

BENEDICTINE COLLEGE
Areas Surrounding Benedictine Abbey
in Atchison County, Kansas

Kansas Geological Survey
Open-file Report 89-45

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BENEDICTINE COLLEGE

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Multidisciplinary Field Trip
GUIDEBOOK

28 October 1989



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Welcome to the second annual multidisciplinary field trip sponsored by the Kansas Academy of Sciences, the Mid-continent Section of the National Association of Geology Teachers and Benedictine College. It is our pleasure to have you here in the older part of the state. In two ways the eastern part of the state is older than the west. Atchison's limestone rocks were formed in Paleozoic seas during the Pennsylvanian period about 25 million years ago. With the exception of the state in the southeast corner all the rest of the geological features are younger. Colleges and universities on the eastern side are older than those on the western side. The oldest college building is north of Atchison on the campus of Highland Community College.

The land that we will visit on the field trip today is owned by Saint Benedict's Abbey. St. Benedict's is one of the corporations that owns Benedictine College. Thus, the land is usually available for use by classes. The river bottom land has been used as a study area for the past three years by a group of students in the biology department.

I hope that the hardwoods of the eastern deciduous forest are in color for the field trip. The view of the Missouri River in the valley below the campus with the hardwoods in color is memorable. There are other spectacular sights from the bluffs. The river you see today is probably a tame and very large barge canal. But, for all that has been done to tame the Missouri River, it still has its moments as a river. I have seen the valley below covered from side to side with flowing water. Another spectacular sight is the migration of turkey vultures during the fall. On the opposite bluff thousands of turkey vultures soar up and out of view when west winds provide a free ride. Thousands of white pelicans use the oxbow lakes for stops during migration. A wintering flock of a quarter million snow geese is accompanied by numerous bald eagles that prey on the geese crippled by hunters.

Daniel E. Bowen
Immediate Past President
Kansas Academy of Science

Soil Survey of Atchison County, Kansas

By Kenneth H. Sallee and Cleveland E. Watts,
Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service,
in cooperation with the Kansas Agricultural Experiment Station

General Nature of the Survey Area

ATCHISON COUNTY is on the eastern border of Kansas, adjacent to Missouri (fig. 1). The county has a total area of 275,840 acres, or 431 square miles. In 1978, the population of the county was 17,748 and Atchison, the county seat, had a population of 10,694.

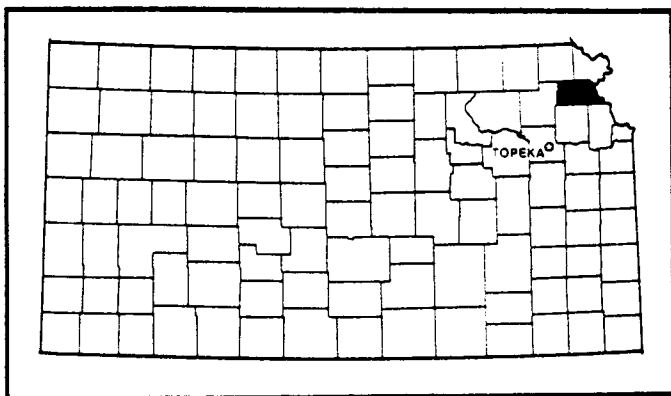


Figure 1.—Location of Atchison County in Kansas.

The eastern part of Atchison County is in the Iowa and Missouri Deep Loess Hills Land Resource Area, and the rest is in the Nebraska and Kansas Loess-Drift Hills Land Resource Area. In the Iowa and Missouri Deep Loess Hills area, the landscape is a succession of steep hills and deeply entrenched valleys adjoining the Missouri River Valley. The soils in that area are deep or moderately deep and generally have a silty or loamy subsoil. The slope of these soils decreases with distance from the river. The Nebraska and Kansas Loess-Drift Hills area ranges from nearly level to moderately steep. The soils generally are deep and formed in loamy glacial till or silty loess.

Farming is the most important agricultural enterprise in the county. Grain sorghum, soybeans, corn, and wheat

are the main crops. Cattle and hogs are the main kinds of livestock.

Nearly all of the industry in Atchison County is within the City of Atchison. Manufactured items include metal products and products made from grain.

The descriptions, names, and delineations of soils in this survey do not fully agree with those on soil maps for adjacent counties. Differences are the result of better knowledge of soils, modification in series concepts, intensity of mapping, or the extent of soils within the survey area.

Climate

By L. Dean Bark, climatologist, Kansas Agricultural Experiment Station, Manhattan, Kansas.

Atchison County has a continental climate typical of the interior of a large land mass in the middle latitudes. Such a climate is characterized by large daily and annual variations in temperature. Winters are cold because of the frequent outbreaks of air from the polar regions. Winter conditions prevail from December to February. Warm temperatures of summer last for about 6 months every year, and spring and fall are relatively short seasons. The warm temperatures provide a long growing season for crops in the county.

Atchison County is in the path of a fairly dependable current of moisture-laden air from the Gulf of Mexico. Precipitation is heaviest late in spring and early in summer. A large part usually comes in late evening or nighttime thunderstorms. Although the total precipitation is generally adequate for any crop, the distribution of the precipitation may cause problems in some years. Prolonged dry periods of several weeks duration are common during the growing season in this area. A surplus of precipitation often produces muddy fields that delay planting and harvest operations.

Table 1 gives data on temperature and precipitation for the survey area as recorded at Atchison in the period 1951 to 1976. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 30.7 degrees F, and the average daily minimum temperature is 20.8 degrees. The lowest temperature on record, which occurred at Atchison on January 22, 1930, is -28 degrees. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87.1 degrees. The highest recorded temperature, which occurred at Atchison on August 14, 1936, is 111 degrees.

The total annual precipitation is about 35 inches. Of this, about 25 inches, or 71 percent, usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 19.92 inches. The heaviest 1-day rainfall during the period of record was 5.96 inches at Atchison on March 16, 1919.

Tornadoes and severe thunderstorms strike occasionally in Atchison County. These storms are usually local in extent and of short duration so that the risk of damage is small. Hail occurs during the warmer part of the year, but the storms are infrequent and local in extent. Crop damage by hail is less in this part of the state than it is in the western part.

The average seasonal snowfall is 20.5 inches. The greatest snow depth was 51.1 inches and occurred during the winter of 1925-26. On an average of 23 days, at least 1 inch of snow is on the ground, but it is unusual for the snow cover to last more than 7 consecutive days. The number of such days varies greatly from year to year.

The prevailing wind is from the south. Average windspeed is highest, 13 miles per hour, in April.

Natural Resources

Soil is the most important natural resource in the county. The crops produced and the livestock that graze the pastureland are marketable products that are affected by the soil.

Other resources of Atchison County are limestone and sand and gravel. Limestone, in large amounts, is quarried and used as road-surfacing material and as riprap along the Missouri River. Sand and gravel are available in small amounts from deposits in the glacial till.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed

the steepness, length, and shape of slopes; the general pattern of drainage; the kinds of crops and native plants growing on the soils; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils

were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural

objects, they have a characteristic variability in their properties. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. These latter soils are called inclusions or included soils.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

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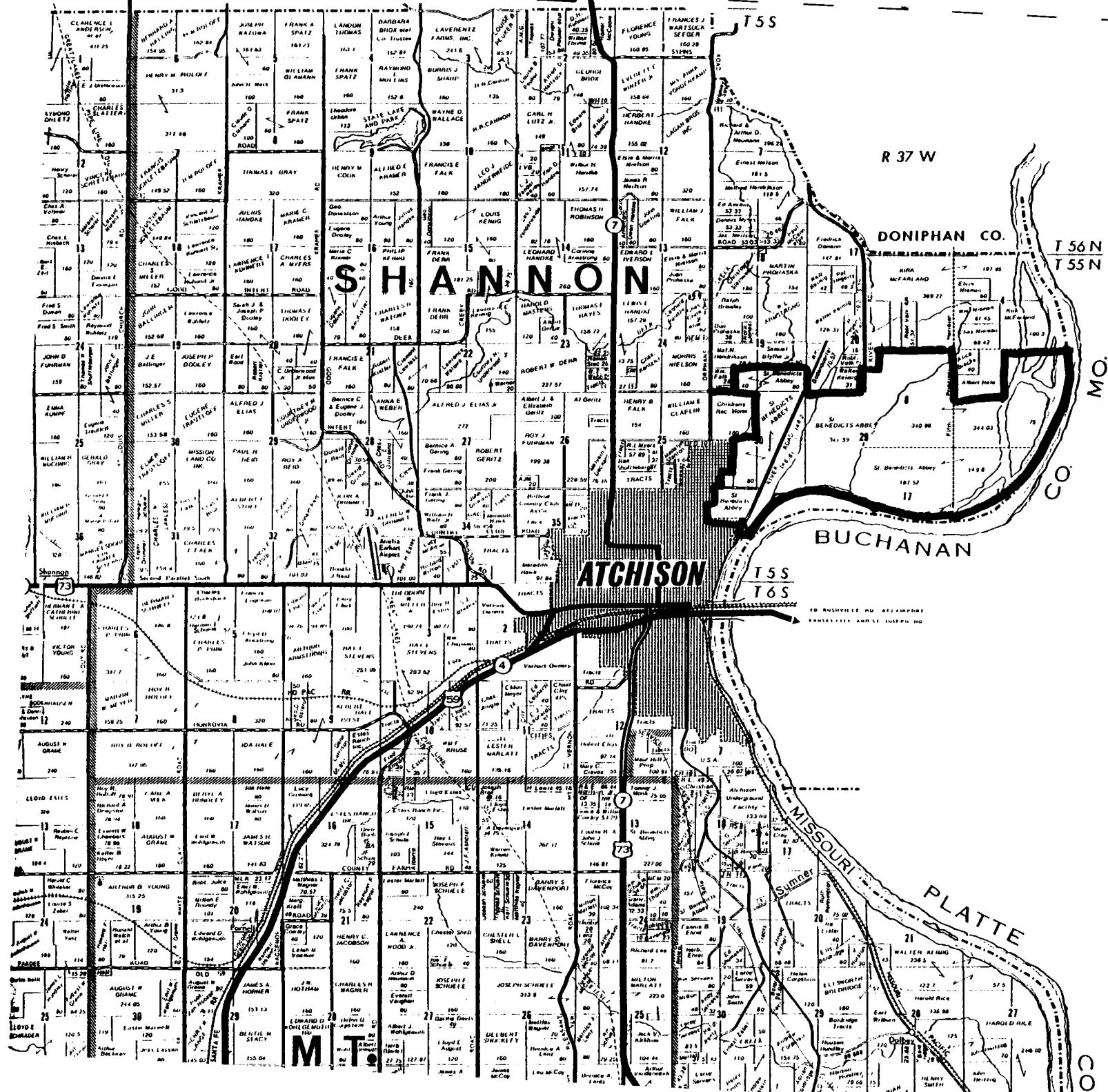
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General Soil Map Units

The general soil map at the back of this publication shows the soil associations in this survey area. Each association has a distinctive pattern of soils, relief, and drainage. Each is a unique natural landscape. Typically, it consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up an association can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one association differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Grundy-Pawnee Association

Deep, nearly level to moderately sloping, somewhat poorly drained and moderately well drained soils that have a dominantly clayey subsoil; on uplands

The soils in this association are on ridgetops and upper side slopes (fig. 2). The broad, smooth ridgetops are uniform in elevation. The side slopes generally have smooth, uniform slopes. Most areas of this association are drained by intermittent drainageways and creeks. Slope ranges from 0 to 7 percent.

This association makes up about 22 percent of the county. It is about 65 percent Grundy soils, 25 percent Pawnee soils, and 10 percent minor soils.

The somewhat poorly drained Grundy soils formed in loess on ridgetops and side slopes. Typically, the surface layer is black silty clay loam about 7 inches thick. The mottled subsoil is about 40 inches thick. The upper part of the subsoil is very dark gray, firm silty clay loam; the middle part is dark grayish brown, firm silty clay; and the lower part is dark grayish brown and grayish brown, firm silty clay. The substratum to a depth of about 60 inches is olive gray, mottled silty clay loam.

The moderately well drained Pawnee soils formed in glacial till on ridgetops and side slopes. Typically, the surface layer is very dark grayish brown clay loam about 8 inches thick. The mottled subsoil is more than 52

inches thick. The upper part of the subsoil is very dark grayish brown, firm clay; the middle part is dark grayish brown and dark brown, firm clay; and the lower part is grayish brown, firm clay loam.

The minor soils in this association are Colo, Kennebec, Sharpsburg, and Shelby soils. The Colo and Kennebec soils are on flood plains along drainageways. Sharpsburg and Shelby soils have a less clayey subsoil than the Grundy and Pawnee soils. They are generally on steeper side slopes or narrower ridgetops.

The soils in this association are used mainly for cultivated crops. In some small areas they are used for hay or pasture. Corn, grain sorghum, soybeans, and small grains are the main crops. Controlling erosion and maintaining tilth and fertility are concerns of management.

2. Shelby-Pawnee-Grundy Association

Deep, nearly level to moderately steep, well drained to somewhat poorly drained soils that have a loamy or dominantly clayey subsoil; on uplands

The soils in this association are on ridgetops and side slopes of uplands that are dissected by narrow drainageways (fig. 3). Slope ranges from 0 to 25 percent.

This association makes up about 30 percent of the county. It is about 45 percent Shelby soils, 30 percent Pawnee soils, 15 percent Grundy soils, and 10 percent minor soils.

The well drained Shelby soils formed in glacial till on side slopes. Typically, the surface layer is very dark grayish brown clay loam about 8 inches thick. The subsoil is friable clay loam about 39 inches thick. The upper part of the subsoil is very dark grayish brown and dark brown, the middle part is brown and mottled, and the lower part is dark yellowish brown and mottled. The substratum to a depth of about 60 inches is light olive brown, mottled clay loam.

The moderately well drained Pawnee soils formed in glacial till on ridgetops and upper side slopes, between the Shelby soils and the Grundy soils. Typically, the surface layer is very dark grayish brown clay loam about 8 inches thick. The mottled subsoil is more than 52 inches thick. The upper part of the subsoil is very dark grayish brown, firm clay; the middle part is dark grayish brown and grayish brown, firm clay; and the lower part is grayish brown, firm clay loam.

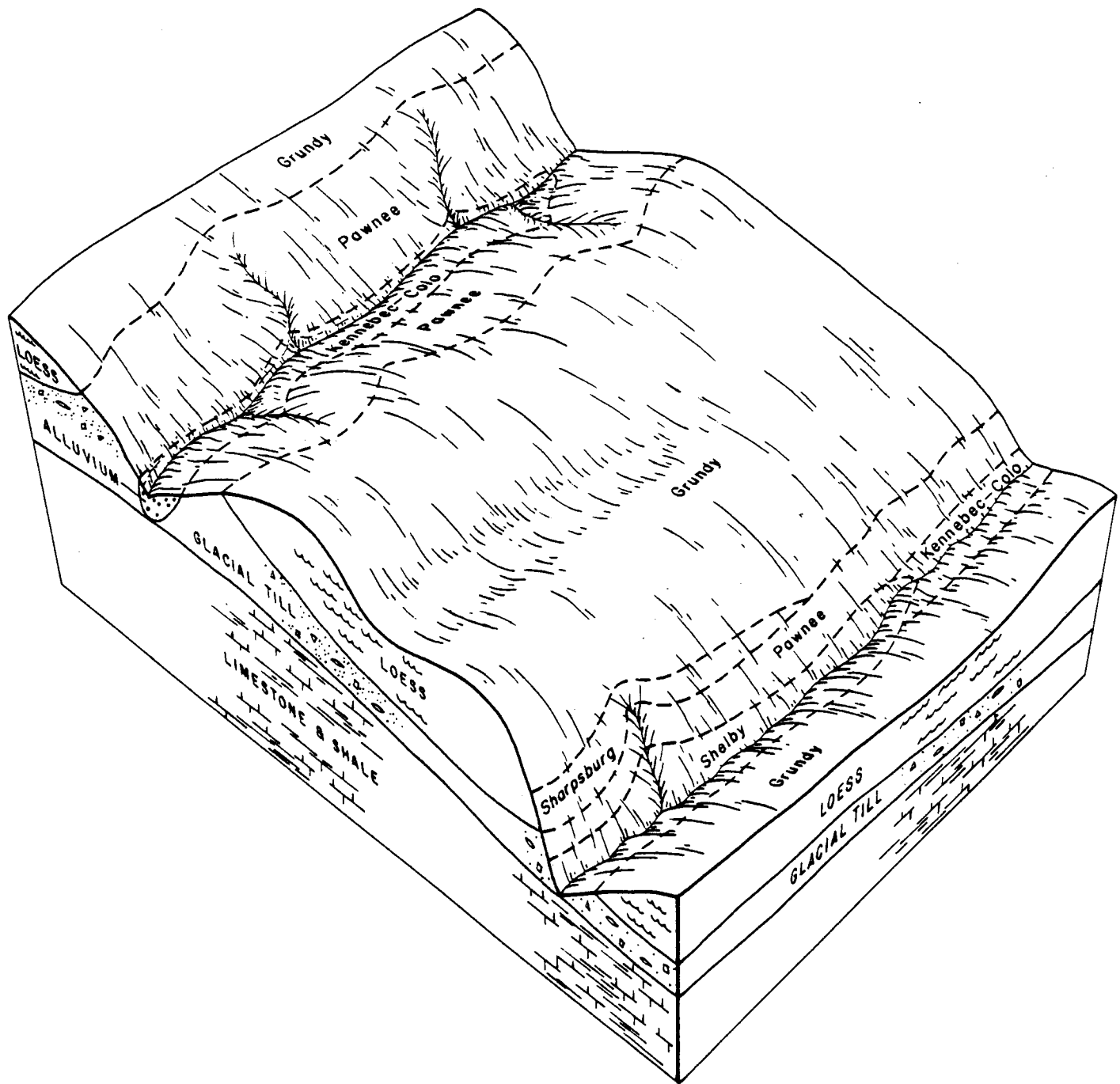


Figure 2.—Typical pattern of soils in the Grundy-Pawnee association.

The somewhat poorly drained Grundy soils formed in loess on broad ridgetops. Typically, the surface layer is black silty clay loam about 7 inches thick. The mottled subsoil is about 40 inches thick. The upper part of the subsoil is very dark gray, firm silty clay loam; the middle part is dark grayish brown, firm silty clay; and the lower

part is dark grayish brown and grayish brown, firm silty clay. The substratum to a depth of about 60 inches is olive gray, mottled silty clay loam.

The minor soils in this association are Colo, Judson, Kennebec, and Sharpsburg soils. The silty Colo and Kennebec soils are on flood plains along drainageways.

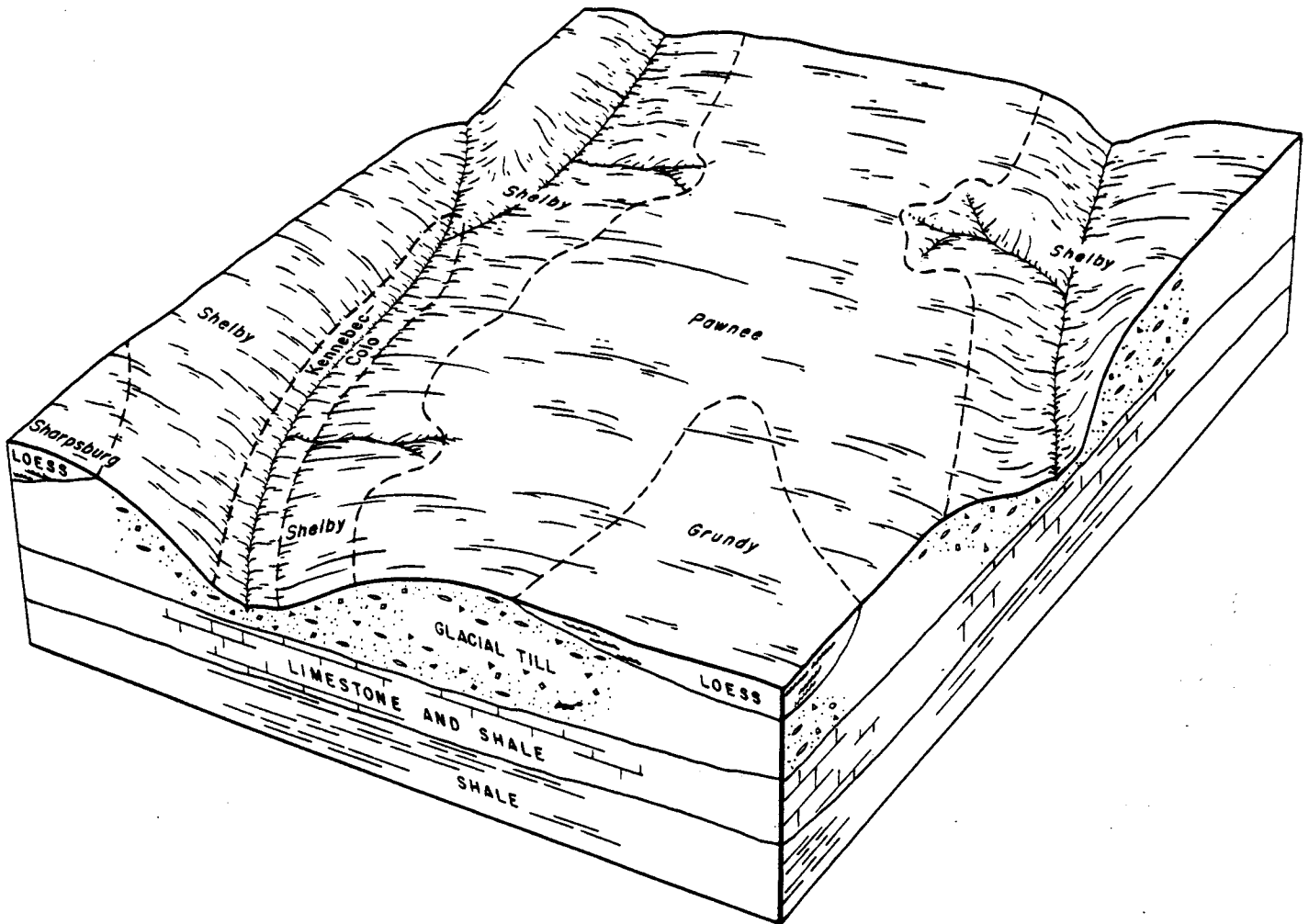


Figure 3.—Typical pattern of soils in the Shelby-Pawnee-Grundy association.

The well drained Judson soils are on foot slopes. Sharpsburg soils have a silty subsoil and are on narrow, convex ridgetops.

The soils in this association are used mainly for cultivated crops. In some small areas they are used for hay or pasture. Corn, grain sorghum, soybeans, and small grains are the main crops. Controlling erosion and maintaining tilth and fertility are concerns of management.

3. Sharpsburg-Shelby Association

Deep, gently sloping to moderately steep, moderately well drained and well drained soils that have a silty or loamy subsoil; on uplands

The soils in this association are on ridgetops and side slopes that are dissected by drainageways and creeks (fig. 4). Slope ranges from 1 to 25 percent.

This association makes up about 14 percent of the county. It is about 45 percent Sharpsburg soils, 35 percent Shelby soils, and 20 percent minor soils.

The moderately well drained Sharpsburg soils formed in loess on ridgetops and upper side slopes. Typically, the surface layer is very dark grayish brown silty clay loam about 7 inches thick. The subsoil is silty clay loam about 47 inches thick. The friable upper part of the subsoil is very dark grayish brown, the firm middle part is dark brown, and the firm lower part is dark brown and dark yellowish brown and mottled. The substratum to a depth of about 60 inches is dark yellowish brown, mottled silty clay loam.

The well drained Shelby soils formed in glacial till on the lower side slopes along drainageways. Typically, the surface layer is very dark grayish brown clay loam about 8 inches thick. The subsoil is friable clay loam about 39 inches thick. The upper part of the subsoil is very dark grayish brown and dark brown, the middle part is brown

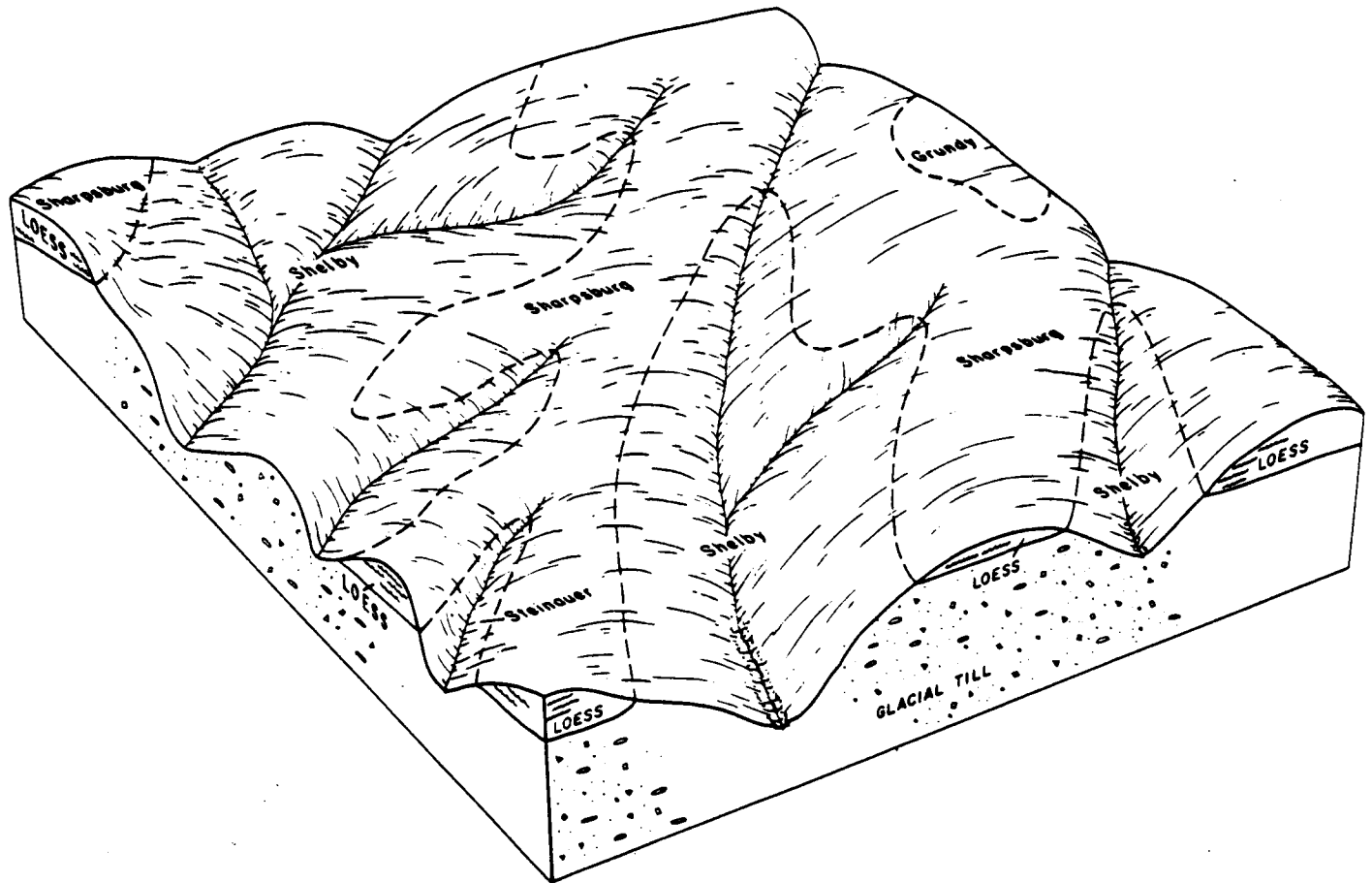


Figure 4.—Typical pattern of soils in the Sharpsburg-Shelby association.

and mottled, and the lower part is dark yellowish brown and mottled. The substratum to a depth of about 60 inches is light olive brown, mottled clay loam.

The minor soils in this association are Grundy, Kennebec, and Steinauer soils. The somewhat poorly drained Grundy soils are on broad ridgetops. Kennebec soils are on flood plains along drainageways. The calcareous Steinauer soils are on the steeper side slopes.

The soils in this association are used mainly for cultivated crops. In some small areas they are used for hay or pasture. Corn, grain sorghum, soybeans, and small grains are the main cultivated crops. Controlling erosion and maintaining fertility are concerns in managing these soils in cultivated areas. Improving forage production is a concern in managing pastures of tame grass.

4. Knox-Armster-Gosport Association

Deep or moderately deep, strongly sloping to steep, well drained and moderately well drained soils that have a silty, loamy, or clayey subsoil; on uplands

The soils in this association are on ridgetops and side slopes that are deeply dissected by drainageways and creeks (fig. 5). Slope ranges from 6 to 45 percent.

This association makes up about 19 percent of the county. It is about 32 percent Knox soils, 30 percent Armster soils, 25 percent Gosport soils, and 13 percent minor soils.

The deep, well drained Knox soils formed in loess on ridgetops and side slopes. Typically, the surface layer is dark brown silty clay loam about 8 inches thick. The subsoil extends to a depth of more than 60 inches. The upper part of the subsoil is dark yellowish brown, friable silty clay loam. The lower part is dark yellowish brown, mottled, friable silt loam.

The deep, moderately well drained Armster soils formed in glacial till. They are on the lower side slopes along drainageways, and in some places they are on ridgetops. Typically, the surface layer is dark brown clay loam about 7 inches thick. The subsoil to a depth of more than 60 inches is dark brown and reddish brown, firm clay loam. The lower part of the subsoil is mottled.

The moderately deep, moderately well drained Gosport soils formed in material weathered from shale

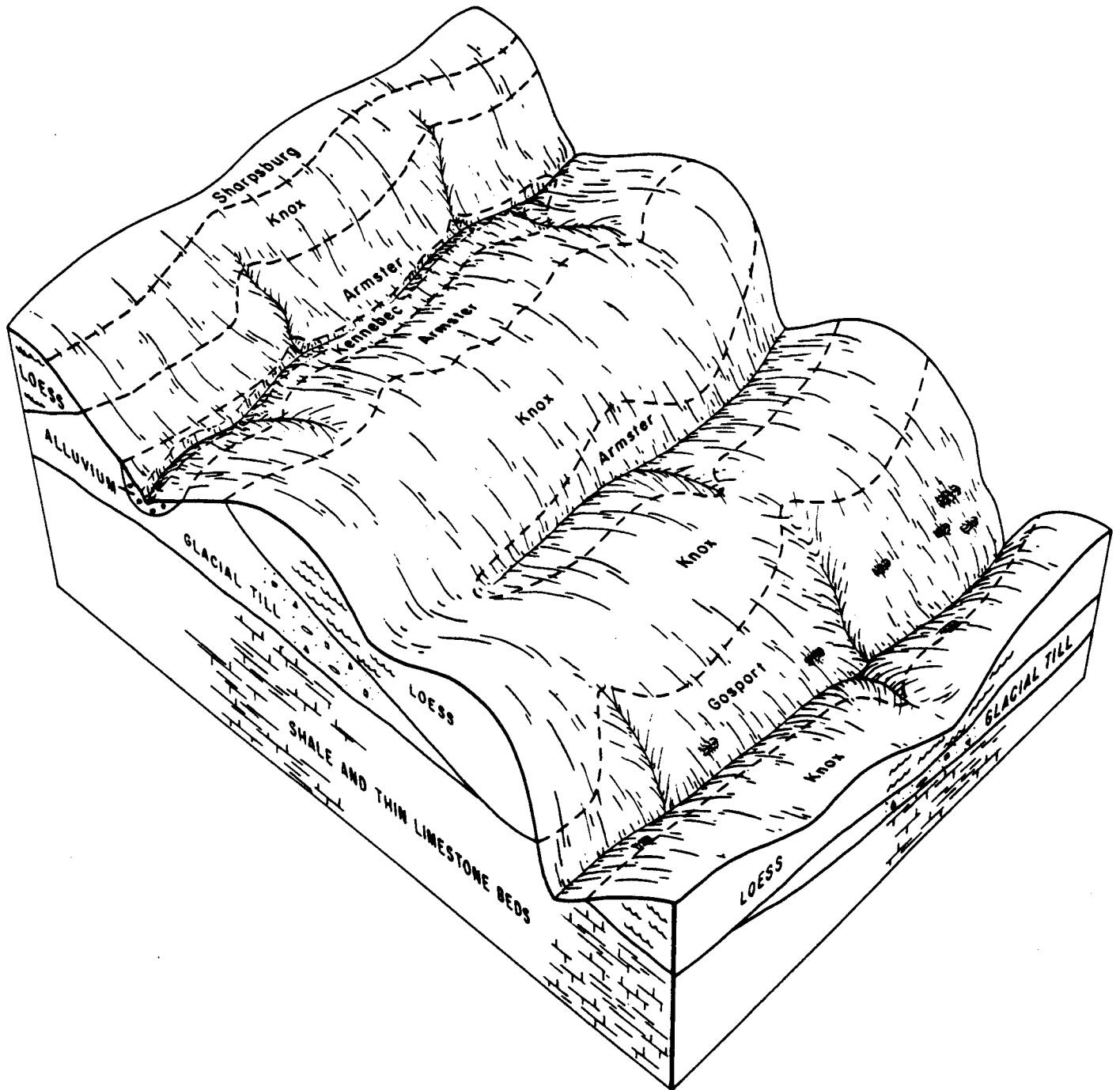


Figure 5.—Typical pattern of soils in the Knox-Armster-Gospport association.

on side slopes. Typically, the surface layer is very dark gray and very dark grayish brown silty clay loam about 8 inches thick. The mottled subsoil is about 27 inches thick. The upper part of the subsoil is dark yellowish brown, firm silty clay loam; the middle part is dark

yellowish brown, very firm silty clay; and the lower part is light olive brown, firm silty clay loam. Shale is at a depth of about 35 inches.

The minor soils in this association are Judson, Kennebec, and Sharpsburg soils. The well drained

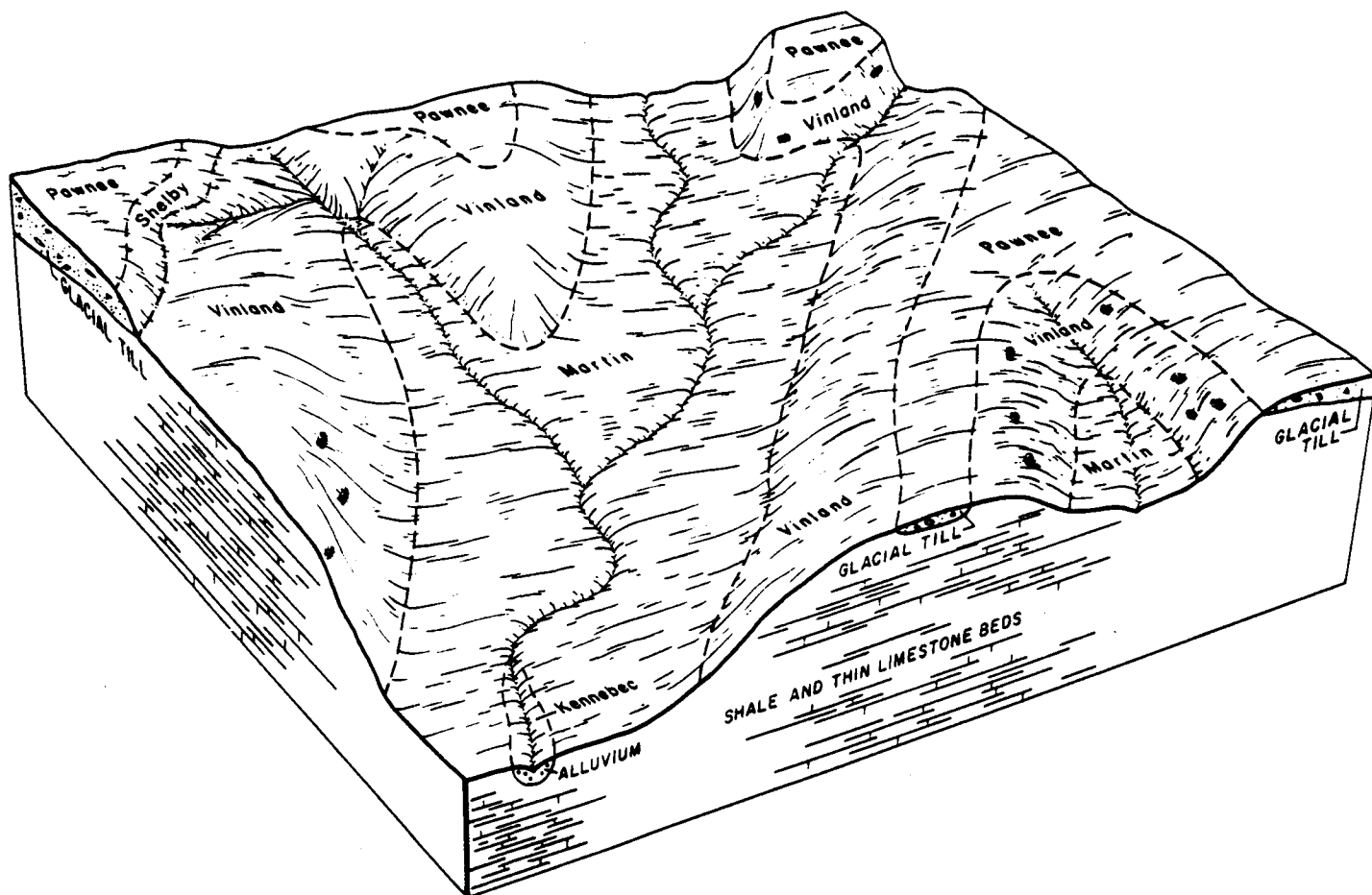


Figure 6.—Typical pattern of soils in the Martin-Vinland-Pawnee association.

Judson soils are on foot slopes. The Kennebec soils are on flood plains along drainageways. The moderately well drained Sharpsburg soils are on convex ridgetops.

The soils in this association are used mainly for pastureland and woodland. Some of the less sloping soils are used for cropland. The major management concerns are controlling erosion and maintaining the growth and vigor of the grasses and trees. An adequate plant cover and ground mulch help to reduce the runoff rate and prevent excessive soil loss.

5. Martin-Vinland-Pawnee Association

Deep or shallow, moderately sloping and strongly sloping, moderately well drained and somewhat excessively drained soils that have a silty, loamy, or clayey subsoil; on uplands

The soils in this association are on ridgetops and side slopes that are deeply dissected by drainageways (fig. 6). Slope ranges from 3 to 15 percent.

This association makes up about 3 percent of the county. It is about 40 percent Martin soils, 35 percent Vinland soils, 15 percent Pawnee soils, and 10 percent minor soils and outcrops of limestone.

The deep, moderately well drained Martin soils formed in material weathered from shale on the lower side slopes. Typically, the surface layer is very dark brown silty clay loam about 7 inches thick. The mottled subsoil is about 42 inches thick. The upper part of the subsoil is very dark brown, firm silty clay loam; the middle part is very dark grayish brown and dark grayish brown, very firm silty clay; and the lower part is olive brown, very firm silty clay. Olive and pale olive shale is at a depth of about 49 inches.

The shallow, somewhat excessively drained Vinland soils formed in material weathered from shale on side slopes. Typically, the surface layer is very dark grayish brown silty clay loam about 8 inches thick. The subsoil is dark grayish brown, friable silty clay loam about 4 inches thick. The substratum is grayish brown shaly silty clay

loam about 7 inches thick. Weathered silty shale is at a depth of about 19 inches.

The deep, moderately well drained Pawnee soils formed in glacial till on ridgetops and the upper side slopes. Typically, the surface layer is very dark grayish brown clay loam about 8 inches thick. The mottled subsoil is more than 52 inches thick. The upper part of the subsoil is very dark grayish brown, firm clay; the middle part is dark grayish brown and dark brown, firm clay; and the lower part is grayish brown, firm clay loam.

Of minor extent in this association are Gosport, Kennebec, and Shelby soils and outcrops of limestone. The moderately deep Gosport soils are on steep side slopes. The Kennebec soils are on flood plains along drainageways. The well drained Shelby soils are on side slopes above the Vinland soils.

The soils in this association are used mainly for pasture, hayland (fig. 7), and cultivated cropland. Some of the steeper soils and the soils along streams support trees. Grain sorghum and small grains are the main crops. Controlling erosion and maintaining fertility and tilth are concerns in managing areas used for crops. Maintaining an adequate and vigorous stand of grasses

is the main concern of hayland and pasture management.

6. Kennebec-Wabash-Colo Association

Deep, nearly level, moderately well drained, very poorly drained, and poorly drained soils that have a silty or clayey subsoil; on flood plains

The soils in this association are on flood plains of the Delaware River and its tributaries and Stranger Creek and Independence Creek. The soils are occasionally or frequently flooded. Slope ranges from 0 to 2 percent.

This association makes up about 9 percent of the county. It is about 40 percent Kennebec soils, 35 percent Wabash soils, 10 percent Colo soils, and 15 percent minor soils.

The moderately well drained Kennebec soils formed in silty alluvium. Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is black, friable silt loam about 25 inches thick. The subsoil is very dark brown, mottled, friable silt loam about 13 inches thick. The substratum to a depth of about 60 inches is very dark grayish brown, mottled silt loam.



Figure 7.—An area of Vinland silty clay loam, 4 to 15 percent slopes, used for hayland.

The very poorly drained Wabash soils formed in clayey alluvium. Typically, the surface layer is black silty clay about 8 inches thick. The subsurface layer is black, very firm silty clay about 20 inches thick. The subsoil to a depth of more than 60 inches is very dark gray and dark gray, mottled very firm silty clay.

The poorly drained Colo soils formed in alluvium. Typically, the surface layer is very dark grayish brown silt loam about 8 inches thick. The mottled subsurface layer is firm silty clay loam about 30 inches thick. The upper part is black, and the lower part is very dark gray. The substratum to a depth of about 60 inches is dark gray, mottled silty clay loam.

The minor soils in this association are Chase, Judson, and Reading soils. The somewhat poorly drained Chase soils are on stream terraces. The well drained Judson soils are on foot slopes. The moderately well drained Reading soils are on rarely flooded stream terraces.

The soils in this association are used mainly for cultivated crops. In some small areas they are used for hay, pasture, and woodland. Corn, soybeans, small grains, and grain sorghum are the main cultivated crops. Controlling flooding and maintaining fertility and tilth are concerns in managing cropland.

7. Haynie-Onawa Association

Deep, nearly level, moderately well drained and somewhat poorly drained soils that have a silty, loamy, or clayey subsoil; on flood plains

This association is on flood plains in the valley of the Missouri River. The soils are occasionally flooded. Slope ranges from 0 to 3 percent.

This association makes up about 3 percent of the county. It is about 50 percent Haynie soils, 40 percent Onawa soils, and 10 percent minor soils.

The moderately well drained Haynie soils formed in loamy alluvium. Typically, the calcareous surface layer is very dark grayish brown silt loam about 8 inches thick. The calcareous substratum to a depth of about 60 inches is stratified, mottled silt loam and very fine sandy loam. The upper part is dark grayish brown, and the lower part is grayish brown or brown.

The somewhat poorly drained Onawa soils formed in clayey and silty alluvium. Typically, the surface layer is very dark grayish brown silty clay loam about 8 inches thick. The upper part of the substratum is dark grayish brown, mottled silty clay about 19 inches thick; and the lower part to a depth of about 60 inches is dark grayish brown, mottled silt loam.

The minor soils in this association are Aquents and Colo and Sarpy soils. The Aquents are in narrow pits that were dug when the levees were constructed. The poorly drained Colo soils are along creeks entering the valley of the Missouri River. The sandy Sarpy soils are on mounds.

The soils in this association are used mainly for cultivated crops. In some small areas along the Missouri River they support trees. Corn, soybeans, grain sorghum, and small grains are the main cultivated crops. Controlling flooding, improving surface drainage, and maintaining tilth and fertility are concerns in managing these soils in cultivated areas.

MAJOR SOIL DESCRIPTIONS

Aq-Aquents, loamy. These nearly level, poorly drained and very poorly drained soils are in borrow pits, where soil material has been removed for fill, mainly in building levees. They are frequently flooded. The pits are nearly vertical. The areas occur as long narrow tracts, mainly between the levees and the Missouri River.

The soils are dominantly loamy. In some areas, recently deposited sand covers the surface; and in a few areas, the soils are clayey.

Included with these soils in mapping are small areas of Haynie, Onawa, and Sarpy soils, which make up 10 to 15 percent of the unit. These included soils are in narrow undisturbed areas between the pits.

Most areas are cultivated to control the brush and trees. The soils are poorly suited to cultivated crops. The crops usually cannot be harvested because of the flooding and deposition of sand. Some areas are covered with a dense stand of willow and cottonwood. Water covers most areas for short periods in most years.

These areas have a good potential for habitat for waterfowl, deer, quail, and furbearers. Tree plantings and excavated ponds help increase wildlife populations.

The soils are generally unsuitable for building site development because flooding is a hazard. Overcoming this hazard is difficult without major flood-control measures.

Hn-Haynie silt loam. This nearly level, moderately well drained soil is on flood plains along the Missouri River and along some upland drainageways. In most areas it is occasionally flooded, but in the areas between levees and Missouri River it is frequently flooded. Individual areas are long and

irregular in shape and range from 10 to 400 acres in size.

Typically, the calcareous surface layer is very dark grayish brown silt loam about 8 inches thick. The calcareous substratum to a depth of about 60 inches is stratified, mottled silt loam and very fine sandy loam. The upper part is dark grayish brown, and the lower part is grayish brown or brown. In some places the dark surface layer is more than 10 inches thick and the depth to calcareous material is more than 10 inches.

Included with this soil in mapping are small areas of the excessively drained Sarpy soils and the somewhat poorly drained Onawa soils. The Onawa soils are in shallow depressions. The Sarpy soils are on higher ridges. These soils make up 5 to 10 percent of the unit.

Permeability is moderate in the Haynie soil, and runoff is slow. Reaction is mildly alkaline or moderately alkaline. Natural fertility is medium, and organic matter content is moderately low. Tilth is good. A perched seasonal high water table is at a depth of 4 to 6 feet.

Most of the acreage is used for cultivated crops. A few small areas are in pasture of tame grass. This soil is well suited to corn, soybeans, wheat, and grain sorghum and to grasses and legumes for hay and pasture. Floodwater, however, can damage crops. Crop residue management helps to maintain fertility and tilth.

This soil is suitable for pasture. Overgrazing or grazing when the soil is too wet, however, causes surface compaction and poor tilth. Brush control, proper stocking rates, pasture rotation, timely deferment of grazing, and restricted grazing during wet periods help to keep the pasture in good condition.

This soil is suited to trees. A few small areas remain in native

hardwoods. Tree seeds, cuttings, and seedlings can survive and grow well if competing vegetation is controlled or removed. Plant competition can be controlled by site preparation or by spraying, cutting, or girdling. No hazards or limitations affect planting or harvesting.

The soil is generally unsuited to building site development because flooding is a hazard. Overcoming this hazard is difficult without major flood-control measures.

Ho-Haynie-Onawa complex. This map unit consists of moderately well drained Haynie soils and somewhat poorly drained Onawa soils of flood plains along the Missouri River. These soils are nearly level. In most areas they are occasionally flooded, but in the areas between levees and Missouri River they are frequently flooded. In some places the Onawa soils are subject to ponding.

Areas of the complex range from 20 to 500 acres in size. They are 50 to 60 percent Haynie soils and 30 to 40 percent Onawa soils. The Haynie soils are on the higher positions. The areas of Haynie soils and the areas of Onawa soils generally are so narrow that mapping them separately at the scale used is not practical.

Typically, the Haynie soils have a surface layer of very dark grayish brown silt loam about 8 inches thick. The substratum to a depth of about 60 inches is dark grayish brown and grayish brown, mottled, stratified silt loam and very fine sandy loam. In some places the dark surface layer is more than 10 inches thick.

Typically, the Onawa soils have a surface layer of very dark grayish brown silty clay loam about 8 inches thick. The upper part of the substratum, to a depth of 27 inches, is dark grayish brown, mottled silty clay. The lower part of the

substratum to a depth of 60 inches is dark grayish brown, mottled, stratified silt loam and very fine sandy loam.

Included with these soils in mapping are small areas of excessively drained Sarpy soils. The Sarpy soils are on sandy ridges. These soils make up 5 to 10 percent of the unit.

Permeability is moderate in the Haynie soils. It is slow in the upper part of the Onawa soils and moderate in the lower part. Runoff is slow. The Haynie soils have good tilth, and the Onawa soils have fair tilth. The shrink-swell potential is high in the Onawa soils. The seasonal high water table is at a depth of 4 to 6 feet in the Haynie soils and 2 to 4 feet in the Onawa soils. Natural fertility is medium, and organic matter content is moderately low.

Most of the acreage is used for cultivated crops. A few small areas are in pasture of tame grass. These soils are well suited to corn, soybeans, wheat, and grain sorghum and to grasses and legumes for hay and pasture. The wetness, however, is a limitation, and the floodwater can damage crops. The Onawa soils are difficult to work because they are wet and they dry slowly in spring. As a result, tillage and harvest are delayed, especially during rainy periods. Surface bedding, and land grading and smoothing improve drainage. Crop residue management helps to maintain fertility and tilth.

These soils are suitable for pasture. Overgrazing or grazing when the soil is too wet, however, causes surface compaction and poor tilth. Brush control, proper stocking rates, pasture rotation, timely deferment of grazing, and restricted grazing during wet periods help to keep the pasture and soils in good condition.

A few small areas remain in native hardwoods. Tree seeds, cuttings, and seedlings survive and grow well if competing plants are controlled. Because of wetness, the use of equipment and plant competition are problems. The use of harvesting equipment is easier in fall and winter, when the soil is relatively dry or frozen. Site preparation and controlled burning, spraying, or cutting reduced the rate of seedling mortality and control plant competition. High winds may blow down trees. Windthrow can be limited by using harvesting methods that will not leave trees standing alone or widely spaced.

These soils are generally unsuitable for building site development because flooding is a severe hazard. Overcoming this hazard is difficult without major flood-control measures.

Hs-Haynie-Sarpy complex. This map unit consists of moderately well drained Haynie soils and excessively drained Sarpy soils on flood plains along the Missouri River. These soils are undulating. In most areas they are occasionally flooded, but in the areas between levees and the Missouri River they are frequently flooded.

Areas of this complex are long and range from 10 to 200 acres in size. They are 50 to 65 percent Haynie soils and 30 to 40 percent Sarpy soils. The Sarpy soils are on slightly higher positions.

Typically, the Haynie soils have surface layer of very dark grayish brown very fine sandy loam about 8 inches thick. The substratum to a depth of about 60 inches is dark grayish brown and grayish brown, mottled, stratified silt loam and very fine sandy loam. In some places the dark surface layer is more than 10 inches thick.

Typically, the Sarpy soils have a surface layer of dark grayish

brown loamy fine sand about 6 inches thick. The substratum to a depth of about 60 inches is grayish brown and dark grayish brown fine sand.

Included with these soils in mapping are small areas of the somewhat poorly drained Onawa soils in shallow depressions. These included soils make up 5 to 10 percent of the unit.

Permeability is moderate in the Haynie soils and rapid in the Sarpy soils. Available water capacity is high in the Haynie soils and low in the Sarpy soils. Runoff is slow. The seasonal high water table is at a depth of 4 to 6 feet in the Haynie soils and to a depth of more than 6 feet in the Sarpy soils. Tilth is good. Organic matter content is low in the Sarpy soils. Reaction is mildly alkaline or moderately alkaline throughout all of the soils.

Most acreage is used for cultivated crops. These soils are suited to corn, grain sorghum, and small grains and to grasses and legumes for pasture and hay. The floodwater can damage crops. Soil blowing and the low available water capacity are additional management concerns on the Sarpy soils. Crop residue management and a protective plant cover help to control soil blowing. Applications of fertilizer help to maintain fertility and tilth. A cover of pasture grasses is effective in controlling soil blowing.

These soils are suited to trees. A few areas remain in native hardwoods. Selecting suitable species, preparing a site adequately, and controlling soil blowing help to obtain a good stand.

These soils are generally unsuitable as sites for buildings because flooding is a hazard. Overcoming this hazard is difficult without major flood-control measures.

On-Onawa silty clay loam. This nearly level, somewhat poorly drained soil is on flood plains along the Missouri River. Most areas are flooded occasionally, and some low areas and channels are flooded frequently. Individual areas are irregular in shape and range from 10 to 8090 acres in size.

Typically, the surface layer is very dark grayish brown silty clay loam about 8 inches thick. The upper part of the substratum is dark grayish brown, mottled, firm silty clay about 19 inches thick; and the lower part to a depth of about 60 inches is stratified dark grayish brown, mottled silt loam. The soil is calcareous throughout. In some places the lower part of the substratum is silty clay.

Included with this soil in mapping are small areas of Haynie soils. The moderately well drained Haynie soils are in the higher areas. They are less clayey than the Onawa soil. Also included are slightly undulating areas of sandy overwash. Inclusions make up about 10 percent of the unit.

Permeability is slow in the upper part of the Onawa soil and moderate in the lower part. Runoff is slow. Available water capacity is high. Natural fertility is medium. Reaction is mildly alkaline or moderately alkaline throughout the soil. The seasonal high water table is at a depth of 2 to 4 feet. Tilth is fair. The shrink-swell potential in the upper part of the soil is high.

Most of the acreage is used for cultivated crops. Some small tracts are pastures of tame grass. This soil is well suited to corn, soybeans, wheat, and grain sorghum and to grasses and legumes for hay and pasture. Cultivated crops can be damaged by the flooding and the wetness. This somewhat poorly drained soil dries slowly. The wetness delays tillage and harvest, especially during rainy period. Surface ditches, surface bedding,

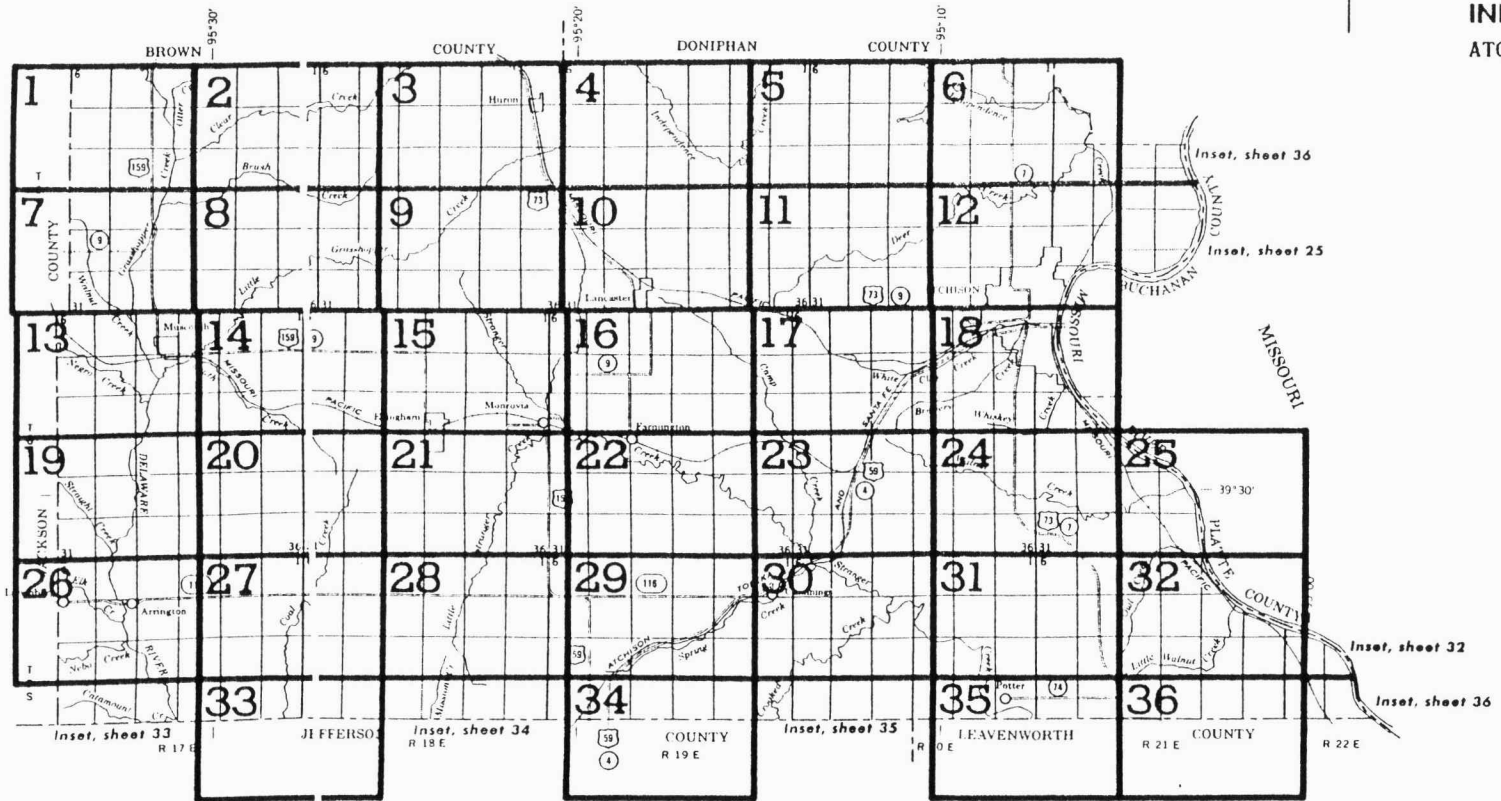
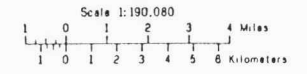
and land grading and smoothing improve drainage. Crop residue management helps to maintain fertility and tilth.

This soil is moderately well suited to pasture. Overgrazing or grazing when the soil is wet, however, causes surface compaction and poor tilth. Brush control, proper stocking rates, pasture rotation, timely deferment of grazing, and restricted grazing during wet periods help to keep the pasture and the soil in good condition.

A few small areas remain in native hardwoods. Because of the wetness of the soil, the use of equipment is limited and plant competition is a problem. Harvesting equipment is easier to use if the soil is relatively dry or frozen. Site preparation reduces the rate of seedling mortality. High winds can blow down trees, but windthrow can be limited by using harvesting methods that do not leave trees standing alone or widely spaced.

This soil is generally unsuitable for building site development because flooding is a severe hazard. Overcoming this hazard is difficult without major flood-control measures.

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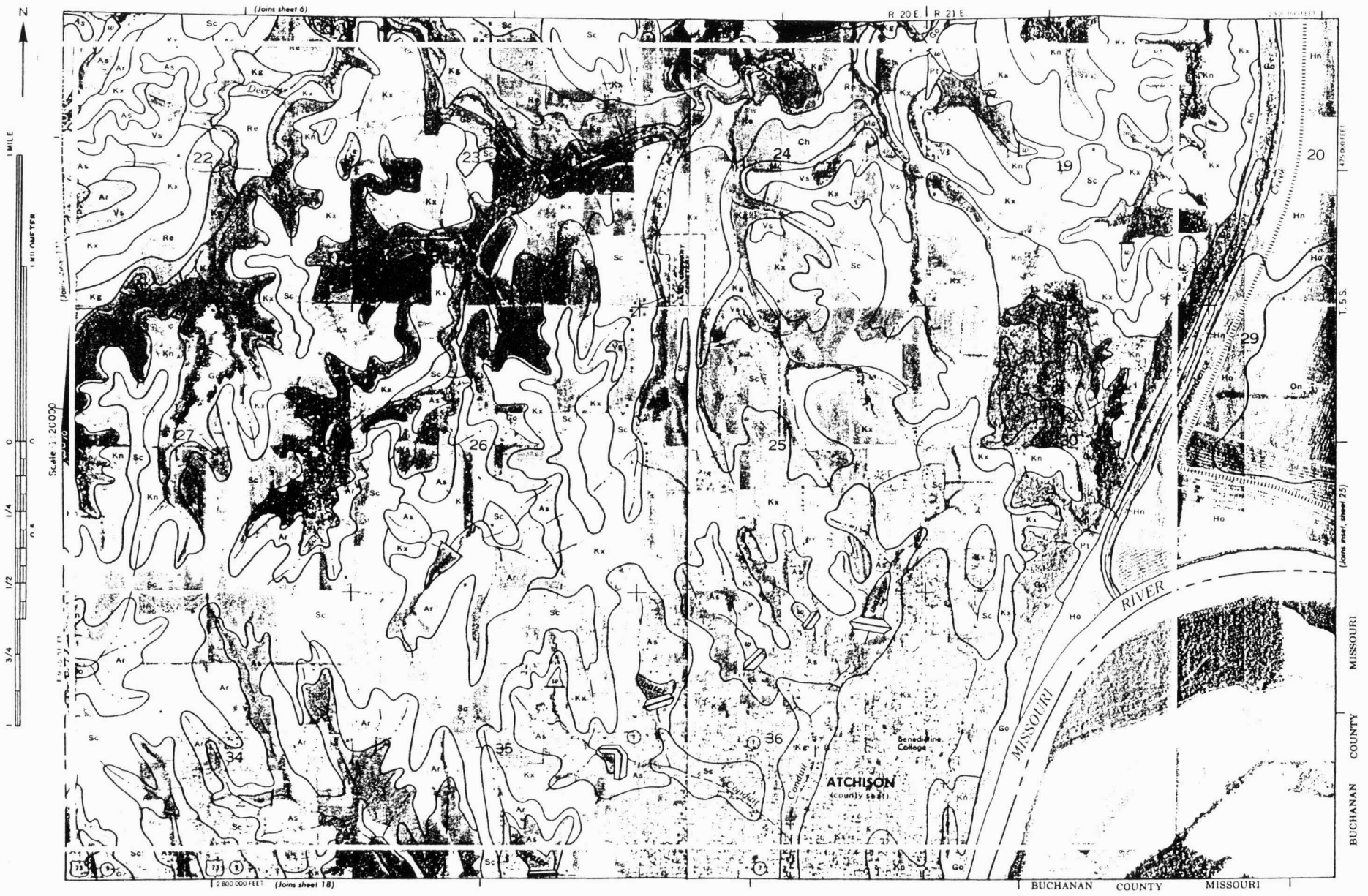


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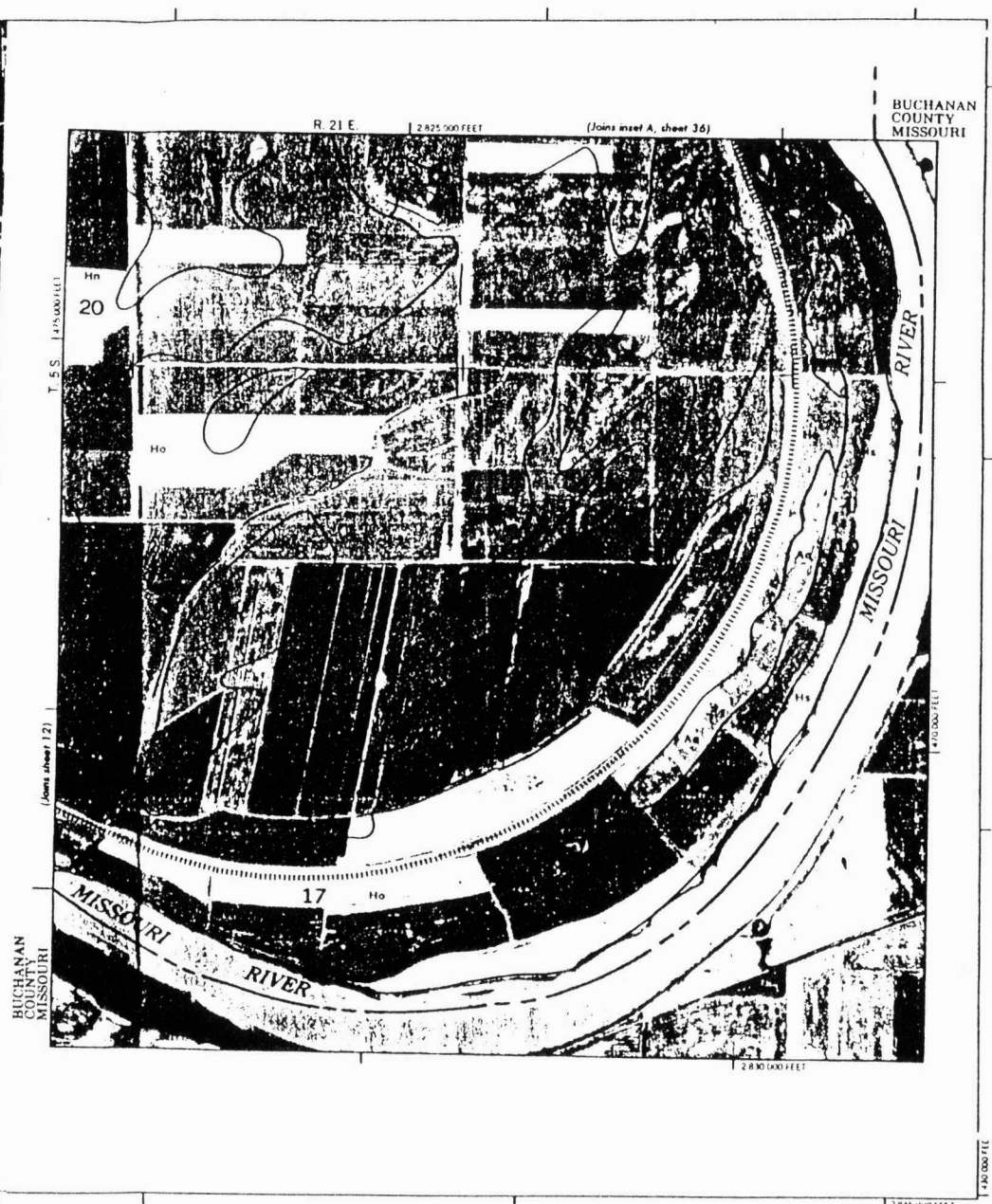
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BUCHANAN COUNTY MISSOURI

BUCHANAN COUNTY MISSOURI

ATCHISON COUNTY, KANSAS — SHEET NUMBER 25



Part 1- The Evolution of a Local
Herbarium of the Flora
of Atchison County Kansas,
with Abstract

9 pages

by

Hubert W. Blocker , O.S.B., Ph.D. , Prof. of Biology, St. Benedict's College

Geography and Phytological Regions :

Saint Benedict's College is located at the northeast corner of the city of Atchison, Kans. , the county seat of Atchison County , one of the four counties in the state bordering the Missouri River. It is one of the smallest of the 105 Kansas counties, and together with all or the greater part of nine other counties in the northeast corner of the state, constitutes the geographical region known as the Dissected Till Plains section of the Central Lowlands province of the Interior Plains. Topographically , it lies wholly within the Ozark Plains which constitute approximately the entire eastern third of the state. The location of Atchison as one of the two upper river counties gives it a variety of plant habitats which many of the larger but less favorably located counties do not share.

Bordering directly on the river, is the Missouri River flood plain, varying in width from a few yards to several miles with a dominant native vegetation of hydrophytes and semi-aquatic plants. Next come the heavily-wooded bluffs which in favorable sections are made up of several terraces (usually three or four) each with its own type of dominant plants. Along the greater part of the bluffs , however, the original vegetation has been greatly disturbed and in part destroyed by successive brush fires , grazing of cattle and such human factors as road-building opening of quarries, deforestation, etc. Where these disturbing factors have been absent, one may get a fair representation of the early plant societies as e.g. one finds along a stretch of a mile or so, three miles south of the City. Here, such indigenous plants as blood-roots, spring beauties, ladies slippers and bell flowers may still be found in greater or less abundance. However, there are some facts of plant distribution along the bluffs that cannot be ascribed to human, or even to edaphic factors. In many places on the lowest terrace, the water leaf, Hydrophyllum is very abundant in late spring. But the plants in the northern half of the county are H. virginianum whereas at the extreme southern end of the county this is replaced by H. appendiculatum and in places in between (at Owl Creek) we find

both species growing side by side. Between the flood plain and the bluffs, a third region may be distinguished at least from the city of Atchison to the southern end of the county. This is the railroad right of way, where the railroad ballast often furnishes specimens not usually found elsewhere. The uplands, beyond the bluffs are divided into pastures, woods and cultivated ground with here and there a patch of native prairie. In one such patch of virgin prairie, about five miles west of Atchison, (W.A. Stevens Prairie) I was able to collect many specimens of the original prairie flora. Besides many of the native grasses, making up the so-called "prairie grass", I was able to find such rare specimens as prairie lilies, closed gentians, ladies tresses, blazing star, gay feathers and all the more common plants usually associated only with the prairie flora. But even in Kansas native prairies are getting very scarce. I remember when in the late 1920s one of my former botany professors at the State Univ. of Iowa, Bouhimef Shimek, an authority on the prairie flora and author of a book on the subject, used to lament the fact that the only prairie left in Iowa were small patches along the railroad right of way. Finally, the cultivated and disturbed grounds on the uplands, as might be expected, furnished most of the so-called "weeds".

Material and Methods:

The work of building up a local herbarium was begun in the spring of 1950, when a few specimens, mostly grasses were collected and preserved, but on the whole most of the work of that season until the spring of 1951 was given over to "tooling up". This consisted in making collecting equipment, herbarium cases and acquiring some practice in the identification of plants by running them through the keys. All the collecting equipment was made in the "shop" shared by the departments of physics, biology and psychology. The psychologists prefer to call this the room of occupational therapy. It is not that standard equipment was not ^aavailable, but rather that I was not satisfied with commercial products. Vascula were made out of a pair of empty canned ham tins, for ends, soldered to a center piece of tin from a lard

can so as to make the vasculum about eighteen inches long with a sixteen inch opening for the door. Since these ham tins came in five different sizes, I was able to construct what I have facetiously called a midget vasculum, a junior vasculum, a senior vasculum, a super vasculum and a vasculum vasculorum. The last mentioned size is almost too bulky to carry far into the field and was usually left in the car and specimens transferred to it when necessary. These vascula with their narrow tops furnish a very convenient place for carrying the long narrow trowels made from about a foot of chromium-plated tubing from an old chair by splitting one end and fashioning it into a blade about an inch and a half wide. It is the best tool I have found for digging up deep roots, tubers and bulbs. Several plant presses were made but seldom used except in the field for such specimens in which the leaves or flowers have a tendency to fold or close up when kept in a vasculum. Ventilators or dividers were cut from corrugated cardboard and specimen folders and driers from newspapers, a single sheet folded once for the former and two double sheets folded twice for the latter. Regular blotters were used only in the field with the plant presses. Instead of using portable plant presses with straps, for routine drying I prefer stacking the specimens on a bench or small table and applying pressure by means of a piece of heavy plywood and a weight of about 40 to 50 pounds. I use a piece of cut stone wrapped in muslin and furnished with a handle. By this method, the pressure is adjusted automatically as the plants dry. Mounting paper, genus covers and labels, of course, had to be purchased, although the labels were printed to order with a large blank place at the bottom for "Remarks". A general heading for the collection, e.g., Plants of Atchison County Kansas, appears on every label. Besides this there is: the Serial Number of the specimen, date, Collector, Scientific Name, Common Name (at least one), locality, Habitat and, as noted, "Remarks". The extent of the "remarks" necessary will vary with different plants. They should not duplicate what the specimen itself shows, e.g., it is useless to record the size when the

whole plant is on the page. It has been my practice to trim off the unused part at the bottom after the label has been typed.

My arrangement of specimens in the herbarium cases would perhaps not meet the approval of a professional botanist. The families are arranged on shelves in family covers in alphabetical order after the manner of the ancient herbals. (These family covers are really genus covers, but I use a lighter paper for genus covers). In these family covers, the genera are arranged in alphabetical order, as also are the species within the genus covers. Of course, this method does not attempt to show any relationship between the families but it puts the plants where they can be instantly located. The only difficulty is the recent decision of the Committee on Nomenclature that every family should be named after a type genus. I have not adopted this new ruling, since they allowed the old names to stand as legitimate alternatives. I still use, e.g. leguminosae and compositae instead of fabaceae and asteraceae. The decision, whether or not these changes should be made, I leave to my successor.

Results:

Since beginning this work about seven years ago, I have gotten together a local county herbarium of some 650 species of vascular plants belonging to 367 genera and representing 93 families. (2) In addition I have added to the State Herbarium, at Kans. State U. at Manhattan, about 275 specimens from this county, of which five or six are new to Kansas. In his first communication to me, dated December 5, 1951, the late Professor Frank C. Gates, Prof. of taxonomy at Kansas State Coll., and Curator of the State Herbarium, writes as follows:

"Mostly for our own convenience, I have made a list of identifications together with remarks in a few cases. The plants are marvelously well put up and very easy to work with. They certainly add a lot to our Atchison County flora, but that is to be expected, since we have had no person especially interested in collecting in that important northeastern county".

The last letter received from him is dated January 21, 1955. In it he says:

"I certainly appreciate your sending in these additions which are

gradually putting Atchison towards the top of county collections" (3)

Professor Gates died March 21, 1955. Since then I have been able to add another 75-80 Atchison County plants to the State Herbarium. Professor Lloyd C. Hulbert, of Kansas State, when he was here in June of 1957 told me that a new Flora of Kansas is in preparation by Professor T.M. Barkley of Kansas State Univ. at Manhattan. (4)

Unfinished Business:

Professor Gates estimated that a complete average county collection would be about seven hundred species, more or less. So this work is still to be considered incomplete. (5) But I have a fair premonition where the additional species might be found: viz., first among the grasses; Kansas is credited with 225 native species, many of them, of course, only in the western part of the state, but I feel that Atchison County should have at least more than half that number. So far, I have collected only 91 species. Then there are the sedges, of which the collection for nearly all the counties is very incomplete. The genus Crataegus, which I have not yet attempted to unscramble. Finally the prairies to the west, if I can find any without crossing the county line. The question I have often asked myself is, "Why should I limit myself to Atchison County in building up our own local collection?" I might answer by saying, as St. Benedict does about his Rule, that this is only for a beginning, to which later botanists of St. Benedict's College may add by exploring neighboring counties or even crossing the river into Missouri. (6)

..... until one has traced it to the genus. The species, of course, should always be checked with the descriptions in the larger manuals. For all plants except the grasses, I found Gray's Manual (8th edit.--Fernald), the most complete. Hitchcock was exclusively used as a checkup on the grasses.

Acknowledgements:

I wish to acknowledge my indebtedness and express my gratitude to all persons

who have helped me to bring this work to its present stage. To Rev. Cyprian Nordhus, O.S.B., pastor of St. Patrick's Church (10 miles south of Atchison) for furnishing transportation and accompanying me on many of my trips as well as for locating fruitful collecting areas in his locality; to the late Prof. F. C. Gates of Kans. State Coll. and his successor Prof. Lloyd C. Hulbert, for checking on over a third of my identifications; to the Rev. Dr. Eugene Dehmer, O.S.B., of the Dept. of Biology, St. Benedict's College, for supplying me with all necessary manuals and monographs as well as botanical supplies for mounting the specimens; to Rev. Placidus Kieffer, O.S.B., Dept. of Biology, St. Benedict's Coll., for assistance in mounting some of the specimens; and lastly but not least, to the many land-owners who generously gave permission for trespassing and collecting on their premises.

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Footnotes and post-1957 Addenda

- (1) This paper was presented at the Fifth Meeting of the Natural Sciences and Math Section of the Amer. Benedictine Academy, Aug. 19-23, 1957 at St. Benedict's Coll. (Fink Hall) and Mt. St. Scholastica Coll. It appeared in the abstracts on p. 18 of the Minutes and Transactions of that meeting.

- (2) "As might be expected the two families represented by the largest number of species are the grasses and the composites, with 91 species of grasses distributed among 42 genera and 75 species of composites in 40 genera. Other large families are the Cruciferae with 24 species in 15 genera the Leguminosae with 38 species in 18 genera, the Cyperaceae with 28 species in 4 genera, and the Kalmiatae with 22 species in 15 genera. At the other extremes, there are 42 families represented by only a single genus, and in 26 cases this genus consists of only a single species."
- (3) Fr. Hubert Blocker, Ph.D., a zoologist by training and experience, took up plant collecting as a hobby when poor health forced retirement from teaching in St. Benedict's Coll. When he noticed that a large number of plants presumably present in Atchison County were not represented by specimens in the State Herbarium at Kans. State Coll, Manhattan, as indicated on maps for each species in the Flora of Kansas (1940), he set out to fill in the blanks.
- This effort led to a correspondence with Prof. Frank Gates and his colleague and successor, Lloyd C. Hulbert, and later with T.M. Barkley. Fr. Hubert routinely sent mounted and identified specimens of all Atchison County plants not already in the State Herbarium to Prof. Gates and colleagues at Manhattan. He also sent duplicates of most of his other species (each with his recorded local serial number) to Prof. Gates et al. at Kansas State for identification and/or verification. In return Fr. Hubert received a series of replies beginning in 1951 and extending to the middle 1960s. In this correspondence Prof. Gates and colleagues verified and commented on his identifications of the Atchison County plants Fr. Blocker had sent them. These letters have been copied and are filed with the Herbarium records and in the Benedictine Coll. Library. Father Hubert died Oct. 18, 1972.
- (4) Prof. T.M. Barkley later sent Fr. Hubert a draft copy of the proposed new Flora for his comments and review. (Note of editor- a check of Books in Print June 1986 did not show that the book had ever been published)
- (5) "There are certain facts that lead me to believe that this estimate is too low for Atchison County. As mentioned above, I have sent in to the Kansas State Herbarium about 300 specimens, but there are, according to the 1940 Flora of Kansas, some 65 specimens of species from Atchison County in the State Herbarium which I have so far not encountered. Since the eastern border of Atchison County is the Missouri river it has neighboring counties on only three sides, but of these there are five, two counties on the north, two on the south and one on the west. These five counties combined list another 135 species not reported from Atchison County. It seems reasonable to expect that these species might also be in our county. We have in our collection a number of species, formerly reported only from the more western counties of the state, and there is no reason to doubt that there might not be more that have so far remained undiscovered. Taking into consideration all these factors, a complete flora of Atchison County, should consist of 850-900 species. Taking this as a basis, the present work might be considered only about 75% complete."
- (6) It was discovered, when making this copy (June 1986) from the original typescript found among Fr. Hubert's Herbarium papers, that there was some confusion in pagination. It skipped from page 3 to 7 with no loss of continuity and pages 9 and 10 were missing with some loss of text as indicated I have not been able to locate any missing pages. But from some preliminary

notes he made for the paper I would judge that he discussed the problem of what cultivated and introduced plants to, include and the fact that there are no "evergreens" in his herbarium even the native Red Cedar, Juniperus virginiana.

- (7) As mentioned in the text Gray's Manual of Botany, 8th edit. by M.L. Fernald, et al. was the mainstay for keying and identification, though Hitchcock was used for the grasses and the 3 volume Britton and Brown Illustrated Flora of the N.E. U.S. and Canada was frequently consulted.

(Note of Editor-Eugene W. Dehner, O.S.B.)

Abstract of the paper on his Herbarium presented by Fr. Hubert Blocker, O.S.B., Ph.D., copied from : Minutes and Transactions of the Fifth Meeting of the Natural Sciences and Mathematics Section of the Amer. Benedictine Academy, held at St. Benedict's and Mt. St. Scholastica Colleges, Atchison, Kans. Aug. 19-23, 1957. (This abstract appeared on p. 18)

THE EVOLUTION OF A LOCAL HERBARIUM: THE FLORA OF ATCHISON COUNTY KANSAS
Rev. Hubert Blocker, O.S.B., St. Benedict's College, Atchison, Kansas

During the years from 1950-1957, an intensive study was made of the native flora of Atchison County, Kansas. Over 660 species of vascular plants were collected and processed into herbarium specimens. In addition, over 275 specimens were sent to the Kansas State Herbarium at Manhattan, Kansas—specimens of species which had not previously been sent in from this county. Of these, five or six had not previously been reported from this state. The late Professor Frank C. Gates, curator of the State Herbarium estimated that an average county collection should consist of about 700 species, more or less. The author of this work feels that Atchison County with its great variety of habitats, on account of its favorable location on the Missouri River, might well have a native flora of from 850 to 900 species of vascular plants, and therefore he considers this work only about 75% to 80% complete. The 660 species thus far collected represent 367 genera and 93 families. The two largest families—the gramineae and the compositae have each over 90 species. Forty-two families are represented by only a single genus, and in 26 cases this genus consists of only a single species.

xerographed by Eugena Dehner, O.S.B.
June 23, 1986

Part 2- A Family-Genus-species List

of the H.W. Blocker Collection

of Atchison County Kans. Plants

20 pages

THE HUBERT W. BLOCKER HERBARIUM

OF

ATCHISON COUNTY KANSAS PLANTS

An Alphabetical Listing of Specimens by Family, Genus and species as Stored in the Herbarium Cabinets in the Biology Dept. of Benedictine College, Atchison, Kansas.

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The genera, with varying numbers of species, mounted on herbarium sheets, are stored in labelled, light paper covers and these in turn are stored in Family covers of heavier paper, arranged in alphabetical order in the herbarium cabinet. Duplicates, pressed but not mounted, of nearly all species in the collection are stored in a separate cabinet.

The label on each specimen sheet has the following information: a general heading for the collection, e.g. Plants of Atchison County Kansas, the serial number of the specimen, date, collector, scientific name, common name, locality, habitat, and "remarks".

The plants in this Atchison County Kans. herbarium were collected, identified, mounted, and labelled by Father Hubert W. Blocker, O.S.B., Ph.D. (b. 9/28/1895, d. 10/18/1972) during the years 1950 to 1967, and later. He recorded his field data and identifications over the years in a 7 X 9" "account book" stored in the herbarium cabinet and titled, "The Catalogue of the H.W. Blocker Herbarium Collection of Atchison County Kansas Plants". Serial Nos. 901 and above are KSU exchange specimens.

Besides the Flora of Kansas by Frank C. Gates, (1940) a number of books and sources were used by Father Hubert (see his "Evolution of the Herbarium of Atchison County Plants" for Bibliography) in the identification of his specimens and in the preparation of this present list. The four principal references used were:

- Barkley, T. M. - A Manual of the Flowering Plants of Kansas, Kansas State Univ. Endowment Assoc. Manhattan, 1963, 401 pp., paperback.
- Benson, L. - Plant Classification D. C. Heath and Co. 1957, 688 pp., illustr.
- Fernald, M.L. - Gray's Manual of Botany, 8th edit. Amer. Book Co. 1950, 1632 pp. illust.
- Lawrence, G.H.M. - Taxonomy of Vascular Plants, Macmillan Co. 1951, 823 pp. illustr.

The Family list, prepared by Fr. Hubert, follows Fernald, except as noted. Any name that does not agree with Fernald (Gray's Manual, 8th edit.) is followed by Fernald's preferred name in brackets, or if not found in Fernald, then by the source where it is found. All spelling follows Fernald. All common names, not otherwise noted, are listed as Father Hubert has them.

Correspondence received from a series of botanists at KSU, Manhattan, F.C. Gates, Lloyd C. Hulbert, T.M. Barkley, and others, acknowledging receipt of HWB specimens and commenting on his collections and identifications, is filed with the Herbarium records.

EWD edit. 7/3/86

ACANTHACEAE - Acanthus family

176. <i>Ruellia caroliniensis</i>	Ruellia
165. <i>R. strepens</i>	Ruellia

ACERACEAE - Maple family

365. <i>Acer Negundo</i>	Box elder
366. <i>A. nigrum</i>	Black maple
522. <i>A. platanoides</i>	Norway maple
530. <i>A. saccharinum</i>	Silver (soft) maple
367. <i>A. saccharum</i>	Sugar maple

AESCVLACEAE [=HIPPOCASTANACEAE] - Buckeye family

77* 343. <i>Aesculus glabra</i> * = var. <i>Sargentii</i>	Buckeye
368. <i>A. Hippcastanum</i>	Horse chestnut

ALISMATACEAE - Water plantain family

741. <i>Alisma subcordatum</i>	Mid plantain
742. <i>Echinodorus cordifolius</i>	Burhead
748. <i>Lophotocarpus calycinus</i>	
424. <i>Sagittaria latifolia</i>	Broad-leaved arrowhead

AIZOACEAE

611. <i>Mollugo verticillata</i>	Carpetweed
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AMARANTHACEAE - Amaranth family

446. <i>Acnida tamariscina</i>	Water hemp
337. <i>Amaranthus graecizans</i>	Tumbleweed
335. <i>A. hybridus</i>	Green pigweed
336. <i>A. retroflexus</i>	Green pigweed, Red root
279. <i>A. spinosus</i>	Spiny amaranth
657. <i>Froelichia floridana</i>	Cottonweed
450. <i>F. gracilis</i>	Cottonweed

AMARYLLIDACEAE - Amaryllis family

390. <i>Hypoxis hirsuta</i>	Yellow star grass
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ANACARDIACEAE - Cashew family

620,808,818. <i>Rhus copallina</i>	Wing-rib sumac
550. <i>R. cotinus</i> [<i>Cotinus Cogygia</i>]	Smoke tree
184. <i>R. glabra</i>	Smooth sumac
495. <i>R. toxicodendron</i>	Poison oak
549. <i>R. typhina</i>	Staghorn sumac

ANNONACEAE - Custard-apple family

59. <i>Asimina triloba</i>	Paw-paw
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APOCYNACEAE - Dogbane family

237. <i>Apocynum cannabinum</i>	Indian hemp
227. <i>A. sibiricum</i>	Dogbane

ARACEAE - Arum family

- | | |
|---------------------------------|--------------------|
| 400. <i>Arisaema Dracontium</i> | Green dragon |
| 94. <i>A. triphyllum</i> | Jack-in-the-pulpit |

ARISTOLOCHIACEAE - Birthwort family

- | | |
|-----------------------------|-------------|
| 78. <i>Asarum canadense</i> | Wild ginger |
|-----------------------------|-------------|

ASCLEPIADACEAE - Milkweed family

- | | |
|--|-------------------|
| 388. <i>Asclepias amplexicaulis</i> | Clasping milkweed |
| 426, 440. <i>A. incarnata</i> | Swamp milkweed |
| 157. <i>A. purpurascens</i> | Purple milkweed |
| 251, 434. <i>A. syriaca</i> | Common milkweed |
| 158. <i>A. tuberosa</i> | Butterfly weed |
| 210. <i>A. verticillata</i> | Whorled milkweed |
| 156. <i>Asclepiodora viridis</i> | Green milkweed |
| 243. <i>Gonolobus laevis</i> [= <i>Ampelamus albidus</i>] | Climbing milkweed |

BALSAMINACEAE - Touch-me-not family

- | | |
|---|----------------------|
| 260. <i>Impatiens biflora</i> [= <i>I. capensis</i>] | Spotted touch-me-not |
| 174. <i>I. pallida</i> | Pale touch-me-not |

BERBERIDACEAE - Barberry family

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|---------------------------------|-----------|
| 65. <i>Podophyllum peltatum</i> | May-apple |
|---------------------------------|-----------|

BETULACEAE [=CORYLACEAE] - Hazel family

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|-------------------------------|---------------|
| 521. <i>Betula pendula</i> | Weeping birch |
| 509. <i>Corylus americana</i> | Hazelnut |
| 513. <i>Ostrya virginiana</i> | Hop hornbeam |

BIGNONIACEAE - Bignonia family

- | | |
|------------------------------|-----------------|
| 261. <i>Campsis radicans</i> | Trumpet creeper |
| 403. <i>Catalpa speciosa</i> | Cigar tree |

BORAGINACEAE - Borage family

- | | |
|---|-----------------------|
| 104. <i>Cynoglossum officinale</i> | Common hound's tongue |
| 5. <i>Lappula echinata</i> | Stickseed |
| 921. <i>L. texana</i> [Barkley, 1963] | Texas stickseed |
| 201. <i>L. virginiana</i> [= <i>Hackelia virginiana</i>] | Beggar's lice |
| 62. <i>Lithospermum arvense</i> | Field gromwell |
| 87. <i>L. canescens</i> | Puccoons |
| 344. <i>L. latifolium</i> | Broad-leaved puccoon |
| 588. <i>Mertensia virginica</i> | Virginia cowslip |

CAMPANULACEAE - Bluebell family

- | | |
|---------------------------------|-----------------|
| 217. <i>Campanula americana</i> | Tall bellflower |
| 619. <i>Lobelia inflata</i> | Indian tobacco |

13. <i>Lobelia siphilitica</i>	Great lobelia
213. <i>L. spicata</i>	Spiked lobelia
666. <i>Specularia leptocarpa</i>	Venus' looking-glass
145. <i>S. perfoliata</i>	Venus' looking-glass
562. <i>Platycodon grandiflorum</i> [Lawrence, 1951]	Bellflower

CANNABINACEAE - Hemp family

219. <i>Cannabis sativa</i>	Marijuana
765,800. <i>Humulus japonicus</i>	Japanese hops
271. <i>H. Lupulus</i>	Common hops

CAPPARIDACEAE - Caper family

716. <i>Polanisia trachysperma</i>	Clammy weed
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CAPRIFOLIACEAE - Honeysuckle family

560. <i>Lonicera japonica</i>	Japanese honeysuckle
179. <i>Sambucus canadensis</i>	Common elder
438. <i>Symphoricarpos orbiculatus</i>	Coralberry, buckbrush
4. <i>Triosteum perfoliatum</i>	Horse gentian
345. <i>Viburnum prunifolium</i>	Sweet haw

CARYOPHYLLACEAE - Pink family

110. <i>Agrostemma Githago</i>	Corn cockle
713. <i>Cerastium brachypodium</i>	Mouse-ear chickweed
52. <i>C. nutans</i>	Mouse-ear chickweed
712. <i>C. semidecandrum</i>	Mouse-ear chickweed
168,819. <i>Dianthus Armeria</i>	Debtford pink
537. <i>Saponaria Vaccaria</i>	Cow-cockle
203. <i>S. officinalis</i>	Soapwort, Bouncing bet
135. <i>Silene antirrhina</i>	Sleepy catchfly
9. <i>S. Cucubalus</i>	Bladder campion
214. <i>S. stellata</i>	Starry campion
89. <i>Stellaria media</i>	Common chickweed

CASSIACEAE

[=LEGUMINOSAE, subfam. CAESALPINIOIDEAE]

536. <i>Gymnocladus dioica</i>	Kentucky coffee-tree
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CELASTRACEAE - Staff-tree family

119. <i>Celastrus scandens</i>	Climbing bittersweet
498. <i>Euonymus atropurpureus</i>	Wahoo

CERATOPHYLLACEAE - Hornwort family

775. <i>Ceratophyllum demersum</i>	Hornwort
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CHENOPODIACEAE - Goosefoot family

178. <i>Chenopodium album</i>	Lambs quarters
170. <i>C. ambrosioides</i>	Mexican tea
695. <i>C. ambrosioides</i> var. <i>anthelminthicum</i>	Wormseed
669. <i>C. Berlandieri</i>	Goosefoot
338. <i>C. Bosciannum</i>	Goosefoot
244. <i>C. hybridum</i> var. <i>gigantospermum</i>	Maple-leaf goosefoot

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|--|------------------|
| 750. <i>Cycloloma atriplicifolia</i> | Winged pigweed |
| 284. <i>Kochia Scoparia</i> | Mexican fireweed |
| 673. <i>Salsolapestifera</i> [=S. <i>Kali</i> var. <i>temuifolia</i>] | Russian thistle |

COMMELINACEAE - Spiderwort family

- | | |
|------------------------------------|------------|
| 46. <i>Commelina communis</i> | Dayflower |
| 194. <i>Tradescantia bracteata</i> | Spiderwort |
| 774. <i>T. virginiana</i> | Spiderwort |

COMPOSITAE - Composite family [= Asteraceae]

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|---|-----------------------------|
| 125. <i>Achillea lanulosa</i> | Yarrow |
| 273. <i>Actinomeris alternifolia</i> | Wingstem |
| 283. <i>Ambrosia elatior</i> [= <i>A. artemesifolia</i> , var. <i>elatior</i>] | |
| 693. <i>A. elatior</i> , forma <i>villosa</i> | Common ragweed |
| 665. <i>A. psilostachya</i> | Western ragweed |
| 266,692.* <i>A. trifida</i> * = forma <i>integrifolia</i> | Giant ragweed |
| 523. <i>Antennaria fallax</i> | Indian tobacco |
| 524. <i>A. neglecta</i> | Pussy's toes |
| 525. <i>A. plantaginifolia</i> | Ladies' tobacco |
| 832. <i>Anthemis arvensis</i> , var. <i>agrestis</i> | Field chamomile |
| 499. <i>A. Cotula</i> | Mayweed |
| 216. <i>Arctium minus</i> | Common burdock |
| 797. <i>Artemisia Abrotanum</i> | Southernwood |
| 429. <i>A. Absinthium</i> | Wormwood |
| 796. <i>A. annua</i> | Wormwood |
| 831. <i>A. vulgaris</i> | Common mugwort, Wild sage |
| 637. <i>Aster azureus</i> | Blue aster |
| 699. <i>A. concinnus</i> | Narrow-leaved smooth aster |
| 330. <i>A. cordifolius</i> | Heart-leaved aster |
| 714. <i>A. ericoides</i> , forma <i>exiguus</i> | Aster |
| 698. <i>A. leavis</i> | Smooth aster |
| 764. <i>A. lateriflorus</i> | Aster |
| 328,722.* <i>A. novae-angliae</i> * = forma <i>roseus</i> | New England aster |
| 700. <i>A. ontarionis</i> (cf. Hulbert 11/25/57) | White heath aster |
| 47,760. <i>A. paniculatus</i> [= <i>A. simplex</i>] | Aster |
| 329. <i>A. praealtus</i> | Willow-leaved aster |
| 761. <i>A. puniceus</i> , forma <i>lucidulum</i> | Aster |
| 331,638. <i>A. sagittifolius</i> * = var. <i>Drummondii</i> | Arrow-leaved aster, shiners |
| 640,810.* <i>A. vimineus</i> * = var. <i>subdumosus</i> | Small white aster |
| 919. <i>Bahia neomexicana</i> [Barkley, 1963] | Bahia |
| 10. <i>Bidens bipinnata</i> | Spanish needles |
| 324. <i>B. cernua</i> | Sticktight |
| 322. <i>B. comosa</i> | Beggar's ticks |
| 323. <i>B. frondosa</i> | Beggar's ticks |
| 293. <i>B. involucrata</i> [= <i>B. polylepis</i>] | Bur marigold |
| 325. <i>B. polylepis</i> | Beggar's ticks |
| 758. <i>Boltonia asteroides</i> | Boltonia |
| 270. <i>Cacalia atriplicifolia</i> | Pale Indian plantain |
| 603. <i>C. tuberosa</i> | Indian plantain |
| 668. <i>Carduus nutans</i> | Musk thistle [Fernald 1950] |
| 544. <i>Centaurea Cyanus</i> | Bachelor's button |
| 103. <i>Chrysanthemum Leucanthemum</i> | Ox-eye daisy |
| 625. <i>Cichorium Intybus</i> | Chicory |
| 447. <i>Cirsium altissimum</i> | Tall thistle |
| 803. <i>C. discolor</i> | Two-colored thistle |
| 412. <i>C. lanceolata</i> | Bull thistle |
| 804. <i>C. ioense</i> | Iowa thistle |

667. <i>C. undulatum</i>	Wavy-leaved thistle
443. <i>C. vulgare</i>	Bull thistle
837. <i>Corsopsis lanceolata</i>	Lance-leaved tickseed
288, 427. <i>C. tinctoria</i>	Tickseed
802. <i>Dyssodia papposa</i>	Fetid marigold
188. <i>Echinacea angustifolia</i>	Purple coneflower
259. <i>Eclipta alba</i>	Yerba de tajo
308. <i>Erechtites hieracifolia</i>	Pilewort
114. <i>Erigeron annuus</i>	Daisy fleabane
272. <i>E. canadensis</i>	Horseweed
602. <i>E. divaricatus</i>	Western fleabane
142. <i>E. philadelphicus</i>	Fleabane
161. <i>E. ramosus</i> [= <i>E. strigosus</i>]	Daisy fleabane
301. <i>Eupatorium altissimum</i>	Thoroughwort
439. <i>E. maculatum</i>	Joe-Pye weed
467. <i>E. perfoliatum</i>	Boneset
254. <i>E. purpureum</i>	Joe-Pye weed
265. <i>E. rugosum</i>	White snake-root
718. <i>E. serotinum</i>	Thoroughwort
49. <i>Galinsoga aristolata</i> [= <i>G. ciliata</i>]	Galinsoga
302. <i>Gnaphalium obtusifolium</i>	Catfoot
461. <i>Grindelia squarrosa</i>	Tarweed
303. <i>Helianthus angustifolius</i>	Narrow-leaved sunflower
300. <i>H. annuus</i>	Common sunflower
256. <i>H. atrorubens</i>	Prairie sunflower
299. <i>H. grosseserratus</i>	Large-toothed sunflower
236, 627. <i>H. laetiflorus</i> * = var. <i>rigidus</i>	Prairie sunflower
460. <i>H. Maximiliani</i>	Sunflower
317. <i>H. tuberosus</i>	Jerusalem artichoke
247. <i>Heliopsis helianthoides</i>	Ox-eye
836. <i>Hypochoeris radicata</i>	Gosmore, Coast dandelion, Cat's ea
297. <i>Kuhnia eupatorioides</i>	False boneset
228. <i>Lactuca canadensis</i>	Wild lettuce
327. <i>Lactuca floridana</i> , var. <i>villosa</i>	Wild lettuce
238. <i>L. Serriola</i> [= <i>L. Scariola</i>]	Prickly lettuce
287. <i>Liatris aspera</i>	Blazing star
436. <i>L. pycnostachya</i>	Gay feather
753. <i>L. scariosa</i>	Blazing star
904. <i>Melampodium cinereum</i> [Barkley, 1963]	Blackfoot
311. <i>Prenanthes aspera</i>	Rattlesnake root
903. <i>Psilostrophe villosa</i> [Barkley, 1963]	Paper flower [Barkley, 1963]
223. <i>Pyrrophappus carolinianus</i>	False dandelion
923. <i>P. scaposus</i> [Barkley, 1963]	False dandelion [Barkley, 1963]
171. <i>Ratibida columnifera</i>	Prairie coneflower
240. <i>R. pinnata</i>	Prairie coneflower
2. <i>Rudbeckia hirta</i>	Black-eyed susan
274. <i>R. laciniata</i>	Wild goldenglow
307. <i>R. subtomentosa</i>	Sweet coneflower
262. <i>R. triloba</i>	Black-eyed susan
121, 833 <i>Senecia glabellus</i> (HWB had 121 <i>S. aureus</i>)	Butterweed
360. <i>S. obovatus</i>	Ragwort
225. <i>Silphium integrifolium</i>	Rosinweed
257. <i>S. laciniatum</i>	Compass plant
202. <i>S. perfoliatum</i>	Cup plant
628. <i>Solidago altissima</i>	Goldenrod
629. <i>S. caesia</i>	Blue-stem Goldenrod
305, 634 <i>S. canadensis</i> * = var. <i>glivocanescens</i>	Goldenrod
633. <i>S. Drummondii</i>	Drummond's Goldenrod
316. <i>S. gigantea</i>	Goldenrod

762. <i>S. graminifolia</i>	Grass-leaved goldenrod
635. <i>S. missouriensis</i>	Missouri Goldenrod
255. <i>S. missouriensis</i> , var. <i>fasciculata</i>	Missouri Goldenrod
321. <i>S. nemoralis</i>	Goldenrod
304. <i>S. rigida</i>	Goldenrod
632. <i>S. rugosa</i>	Goldenrod
631. <i>S. serotina</i> [= <i>S. gigantea</i>]	Goldenrod
630. <i>S. speciosa</i>	Goldenrod, showy wand
314. <i>S. ulmifolia</i>	Goldenrod, Elm-leaved
407. <i>Sonchus asper</i>	Sow thistle
508. <i>S. oleraceus</i>	Common sow thistle
821. <i>Taraxacum erythrospermum</i>	Red-seeded dandelion
98. <i>T. officinale</i>	Common dandelion
42. <i>Tragopogon pratensis</i>	Goat's beard
220. <i>Vernonia Baldwini</i>	Ironweed
679. <i>V. fasciculata</i>	Ironweed
313. <i>Xanthium pensylvanicum</i>	Cocklebur

CONVOLVULACEAE - Convolvulus family

137,783.* <i>Convolvulus arvensis</i> ,* forma <i>auriculatus</i>	Field bindweed
190. <i>C. sepium</i>	Hedge bindweed
664. <i>Cuscuta Sephalanthi</i>	Dodder
435. <i>C. glomerata</i>	Dodder
812. <i>Ipomoea coccinea</i>	Red morning glory
445. <i>I. hederacea</i>	Morning glory
701. <i>I. lacunosa</i>	White morning glory
182. <i>I. purpurea</i>	Common morning glory

CORNACEAE - Dogwood family

143. <i>Cornus Drummondii</i>	Dogwood
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CRASSULACEAE - Orpine family

563. <i>Sedum sarmentosum</i>	Stone crop
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CRUCIFERAE - [= Brassicaceae -Gates] - Mustard Family

372. <i>Arabis canadensis</i>	Sickle-pod
369. <i>Barbaria vulgaris</i>	Common winter cress
150. <i>Brassica campestris</i> [= <i>B. Rapa</i>]	Bird's rape
144. <i>B. juncea</i>	Leaf mustard
378. <i>B. Kaber</i>	Charlock
136. <i>B. nigra</i>	Black mustard
834. <i>B. Rapa</i> (cf. <i>B. campestris</i> , #150)	Rape
85. <i>Camelina microcarpa</i>	False flax
79. <i>Capsella bursa-pastoris</i>	Shepherd's purse
357. <i>Cardaria Draba</i>	Hoary cress
660. <i>Chorispora tenella</i> +	Chorispora
517, 581 <i>Coringia orientalis</i>	Hare's-ear mustard
74. <i>Dentaria laciniata</i>	Toothwort
96. <i>Descurainia pinnata</i> , var. <i>brachycarpa</i>	Tansy mustard
648. <i>D. sophia</i>	Tansy mustard
584. <i>Erysimum repandum</i>	Treacle mustard
132. <i>Hesperis matronalis</i>	Rocket
500. <i>Lepidium campestre</i>	Peppergrass
93. <i>L. virginicum</i>	Peppergrass

+ A native of Asia; listed and illustrated in Wild Flowers of the U.S., Vol. on "Central, Mountains and Plains", pp. 247-48, Plate 86. Specimen found on bluffs east of N. Campus April 1983. EWD note

704. <i>Nasturtium officinale</i>	Water cress
319,647. <i>Rorippa palustris</i> [= <i>R. islandica</i>]	Marsh cress
655. <i>R. sessiliflora</i>	Yellow cress
113. <i>Sisymbrium altissimum</i>	Tumble mustard
127. <i>S. officinale</i>	Hedge mustard
910. <i>Stanleya pinnata</i> [Barkley, 1963]	Prince's plume [Barkley, 1963]
56. <i>Thlaspi arvense</i>	Penny cress

CUCURBITACEAE - Gourd family

449. <i>Cucurbita foetidissima</i>	Missouri gourd
687. <i>Echinocystis lobata</i>	Wild cucumber
286. <i>Sicyos angulatus</i>	One-seeded bur cucumber

CYPERACEAE - Sedge family

480. <i>Carex aggregata</i>	Sedge
778. <i>C. Bebbii</i>	"
579. <i>C. Bicknellii</i>	"
482,533. <i>C. blanda</i>	"
483. <i>C. brevior</i>	"
575. <i>C. cephalophora</i>	"
478. <i>C. conjuncta</i>	"
777. <i>C. cristatella</i>	"
492. <i>C. Davisii</i>	"
415. <i>C. Frankii</i>	"
484. <i>C. gravida</i>	"
476. <i>C. grisea</i> [= <i>C. amphibola</i> var. <i>turgida</i>]	"
474. <i>C. hyalinolepis</i>	"
477. <i>C. Leavenworthii</i>	" ,Dew
479. <i>C. Merritt-Fernaldii</i>	"
481. <i>C. mesochorea</i>	"
526. <i>C. molesta</i>	" , walking
577. <i>C. Muhlenbergii</i> , var. <i>enervis</i>	"
710. <i>C. oligocarpa</i>	"
526. <i>C. retroflexa</i>	"
578. <i>C. scoparia</i>	"
473. <i>C. stipata</i>	"
781. <i>C. tribuloides</i>	"
493. <i>C. vulpinoidea</i>	"
735. <i>Cyperus acuminatus</i>	" ,hook
737,789. <i>C. diandrus</i>	"
683,747. <i>C. erythrorhizos</i>	"
616. <i>C. esculentus</i>	Yellow nut grass
457, 726. <i>C. ferruginescens</i>	Sedge
502. <i>C. filiculmis</i>	"
791. <i>C. globulosus</i>	"
728. <i>C. inflaxus</i>	"
743. <i>C. rivularis</i>	"
515. <i>C. strigosus</i>	"
746. " " "	"
688. <i>Eleocharis acicularis</i>	Spike rush
519. <i>E. calva</i>	" "
650. <i>E. compressa</i>	" "
727. <i>E. obtusa</i>	" "

416,786. <i>Scirpus atrovirens</i>	Bulrush
787. <i>S. cyperinus</i>	Bulrush
785. <i>S. fluviatilis</i>	River bulrush
782. <i>S. paludosus</i>	Prairie Bulrush
776. <i>S. robustus</i>	Bulrush
733. <i>S. Smithii</i>	Rush
458. <i>S. validus</i>	Soft-stem bulrush

DIOSCOREACEAE - ~~Yam~~ family

553. <i>Dioscorea villosa</i>	Wild Yam
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EBENACEAE - Ebony family

554. <i>Diospyros virginiana</i>	Persimmon
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EQUISETACEAE - Horsetail family

511. <i>Equisetum hyemale</i> , var. <i>robustum</i>	Scouring rush
661. <i>E. pratense</i>	Thicket horsetail

EUPHORBIACEAE - Spurge family

557. <i>Acalypha gracilens</i>	Three-seeded mercury
755. <i>A. ostryaefolia</i>	Three-seeded mercury
309. <i>A. virginica</i>	Three-seeded mercury
290. <i>Croton glandulosus</i>	Hogwort
675. <i>C. Monanthogynus</i>	Croton
196. <i>Euphorbia corollata</i>	Flowering spurge
16. <i>E. Cyparissias</i>	Graveyard weed
211. <i>E. dentata</i>	Toothed spurge
281. <i>E. heterophylla</i>	Painted leaf
680. <i>E. hypericifolia</i> [= <i>E. maculata</i>]	Large spotted spurge
264. <i>E. maculata</i>	Eyebane spurge
269. <i>E. marginata</i>	Snow-on-the-mountain
690. <i>E. serpens</i>	Round-leaved spreading spurge
684,828. <i>E. strictospora</i> [Barkley, 1963]	Narrow-leaved spurge
456. <i>E. supina</i>	Milk perslane
909. <i>Tragia urticifolia</i>	

FAGACEAE - Beech family

555. <i>Castanea dentata</i>	Chestnut
504. <i>Quercus alba</i>	White oak
594. <i>Q. borealis</i> [<i>Q. rubra</i> var. <i>borealis</i>]	Red oak, northern
527. <i>Q. macrocarpa</i>	Bur oak
503. <i>Q. marilandica</i>	Black-jack oak
506. <i>Q. Muehlenbergii</i>	Chestnut oak
806. <i>Q. palustris</i>	Pin oak
607. <i>Q. prinoides</i>	Scrub chestnut oak
507. <i>Q. Shumardii</i> , var. <i>Schneeki</i>	Shumard's red oak
595. <i>Q. stellata</i>	Post oak
505,541. <i>Q. velutina</i>	Black oak

GENTIANACEAE - Gentian family

306. *Gentiana clausa* Closed gentian

GERANIACEAE - Geranium family

117. *Geranium carolinianum* Crane's bill
520. *G. maculatum* Crane's bill

GRAMINEAE [= Poaceae-Gates] -Grass Family

409. *Agropyron repens* Quack grass
398. *Agrostis alba* Red top
393. *A. hyemalis* Hair grass
707. *A. perennans* Upland bent
709. *Alopecurus carolinianus* Foxtail
770. *A. pallescens* [sp.?] Washington foxtail
25. *Andropogon Gerardi* Big bluestem
30. *A. scoparius* Little bluestem
642. *A. virginicus* Beard grass
794. *Aristida basiramea* Triple awned grass
908. *A. longisetata*, var. *robusta* [Barkley, '63] Triple awned grass
916. *A.* " " , var. *longisetata* " " Triple awned grass
21. *A. digantha* Triple awned grass
221. *Bouteloua curtipendula* Side oats grama grass
827. *B. gracillis* Blue grama grass
401. *Bromus commutatus* Hairy chess
396. *B. inermis* Smooth brome grass
652. *B. japonicus* Chess
397. *B. purgans* Brome grass
604. *B. secalinus* Cheat
402. *B. tectorum* Downy chess
1. *Buchloé dactyloides* Buffalo grass
626. *Calamagrostis canadensis* Reed grass
252. *Cenchrus pauciflorus* Sand bur
463. *Cinna arundinacea* Wood reed grass
697. *Cortaderia selleana* [Gates] Pampas grass
538. *Cynodon dactylon* Bermuda grass
37. *Dactylis glomerata* Orchard grass
824. *Deschampsia caespitosa* Tufted hair grass
462. *Digitaria Ischaemum* Smooth crab grass
31. *D. sanguinalis* Crab grass
917. *Distichlis stricta* Alkali grass
32, 708. *Echinochloa crusgalli* Barnyard grass
39. *Eleusine indica* Goose grass
605, 613. *Elymus canadensis* Nodding wild rye
417. *E. villosus* Wild rye
36, 608. *E. virginicus* Virginia wild rye
612. *Eragrostis barreleiri* [Barkley, 1963] Love grass
38. *E. Frankii* Frank's lovegrass
682. *E. hypnoides* Smooth creeping lovegrass
418. *E. megastachya* Stinkgrass
615. *E. pectinacea* Pursh lovegrass
610. *E. pilosa* India lovegrass
459. *E. poaeoides* Lovegrass
749. *E. reptans* Hairy creeping lovegrass

24. <i>E. spectabilis</i>	Purple lovegrass
406. <i>Festuca elatior</i>	Meadow fescue
653. <i>F. obtusa</i>	Nodding fescue grass
705. <i>F. octoflora</i> [Barkley, 1963]	Six-weeks fescue
706, 823. <i>F. ovina</i>	Sheep fescue
649. <i>F. paradoxa</i>	Fescue grass
420. <i>Glyceria canadensis</i>	Rattlesnake grass
413. <i>G. striata</i>	Fowl manna grass
155. <i>Hordeum jubatum</i>	Squirrel-tail grass
597. <i>H. pusillum</i>	Little barley
659. <i>Hystrix patula</i>	Bottlebrush grass
391. <i>Koeleria cristata</i>	June grass
624. <i>Leersia oryzoides</i>	Rice cut grass
28. <i>L. virginica</i>	Cut grass
34. <i>Leptochloa fascicularis</i> [Barkley, 1963]	Salt meadowgrass
751. <i>L. mucronota</i> [= <i>L. filiformis</i>]	Red strangletop
399. <i>Lolium multiflorum</i>	Italian rye grass
922. <i>Melica nitens</i>	Three-flower melic [Barkley, 1963]
600. <i>Milium effusum</i>	Millet grass
924. <i>Muhlenbergia arenicola</i> Barkley '63	Sand Muhly
598. <i>M. asperifolia</i>	Scratch grass
464. <i>M. brachyphylla</i>	Short-leaved Muhly
618. <i>M. foliosa</i> [= <i>M. mexicana</i>]	Bearded wire-stem Muhly
23. <i>M. mexicana</i>	Wirestem muhly
22. <i>M. racemosa</i>	Marsh muhly
29. <i>M. Schreberi</i>	Nimble Will
614. <i>M. sobolifera</i>	Muhly
617. <i>M. sylvatica</i>	Muhly
913. <i>Oryzopsis hymenoides</i>	Silkgrass, Indian Millet [Fernald, 1950]
442. <i>Panicum capillare</i>	Old witch grass
497. <i>P. clandestinum</i>	Panic grass
33. <i>P. dichotomiflorum</i>	Fall panicum
820. <i>P. huachucae</i> [= <i>P. lanuginosum</i>]	Panic grass
392. <i>P. latifolium</i>	Broad-leaved panic grass
586. <i>P. malacophyllum</i>	Panic grass
371. <i>P. oligoanthos</i> , var. <i>Scribnerianum</i>	Panic grass
539. <i>P. pareococius</i> [Barkley, 1963]	Panic grass
585. <i>P. villosissimum</i> (= #820, cf. Hulbert 1/17/58)	Panic grass
454. <i>P. virgatum</i>	Switch grass
40. <i>Paspalum ciliatifolium</i>	Paspalum
35. <i>Phalaris arundinacea</i>	Reed canary grass
501. <i>Phleum pratense</i>	Timothy
292. <i>Phragmites communis</i>	Common reed
589. <i>Poa annua</i>	Annual blue grass
590. <i>P. Chapmaniana</i>	Chapman's bluegrass
404. <i>P. compressa</i>	Canada bluegrass
381. <i>P. pratensis</i>	Kentucky bluegrass
380. <i>P. sylvestris</i>	Timber bluegrass
744. <i>Polypogon monspeliensis</i>	Rabbit-foot grass
601. <i>Schedonnardus paniculatus</i>	Tumble grass
901. <i>Sclerochloa dura</i> [?]	
234. <i>Setaria glauca</i> (cf. Gates corres. 12/19/51)	Yellow foxtail
222, 606. <i>S. italica</i> * " " " " }	Italian millet
241. <i>S. viridis</i>	Green foxtail

26. <i>Sorghastrum nutans</i>	Indian grass
333. <i>Sorghum halepense</i>	Johnson grass
339. <i>Spartina pectinata</i>	Slough grass
654. <i>Sphenopholis intermedia</i>	Slender wedge grass
394. <i>S. obtusata</i>	Prairie wedge grass
641, 636. <i>Sporobolus asper</i>	Dropseed
672. <i>S. cryptandrus</i>	Sand dropseed
685. <i>S. neglectus</i>	Dropseed
639. <i>S. vaginiflorus</i>	Dropseed
912. <i>Stipa comata</i>	Needle and thread [Barkley, 1963]
395. <i>S. spartea</i>	Porcupine grass
27. <i>Triodia flava</i>	Tall red-top
920. <i>T. pilosa</i> [Barkley, 1963]	Hairy triodia [Barkley, 1963]
41. <i>Tripsacum dactyloides</i>	Gama grass

HYDROCHARITACEAE - Frog's-bit family

801. <i>Elodea canadensis</i>	Waterweed
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HYDROPHYLLACEAE - Waterleaf family

88. <i>Ellisia nyctelæa</i>	Ellis' waterleaf
469. <i>Hydrophyllum appendiculatum</i>	Waterleaf
81. <i>H. virginianum</i>	John's cabbage

HYPERICACEAE [=Guttiferae] - St. John's-wort family

206. <i>Hypericum punctatum</i>	St. John's wort
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IRIDACEAE - Iris family

644. <i>Iris versicolor</i>	Blue flag
84. <i>Sisyrinchium campestre</i>	Blue-eyed grass
120. <i>S. graminoides</i> [= <i>S. angustifolium</i>]	Blue-eyed grass

JUGLANDACEAE - Walnut family

591. <i>Carya cordiformis</i>	Bitternut hickory
592. <i>C. ovata</i>	Shagbark
596. <i>C. tomentosa</i>	Mockernut hickory
531. <i>Hicoria pecan</i> [= <i>Carya illinoensis</i>]	Pecan
382. <i>Juglans nigra</i>	Black walnut

JUNCACEAE - Rush family

729. <i>Juncus bufonius</i>	Toad rush
488. <i>J. Dudleyi</i>	Rush
745. <i>J. filiformis</i> (= <i>J. dudleyi</i> , cf. Hulbert 3/31/61)	Rush
826. <i>J. interior</i>	Bog rush
730. <i>J. nodosus</i> (= <i>J. Torreyi</i> , cf. Hulbert 3/31/61)	Knotted rush
472. <i>J. tenuis</i>	Rush
731. <i>J. Torreyi</i>	Rush

KRAMERIACEAE [Barkley, 1963]

918. <i>Krameria lanceolata</i>	
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LABIATAE - Mint Family

263. <i>Agastache nepetoides</i>	Yellow giant hyssop
907. <i>Hedeoma drommondii</i> [Barkley, 1963]	False Penny Royal
756. <i>H. pulegioides</i>	American pennyroyal
92. <i>Lamium amplexicaule</i>	Henbit
815. <i>L. hybridum</i>	Henbit
63. <i>L. purpureum</i>	Purple dead-nettle
186. <i>Leonurus Cardiaca</i>	Motherwort
451. <i>Lycopus americanus</i>	Water horehound
805. <i>Marrubium vulgare</i>	Horehound
341,792. <i>Mentha arvensis</i>	Field mint
799. <i>M. canadensis</i> [= <i>M. arvensis</i> var. <i>villosa</i>]	American wild mint
793. <i>M. gentilis</i>	Creeping whorled mint
798. <i>M. sativa</i> [= <i>M. cardiaca</i>]	Marsh whorled mint
235. <i>Monarda fistulosa</i>	Wild bergamot
185. <i>Nepeta cataria</i> [Barkley, 1963]	Catnip
318. <i>Perilla frutescens</i>	Beefsteak plant
277,830. <i>Physostegia virginiana</i>	False dragonhead
14. <i>Prunella vulgaris</i> , var. <i>lanceolata</i>	Selfheal
226. <i>Pycnanthemum pilosum</i>	Mountain mint
430. <i>P. tenuifolium</i>	Mountain mint
291. <i>P. virginianum</i> (= <i>P. flexuosum</i> , Gates 12/19/51)	Mountain mint
239. <i>Salvia Pitcheri</i> [= <i>S. azurea</i>]	Blue sage
102. <i>S. reflexa</i>	Small blue sage
662. <i>S. splendens</i>	Scarlet sage
166. <i>S. sylvestris</i>	Wood sage
444. <i>Scutellaria lateriflora</i>	Mad-dog skullcap
494. <i>Stachys olympica</i>	Woolly hedge nettle
258. <i>S. palustris</i>	Hedge nettle
678. <i>S. tenuifolia</i>	Smooth hedge nettle
17. <i>Teucrium canadense</i>	American germander

LAURACEAE - Laurel family

535. <i>Sassafras albidum</i>	White sassafras
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LEGUMINOSAE - Pulse family

784,826. <i>Albizia Julibrissin</i>	Silk tree
189. <i>Amorpha canescens</i>	Lead plant
656. <i>A. fruticosa</i>	False indigo
285. <i>Apios tuberosa</i> [= <i>A. americana</i>]	Ground nut
736. <i>Astragalus canadensis</i>	Milk vetch
422. <i>Baptisia leucantha</i>	White false indigo
383. <i>B. leucophaea</i>	False indigo
248. <i>Cassia fasciculata</i>	Partridge pea
677. <i>C. marilandica</i>	Wild senna
376. <i>Cercis canadensis</i>	Redbud tree
246. <i>Desmanthus illinoensis</i>	Prairie mimosa
50. <i>Desmodium acuminatum</i> [= <i>D. glutinosum</i>]	Beggar's tick
278. <i>D. bracteosum</i> [= <i>D. cuspidatum</i>]	Tick refoil
623. <i>D. bracteosum</i> , var. <i>longifolium</i>	" "
621. <i>D. Dillenii</i> [= <i>D. perplexum</i>]	" "
212. <i>D. illinoense</i>	" "
282. <i>D. paniculatum</i>	" "
622. <i>D. sessilifolium</i>	" "
373. <i>Gleditsia triacanthus</i>	Honey locust
906. <i>Glycyrrhiza lepidota</i>	Wild licorice [Barkley, 1963; Fernald, 1950]

296,754. <i>Lespedeza capitata</i>	Bush clover
312. <i>L. Nuttalli</i> (<i>L. manniana</i> , Gates, 12/19/51)	" "
441. <i>L. violacea</i>	" "
811. <i>L. virginica</i>	" "
516. <i>Lotus corniculatus</i>	Birdsfoot trefoil
147. <i>Medicago lupulina</i>	Black medic
543. <i>M. sativa</i>	Alfalfa
129. <i>Melilotus alba</i>	White sweet clover
130. <i>M. officinalis</i>	Yellow sweet clover
911. <i>Oxytropis Lambertii</i>	Locoweed [Barkley, 1963; Fernald, 1950]
207. <i>Petalostemum candidum</i>	White prairie clover
905. <i>P. compactum</i> [Barkley, 1963]	Prairie clover [Barkley, 1963]
208. <i>P. purpureum</i>	Purple prairie clover
90. <i>Robinia Pseudo-Acacia</i>	Black locust
280. <i>Strophostyles helvola</i>	Wild bean
719. <i>S. leiosperma</i>	Small wild bean
131. <i>Trifolium hybridum</i>	Alsike clover
351. <i>T. incarnatum</i>	Crimson clover
149. <i>T. pratense</i>	Red clover
148. <i>T. repens</i>	White clover
122. <i>Vicia americana</i>	Vetch
582. <i>V. cracca</i> (= <i>V. lasycarpa</i> , Hulbert 1/7/57)	"
583. <i>V. oregana</i> [<i>V. americana</i> , var. <i>truncata</i>]	"
173. <i>V. villosa</i>	Hairy vetch
757,795. <i>Vigna sinensis</i>	Cowpea

LEMNACEAE - Duckweed family

829. <i>Lemna minor</i>	Duckweed
817. <i>Spirodela polyrrhiza</i>	Large duckweed

LILIACEAE - Lily family

408. <i>Allium canadense</i>	Wild garlic
512. <i>A. stellatum</i>	Wild onion
112. <i>Asparagus officinalis</i>	Asparagus
67. <i>Erythronium albidum</i>	White dog's tooth
209. <i>Hemerocallis fulva</i>	Day lily
423. <i>Lilium michiganense</i>	Turk's-cap lily
379. <i>Ornithogallum umbellatum</i>	Star of bethlehem
100. <i>Polygonatum canaliculatum</i>	Solomon's seal
374. <i>Smilax hispida</i> [= <i>S. tannoides</i> var. <i>hispida</i>]	Bristly greenbriar
385. <i>S. lasioneura</i>	Carrion flower smilax
825. <i>S. Pseudo-China</i>	False China-root
71. <i>Uvularia grandiflora</i>	Bellwort

LINACEAE - Flax family

915. <i>Linum rigidum</i>	Yellow flax [Barkley, 1963]
645. <i>L. usitatissimus</i>	Flax

LYTHRACEAE - Loosestrife family

320. <i>Ammannia coccinea</i>	Toothcap
431. <i>Lythrum alatum</i>	Loosestrife

MAGNOLIACEAE - Magnolia family

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|---|------------|
| 534. <i>Liriodendron Tulipifera</i> | Tulip tree |
| 561. <i>Magnolia soulangeana</i> (M. obovata X M.Yulan) | Magnolia |

MALVACEAE - Mallow family

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|---|-------------------|
| 180. <i>Abutilon Theophrasti</i> | Velvet leaf |
| 559. <i>Althaea rosea</i> | Hollyhock |
| 91. <i>Callirhoë alcaeoides</i> | Poppy mallow |
| 773. <i>C. digitata</i> (dupl. # 91, cf. A.Abel, 8/10/62) | Poppy mallow |
| 558. <i>Hibiscus syriacus</i> | Rose of Sharon |
| 11. <i>H. Trionum</i> | Flower of an hour |
| 43. <i>Malva neglecta</i> | Cheeses |
| 161. <i>M. rotundifolia</i> | Mallow |
| 453. <i>Sida spinosa</i> | Prickly mallow |

MARTYNIACEAE - Martynia family

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| 8. <i>Martynia louisianica</i> [= <i>Proboscidea louisianica</i>] | Devil's claw |
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MENISPERMACEAE - Moonseed family

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|-----------------------------------|----------|
| 108. <i>Menispermum canadense</i> | Moonseed |
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MORACEAE - Mulberry family

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|------------------------------|----------------|
| 425. <i>Maclura pomifera</i> | Osage orange |
| 540. <i>Morus alba</i> | White mulberry |
| 529. <i>M. rubra</i> | Red mulberry |

NYCTAGINACEAE - Four-o'clock family

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|------------------------------|-------------------|
| 48. <i>Mirabilis hirsuta</i> | Four o'clock |
| 107. <i>M. nyctaginea</i> | Wild four o'clock |

NYSSACEAE - Sour gum family

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|-----------------------------|-----------|
| 790. <i>Nyssa sylvatica</i> | Black gum |
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OLEACEAE - Olive family

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|---------------------------------|-------------|
| 528. <i>Fraxinus americana</i> | White ash |
| 580. <i>F. pensylvanica</i> | Green ash |
| 551. <i>Lingustrum amurense</i> | Amur privet |

ONAGRACEAE - Evening Primrose family

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|--|-------------------------|
| 452, 658. <i>Circaea latifolia</i> | Enchanter's night shade |
| 468. <i>Epilobium coloratum</i> | Willow herb |
| 232. <i>Gaura biennis</i> | Gaura |
| 18. <i>G. parviflora</i> | Gaura |
| 674. <i>Ludwigia palustris</i> , var. <i>americana</i> | Marsh purslane |
| 466. <i>L. polycarpa</i> | False loosestrife |
| 245. <i>Oenothera biennis</i> | White evening primrose |
| 159, 835. <i>O. lanciniata</i> | Evening primrose |
| 133. <i>O. speciosa</i> | White evening primrose |

OPHIOGLOSSACEAE - Adder's-tongue family

485. *Botrychium virginianum* Rattlesnake fern

ORCHIDACEAE - Orchis family

723. *Corallorhiza Wisteriana* Coral root
 82. *Cypripedium parviflorum* [=C. *Calceolus* var. *parviflorum*] Yellow ladies' slipper, small
 720. *Spiranthes cernua*, var. *ochroleuca* Screw auger
 310. *S. gracilis* Ladies' tresses

OROBANCHACEAE - Broom-rape family

83. *Orobanche uniflora* One-flowered cancer root

OXALIDACEAE - Wood-sorrel family

124. *Oxalis stricta* Yellow sorrel
 99. *O. violacea* Wood sorrel

PAPAVERACEAE - Poppy family

69. *Corydalis falvula* Yellow harlequin
 73. *Dicentra Cucullaria* Dutchman's breeches
 771. *Fumaria officinalis* Fumitory
 70. *Sanguinaria canadensis* Blood root

PASSIFLORACEAE - Passion flower family

663. *Passiflora caerulea* Passion flower

PHRYMACEAE - Lopseed family

249. *Phryma Leptostachya* Lopseed

PHYTOLACCACEAE - Pokeweed family

193. *Phytolacca americana* Pokeweed

PLANTAGINACEAE - Plantain family

44. *Plantago aristata* Bracted plantain
 45. *P. lanceolata* Buckhorn plantain
 151. *P. Rugelii* Common plantain
 153. *P. virginica* Virginia plantain

PLATANACEAE - Plane-tree family

545. *Platanus occidentalis* Sycamore

PLUMBAGINACEAE - Leadwort family

694. *Plumbago Larpenae* [Lawrence, 1951; Benson, 1957]
 Plumbago

POLEMONIACEAE - Polemonium family

55. *Phlox divaricata* Blue phlox
 377. *P. pilosa* Prairie phlox
 75. *P. subulata* Moss-pink
 66. *Polemonium reptans* Jacobin ladder

POLYGONACEAE - Buckwheat family

115, 639. <i>Polygonum aviculare</i>	Knotweed
231. <i>P. coccineum</i>	Swamp smartweed
164. <i>P. Convolvulus</i>	Black bindweed
465. <i>P. dumetorum</i> [= <i>P. cristatum</i>]	False buckwheat
268. <i>P. Hydropiper</i>	Common smartweed, Water pepper
154. <i>P. lapathifolium</i>	Pale smartweed
229, 696* <i>P. pensylvanicum</i> (*= forma <i>albinum</i>)	Smartweed
177. <i>P. persicaria</i>	Lady's thumb
671. <i>P. prolificum</i>	Knotweed
242, 681* <i>P. punctatum</i> (*= var. <i>leptostachyum</i>)	Water smartweed
670. 691. <i>P. ramosissimum</i> (cf. Hulbert, 11/25/57)	Bushy knotweed
275. <i>P. scandens</i>	Climbing false buckwheat
111. <i>Rumex Acetocella</i>	Sheep sorrel
106. <i>R. altissimus</i>	Pale dock
370. <i>R. crispus</i>	Yellow dock
491. <i>R. obtusifolius</i>	Bitter dock
490. <i>R. Patientia</i>	Patience dock
739. <i>R. persicarioides</i> (cf. Hulbert corr. 3/31/61)	Golden dock
738. <i>R. salicifolia</i> (" " " ")	Willow-leaved dock
267. <i>Tovara virginiana</i>	Jumpseed

POLYPODIACEAE - Fern family

455. <i>Adiantum pedatum</i>	Maidenhair fern
715. <i>Asplenium platyneuron</i>	Spleen wort
470. <i>Cystopteris fragilis</i>	Bladder fern
809. <i>Dryopteris Thelypteris</i>	Meadow fern
514. <i>Onoclea sensibilis</i>	Sensitive fern
807. <i>Woodsia obtusa</i>	Large Woodsia

PORTULACACEAE - Purslane family

72. <i>Claytonia virginica</i>	Spring beauty
340. <i>Portulaca dioeracea</i>	Common purslane

PRIMULACEAE - Primrose family

769. <i>Androsace occidentalis</i>	Androsace
187. <i>Lysimachia ciliata</i>	Fringed loosestrife

RANUNCULACEAE - Crowfoot family

574, 646. <i>Anemone caroliniana</i>	Prairie anemone
15. <i>A. virginiana</i>	Thimbleweed
60. <i>Aquilegia canadensis</i> , var. <i>latiuscula</i>	Columbine
556. <i>Clematis panniculata</i> [= <i>C. dioscoreifolia</i> var. <i>robusta</i>]	Clematis
175. <i>Delphinium Ajacis</i>	Rocket larkspur
140. <i>D. carolinianum</i> (cf. Gates corr. 12/5/51)	Carolina larkspur
139. <i>D. tricorne</i>	Dwarf larkspur
105. <i>D. virescens</i>	White larkspur
68. <i>Isopyrum bitermum</i>	False rue anemone
651. <i>Myosurus minimus</i>	Mousetail
54. <i>Ranunculus abortivus</i>	Kidney-leaf buttercup
432. <i>R. acris</i>	Tall buttercup
334. <i>R. sceleratus</i>	Cursed crowfoot
80. <i>R. septentrionalis</i>	Swamp buttercup
134. <i>Thalictrum dasycarpum</i>	Tall meadow rue

RHAMNACEAE - Buckthorn family

204. <i>Ceanothus americanus</i>	New Jersey tea
97. <i>C. ovatus</i>	Red root

ROSACEAE - Rose family

250. <i>Agrimonia pubescens</i>	Agrimony
289. <i>A. parviflora</i>	Harvest lice
768. <i>Crataegus crus-galli</i>	Hawthorn
767. <i>C. mollis</i>	Hawthorn
348. <i>Fragraria virginiana</i>	Wild strawberry
172. <i>Geum canadense</i> [Barkley, 1963]	White avens
725. <i>Potentilla canadensis</i> (cf. Hulbert, 3/31/61)	Cinquefoil
160. <i>P. nonspeliensis</i> [= <i>P. norvegica</i>]	Strawberry weed
448. <i>P. paradoxa</i>	Cinquefoil
496. <i>P. rivalis</i> (= <i>P. millegrana</i> , cf. Gates, ✓)	Cinquefoil
109. <i>P. recta</i> 11/18/53)	Cinquefoil
141. <i>P. simplex</i>	Old-field cinquefoil
375. <i>Prunus americanus</i> (cf. Gates, 11/19/52)	Wild plume
352. <i>P. serotina</i>	Wild black cherry
362. <i>P. virginiana</i>	Choke cherry
347. <i>Pyrus ioensis</i>	Wild crabapple
711. <i>Rosa multiflora</i>	Rose
181. <i>R. satigera</i>	Climbing rose
126. <i>R. suffulta</i>	Prairie rose
364. <i>Rubus argutus</i>	Blackberry
356. <i>R. flagellaris</i>	Wild blackberry
363. <i>R. occidentalis</i>	Black raspberry

RUBIACEAE - Madder family

230. <i>Cephalanthus occidentalis</i>	Buttonbush
61. <i>Galium aparine</i>	Cleavers
123. <i>G. circaezans</i>	Enchanters nightshade
813. <i>G. concinnum</i>	Shining bedstraw
405. <i>G. tinctorum</i> (= <i>G. concinnum</i> , Gates 11/19/52)	Bed straws
20. <i>Houstonia minima</i>	Small bluets

RUTACEAE - Rue family

542. <i>Xanthoxylum americanum</i>	Prickly ash
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SALICACEAE - Willow family

361. <i>Populus deltoides</i>	Cottonwood
570, 571. * <i>Salix alba</i> (* = var. <i>vitellina</i>)	White willow
564. <i>S. amygdaloides</i>	Peachleaf willow
572. <i>S. babylonica</i>	Weeping willow
573. <i>S. caroliniana</i> (= <i>S. fragilis</i> , Hulbert 1/7/57)	Ward willow
568. <i>S. cordata</i> (= <i>S. amygdaloides</i> , " " " ")	Heart-leaved willow
566. <i>S. eriocephala</i>	Missouri River willow
569. <i>S. fragilis</i> (= <i>S. nigra</i> , Hulbert, 1/7/57)	Crack willow
471. <i>S. humilis</i> , (var. <i>rigiduscula</i> " " " ")	Prairie willow
565. <i>S. interior</i>	Sandbar willow
567. <i>S. nigra</i>	Black Willow

SANTALACACEAE - Sandalwood family

358. *Commandra richardsoniana* Bastard toad-flax

SAPINDACEAE - Soapberry family

552. *Koeleruteria paniculata* Golden rain tree

SAXIFRAGACEAE - Saxifrage family

6. *Heuchera richardsonii* Alum root
 51. *Ribes missouriense* Goose berry, Missouri
 486. *R. odoratum* Missouri currant
 332. *Penthorum sedoides* Ditch stone-crop

SCROPHULARIACEAE - Figwort family

902. *Castilleja citrina* [Barkley, 1963]
 734. *Conoclea multifida* Conoclea
 752. *Gerardia besseyana* [= *G. tenuifolia* var. *macrophylla*] *Gerardia*
 205. *Linaria vulgaris* Butter and eggs
 326. *Lindernia dubia* False pimpernel
 763, 816. *Mimulus alatus* Sharp-winged monkey flower
 276. *M. ringens* Monkey flower
 146. *Penstemon digitalis* Beard's tongue
 359. *Pedicularis canadensis* Louse wort
 215. *Scrophularia marilandica* Figwort, Carpenter's square
 224. *Seymeria macrophylla* Mullein foxglove
 686, 7. *Verbascum blattaria* Moth mullein
 197. *V. thapsus* Common mullein
 822. *Veronica agrestis* Field speedwell
 740, 779. *V. anagallis-aquatica* Water speedwell
 64. *V. arvensis* Corn speedwell
 57. *V. peregrina* Purslane speedwell
 298. *Veronicastrum virginicum* Culver's root

SIMARUBACEAE - Quassia family

548. *Ailanthus altissima* Tree of heaven

SOLANACEAE - Nightshade family

643. *Datura innoxia* Thornapple
 195. *D. stramonium* Jimson weed
 703. *D. tatula* [= *D. stramonium* var. *tatula*] Purple jimson weed
 389. *Lycium halimifolium* Matrimony vine
 732. *Physalis alkekengi* Chinese lantern plant
 295. *P. comata* Ground cherry
 192. *P. heterophylla* Ground cherry
 702. *P. ixocarpa* Tomatillo
 676. *P. missouriensis* (cf. Hulbert ltr. 11/25/57) Small-flowered ground cherry
 759. *P. pubescens* (*P. missouriensis* Hulb. 3/31/61) Ground cherry
 599. *P. umila* Ground cherry
 294. *P. subglabrata* Ground cherry
 116. *P. virginiana* Ground cherry
 152. *Solanum carolinense* Horse nettle
 721. *S. dulcamara* Bittersweet
 12. *S. nigrum* Deadly nightshade
 233. *S. rostratum* Buffalo bur

SPARGANIACEAE - Burr-reed family

780. *Sparganium eurycarpum* Bur reed

STAPHYLEACEAE - Bladdernut family

76. *Staphylea trifolia* Bladdernut

TILIACEAE - Linden family

510. *Tilia americana* Linden, Bass-wood
 546. *T. cordata* (Europaea) European linden
 547. *T. petiolaris* Pendent silver linden

TYPHACEAE - Cat-tail family

419. *Typha angustifolia* Narrow-leaved cat-tail
 428. *T. latifolia* Common cat-tail

ULMACEAE - Elm family

766. *Celtis occidentalis* Hackberry
 353. *Ulmus americana* White elm
 724. *U. glabra* Scotch elm
 814. *U. pumila* Chinese elm
 354. *U. rubra* Red elm

UMBELLIFERAE - Parsley family

342. *Chaerophyllum texanum* Chervil
 218. *Circuta maculata* Water hemlock
 128. *Conium maculatum* Poison hemlock
 163. *Cryptotaenia canadensis* Honey wort
 138. *Daucus carota* Queen Anne's lace
 191. *Eryngium yuccifolium* Rattlesnake master
 169. *Falcaria vulgaris* Sickleweed
 167. *Heracleum lanatum* [=H. maximum] Cow parsnip
 95, 346. **Osmorhiza longistylis**=var. *villicaulis* Anise root
 384. *Pastinaca sativa* Parsnip
 387. *Polytaenia Nuttalli* Prairie parsley
 3. *Sanicula canadensis* Black snakeroot
 118. *S. gregaria* Black snakeroot
 518. *S. marilandica* Black snakeroot
 421. *Torilis japonica* Hedge parsley
 386. *Zizia aurea* Golden alexanders

URTICACEAE - Nettle family

200. *Laportea canadensis* Wood nettle
 315. *Pilea pumila* Clear weed
 199. *Urtica procera* Tall nettle

VALERIANACEAE - Valerian family

86. *Valerianella radiata* (cf. Gates ltr. 12/5/51) Corn salad

VERBENACEAE - Vervain family

19. <i>Lippia lanceolata</i> (cf. Gates letter 12/5/51)	Fog-fruit
489. <i>Verbena bracteata</i>	Verbena
587. <i>V. canadensis</i>	Wild verbena
253. <i>V. hastata</i>	Tall blue verbena
183. <i>V. simplex</i>	Verbena
162. <i>V. stricta</i>	Hoary verbena
609,788. <i>V. stricta</i> X <i>V. urticifolia</i>	Verbena (hybrid)
198. <i>V. urticifolia</i>	Nettle-leaved verbena

VIOLACEAE - Violet family

593. <i>Viola affinis</i>	Violet
53. <i>V. cucullata</i>	Violet
487. <i>V. pedatifida</i>	Pansy violet
350. <i>V. pensylvanica</i>	Smooth yellow violet
58. <i>V. Rafinesquii</i> [= <i>V. Kitaibeliana</i> var. <i>Rafinesquii</i>]	Field pansy
349. <i>V. soraria</i>	Blue violet

VITACEAE - Vine family

414. <i>Ampelopsis cordata</i>	False grape
410. <i>Parthenocissus inserta</i>	Virginia creeper
411. <i>Vitis cinerea</i>	Pigeon grape
355. <i>V. vulpina</i>	River grape

ZOSTERACEAE - Pondweed family

772. <i>Potamogeton foliosus</i>	Leafy pondweed
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ZYGOPHYLLACEAE - Caltrop family

437. <i>Tribulus terrestris</i>	Puncture vine
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Note:

As I recall, this Family-genus-species List was compiled between 1967 and 1970 from the Family List of Father Hubert by Mr. Kenneth Andersen and typed by Barbara Turner, wife of Ronald of the Biology Faculty. Father Hubert had a copy for proof reading and it was from this, I think, the typescript I have used to produce this list was made.

In editing and proof-reading this typescript I have cited in (), usually without changing Father Hubert's original designations as found in his Field Catalogue or on the Herbarium sheets, some of the emendations and comments he had received from his correspondents at Kansas State College at Manhattan, between the years 1951 and 1968.

Eugene Dehner, O.S.B., Ph.D., Editor
Professor of Biology, Emeritus
July 11, 1986

BIRDS OF ATCHISON COUNTY

GREBES

Pied-billed Grebe

PELICIAN, white

CORMORANTS

Double-crested

HERONS

Great Blue

Cattle Egret

GEESE

White-fronted

Snow

Blue

Canada

DUCKS

Wood

Green-winged Teal

Mallard

Northern Pintail

Blue-winged Teal

Cinnamon Teal

Northern Shoveler

Gadwall

American Wigeon

Canvasback

Redhead

Ring-necked

Greater Scaup

Lesser Scaup

Common Goldeneye

Bufflehead

Hooded Merganser

Common Merganser

Ruddy Duck

VULTURES

Turkey

HAWKS, EAGLES

Osprey

Bald Eagle

Northern Harrier

Cooper's

Northern Goshawk

Red-shouldered

Broad-winged

Red-tailed

Rough-legged

Golden Eagle

FALCONS

American Kestrel

Merlin

Peregrine

PHEASANT

Ring-necked

GROUSE

Ruffed Grouse

TURKEY

QUAIL

Northern Bobwhite

RAILS

Sora

GALLINULES

American Coot

PLOVERS

Semipalmated

Piping

Killdeer

SANDPIPERS

Greater Yellowlegs

Lesser Yellowlegs

Solitary

Spotted
Semipalmated
Common Snipe
American Woodcock

PHALAROPES
Wilson's

GULLS
Franklin's
Ring-billed
Herring

TERNs
Caspian
Common
Black

PIGEONS
Rock Dove

DOVES
Mourning

CUCKOOS
Black-billed
Yellow-billed

OWLS
Eastern Screech
Great Horned
Barred

GOATSUCKERS
Common Nighthawk
Chuck-will's Widow

SWIFTS
Chimney

HUMMINGBIRDS
Ruby-throated

KINGFISHER
Belted

WOODPECKERS
Red-headed
Red-billied
Yellow-bellied Sapsucker
Downy
Hairy
Northern Flicker
 Yellow-shafted
 Red-shafted
Pileated

FLYCATCHERS
Eastern Wood-pewee
Eastern Phoebe
Great Crested
Western Kingbird
Eastern Kingbird

LARK, Horned

SWALLOWS
Purple Martin
Tree
N. Rough-winged
Bank
Cliff
Barn

JAY, CROW
Blue Jay
American Crow

CHICKADEES, TITMOUSE
Black-capped
Tufted Titmouse

NUTHATCHES
Red-breasted
White-breasted

CREEPER, Brown

WRENS

House
Winter

KINGLETS

Golden-crowned
Ruby-crowned

GNATCATCHER

Blue-gray

THRUSHES

Eastern Bluebird
Swainson's
Hermit
Wood
American Robin

THRASHERS

Gray Catbird
Northern Mockingbird
Brown

WAXWINGS

Cedar

SHRIKES

Loggerhead

STARLING, European

VIREOS

Solitary
Red-eyed

WARBLERS

Tennessee
Nashville
Yellow
Yellow-rumped
Common Yellowthroat

Wilson's
Yellow-breasted Chat

TANGERS

Summer

GROSBEAKS, BUNTINGS

Rose-breasted Grosbeak
Indigo Bunting
Dickcissel

SPARROWS

Rufous-sided Towhee
American Tree
Vesper
Savannah
Fox
Song
Lincoln's
White-throated
White-crowned
Harris'
Dark-eyed Junco

BLACKBIRDS, ORIOLES

Red-winged
E. Meadowlark
Yellow-headed
Rusty
Brewer's
Common Grackle
Brown-headed Cowbird
Orchard Oriole
Northern Oriole

FINCHES

Purple
Red Crossbill
Pine Siskin
Am. Goldfinch

WEAVER FINCH

House Sparrow