly in Garrard, Lincoln, and Madison counties. They produce very good bluegrass pasture but are unsuited to cultivation, since erosion of the surface soil exposes the marl, on which plant growth is very difficult. Much of the acreage, previously cultivated, is now in cedar, brush, or scrub pasture.

PARKE fine sandy loam

Grayish-brown fine sandy loam, moderately or strongly acid, 8-10 inches thick; underlain by brownish friable sandy clay, strongly acid, 12-24 inches thick; underlain by yellowish-brown friable stratified sandy material, in places containing heavy lenses and calcareous conglomerate of local and erratic rocks.

Parke soils are derived from old glacial till or terrace materials. They occur very inextensively along the Ohio river bluffs in the vicinity of Fort Mitchell and are largely in estates, forests, and grass. Agriculturally, they are insignificant.

PEARMAN silt loam

Light grayish-brown friable silt loam, moderately or strongly acid, 8-10 inches thick; underlain by yellow or yellowish-brown firm silty clay loam, moderately or strongly acid, 10-14 inches thick; underlain by compact silty clay, predominantly brown but spotted with gray and yellow, strongly acid, 16-18 inches thick; underlain by mottled brown, yellow, and gray dense tough silty clay.

Pearman soils are moderately well drained, occupying undulating to gently rolling uplands from mixed sandstones, limestones, and shales in close association with the Christian, Caneyville, Talbott, and Westmoreland soils. They resemble the Tilsit soils but have heavier subsoils and are partly of limestone origin. Compared with the Bedford soils, they are derived partly from sandstone and shale and are less productive.

The Pearman soils are moderately extensive in the sandstone portion of the Western Pennyroyal, particularly in Grayson county, and occur somewhat widely in the Eastern Pennyroyal. They are suitable for general farming and produce fair yields of corn, small grain, and the less-exacting species of legumes and grasses. A considerable acreage is in permanent pasture, much of which is brushy.

PHILO silt loam

Grayish-brown or brownish-gray friable silt loam, moderately to strongly acid, 8-12 inches thick; underlain by a similar layer lighter in color and mottled yellow, gray, and brown in the lower part, mod-

erately acid, 10-20 inches thick; underlain by stratified acid alluvium.

Philo soils consist of moderately well-drained alluvium washed from upland soils of sandstone and shale origin such as those of the Muskingum, Wellston, Tilsit, Hartsells, and Hector series. They are more acid and somewhat less productive than the Hamblen and Lindsides soils which they resemble but which contain alluvium from uplands wholly or partly from calcareous materials.

The Philo soils are extensive in the Eastern Coalfield and along the headwaters of local streams in parts of the Knobs and Western Coalfield. They are particularly important to agriculture in the rougher sections where cropland is limited. They produce fair to moderately good yields of corn, hay, and pasture.

POPE silt loam

Light brown mellow silt loam, moderately to strongly acid, 6-10 inches thick; underlain by light brown to brownish-yellow heavy silt loam, moderately to strongly acid, 2-3 feet thick; underlain by stratified acid alluvium, predominantly sandy or gravelly.

Pope soils consist of well-drained alluvium derived from upland soils of acid sandstone and shale origin such as those of the Muskingum, Wellston, Tilsit, Hanceville, and Hector series. They are more acid and less productive than the Staser and Huntington soils which are derived from uplands wholly or partly from calcareous materials.

The Pope soils occur in small areas widely distributed throughout the Eastern Coalfield and along local streams in parts of the Knobs and Western Coalfield. The total acreage is not large, but the soils are highly important to agriculture in hilly or mountainous areas where cropland is scarce. They produce moderately good yields of corn, hay, and pasture.

PRADER silt loam

Gray friable silt loam splotted with light gray, yellow, and brown, near neutral, 6-10 inches thick; underlain by mottled brownish-gray, light gray, and yellow silt loam or light silty clay loam, the proportion of gray increasing with depth, near neutral, depth variable to stratified alluvium.

Prader soils consist of poorly drained alluvium washed from uplands predominantly of sandstone and shale origin but containing enough calcareous materials to render the alluvium near neutral in reaction. In other respects they are similar to the Atkins soils.

The Prader soils are fairly extensive in small-sized areas along streams in the Knobs, Eastern Pennyroyal, and sandstone part of the

Western Pennyroyal. Their poor drainage limits their use principally to pasture and hay except in very favorable seasons, when poor to fair yields of corn are possible. Drainage improves their productivity considerably.

PRIDE silt loam

Light yellowish-brown friable silt loam, moderately acid, 10-14 inches thick; underlain by yellowish-brown firm silty clay with faint fine mottles of yellow in the lower part, strongly acid, 12-18 inches thick; underlain by variegated brown and yellowish-brown very friable silt loam, containing some dark brown diffuse concretions in places, near neutral to alkaline, 12-30 inches thick; underlain by light yellowish-brown very friable calcareous silt loam.

Pride soils are well drained. They occupy moderately high terraces underlain by calcareous silty sediments derived largely from loess. They differ from the Lintonia soils in having heavier textured subsoils, somewhat thinner solums, and alkaline or calcareous C horizons.

The Pride soils are inextensive except locally in Union, Henderson, and Daviess counties, and possibly in those counties of the Purchase adjacent to the Mississippi river. They produce moderately good yields of corn, small grain, legumes, and grasses.

PROVIDENCE silt loam

Grayish-brown friable silt loam, moderately acid, 8-12 inches thick; underlain by yellowish-brown moderately firm to friable silty clay loam containing some splotches of pale yellow and gray in the lower part, moderately acid, 12-24 inches thick; underlain by brownish-gray compact silty clay loam or sandy claypan splotched with yellow, gray, and brown, strongly acid, 4-24 inches thick; underlain by stratified sandy and heavy coastal-plain materials.

Providence soils are moderately well drained. They are developed from shallow loess over coastal-plain materials in association with the Lexington, Brandon, and Lax soils. Compared with the Lax soils, they contain sandy rather than gravelly materials in the lower part of the solum and in the substrata.

The Providence soils are of moderate occurrence in the Purchase and Cumberland-Tennessee river section. They produce fair yields of corn, lespedeza, and redtop and moderately good yields of dark tobacco.

PURDY silt loam

Gray smooth silt loam somewhat mottled with yellow and brown, strongly acid, 6-8 inches thick; underlain by light gray silt loam con-

taining many small dark concretions and somewhat compact in the lower part, strongly acid, 14-16 inches thick; underlain by mottled light gray and yellowish-brown compact silty clay loam pan, strongly acid, 6-12 inches thick; underlain by stratified silty, clayey, and sandy alluvium.

The Purdy series includes poorly drained soils developed on stream terraces in association with other members of the Holston catena and upland soils of acid sandstone and shale origin. Although widely distributed in the Eastern Coalfield, Knobs, Western Coalfield, and sandstone part of the Western Pennyroyal, their total acreage is small. Because of their poor drainage and low fertility, they are best used for pasture, wild hay, or forest.

RARDEN silt loam

Light grayish-brown slightly platy silt loam, moderately acid, 8-10 inches thick; underlain by brownish-yellow heavy silty clay, strongly acid, 6-10 inches thick; underlain by variegated yellow, red, and gray plastic clay, strongly acid, 10-15 inches thick; grading into unweathered acid clay shale.

Rarden soils occupy undulating to rolling dissected uplands, derived from dense clay shales. They are inextensive and unimportant except locally in the Eastern Coalfield and Knobs. They are best suited for forest and pasture and produce poor to fair yields of general farm crops.

RAYWICK silt loam

Grayish-brown or light brown friable silt loam with a few chert fragments in places, moderately acid, 8 or 10 inches thick; underlain by brown, yellowish-brown, or reddish friable silty clay loam with numerous chert fragments, moderately acid, 8-14 inches thick; underlain by mottled yellow, brown, red, and gray moderately plastic clay, strongly acid, 10 or 15 inches thick; grading into unweathered variegated acid shale.

Raywick soils occupy undulating to gently rolling uplands and are developed from a thin veneer of cherty limestone residuum over acid shales. The upper part of the solum resembles that of the Baxter soils but the lower part of the profile is similar to that of the Rarden soils.

The Raywick soils are very inextensive and of small total acreage, principally in the Knobs and Eastern Pennyroyal. Yields of the common field crops are fair.

RENOX silt loam

Brown or dark brown heavy silt loam, containing numerous very small reddish shale fragments; sandstone, shale, chert, and limestone fragments of various sizes may be scattered on and throughout the layer; slightly to moderately acid, 8-14 inches thick; underlain by light brown to light grayish-brown friable heavy silt loam containing many small reddish flecks and fragments of weathered shale or fine grained sandstone which when crushed and mixed with the matrix, impart a pinkish or light salmon cast; slightly to moderately acid, 1-3 feet or more thick; underlain by a thin layer of variable residuum from Devonian black shale or Ordovician limestone.

Renox soils occupy footslope positions and are developed from local alluvial-colluvial materials washed from uplands of black shale, limestone, sandstone, and acid shale origin. They occur as bands between slopes of Westmoreland, Rockcastle, or Colyer soils and the adjacent stream terraces.

The Renox soils are very minor, occurring in the escarpment sections of the Eastern Pennyroyal and Knobs. They are probably best used for pasture and hay crops, although under careful management they produce fair to moderately good yields of corn.

RICHLAND silt loam

Light grayish-brown friable silt loam, moderately acid, about 10 inches thick; underlain by brownish-yellow moderately firm light silty clay loam, moderately acid, 12-18 inches thick; underlain by predominantly brown compact silt loam or silty clay loam hardpan spotted with yellow, gray, and rust-brown, moderately acid, 12-36 inches thick; underlain by yellow friable silt loam spotted with gray, dark yellow, and rust-brown, moderately acid.

Richland soils are moderately well drained. They occupy stream terraces derived from sediments of loess origin in association with other members of the Lintonia catena. In general profile characteristics, they resemble the Loring soils of the loessial uplands and the Freeland soils of the terraces derived from sediments of mixed loess and coastal-plain origin. Compared with the Freeland soils, they contain little or no sand throughout the profile.

The Richland soils occur as small areas along streams in the Purchase and northwestern part of the Western Coalfield. Total acreage is small. They produce fair to moderately good yields of corn, dark tobacco, lespedeza, soybeans, sorghum, small grain, forage crops, and pasture.

ROBERTSVILLE silt loam

Gray friable silt loam faintly mottled with rust brown and black and containing concretions in places, strongly acid, 8-15 inches thick; underlain by predominantly gray silty clay or silty clay loam pan mottled with brown and yellow, strongly acid, 12-36 inches or more thick; underlain by gray fine-textured acid sediments spotted with yellow and brown.

Robertsville soils are poorly drained, occupying flat or slightly depressed areas of stream terraces derived principally from sediments washed from upland soils of limestone origin. They are associated with Cumberland, Etowah, Elk, Captina, and Taft soils of like origin and resemble the Purdy soils derived from sediments of acid sandstone and shale origin.

The Robertsville soils are widely distributed as small areas throughout the limestone sections of Kentucky. The total acreage is not large. Because of their poor drainage and low fertility, these soils are best used for pasture and hay production. Even when drained, they produce only poor to fair yields of corn.

ROCKCASTLE shaly loam

Gray, grayish-yellow, or very light brown silt loam containing large quantities of gray, olive, and blue-gray shale fragments, strongly acid, 6-12 inches thick; underlain by yellow silty clay passing into mottled gray and yellow silty clay and containing large quantities of shale fragments in various stages of weathering, strongly acid, 6-12 inches thick; underlain by gray, olive-gray, and bluish-gray acid shales.

Rockcastle soils occupy steep slopes and are derived principally from light-colored heavy acid shales. They are commonly associated with the Colyer, Rarden, and Westmoreland soils. Compared with the Westmoreland soils, they have gray rather than dark colored surface soils, lack the limestone content of the Westmoreland soils, and are much less productive. Seepy spots are common in some areas.

The Rockcastle soils are very extensive in the rougher deeply dissected portions of the Knobs and Eastern Pennyroyal, and the total acreage is large. These soils are very poor agriculturally and are largely in forest. They are used to a limited extent for pasture which is of poor quality and for cultivation to corn with poor results.

ROELLEN silty clay loam

Brown or dark gray moderately friable light silty clay loam, near neutral, 6-10 inches thick; underlain by sticky, plastic heavy silty clay predominantly gray or dark gray, spotted with yellow, light gray, and brown, near neutral, 18-24 inches thick; underlain by a similar

layer somewhat heavier in texture and more plastic and sticky, near neutral, several feet thick.

Roellen soils are very poorly drained. They occupy low terraces or high-bottom positions, and are derived from calcareous loess sediments overlying heavy alluvium thought to be Mississippi river slackwater deposits. They are associated with the light-colored Hooten soils of like origin.

The soils are very inextensive, and they probably occur only as small areas near the Mississippi river. With drainage, they produce good yields of corn and hay crops.

ROSSMOYNE silt loam

Light grayish-yellow friable silt loam, moderately to strongly acid, 10-15 inches thick; underlain by brownish-yellow friable light silty clay loam, strongly acid, 8-10 inches thick; underlain by mottled light gray and yellowish-brown silty clay loam containing soft concretions, strongly acid, 8 or 9 feet thick; underlain by medium textured Illinoian glacial till.

Rossmoyne soils are moderately well drained. They occupy gentle topography in association with other members of the Cincinnati catena derived from Illinoian till. The upper part of the profile is probably influenced by loess. They resemble the Nicholson soils but are much thicker in the solum and are underlain by till rather than siltstone and interbedded calcareous shale and limestone.

The Rossmoyne soils are of minor occurrence. They are important only locally in parts of Trimble and Boone counties but may occur as small areas elsewhere within the glaciated part of northern Kentucky along the Ohio river. They produce fair to moderate yields of corn, small grain, hay, and pasture.

RUSSELLVILLE silt loam

Light yellowish-brown very friable silt loam, moderately acid, 7-12 inches thick; underlain by yellowish-brown friable silty clay loam, moderately acid, 18-28 inches thick; underlain by light yellowish-brown slightly compact silt loam or silty clay loam mottled and streaked with gray and brown, strongly acid, 6-12 inches thick; underlain by reddish-brown firm silty clay usually mottled with light yellowish brown and yellowish gray, strongly acid, extending to high-grade limestone at variable depths.

Russellville soils occupy gentle topography in association with Crider, Hagerstown, and Cookeville soils. Commonly, the upper part of the solum is derived from or influenced by loess. Compared

with the Dickson and Bewleyville, the Russellville soils have browner solums, are underlain by high-grade rather than cherty limestones, and are more productive.

The Russellville soils are widely distributed and of considerable agricultural importance in the limestone portion of the Western Pennyroyal, in the Eastern Pennyroyal, and in parts of the Outer Bluegrass, particularly in Jefferson, Oldham, and Bullitt counties. They are used extensively for the production of small grain and orchard grass hay and seed. Other crops include corn, clover, and dark and burley tobacco. Yields are moderate to good.

SALVISA silty clay loam

Dull brown or grayish-brown silty clay loam, commonly with shallow ledgy outcrops of thin-bedded limestones, near neutral, 3-10 inches thick; underlain by yellowish-brown or yellow granular heavy plastic silty clay, near neutral, 6-18 inches thick; underlain by light yellow and olive heavy plastic silty clay or clay, alkaline, 5-15 inches thick; underlain by fragmentary thin-bedded limestones, moderately high in phosphate.

Salvisa soils occupy gently rolling to hilly slopes in association with the Maury and Mercer soils of the Inner Bluegrass. They resemble the Fairmount soils, but differ from them in having much more profile development and a higher phosphate content.

The Salvisa soils are extensive in the Inner Bluegrass, particularly along the border of the Bluegrass Hills. They are used mostly for bluegrass pasture. Crops include grass and legume hay, burley tobacco, and corn, but drouth injury is usually severe except in seasons of most favorable rainfall distribution. Shallow areas and rock outcrops also restrict their use for crops.

SANGO silt loam

Pale gray or yellowish-gray floury silt loam, strongly acid, 7-12 inches thick; underlain by yellow or pale brownish-yellow friable light silty clay loam, strongly acid, about 10 inches thick; underlain by a firm brittle hardpan of mottled gray, yellow, and brown silty clay loam containing concretionary material in places, strongly acid, 12-20 inches thick; underlain by mottled gray, yellow, and brown somewhat compact silty clay loam commonly containing chert fragments, strongly acid, several feet thick. Many areas contain a scattering of chert fragments throughout the profile.

Sango soils are moderately well drained. They occupy very gently undulating uplands in close association with Weon, Baxter, Dickson.

Lawrence, and Guthrie soils, all derived largely from low-grade cherty limestones. They resemble the Bedford soils in degree of drainage but are more friable and lighter textured in the subsoil, are derived from poorer grade limestones, and are less productive.

The Sango soils are widespread and important soils of the Eastern Pennyroyal and occur to less extent in the Western Pennyroyal and parts of the Knobs. They are widely used for the production of general farm crops, including corn, forage, and hay; but yields are low to fair. A considerable amount is idle or in scrub pasture, and some is in forest.

SCIOTOVILLE silt loam

Grayish-brown silt loam, moderately to strongly acid, 8-12 inches thick; underlain by yellowish-brown silty clay loam, moderately to strongly acid, 6-12 inches thick; underlain by mottled light gray, brown, and yellowish-brown silty clay loam or sandy clay loam, strongly acid, depth variable, grading into sandy and gravelly water-laid sediments. Small mica flakes are evident throughout the profile.

Sciotoville soils are moderately well drained. They occupy smooth terraces in association with the Wheeling, Weinbach, Ginat, and Chilo soils principally from Ohio river sediments of mixed alluvium washed from a wide variety of upland soils.

The Sciotoville soils are widely distributed along the Ohio river and produce moderately good yields of general farm crops, vegetable and orchard crops, and pasture. Above the mouth of Green river, sandier types prevail, and in the vicinity of Louisville particularly, the Sciotoville and associated Wheeling soils are highly prized for horticultural purposes, with and without overhead irrigation.

SHANNON loam

Light brown friable loam, moderately acid, 12-18 inches thick; underlain by friable yellow loam or light sandy clay loam, usually containing small gravel, moderately acid, 20-30 inches thick; underlain by stratified alluvium of loess and coastal-plain origin.

Shannon soils are well drained or somewhat excessively drained. They occupy flood plains of alluvium washed from Lexington, Lax, Loring, Brandon, and other upland soils developed from shallow loess over coastal-plain materials. Sand content throughout the profile distinguishes them from the Vicksburg and Morganfield soils, and they are also more acid than the Morganfield soils.

The Shannon soils are important locally in the central and eastern portions of the Purchase and in the Cumberland-Tennessee river section. They are moderately productive for corn, melons, cowpeas,

lespedeza, and redtop, but are less desirable for small grain and tobacco because of their susceptibility to flooding. The more sandy types may be droughty.

SHARKEY clay

Dark brownish-gray moderately granular clay containing brown specks and stains, near neutral to alkaline, 6-10 inches thick; underlain by mottled gray and brown moderately plastic clay, alkaline to calcareous, several feet thick.

Sharkey soils are very poorly drained, occupying nearly level flood plains or beds of old former backwater lakes. They are very inextensive, being confined to a small area south of Louisville and scattered small areas along the Ohio and Mississippi rivers. When drained, they are very productive, particularly for soybeans, alfalfa, and other forage crops.

SHELBYVILLE silt loam

Brown friable silt loam, moderately acid, 6-18 inches thick; underlain by yellowish-brown friable silty clay loam, moderately acid, 15-20 inches thick; underlain by a characteristic concretionary zone of moderately compact silty clay loam or silty clay containing dull splotches of brown and gray and a very large quantity of dark concretionary material which gives the layer a friable consistence despite its stickiness, slightly or moderately acid, 10-14 inches thick; underlain by predominantly yellow tough plastic and sticky silty clay, thoroughly splotched with brown, olive, and gray, near neutral, extending to bedrock of thin-bedded argillaceous limestone at variable depths.

Shelbyville soils are well drained and closely associated with the Lowell and Fairmount soils. They differ from the Lowell soils in having lighter textured and decidedly more friable subsoils and a firm layer very rich in dark concretionary materials in the lower part of the solum. Typically, they occupy gentler slopes than the Lowell soils and are usually deeper to bedrock.

The Shelbyville soils are among the most extensive of the Outer Bluegrass and are well adapted to burley tobacco, of which they produce good to high yields. They are also productive for corn, small grain, a variety of legumes and grasses, and orchard grass seed.

SIBERIA fine sandy loam

Brownish-gray very friable fine sandy loam, strongly acid, 8-10 inches thick; underlain by yellow to pale yellow friable sandy clay loam, strongly acid; 10-14 inches thick; underlain by mottled yellow and gray clay hardpan, strongly acid, 6-8 inches thick; underlain by

grayish sandy clay with splotches of yellowish-brown sandy materials, strongly acid.

Siberia soils are moderately well drained, occupying gently undulating topography in association with Malt and Hodgenville soils. They are derived from mixed rock remnant or valley fill materials weathered from cherty limestones, soft sandstones, and quartz conglomerates. The Siberia soils resemble the Pearman in degree of drainage but are sandier throughout, lack the tough plastic lower subsoil layer of the Pearman, and typically occur on more nearly level topography.

The Siberia soils are inextensive and of little agricultural importance. They occur principally in Larue, Hardin, and Hart counties. Their principal use is for hay and pasture with some in cultivation to corn. Yields are low.

STALCUP silt loam

Dark brown granular heavy silt loam to light silty clay loam containing a few water-worn sandstone fragments, near neutral, 12-24 inches thick; underlain by dark brown to brown heavy silt loam to light silty clay loam containing large quantities of small wafer-like water-worn sandstone and shale fragments and a scattering of chert fragments, near neutral, 2 feet or more thick; underlain by miscellaneous stream terrace or first bottom alluvial materials.

Stalcup soils are well drained. They occupy alluvial-colluvial fan or high-bottom positions in association with upland and terrace soils from mixed limestone, sandstone, and shale materials. Their surface soils resemble those of the Huntington or Falmouth series, but their subsurfaces are characterized by the presence of large quantities of water-worn wafer-shaped fragments of shale and fine-grained sandstone.

The Stalcup soils are very inextensive, but important locally in Cumberland county and possibly adjoining counties in the Eastern Pennyroyal. A few scattered areas occur in the Knobs. These soils are productive for corn, hay, and pasture.

STASER silt loam

Light grayish-brown or dull brown friable silt loam, near neutral, 10-12 inches thick; underlain by friable light grayish-brown light silty clay loam containing faint splotches of yellow and gray in the lower part, near neutral, 30-36 inches thick; underlain by more or less mottled light brown and gray stratified alluvial materials, near neutral.

Staser soils are composed of well drained alluvial materials washed from upland soils derived from sandstones, calcareous shales, acid

shales, and limestones, influenced, in places, by loess. They differ from the Pope soils principally in being much less acid and from the Huntington soils in being lighter colored throughout the profile and in having a less strongly developed granular or crumb structure.

The Staser soils are extensive first-bottom soils of the Knobs, Eastern Pennyroyal, and sandstone portion of the Western Pennyroyal. They are productive for corn, hay, and pasture, and are particularly important to agriculture in rougher areas where suitable cropland is scarce.

STURGIS fine sandy loam

Light yellowish-brown very friable fine sandy loam, moderately or strongly acid, 8-14 inches thick; underlain by yellowish-brown friable fine sandy clay loam, strongly acid, 14-20 inches thick; underlain by stratified sediments in which yellowish-brown sandy loam predominates, interstratified with yellowish-gray heavier layers, slightly to moderately acid, 30 inches or more thick.

Sturgis soils are well drained. They occupy low, sandy, old natural levees or higher parts of terraces which are dominantly silty. The terrace materials are largely from uplands of loess and sandstone and shale origin. The Sturgis soils resemble the Dexter soils in many respects but contain no sediments of coastal plain origin. They are thought to be very inextensive as old levees along the Tradewater river in Union and possibly adjoining counties. They are moderately productive for corn, small grain, and hay.

TAFT silt loam

Gray friable silt loam, strongly acid, 8-10 inches thick; underlain by weak yellow firm clay loam, silty clay loam, or silty clay splotched with light gray, yellow, and brown in the lower part, strongly acid, 10-12 inches thick; underlain by light gray tough plastic silty clay or silty clay loam splotched with yellow and yellowish-brown containing water-worn gravel in places, strongly acid, 2 feet or more thick.

Taft soils are somewhat poorly drained, occupying nearly level terrace positions, and are derived from old alluvium from uplands of limestone or mixed origin. They are associated with the well-drained Elk, moderately well-drained Captina, and poorly drained Robertsville soils.

The Taft soils are widely distributed along most streams in Kentucky that carry sediments originating wholly or partly in limestone country. They produce poor to fair yields of corn, hay, and pasture.

TALBOTT silty clay loam

Grayish-brown somewhat friable silty clay loam, acid, 6-9 inches thick; underlain by tight tough yellowish-red silty clay or clay faintly mottled and splotched with yellow, particularly in the lower part, acid, about 2 feet thick; underlain by reddish-yellow clay highly mottled with brown, gray, and yellow and containing chert or limestone fragments, acid, depth variable to limestone bedrock.

Talbott soils are well drained, occupying undulating to rolling slopes in association with Colbert, Caneyville, Hagerstown, and Decatur soils. They have better drainage and more profile development than the Colbert soils and lack the sandstone content and mixed character of the Caneyville soils. They have tougher, more plastic subsoils and are less productive than the Hagerstown and Decatur.

The Talbott soils are widespread as small areas throughout the Eastern and Western Pennyroyal sections, and to some extent along the junction of the Outer Bluegrass with the Knobs. Total acreage is not large. They produce fair yields of corn, small grain, lespedeza, bluegrass, orchard grass, and other crops. In places, however, stoniness and erosion reduce their agricultural value considerably.

TARKLIN cherty silt loam

Yellowish-gray friable silt loam containing geodes, chert, and sandstone fragments, strongly acid, 8-10 inches thick; underlain by yellow heavy silt loam to silty clay loam containing much coarse material as above, strongly acid, 9-12 inches thick; underlain by mottled yellow, gray, and brown silty clay loam to silty clay containing many geodes, chert, and sandstone fragments, strongly acid, depth variable to underlying residual materials.

Tarklin soils are derived from local alluvial-colluvial accumulations on footslopes and fans in association with the Mobley soils of the stream terraces and such upland soils as the Rockcastle, Bodine, Dickson, and Weon series. Parent rocks are low-grade geodic or cherty limestone, shale, and shaley sandstone of the Eastern Pennyroyal and Knobs. Tarklin soils differ from the Greendale in being stonier, lighter colored, and considerably less productive.

The Tarklin soils comprise small areas in the Eastern Pennyroyal and Knobs. They are infertile, stony, and droughty. Although used for pasture, hay, or cultivation to corn, yields are low.

TIGRETT silt loam

Light yellowish-brown friable silt loam, moderately to strongly acid, 18-40 inches thick; underlain by mottled light yellowish-brown and gray silt loam, moderately to strongly acid, 20-60 inches thick.

Tigrett soils occupy local drainageways, depressions, and toe slopes in association with upland soils of the Memphis catena derived from loess. Compared with the Alva soils of like position and drainage but from mixed loess and Coastal Plain materials, they contain little or no sand throughout the profile. Compared with the Shannon soils, the Tigrett are of local alluvial-colluvial origin rather than alluvial soils of the stream flood plains.

The Tigrett soils are minor ones of the Purchase and Western Coalfield. They are productive for certain truck crops such as tomatoes and strawberries and fairly productive for corn, hay, and pasture. The more sandy types may be somewhat drouthy.

TILSIT silt loam

Light yellowish-brown silt loam, strongly acid, 7-9 inches thick; underlain by yellowish-brown or yellow friable heavy silt loam to silty clay loam, moderately to strongly acid, 10-16 inches thick; underlain by mottled yellow, brown, and gray silty clay loam hardpan, strongly acid, 10-20 inches thick; underlain by mottled yellowish-brown and gray friable silty clay loam containing shale and fine-grained sandstone fragments.

Tilsit soils are moderately well drained, occupying undulating uplands from fine-grained sandstone and shale in association with Muskingum, Wellston, Johnsburg, and Mullins soils, and are often influenced by loess. They are much siltier than the Cleburne soils of sandstone origin and lack the limestone influence of the Pearman.

The Tilsit soils, among the most extensive agricultural soils of the state, comprise a large acreage in the Western Coalfield, Eastern Coalfield, Knobs, and sandstone part of the Western Pennyroyal. They occur to some extent in the Eastern Pennyroyal. They are used for corn, small grain, lespedeza, redbud, other grasses and legumes, and dark and burley tobacco. Yields of most crops are fair to moderate. A considerable acreage is idle, in scrub pasture, or in second-growth forest.

TYLER silt loam

Light gray platy silt loam with brown spots, strongly acid, 7-10 inches thick; underlain by heavy compact light yellow silty clay mottled with gray and brown in the lower part, strongly acid, 10-20 inches thick; underlain by light-colored stratified silt, clay, and sand, strongly acid, thickness variable.

Tyler soils are somewhat poorly drained. They occupy stream ter-

ances composed of old alluvial sediments washed from uplands of sandstone and shale origin in association with other members of the Holston catena. They resemble the Taft soils in position and degree of drainage but lack their influence from limestone or other calcareous materials.

The Tyler soils occur along streams in the Eastern Coalfield and parts of the Western Coalfield and Knobs. They are best used for pasture and hay. Corn yields, normally low, are improved somewhat by drainage or bedding.

UNIONTOWN silt loam

Light yellowish-brown silt loam, moderately acid, 7-12 inches thick; underlain by brown to olive-brown firm silty clay somewhat variegated inside the structural units, strongly acid, 10-24 inches thick; underlain by yellowish-brown silty clay loam with fine low-contrast mottles of light olive-gray and a few dark brown specks, strongly acid, 10-20 inches thick; underlain by dark yellowish-brown firm silty clay loam or silty clay with low contrast mottles of light olive gray, strongly acid, thickness undetermined. In places alkaline layers and lime concretionary zones occur.

Uniontown soils are well drained and are developed from fine sediments of stream terraces along the margins of the Ohio river flood plain. They are associated with the Memphis and related soils of the uplands and with the Huntington and Wheeling catenas of the flood plains and sandier stream terraces, respectively.

The Uniontown soils are inextensive except along the Ohio river south of the mouth of the Green river, and along the Green river as far south as Hopkins county. They are used principally for soybeans, corn, hay, and pasture. Productivity varies from place to place with differences in soil reaction. In general, crop yields are fair to moderately good.

UPSHUR silty clay loam

Brown friable granular silty clay loam, slightly acid, 5-12 inches thick; underlain by dull red clay, slightly acid, 10-14 inches thick; underlain by heavy reddish-brown or dark red sticky plastic clay, near neutral, about 2 feet thick; underlain by purplish-red or "Indian red" clayey shale, more or less calcareous.

Upshur soils occupy crests of ridges, knobs, and gentle plateau slopes in association with Muskingum, Rarden, and Westmoreland soils. They are confined largely to Boyd and adjoining counties of the Eastern Coalfield. Here they are important locally, and are used almost entirely for pasture, for which they are fairly productive.

Their heavy texture and susceptibility to erosion makes them poorly adapted to tillage. Total acreage is small.

VICKSBURG silt loam

Brown friable silt loam, moderately acid, 8-10 inches thick; underlain by yellowish-brown very friable silt loam, moderately acid, 24-30 inches thick; underlain by yellowish-brown friable silt loam or silty clay loam with some splotches of gray and brown, moderately acid, 12-18 inches thick; underlain by predominantly yellow friable silty clay loam splotched gray, yellow, and brown and containing small dark concretions in places, moderately acid, several feet thick.

Vicksburg soils are well-drained first-bottom soils composed of alluvium washed from Memphis and associated upland soils of loess origin. They are more acid and somewhat less productive than the Morganfield soils and lack the noticeable sand content of the Shannon soils.

The Vicksburg soils are of minor occurrence in the Purchase and in parts of the Western Coalfield. They are good productive bottomland soils, particularly for corn and cowpeas, lespedeza, redtop, and other pasture and hay crops.

WAVERLY silt loam

Gray or light gray floury silt loam mottled with brown, strongly acid, 10-12 inches thick; underlain by bluish-gray silty clay mottled with pale yellow and brown, strongly acid, 10-20 inches thick; underlain by light-colored stratified silt and clay, acid, several feet thick.

Waverly soils are very poorly drained first-bottom soils composed of alluvium washed from Memphis and associated soils of loess origin. They lack the sand content of the Beechy soils of like position and drainage but are composed of mixed sediments of loess and coastal-plain origin. Compared with the Falaya soils, they are predominantly gray rather than pale yellow in the subsoil.

The Waverly soils are fairly extensive in the Purchase Region and of minor occurrence in parts of the Western Coalfield. They are mostly in forest, and in their natural state are too poorly drained for crop production. Wild hay is harvested from some areas, and some are used for pasture. With drainage, they produce fair yields of corn, hay, and pasture.

WAYNESBORO fine sandy loam

Grayish-brown mellow fine sandy loam, strongly acid, 6-10 inches thick; underlain by red, light red, or yellowish-red fine sandy clay, strongly acid, 2-3 feet thick; underlain by mottled light red, yellow,

and gray sandy clay loam or sandy clay containing gravel and cobbles of sandstone in places.

Waynesboro soils occupy old high terraces in association with many upland soils of sandstone and shale origin such as those of the Muskingum, Wellston, Hanceville, and Hector series. They resemble the Cumberland soils but have much sandier solums, contain no appreciable alluvium of limestone origin, and are less productive.

The Waynesboro soils are very inextensive and occur principally along the Cumberland river in eastern Kentucky, with a few scattered areas along other major streams. They are fairly productive for corn, small grain, soybeans, cowpeas, lespedeza, other legumes and hay crops, truck crops, and pasture.

WELLSTON silt loam

Grayish-brown friable silt loam, moderately or strongly acid, 5-7 inches thick; underlain by yellowish-brown friable silty clay loam, strongly acid, 18-22 inches thick; underlain by yellowish-brown heavy silt loam slightly mottled with gray and containing a few sandstone fragments, especially in the lower portion, strongly acid, 10-15 inches thick; underlain by disintegrated sandstone, siltstone, and shale.

Wellston soils are well drained, occupying gently rolling to rolling uplands in association with Muskingum, Tilsit, and other soils derived principally from acid sandstones and shales. In many places in the Western Coalfield, the upper part of the solum is derived partly from loess.

The Wellston soils are important and widely distributed in the Western and Eastern Coalfields and to a less extent in the Knobs, and Eastern Pennyroyal. They produce fair yields of corn, small grain, tobacco, and hay. Many areas are badly eroded. A considerable acreage is in pasture (much of which is scrubby), or in forest, or is idle.

WEON cherty silt loam

Light grayish-brown or brownish-gray cherty silt loam commonly containing sandstone fragments and silica geodes, strongly acid, 9-12 inches thick; underlain by light red, brownish-red, or yellowish-red raw tough brittle heavy silty clay containing angular chert fragments, strongly acid, 6-18 inches thick; underlain by tough heavy blocky silty clay or clay containing angular chert fragments, structural units are yellowish-brown with interior splotching of yellow, gray, and light red, strongly acid, 2-6 feet thick; underlain by weathered variegated acid shale or residuum from highly argillaceous cherty limestone, strongly acid, several feet thick.

Weon soils occupy karst (sinkhole) topography or smooth mild to moderately steep slopes and are derived from cherty limestone interbedded with heavy acid shales or from highly argillaceous cherty limestone. They resemble the Baxter soils in general appearance, but are much heavier textured throughout the subsoil and are less productive.

The Weon soils are extensive in the Eastern Pennyroyal. They are used for corn, tobacco, hay, and pasture, but yields are low. A considerable acreage is idle or in forest.

WESTMORELAND silt loam

Brown to dark gray friable granular silt loam, near neutral, 6-10 inches thick; underlain by yellowish-brown firm silty clay loam, near neutral or alkaline, 12-18 inches thick; underlain by disintegrated interbedded limestone, shale, and sandstone.

Westmoreland soils occupy steep slopes in association with Muskingum, Upshur, Rockcastle, and Colyer soils. They lack the red color of the Upshur soils and compared with the Muskingum, Rockcastle, and Colyer soils, they are derived partly from limestone and are much more productive of pasture.

The Westmoreland soils are very extensive in the Knobs, Eastern Pennyroyal, along the western border of the Eastern Coalfield, and in the sandstone portion of the Western Pennyroyal. They are steep and largely in forest but produce moderately good bluegrass pasture, particularly on the lesser slopes.

WHEELING loam

Grayish-brown loam, moderately to strongly acid, 4-12 inches thick; underlain by yellowish-brown or faintly reddish-brown clay loam, strongly acid, 12-20 inches thick; underlain by light yellowish-brown sandy clay loam, strongly acid, 2 feet or more thick; grading into stratified sandy and gravelly materials. Mica flakes are present throughout the profile.

Wheeling soils occupy stream terraces in association with the Bellevue, Sciotoville, Weinbach, Ginat, and Chilo soils. They are developed on mixed alluvium derived from a wide variety of sources.

The Wheeling soils are extensive along the Ohio river, particularly above the mouth of the Green. They are especially suitable for orchards and truck crops but are used also for general crops, of which they produce moderately good yields. In the vicinity of Louisville overhead irrigation is used to some extent for horticultural crops on these soils.

WOOLPER silty clay loam

Brown or dark brown granular silty clay loam, slightly acid, 10-12 inches thick; underlain by dark brown moderately friable silty clay, sticky and plastic when wet, slightly acid, 10-14 inches thick; underlain by olive-brown plastic calcareous silty clay spotted with gray, yellow, and yellowish-brown, especially in the lower part, slightly acid, 12 inches or more thick.

The well-drained Woolper soils are developed from local alluvial-colluvial accumulations washed from Fairmount, Lowell, Shelbyville, and similar soils derived from thin-bedded limestone and shale or argillaceous limestone. They differ from the Manse soils of similar origin in having well-developed B horizons and heavier texture throughout.

The Woolper soils are of wide occurrence in the Outer Bluegrass and Bluegrass Hills but the total acreage is relatively small. They are productive and are used chiefly for pasture in long rotation with tobacco and general farm crops including corn, small grain, and hay.

ZOAR silt loam

Light brown or grayish-brown friable silt loam, acid, 6-8 inches thick; underlain by yellowish-brown firm to friable silt loam, acid, 7-10 inches thick; underlain by pale yellow light silty clay loam mottled faintly with gray, acid, about 6 inches thick; underlain by yellow or grayish-yellow massive clay or silty clay mottled with gray, acid, 18-24 inches thick; underlain by gray laminated clay or silty clay mottled with yellow or brown.

Zoar soils are moderately well drained. They occupy stream terraces in association with Monongahela, Tyler, and Purdy soils, all developed from alluvial sediments of sandstone and shale origin. They differ from the Monongahela soils chiefly in having much heavier textured pans and substrata.

The Zoar soils probably are widely distributed in the Knobs and possibly occur in the Eastern and Western Coalfields and the Eastern Pennyroyal; however, the total acreage is thought to be small. They are suitable for corn, small grain, and hay, but yields are only fair. They are fairly productive for pasture.

APPENDIX

Evaluation of Soil Surveys of Kentucky Counties

CALLOWAY COUNTY (1945)

An accurate modern detailed soil survey map and report. Soil nomenclature is up-to-date, except that Memphis silt loam, as mapped, is largely Loring silt loam. Bottomlands along Tennessee river and for some distance up its tributaries are now under the waters of Kentucky Lake.

CHRISTIAN COUNTY, (1914)

An older survey of limited usefulness. The map is very general and suitable only for broad generalized work. Soil boundaries are fairly accurate. The text is of little value other than historical.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Christian silt loam	Christian, Caneyville, Pearman, Wellston, Manitou, Tilsit, and Talbott soils predominate.
Christian stony loam	Caneyville, Westmoreland, Muskingum, Christian, and Talbott soils predominate.
Clarksville silt loam	Russellville, Dickson, Bedford, Sango, Bewleyville, and Elk soils predominate.
Colbert stony clay	Colbert, Westmoreland, Caneyville soils, and Stony lands predominate.
DeKalb silt loam	Wellston, Manitou, Tilsit, Hartsells, and Muskingum soils predominate.
DeKalb silt loam, flat phase ..	Tilsit, Johnsburg, and Mullins soils predominate.
DeKalb stony silt loam	Muskingum, Jefferson, Wellston, Hartsells, Westmoreland, Caneyville soils, and Stony lands predominate.
DeKalb fine sand	Chiefly Hartsells and Muskingum soils.
Guthrie silt loam	Chiefly Guthrie, Ooltewah, Lawrence, and Sango soils.
Hagerstown silt loam	Crider, Hagerstown, Russellville, Decatur, Abernathy, and Ooltewah soils predominate. Areas of Baxter and other soils are included.
Hagerstown clay loam	Chiefly Hagerstown, Decatur, Ashburn, and Abernathy soils, with some Baxter, Ooltewah, and others.
Huntington silt loam	In northern part of county, Pope, Philo, Atkins, Staser, Hamblen, and Prader soils; in the southern part, Huntington soils predominate, with lesser amounts of Lindside, Melvin, Ennis, and Lobelville soils.

FAYETTE COUNTY (1931)

A fairly good detailed soil survey. Soil nomenclature is up to date with the few exceptions listed below. Soil descriptions are good. Land values and other economic data are, of course, no longer applicable.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
(Only soils involving changes are listed.)	
Elk silt loam	Elk and Captina silt loams.
Huntington silt loam, colluvial phase	Manse silt loam.
Maury silt loam, imper- fectly drained phase	Donerail silt loam.
Maury stony silty clay	Stony lands, Maury soil material.
Muskingum loam	Nicholson loam.
Robertsville silt loam	Guthrie silt loam, depressional phase.

FRANKLIN COUNTY (1915)

A Kentucky Experiment Station map and report in which standard soil type nomenclature is not used. It is of little use except for very broad generalized work and historical interest, and has long been out of print.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Black clay loam (bottom)	Chiefly Dunning and Burgin soils, with some Newark and Melvin.
Bluff and cliff land	Rock outcrop, stony lands.
Brown fine sandy loam (first bottom)	} Chiefly Huntington and Lindside soils.
Brown loam (first bottom) ..	
Brown loam (Lexington and High Bridge forma- tions)	Maury, Hagerstown, Loradale, McAfee, and Donerail soils predominate.
Gray fine sandy loam (river bottom)	Chiefly Melvin and Newark soils.
Light brown loam Maysville formation	Chiefly Shelbyville and Lowell soils with some Nicholson and Fairmount.
Stony loam, hilly	Stony lands—Maury soil material, Stony phases of Maury soils, and Salvisa, Fairmount, and Mercer soils predominate.
Yellow clay loam (Eden formation)	Chiefly Eden soils, with some Fairmount.
Yellow fine sandy loam (transported)	Uncertain. The Elk, Holston, and Bybee catenas are possibilities.
Yellow loam (Cynthiana formation)	Chiefly Mercer, Loradale, and Salvisa soils.
Yellow loam (second bottom)	Principally Elk, Captina, and Falmouth soils, with some Taft and Robertsville.
Yellow silt loam (transported)	Bybee, Goodloe, Dodds, and Cumberland soils predominate. (Areas of these soils also occur, but are not mapped out, west of Frankfort.)

GARRARD COUNTY (1924)

A very good survey of the older, less detailed type. Soil boundaries are accurate and although most of the mapping units are con-

siderably generalized, the map and report still have great usefulness in portraying soils information about the county. Most of the soil names used have not been changed, but many new series now recognized were included as variations in the series as mapped.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Culleoka gravelly silt loam	Chiefly Culleoka soils, with some Eden, Fairmount, Nicholson, and Lowell.
DeKalb silt loam	Muskingum, Rockcastle, Wellston, Manitou, Colyer, and associated colluvial soils predominate.
Elk silt loam	Chiefly Elk and Captina soils, with some Lowell, Greendale, Humphries, and others.
Fairmount stony silty clay loam	Fairmount, Eden, Maddox, Lowell, and Otway soils predominate.
Fairmount silty clay loam	} Chiefly Otway, Beasley, Fairmount, and Lowell soils.
Fairmount silty clay loam eroded phase	
Huntington silt loam	Chiefly Huntington and Lindside soils.
Lebanon silt loam	} Dickson, Sango, Lawrence, Guthrie, and Colbert soils predominate.
Lebanon silt loam, gravelly phase	
Lowell silt loam	} Chiefly Lowell and Beasley soils, with some Shelbyville, Maddox, Nicholson, Otway, and Fairmount.
Lowell silty clay loam	
Maury silt loam	} Chiefly Maury and Loradale soils, with some Mercer and Donerail.
Maury silt loam, rolling phase	
Pope silt loam	Staser, Hamblen, and Prader soils predominate.
Tilsit silt loam	Tilsit, Johnsburg, Monongahela, Tyler, Lickdale, Byington, and related soils.
Rough stony land	Stony lands and rock outcrops.

GRAVES COUNTY (1915) (New survey in press)

The old survey, by the Kentucky Experiment Station, in which standard soil type nomenclature was not used, has long been out of print. It is not reviewed here because a modern detailed soil survey has recently been completed and will soon be published.

JESSAMINE COUNTY (1916)

An old, very generalized survey, of little current value. Both map and text material are far out of date.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Colbert silt loam	Chiefly Salvisa and Mercer soils, with some Loradale, in the northern part of the county; in the southern part, chiefly Lowell, Culleoka, and Nicholson, with some Eden and Fairmount.
Fairmount stony clay	Chiefly Fairmount, Eden, and Culleoka soils.
Guthrie silty clay loam	Chiefly Guthrie (depressional phase) and Ooltawah soils, probably with some Taft and Robertsville soils.

Hagerstown silt loam	Chiefly Maury soils with some Hagerstown, Loradale, Mercer, Salvisa, Donerail, and others.
Hagerstown silt loam, shallow phase	} Chiefly Salvisa, shallow phases of Maury, Loradale and Mercer soils, and Stony lands.
Hagerstown clay loam	
Huntington silt loam	Chiefly Linside and Huntington soils.
Rough stony land	Stony lands and limestone outcrops.

LOGAN COUNTY (1922)

An excellent survey of the older type. Soil boundary lines are accurate and the survey is still suitable for all but detailed work despite out-of-date soil nomenclature for many of the mapping units. Degree of detail and accuracy are unusually good for a survey so old.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Abernathy silty clay loam	Abernathy and Ooltewah soils.
Christian stony loam	Christian, Caneyville, Talbott, Colbert, Westmoreland, Pearman soils, and Stony lands predominate.
Christian very fine sandy loam	} Christian, Talbott, Pearman and Wellston soils predominate, with some Colbert, Caneyville, and others.
Christian silt loam	
Clarksville silt loam	Chiefly Russellville, Bedford, and Bewleyville soils.
Decatur stony clay	} Chiefly Decatur soils with inclusions of Talbott, Colbert, Abernathy, and other soils, and Stony lands.
Decatur clay loam	
Decatur clay loam, stony and eroded phases	
Decatur silt loam	Chiefly Decatur and Hagerstown soils with inclusions of Crider, Ashburn, Abernathy, and Ooltewah.
Decatur gravelly clay loam ...	Chiefly Ashburn and Baxter soils.
Dunning silt loam	Dunning silt loam.
Elk silt loam	Elk, Captina, Falmouth, and Hermitage soils.
Guthrie silt loam	Chiefly Guthrie and Lawrence soils, with some Sango and Melvin.
Hanceville stony loam	Chiefly Muskingum soils, Stony lands and rock outcrop with some Hector, Wellston, Manitou, Hanceville, and others.
Hanceville very fine sandy loam	Chiefly Linker, Hector, and Hartsells soils.
Hanceville silt loam	Wellston, Manitou, Hanceville, Christian, Linker, and Tilsit soils predominate.
Huntington silt loam	Chiefly Huntington and Linside soils in the southern part; Staser and Hamblen soils in the northern part.
Huntington silty clay loam	Chiefly Newark and Melvin soils.
Pope silt loam	Pope, Philo, Nail, Staser, and Hamblen soils predominate.
Shelbyville stony clay	Chiefly Colbert, Talbott, and Burgin soils, and limestone rocklands.
Tilsit silt loam	} Chiefly Tilsit and Manitou soils, with some Wellston, Johnsburg, Mullins, Pearman, Christian, and others.
Tilsit silty clay loam	
Rough stony land	Limestone rockland, limestone outcrops, sandstone outcrops, and stony lands—limestone materials.

MADISON COUNTY (1906)

The best of the very old surveys, still useful for broad generalized study, but the soil nomenclature is completely out of date. The survey is extremely generalized, but major boundaries coincide fairly well with major physiographic and geologic changes. Only five soil series including but ten soil types were mapped. A very large number of series are now recognized in Madison county in which three major physical divisions of the state are represented—Outer Bluegrass, Bluegrass Hills, and Knobs.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Cumberland loam	Bybee, Goodloe, Dodds, Tyler, and Purdy soils.
DeKalb fine sandy loam	Chiefly Muskingum soils, with inclusions of Weston and Hartsells.
DeKalb loam	Chiefly Culleoka soils, with some Eden, Nicholson, Kenton, Shelbyville, Lawrence, and Guthrie.
DeKalb shale loam	Chiefly Rockcastle soils, with important occurrence of Colyer, Lickdale, Leadvale, Otway, Greendale, Westmoreland, and Muskingum.
DeKalb silt loam	Tilsit, Colyer, Byington, Fawcett, Lickdale, Muse, Leadvale, Otway, Beasley, Monongahela, Zoar, Tyler, Purdy, Hamblen, Prader, and Staser soils, and shale outcrops and stony lands predominate.
Guthrie clay	Chiefly Lawrence and Guthrie soils with inclusions of Captina, Taft, Robertsville, and Bedford soils.
Hagerstown clay	Chiefly Lowell, Otway, Beasley, and Fairmount soils with important occurrence of Shelbyville, Craitown, and Hagerstown soils, and marl outcrops.
Hagerstown loam	Chiefly Shelbyville soils with important occurrence of Lowell, Otway, Beasley, Hagerstown, and Fleming soils.
Hagerstown stony clay	Chiefly Fairmount, Eden, and Culleoka soils, stony lands—limestone materials, and limestone outcrops in the western half of the county; Otway and Fairmount soils and stony lands—limestone materials in the eastern half.
Muck	Berea muck.
Riverwash	Stony alluvium and stony colluvium.
Rough stony land	Stony land—limestone materials, limestone rockland, and limestone outcrops in northern part; stony lands—Westmoreland soil materials in southern part.
Wabash silt loam	Huntington, Dunning, Lindside, Newark, Melvin, Staser, Hamblen, and Prader soils predominate.

MARSHALL COUNTY (In press)

A modern detailed soil survey has been completed but has not yet been published.

MASON COUNTY (1904)

A very old extremely generalized survey of little present value.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Elkton clay	Chiefly Ginat, Weinbach, and Chilo soils.
Hagerstown clay	Chiefly Lowell and Fairmount soils with areas of Eden, Hagerstown, Bedford, Otway, Beasley, Manse, Woolper, Huntington, Lindsie, and others.
Hagerstown loam	Chiefly Shelbyville and Lowell soils with some Fairmount, Manse, Woolper, Huntington, Lindsie, and others.
Meadow	Chiefly Newark, Melvin, and Dunning soils with some Huntington and Lindsie.
Norfolk fine sandy loam	Chiefly Bellevue soils with some Wheeling and Sciotoville.
Norfolk loam	} Chiefly Wheeling and Sciotoville soils, with some Weinbach, Ginat, and Bellevue.
Leonardtown loam	

McCRACKEN COUNTY (1906)

A very old survey essentially worthless at present, even for generalized work. Only three soil separations are shown for the entire county. These are so broad that a listing of present nomenclature would be of no help in interpreting the map. The Memphis silt loam, as mapped, includes most soils of the Purchase Region. The Waverly clay includes roughly the wider areas of all the Ohio river bottomland soils, and the Waverly silt loam includes a few of the widest areas of bottomlands along Mayfield creek, Clarks river, and Massac creek, involving virtually all bottomland soils composed of sediment of acid loess or mixed loess and Coastal Plain origin.

MERCER COUNTY (1930)

A very good detailed soil survey suitable for essentially all purposes except detailed planning of individual farms. In the main, soil boundaries are accurate, soil descriptions good, and soil nomenclature is current, with the few exceptions listed below. Text material dealing with land values and similar economic questions is, of course, considerably out of date.

<i>Nomenclature used</i> (Only soils involving changes are listed.)	<i>Present nomenclature</i>
Elk silt loam	Elk and Captina soils.
Holly silt loam	Newark and Melvin soils.
Muskingum loam	Nicholson and Culleoka soils.
Robertsville silt loam	Taft and Robertsville soils.

MUHLENBERG COUNTY (1924)

A fair survey with moderate amount of detail. In some cases, soil units are not clearly conceived and soil boundary lines are not as accurate as they should be, but the map is suitable for many purposes. Nomenclature is largely obsolete, however. Shallow loess, present more or less throughout the county, was not recognized in the survey.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Atkins silt loam	} Nail, Atkins, Prader, and Philo soils predominate.
Atkins silty clay loam	
Christian stony loam	Chiefly Caneyville soils with some Christian, Talbott, Pearman, and others.
Christian silt loam	Chiefly Christian, with some Talbott, Pearman, Manitou and others.
Cincinnati stony clay	Chiefly Colbert, Talbott, and Caneyville soils.
Elk gravelly loam	} Not Elk soils, but present nomenclature is questionable. Described as old high terrace soils. They may be soils from loess over eocene gravel beds, similar to Brandon, Lax, and Iola soils.
Elk loam	
Hanceville stony loam	Chiefly Muskingum, Wellston, Manitou, and Jefferson soils.
Hanceville silt loam	Chiefly Wellston, Manitou, and Hartsells soils.
Holly silt loam	} Newark, Melvin, Lindside, and unclassified heavy textured calcareous soils predominate.
Holly silty clay loam	
Huntington loam	Huntington, Lindside, Bruno, Staser and Hamblen soils.
Huntington silt loam	Chiefly Lindside soils with some Newark, Huntington, Hamblen, and Prader soils.
Pope silt loam	Chiefly Pope, Philo, Barbourville, and Cotaco soils.
Robertsville silt loam	Possibly Henry and Calloway soils developed in loess overlying eocene gravel beds, rather than Robertsville soils.
Tilsit silt loam	Manitou and Tilsit soils (influenced by loess) predominate. Includes some Loring and Grenada soils, particularly in northern part.
Rough stony land	Stony lands, sandstone and limestone outcrops.

ROCKCASTLE COUNTY (1911)

A good survey of the old reconnaissance type, quite detailed for its time, yet suitable only for rather broad, generalized work. The map distinguishes major physiographic and geologic areas with fair accuracy. Soil descriptions are very meager and other text material is, of course, much out of date.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Clarksville silt loam	Chiefly Sango, Dickson, and Lawrence soils with some Baxter, Cookeville, and others.
Colyer silt loam	Chiefly Byington and Colyer soils with some Tilsit.
DeKalb sand	} Chiefly Hartsells and Cleburne soils with some Muskingum.
DeKalb fine sandy loam	
DeKalb shale loam	Chiefly Muskingum soils with some Hector, Hartsells, Rarden, Linker, Wellston, and others.
DeKalb silt loam	Tilsit, Manitou, Wellston, and Rarden soils predominate.
Elk silt loam	Tyler, Monongahela, Purdy, and Leadvale soils predominate.

Guthrie silt loam	Chiefly Guthrie and Lawrence soils.
Hagerstown silt loam	Hagerstown, Cookeville, Russellville, Talbott, and Baxter soils predominate.
Hagerstown-silt loam, steep shallow phase	Hagerstown, Talbott, Caneyville, Ashburn, Cookeville, Christian, Westmoreland, stony lands, limestone rockland, and limestone outcrops predominate.
Holly silt loam	Prader, Lee, Hamblen, Lobelville, and probably others.
Huntington loam	Chiefly Pope, Philo, and Barbourville soils in southeastern half; Staser, Hamblen, Huntington, and Lindside in northwestern half.
Lickdale shale loam	Steep areas are chiefly Rockcastle soils; gentler areas include Leadvale, Cruze, Muse, Lickdale, Greendale, Monongahela, Zoar, Tyler, Purdy, Byington, and others.
Pennington clay	Chiefly Colbert soils.
Rock outcrop	Sandstone—conglomerate outcrop and limestone outcrop.
Rough stony land	Stony lands—limestone materials, stony lands—sandstone and conglomerate materials, and stony lands—limestone and sandstone materials.

SCOTT COUNTY (1904)

A very old survey, essentially useless. Only two soils are mapped, both in the same series: Hagerstown loam and Hagerstown clay. The former marks in a very general way that part of the county in the Bluegrass Hills; the latter, the part in the Inner Bluegrass. Further evaluation of the nomenclature is not necessary, since Key Chart B and the identification descriptions may be consulted for details.

SHELBY COUNTY (1919)

A good survey of the older type. Soil units are rather generalized but accurately shown. Useful for work requiring no more than moderate detail. Soil descriptions are fairly good, but much of the text material dealing with agricultural values and soil management is, of course, out of date.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Cincinnati silt loam	} Chiefly Lowell soils, with some Manse, Woolper, and Fairmount. As mapped on Jephtha Knob, some Baxter and Dickson soils are included.
Cincinnati silt loam, rolling phase	
Cincinnati silty clay loam	Chiefly Lowell and Fairmount soils.
Eden clay	Chiefly Eden soils with some Fairmount, Manse, Brashear, and Woolper.
Eden silt loam	Chiefly Nicholson and Eden soils.
Elk silt loam	Chiefly Elk and Captina soils.
Hagerstown silt loam	Chiefly Russellville, Hagerstown, and Baxter soils.
Huntington silt loam	Chiefly Huntington and Lindside soils.
Shelbyville silt loam	Chiefly Shelbyville and Manse soils.
Shelbyville silt loam, rolling phase	Chiefly Shelbyville and Manse soils with some Lowell, Woolper, and Fairmount.

UNION COUNTY (1902)

The oldest survey of a Kentucky county and one of the earliest in the United States. Detail is exceptional for a survey of such early date, but the map and report are of little or no present value other than historical, and have long been out of print.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Miami fine sandy loam	Chiefly Bruno, Huntington, and Lindside soils and Riverwash, with other series included.
Miami loam	Chiefly Memphis, Loring, and Grenada soils with important occurrence of Elbridge, Muskingum, Wellston, Manitou, and members of the Tigrett. Lintonia, Pride, and Morganfield catenas, and other soils.
Sharkey clay	Chiefly DeKoven soils with inclusions of Morganfield, Hitesville, Caseyville, and other soils.
Sturgis fine sandy loam	Chiefly Sturgis soils, with inclusions of members of the Lintonia and Pride catenas and other soils.
Waverly silt loam	} Chiefly soils of the Morganfield catena with important occurrence of those of the Lintonia, Tigrett, and Vicksburg catenas, and other soils.
Memphis silt loam	
Yazoo clay	Soils of the Huntington, Uniontown, and Wheeling catenas predominate, but others are included.

WARREN COUNTY (1905)

A very old survey, broadly generalized, and essentially worthless for soils study. Only four soil-type separations, involving two soil series (both now obsolete) are mapped. Each separation includes a wide variety of soils, but in a very rough way the Clarksville silt loam is dominantly Decatur soils, the Clarksville loam is dominantly alluvial soils of the Huntington and Staser catenas, the Clarksville clay loam is largely eroded and stony phases of Decatur and Caneville soils, and DeKalb silt loam is largely soils of the Christian and Wellston catenas. Rough stony land indicates only the larger stony areas, and many other areas of stony land, limestone rockland, and limestone outcrop occur.

WEBSTER COUNTY (1912)

A Kentucky Experiment Station map and report in which standard soil type nomenclature is not used. It is of little use except for broad generalized work and historical interest, and has long been out of print. The mapping units, while highly generalized, are shown with fair accuracy. The map scale of 2 miles equals one inch is only half that of most surveys of Kentucky counties.

<i>Nomenclature used</i>	<i>Present nomenclature</i>
Dark brown clay loam (bottom)	Chiefly Melvin, Dunning and unclassified calcareous bottom land and low terrace soils, and includes others also.

- Gray clay loam (bottom) Chiefly Prader, Hamblen, Melvin, Newark, and unclassified calcareous bottom land and low terrace soils and includes others also.
- Gray silt loam (bottom) Chiefly Collins, Falaya, Waverly, Hamblen, and Prader soils but includes many others.
- Yellow silt loam (hilly) Loring, Grenada, Wellston, Manitou, and Muskingum soils predominate, but others are included.
- Yellow silt loam (undulating) Grenada, Calloway, Henry, and Tilsit soils predominate, with inclusions of Loring, Manitou, and many others.