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Lexicon
of
Stratigraphic Nomenclature
in
Missouri

by

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Ph.D.

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FOREWORD

Geology was in its infancy as a science in 1847 when George Engelmann, a noted physician and botanist, named a limestone formation after the thriving community located nearby. I doubt Mr. Engelmann realized the name "St. Louis limestone" would still be in use today (with the only change being a capital L in "Limestone"). George Swallow, the first State Geologist, and his staff (1855) were more generic in naming bedrock units they investigated. They assigned names such as "1st Magnesian Limestone" (now known as the Joachim Dolomite) or the "Saccharoidal Sandstone" (later recognized to be equivalent to the St. Peter Sandstone of Minnesota). In the intervening century and a half, healthy debates have raged about the age, stratigraphic relationships, and, yes, the most appropriate names for geologic units across the state.

The *Lexicon of Stratigraphic Nomenclature in Missouri* is a culmination of 150 years of geologic exploration in the Show-Me State. On a more personal note, it is the culmination of dozens of years of effort by Dr. Thomas L. Thompson in refining our understanding of stratigraphy and how Missouri's geologic units fit together. The document's completion was a monumental task that few stratigraphers have the ability to accomplish. Dr. Thompson has produced an exhaustive work that contains thousands of rock names gleaned from nearly one thousand references. In spite of all his effort and attention to detail, I'm sure Dr. Thompson would readily admit that there is room for improvement. There are stratigraphic problems yet to solve, but the problems are getting smaller and more precise as the science of geology approaches maturity. This lexicon will not end the debates, but it serves to clarify the issues and crystallize the foundation upon which future discussions will be framed.

This document provides much needed consistency for geologists of all disciplines that are working in or around the state of Missouri. It serves as a guide to cross-reference specific nomenclature changes and stratigraphic agreements that have been achieved over time and across state boundaries between a number of investigators. The ability to correlate geologic units regionally is critical to developing and preserving our land and water resources. The magnitude and comprehensive nature of this document will be a great aid to future generations who will continue to puzzle over the complexity of Missouri's geology in hopes of achieving the goal of perfecting the stratigraphy of the midcontinent.

The Missouri Department of Natural Resources' Division of Geology and Land Survey presents its best attempt to date to achieve consensus between the investigators of yesterday and the workers of today. It marks a watershed in technology as it is the first stratigraphic publication by this division to be presented in an electronic format over the internet and on CD. Copies are available at www.dnr.state.mo.us/dgls/adm/publications/index.html. Printed copies and CDs can be obtained by writing the Division of Geology and Land Survey, PO Box 250, Rolla, MO 65402.

Mimi R. Garstang, RG
Director and State Geologist

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LEXICON
OF STRATIGRAPHIC NOMENCLATURE IN MISSOURI

by
Thomas L. Thompson

INTRODUCTION

This is an alphabetical listing of stratigraphic names used in published reports for rock units exposed in Missouri. Some names were derived from states other than Missouri, and a few were not actually proposed for use in Missouri, but have been defined as equivalent to named units in Missouri.

Unit names listed in ***bold italic*** are formal stratigraphic units currently recognized in Missouri (Thompson, 1995). Coal beds and informally used stratigraphic units are underlined ("**Alvis Coal Bed**") The formal name is followed by the list of rock-stratigraphic units this name is classified under, in order of increasing content; *i.e.*:

Aarde Shale Member **of Howard Formation, Sacfox Subgroup, Wabaunsee Group**

This is followed by various ways in which this unit has been referred to in published reports. The final line indicates the time-stratigraphic units (the age) the stratigraphic unit is classified under:

Pennsylvanian System (Virgilian Series)

Synonyms (more than one name for the same stratigraphic unit) and homonyms (more than one stratigraphic unit with the same name), and stratigraphic levels of use of these names (whether a member of a formation, or a formation, group, etc.) are best known for units of Paleozoic age, because they have been extensively researched and compiled into three published reports and two manuscripts in progress that constitute "**The Paleozoic Succession in Missouri**" (Missouri Department of Natural Resources' Division of Geology and Land Survey **Report of Investigations 70**). Nomenclature of units not of Paleozoic age are not as well documented, and may not have a listing of previously used names or name combinations.

Underlined units following **bold** unit names identify the hierarchy of units the bold unit belongs within; *i.e.* **Aarde Shale Member** of Howard Formation, this followed by the reference of the author who identified this unit under that name [(Thompson, 1995)]; this reference is found in the **Bibliography** at the end of the text. If the author and date are in bold [(**Moore, 1932**)], this reference is the author who originally proposed the name. If the published description is from sections outside of Missouri, the state it is from is noted after the author citation ("- in Kansas"). If no such note occurs, the name was either published for Missouri, or is in a publication covering an area in which Missouri is included, and the name listed was used for strata in Missouri, even though it may also have been described for (or from) other states surrounding Missouri.

If the named unit is a synonym of another unit name that is now the formally recognized name for that stratigraphic unit in Missouri, the listing will have a statement following the author citation in ***bold italics*** after an equal sign (=), stating the name this unit is currently formally referred to; = ***Raytown Limestone Member of Iola Formation.***

Many of the listings are for names given to units that were never accepted by other geologists, or are older terms that are no longer in use, but are listed where they alphabetically occur so they may be found easily, even if the searcher does not know where in the stratigraphic column they occur. The first reference is simply the name, i.e., **Allen limestone**, underlined and **in bold**. If there are one or more uses by known authors, these are listed after the initial reference.

Some of the detailed discussions were originally compiled in an unpublished manuscript "Lexicon of Missouri Geology," by Nancy Schofield, in 1963, for in-house use by geologists of the then-named Missouri Geological Survey and Water Resources. This information was initially used as the "skeleton" from which the final, more-detailed listing was constructed.

As a note of caution, some of the citations may not be completely accurate, especially those from early workers in the Pennsylvanian System, and from C.R. Keyes (1892-1943), who published seemingly hundreds of short papers a year. There are over 185 separate stratigraphic units in the Pennsylvanian, and it was sometimes very difficult to understand how the individual stratigrapher was classifying the members within the various formations. Also, misscorrelations were common, and some of these have never quite been completely straightened out.

Question marks occur throughout this listing for a variety of reasons. Some are because the original author used them in his/her nomenclature, while others are because it was not clear what the original author's intentions were, and later authors questioned their usage or name. Certain formations are questioned (?) because no one is certain if this stratigraphic unit actually occurs in Missouri (i.e., Powell ? Dolomite), but the unit has been correlated with rocks of that name from another state. The reason for each question mark must be evaluated individually.

A

Aarde Shale Member of Howard Formation, Sacfox Subgroup, Wabaunsee Group

Aarde shale member of Howard limestone (**Moore, 1932**)
Aarde shale member of Howard limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Aarde member of Howard formation (Searight and Howe, 1961)
Aarde Shale Member of Howard Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Aarde Shale Member of Howard Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 205) stated the Aarde Shale Member was named from the "Aarde farm, sec. 4, T. 26 S., R. 11 E., Greenwood county [Kansas]."

Thompson (1995, p. 128) stated "The Aarde Shale Member...is composed, from the base upward, of an underclay, the Nodaway coal bed, which is over 1 ft thick in some areas, and a fissile dark-gray shale, which contains thin, irregular beds of fossiliferous limestone. Phosphatic concretions are present in the fissile shale at some localities. The member is approximately 4 ft thick." The Aarde Shale Member overlies either the Bachelor Creek Limestone Member of the Howard Formation or the Severy Formation, and is overlain by the Church Limestone Member of the Howard Formation.

Abernathy Member of Joachim Dolomite

Abernathy Member of Joachim Dolomite (**Templeton and Willman, 1963**; Willman and Buschbach, 1975)
Abernathy Member of "lower Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Temple and Willman (1963, p. 58) stated "The Abnernathy Member of the Joachim...is here named for the Abernathy school, 2 mi north of the type section in a bluff on the north side of Missouri State Highway 74, 1½ mile east of Dutchtown, Cape Girardeau County, Missouri. This is half a mile west of Pecan Grove School and 1¾ mi east of Dutchtown."

The Abernathy is the basal member of the Joachim Dolomite, and is overlain by the Augusta Member. The Abernathy is restricted to the region of its type section in southeastern Missouri, whereas the other Joachim members occur essentially throughout its outcrop area. Elsewhere the Augusta Member is the basal member of the Joachim.

Ackerman Formation of Wilcox Group

Ackerman beds (**Lowe, 1913**)
Ackerman formation (Searight and Howe, 1961)
Ackerman Formation (Thompson, 1995)

Tertiary System (Paleocene Series)

Type section: Lowe (1913, p. 23-25) named the lowest division of the Wilcox formation the "Ackerman beds" because of typical development near town of Ackerman, Choctaw County, Mississippi. Later Wilcox was raised to a group, and Ackerman to a formation.

The lower formation of the Wilcox Group, the Ackerman overlies the Porter's Creek Clay of the Midway Group and is overlain by the Holly Springs Formation, except in places where the Ackerman has been completely removed, where Holly Springs lies on the Porters Creek Clay. McQueen (1939, p. 59-76) identified the Ackerman and Holly Springs as subdivisions of the Wilcox Group, in Missouri. However, most of his "Ackerman" was found to be mainly Porters Creek, with possible remnants of true Ackerman at the top.

Thompson (1995, p. 139) stated "The Ackerman Formation is predominantly a light-gray to brown, silty, nonmarine clay. It is slightly lignitic, and glauconite is locally present at its base. The clay in the upper 6 to 8 ft of the formation is very plastic and is bright-red or yellow. In a few places, the formation's contact with the underlying Porters Creek is marked by the presence of a lenticular sandstone body. This sandstone is white to yellow, medium-grained, and has clay particles disseminated throughout the mass. At one locality boulders of quartzite 3 to 4 ft in diameter are present near the base of the formation. At another locality rounded boulders of bauxitic clay...presumably derived from the top of the Porters Creek Clay, are erratically incorporated in the basal lenticular sandstone of the Ackerman..."

"..The Ackerman is...variable in its thickness which ranges from 0 to 100 ft or more...most subsurface records do not distinguish the Ackerman from the Holly Springs."

<u>Ada limestone</u>

Ada limestone (Gudstadt, 1958) - in Oklahoma, = ***Cape Limestone***

Ordovician System (Cincinnatian Series)

Gudstadt (1958, p. 523-524) proposed **"Ada limestone"** to replace "Fernvale", which he felt did not correlate with the Fernvale of the type area in Tennessee. Ada was preempted, and Templeton and Willman (1963) proposed **Cape Limestone** for this unit.

<u>Admire shale</u>

Admire shale (Haworth and Bennett, 1908; Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Willard Shale to Pillsbury Shale of Wabaunsee Group***

Admire shale (Hinds and Greene, 1915) = ***Willard Shale to Dry Shale of Wabaunsee Group***

Pennsylvanian System (Virgilian Series)

Aftonian Stage

Aftonian Stage <u>of Pleistocene Series</u> (Searight and Howe, 1961; Thompson, 1995)

Quaternary System (Pleistocene Series)

Type area: The name was originally introduced by Chamberlin (1895, p. 270-277) and was derived from exposures between Afton and Thayer, Iowa.

This name was applied by Wilmarth (1938) to an interglacial stage during which the Aftonian soil, gumbotil, vegetal and other interglacial deposits were formed. This stage followed the oldest (Nebraskan) stage of glaciation and preceded the second (Kansan) stage of glaciation. Whitfield (*in* Thompson, 1995, p. 146) stated "No record of Afton deposits has been reported in Missouri. The Aftonian age is an interglacial period during which soil-forming processes altered all exposed material."

<u>Albion Series</u>

Albion Series (Gealy, 1955) = ***Alexandrian (Llandovery) Series***

Silurian System

Type area: A Lower Silurian series identified from strata exposed in the state of New York.

Gealy (1955) used Albion in Missouri instead of the "Alexandrian series" proposed by Savage (1908) for strata in Alexander County, Illinois. He determined that type Alexandrian strata also included beds which he considered to be upper Ordovician in age. Although he was correct in this, those strata of Ordovician age ("Edgewood", now Leemon Formation, and Girardeau Limestone) were redefined as upper Ordovician (Cincinnatian), and the Alexandrian succession was redefined (Thompson and Satterfield, 1975) to include only the Sexton Creek Limestone in its type area.

<u>Allen limestone</u>

Allen limestone (Adams, 1904) = ***Plattsburg Formation?***

Allen limestone member <u>of Wilson formation</u> (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***Plattsburg Formation***

Allen limestone member of Garnett limestone (Haworth and Bennett, 1908) - in Kansas; = ***Wyandotte to Plattsburg***
Pennsylvanian System (Missourian Series)

Alexandrian Series

Alexandrian formation (Savage, 1908) = ***Leemon Formation (Ordovician in age) and Sexton Creek Limestone (lower Silurian)***
Alexandrian series (Savage, 1909) = ***lower Silurian and upper Ordovician formations***
Alexandrian Series (Thompson and Satterfield, 1975) = ***Sexton Creek Limestone***
Silurian System (Llandoverian Series)

Type area: Proposed by Savage (1908, p. 434) for the early Silurian strata occurring in Alexander County, Illinois, and adjacent southeastern Missouri.

The Alexandrian Series originally included (ascending) the Girardeau Limestone, Edgewood Formation and Sexton Creek Limestone (Savage, 1908). It was thought to bridge the interval between Cincinnatian (Late Ordovician) and Clinton (Middle Silurian). But Schuchert (1910, p. 538) realized that the Clinton strata of Ohio, or the Brassfield Formation, are older than the type Clinton in New York. Savage (1913) then correlated the Brassfield with the Sexton Creek, and placed the Sexton Creek at the top of the Alexandrian series. In 1917 Savage decided that the Orchard Creek formation, formerly uppermost Richmondian (Cincinnatian), should be placed at the base of the Alexandrian series. Since then, the Orchard Creek, Girardeau, and "Edgewood" of southeastern Missouri and adjacent Illinois have been placed back at the top of the Cincinnatian by Thompson and Satterfield (1975), so only the Sexton Creek Limestone in southeastern Missouri, and the Bowling Green Dolomite of northeastern Missouri, constitute Alexandrian-age strata in Missouri. Alexandrian-age strata are preceded by Late Ordovician (Cincinnatian) rocks, and underlie Middle Silurian (Niagaran) formations. On a global scale, Alexandrian strata are in the lower **Llandoverian Series**

Algomic period

Algomic period (Keyes, 1914, 1915)
Precambrian Erathem (Archeozoic Era)

This term was originally defined by Keyes (1914, p. 201) for the latest period of the Archeozoic Era in the Lake Superior region. Keyes (1915, p. 254) used the term in regard to Missouri. His Francoisian series represented the Algomic period.

Algonkian system or period

Precambrian Erathem

According to Wilmarth (1938), this term was for many years applied to the rocks and the time immediately preceding the Cambrian Period (System) and succeeding the Archean Period (System). It is no longer used.

Alluvium formation

Quaternary System

This is a term applied by Swallow (1855) to **alluvial deposits** in Missouri.

Altamont Formation of Appanoose Subgroup, Marmaton Group

Altamont limestone (Adams, 1896) - in Kansas
Altamont limestone of Pleasanton shale (Haworth, 1898; Haworth and Bennett, 1908) - in Kansas
Altamont limestone member of Marmaton formation (Moore and Haynes, 1917) - in Kansas
Altamont limestone member of Pleasanton formation (Greene and Pond, 1926)
Altamont limestone (McQueen and Greene, 1938) = ***Amoret Limestone Member only?***

Altamont limestone of Henrietta group (3 members) (Cline, 1941)
shale member of Altamont limestone (Cline, 1941) = ***Lake Neosho Shale Member of Altamont Formation***
Altamont limestone of Marmaton group (3 members) (Jewett, 1941; Moore, et al., 1951) - in Kansas
Altamont limestone of Henrietta group (3 members) (Clair, 1943) = ***Bandera Shale (Member) and Worland and Amoret members of the Altamont Formation***
shale between Tina and Worland members of Altamont limestone (Clair, 1943) = ***Lake Neosho Shale Member***
Altamont limestone of Henrietta group (Branson, 1944b) = ***Worland Limestone Member of Altamont Formation*** only
Altamont formation of Marmaton group (3 members) (Greene and Searight, 1949; Cline and Greene, 1950; Searight and Howe, 1961)
Altamont Limestone of Marmaton Group (3 members) (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Altamont Formation of Marmaton Group (3 members) (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: The Altamont limestone was named by Adams (1896). Jewett (1941, p. 326) stated "No exposures in the vicinity of Altamont that show the whole Altamont formation are known. The same condition seems to have obtained also in the time of Adam's report (1902, p. 32)...The Lake Neosho shale, a part of the overlying Worland limestone, and a part of the underlying Tina [Amoret] limestone...all are exposed near the center of the west line of sec. 5, T. 33 S., R. 19 E., which is about 3.5 miles west of Altamont. These rocks were much better exposed in 1935 than in 1941. This exposure is partly artificial, but inasmuch as it is the best one available it is here designated as the type." (Labette County, Kansas).

The Altamont Formation overlies the Bandera Shale, and is overlain by the Nowata Shale. It comprises three members, the lower of which (Amoret Limestone Member) is not always present. When missing, the Lake Neosho and underlying shales of the Bandera are often together called the **Lake Neosho - Bandera Shales undifferentiated**.

Alvis Coal Bed of Labette Shale, Appanoose Subgroup, Marmaton Group

"Alvis" coal (Todd, 1957)
Alvis coal (Jeffries, 1958) - in unpublished ms.
Alvis coal of Labette formation (Searight, 1959)
Alvis (?) coal of Labette Formation (Gentile, 1967)
Alvis coal of Labette Formation (Gentile, 1976)
Alvis coal bed of Labette Formation (Labette Shale) (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: The Alvis coal was named in an unpublished Ph. D. dissertation (N.W. Jeffries, 1958) from an exposure in a quarry in Bates County, Missouri. Gentile (1976, p. 66) located this section in the "East face of active quarry; SW¼ SE¼ sec. 19, T. 40 N., R. 31 W.; 2.5 miles west of Butler, Bates County, Missouri."

Thompson (1995, p. 106) stated "The basal bed of the Labette Formation, from the Missouri-Kansas boundary in Bates County to the Missouri-Iowa boundary in Putnam County, is a persistent underclay. From Johnson County southwestward along the cropline, the basal underclay is overlain by the thin **Alvis coal bed**, which is in turn overlain by dark-gray, fossiliferous shaly limestone that is sporadically persistent at least as far north as the Missouri River in Lafayette County, where it rests on underclay..."

Amazonia Limestone Member of Lawrence Formation, Douglas Group

Amazonia limestone bed of Lawrence shale member of Douglas formation (**Hinds and Greene, 1915**)
Amazonia limestone (Moore, 1929)
Amazonia limestone member of Lawrence shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Amazonia limestone member of Lawrence shale (McQueen and Greene, 1938; Branson, 1944b)
Amazonia member of Lawrence formation (Searight and Howe, 1961)
Amazonia Limestone Member of Lawrence Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Amazonia Limestone Member of Lawrence Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Hinds and Greene (1915), who named the Amazonia limestone, did not locate the type section, although they did describe it. Cordell (1947) located a section in the NE SW sec. 36, 59N-36W, southwest of Amazonia, Andrew County, in the Missouri River bluffs just north of the Burlington Northern tracks and immediately north of an east-west road, that could be the type section Hinds and Greene described.

Thompson (1995, p. 122) stated "The Amazonia Limestone Member...is a light- to medium-gray, dense to finely crystalline limestone, which commonly is exposed as a single ledge. The limestone has a rough, brecciated or conglomeratic texture and is characterized by poorly-defined bedding. The thickness of the member increases northward from southwestern Buchanan County, where it is 2 ft thick, to the St. Joseph area and Amazonia area, where it is 12 to 15 ft thick. The member is very thin, or absent in northwestern Platte County." The Amazonia Limestone Member overlies the "lower unnamed shale member" and is overlain by the "upper unnamed shale member" of the Lawrence Formation.

Amoret Limestone Member of Altamont Formation, Appanoose Subgroup, Marmaton Group

Amoret limestone member of Altamont formation (**Greene and Searight, 1949**; Cline and Greene, 1950)
Amoret limestone member of Altamont limestone (Moore, et al., 1951) - in Kansas
Amoret member of Altamont formation (Searight and Howe, 1961)
Amoret Limestone Member of Altamont Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Amoret Limestone Member of Altamont Formation (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Cline and Greene (1950, p. 18-19) stated "The outcrop in the SW¼ sec. 33, T. 40 N., R. 33 W., two miles south of Amoret, Bates County, Missouri, is hereby designated as the type locality of the Amoret limestone. The section exposed at the locality ranges from Bandera shale upward through the Amoret limestone, Nowata shale, Lenapah limestone, and into the Memorial [Holdenville] shale."

Greene and Searight (1949, p. 7) proposed the Amoret from Amoret, in Bates County, Missouri "...as a substitute for the name Tina [Cline, 1941, p. 29], which is abandoned because the rocks for the type Tina have proven not to be Amoret." Thompson (1995, p. 108) stated "This variable unit is composed of fossiliferous beds of limestone and calcareous shale. In many places it is represented by a thin bed of limestone, or by algal limestone nodules which are embedded in fossiliferous green shale. At some localities...in Jackson, Lafayette, Ray, Carroll, and Livingston counties, the unit appears to be absent, and the boundary between the Altamont and underlying Bandera Formation is obscure. The Amoret Limestone Member ...varies in thickness from 0 to 5 ft." The Amoret overlies the Bandera Shale, and is overlain by the Lake Neosho Shale Member of the Altamont Formation. When missing, the Lake Neosho and underlying shales of the Bandera are often together called the **Lake Neosho - Bandera Shales undifferentiated**.

Ancell Group

Ancell Group (Templeton and Willman, 1963) = ***St. Peter, Joachim, Dutchtown, and Glenwood formations***
"Ancell Group" (Thompson, 1991)

Ordovician System (Mohawkian Series)

Templeton and Willman (1963, p. 31) stated "Ancell strata are considered a group for the following reasons.
1) The sequence consists of sandstones and impure dolomites and limestones, most of which wedge out in various directions and consequently are irregularly distributed.
2) The sequence differs in many lithologic details from the underlying Everton Group and contrasts sharply with the overlying less clastic, much more continuous strata of the Platteville Group.
3) The Ancell Group is bound by unconformities or diastems.
4) Strata of Ancell lithology are present throughout much of the eastern United States."

Andrew shale

Andrew shale member of Lawrence shale (Keyes, 1899) = ***Weston and Lawrence Shales?***
Andrew (Lawrence) shales (Condra and Bengston, 1915) - in Nebraska; = ***Weston to Lawrence Shales***
"IV. Shale" of Andrew (Lawrence) shales (Condra and Bengston, 1915) - in Nebraska; = ***Snyderville Shale Member of Oread Formation***

Pennsylvanian System (Virgilian Series)

Animikian series

Precambrian Erathem

AThis was a term used by Keyes for the Animikie group of other geologist. Keyes (1915, p. 253) used it to include the Ironton slate and Pilot Knob conglomerate of Missouri.

Anna - Labette Shales undifferentiated **Appanoose Subgroup, Marmaton Group**

Pennsylvanian System (Desmoinesian Series)

The Labette Shale is the basal formation of the Appanoose Subgroup of the Marmaton Group. It overlies the Higginsville Limestone of the Fort Scott Subgroup, and is overlain by the **Anna Shale Member** of the overlying Pawnee Formation. The top of the formation is marked by the **Lexington Coal Bed**, where present. If the Lexington coal is absent, often the Anna - Labette contact cannot be discerned, and the two are combined into the **Anna - Labette Shales undifferentiated.**

Anna Shale Member **of Pawnee Formation, Appanoose Subgroup, Marmaton Group**

Anna shale member of Pawnee limestone (**Jewett, 1941**; Moore, et al., 1951) - in Kansas
Anna shale member of Pawnee formation (Greene and Searight, 1949)
Anna member of Pawnee formation (Cline and Greene, 1950; Searight and Howe, 1961)
Anna Shale Member of Labette Shale (Branson, et al., 1965) - in Oklahoma
Anna Shale Member of Pawnee Formation (Landis and Van Eck, 1965) - in Iowa
Anna Shale Member of Pawnee Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Anna Member of Pawnee Formation ("Lexington coal zone") (Merrill, 1973)
Anna Shale Member of Pawnee Formation (Gentile, 1976; Kidder, 1985; Thompson, 1995)
Anna Shale Member of Pawnee Limestone (Price, 1981) - in Missouri, Kansas, and Iowa
Anna Shale Member of Oologah Limestone (Price, 1981) - in Oklahoma

Pennsylvanian System (Desmoinesian Series)

Type section: The Anna Shale Member was named by Jewett (1941, p. 307), who stated "The type exposure of the Anna shale is the same as that of the Pawnee limestone, that is, a little north of the center of sec. 7, T. 27 S., R. 24 E., in Bourbon County, Kansas, on Kansas highway 7."

Thompson (1995, p. 107) stated "The Anna Shale Member...is mostly black or greenish-gray, fissile, calcareous shale which contains flattened phosphatic concretions. It commonly grades into greenish-gray calcareous shale above. The member is persistent, but thin, ranging from 1 to 3 ft in thickness." The Anna Shale Member is overlain by the Myrick Station Limestone Member of the Pawnee Formation, and overlies the Lexington Coal Bed of the Labette Shale. If the underlying Lexington Coal Bed is absent, the Anna is difficult to impossible to separate from the dark-gray shale of the Labette Shale below; this unit is then identified as the **Anna-Labette Shales undifferentiated**.

Appanoose Subgroup **of Marmaton Group**

Appanoose (**Bain, 1896**)
Appanoose subgroup of Marmaton group (Searight and Howe, 1961)
Appanoose Subgroup of Marmaton Group (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type area: The Appanoose was named and described by Bain (1896) from Appanoose County, Iowa.

The original concept of the Appanoose, as proposed by Bain (1896), was a sequence of strata from the top of the Mulky coal to the top of the present Marmaton Group (essentially that succession now comprising the Marmaton Group). Moore (1948) rejected Appanoose as essentially a synonym of Marmaton (which it was). The name was revived, and redefined, by Searight and Howe (1961) to represent as a subgroup those strata of the Marmaton Group above the Fort Scott Subgroup, *i.e.*, Labette through Holdenville strata. Apparently, the term Appanoose has never been used in Kansas.

Arbuckle

"upper Arbuckle" (McCracken, 1955) = ***Ibexian Series***
Arbuckle (Oros, et al., 1975) = ***Upper Cambrian and Lower Ordovician***
Cambrian and Ordovician Systems

Arbuckle is a term usually associated with Oklahoma. Kansas uses the term for all strata from the Eminence Dolomite (Upper Cambrian) to the top of the Ibexian Series of the Ordovician System.

Archean Period or System

Precambrian Erathem

According to Wilmarth (1938), this is a term that was for many years applied to the time and the rocks preceding the Algonkian Period (now discarded) and covering the oldest known rocks, but which is no longer used.

Archeozoic Era

Precambrian Erathem

Archeozoic is a time term covering part of the Proterozoic Era of the U.S. Geological Survey. As originally defined it included all Precambrian time (Wilmarth, 1938). In later usages its meaning was altered to include various parts of the Precambrian.

Archimedes limestone

Archimedes limestone (Nicollet, 1843) = ***Keokuk - St. Louis formations??***
Archimedes limestone (Owen, 1852; Swallow, 1858) = ***Chesterian Series***
Second Archimedes limestone (Owen, 1852) = ***Ste. Genevieve Limestone***
Third Archimedes limestone and geodiferous beds (Owen, 1852) = ***Warsaw and Salem Formations***
Lower Archimedes limestone (Owen, 1852) = ***Keokuk Limestone***
Archimedes group (Shumard, 1855, 1859) = ***Meramecian and Chesterian Series***
Archimedes limestone (Shumard, 1855, 1859; Swallow, 1855; Marbut, 1898) = ***Keokuk, Warsaw, and Salem formations?, Chesterian? (possibly mostly Chesterian Series)***
Third Archimedes limestone (Schumard, 1855) = ***Warsaw Formation***
Lower Archimedes limestone or Keokuk limestone (Hall, 1857)
Warsaw or second Archimedes limestone (Hall, 1857) = ***Warsaw and Salem or St. Louis formations***
Upper Archimedes limestone (Swallow, 1858) = ***Chesterian Series***
Mississippian System (Osagean, Meramecian, and/or Chesterian Series)

The paleontological name *Archimedes* was applied in early Missouri reports to certain Chesterian, Meramecian, and Osagean limestones in which that fossil was particularly common. *Archimedes* was first used stratigraphically by Owen (1852, p. 92) in southeastern Iowa. The "First *Archimedes* limestone," or "Upper *Archimedes* limestone," was applied to the beds above the Aux Vases Sandstone and beneath a sandstone at Chester, Illinois, called by Swallow "Chester sandstone," which Stuart Weller stated is the Palestine Sandstone of modern nomenclature. The "Upper *Archimedes*" was also called the Kaskaskia limestone and the Tribune limestone. "Second *Archimedes* limestone" was applied to the **Ste. Genevieve Limestone**. "Third *Archimedes* limestone," or "Lower *Archimedes* limestone" was applied to limestone in the lower **Warsaw Formation**, to limestones of the Warsaw and Keokuk formations, and to the **Keokuk Limestone** alone.

Ardmore

Lower Ardmore coal (Hinds and Greene, 1915) = ***Croweburg Coal Bed?***
Ardmore cyclothem (Abernathy, 1937) - in Kansas; = ***Verdigris Formation***
Ardmore limestone (Cline, 1941) = ***Verdigris Formation***
Ardmore formation (Branson, 1944b; Jewett, 1949; Unklesbay, 1952a) = ***Verdigris Formation***
Ardmore cyclothem (Moore, 1949; Moore, et al., 1951) - in Kansas; = ***Croweburg and Verdigris formations***
"lower Ardmore" coal(?) (Robertson, 1973) = ***Croweburg Coal Bed***

Pennsylvanian System (Desmoinesian Series)

Ardmore Limestone Member of Verdigris Formation, Cabaniss Subgroup, Cherokee Group

Ardmore limestone (Gordon, 1896)
Ardmore limestone member of Cherokee shale (Hinds and Greene, 1915)
Rich Hill, Ardmore, or Verdigris limestone (Greene, 1933)
Ardmore (Rich Hill) (Verdigris of Oklahoma) limestone member of Upper Cherokee formation (McQueen and Greene, 1938)
Ardmore limestone (Verdigris limestone) (Bartle, 1938)
Ardmore limestone of Ardmore formation (Cline, 1941)
Ardmore limestone of Cherokee shale (Ellison, 1941)
Ardmore formation (Branson, 1944b)
Ardmore (Verdigris) limestone of Ardmore cyclothem (Moore, 1949)
Ardmore limestone of Ardmore cyclothem (Moore, et al., 1951) - in Kansas
Verdigris ("Ardmore") limestone of Verdigris formation (Searight, 1955)
Ardmore limestone (Wanless, 1955) "= **Oak Grove limestone** of Illinois"
Ardmore (Verdigris) limestone of Verdigris formation (Searight, 1959)
Ardmore limestone member of Verdigris formation (Searight and Howe, 1961)
Ardmore Limestone Member of Verdigris Formation (Gentile, 1976; Thompson, 1995)
Ardmore Limestone Member of Swede Hollow Formation (Ravn, et al.,1984) - in Iowa
Ardmore Limestone of Verdigris cycle (Heckel, 1984)
Ardmore Limestone Member of Verdigris Formation (Brenner, 1989) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Gordon (1896), McQueen (1943) described what was to be later designated the type section of the "Ardmore formation," and stated (p. 84) "The following section of the Ardmore formation was measured one mile northeast of the Village of Ardmore, along the country road just west of the center east line, sec. 24, T. 56 N., R. 15 W., Macon County." (Missouri)

Gordon (1896) named the **Ardmore limestone** from exposures in Macon County, Missouri. This limestone is laterally persistent, and extends into central or south-central Oklahoma, where it was named the **Verdigris limestone** by Smith (1928), and into western Missouri where it was named the **Rich Hill limestone** by Greene and Pond (1926). Abernathy (1937) redefined the Ardmore as the **"Ardmore cyclothem"** with the Ardmore limestone as one of the more characteristic units within this cyclothem. Searight, et al. (1953) formally proposed that Abernathy's "cyclothem" be called the **Verdigris formation**, identifying the prominent limestone member as the **Verdigris limestone member**. Finally, to better promote understanding of Missouri stratigraphy, and to alleviate the awkward situation of a formation and member of that formation bearing the same name, Searight and Howe (1961) proposed the present nomenclature, the **Ardmore Limestone Member of the Verdigris Formation**.

Argentine Limestone Member of Wyandotte Formation, Zarah Subgroup, Kansas City Group

Argentine limestone member of Wyandotte limestone (**Newell, *in* Moore, 1932**)
Argentine limestone (Condra, et al., 1932)
Iola limestone (Argentine) (Gunnell, 1933)
Argentine limestone member of Wyandotte limestone (Condra, 1935)
Argentine limestone member of Wyandotte limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Argentine limestone member of Iola limestone (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)

Argentine limestone of Wyandotte formation (Condra and Scherer, 1939) - in Nebraska
Argentine limestone of Wyandotte limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Argentine limestone member of Wyandotte formation (Moore, 1948)
Argentine member of Wyandotte formation (Searight and Howe, 1961)
Argentine Member of Wyandotte Formation (Burchett, 1965) - in Nebraska
Argentine Limestone Member of Wyandotte Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Argentine Limestone Member of Wyandotte Limestone (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Argentine Limestone Member of Wyandotte Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: The Argentine Limestone Member was originally named by Newell (*in* Moore, 1932). Moore (1936, p. 121) located the type section at "Argentine station, Kansas City, Kan. typically exposed in quarry just south of 26th St. and Metropolitan Ave., Kansas City, Kan."

Thompson (1995, p. 116) stated "The Argentine Limestone Member...is a fossiliferous limestone which is extremely variable in thickness. Algal material is thought to be the most important constituent of the rock, although many invertebrate fossils also occur in it. The thickness...decreases from a maximum of more that 40 ft at Kansas City, to less than 1 ft in northern Missouri. A thick limestone in northwestern Cass County that has long been referred to as the Argentine is now believed to include the Farley as well." The Argentine Limestone Member overlies the Quindaro Shale Member, and is overlain by the Island Creek Shale Member of the Wyandotte Formation.

Argillaceous

"Argillaceous-calcareous group of Evans Falls" (Gordon, 1895) - in southeastern Iowa; = ***Chouteau Group***

Mississippian System (Kinderhookian Series)

Argillo

Argillo-calcareous group (Owen, 1852) = ***Kinderhookian Series***

Mississippian System (Kinderhookian Series)

Arkansan Series

Arkansan Series (Keyes, 1910) = ***Morrowan and Atokan Series of Pennsylvanian System***

Pennsylvanian System (Morrowan and Atokan Series)

Asherville alluvium

Quaternary System

A term proposed by Farrar and McManamy (1937, p. 38) for material found in the vicinity of Asherville, Stoddard County, Missouri. It rests on the Powell (?) and Ripley formations and also on the loess in this area. They considered it to be Pleistocene(?).

Ashland limestone

Ashland limestone facies of Mineola limestone (Branson, 1924)
Ashland limestone (Branson, 1941, 1944a, 1944b)
Ashland limestone (Cooper, et al., 1942) "= **Solen limestone** of Iowa"
Ashland limestone facies of Callaway formation (Unklesbay, 1952a)
Ashland facies of Callaway formation (Koenig, 1961a)

Devonian System (Middle Devonian Series)

Type section: Branson (1941, p. 34-38, 81-85) named this unit the "Ashland formation" from the town of Ashland, 7 miles from which the beds are typically exposed, "in sec. 1, 47 N., R. 12 W."

A facies of the **Cedar Valley Limestone** (Thompson, 1993), Branson stated the Ashland overlies the Cooper and underlies the Callaway. Unklesbay (1952a, p. 37-39) considered the Ashland to be a facies development within the Callaway (now Cedar Valley) Formation. Koenig (1961a) noted that the Ashland facies is restricted to just a few scattered exposures in Boone and Moniteau counties. Thompson (1993) regarded it to be of minor importance to the Cedar Valley Limestone, and did not include it with the other three facies, the Callaway, Mineola, and Cooper facies, of the Cedar Valley Limestone of Missouri,

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<u>Atchison shales</u>

Atchison shales (Keyes, 1899, 1901b, 1937g, 1941f) = ***Calhoun Shale to Stotler Formation***

Pennsylvanian System (Virgilian Series)

Atokan Series (Stage)

Atokan Series (Moore, et al., 1951; Baars and Maples, 1998) - in Kansas
Atokan series (Searight, 1955) - in Missouri
Atokan Series (Searight and Howe, 1961; Gentile, 1976; Lambert and Thompson, 1990, Thompson, 1995)

Pennsylvanian System (Subsystem)

Type area: The Atokan Series was named (originally as a formation) for the town of Atoka, in Atoka County, Oklahoma.

Groves (1986, p. 346) stated 'The Atoka Formation was named by Taff and Adams (1900) for exposures in the Choctaw Coal Field, including the town of Atoka, Oklahoma. No type section was designated, however. Branson (1962) subsequently proposed that an area of northwestern Atoka County (which likewise includes the town of Atoka) serve as type for the formation. This proposal was not adopted because rocks in the area referred to by Branson are poorly exposed and unsuited for study (Sutherland and Manger, 1984). Although some controversy still exists concerning an acceptable type area for the formation (and series), the region extending for 10-20 km (6-12 mi) northwest of the town of Clarita in Coal County was proposed by Strimple and Watkins (1969), and endorsed by Sutherland and Manger (1983), as the most important reference area..."

<u>Auburn chert</u>

Auburn chert (Randall, 1934) = ***Plattin Limestone***

Ordovician System (Mohawkian Series)

This name was proposed by Rowley (1908, p. 14) for the “intensely hard bluish limestone, with soft chert bands full of fossils, forming the surface stone of Auburn, Lincoln County, Missouri." He included it in the Trenton limestone. It is no longer used.

Auburn Shale of Nemaha Subgroup, Wabaunsee Group

Auburn shale (**Beede, 1898**; Moore, 1936; Moore, et al., 1951) - in Kansas
Auburn shale <u>of Humphrey shale member of Wabaunsee formation</u> (Condra, 1927) - in Nebraska
Auburn shale member <u>of Humphrey Creek shale</u> (Moore, 1932)
Auburn shale member <u>of Humphrey shale formation</u> (Ver Wiebe and Vickery, 1932) - in Kansas
Auburn shale member <u>of Nemaha limestone</u> (Condra, et al., 1932) - in Nebraska
Auburn shale formation (Condra, 1935)
Auburn shale (McQueen and Greene, 1938; Moore, 1948)
Auburn shale member <u>of Willard shale</u> (Branson, 1944b)
Auburn formation (Searight and Howe, 1961)
Auburn Shale (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Auburn Formation (Burchett, 1970) - in Nebraska
Auburn Shale (Pabian and Diffendal, 1989) - in Nebraska
Auburn Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: The Auburn shale was named by Beede (1898). Moore (1936, p. 222) stated a type section was "Not designated, but undoubtedly it is in the vicinity of Auburn, Shawnee county, Kansas. Good exposures of the shale occur along Wakarusa Creek (near NE cor., sec. 26, T. 13 S., R. 14 E., southwest of Auburn)."

In Missouri, Branson (1944b) referred to this unit as the **Auburn shale member of Willard shale.** Thompson (1995, p. 129) stated "The Auburn Shale is composed mostly of micaceous, silty, gray shale, but it contains a persistent layer of silty, maroon clay in its upper part. A bed of calcareous siltstone and fine sandstone is present below the maroon clay at some localities. In its outcrop area, the formation is approximately 30 ft thick." The Auburn Shale overlies the Wakarusa Limestone Member of the Bern Formation, and is overlain by the Reading Limestone Member of the Emporia Formation.

Augusta limestone

Augusta limestone (Keyes, 1893a; Weller, 1895; Weeks, 1902) = ***Osagean and pre-St. Louis Meramecian Series***
Augusta group (Keyes, 1895a)

Mississippian System (Osagean and Meramecian Series)

Keyes (1893a, p. 59-71) introduced the term "Augusta limestone," derived from Augusta, Des Moines County, Iowa, to include **rocks between the Kinderhook group below and the St. Louis limestone** (broad usage) above. It included what has been called Warsaw shale and limestone, Geode bed, Keokuk limestone, Upper Burlington limestone, and Lower Burlington limestone. Basically the term was used for all of the Osagean series, except the Fern Glen Formation, and part of the overlying Meramecian Series. Later Keyes and others used the terms "Augusta stage" and "Augusta group" in the same sense. This concept is no longer used.

Augusta Member of Joachim Dolomite

Augusta Member of Joachim Dolomite (**Templeton and Willman, 1963**; Willman and Buschbach, 1975)
Augusta Member of "lower Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 59) stated "The Augusta Member of the Joachim ...is here named for the village of Augusta, which is 5 miles west of the type section...in a cut on the Chicago, Rock Island and Pacific Railroad, at the foot of the bluffs along the south side of the Missouri River, a mile southwest of the hamlet of St. Albans, Franklin County, Missouri."

The Augusta Member is the only member of the "lower Joachim Dolomite" north of the Cape Girardeau County area. It is characterized by interbedded sandstone, sandy dolomite, and dolomite, reflecting the transitional nature of the Joachim - St. Peter boundary. It overlies the St. Peter Sandstone in most of its extent, and is overlain by the shaly dolomite of the Boles Member of the "middle Joachim Dolomite."

Aux Vases Sandstone

Aux Vases sandstone (**Keyes, 1892**)
Aux Vases sandstone (Weeks, 1902) "= Ferruginous sandstone"
Aux Vases member of Chester group (Buehler, 1907)
Aux Vases sandstone ("Ferruginous sandstone") (Weller, 1920)
Aux Vases sandstone (Weller and St. Clair, 1928; Swann, 1950) "= Brewerville formation of Illinois"
Aux Vases sandstone (Spreng, 1961)
Aux Vases Sandstone (Swann, 1963) - in Illinois; at top of Valmeyeran (Meramecian) Series
Aux Vases Sandstone (Thompson, 1979a, 1986; Sable, 1979) - at top of Meramecian Series
Aux Vases Sandstone (Maples and Waters, 1987; Thompson, 1995) - Chesterian Series

Mississippian System (Chesterian Series)

Type section: Keyes (1892, p. 295; 1894, p. 72) proposed the name Aux Vases for the "Ferruginous sandstone" of Shumard and others. It was named for exposures on River Aux Vases, Ste. Genevieve County, Missouri. Thompson (1986, p. 121) stated "The type section...consists of exposures in the bluff at the mouth of River Aux Vases, N½ NW¼ sec. 13, T. 37 N., R. 9 E... Kaskaskia 7½' Quadrangle."

Prior to 1963, the Aux Vases Sandstone was the basal formation of the Chesterian Series. It underlies the Renault Formation and overlies the Ste. Genevieve Limestone. Swann (1963, p. 21) placed the Aux Vases at the top of the underlying Meramecian Series, based on the facies relationship of Aux Vases strata to uppermost Ste. Genevieve units to the east in eastern Illinois and Kentucky. This relationship was acknowledged by Thompson (1986). However, more recent work has concluded that the St. Louis - Ste. Genevieve boundary is the best place to put the Meramecian - Chesterian boundary, and therefore, Ste. Genevieve and Aux Vases strata are now assigned to the lower Chesterian, instead of upper Meramecian, Series (Maples and Waters, 1987).

Auxvasse Creek sandstone

Auxvasse Creek sandstone member of Callaway formation (Counselman, 1935) = ***"Hoing sandstone"***
Auxvasse Creek sandstone member of Callaway limestone (Kindle and Miller, 1939) = ***"Hoing sandstone"***
Auxvasse sandstone (Croneis, 1944)
Auxvasse Creek sandstone of Callaway (Stainbrook, 1945) = "Hoing sandstone of Iowa"
Devonian System (Middle Devonian Series)

Type section: Conselman (1935, p. 108, 110-113) proposed this name for the basal member of the Callaway limestone in his Auxvasse Creek quadrangle, which is the southeast quarter of the area comprising the Fulton 15' Quadrangle, in Callaway County, Missouri. It is named for Auxvasse Creek in that area. This sand has also been called the **Hoing sandstone of the Cedar Valley Limestone** (Thompson, 1993, p. 132).

Avant limestone

Avant limestone member of Iola limestone (Moore, 1937) - in Kansas; = ***Raytown Limestone Member of Iola Formation***
Raytown (Avant) limestone member of Iola limestone (Moore, 1949) - in Kansas; = ***Raytown Limestone Member***
Pennsylvanian System (Missourian Series)

Avoca Limestone Member of Lecompton Formation, Shawnee Group

Avoca Limestone of Lecompton limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska
Avoca limestone member of Lecompton limestone (Moore, 1932)
Avoca limestone member of Lecompton limestone (Moore, et al., 1951) - in Kansas
Avoca member of Lecompton formation (Searight and Howe, 1961)
Avoca Limestone Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Avoca Limestone Member of Lecompton Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Avoca Limestone Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Moore (1936, p. 177) located the type section "On south fork Weeping Water Creek, 3 miles east of Avoca, Otoe county, Nebraska."

Thompson (1995, p. 124-125) stated "The Avoca Limestone Member...consists of two or more beds of argillaceous limestone that are separated by shaly partings. The limestone contains an abundance of fusuline foraminifera. The thickness of the member ranges from 3 to 5 ft in southern Holt County and is of comparable thickness elsewhere in northwestern Missouri." The Avoca Limestone Member overlies the King Hill Shale Member of the Lecompton Formation, and is overlain by the Tecumseh Shale.

B

Bachelor Creek Limestone Member of Howard Formation, Sacfox Subgroup, Wabaunsee Group

Bachelor Creek limestone member of Howard limestone (**Moore, 1932**, 1936, 1949; Moore, et al., 1951) - in Kansas

Bachelor Creek member of Howard formation (Searight and Howe, 1961)

Bachelor Creek Limestone Member of Howard Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas

Bachelor Creek Limestone Member of Howard Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 205) described the type section as along "Bachelor Creek, sec. 33, T. 25 S., R. 11 E., about 5 miles east of Eureka, [Greenwood County] Kans."

Thompson (1995, p. 128) stated "The Bachelor Creek Limestone Member ...is present in only one locality in Holt County. Here, it is a dense, bluish-gray limestone, which is only a few inches thick." This section is at the SW NE 32, 60N-38W, in the east bluff of the Missouri River valley at the "southeast edge of Forest City." The Bachelor Creek Limestone Member overlies the Severy Formation, and is overlain by the Aarde Shale Member of the Howard Formation.

Bachelor Formation

Bachelor Formation (**Mehl, 1960**, 1961; Thompson and Fellows, 1970; Sable, 1979; Thompson, 1984, 1986)

Bachelor Sandstone (Thompson, 1984) - in east-central and southeastern Missouri

Mississippian System (Kinderhookian Series)

Type section: Thompson (1986, p. 28) stated "The type section of the Bachelor Formation was defined by Mehl (1960, p. 94) as an exposure in a streambed in the SE¼ NW¼ SW¼ sec. 9, T. 48 N., R. 8 W., Callaway County, Missouri..."

Thompson (p. 32) added "A thin (1-in. to 1-ft) widespread sandstone at the base of the Mississippian carbonate section has been variously correlated (depending on the backgrounds of the individuals involved, and the areas studied) with the Sylamore Sandstone of Arkansas (a facies of the Upper Devonian Chattanooga Shale) and with the Lower Mississippian Bushberg Sandstone of eastern Missouri. Mehl (1960, 1961) reported that the sandstones called Sylamore in Missouri are Late Devonian in some cases and Early Mississippian (middle Kinderhookian) in others...The age difference was too great to attribute to transgression (Late Devonian to middle Kinderhookian); therefore, Mehl proposed the name **Bachelor** to replace "Sylamore" for the basal Mississippian sandstone beneath the Kinderhookian limestones in Missouri."

The Bachelor Formation overlies strata from as old as Ibexian (Lower Ordovician) to Late Devonian, and is overlain by Kinderhookian carbonates (Compton Limestone to "Chouteau limestone undifferentiated") except for east-central Missouri where it is directly overlain by the Osagean Fern Glen Formation.

Backbone Limestone

Backbone Limestone (Ozora) (Droste and Shaver, 1987) - in Illinois; = ***Little Saline Limestone***

Devonian System (Lower Devonian Series)

Backwater Creek shale

Backwater (*sic.*) Creek shale member of Fort Scott formation (Clair, 1943) = ***upper shale of Little Osage Shale***

Pennsylvanian System (Desmoinesian Series)

This was a miss spelling of **Blackwater Creek** by Clair (1943). See "Blackwater Creek shale."

<u>**Bagnell till**</u>

Bagnell till (Keyes, 1932b, 1941b)

Quaternary System

A name introduced by Keyes (1932b, p. 197-220) for a very old sheet of glacial till in Missouri. Keyes (1941b, p. 156) used this term for till at the top of his Gravoisan series.

Bailey Formation

Bailey limestone (**Ulrich, 1904a**; Keyes, 1914; Savage, 1920a) = ***Bailey and Little Saline formations***
Bailey limestone (Dake, 1918; Tansey, 1922; Branson, 1944a)
Bailey limestone <u>of Helderbergian series; New Scotland equivalent</u> (Savage, 1920b)
Bailey Formation (Croneis, 1944; Thompson, 1993, 1995)
Bailey formation (Koenig, 1961a)
Bailey Formation (Amsden, 1962; 1963) "= Haragan/Bois d"Arc Formation of Oklahoma"

Devonian System (Lower Devonian Series)

Type section: The Bailey Formation was named by Ulrich (1904a, p. 110) from an exposure at the former Bailey's Landing on the west bluff of the Mississippi River valley, Perry County, Missouri, a short distance above the present Red Rock Landing. Croneis (1944, p. 105) added "Here the Bailey beds crop out in a fault block tilted toward the river..." Thompson (1993, p. 76) located this section as "...in the center SE¼ sec. 11, T. 35 N., R. 12 E., Perry County, Missouri, Crosstown and Rockwood Ill.-Mo. 7½' quadrangles..."

A lower Devonian formation in eastern Missouri, the Bailey Formation overlies the Middle - Upper Silurian Bainbridge Formation, and is overlain by the Lower Devonian Little Saline Limestone or the Clear Creek Chert. The Bailey has been at times considered to be Late Silurian in age (Droste and Shaver, 1987), and it was variously called "Delthyris Shaley limestone" and "Lower Helderberg" before the name Bailey was proposed.

Bainbridge Formation

Bainbridge limestone (**Ulrich, 1904a**) = ***Sexton Creek? and Bainbridge formations***
Bainbridge (Niagara) limestone (Savage, 1909)
Bainbridge limestone (Savage, 1926) "= Joliet - Port Byrn of Illinois"
Bainbridge formation (Branson and Mehl, 1933b; Branson, 1944b; Martin, et al., 1961a)
Bainbridge formation (Ball and Maxwell, 1936) "= Henryhouse formation of Oklahoma"
Bainbridge formation (Ball, 1942) "= Lafferty and St. Clair formations of Arkansas"
Bainbridge group (Lowenstam, 1949; Berry and Boucot, 1970)
"basal limestone of the Bainbridge Formation" (Satterfield and Thompson, 1969) = ***St. Clair Limestone Member***
Bainbridge Formation (2 members) (Satterfield and Thompson, 1969; Rexroad and Craig, 1971; Satterfield and Thompson, 1975; Thompson, 1993, 1995)
"lower massive limestone of the Bainbridge Formation" (Satterfield and Thompson, 1975) = ***St. Clair Limestone Member***
Bainbridge Limestone (Bounk, 1975)
Bainbridge Group (Ausich, 1987)

Silurian System (Wenlockian - Ludlovian Series)

Type section: Ulrich (1904a, p. 110-111) proposed the name Bainbridge for Silurian beds occurring in the Mississippi River bluffs above and below the small town of Bainbridge, Cape Girardeau County, Missouri. Thompson (1993, p. 40) stated that "The type section of the Bainbridge Formation is a composite of two sections in and south of the Trail of Tears State Park, Cape Girardeau County, Missouri, Ware 7½' Quadrangle. All but the basal Seventy-Six Shale Member of the Bainbridge is exposed at the type section. The St. Clair Member is exposed in Trail of Tears State Park, in a stream bed along the south entrance road just west of the caretakers house, SE¼ NW¼ SE¼ sec. 14, T. 32 N., R. 14 E. The overlying Moccasin Springs Member is exposed in the SE¼ SE¼ NW¼ sec. 24, in the head of a small box canyon in the west bluff of the Mississippi River Valley, above the Burlington-Northern tracks, approximately 1 mi south of Moccasin Springs..., 2 mi north of the former location of the small village of Bainbridge."

Representative of the Niagaran Series (upper Llandovery through to the Pridoli Series in the World Standard Section) in southeastern Missouri, the Bainbridge Formation overlies the lower Silurian Sexton Creek Limestone and is overlain by the Lower Devonian Bailey Formation. Including more strata when originally proposed than it does today, Ulrich (1911) restricted the Bainbridge to beds of late Niagaran age underlying the Bailey and overlying the Brassfield (Sexton Creek). Lowenstam (1949, p. 7-18) raised the Bainbridge Formation in Illinois to a group with two formations, the lower unit called the St. Clair Formation (St. Clair Limestone Member in Missouri), and the upper unit the Moccasin Springs Formation (Moccasin Springs Member in Missouri). A third member, the **Seventy-Six Shale Member**, separates the underlying Sexton Creek Limestone from the basal Bainbridge St. Clair Limestone Member.

Baird Mountain Limestone Member of Northview Formation

Mississippian System (Kinderhookian Series)

Type section: The Baird Mountain Limestone Member of the Northview Formation was named by Thompson and Fellows (1970) from (Thompson, 1986, p. 60) "...a large quarry on Baird Mountain...immediately south of Table Rock Lake dam, SW¼ NW¼ sec. 26, T. 22 N., R. 22 W., Taney County, Missouri..."

Thompson (1986, p. 60) added "The Baird Mountain Limestone Member of the Northview Formation has been recognized only in the southern part of southwestern Missouri, and northwestern Arkansas. Characteristically a red argillaceous, fossiliferous limestone, usually 1 to 2 ft thick, it is quite distinct from the greenish-gray argillaceous limestone [of the Northview Formation] below and the red and gray mottled limestone of the Pierson above..."

Bandera flagging

Bandera flagging (Greene and Pond, 1926) = ***Bandera Quarry Sandstone Member of Bandera Shale***

Pennsylvanian System (Desmoinesian Series)

Bandera Quarry Sandstone Member of Bandera Shale, Appanoose Subgroup, Marmaton Group

Bandera quarry sandstone of Bandera shale (**Jewett, 1941**) - in Kansas
Bandera quarry sandstone member of Bandera shale (Moore, 1948)
Bandera Quarry sandstone member of Bandera formation (Greene and Searight, 1949)
Bandera Quarry sandstone member of Bandera shale (Moore, et al., 1951) - in Kansas
Bandera Quarry member of Bandera formation (Searight and Howe, 1961)
Bandera Quarry ("Peru", "Polo") sandstone (Anderson and Wells, 1968)
Bandera Quarry Sandstone Member of Bandera Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Bandera Quarry Sandstone Member of Bandera Formation (Gentile, 1976)
Bandera Quarry Member of Bandera Shale (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Jewett (1941, p. 323), he stated that the type section was located at the "...Bandera quarries, near the center of the north line of the SW¼ sec. 29, T. 25 S., R. 23 E., Bourbon county, Kansas."

Thompson (1995, p. 107-108) stated that this member "...composed of shale and sandstone, occupies the upper part of the formation in many places in western and northern Missouri."

Bandera Shale of Appanoose Subgroup, Marmaton Group

Bandera shales (Adams, 1903)
minor coal of Bandera shales (Adams, 1903) = ***Mulberry Coal Bed***
Bandera shale member of Pleasanton formation (McCourt, 1917; Greene, 1933)

Bandera shale member of Marmaton formation (Moore and Haynes, 1917) - in Kansas
Bandera shale of Henrietta Group (3 members) (McQueen and Greene, 1938) = ***Bandera Shale and Amoret and Lake Neosho Shale Members of Altamont Formation***
Bandera shale of Pleasanton group (Cline, 1941)
Bandera shale of Marmaton group (Jewett, 1941; Moore, et al., 1951) - in Kansas
Bandera shale member of Altamont limestone (Clair, 1943)
Bandera shale of Marmaton group (Branson, 1944b) = ***Bandera Shale and Amoret and Lake Neosho Members of the Altamont Formation***
Bandera formation of Marmaton group (1 member) (Greene and Searight, 1949; Cline and Greene, 1950; Searight and Howe, 1961)
Bandera Shale of Marmaton Group (1 member) (Jewett, et al., 1968) - in Kansas
Bandera Formation of Marmaton Group (1 member) (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Adams (1903, p. 32) stated "The term Bandera shales is here applied to the rocks occupying the interval between the Pawnee limestone and the Altamont limestone..." Jewett (1941, p. 323) stated "The name Bandera is taken from old Bandera station in sec. 29, T. 25 S., R. 23 E., Bourbon County, Kansas, near which flagstone quarries in the formation are located. Unfortunately a continuous and complete section is not observable there."

Thompson (1995, p. 107) stated "The succession of beds within the Bandera Formation exhibits considerable variation along the line of outcrop from the Kansas state line to the Missouri-Iowa state line..." The unit includes an underclay, the Mulberry Coal Bed, a zone of thin, alternating fossiliferous limestone and shale beds, and the Bandera Quarry Sandstone Member. The Bandera varies from 2 to 21 ft in thickness.

The Bandera Shale overlies the Coal City Limestone Member of the Pawnee Formation, and is overlain by the Amoret Limestone Member of the Altamont Formation. Where the latter is missing, the Lake Neosho Shale Member of the Altamont Formation and the upper beds of the Bandera are difficult to distinguish, and the term **Lake Neosho-Bandera Shales undifferentiated** is used.

Barclay limestone

Barclay limestone (Adams, 1903) in Kansas; = ***Bern Formation***
Pennsylvanian System (Virgilian Series)

Barnhart formation

Barnhart formation (Cooper, 1956) - replaced "Decorah" in Missouri; = ***Spechts Ferry Formation of Decorah Group***
Ordovician System (Mohawkian Series)

Barry sandstone

"Barry sandstone"
Ordovician System (Ibexian Series)

This is a sandstone in the upper part of the Roubidoux Formation identified in many well logs of the Missouri Depoartment of Natural Resources, Division of Geology and Land Survey, in Barry County, southwestern Missouri.

Bartlesville sandstone

Clear Creek or Bartlesville sandstone member of Cherokee formation (Greene, 1933) = ***Warner - Bluejacket Sandstones***
Bluejacket ("true Bartlesville") (Bartle, 1938) = ***Bluejacket Sandstone***
upper Bartlesville sandstone (Bartle, 1941) = ***Bluejacket Sandstone***
"true Bartlesville sandstone member of lower Cherokee formation" (Clair, 1943) = ***Warner Sandstone?***
"so-called Bartlesville sandstone" (Clair, 1943) = ***Bluejacket Sandstone?***
Bluejacket Formation ("Bartlesville" sandstone) (Anderson and Wells, 1968)
Pennsylvanian System (Desmoinesian Series)

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basal Mississippian sandstone

"basal Mississippian sandstone" (Sohn, 1961) = ***Bachelor Formation***

Mississippian system (Kinderhookian Series)

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basal Pennsylvanian conglomerate

"basal Pennsylvanian conglomerate" = ***Graydon Conglomerate***

Pennsylvanian System (Atokan and/or Desmoinesian Series)

This was the "wastebasket" term used for the basal unit of the Pennsylvanian succession where it was a chert conglomerate. It occurs in widespread localities from central Missouri to far western Missouri, and may actually be different ages at different localities. Today this is called the **Graydon Conglomerate**.

Basal sandstone

Basal sandstone (Gallaher, 1900) = ***Lamotte Sandstone***

Cambrian System (Upper Cambrian Series)

This is a term used by Gallaher (1900, p. 88-90) for the **Lamotte Sandstone**.

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basal shale member

basal shale member of Sulphur Springs formation (Weller and St. Clair, 1928) = ***unnamed lower shale of Sulphur Springs Group***

Devonian System (Upper Devonian Series)

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basal silty and shaley zone

"basal silty and shaley zone in upper Bonneterre Formation" (Howe, et a., 1972) = ***Sullivan Siltstone Member of Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Howe, et al. (1972) used this term for the unit that was named the Sullivan Siltstone Member of the Bonneterre Formation by Kurtz, et al. (1973).

Basset Member

Basset Member of Little Cedar Formation of Cedar Valley Group (Witzke, et al., 1988) **-** in Iowa
Basset Member of Little Cedar Formation of Cedar Valley Group (Woodruff, 1990) **-** in northeastern Missouri; = ***Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

Batesville Sandstone

Batesville formation (Penrose, 1891) **-** in Arkansas
Batesville formation (Simonds, 1891) in Arkansas; = ***Wedington Sandstone Member of Fayetteville Formation***
Batesville sandstone (Croneis, 1930) = ***Hindsville and Batesville formations***
Batesville formation (Clark, 1941) **-** unpublished, first reference in Missouri
Batesville formation (Branson, 1944b; Spreng, 1961)
Batesville sandstone member of Carterville formation (Weller, et al., 1948)
Batesville formation (Garner, 1967) = ***Hindsville and Batesville formations***
Limestone facies of Batesville Sandstone (Ogren, 1968) = ***Hindsville Limestone***
Batesville Formation (Thompson, 1972, 1986)
Batesville Sandstone (Thompson, 1995)

Mississippian System (Chesterian Series)

Type section: The Batesville Sandstone was named by Branner from exposures near Batesville, Arkansas, and originally described by Simonds *in* Branner and Simonds (1891, p. 49-53).

In southwestern Missouri. the Batesville, usually a fine-grained reddish sandstone, overlies the Hindsville Limestone (which in Arkansas is often regarded as the basal member of the Batesville) or locally the Keokuk Limestone, and underlies the Fayetteville Formation. Clark (1941) mapped the Batesville and associated Chesterian formations in the southeastern part of the Cassville 15' Quadrangle, preserved as outliers within a down-dropped fault block, primarily in Barry County, Missouri. It has also been recognized in Newton County and possibly in Greene County, southwestern Missouri, and more recently this sandstone, along with the Hindsville Limestone, was identified in northern Pulaski County (Thompson and Robertson, 1993, p. 15).

Beauvais Sandstone

Beauvais formation (Dake, 1918) - from unpublished ms. of Weller
Beauvais sandstone (Weller and St. Clair, 1928)
Beauvais formation (Croneis, 1944) "= Wittenberg shales" of Perry County; = Marcellus
Beauvais sandstone (Hoover, 1944) "= Meisenheimer of Illinois"
Beauvais formation (Koenig, 1961a) "= basal member of Lingle formation in Illinois"
Beauvais Sandstone (Summerson and Swann, 1970; Thompson, 1993, 1995)

Devonian System (Middle Devonian Series)

Type section: The Beauvais Sandstone was named by Dake (1918, p. 174) from an unpublished manuscript by Stuart Weller. Weller and St. Clair (1928) noted that the type exposure was along Little Saline Creek in Beauvais Township, Ste. Genevieve County, Missouri, and the township name was proposed for the formation. Dake stated (p. 175) "... the best exposure being on the south bank of the Little Saline, a quarter mile east of the Boarman School road." Thompson (1993, p. 102) located the type section along Little Saline Creek, "...located approximately in the NW¼ SE¼ SE¼ sec. 21, T. 36 N., R. 9 E., in southeastern Ste. Genevieve County, Missouri, Minnith 7½' Quadrangle, south and west of the Ozora Marble Company quarries."

The Beauvais Sandstone is overlain by the St. Laurent Limestone and overlies the Grand Tower Limestone, both also of Middle Devonian age. Weller and St. Clair (1928, p. 148) defined the Beauvais as the conspicuous sandstone formation lying immediately above the Grand Tower limestone (which was mined at Ozora). They noted that the Beauvais is very similar in appearance to the St. Peter Sandstone, which is exposed not too many miles to the east.

Beckett Limestone of Plattin Group

Beckett limestone <u>of Plattin group</u> (Larson, 1951; Twenhofel, et al., 1954)
Beckett Formation <u>of Plattin Subgroup of Platteville Group</u> (McCart, 1986)
Beckett Limestone <u>of Plattin Group</u> (Thompson, 1991, 1995; Spreng and McCart, 1994)

Ordovician System (Mohawkian Series)

Type section: The Beckett was originally proposed by Larson (1951, p. 2049-2052) for a "formation of fine-textured calcite limestone having many layers of intraformational calcarenite and carbonate pebble conglomerate" in his Plattin group. Thompson (1991, p. 147) located the type section as north of the large road cuts along U.S. Highway 61, NE¼ sec. 28, T. 38 N., R. 8 E., Weingarten 7½' Quadrangle. According to Larson, "...much of the lower Beckett is concealed at the type section but its relation to bounding formations is clear."

Thompson (1991, p. 110) revived the concept originally proposed by Larson (1951) of the Plattin Group composed of four (and locally five) formations. The Beckett Limestone, usually the second above the base of the group, overlies the basal Plattin Bloomsdale Limestone and is in turn overlain by the Hager Limestone. The name is derived from the Beckett Hills in eastern Ste. Genevieve County, Missouri.

<u>Bedford limestone</u>

Bedford oolitic limestone (Hopkins and Siebenthal, 1896) in Indiana; **= *Salem Formation***
Bedford limestone (Cumings, 1901) **= *Salem Formation***

Mississippian System (Meramecian Series)

Beech Creek Limestone Member of Golconda Formation

Beech Creek (Barlow) limestone (Potter, et al., 1958)
Beech Creek Limestone of Golconda Group (Swann, 1963)
Beech Creek Limestone Member of Golconda Formation (Shaver, et al., 1970) - in Illinois, "= Beech Creek Limestone of Indiana"
Beech Creek Limestone Member of Golconda Formation (Thompson, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Shaver, et al. (1970, p. 10) stated "The Beech Creek Limestone was named by Malott (1919, p. 11-15) for exposures along Beech Creek in Greene County [Indiana]. Later he (1952, p. 73-75) designated a type section at Ray's Cave in the NE¼ NW¼ sec. 13, T. 7 N., R. 4 W."

Thompson (1995, p. 90) stated "The Beech Creek Limestone Member of the Golconda Formation is a 5-20-ft thick, dark-gray to brown limestone, which contains an abundance of foraminifera, small gastropods, and pelecypods." In Missouri, the Beech Creek Member is overlain by the Fraileys Shale Member of the Golconda Formation, and overlies the Cypress Formation.

Beecher Member

Beecher Member of Dunleith Member of Kimmswick Subgroup (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***lower part of "Lower Kimmswick Limestone"***
Ordovician System (Mohawkian Series)

This was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Beech member

Beech member of Bainbridge formation (Ball, 1942) = ***lower part of Moccasin Springs Member of Bainbridge Formation***
Silurian System (Wenlockian and Ludlovian Series)

Beekmantown

Beekmantown (Beekmantownian) (Clark and Schuchert, 1899) = ***Ibexian Series***
Beekmantown system (Dake (1921) = ***Roubidoux to Powell***
Beekmantown (Ozarkian) group (Edson, 1927)
Beekmantown group (Folger, 1928)
Beekmantown (Canadian) (Ireland, 1936) = ***Roubidoux to Powell***
Ordovician System (Ibexian Series)

An eastern (New York) term for a group of lowermost Ordovician formations, "Beekmantown" was occasionally used in Missouri up to the 1930's as a general time term for lower Ordovician rocks in Missouri. It is synonymous with **Canadian,** and more recently **Ibexian**.

Beil Limestone Member of Lecompton Formation, Shawnee Group

Beil limestone of Lecompton limestone member of Shawnee formation (**Condra, 1930**) - in Nebraska
Beil limestone member of Lecompton limestone (Moore, 1932)
Biel (*sic.*) limestone member of Lecompton limestone (McQueen and Greene, 1938; Branson, 1944b)
Beil limestone of Lecompton limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Beil limestone member of Lecompton formation (Moore, 1948)
Beil limestone member of Lecompton limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Beil member of Lecompton formation (Searight and Howe, 1961)
Beil Limestone Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska

Beil Limestone Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Beil Limestone Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Originally named the "Cullom limestone of the Lecompton limestone member of the Shawnee formation," by Condra (1927), Condra (1930) renamed it the Beil limestone member from (Moore (1936, p. 176) the "Beil farm, on Missouri river bluff, mouth of Kanosha Creek, south of Rock Bluff , Nebraska."

Thompson (1995, p. 124) stated "The Beil Limestone Member...is composed of several layers of fossiliferous limestone, which are interbedded with calcareous shale. The member is 4 to 5 ft thick." The Beil Limestone Member overlies the Queen Hill Shale Member, and is overlain by the King Hill Shale Member of the Lecompton Formation.

Bell Mountain Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Bell Mountain ash flows (Anderson, 1962)
Bell Mountain Rhyolite (Berry, 1976; Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SE¼ NE¼ sec. 2, T. 33 N., R. 1 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "The Bell Mountain Rhyolite is a maroon to dark maroon ash-fall tuff containing lapilli and a 6-15 ft thick zone containing lithophysae. The formation is nearly 100 ft thick and is widely exposed in the Taum Sauk area." This unit was called "Bell Mountain ash flows" by Anderson (1962), and the "upper part of Unit D, tuff of Stouts Creek" by Anderson (1970).

Beloit limestone

Beloit limestone (Keyes, 1937a) = ***Joachim and Plattin formations***
Ordovician System (Mohawkian Series)

Proposed originally by Sardeson (1896, p. 356-368) for middle Ordovician exposures at Beloit, Wisconsin, overlying the St. Peter Sandstone, Keyes (1937a) used the name "Beloit" for both the Joachim Dolomite ("Beloit dolomite") and Plattin Limestone ("Beloit limestone") in Missouri.

Benton sand

Tertiary System

This was a term used by Marbut (1902, p. 23-27) for sands which he stated underlie the whole area of Crowleys and Benton ridges, and are of late Tertiary age, probably "Lafayette". He also calls them "Lafayette sands". They underlie the Piketon or Lafayette (Mounds) gravel or the loess, and overlie the Idalia shale or clay. Wilmarth (1938) stated they appear to belong to the Wilcox Group of Eocene age. They were named for exposures at Benton Ridge, Scott County, Missouri.

Bern Formation of Nemaha Subgroup of Wabaunsee Group

Bern limestone (3 members) (**Moore and Mudge, 1956**)
Bern formation (3 members) (Searight and Howe, 1961)
Bern Limestone (3 members) (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Bern Formation (3 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Moore and Mudge (1956), they stated (p. 2277) "The Bern limestone is named from the town of Bern in northern Nemaha County, Kansas. The type section is exposed in a road cut in the SE.¼ SE.¼ of sec. 7, T. 1 S., R. 13 E., about 0.5 mile north and 1 mile west of Bern."

This includes the lower part of the "**Willard shales**" of Branson (1944b). Thompson (1995, p. 129) stated "The Bern Formation contains three members...The total thickness of the Bern is about 10 ft." The Bern Formation overlies the Silver Lake Shale Member of the Scranton Formation, and is overlain by the Auburn Shale.

Bethany Falls Limestone Member of Swope Formation, Bronson Subgroup, Kansas City Group

"Bethany Falls" limestone (**Broadhead, 1866**)
Bethany limestone (Broadhead, 1874; Adams, 1896)
Bethany Falls limestone (Gallaher, 1900)
Bethany Falls limestone (Haworth, 1898; Hayworth and Bennett, 1908) - in Kansas; = ***Hertha Formation***
Bethany limestone (Keyes, 1896c) = ***Kansas City Group "between Bourbon and Chanute"***
Bethany limestone (Keyes, 1898b) = ***Hertha Formation***
Bethany limestone (Keyes, 1899, 1941f) = ***Hertha to Winterset?***
Bethany Falls limestone member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917) = ***Bronson Subgroup, or at least Swope Formation***
Bethany Falls limestone member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Bethany Falls Limestone Member, or entire Swope Formation***
Bethany Falls limestone member of Kansas City formation (Condra, 1927) - in Nebraska; = ***Bethany Falls Limestone Member, or entire Swope Formation***
Bethany Falls limestone (Condra, et al., 1932) = ***Swope Formation***
Swope limestone member of Bethany Falls limestone (Condra, et al., 1932)
Bethany Falls limestone member of Swope formation (Jewett, 1932) - in Kansas
Bethany Falls limestone member of Swope limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Bethany Falls limestone (Swope) (Moore, 1937)
Bethany Falls limestone (McQueen and Greene, 1938; Branson, 1944b)
Bethany Falls limestone of Swope formation (Condra and Scherer, 1939) - in Nebraska
Bethany Falls limestone member of Swope formation (Clair, 1943)
Bethany Falls limestone (Wanless, 1955) = **Carlinville limestone of Illinois**
Bethany Falls member of Swope formation (Searight and Howe, 1961)
Bethany Falls Limestone (Payton, 1966)
Bethany Falls Limestone Member of Swope Formation (Payton, 1966; Gentile, 1976; Thompson, 1995)
Bethany Falls Limestone Member of Swope Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Bethany Falls Limestone Member of Swope Limestone (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Bethany Falls Limestone Member of Swope Formation (Mossler, 1971) - in Kansas
Bethany Falls Limestone Member of Coffeyville Formation (Watney, et al., 1989) - in southern Kansas

Pennsylvanian System (Missourian Series)

Type section: Originally named by Broadhead (1866), Moore (1936, p. 87) described the type section as at the "Falls on Big Creek at Bethany Mo. [Harrison County]" No better location was given.

Thompson (1995, p. 114) stated "The Bethany Falls Limestone Member...is probably the most extensively quarried Pennsylvanian limestone in western Missouri. It is exposed as a single massive ledge. A pronounced parting separates the wavy-bedded lower part of the member from an upper, generally thicker, nodular part. The uppermost part of the member is oolitic over wide areas. The Bethany Falls is chert-free in most areas and is about 20 ft thick."

McQueen and Greene (1938) and Branson (1944b) did not recognize the Swope Formation, but placed the lower two members in the "Ladore shale," leaving the Bethany Falls to stand alone as a formation. It was, however, equivalent to the Bethany Falls member of others, and not the Bronson Subgroup as used prior to proposal of the Swope. The Bethany Falls Limestone Member overlies the Hushpuckney Shale Member of the Swope Formation, and is overlain by the Galesburg Shale.

Names like **Bethany limestone**, or **Bethany Falls limestone member of Kansas City formation** were first proposed (Keyes, 1896c; Hinds and Greene, 1915) for the succession of thick limestone and thinner shales that comprise what we today call the **Bronson Subgroup** of the Kansas City Group. Moore (1932) redefined the Kansas City units, and confined the name Bethany Falls to the upper limestone member of the "Swope limestone."

Bethel Member of Paint Creek Formation

Bethel sandstone (Weller, 1939) = ***Yankeetown Sandstone***
Bethel Sandstone of Paint Creek Group (Swann, 1963) - in Illinois
Bethel Member of Paint Creek Formation (Thompson, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Atherton, et al. (1975, p. 153) stated "The Bethel Sandstone (Butts, 1917, p. 63-64) is named for Bethel School, 3.5 miles west of Marion, Crittenden County, Kentucky.

Thompson (1986, p. 135) noted "Spreng (1961, p. 75) described the middle part of the Paint Creek Formation in Missouri as a shale with a few limestone beds in the upper part and noncalcareous red claystone in the lower part. It is 15 to 30 ft thick." In Illinois (Atherton, et al., 1975, p. 153) "It is dominantly sandstone...but it grades to shale to the west". In Missouri, the Bethel Member overlies the Downeys Bluff Limestone member, and is overlain by the Ridenhower Limestone Member of the Paint Creek Formation.

Bevier Coal Bed of Bevier Formation, Cabaniss Subgroup, Cherokee Group

Bevier coal (**McGee, 1888**; Gordon, 1896)
"lower Bevier" (Hinds, 1912) = ***Wheeler Coal Bed***
Bevier or Williams coal of Cherokee formation (Greene, 1933)
Bevier coal of Lagonda shale and sandstone of Upper Cherokee formation (McQueen and Greene, 1938)
Bevier coal of Cherokee shale (Pierce and Courtier, 1938) - in Kansas
coal of Bevier formation (Moore, 1948)
Bevier coal of Bevier cyclothem (Moore, 1949; Moore, et al., 1951) - in Kansas
Bevier coal (Wanless, 1955) = **Indiana coal No. 4**
Bevier coal of Bevier formation (Searight and Howe, 1961)
Bevier coal of Senora Formation (Branson, et al., 1965) - in Oklahoma
Bevier coal of Cabaniss Formation (Jewett, et al., 1968) - in Kansas
Bevier coal of Swede Hollow Formation (Swade, 1985) - in Iowa
Bevier Coal Member of Swede Hollow Formation (Ravn, et al., 1984) - in Iowa
Bevier coal of "Bevier member" of Banzet formation (Brenner, 1989) - in Kansas
Bevier coal bed of Bevier Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Howe (1956, p. 78) stated "The name Bevier was originally applied by McGee (1888, p. 328-336) to the coal mined extensively at Bevier, Macon County, Missouri, after which town it takes its name..."

Robertson (1971, p. 19) stated "The coal bed known commercially as the Bevier contains Missouri's most important coal deposits....

"The commercial Bevier bed...consists of two benches separated by a thin 'binder' of clay or sandstone. In the Bevier Field the 'binder' ranges in thickness from 1 to 9 inches...West of the Bevier Field proper, this parting thickens, splitting the Bevier into two beds. In western Chariton County, this parting is 10 ft or more thick...the commercial Bevier bed of the Bevier Field is referred to as the Bevier-Wheeler. Beyond the western margin of the Bevier Field two coal beds are recognized. These are the Bevier (upper) and the Wheeler (lower)."

Bevier Formation of Cabaniss Subgroup, Cherokee Group

Bevier cyclothem (**Abernathy, 1937**; Moore, et al., 1951) - in Kansas
Bevier formation (McQueen, 1943; Searight and Howe, 1961)
Bevier - Lagonda Formations (Gentile, 1976) = ***Bevier and Lagonda Formations*** (where Bevier Coal Bed is hard to identify or very thin)
"Bevier member" of Banzet formation (Brenner, 1989) - in Kansas
Bevier Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: The Bevier Formation was originally named the "Bevier cyclothem" by Abernathy (1937) to include the coal bed named "Bevier" by McGee (1888). McQueen (1943, p. 89) stated "The name Bevier was applied by Gordon [1896] to a comparatively thick and economically important coal, which is extensively mined in the vicinity of Bevier, Macon County, and in the contiguous counties of north central Missouri." McQueen extended the definition of Bevier to include the underlying underclay and black and gray shales **above** the coal. Howe (1956, p. 78) added "The name Bevier was originally applied by McGee (1888, p. 328-336) to the coal mined extensively at Bevier, Macon County, Missouri, after which town it takes its name..."

The Bevier Formation consists of mottled shale, fossiliferous earthy limestone and dark shale in western Vernon County. Searight and Howe (1961, p. 88-89) added "From western Henry County northward... these three units are overlain by an underclay which is laterally displaced by a few feet of stigmarian sandstone which in turn thins but extends into western Randolph County as the 'bench rock' between the Wheeler and Bevier coal beds...Westward beyond western Henry County, the boundary between the Bevier and Lagonda formations is obscure owing to absence of the Bevier coal bed."

The Bevier Formation overlies the Wheeler Coal Bed of the Verdigris Formation, and is overlain by the Lagonda Formation. Often, where the "bench rock" is very thin, or only a shale parting, the Wheeler and Bevier coals have been lumped together as one unit, and only the upper part of the coal is the "Bevier Formation."

<u>Big Buffalo series</u>

Big Buffalo series (Ulrich and Bassler, 1915; Grohskopf, et al., 1939) = ***Everton - Joachim***

Ordovician System (Whiterockian and lower Mohawkian Series)

This series, now discredited, was thought to fall between Chazyan and Beekmantown (Canadian) in age. Ulrich (1911, p. 27), in his general time scale, grouped together (descending) the Joachim of Missouri, the St. Peter of Minnesota, and the Everton of Arkansas as belonging to an "Unnamed epoch." Ulrich and Bassler (1915, pls. 1, 2) used **"Big Buffalo series"** for (descending) Jasper of Arkansas, St. Peter of Minnesota, and Everton and Sneeds of Arkansas. Buehler (1922) on the geologic map of Missouri, used **"Buffalo"** as a group term to include Joachim limestone, St. Peter sandstone, and Everton limestone. Ulrich (1926, p. 329) used **"Buffalo River series"** as a general time term for rocks between Chazyan and Beekmantown. It was named for exposures on Buffalo River (formerly called Buffalo Fork of the White River) in Newton County, Arkansas. The river was also formerly called Big Buffalo.

It appears that at least part of this series would now include the Whiterockian Series (Everton Formation), and the lowermost Mohawkian Series (Joachim - St. Peter facies complex).

Bignell Loess

Quaternary System (Pleistocene Series, Wisconsinan Stage)

Type section: Baars and Maples (1998) located the type section as the "Bignell Hill section, southeast of North Platte, 1.7 mi...south of Bignell, in E/2, E/2, sec. 3, T. 12 N., R. 29 W., Lincoln County, Nebraska..."

Named by Schultz and Stout (1945, p. 241) from exposures along the south bluff of the Platte River Valley, near the town of North Platte, Lincoln County, Nebraska, the term was used in Missouri in Platte County by Davis, et al. (1960) for a loess which was correlated with the Bignell loess of the Iowa Point section in Doniphan County, Kansas.

Whitfield (*in* Thompson, 1995, p. 148) stated "The Bignell loess overlies the Peoria loess and is differentiated from it by the presence of the underlying Brady Geosol or by means of fossil snails. The Bignell loess is approximately one-fourth as thick as the Peoria loess. It is obscured in modern soil profiles where the loess in thin. It is medium- to coarse-grained, light yellowish-brown silt which contains very fine- to fine-grained sand."

Big Springs Limestone Member **of Lecompton Formation, Shawnee Group**

Big Springs Limestone <u>of Lecompton limestone member of Shawnee formation</u> (**Condra, 1927**)
Big Springs limestone member <u>of Lecompton limestone</u> (Moore, 1932)
Big Springs limestone member <u>of Lecompton limestone</u> (Moore, 1936; Moore, et al., 1951) - in Kansas
Big Springs member <u>of Lecompton formation</u> (Searight and Howe, 1961)

Big Springs Limestone Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Big Springs Limestone Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Big Springs Limestone Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Moore (1936, p. 175) located the type section as "near Big Springs, Douglas county, Kansas. Typically exposed in road cut near center S. line sec. 36, T. 11 S., R. 17 E., about 4.5 miles west of Lecompton."

Thompson (1995, p. 124) stated "The Big Springs Limestone Member...consists of a single bed of dark-gray, dense limestone that has an average thickness of about 1 ft." The Big Springs Limestone Member overlies the Doniphan Shale Member, and is overlain by the Queen Hill Shale Member of the Lecompton Formation.

Bird Creek
Bird Creek limestone (Heald and Mather, 1918) - in Oklahoma; = ***Church Limestone Member of Howard Formation***
Pennsylvanian System (Virgilian Series)

These may or may not be the same unit Heald and Mather called the "Buck Creek limestone" in the same paper..

Birds-Eye limestone
Birds-eye Limestone (Swallow, 1855) = ***Brickeys Member of Bloomsdale Limestone***
Birds-Eye limestone (Shumard, 1873; Broadhead, 1874)
Ordovician System (Mohawkian Series)

"Birds-eye" is a descriptive term applied in a titular sense in early reports of Missouri as well as elsewhere. In Missouri the term was used for a part of the Plattin Group of present nomenclature, probably to dolomitic units such as the Brickeys Member of the Bloomsdale Limestone, and possibly to some of the Joachim Dolomite.

Birdsville
Birdsville formation (Ulrich, 1904a) = ***Vienna Limestone and above in Chesterian Series***
Birdsville member of Chester group (Buehler, 1907) - in Missouri, = ***Vienna Limestone***
Birdsville member of Kaskaskia formation (Schuchert, 1910) = ***Vienna Limestone and above in Chesterian Series***
Birdsville formation (Girty, 1915a) - in Arkansas
Mississippian System (Chesterian Series)

Ulrich (1904a, p. 109) proposed "Birdsville formation" for the shales, sandstone, and thin limestones composing the upper part of the Chester group. The name was derived from Birdsville, Livingston County, Kentucky.

Ulrich (1916, p. 157) used "Upper Chester" or "Birdsville group" for all of the Chesterian Series of western Kentucky and Illinois above the base of the typical Cypress sandstone. The terms were used in Missouri by Buehler (1907, p. 227), Crane (1912, p. 50-51), and Buckley (1909, p. 14). The Birdsville is now divided into several formations and the name has been discarded.

Birkmose Sandstone Member **of Franconia Formation**
Cambrian System (Upper Cambrian Series)

Kurtz (1989) identified this unit in the Upper Cambrian strata in the subsurface of northern Missouri. He stated (p. 78) "The Birkmose is a highly glauconitic, fine grained sandstone and shale unit. Burrowing has destroyed most of the original laminations. The unit is highly diachronous in that the age ranges from middle Franconian in the Upper Mississippi Valley outcrop area to lower Franconian in northern Missouri." Kurtz regarded the Birkmose Member to be equivalent to the Whetstone Creek Member of the Bonneterre Formation in southeastern Missouri.

Black Lead

Black Lead (Gallaher, 1900) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

This term was used by Gallaher (1900, p. 92-93) for the "fourth member of our Cambrian section... (the) second ore-bearing, or country rock, in the Magnesian Lens." It is a part of the **Bonneterre Formation** of current nomenclature, probably the upper part. It was named at Mine LaMotte because of its dark color; Gallaher also called it the "Third Limestone."

Black Ledge

Black Ledge (Cullison, 1944) = ***Powell Dolomite***

Ordovician System (Ibexian Series)

This is a local term used in the zinc mining region in north central Arkansas, according to Cullison (1944, p. 43). The Cotter-Powell contact (Cullison, 1944, p. 33) was placed a specific distance below the very fossiliferous beds of the Powell dolomite known locally as the "Black Ledge." The name alludes to the very dark color of the bed when weathered. It is not known if this horizon can be found in Missouri.

Black shale

Black shale (early reports) = ***Chattanooga*** or ***Grassy Creek Shale***

Devonian System (Late Devonian Series)

This descriptive term was applied in early reports to a widespread exposures of black shale. It has also been called "Eureka shale", "Noel shale", "Grassy Creek Shale", and "Chattanooga Shale". The latter two terms are still used; Eureka and Noel shales are both names for what is now called **Chattanooga Shale**; the **Grassy Creek Shale** is the northeastern Missouri equivalent. It has been previously considered Devonian and/or Mississippian in age, but is generally now regarded as Late Devonian.

Black and White chert

Black and White chert (Cullison, 1944) = ***Cotter Dolomite***

Ordovician System (Ibexian Series)

This is a very diagnostic chert above the Hercules Tower (Swan Creek?) sandstone of the Cotter Dolomite in southern and southwestern Missouri. It was named by Cullison (1944, p. 29) because of its color.

Blackjack Creek Limestone of Fort Scott Subgroup, Marmaton Group

Blackjack Creek limestone member of Fort Scott limestone (**Cline, 1941**)
Blackjack Creek limestone member of Fort Scott limestone (Jewett, 1941) - in Kansas
Blackjack Creek limestone member of Fort Scott formation (Clair, 1943; Greene and Searight, 1949; Searight, 1959)
Black Jack Creek limestone of Fort Scott limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Blackjack Creek cyclothem (Moore, 1949; Moore, et al., 1951) - in Kansas; = ***Mulky, Excello, and Blackjack Creek formations***
Blackjack Creek limestone member of Fort Scott formation (Moore, et al., 1951) - in Kansas
Blackjack Creek limestone (Wanless, 1955) "= Hanover limestone of Illinois"
Blackjack Creek formation of Fort Scott subgroup (Searight and Howe, 1961)
Blackjack Creek Limestone Member of Fort Scott Formation (Branson, et al., 1965) - in Oklahoma

Blackjack Creek Limestone Member of Fort Scott Formation (Landis and Van Eck, 1965) - in Iowa
Blackjack Creek Limestone Member of Fort Scott Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Blackjack Creek Formation of Fort Scott Subgroup (Neal 1969a, 1969b)
Blackjack Creek Limestone Member of Mouse Creek Formation (Ravn, et al., 1984) - in Iowa
Blackjack Creek Limestone of Fort Scott Subgroup (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Cline (1941), proposed the name "Blackjack Creek limestone member of the Fort Scott formation" from a personal communication by F.C. Greene. Cline did not describe a type section for the Blackjack Creek. However, he did describe a section (p. 33-35), "Section II" from the "Houx Ranch", in sec. 15, 46N-27W, in Johnson County, Missouri, which he used as the type for the Houx Limestone Member of the Little Osage Shale. This section could also serve as the type for the Blackjack Creek.

Also known as the "lower Fort Scott limestone", Thompson (1995, p. 105) stated "The Blackjack Creek consists of an upper and lower unit. The lower unit is persistent and commonly present as a single bed of finely crystalline, earthy limestone...The upper unit is absent in many places, but wherever present, it is composed of nodular limestone or calcareous shale, which contain nodules of limestone that are sufficiently abundant in many places to form beds near the top of the unit." The two carbonate units may be separated by several feet of shale, and the formation ranges in thickness from more than 12 ft in some localities, to less than 1 ft in others. The Blackjack Creek Limestone overlies the Excello Shale, and is overlain by the Little Osage Shale.

Blackjack Knob Member

Blackjack Knob Member of Theodosia Formation (Cullison, 1944) = ***Cotter Dolomite*** (lower part)
Blackjack Knob Member of Cotter Dolomite (Hedden, 1976)
Ordovician System (Ibexian Series)

Cullison (1944. p. 25) proposed this name, from outcrops on the north side of Blackjack Knob in eastern Taney County, Missouri, for the upper member of his Theodosia Formation. The base is marked by a thin desiccation-cracked, ripple-marked sandstone. It is underlain by the Lutie Member and overlain by the Cotter Formation (restricted; see Thompson, 1991, p. 51, Fig. 29).

Black River

Black River limestone (Swallow, 1855; Shumard, 1873; Broadhead, 1874) = ***Plattin Limestone*** above Brickeys Member
Black River limestone (Broadhead, 1873; Gallaher, 1900)
Black River - Birds-Eye limestones (Potter, 1873)
Black River group (Vaughn, 1911; McQueen, 1937)
Black River (Lowville) (Edson, 1927) = ***Plattin - Decorah***
Black River (Kay, 1929b) = ***Plattin - Decorah***
"Blackriver forms from southeastern Missouri" (Randall, 1934)
Black River (Thiel, 1937) = ***upper Joachim - Plattin***
Black River series (Ulrich, 1939) = ***Plattin Limestone***
Blackriveran Stage of Champlainian Series (Barnes, et al., 1973) = ***Joachim - Plattin***
Ordovician System (Mohawkian Series)

This is a New York term applied by early Missouri geologists to part of the **Plattin Limestone**. It is not used in Missouri at present, but is the name of the lower stage of the Mohawkian Series that includes the St. Peter Sandstone, Joachim Dolomite, and Plattin Group in Missouri (see Thompson, 1991, p. 68, Fig 39).

Black River-Birdseye

Black River-Birdseye limestone = ***Plattin Limestone (Group)*** (and Joachim Dolomite?)
Ordovician System (Mohawkian Series)

A compound term applied in early Missouri reports to the **Plattin Limestone (Group)**, and possibly either to the Brickeys Member of the Bloomsdale Limestone (Plattin Group) or to parts or all of the underlying Joachim Dolomite.

Black Rock Formation

Black Rock Formation (Branner, 1929) - in Arkansas

Ordovician System (Ibexian Series)

Differentiated and named by Ulrich, but first published by Branner (1929) on the geologic map of Arkansas, the Black Rock overlies the Smithville Dolomite and underlies the Everton Formation. It has not officially been recognized in Missouri. It was tentatively identified in the subsurface in a well just across the Missouri line in Arkansas by Earl McCracken of the Missouri Geological Survey in an unpublished manuscript. The Blackrock Formation is the uppermost unit of the lower Ordovician Ibexian Series in the Arkansas section.

Black shale

Black shale (early geologists) = ***Grassy Creek and Saverton Shales, and Chattanooga Shale***
Black slate (Meek and Worthen, 1861) = ***Grassy Creek Shale and Chattanooga Shale***
"Black" shale (Wheeler, 1896) = ***Grassy Creek Shale***
black and green shales (Keyes, 1897a) = ***Grassy Creek and Saverton Shales?***
black shale member of Sulphur Springs formation (Weller and St. Clair, 1928) = ***lower unnamed shale of Sulphur Springs Group***
"Black shale deposits of Missouri" (Savage and Sutton, 1931) = ***Grassy Creek Shale and equivalent units***

Devonian System (Upper Devonian Series)

Black shale and limestone

Black shale and limestone (Ulrich, 1911) = ***St, Laurent Limestone?***

Devonian System (Middle Devonian Series)

Blackwater Creek shale

Backwater (*sic.*) Creek shale member of Fort Scott formation **(Clair, 1943)** = ***upper shale of Little Osage Shale***
Blackwater Creek shale of Little Osage shale member of Fort Scott formation (Greene and Searight, 1949)
Blackwater Creek shale of Little Osage Shale member of Fort Scott formation (Unklesbay, 1952a)
Blackwater Creek shale of Fort Scott formation (Howe and Searight, 1953)

Pennsylvanian System (Desmoinesian Series)

This was a name proposed by Clair (1943) for the upper shale (above the Houx Limestone) of the Little Osage Shale. Although several authors used the term (Greene and Searight, 1949; Unklesbay, 1952a; Howe and Searight, 1953) it never gained formal acceptance. Ravn, et al. (1984) called this interval the "Unnamed Shale Member" of the Stephens Forest Formation in Iowa

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Block Limestone Member of Cherryvale Formation. Linn Subgroup, Kansas City Group

Block limestone member of Cherryvale shale (**Newell, *in* Moore, 1932**)
Block limestone (Moore, 1936; Newell, 1936) - in Kansas
Block limestone member of Sarpy formation (Condra, 1949) - in Nebraska
Block limestone member of Cherryvale shale (Moore, et al., 1951) - in Kansas
Block member of Cherryvale formation (Searight and Howe, 1961)
Block Member of Sarpy Formation (Burchett, 1965) - in Nebraska
Block Limestone Member of Sarpy Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Block Limestone Member of Cherryvale Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Block Limestone Member of Cherryvale Formation (Gentile, 1976; Howe, 1986; Thompson, 1995)
Black (*sic.*) Limestone Member of Cherryvale Shale (Watney, et al., 1989) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 98) located the type section as "Near the hamlet of Block in eastern Miami county [Kansas]. Typical exposures are found in roadcuts near center S line sec. 6, T. 18 S., R. 24 E., and near center W line sec. 18, T. 19 S., R. 23 E."

Thompson (1995, p. 115) stated "The Block Limestone Member...is one to two persistent beds of dark-gray, fossiliferous limestone. A great many fossils are also present in an associated calcareous shale. The thickness...ranges from less than 1 ft to approximately 4 ft." Howe (1986, p. 24) added "In western and northern Missouri, beds classed with the Block include a number of thin, apparently persistent limestone beds and the shale that separates them. Differentiation of beds properly classed as Block becomes increasingly more difficult as the Cherryvale succession is traced northward across the state into Iowa." The Block Limestone Member overlies the Fontana Shale Member, and is overlain by the Wea Shale Member of the Cherryvale Formation.

Blomeyer Member of Bloomsdale Limestone, Plattin Group

Blomeyer Member of Mifflin Formation of Plattin Subgroup of Platteville Group (**Templeton and Willman, 1963**)
Blomeyer Member of Bloomsdale Limestone of Plattin Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p[. 80) stated "The Blomeyer Member...is here named for the village of Blomeyer, Missouri, about 6 miles southwest of the type section, which is a small quarry on the north side of Missouri Highway 74, a quarter of a mile east of the highway junction at Rock Levee, Cape Girardeau County [Missouri]." This quarry has since been removed by a larger quarrying operation.

Thompson (1991, p. 138) stated "In southern Cape Girardeau County, the **Blomeyer Member** of the Bloomsdale Limestone has been identified between the Brickeys and the underlying 'Pecatonica Formation,' but is known only from a few exposures near the area of the type section. The best exposure is in the Southeast Stone Company quarry, at the location of the former type section."

Bloomfield sands

Bloomfield sands (Keyes, 1894a) = ***Holly Springs Formation of Wilcox Group***
Tertiary System (Eocene Series)

A term used by Keyes (1894a, p. 30) for sands of Eocene age, best exposed in the bluffs of the Mississippi River in Scott and Stoddard counties, named from Bloomfield, in Stoddard County, Missouri. Wilmarth (1938) stated they are part of the Wilcox Group, and thus, are probably within the **Holly Springs Formation**.

Bloomsdale Limestone of Plattin Group

Bloomsdale formation of Plattin group (**Larson, 1951**)
Bloomsdale limestone of Plattin group (Twenhofel, et al., 1954)
Bloomsdale Formation of Plattin Subgroup of Platteville Group (McCart, 1986)
Bloomsdale Limestone of Plattin Group (3 members) (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Larson (1951, p. 2046-2048) applied the name Bloomsdale to "A formation characterized by calcilutite and fine-textured dolomite rock with interbeds of oolite and carbonate-pebble conglomerate." The name is taken from the town of Bloomsdale, Ste. Genevieve County, Missouri. The type section is 3.5 miles east of town in the bed of a small stream rising in the SW NE sec. 15, T. 38 N., R., 8 E., near an abandoned stone house (Thompson, 1991, p. 134, Fig. 79).

The basal formation of the **Plattin Group**, the Bloomsdale is overlain by the Beckett Limestone of the Plattin Group and overlies the Joachim Dolomite (or "Pecatonica Formation" in the Cape Girardeau region). It comprises two members, the upper Establishment Creek Shale Member, and lower Brickeys Member, except in the Cape Girardeau area, where a third, basal member, the Blomeyer Member, is present.

Bluejacket Coal Bed of Bluejacket Sandstone, Krebs Subgroup, Cherokee Group

Bluejacket coal of Bluejacket formation (Searight, et al., 1953; Branson, 1957) - in Missouri and Kansas
Bluejacket coal of Boggy formation (Branson, 1957) - in Oklahoma
Bluejacket coal (Searight, 1959) "= Rock Island (No. 1) coal in Illinois"
Bluejacket coal bed of Bluejacket formation (Searight and Howe, 1961)
Bluejacket coal bed of Bluejacket Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Ohern (1914), Howe (1951, p. 2090) stated "It is a well defined lithologic and mappable unit, typically exposed in the NE¼ NE¼ of Sec. 25, T. 27 N., R. 20 E., along the road from Bluejacket west to Pyramid Corners, in the east slope of Timbered Hill, on Oklahoma Highway 25, in Craig County, Oklahoma."

Bluejacket Sandstone of Krebs Subgroup, Cherokee Group

Bluejacket sandstone (McCoy, 1921) - in Oklahoma
Bluejacket sandstone member of Savanna sandstone (Wilson, 1935) - in Oklahoma
Bluejacket cyclothem (Abernathy, 1937) - in Kansas
Bluejacket sandstone member of Cherokee shale (Pierce and Courtier, 1938) - in Kansas
Bluejacket ("true Bartlesville") (Bartle, 1938)
Bluejacket sandstone (Clair, 1943)
Bluejacket sandstone member of Boggy formation (Condra, 1949) - in Oklahoma
Bluejacket sandstone of Bluejacket cyclothem (Moore, 1949)
Bluejacket sandstone member of Lower Cherokee cyclothem (Moore, et al., 1951) - in Kansas
Bluejacket formation (Searight, et al., 1953) - included "Bluejacket sandstone"
Bluejacket formation (Searight, 1955) "= upper Graydon formation of western Missouri"
Bluejacket formation (Searight, 1959) - upper Venteran substage, = Bernadotte sandstone in Illinois
Bluejacket formation (Searight and Howe, 1961)
Bluejacket Sandstone Member of Bluejacket Formation (Hayes, 1963)
Bluejacket Sandstone and coal of Boggy Formation (Branson, et al., 1965) - in Oklahoma
Bluejacket Formation ("Bartlesville" sandstone) (Anderson and Wells, 1968)
Bluejacket Sandstone Member of Krebs Formation (Jewett, et al., 1968; Heckle, et al., 1979; Baars and Maples, 1998) - in Kansas
Bluejacket Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Ohern (1914), Howe (1951, p. 2090) stated "It is a well defined lithologic and mappable unit, typically exposed in the NE¼ NE¼ of Sec. 25, T. 27 N., R. 20 E., along the road from Bluejacket west to Pyramid Corners, in the east slope of Timbered Hill, on Oklahoma Highway 25, in Craig County, Oklahoma."

Thompson (1995, p. 98) stated "Where it is completely represented, the Bluejacket Formation consists of (from the base upward): 1) a dark-gray to black, brittle shale with abundant siderite or clay-ironstone concretions; 2) a siltstone or fine-grained, thinly-laminated sandstone; 3) a medium- to fine-grained sandstone which is conglomeratic in many places, the conglomerate pebbles composed of siderite or clay ironstone 'blisters' of shale; 4) an underclay; and 5) the **Bluejacket coal bed**...The average thickness of the formation is approximately 25 ft, but because of cutouts and pinchouts, it is locally absent and apparently is as much as 70 ft thick in some localities." The Bluejacket is overlain by the Seville Formation, and overlies the Drywood Shale.

Blue Mound Shale Member of Shale Hill Formation, Pleasanton Group - Howe (1982)

Blue Mound Shale Member of Shale Hill Formation (**Howe, 1982**)
Pennsylvanian System (Missourian Series)

This is the upper shale of the former "upper unnamed formation" of the Pleasanton Group, proposed by Howe (1982) as the upper member of his Shale Hill Formation.

Bluff formation

Bluff formation (early reports)

Quaternary System (Pleistocene Series)

"Bluff formation" is a descriptive term used in early reports on the Gulf Coastal Plain and Central States to designate the **Pleistocene loess**, which has a tendency to form bluffs. It was used in Missouri by some of the early geologists.

Bob member

Bob member of Bainbridge formation (Ball, 1942) = ***upper shale of Moccasin Springs Member of Bainbride Formation***

Silurian System (Wenlockian and Ludlovian Series)

Boice Shale

Boice Shale (Carlson, 1963) = ***Hannibal Shale?***

Mississippian System (Kinderhookian Series)

Thompson (1995, p. 70) stated "In Missouri, the upper part of the 'Kinderhook shale,' which has been referred by Reed (1946) and Lee to the **Boice Shale** in Nebraska and Kansas, consists of grayish-green shale which is in part carbonaceous and interbedded with dolomitic shale."

Boles Member of Joachim Dolomite

Boles Member of Joachim Dolomite (**Templeton and Willman, 1963**)

Boles Member of "middle Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: The type section of the Boles Member (Templeton and Willman, 1963) is the same as that for the Defiance Member, a Quarry in the north bluffs of the Missouri River Valley, one mile southwest of the village of Matson, St. Charles County, Missouri.

The Defiance and Boles Members are very similar lithologically. However, the Boles does possess one or more beds of small chert nodules at some localities. It was at this chert horizon that the base of the "Rock Levee" formation was placed, before it was realized (Thompson, 1991) that the "Rock Levee" (*i.e.*, "Pecatonica") Formation did not extend any farther north than its pinch-out in Perry County, Missouri. The "middle Joachim Dolomite" (Boles and Defiance Members combined) is readily distinguishable from the massively-bedded Matson Member above, and the slabby-bedded, sandy Augusta Member below.

Bolin Creek sandstone member

Bolin Creek sandstone member of St. Elizabeth formation (Ball and Smith, 1903) = ***Roubidoux Formation (part)***

Bolin Creek sandstone member of Roubidoux formation (Marbut, 1907)

Ordovician System (Ibexian Series)

Ball and Smith (1903, p. 50, 61) applied the term "Bolin Creek sandstone member" to the prominent sandstones within their "St. Elizabeth formation", which is essentially the **Roubidoux Formation** of present nomenclature. Later it was sometimes shortened to "Bolin sandstone". It was named for exposures on Bolin Creek, Miller County, Missouri.

Bolivar sandstone

Bolivar sandstone (Shepard, 1904) = ***Roubidoux Formation***

Ordovician System (Ibexian Series)

Shepard (1904, p. 42), in a table only, applied the name "Bolivar sandstone" as equivalent to the "Marshfield sandstone," "First sandstone," "Pacific sandstone," and "Crystal City sandstone." Bain and Ulrich (1905b, p. 12; 1905a,

p. 234) questionably correlated the Bolivar sandstone with the **Roubidoux Formation**. Bedrock around Bolivar consists primarily of the Jefferson City and Cotter Dolomites, and probably because of this, J. Bridge (1930, personal communication to Wilmarth, 1938) stated that the Bolivar sandstone is either equivalent to the Marshfield sandstone or represents some of the basal Pennsylvanian sands. The "Pacific sandstone" and "Crystal City sandstone" are both St. Peter Sandstone, and do not correlate with Shepard's "Bolivar sandstone."

Bonner Springs Shale of Zarah Subgroup, Kansas City Group

Bonner Springs shale (**Newell, *in* Moore, 1932**)
Bonner Springs shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Bonner Springs shale member of Lane shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Bonner Springs formation (Condra and Scherer, 1939) - in Nebraska
Bonner Springs shale (Ellison, 1941; Moore, 1948)
Bonner Springs shale formation (Condra and Reed, 1943, 1959) - in Nebraska
Bonner Springs formation (Searight and Howe, 1961)
Bonner Springs Formation (Burchett, 1965, 1970, 1971) - in Nebraska
Bonner Springs Shale (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Lane - Bonner Springs Shale (Heckel, et al., 1979; Pabian and Diffendal, 1989) - in southern Kansas; *= from Lane (Liberty Memorial) to Bonner Springs*
Bonner Springs Formation (Howe, 1986)
Bonner Springs Shale (Thompson, 1995)

Pennsylvanian System (Missouri Series)

Type section: Named by Newell (*in* Moore, 1932), Ver Wiebe and Vickery (1932, p. 115) located the type section at the "Cement plant quarry east of Bonner Springs, Wyandotte county, Kansas, T. 11s, R. 23e." Moore (1936, p. 1213) called this the Lone Star Cement Plant quarry, northeast of Bonner Springs, Kan."

Thompson (1995, p. 117) stated "The Bonner Springs Shale is composed principally of silty, gray, micaceous shale, but includes lenticular sandstone and locally, silty limestone in the upper part....the lower and middle parts...contain scattered clay-ironstone concretions. The thickness of the formation ranges from less than 20 to as much as 40 ft." The Bonner Springs Shale overlies the Farley Limestone Member of the Wyandotte Formation, and is overlain by the Merriam Limestone Member of the Plattsburg Formation of the Lansing Group.

Bonneterre Formation

"Bonne Terre, or St. Joseph, limestone" (**Nason, 1901**) (lower part)
Bonne Terre limestone (Bain and Ulrich, 1905)
Bonneterre limestone (Walcott, 1912)
Bonne Terre dolomite (Tarr, 1918)
Bonneterre formation (Weller and St. Clair, 1928; Searight and Howe, 1961)
Bonne Terre formation (McQueen and Greene, 1938)
Bonneterre Formation (2 members) (Kurtz, et al., 1975; Kisvarsanyi, et al., 1976; Kurtz, 1989; Thompson, 1995)
Bonneterre-Eau Clair Formations (Bohm, 1981)
Bonneterre Dolomite (Gregg, 1985)

Cambrian System (Upper Cambrian Series)

Type section: Nason (1901, p. 396) was the first to use the name Bonneterre. He applied it to the beds between what is now called the LaMotte Sandstone and an edgewise conglomerate in what is now called the Davis Formation. It was named for exposures at Bonne Terre, St. Francois County, Missouri.

Nason's failure to designate which edgewise conglomerate was the top of his Bonneterre left the top of the formation uncertain. Buckley (1909, p. 26-44) was the first to establish the top of the Bonneterre as now defined. The Bonneterre Formation overlies the LaMotte Sandstone and is in turn overlain by the Davis Formation. It is equivalent to portions of the "St. Joseph limestone" of Winslow, the "Fredericktown limestone" of Keyes, the "Third Magnesian limestone" of Swallow, and the "Decaturville" of Shepard.

"Bonneterre - Lamotte transition beds"

"lower Bonneterre Formation" (Howe, et al., 1972)
Bonneterre-Lamotte "transition" beds (Kurtz, et al., 1975)
"Bonneterre-Lamotte transition zone" (Thompson, 1995)
Cambrian System (Upper Cambrian Series)

Thompson (1995, p. 19) stated "The relationship of the Bonneterre and the underlying Lamotte Sandstone is one of conformity. The lower part of the Bonneterre consists of alternating beds of dolomite and arenaceous dolomite with the amount of sand increasing toward the base. This sandy zone (often called the **'Bonneterre-Lamotte transition zone'**) is usually 10-20 ft thick, but may approach a thickness of 200 ft. The Bonneterre overlaps the underlying Lamotte on the flanks of Precambrian highs." Howe, et al. (1972) called this the **"lower Bonneterre Formation."**

Boone

"Boone chert" (early geologists) = ***Reeds Spring Formation***
Boone formation (Schuchert, 1910) - in Arkansas; = ***essentially the Kinderhookian and Osagean Series***
Boone chert (Barton, 1918) = ***Reeds Spring and Elsey Formations***
Boone limestone (Ulrich, 1904b; Girty, 1915b) - in Arkansas; = ***Kinderhookian and Osagean Series***
Boone formation (Moore, 1928; Gordon, 1944) - in Joplin district; = ***Kinderhookian and Osagean Series***
Boone Group (Barney, 1965) = Boone Formation, = ***Kinderhookian and Osagean Series***
Joplin Member of Boone Formation (McKnight and Fischer, 1970) = ***Keokuk Limestone***
Boone Formation (Dutro, et al., 1979) = ***Osagean Series***
Mississippian System (Kinderhookian and/or Osagean Series)

The "Boone formation" was named by Branner and described by Simonds (Branner and Simonds, 1891) for extensive exposures in Boone County, Arkansas. The name has been used occasionally in southwestern Missouri for the Osagean limestones and cherty limestones from Pierson through Keokuk Limestones. Boone Formation is formally recognized in Arkansas and northeastern Oklahoma for this succession.

The name "Boone chert" has been applied to the extremely cherty middle part of the Osagean succession in Arkansas and southwestern Missouri - the middle part of the "Boone formation." In Missouri this is generally referred to as the **Reeds Spring Formation**.

Boston Group

Boston Group (Simonds, 1891) - in Arkansas; = ***Morrowan Series***
Pennsylvanian System (Morrowan Series)

This name was changed by Ulrich (1904b) to **"Morrow group"** because the name "Boston" was preoccupied.

Bottom Prairie formation

Bottom Prairie formation (Swallow, 1855)
Quaternary System

A name applied by Swallow (1855).

Bourbon

Bourbon group (Moore, 1932) - in Kansas; = ***Pleasanton Group***
Bourbon shale (Ockerman, 1936) - in Kansas
Bourbon formation (Moore, 1936; Newell, 1936; Ellison, 1941) - in Kansas; = ***Pleasanton Group***
"Big Lake" or Warrensburg sand member of Bourbon formation (Bartle, 1938)
"Channel sand" of Bourbon formation (Bartle, 1941) = ***Weldon River (Warrensburg) Sandstone Member of Pleasanton Group***
Pennsylvanian System (Missourian Series)

Bowling Green Dolomite of Edgewood Group

Bowling Green formation (**Keyes, 1898c**)
Bowling Green member of Edgewood limestone (Savage, 1913)
Bowling Green limestone (Keyes, 1914) = ***Cyrene Limestone and Bowling Green Dolomite***
Bowling Green member of Edgewood formation (Martin, et al., 1961a)
Bowling Green Dolomite of Edgewood Group (Amsden, 1974, 1986; Thompson and Satterfield, 1975; Thompson, 1991, 1993, 1995)
Silurian System (Llandoverian Series)

Type section: The name Bowling Green was first used by Keyes (1898c, p. 59, 62) for what was then considered the topmost Silurian in Pike County, Missouri, and Calhoun County, Illinois. It was named for exposures near Bowling Green, Pike County, Missouri. Thompson and Satterfield (1975, p. 99) stated "According to Rowley (1916, p. 317) the type section described by Keyes is in the south bank of Noix Creek, east of the large railroad bridge... We designate an abandoned quarry at this site as the type section."

Regarded initially as the upper member of the Edgewood Formation, the Lower Silurian Bowling Green Dolomite overlies the Lower Silurian Bryant Knob Formation, or the Noix Oolite or Cyrene Limestone of Late Ordovician age, all of which are formations within the Edgewood Group. The Bowling Green is overlain by the Late Devonian Grassy Creek Shale.

Braddyville

Braddyville limestone (Calvin, 1901) - in Iowa; = ***Deer Creek Formation to Topeka Formation***
Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Deer Creek Formation to Topeka Formation***
"X. Shales and Limestone" of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Severy and Howard formations***
upper limestone of Union limestone member of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Coal Creek Limestone Member of Topeka Formation***
lowest shale of Union limestone of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Holt Shale Member of Topeka Formation***
basal limestone of Union limestone of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***DuBois Limestone Member of Topeka Formation***
"IX. Shale" of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Turner Creek Shale Member of Topeka Formation***
"VIII. Shale" of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Calhoun Shale***
Pennsylvanian System (Virgilian Series)

Brady Paleosol

Brady buried soil (Schultz and Stout, 1945) - in Nebraska
Brady Geosol (Whitfield, *in* Thompson, 1995)
Quaternary System (Pleistocene Series, Wisconsinan Stage)

Type section: Baars and Maples (1998) located the type section as the "Bignell Hill section, southeast of North Platte, 1.7 mi...south of Bignell, in E/2, E/2, sec. 3, T. 12 N., R. 29 W., Lincoln County, Nebraska..."

Schultz and Stout (1945, p. 241) described the Brady buried soil from exposures in the south wall of the Platte River Valley in Lincoln County, Nebraska. It was identified in Platte County, Missouri, by Davis (enter date of thesis) who used the top of the Brady soil as the dividing surface between upper and lower Wisconsinan deposits.

Whitfield (*in* Thompson, 1995, p. 148) stated "The Brady Geosol is believed to have developed during a brief cessation in the deposition of loess. The Brady is somewhat darker than the underlying Peoria loess. It is generally less than 2 ft thick."

Brassfield limestone

Brassfield limestone (Flint and Ball, 1926) "= Sexton Creek of Illinois"
Brassfield (Ball, 1939) = ***Sexton Creek Limestone***
Brassfield (Sexton Creek) (Ball, 1942)
Brassfield limestone (Branson, 1944b) = ***Sexton Creek Limestone***
Silurian System (Llandovery Series)

The name Brassfield was proposed by Foerste (1905, p. 145; 1906, p. 10, 27) for the basal Silurian of Kentucky, the formation named for exposures near Brassfield, Madison County, Kentucky. Geologists from Wilson (1922, p. 48) to Thompson and Satterfield (1975) have noted that the **Sexton Creek Limestone** of Missouri is the equivalent of the Brassfield of Kentucky, but the term Sexton Creek has been retained for the Missouri strata.

Breadtray Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Breadtray granite (Tolman and Robertson, 1969)
Breadtray Granite (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Tolman and Robertson (1969, p. 40) stated "The Breadtray granite crops out in a broad band several miles wide from Doe Run Creek (south of the town of Doe Run, 35N-5E; 17) southward for 7 or 8 miles. The unit is named from exposures on Bread Tray Mountain, 34N-4E; 1."

Robertson (*in* Thompson, 1995, p. 12) stated "According to Kisvarsanyi (1981., p. 21) the Breadtray facies '...forms an onion-like skin on the tops of subvolcanic massifs...' It grades into the medium- to coarse Butler Hill Granite with depth."

Breezy Hill Limestone Member of Mulky Shale, Cabaniss Subgroup, Cherokee Group

Breezy Hill limestone member of Cherokee shale (**Pierce and Courtier, 1938**) **-** in Kansas
Breezy Hill limestone of Breezy Hill cyclothem (Moore, 1949; Moore, et al., 1951) **-** in Kansas
Breezy Hill limestone member of Lagonda formation (Unklesbay, 1952a)
Breezy Hill limestone member of Senora formation (Branson, 1954a) **-** in Oklahoma
Breezy Hill limestone of Mulky formation (Searight, 1955)
Breezy Hill member of Mulky formation (Searight and Howe, 1961)
Breezy Hill Limestone Member (of Cabaniss Formation) (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Breezy Hill Member of Mulky Formation (Neal, 1969; Gentile, 1976)
Breezy Hill Limestone of Cherokee Group (Kidder, 1985)
Breezy Hill Limestone of Mulky member of Banzet formation (Brenner, 1989) **-** in Kansas
Breezy Hill Limestone Member of Mulky Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Pierce and Courtier (1938, p. 33) named the "Breezy Hill limestone member of the Cherokee shale" "...from the exposures at Breezy Hill, just southwest of Mulberry, [Crawford County] Kan." This is located approximately 1½ miles southwest of Mulberry, in secs. 10 and 11, 29S-25E.

Thompson (1995, p. 103) added "The Breezy Hill...is a hackly, nodular limestone in western Missouri that lies at the base of the underclay [of the Mulky Coal Bed] either as a bed or as discontinuous masses."

Brewerville formation

Brewerville formation (Weller, 1913) = ***Aux Vases Sandstone***
Mississippian System (Chesterian Series)

An abandoned name for the **Aux Vases Sandstone,** the Brewerville was named by Weller (1913, p. 118-121) for Brewerville Township, Randolph County, Illinois, where it is well exposed in the Mississippi River bluffs. Weller (1913, p. 118-121) believed that the basal sandstone of the Chester series in Monroe and Randolph counties, Illinois, belonged to two distinct formations. He proposed the name Brewerville for the lower of the two formations and included the upper in the Renault Formation. However, later work in Ste. Genevieve County, Missouri (Weller and St. Clair, 1928, p. 226), indicated that the Aux Vases Sandstone of Keyes was the exact equivalent of the Brewerville of S. Weller. Therefore the name Brewerville was abandoned.

Brickeys Member of Bloomsdale Limestone of Plattin Group

Brickeys Member of Mifflin Formation of Plattin Subgroup (Templeton and Willman 1963; Farrell, 1967)
Brickeys Member of Bloomsdale Limestone of Plattin Group (Thompson, 1991, 1995)
Brickeys Member of Plattin Limestone (Thompson, 1991)
Ordovician System (Mohawkian Series)

Type section: Temple and Willman (1963, p. 81) stated "The Brickeys Member...is here named for the village of Brickeys, in Ste. Genevieve County, southeastern Missouri. The type section is an exposure in a quarry on the east side of [U.S. Highway 61], 0.3 mile south of the side road to Brickeys."

The Brickeys Member consists mostly of pure purplish-brown to chocolate-brown, often oolitic, litho- graphic limestone interbedded with beds of dolomite and dolomitic shale. Several prominent scour surfaces are evident within the unit, and near the top, and "birdseye" structures are often present in the more dolomitic units. The Brickeys Member is overlain by the Establishment Shale Member of the Bloomsdale Limestone, and overlies either the Metz Member of the Joachim Dolomite, or the Blomeyer Member of the Bloomsdale Limestone (the latter only in a restricted area of southeastern Missouri).

Briton Member

Briton Member of Mifflin Formation of Plattin Subgroup (Templeton and Willman, 1963) = ***lower part of Beckett Limestone of Plattin Group***
Ordovician System (Mohawkian Series)

Bronson Subgroup of Kansas City Group

Bronson formation (**Adams, 1904**; Moore, 1932) - in Kansas
Bronson beds (Wooster, 1905) - in Kansas
Bronson group (Condra, 1935) - in Nebraska
Bronson group (Moore, 1936) - in Kansas
Bronson group (Ellison, 1941) = ***Hertha to Dennis formations of Kansas City Group***
Bronson subgroup of Kansas City group (Moore, 1948; Searight and Howe, 1961)
Bronson subgroup of Kansas City group (Moore, 1949; Moore, et al., 1951) - in Kansas
Bronson Subgroup of Kansas City Group (Payton, 1966; Gentile, 1976; Thompson, 1995)
Bronson Subgroup of Kansas City Group (Jewett, et al., 1968; Mossler, 1973; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Bronson Group (Ravn, et al., 1984) - in Iowa; = ***Hertha to Dennis***
Pennsylvanian System (Missourian Series)

Type area: The Bronson Subgroup was named from exposures in the vicinity of Bronson, Bourbon County, Kansas.

Adams (1904, p. 17) stated "In the northeastern part of the Iola quadrangle, succeeding the Dudley shale, is a heavy limestone formation which has a thickness of from 60 to 80 feet..."

Brown Mountain Rhyolite Porphyry of St. Francois Mountains Intrusive Suite, Hypabyssal Rocks

Brown Mountain rhyolite porphyry (Tolman and Robertson, 1969)
Brown Mountain Rhyolite Porphyry (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Tolman and Robertson (1969, p. 50) stated that the Brown Mountain Rhyolite Porphyry and "...is named from exposures on Brown Mountain, 33N-4E: 1. The outcrop area is approximately 4 square miles."

They added "This is an intrusive sill-like body related to the Breadtray granite in a manner similar to the relation of the Buford granite porphyry to the Slabtown granite. It is apparently a marginal facies which chilled rather rapidly..."

Bryant Knob Formation of Edgewood Group

Bryant Knob Formation of Edgewood Group (1 member) (Amsden, 1974) - from ms. of Thompson and Satterfield
Bryant Knob Formation of Edgewood Group (1 member) (Thompson and Satterfield, 1975; Amsden, 1986; Thompson, 1991, 1993)
Silurian System (Llandoverian Series)

Type section: Thompson and Satterfield (1975, p. 98) stated "We designate the Kissenger roadcut...less than 1 mile northeast of the topographic feature known locally as Bryant Knob, to be the type section for the Bryant Knob Formation, and the Kissenger Limestone Member of the Bryant Knob." Thompson (1993, p. 14) added "This is a roadcut on the west side of Missouri Highway 79, approximately 3 mi south of Clarksville, SW¼ sec. 35, T. 53 N., R. 1 E., Pike County, Missouri."

Thompson (1995, p. 43) stated "Identified as the 'Cyrene member of the Edgewood formation' by Martin et al. (1961a), the Bryant Knob Formation was named by Thompson and Satterfield (1975) from exposures in Pike County. They stated (p. 98) 'We define the Bryant Knob Formation as the bioclastic limestone and dolomitic limestone and shale between the Noix Limestone and the Bowling Green Dolomite. The predominate rock type is the bioclastic limestone, and this is named the Kissenger Limestone Member of the Bryant Knob.'"

Bryant limestone

Bryant or Trenton limestone (Keyes, 1898c) = ***Plattin or Plattin and Kimmswick Limestones***
Bryant limestone (Keyes, 1915, 1923a; 1937a) - rejected "Plattin"
Ordovician System (Mohawkian Series)

The Bryant limestone was proposed by Keyes (1898c, p. 59-61) for limestone underlying the "McCune limestone" (upper Kimmswick Limestone) and overlying the "Folley limestone" (Keyes, 1895; Joachim Dolomite today) in Pike and Lincoln counties, Missouri, named for exposures along Bryant Creek, Lincoln County, Missouri. It has since been interpreted as equivalent to the Plattin or to the Plattin and the lower part (pre-"McCune") of the Kimmswick.

Buck Creek formation

Buck Creek formation (Heald and Mather, 1918?) - in Oklahoma; = ***Church Limestone Member of Howard Formation (part)***
Pennsylvanian System (Virgilian Series)

This may be the same unit Heald and Mather (1918) called **"Bird Creek limestone."**

Buck Mountain Shut-Ins Formation of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Buck Mountain bedded tuff (Anderson, 1962) = ***upper Buck Mountain Shut-Ins Formation***

Buck Mountain andesite flows and tuffs (Anderson, 1962) = ***lower Buck Mountain Shut-ins Formation***
Buck Mountain Shut-Ins Formation Taum Sauk Group, St. Francois Mountains Volcanic Supergroup (Berry, 1976; Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SE¼ sec. 33, T. 34 N., R. 3 E., Iron County, Missouri.

Anderson (1962) named these two units which together comprise the **Buck Mountain Shut-Ins Formation** of Berry (1976); the "andesite flows and tuffs" are the lower part, the "bedded tuff" the upper part of the formation. Anderson (1970) used the names "the tuff of Mill Creek", "tuff and lava flows of Lake Springs", and the base of "Unit A, tuff of Stouts Creek", all to define parts of the unit Berry called Buck Mountain Shut-Ins Formation.

Robertson (*in* Thompson, 1995, p. 10) stated "The Buck Mountain Shut-Ins Formation consists of a sequence of black, andesitic lava flows containing white plagioclase phenocrysts, interbedded with bedded air-fall tuffs and at least one rhyolitic ash-flow tuff. The formation ranges in thickness between 260 and 3,000 ft." Anderson (1962) called this unit the "Black Mountain andesite flows and tuffs", overlain by the base of the "Lindsey Mountain composite ash flows".

Buffalo group

Buffalo group (Buehler, 1922) = ***Everton to Joachim***
Ordovician System (Whiterockian - lower Mohawkian Series)

Buehler used this term for units that were called **"Big Buffalo series"** in Arkansas (Ulrich and Bassler, 1915) and Missouri (Grohskopf, et al., 1939), or **"Buffalo River series"** by Ulrich (1926, 1939).

Buffalo shale

Buffalo shale of Hudson River group (Keyes, 1898c) = ***Maquoketa Shale***
Buffalo Shale (Maquoketa or Richmond) (Rowley, 1916)
Ordovician System (Cincinnatian Series)

Keyes (1898c, p. 59, 61) proposed the name "Buffalo shale" for fossiliferous shales (now identified as the **Maquoketa Shale**) forming the top unit of the Ordovician System in Pike County, Missouri, named for Buffalo Creek in that county. He defined it as underlying the Noix oolite and overlying the "McCune limestone" (Kimmswick). Savage (1913, p. 356) correlated the blue shale at the top of the Ordovician in Pike, Lincoln, and Ralls counties, Missouri, with the Orchard Creek Shale of southern Illinois (which is the upper part of the Maquoketa Group today in southeastern Missouri). This shale has also been called the "Hudson River shale," referring to similar strata in New York, and the "Buffalo Creek shale."

Buffalo River series

Buffalo River series (Ulrich, 1926, 1939) - see **"Big Buffalo series"** and **"Buffalo group"**.
Ordovician System

Buford Granite Porphyry of St. Francois Mountains Intrusive Suite, Hypabyssal Rocks

Buford granite phorphyry (Tolman and Robertson, 1969)
Buford Granite Porphyry (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Tolman and Robertson (1969, p. 37) stated "This unit crops out extensively on Buford Mountain and in the Sing Lake area in Iron County and is named for exposures on Buford Mountain (35N-3E: 27)."

They added (p. 37) that the Buford Granite Porphyry "... is a dense, very fine grained, mottled brown and green porphyritic rock with abundant small light brown orthoclase phenocrysts. Textures range from microgranular...to aphanitic."

"buhr stone" ("buhrstone") beds **of Roubidoux Formation**

"Buhrstone beds" of 2nd Magnesian limestone (Pumpelly, 1873)

Ordovician System (Ibexian Series)

This term was used first by Broadhead (1873, p. 31) for silicious, cellular-structured beds at the top of the **Roubidoux Formation**. He states, "Lying at the base of the Second Magnesian Limestone, and over the Second Sandstone, are found silicious beds, generally cellular, which very much resemble the French Buhr-stone."

Bull Shoals Member

Bull Shoals Member of Cotter Dolomite (**Hedden, 1976**) = ***upper member of Cotter Dolomite***

Ordovician System (Ibexian Series)

Hedden (1976) named the Bull Shoals Member for the uppermost of three members of the Cotter Dolomite, the other two being the Blackjack Knob and Lutie members.

Bull Shoals Mountain chert

Bull Shoals Mountain chert (Cullison, 1944) = ***Powell Dolomite***

Ordovician System (Ibexian Series)

A term used by Cullison (1944, p. 39) for a very persistent, delicately banded chert nodule bed at the base of the Powell Dolomite.

"Burbank" sandstone

"Burbank" sandstone of Croweburg Formation (Anderson and Wells, 1968)

Pennsylvanian System (Desmoinesian Series)

Burgner Formation

Burgner formation (**Searight and Palmer, 1957**; Unklesbay and Palmer, 1958; Hoare, 1961a)

"sandy limestone" of the Burgner formation (Searight and Howe, 1961) = ***"Ladden Branch" limestone of Riverton Formation***

Burgner Formation (Lambert and Thompson, 1990; Thompson, 1995)

Pennsylvanian System (Atokan Series)

Type section: Searight and Palmer (1957) named the Burgner Formation from a rock core drilled by the Missouri Division of Highways in the SW¼ NE¼ sec. 20, 28N-32W, Jasper County, Missouri, in the "Carterville sink" structure 1 mile west of Webb City.

The Burgner core contained about 12 feet of limestone that yielded fusulinids and cephalopods. Thompson (1953) on fusulinids, and Unklesbay and Palmer (1958) on cephalopods, both determined the age of the Burgner limestone to be middle Atokan. Since then, several exposures of sandy calcarenitic limestone in west-central Missouri have been studied, and conodonts from them also indicate an Atokan age (Lambert and Thompson (1990). These exposures of the **"Ladden Branch limestone" of the Riverton Formation** are regarded as a possible facies of the Burgner limestone.

Burlingame Limestone Member of Bern Formation, Nemaha Subgroup, Wabaunsee Group

Burlingame limestone (**Hall, 1896**; Prosser, 1902) - in Kansas

Burlingame Limestone of Nemaha formation (Condra and Bengston, 1915) - in Nebraska

Burlingame limestone (Hinds and Greene, 1915)

Burlingame limestone member of Wabaunsee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Burlingame and Soldier Creek members of Bern Formation***

Burlingame limestone member of Wabaunsee formation (Condra, 1927) - in Nebraska

Burlingame limestone (Moore, 1932; McQueen and Greene, 1938)
Burlingame limestone member of Nemaha limestone (Condra, et al., 1932)
Burlingame limestone formation (3 members) (Condra, 1935)
Burlingame limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Burlingame limestone of Shawnee group (Moore, et al., 1944)
Burlingame limestone member of Willard shale (Branson, 1944b)
Burlingame limestone formation (Greene and Searight, 1949)
Burlingame limestone member of Bern formation (Moore and Mudge, 1956)
Burlingame member of Bern formation (Searight and Howe, 1961)
Burlingame Limestone (Van Eck, 1965) - in Iowa
Burlingame Limestone Member of Bern Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Burlingame Formation (3 members) (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Burlingame Limestone Member of Bern Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Hall (1896), Ver Wiebe and Vickery (1932, p. 111) stated the type section was at "Burlingame, Chase county, Kansas, T. 14s, R. 15e."

Possibly an exposure on a prominent mound mentioned by Hall (1896), 2 miles west of Burlingame, should be considered the type exposure.

In Missouri, Hinds and Greene (1915) called this the "**Tarkio limestone member of the Wabaunsee formation**," McQueen and Greene (1938) and Greene and Searight (1949) the **Burlingame limestone,** and Branson (1944b) the **Burlingame limestone member of the Willard shale.**

Thompson (1995, p. 129) stated "Where it is exposed in Atchison County, the Burlingame Limestone Member...is commonly a single, massive bed of argillaceous limestone that has an average thickness of about 2 ft. The uppermost part of this bed contains a large amount of fossilized material, which is coated with '*Osagia*.' In Nodaway County the member is composed of..[at the base]..about 1 ft of greenish-gray, dense, algal limestone, 3 to 4 ft of calcareous claystone, and of a few inches of slabby limestone." The Burlingame Limestone Member overlies the Silver Lake Shale Member of the Scranton Formation, and is overlain by the Soldier Creek Shale Member of the Bern Formation.

Burlingame shales

Burlingame shales (Haworth, 1895, 1896; Beede, 1898, 1902; Adams, 1903) - in Kansas; = ***Scranton Formation***
Pennsylvanian System (Virgilian Series)

Burlington Limestone

Encrinital group of Burlington (Owen, 1852) - may have included some or all of the Keokuk Limestone as well
Burlington limestone (Hall, 1857; Weller, 1895; Weeks, 1902; Bridge, 1917; Kissling, 1961)
Encrinital or Burlington limestone (Englemann, 1863)
Encrinital group of Burlington (Williams, 1891)
Burlington stage of Osage age (Williams, 1891)
Burlington limestone (Carthage limestone) (Buckley and Buehler, 1904) = ***Keokuk and Warsaw Formations***
"Burlington white chert" (Bridge, 1917) = ***lower part of Burlington Limestone*** at Louisiana, Missouri
Burlington limestone (Keyes, 1934) = ***Burlington and Fern Glen*** - rejected name "Fern Glen"
Burlington formation (Weller and St. Clair, 1928; Spreng, 1961)
Burlington limestone member of Boone limestone (Giles, 1933) - in Arkansas
"lower Burlington limestone" (Kissling, 1961) = "unassigned Osagean limestone" of Kissling, 1960
Burlington Limestone ("White Ledge") (Carter, 1968)
Lower Burlington Limestone (Carter, 1974) = "White Ledge" of Rowley"
Burlington Limestone (Thompson, 1967, 1975, 1986; Thompson and Fellows, 1970; Collinson, et al., 1979)
Mississippian System (Osagean Series)

Type section: Hall (1857, p. 190) stated "The encrinital limestone of Burlington [Owen, 1852, p. 90-140], or, as we shall hereafter term it, the *Burlington limestone*, is characterized by its great numbers of crinoids..." he was referring to beds Owen (1852) had called the "Encrinital group of Burlington" and the "reddish brown Encrinital group of Hannibal." The formation was named for exposures in the bluffs of the Mississippi River Valley at Burlington, Des Moines County, Iowa.

The Burlington Limestone overlies either earlier Osagean strata (Elsey Formation, Fern Glen Formation, or Pierson Limestone) or strata of Kinderhookian age (Chouteau Group or Hannibal Shale), and underlies the Osagean Keokuk Limestone.

Burlington-Keokuk Limestone undifferentiated

Mississippian System (Osagean Series)

A compound term used in places where the Burlington and Keokuk Limestones are difficult to impossible to separate. Greene and Pond (1926, p. 32) called these beds the "Osage group."

Burroak Shale Member of Deer Creek Formation, Shawnee Group

Burroak shale <u>of Deer Creek limestone formation</u> (**Condra and Reed, 1937**, 1943, 1959) **-** in Iowa and Nebraska
Burroak shale member <u>of Deer Creek formation</u> (Moore, 1948; Condra, 1949; Moore, 1949c; Jewett, 1949) **-** in Nebraska
"Burroak" Shale <u>of Deer Creek Limestone</u> (Heckel, et al., 1979)

Pennsylvanian System (Virgilian Series)

Type section: Condra and Reed, 1936, p. 54) located the type section of the Burroak Shale Member as "...road cuts and ravines near Burr Oak school (E½ sec. 21, T. 71 N., R. 43 W., Fremont Co., Iowa), about 6 miles south of Pacific Junction, Iowa."

The **Haynies Limestone Member** occurs in Iowa and Nebraska, and possibly in a few places in Kansas between the **Larsh Shale Member** below and the **Burroak Shale Member** (formerly **Mission Creek**) above. Condra (1927) indicated it also occurred in northern Kansas and northwestern Missouri, but was quite thin where found. If the Haynies limestone is not present, this interval is called the **Larsh-Burroak Shale Member**. However, in Nebraska and Iowa, the three members are separately identified as the Larsh, Haynies and Burroak members of the Deer Creek Formation.

Bushberg Sandstone of Sulphur Springs Group

Bushberg sandstone member <u>of Sulphur Springs formation</u> (**Ulrich, 1904a**; Weller and St. Clair, 1928)
Bushberg formation (Schuchert, 1910)
Bushberg sandstone member <u>of Kinderhook formation</u> (Fenneman, 1911)
Bushberg sandstone (Moore, 1928, Morey, 1936)
Bushberg sandstone (Branson and Mehl, 1934; Branson, 1944a; Sohn, 1960) = ***both Bushberg Sandstone, and Bachelor Formation of Mississippian age***
Bushberg sandstone (Morey, 1935) = ***Bachelor Formation of Mississippian age***
Bushberg sandstone <u>of Sulphur Springs formation</u> (Weller and Sutton, 1940)
Bushberg (Echols and Gouty, 1956) = ***Bachelor Formation of Mississippian age***
Bushberg formation (Mehl, 1960, 1961) - rejected "Sulphur Springs"
Bushberg sandstone <u>of Sulphur Springs group</u> (Koenig, 1961a)
Bushberg formation (Koenig, 1961b)
Bushberg Sandstone (Pierce and Langenhaim, 1974) = ***Bachelor Formation of Mississippian age***; from Branson and Mehl (1934)
Bushberg Sandstone (Thompson, 1979a, 1984, 1986)
Bushberg Sandstone Member <u>of Sulphur Springs Formation</u> (Sable, 1979)
Bushberg Sandstone <u>of Sulphur Springs Group</u> (Thompson, 1993, 1995)

Devonian System (Upper Devonian Series)

Type section: Ulrich (1904a, p. 110) named the sandstone at the top of his Sulphur Springs formation the Bushberg member, named for exposures at Bushberg, Jefferson County, Missouri.

Branson and Mehl (1933d, p. 174) redesignated the Sulphur Springs formation as a group, and the Bushberg to the Bushberg Sandstone. It is the "Old Red Sandstone" Broadhead (1873, p. 45-47) discussed from Warren County, Missouri. The Bushberg Sandstone often is overlain by a thin (1-ft±) well-cemented sandstone of Mississippian age (Bachelor Formation) that in the past was usually not distinguished from the Bushberg. Therefore, any reference of Bushberg Sandstone prior to 1970 may include the Bachelor at the top.

Butler coal bed

Butler coal bed (Broadhead, 1874) = ***Lexington Coal Bed of Labette Shale***

Pennsylvanian System (Desmoinesian Series)

Butler Hill Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Butler Hill granite (**Tolman and Robertson, 1969**)
Butler Hill Granite (Robertson, *in* Thompson, 1995)

Precambrian Erathem

Type section: Tolman and Robertson (1969) stated "Near the town of Syenite (1½ miles west of Knob Lick), St. Francois County, there are good exposures of a light pink granite (here designated the Butler Hill granite from exposures on Butler Hill, 34N-6E: 7aa)."

Robertson (*in* Thompson, 1995, p. 12) stated "The Butler Hill Granite [Tolman and Robertson, 1969] (p. 42) "...is a medium to coarsely-medium grained light red to pink granite composed chiefly of red potash feldspar and quartz, but with significant amounts of light gray to buff plagioclase, green to dark brown biotite, and (rarely) hornblende..."

Butler Hill Group of St. Francois Mountains Volcanic Supergroup

Butler Hill Group (**Sides, 1976**; Robertson, *in* Thompson, 1995)

Precambrian Erathem

The **Butler Hill Group** was proposed by Sides (1976) for volcanic rock units in the Lake Killarney quadrangle area of Iron and Madison counties, Missouri. The classification was reviewed by Robertson (*in* Thompson,1995, p. 11).

Buxton formation

Buxton formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***Weston Shale and Lawrence Shale***

Pennsylvanian System (Missourian Series)

Buzzard's Cave facies

Buzzard's Cave facies of Chouteau Limestone (Frey, 1967) = ***"Chouteau Limestone undifferentiated"***

Mississippian System (Kinderhookian Series)

C

Cabaniss Subgroup of Cherokee Group

Cabaniss group (**Oakes, 1953**) - in Oklahoma
Cabaniss group of Cygnian Substage (Howe and Searight, 1953)
Cabaniss formation (Wanless, 1955)
Cabaniss subgroup of Cherokee group (Howe, 1956; Searight and Howe, 1961; Hoare, 1961a)
Cabaniss Group (Branson, et al., 1965) "= Senora Formation in Oklahoma"
Cabaniss Formation (Jewett, et al., 1968; Heckle, et al., 1979; Baars and Maples, 1998) - in Kansas
Cabaniss Subgroup of Cherokee Group (Neal, 1969; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type area: Oakes (1953) named the Cabaniss group from the village of Cabaniss, in T. 6 N., R. 12 E., Pittsburg County, Oklahoma.

Thompson (1995, p. 100) noted, "The Cabaniss Subgroup varies in thickness from essentially a featheredge in the northern region and in the vicinity of the Lincoln Fold, up to slightly more than 280 ft in the Forest City Basin. Its average thickness in western Missouri south of the Missouri River is approximately 185 ft." The Cabaniss Subgroup is overlain by the basal beds of the Marmaton Group, the Excello Shale, and overlies the Seville Formation of the Krebs Subgroup of the Cherokee Group.

Cairo till

Cairo till of Gravoisan series (Keyes, 1941b)

Quaternary System (Pleistocene Series)

Keyes (1941b, p. 156) used "Cairo till" in a chart for a till underlying his "Bagnell till" and overlying the "Lafayette gravel". It is a part of his "Gravoisan series."

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calcarenitic carbonate

"calcarenitic carbonate of upper Bonneterre Formation" (Howe, et al., 1972) **= *Whetstone Creek Member of Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Howe, et al. (1972) used this term in referring to the unit Kurtz, et al. (1973) named the **Whetstone Creek Member of the Bonneterre Formation.**

Calciferous

Calciferous sandrock (early geologists; Swallow, 1855)
Calciferous group (early geologists)

Cambrian and Ordovician Systems

Terms applied originally in early New York reports to beds occupying the interval between "Birdseye (Lowville) limestone" (Plattin) above and "Potsdam sandstone" (Lamotte) below. In Missouri the terms were used by the early geologists for Cambrian and Ordovician beds. Swallow (1855?) included seven formations in his Calciferous sandrock: (descending) First Magnesian limestone, First or Saccharoidal sandstone, Second Magnesian limestone, Second sandstone, Third Magnesian limestone, Third sandstone, and Fourth Magnesian limestone. The terms "Magnesian limestone series" and "Ozark series" have also been used in the same sense.

Calhoun limestone

Calhoun limestone (Beede, 1898) - in Kansas; **= *Deer Creek Formation***

Pennsylvanian System (Virgilian Series)

Calhoun Shale of Shawnee Group

Calhoun sandstone and shale (**Beede, 1898**) - in Kansas
Calhoun shale (Haworth, 1898; Beede, 1902b; Haworth and Bennett, 1908; Moore, 1937; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Calhoun shales (Adams, 1903) - in Kansas
Calhoun shale member of Shawnee formation (Hinds and Greene, 1915)
Calhoun shale member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Jones Point shale of Calhoun shale member of Shawnee formation (Condra, 1927) - in Nebraska; **= *Calhoun Shale*** (some sections)
Calhoun shale member of Shawnee formation (Condra, 1927) - in Nebraska; **= *Calhoun Shale and lower two members of Topeka Formation***

Calhoun shale member of Shawnee formation (Condra, 1930) - in Nebraska; = ***Calhoun Shale and lower three members of Topeka Formation***
Calhoun shale (Moore, 1932; Condra, et al., 1932) = ***Calhoun Shale and lower two members of Topeka Formation***
Jones Point shale member of Calhoun shale (Moore, 1932, 1936; Ver Wiebe and Vickery, 1932; Condra, et al., 1932) - in Kansas and Nebraska; = ***Calhoun Shale***
Topeka-Calhoun shales (Condra, 1933) - in Nebraska; = ***Topeka Formation***
Calhoun shale (Condra, 1933) - in Nebraska; = ***Turner Creek Shale Member of Topeka Formation***
Calhoun shale formation (Condra, 1935) - in Nebraska; = ***Calhoun Shale and lower two members of Topeka Formation***
Calhoun shale (Moore, 1936, 1937) - in Kansas; = ***Calhoun Shale and lower two members of Topeka Formation***
Calhoun shale (McQueen and Greene, 1938) = ***Calhoun Shale and lower two members of Topeka Formation***
Calhoun shale (Branson, 1944b) = ***Calhoun Shale and lower three members of Topeka Formation***
Calhoun formation (Moore, 1948; Searight and Howe, 1961)
Calhoun Shale (Jewett, et al., 1968; French, et al., 1988; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Calhoun Shale (Burchett, 1970, 1971) - in Nebraska
Calhoun Shale (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named the "Calhoun sandstone and shale" by Beede (1898), Moore (1936, p. 190) located the type section in the "Calhoun Bluffs, near center S line sec. 14, T. 11 S., R. 16 E., on north side of Kansas river, 3 miles northeast of Topeka [Shawnee County, Kansas]."

Part of the "Atchison shales" of Keyes (1899, 1901b, 1937, 1941), and "Calhoun shale member of Shawnee formation" of Hinds and Greene (1915), Thompson (1995, p. 125) stated "In northwestern Missouri, the Calhoun Shale, except for a few beds of thin, argillaceous limestone near its base, is composed of light- to medium-gray, silty shale. The formation is absent, or not differentiated in many places in the subsurface north and west of its outcrop area in southern Holt and Nodaway counties. Exposures range from less than 5 ft, to a maximum of 10 ft." The Calhoun Shale overlies the Ervine Creek Limestone Member of the Deer Creek Formation, and is overlain by the Hartford Limestone Member of the Topeka Formation.

Calico
Newton or Calico (sandstone) (Ulrich, 1939) - in Arkansas; = ***lower sandstone of Everton Formation***
Ordovician System (Whiterockian Series)

Callaway facies of Cedar Valley Limestone
Callaway limestone (**Keyes, 1894a**; Greger, 1909) = St. Laurent Limestone in part
Callaway limestone (Wheeler, 1896; Weeks, 1902; Branson and Greger, 1915; Branson, 1922, 1941, 1944a, 1944b; Kindle and Miller, 1939; Keyes, 1940b, 1941b, 1941g; Dott, 1941; Croneis, 1944; Cooper, 1945)
Callaway? limestone (Keyes, 1898c) - in northeastern Missouri
Callaway limestone (Wilson, 1922; Savage, 1925) - "Upper Devonian"
Callaway formation (Counselman, 1935)
Callaway limestone (Keyes, 1939b) - replaced "Cedar Valley" in Iowa
Callaway formation (McQueen and Hinchey, 1941) = Mineola facies of Fraunfelter
Callaway limestone (Keyes, 1941e) = considered "St. Laurents" a junior synonym of "Callaway"
Callaway limestone (Cooper, et al., 1942) = Coralville limestone of Iowa
Callaway (Stainbrook, 1945)
Callaway formation (Unklesbay, 1952a) = ***Cedar Valley Limestone***; **first use of "Callaway" for entire formation**
Callaway limestone facies of Callaway formation (Unklesbay, 1952a)
Callaway Formation (Unklesbay, 1955; Koenig, 1966, 1967)
Callaway formation (Koenig, 1961a)
Callaway Limestone of Hunton Limestone Megagroup (Swann and Willman, 1961)
Callaway Limestone Lithofacies of Cedar City Formation (Fraunfelter, 1967)

Callaway facies of Cedar City formation (Sleeman, 1967)
Callaway facies of Callaway Formation (Koenig, 1967)
Callaway facies of Cedar Valley Limestone (Collinson, et al., 1967a; Thompson, 1993, 1995)
Callaway lithofacies of Cedar Valley Formation (Schumacher, 1972)
Callaway Member of Cedar Valley Limestone (Kocken and Carrozi, 1991)
Devonian System (Middle Devonian Series)

Type section: Keyes (1894a, p. 30, 43) applied the name Callaway to the Devonian limestones in central Missouri previously noted by Owen (1852), Swallow (1855, 1860), and Broadhead (1873). The unit was named for its development on Highway O, SW NW NW NE 1, 46N-9W, in Callaway County, Missouri.

The term Callaway was applied to two limestones which were later regarded as being distinct units by Greger (1909, p. 374-375), who recognized that Keyes had confused the St. Laurent of southeastern Missouri with the Callaway of central Missouri and suggested restriction of the term. Other workers have used the Callaway essentially as designated by Greger, but they have differed as to age relationships. Unklesbay (1952a, p. 30-39) considered the Callaway formation to consists of the "Ashland limestone facies," "Cooper limestone facies," and "Callaway limestone facies". The Missouri Geological Survey (1961) then considered the Callaway formation to consist of the "Ashland facies," "Cooper facies," and "Mineola facies." In some old reports it was called Hamilton. Today it is regarded as the **Callaway facies of the Cedar Valley Limestone**, and is distinct in lithological makeup from the Cooper and Mineola facies of the Cedar Valley (Thompson, 1993).

Calwood Limestone Physiofacies

Calwood Limestone Physiofacies of Mineola Crinoidal, Arenaceous, Coarse-grained Limestone Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***Mineola facies of Cedar Valley Limestone***
Devonian System (Middle Devonian Series)

Cambrian System

Cambric Period (Keyes, 1914, 1941a, 1941c)
Cambrian Period (Chenowith, 1968)
Cambrian System (Hayes and Knight, 1961; Thompson, 1995)
Cambrian System

These are the rocks of the oldest Paleozoic period. Prior to 1908 the entire Cambrian and Ordovician systems were classified as Cambro-Ordovician; from 1908 to 1912 these rocks were referred to the Cambrian; and from then until 1930 the Cambrian-Ordovician boundary was drawn at the Gasconade-Roubidoux contact. Ulrich (1911) added the Ozarkian System between the Cambrian and Canadian Systems, and placed the boundary between the Cambrian (restricted) and Ozarkian Systems at the Elvins-Potosi contact. Bridge (1930, p. 55) made the top of the Cambrian the top of the Eminence and the base of the Ordovician the base of the Gunter Sandstone. This is the present definition. In Missouri, all of the Cambrian succession is regarded as Upper Cambrian in age, except for perhaps the very basal part of the Lamotte Sandstone in certain places.

Cambric - A variant on "Cambrian" coined by Keyes.

Canadian Series

Canadian series (**Dana, 1874**; Adams, *in* Adams and Ulrich, 1905)
Canadic Period (Schuchert, 1910)
Canadian System (Ulrich, 1911) = ***Jefferson City to Powell Dolomites***
Canadian system (Ulrich, *in* Ulrich and Bassler, 1915; Grohskopf and Hundhausen, 1937; McQueen and Greene, 1938; Ulrich and Cooper, 1938) = ***Roubidoux to Powell***
Canadian or early Ordovician system (Wilson, 1922) = ***Roubidoux to Powell***
Canadian system of Ulrich (McQueen, 1931a, 1931b; Grohskopf, et al., 1939) = ***Roubidoux to Powell***

Canadian system (Farrar and McManamy, 1937) = ***Powell Dolomite only***
Canadian series (Beveridge, 1951; **Twenhofel, et al., 1954**) = ***Gasconade to Powell***
Canadian System (Flower, 1957)
Canadian Series (Martin, et al., 1961; Thompson, 1991) = ***Ibexian Series***
Canadian (Ibexian) Series (Thompson, 1995)
Ordovician System (Ibexian Series)

Ulrich (1911) proposed the Cambrian System for strata from LaMotte through Derby-Doerun, Ozarkian System for Eminence - Gasconade (and Roubidoux?) succession, and **Canadian System** from the base of the Jefferson City to the top of the Smithville - Powell (top of present-day Ibexian Series). The term Canadian had previously been used in the east by Dana (1874, p. 214; 1875, p. 142, 163, 182), and Ulrich adopted Dana's term. In 1915, Ulrich (*in* Ulrich and Bassler), in an unpublished but much-quoted manuscript, redefined the Canadian to include Roubidoux through Powell strata in Missouri. **Twenhofel, et al., (1954)** finalized the Canadian (now Ibexian) Series to include the Gasconade through Powell (or Smithville or Blackrock in Arkansas) formations.

Recent revision of the World Standard Section for the Ordovician System has proposed to replace the "Canadian Series" with the **Ibexian Series**, the latter defined from more complete successions in the state of Utah. The Ibexian (Canadian) Series is the basal (oldest) Ordovician series. It includes strata in Missouri from the base of the Gasconade Dolomite (base of the Gunter Sandstone Member) to the top of the Smithville Formation. It is an adaptation (Twenhofel, 1954) of Ulrich's Canadian system. Prior to then, Canadian was only for the upper part of the Lower Ordovician Roubidoux or Jefferson City and above. The Eminence-Potosi of the upper Cambrian and Gasconade Dolomite were part of the Ozark or Ozarkian series or system.

Canville Limestone Member of Dennis Formation, Bronson Subgroup, Kansas City Group

Canville limestone member <u>of Dennis formation</u> (**Jewett, 1932**; Moore, 1936) - in Kansas
Canville limestone member <u>of Galesburg shale</u> (McQueen and Greene, 1938; Branson, 1944b)
Canville limestone <u>of Dennis formation</u> (Condra and Scherer, 1939) - in Nebraska
Canville limestone member <u>of Dennis formation</u> (Moore, 1948)
Canville limestone member <u>of Dennis limestone</u> (Moore, et al., 1951) - in Kansas
Canville member <u>of Dennis formation</u> (Searight and Howe, 1961)
Canville Limestone Member <u>of Dennis Formation</u> (Payton, 1966; Gentile, 1976; Thompson, 1995)
Canville Limestone Member <u>of Dennis Formation</u> (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Canville Limestone Member <u>of Dennis Limestone</u> (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Named by Jewett (1932), Moore (1936, p. 91) stated the unit was named from "Canville Creek, Neosho county [Kansas]. Typical exposures about 3 miles west of Stark in roadcuts at NE cor. sec. 26, T. 26 S., R. 20 E., and in the SE¼ sec. 20, T. 27 S., R. 19 E."

Thompson (1995, p. 114) stated "The Canville Limestone Member... is found in only a few counties in western Missouri, but it is well-represented in Bates County. It is a dark-gray, thin, lenticular limestone whose maximum thickness is about 4 in." The Canville overlies the Galesburg Shale, and is overlain by the Stark Shale Member of the Dennis Formation.

<u>**Cap-au-Gres sandstone**</u>
Cap-au-Gres sandstone (Keyes, 1898c) = ***St. Peter Sandstone***
Ordovician System (Mohawkian Series)

A synonym for the **St. Peter Sandstone** used by Keyes (1898c, p. 59, 60), Cap-au-Gres was named for the development at Cap au Gres, a headland on the Illinois side of the Mississippi River in Calhoun County, Illinois.

Cape Girardeau limestone

Cape Girardeau limestone (Shumard, 1855; Schuchert, 1897) = ***Girardeau Limestone***
Cape Girardeau limestone (Swallow, 1855) = ***Sexton Creek, and possibly Girardeau, Limestone***
Cape Girardeau limestone (Buehler, 1907) = ***Sexton Creek, and possibly, Girardeau, Limestone***
Cape Girardeau limestone (Savage, 1908) = ***Girardeau and Leemon formations***
"Cape Girardeau or Alexandrian formation" (Savage, 1909) = ***Girardeau Limestone?***
Cape Girardeau (Girardeau) limestone (Alexandrian series) (Scoby, 1938) = ***Girardeau Limestone?***
Ordovician system (Cincinnatian Series)

Cape Girardeau marble

Cape Girardeau marble of Trenton limestone (Shumard, 1855) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

Cape Girardeau sandstone

Cape Girardeau sandstone of Hudson River Group (Shumard, 1863) = ***Thebes Sandstone***
Cape Girardeau sandstone (Shumard, 1873) = ***Thebes Sandstone***
Ordovician System (Cincinnatian Series)

This is a sandstone named by Shumard (1863, p. 156) as the middle formation of his "Hudson River group" (Maquoketa Group) in Cape Girardeau County. It is separated from the overlying Cape Girardeau Limestone by 25 feet of blue shale (Orchard Creek Shale) overlain by 25 feet of yellow shale. It is underlain by 60 feet of dark shale (Cape La Croix Shale) which overlies the "Receptaculite limestone" (Kimmswick Limestone). Dake (1918, p. 172) stated that the **Thebes Sandstone** is the "Cape Girardeau sandstone" of Shumard. It was named for Cape Girardeau, Missouri.

Cape La Croix Shale of Maquoketa Group

Ordovician System (Cincinnatian Series)

Type section: Thompson (1991, p. 226) stated "Gealy (1955, p. 94a)... described an excellent exposure of about 4 ft of Thebes Sandstone and 18 ft of an unnamed lower shale of the Maquoketa Group, which he named the 'Randol shale.' This section is herein chosen to serve as the type for the Cape La Croix Shale...", an exposure on Cape La Croix Creek in the northeastern edge of Cape Girardeau, Cape Girardeau County, Missouri; SW SW SW 13, 31N-13E.

The lower shale of the Maquoketa Group, the "Maquoketa shale" beneath the Thebes Sandstone, went unnamed, except for Gealy's attempt in an unpublished manuscript (1955), until Thompson (1991) named it to complete the Maquoketa Group in southeastern Missouri. The Cape La Croix overlies the Cape Limestone, and is overlain by the Thebes Sandstone of the Maquoketa Group.

Cape Limestone

Cape limestone (Gudstadt, 1958; Pulse and Sweet, 1960)
Cape formation (Martin, et al., 1961a)
Cape Limestone of Maquoketa Group (Templeton and Willman, 1963)
Cape Limestone (Sweet, et al., 1975; Ross, et al., 1982; Thompson, 1982, 1991,1995)
Ordovician System (Cincinnatian Series)

Type section: The name Cape Limestone was proposed by Gudstadt (1958) to replace "Fernvale," and supported by Templeton and Willman (1963) to replace "Ada limestone" in Oklahoma and "Fernvale limestone" in southern Illinois and southeastern Missouri. The type section is (Sweet, et al., 1975, p. 6) in a "...roadcut on Main Street, 100 yards north of junction of Main and Broadway streets in the city of Cape Girardeau..." (center W½ NW¼ NE¼ 5, 30N-14E).

The Cape Limestone is the a thin carbonate unit formerly identified as "Fernvale" overlying the Kimmswick limestone and underlying the lower shale of the Maquoketa Group in the southeastern Missouri area, or the Maquoketa

Shale in east-central Missouri (Jefferson County). Gealy (1955, p. 83) had earlier stated that the Fernvale fauna is a recurring one, and until such time as a rock unit bearing it can be shown to be lithologically continuous with the type Fernvale Formation of Tennessee, use of the name "Fernvale" should be restricted to central Tennessee and dropped in all other areas.

Cape marble

Cape marble (Shumard, 1855) = ***Kimmswick Limestone***
Cape Girardeau marble
Ordovician System (Mohawkian Series)

The name "Cape marble" was first used by Shumard (1855) in print, but apparently was locally known prior to his usage, He used it as a subdivision of his Trenton. Later it was known as the "Receptaculites limestone" (Shumard, 1873, p. 264). According to Wilmarth (1938) it is part of the **Kimmswick Limestone**. It was named for Cape Girardeau, southeastern Missouri, near which it occurs.

Captain Creek Limestone Member of Stanton Formation, Lansing Group

Captain Creek ("Meadow") limestone member of Stanton limestone (Condra, 1935)
Captain Creek limestone member of Stanton limestone (**Newell, 1936**; Moore, 1936; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Captain Creek limestone of Stanton formation (Condra and Scherer, 1939) - in Nebraska
Captain Creek member of Stanton formation (Searight and Howe, 1961)
Captain Creek Limestone Member of Stanton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Captain Creek Limestone Member of Stanton Limestone (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Captain Creek Limestone Member of Stanton Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (1936), Moore (1936, p. 132) located the type section as "...exposures on Captain Creek 2 miles east of Eudora, Kan. Roadcut near SE cor. sec. 3, T. 13 S., R. 21 E. [Douglas County, Kansas]".

This limestone was originally called the "**Meadow limestone bed** of Stanton limestone member of Lansing formation" (Condra, 1930), from Nebraska. Thompson (1995, p. 119) stated "The Captain Creek Limestone Member...consists of bluish-gray, dense limestone, which has pronounced vertical joints. The member occurs either as a thin- and even-bedded unit or as a single, massive bed. It is commonly oolitic, and ranges from 2 to 4 ft thick." The basal member of the Stanton Formation, the Captain Creek Limestone Member overlies the Vilas Shale, and is overlain by the Eudora Shale Member of the Stanton Formation.

Carbonic

This is a variant of "Carboniferous" (Mississippian - Pennsylvanian) used several times by Keyes.

Carboniferous System

Lower Carboniferous (early geologists) = ***Mississippian System***
Subcarboniferous (early geologists) = ***Mississippian System***
Coal Measures of Carboniferous order (Conybaere, 1822) = ***Pennsylvanian System***
Subcarboniferous group (Owen, 1838) - included Chattanooga Shale of Upper Devonian age
Carboniferous or "Mountain limestone on the Mississippi" (Englemann, 1847) = ***Mississippian System***
Carboniferous system (Keyes, 1896c) = ***Mississippian and Pennsylvanian Systems***
Lower Carboniferous system (early geologists; Buckley, 1903) = ***Mississippian System***
Mississippian and Pennsylvanian Subsystems

A term formerly used for the rocks of the Mississippian and Pennsylvanian Systems of the present terminology, Carboniferous has recently been rejuvenated as the formal name for the system, including Mississippian and Pennsylvanian as subdivisions (**Subsystems**) of the Carboniferous.

Carlyle limestone

Carlyle limestone (Kirk, 1896; Haworth, 1898a, 1898b) - in Kansas; = ***Plattsburg Formation?***
Carlyle limestone (Adams, 1903) - in Kansas; ***"= Stanton limestone"***

Pennsylvanian System (Missourian Series)

Carterville formation

Carterville formation (Smith and Siebenthal, 1907; Spreng, 1961) - some sections = ***Hindsville Limestone***
Carterville (Hindsville) Formation (Thompson, 1972) - regarded most Carterville exposures to be Hindsville Limestone

Mississippian System (Chesterian Series)

An Upper Mississippian (Chesterian) formation often occurring in depressions in the Keokuk Limestone ("Boone formation") in southwestern Missouri, the Hindsville Limestone ("Carterville formation") is overlain by Cherokee strata of Pennsylvanian age, or by the fine-grained Batesville Sandstone of Chesterian age. It was named by Smith and Siebenthal (1907) for exposures just west of Carterville, Jasper County, Missouri. Thompson (1986) regarded most Carterville exposures as outliers of the **Hindsville Limestone.**

Carthage limestone

Carthage limestone (Gallaher, 1898) = ***Keokuk and Warsaw limestones***
Burlington limestone (Carthage limestone) (Buckley and Buehler, 1904) = ***Keokuk and Warsaw limestones***

Mississippian System (Osagean Series)

This is a name used by Gallaher in 1898 (p. 30, 37) for the Warsaw and Keokuk formations, and in 1900 (p. 162-166) for the Burlington-Keokuk exposed at Carthage, Jasper County, Missouri.

Carthage Marble

Carthage Marble (early geologists) = ***Warsaw Formation***

Mississippian System (Meramecian Series)

The industry name for stone quarried near Carthage, Jasper County, Missouri, for building stone and facing for stone construction. Most of the quarries were in the **Warsaw Formation**, and the rock was not a "marble" in the true sense, but a good-grade high-quality limestone.

Carver Creek Granite Porphyry of St. Francois Mountains Intrusive Suite, Hypabyssal Rocks

Carver Creek granite porphyry (Tolman and Robertson, 1969)
Carver Creek Granite Porphyry (Robertson, *in* Thompson, 1995)

Precambrian Erathem

Type section: This unit was named by Tolman and Robertson (1969, p. 39) who stated "This rock unit crops out at the base of Hogan Mountain along Carver Creek, 33N-3E: 27, 28, and 29, where it occurs in a sill-like mass approximately 100 ft thick which has intruded units of the Stouts Creek rhyolite."

Tolman and Robertson (1969, p. 39) added, the Carver Creek Granite Porphyry "...is very fine grained with a green and purple mottled groundmass containing fine-grained clusters of mafic minerals. Phenocrysts are quite large, up to 10 mm in length, and consist of dark pink orthoclase. The phenocrysts comprise about 5 percent of the rock in a microgranitic groundmass."

<u>Cass</u>

Cass Formation (Burchett, 1970, 1971) - in Nebraska; = ***Stranger Formation***

upper limestone member <u>of Cass Limestone</u> (Goebel, et al., 1989) - in Iowa and Nebraska; = ***Amazonia Limestone Member of Lawrence Formation***

Pennsylvanian System (Virgilian Series)

Castlewood Limestone Member of Spechts Ferry Formation, Decorah Group

Castlewood Member <u>of Spechts Ferry Formation</u> (**Templeton and Willman, 1963**; Willman and Kolata, 1978; Kolata, et al., 1986)

Castlewood Limestone Member <u>of Spechts Ferry Formation</u> (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 107) stated "The Castlewood Member is here named for the village of Castlewood, St. Louis County, Missouri, 1½ miles northwest of the type section, which is in the Mincke section." Thompson (1991, p. 186) added "This section is an exposure in the south bluff of the Meramec River, along the Burlington-Northern Railroad, ¼ mi northeast of Mincke Siding, near the center of E½ SE¼ SE¼ sec. 21, T. 44 N., R. 4 E., Manchester 7½' Quadrangle..."

Thompson (1995, p. 34-35) stated "The Castlewood...is the basal unit of the Decorah Group, and is a single 2-6-ft bed of light-gray, finely crystalline limestone above a thin yellow-brown clay (**Diecke K-bentonite bed**). The limestone is very similar to that of the underlying Plattin, but included fossils show an unconformity present between the Plattin and basal Decorah rocks, marked by the...bentonite." The Castlewood Limestone Member overlies the thin Diecke K-bentonite and Macy Limestone of the Plattin Group, and is overlain by the Glencoe Shale Member of the Spechts Ferry Formation.

<u>Cave limestone</u>

Cave limestone (Swallow, 1866, 1867) = ***Wyandotte Formation (Argentine Limestone?)***

Pennsylvanian System (Missourian Series)

<u>Cedar Bluff felsite</u>

Cedar Bluff felsite (Anderson, 1962) = ***Pond Ridge Rhyolite***

Precambrian Erathem

This was a unit named by Anderson (1962), the upper part of which was included by Berry (1976) in his **Pond Ridge Rhyolite** of the Taum Sauk Group, St. Francois Mountains Volcanic Supergroup.

Cedar Bluff Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Cedar Bluff rhyolite (Anderson, 1962)

Cedar Bluff Rhyolite (Berry, 1976; Robertson, *in* Thompson, 1995)

Precambrian Erathem

Type section: Named by Anderson (1962), and formally proposed by Berry (1976), the type section is in the NE¼ NW¼ sec. 3, T. 33 N., R. 3 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The Cedar Bluff Rhyolite is a brownish-maroon to gray ash-flow tuff containing 25-50 percent white plagioclase phenocrysts. The formation is exposed on Sheperd Mountain and Pond Ridge. It is approximately 1,900 ft thick."

<u>Cedar City Formation</u>

Cedar City Formation (Fraunfelter, 1964, 1967a; Sleeman, 1967; Fullerton, 1973; Huddle and Repetski, 1981) ***= Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

Fraunfelter (1967) proposed the name Cedar City Formation to replace the "Callaway Formation," the Cedar City named from a roadcut on U.S. Highway 54, just north of Jefferson City, in Callaway County, just north a few miles of the town of Cedar City. He regarded the Callaway Limestone of central Missouri to be a direct correlative of the Cedar Valley Limestone of Iowa, and proposed the name to reflect this relationship. Thompson (1995, p. 52) stated "However, the close similarity of 'Cedar City' to 'Cedar Valley' led the Missouri Geological Survey to reject 'Cedar City' to avoid possible confusion." It was for these reasons that Thompson (1993) finally proposed to adopt "Cedar Valley Limestone" for the Middle Devonian unit in Missouri that was known to extend from Iowa and Illinois into Missouri.

<u>Cedar Creek limestone</u>

Cedar Creek limestone <u>of Platte shales</u> (Condra and Bengston, 1915) **-** in Nebraska: **= *Ost Limestone Member of Tecumseh Shale***

Cedar Creek limestone <u>of Tecumseh shale member of Shawnee formation</u> (Condra, 1927) **= *Ost Limestone Member of Tecumseh Shale***

Pennsylvanian System (Virgilian Series)

<u>Cedar Fork Member</u>

Cedar Fork Member <u>of Burlington Limestone</u> (Collinson, et al., 1979)

Mississippian System (Osagean Series)

This is the uppermost member of the three members of the Burlington Limestone in northeastern Missouri. They have never been used other than in occasional references. The other two are the Dolbee Creek Member (lower) and Haight Creek Member (basal).

Cedar Vale Shale Member of Scranton Formation, Sacfox Subgroup, Wabaunsee Group

Cedar Vale shale member <u>of Scranton shale</u> (**Condra, 1930**, 1935; Moore, 1932; Condra, et al., 1932)
Cedar Vale shale (Moore, 1936, 1949; Moore, et al., 1951) **-** in Kansas
Cedar Vale shale (McQueen and Greene, 1938; Moore, 1948)
Cedar Vale shale member <u>of Scranton shale</u> (Branson, 1944b; Moore and Mudge, 1956)
Cedar Vale shale formation (Greene and Searight, 1949)
Cedar Vale member <u>of Scranton formation</u> (Searight and Howe, 1961)
Cedar Vale Shale (Van Eck, 1965) **-** in Iowa
Cedar Vale Shale Member <u>of Scranton Shale</u> (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Cedarvale (*sic.*) Shale Member <u>of Scranton Formation</u> (Burchett, 1970) **-** in Nebraska
Cedar Vale Formation (Frest, et al., 1981) **-** in Iowa and Missouri
Cedar Vale Shale Member <u>of Scranton Formation</u> (Pabian and Diffendal, 1989) **-** in Nebraska
Cedar Vale Shale Member <u>of Scranton Formation</u> (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1930), Moore (1936, p. 212) located the type section "Near Cedar Vale, Chatauqua county, Kansas. Exposed in east bluff of Caney River, in sec. 12, T. 34 S., R. 8 E."

Thompson (1995, p. 129) stated "The Cedar Vale Shale Member...is composed mostly of gray shale, which contains clay-ironstone concretions. The **Elmo coal bed** and its associated underclay occur at the top of the member. The Cedar Vale is between 10 and 15 ft thick." The Cedar Vale Shale Member overlies the Happy Hollow Limestone Member, and is overlain by the Rulo Limestone Member of the Scranton Formation.

Cedar Valley Limestone

Limestones of Cedar Valley (Owen, 1850, 1852?) - in Iowa
Cedar Valley limestone (**McGee, 1891**) - in Iowa
Cedar Valley Limestone (Collinson, et al., 1967; Huddle and Repetski, 1981; Kocken and Carozzi, 1991; Thompson, 1993, 1995)
Cedar Valley Formation (Schumacher, 1972)
Cedar Valley Formation (Klapper and Barrick, 1983; Bunker, et al., 1985) - In Iowa
Cedar Valley Group (Bunker, et al., 1986; Witzke, et al., 1988; Bunker and Witzke, 1991) - In Iowa
Cedar Valley Group (Woodruff, 1990) - in northeastern Missouri
Devonian System (Middle Devonian Series)

Type section: The Cedar Valley was named by McGee (1891) for limestones exposed along the Cedar River in east-central Iowa. Witzke et al. (1988, p. 14) stated "No type locality for the Cedar Valley has ever been proposed, but a primary reference section at the Conklin Quarry near Iowa City has been proposed (Bunker, et al., 1985)."

Thompson (1995, p. 51) stated "Thompson (1993) proposed to place all strata in Missouri previously called 'Callaway Formation' within the Cedar Valley Limestone. He stated (p. 129-130) 'The several facies that compose the Cedar Valley Limestone in Missouri have each at some time been given a separate name. The three most widespread facies, **Callaway**, **Cooper**, and **Mineola**, were initially regarded as separate formations (Branson, 1923, 1944a, 1944b). However, their interbedded nature and areal distribution has led present stratigraphers to regard them as facies within a single formation...'"

Cement City Limestone Member of Drum [Dewey] Limestone, Linn Subgroup, Kansas City Group

Cement City limestone bed <u>of Chanute shale member of Kansas City formation</u> (**Hinds and Greene, 1915**; McCourt, 1917)
Cement City limestone member <u>of Drum limestone</u> (Moore, 1932)
Cement City limestone (Condra, et al., 1932)
Cement City limestone member <u>of Drum limestone</u> (Condra, 1935) - in Nebraska
Cement City limestone member <u>of Chanute shale</u> (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Cement City limestone member <u>of Drum limestone</u> (Moore, 1948)
Dewey (Cement City) limestone member <u>of Drum limestone</u> (Moore, 1949) - in Kansas
Cement City limestone member <u>of Drum limestone</u> (Jewett, 1949) - in Kansas
Cement City member <u>of Drum formation</u> (Searight and Howe, 1961)
Cement City Member <u>of Drum Formation</u> (Burchett, 1965) - in Nebraska
Cement City Limestone Member <u>of Drum Formation</u> (Burchett and Reed, 1967; Burchett, 1971) - in Nebraska
Lower limestone of Drum (Cement City) Limestone (Merrill and Powell, 1980) = ***Cement City Limestone Member***
Cement City Limestone Member <u>of Drum Formation</u> (Howe, 1986)
Cement City Limestone Member <u>of Dewey Limestone</u> (Watney, et al. 1989) - in Kansas; = ***Cement City and Corbin City Members of Drum Limestone?***
Cement City Limestone Member <u>of Dewey Limestone</u> (Watney and Heckel, 1994) - in Kansas
Cement City Member <u>of Drum Limestone</u> (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: The Cement City Member was originally named by Hinds and Greene (1915). Howe (1986) located the type section of the Cement City Member as the quarry of the Missouri Portland Cement Company Sugar Creek plant, SW SW sec. 13, T. 50 N., R. 32 W, at Cement City, Jackson County, Missouri.

Thompson (1995, p. 115) stated "The Cement City Member of the Drum Limestone is a gray to buff, thin-bedded limestone that is locally suboolitic in the upper part. This suboolitic limestone may possibly prove to be the Corbin City Limestone of Kansas. The member is 5 to 10 ft thick."

The Dewey Limestone Member of the Drum Limestone (Watney, et al., 1989) was named by Ohern (1910) from sections in Oklahoma. The type section is at an old quarry of the Dewey Portland Cement Company near Dewey, Washington County, Oklahoma (sec. 26, T. 27 N., R. 13 E.). Moore (1948) proposed to replace the name Cement City with Dewey, as the latter had priority over the former. However, other state Surveys choose to retain the name Cement City "until question of stratigraphic identity of the type of this unit (near Kansas City) and the Dewey is removed."

Cenozoic Era

Cenozoic Era

Cenozoic is a major geologic time term, meaning "recent life", employed to cover the youngest geologic periods, the Quaternary and Tertiary Periods (Wilmarth, 1938). It follows the Paleozoic ("ancient life") and Mesozoic ("middle life"?) Eras.

Thompson (1995, p. 137) stated "Rocks of the Cenozoic Era mantle much of northern Missouri and are composed principally of glacial, alluvial, and eolian deposits of Pleistocene age. Older rocks of Paleocene, Eocene, and Pliocene? age are also present within the state, but with the exception of those of the Pliocene?, are restricted to...the extreme southeastern part of Missouri."

Central Marble boulder member

Central Marble boulder member (Buckley, 1909) = ***Davis Formation***,

Cambrian System (Upper Cambrian Series)

This was a descriptive term used by Buckley (1909, p. 34-35) for a member of the **Davis Formation** that contains large spherical solid limestone or dolomitic "marbles" of algal material within a shale. It was also so called the **"marble bed"** of the Davis Formation.

Central Plains Orogen

Precambrian Erathem

Robertson (*in* Thompson, 1995, p. 5) stated "The oldest rocks known to occur in Missouri are early Proterozoic, 1.6-1.8 Ga [billion years]..., metamorphic and granitic rocks of the **Central Plains Orogen**...These rocks originated as an oceanic arc complex, which was subsequently accreted to the previously existing North American Continent. This terrane does not crop out but occupies a subcrop belt beneath Paleozoic and volcanic rocks approximately 150 miles wide from the northwest corner of the state to at least as far as southwest Missouri where...it represents the floor complex upon which the acidic ash-flow tuffs and flows of the St. Francois (and Spavinaw) terranes were extruded."

***Chaetetes* limestone**

Chaetetes* limestone** (Broadhead, 1874; Haworth, 1898) = ***Higginsville Limestone

"Chaetetes" limestone of Cherokee formation (Knight, 1930) = ***Blackjack Creek Limestone***

Chaetetes* limestone** of Cherokee formation (Unklesbay, 1955) = ***Blackjack Creek Limestone

Pennsylvanian System (Desmoinesian Series)

Champlainian series

Champlainian series (Schuchert and Barrell, 1914; Twenhofel, et al., 1954) = ***Whiterockian and Mohawkian Series***

Champlainian Series (Martin, et al., 1961a; Templeton and Willman, 1963; Barnes, et al., 1973; Thacker and Satterfield, 1997) = ***Whiterockian and Mohawkian Series***

Ordovician System (Whiterockian and Mohawkian Series)

A term formally applied to the middle Series of the Ordovician system, Champlainian included the Mohawkian (upper) and Chazyan (lower) Stages, and was between the upper Ordovician Cincinnatian Series and lower Ordovician Canadian (Ibexian) Series. Today the term is meaningless, as only the lower three-fourths of the Whiterockian is Middle Ordovician, the upper Whiterockian and Mohawkian Series included in the Upper Ordovician (Webby, 1998).

Chanute Shale of Linn Subgroup, Kansas City Group

Chanute shales (**Haworth and Kirk, 1894**) - in Kansas; = ***shales between Dennis and Iola formations***
Chanute shale (Adams, 1903, 1904) - in Kansas; = ***shales between Dennis and Iola formations***
Chanute shale member of Wilson formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***shales between Dennis and Iola formations***
Chanute shale (Beede and Rogers, 1908) = ***Quivira to Chanute shales***
Chanute shale (Haworth and Bennett, 1908) - in Kansas; = ***shale between Drum and Iola formations***
Chanute shale member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917; Bartle, 1933) = ***Quivira shale, Drum (Dewey) limestone, Chanute shale, Iola Formation, and Lane (Liberty Memorial) Shale***
Chanute shale member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Quivira shale, Drum (Dewey) limestone, and Chanute shale***
Chanute shale member of Kansas City formation (Condra, 1927) - in Nebraska; = ***Quivira shale, Drum (Dewey) limestone, and Chanute shale***
Chanute shale (Moore, 1929; Moore, 1936)
Chanute shale member of Chanute shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b) = ***Quivira shale, Drum (Dewey) limestone, Chanute shale, Iola formation, and Lane (Liberty Memorial) shale***
Union Station member of Chanute shale (Clair, 1943)
Chanute formation (Moore, 1949; Moore, et al., 1951) - in Kansas
Chanute formation (Searight and Howe, 1961)
Chanute Formation (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska
Chanute Shale (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Chanute Formation (Howe, 1986)
Chanute Shale (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Ver Wiebe and Vickery (1932, p. 116) located the type section near "Chanute, Neosho county, Kansas, T. 27s, R. 18e." Moore (1936, p. 109) stated it was near "Chanute, Neosho county, Kansas. typically exposed in SE¼ sec. 33, T. 26 S., R. 18 E., along highway and at several places in central part of T. 28 S., R. 18 E."

Haworth and Kirk (1894) first proposed the unit called "Chanute shales", which included strata between the Dennis Formation and the Iola Formation (Cherryvale, Drum and Chanute formations), and possibly up to the Wyandotte Formation (Clair, 1943). Haworth and Bennett (1908) restricted the Chanute to the shale between the Drum and Iola formations, as presently used. Hinds and Greene (1915) used the term in the broad sense as "Chanute shale member of the Kansas City formation". McQueen and Greene (1938) restricted it to the present unit as the **"Chanute shale member of the Chanute shale"**. It was Moore (1929, 1936) who proposed the simple name **Chanute shale** (in a restricted sense) for the present use of the name. As currently used, the Chanute Shale overlies the Drum (or Dewey) Limestone, and is overlain by the Paola Limestone Member of the Iola Formation.

Charette limestone

Charette limestone (Broadhead, 1873) = ***Kimmswick Limestone***
Charette or Receptaculite limestone (Pumpelly, 1873) = ***Kimmswick Limestone***
Charette limestone (Keyes, 1937a, c; 1941) - rejected "McCune" and "Kimmswick"

Ordovician System (Mohawkian Series)

This name was proposed by Broadhead (1873, p. 49-50) for upper Trenton beds. They underlie what Broadhead referred to as the Upper Silurian "Crinoidal limestone" and overly the Middle Trenton limestone. Broadhead believed it to be the same as the "Receptaculites limestone" of Shumard. Bridge (1930, personal communication to Wilmarth, 1938) stated this limestone probably represents the **Kimmswick Limestone** as now restricted. It was named for exposures on Charette Creek, Warren County, Missouri. Wilmarth spells the name with two r's, "Charrette", but it is printed in Broadhead as "Charette."

"Chariton" conglomerate

"Chariton" conglomerate (early workers) = ***Warrensburg Sandstone Member of "upper unnamed formation" of Pleasanton Group***
Pennsylvanian System (Missourian Series)

Thompson (1995, p. 111) stated "The coarse, locally-developed, limestone conglomerate, which is at the based of the channel-fill deposits at some localities, is the **"Chariton" conglomerate** of earlier workers and it is also regarded as a facies of the Warrensburg."

Chartresan series

Chartresan series (Keyes, 1933, 1938c, 1941b) = ***upper Meramecian and lower Chesterian Series***
Mississippian System (Meramecian and Chesterian Series)

This term was used by Keyes (1941b, p. 156) for a series including (descending) Pella Shale (of Iowa), (Ste.) Genevieve limestone, (St.) Louis limestone, and Spergen limestone. It overlies his "Mississippian series" and underlies his "Oshawanan series".

Chattanooga Shale

Chattanooga black shale (Hayes, 1891) - in Tennessee
Chattanooga shale (Adams and Ulrich, 1905) - southwestern Missouri, rejected name "Noel"
Chattanooga shale (Ulrich, 1915) = ***unnamed lower shale of Sulphur Springs Group***
Chattanooga shale (Moore, 1928) - rejected name "James River"
Chattanooga shale (Giles, 1933) - also used "Noel" shale and "Hannibal shale"
Chattanooga shale (Kindle and Miller, 1939) - also used "James River shale" and "Noel shale"
Chattanooga shale (Koenig, 1961a)
Chattanooga shale (Mehl, 1961) - in east-central and southeastern Missouri (= ***Grassy Creek Shale***), Noel Shale in southwestern Missouri
Chattanooga Shale (Thompson and Fellows, 1970, Thompson and Satterfield, 1975; Thompson, 1993, 1995) - in southwestern Missouri
Devonian System (Upper Devonian Series)

Type section: The Chattanooga Shale was named by Hayes (1891, p. 143) for Chattanooga, Tennessee, which is situated on a belt of shale originally mapped by Safford as “Black shale.”

Extensively exposed in southwestern Missouri, the Chattanooga Shale had earlier been called the "Eureka shale" by geologists of the Arkansas Geological Survey. This name was also used in Missouri, but the name was preoccupied. Ulrich, therefore, (1904a) proposed the name "Noel shale". But later (Ulrich, 1911,1912; Adams and Ulrich, 1905) noted that it seemed probable that the Noel shale was most likely the direct equivalent of the Chattanooga Shale exposed in Tennessee, and therefore, the name Chattanooga came into general use for the southwestern Missouri black shale (Moore, 1928, p. 108).

Ulrich (1911, pl. 29) designated the term "James River shale", but there seems no reason for regarding this shale as different from Chattanooga (Moore, 1928, p. 108). The age of this formation has been the subject of much controversy, having been considered both Devonian and Mississippian at different times and by different authors. It is now regarded essentially universally as Late Devonian. The Chattanooga Shale overlies lower Ordovician (Ibexian) strata over most of its extent in southwestern Missouri, but does rest on the Middle Devonian Fortune Formation in a small area of Barry County, Missouri. It is overlain by the Bachelor Formation and succeeding Compton Limestone of early Mississippian (Kinderhookian) age.

Chautauquan Series

Chautauquan Series (Cooper, et al., 1942) = ***lower Upper Devonian***
Devonian System (Upper Devonian Series)

<u>Chazyan</u>

Chazyan series (Ulrich, 1926, 1939) = ***Everton - Joachim***
Chazyan group (Folger, 1928) = ***St. Peter - Joachim***
Chazyan (Edson, 1927, 1929) = ***Everton - Joachim***
Chazyan (Kay, 1929; Thiel, 1937) = ***St. Peter - Joachim***
Chazyan Stage <u>of Champlainian Series</u> (Martin, et al., 1961a; Templeton and Willman, 1963) = ***Everton - Joachim***
Chazyan Stage <u>of Champlainian Series</u> (Barnes, et al., 1973) = ***St. Peter - Joachim***
Ordovician System (Whiterockian an/or lower Mohawkian Series)

This general time-rock term, originally proposed for strata in New York, was adopted in Missouri to include the lower "middle Ordovician" formations; (in ascending order) the Everton (Whiterockian) and (Mohawkian) St. Peter, Dutchtown, and Joachim formations.

Checkerboard Limestone Member of Hepler Formation, Pleasanton Group - of Heckel and Watney (in press)

Checkerboard limestone (Searight and Howe, 1961) "= Exline member of Middle formation of Pleasanton Group"
Checkerboard Limestone (Thompson, 1995) "= Exline Limestone Member of "middle unnamed formation" of Pleasanton Group"
Checkerboard Limestone Member of Hepler Formation (Heckel and Watney, 2001 [in press]) - in Kansas
Pennsylvanian System (Missourian Series)

The Checkerboard Limestone was named from northern Oklahoma, and has been regarded by some as the equivalent of the **Exline Limestone Member** of Missouri. However, Heckel and Watney (in press) consider them to be separate units.

Chelsea Sandstone Member of Scammon Shale, Cabaniss Subgroup, Cherokee Group

Chelsea sandstone (**Ohern, 1914**) - in Oklahoma
Chelsea sandstone member <u>of Scammon formation</u> (Searight, et al., 1953)
Chelsea (Skinner) sandstone member <u>of Senora formation</u> (Branson, 1954a) - in Oklahoma
Chelsea member <u>of Scammon formation</u> (Searight and Howe, 1961)
Chelsea Sandstone Member <u>of Senora Formation</u> (Branson, et al., 1965) - in Oklahoma
Chelsea Sandstone Member <u>of Cabaniss Formation</u> (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Chelsea Member (of Scammon Formation) (Gentile, 1976)
Chelsea Sandstone Member <u>of Scammon Formation</u> (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Ohern (1914), Baars and Maples (1998, p. 39) stated that the Chelsea was "Named for exposures that form prominent escarpment from upper branches of Whiteoak Creek, south and west to Chelsea, Rogers County, Oklahoma."

Thompson (1995, p. 101) stated "The Chelsea Sandstone Member...is a fine-grained micaceous chan- nel sandstone that locally cuts out lower Scammon units."

Cheltenham Formation

Cheltenham Fireclay seam (**Wheeler, 1896**)
Cheltenham formation (McQueen, 1943; Searight and Howe, 1961)
Cheltenham fire clay (Branson, 1944b)
Cheltenham formation <u>of Cherokee group</u> (Branson (1944b)
Cheltenham Clay (Wanless, 1975)
Cheltenham Formation (Thompson, 1979, 1995)
Pennsylvanian System (Atokan or Desmoinesian Series)

Type section: McQueen (1943, p. 38) stated "The name Cheltenham was first used by Wheeler, who applied it to a fire clay seam occurring just above the base of the Cherokee group in the Cheltenham district in the south part of the city of St. Louis."

Over most of its extent, Cheltenham strata rest on Ordovician rocks. The first identifiable formation overlying the Cheltenham is the Blackjack Creek Limestone, of mid-Desmoinesian age. It is possible that the Cheltenham is Desmoinesian in age, and not Atokan, but this cannot be proven at this time.

Chemung

Chemung group (Swallow, 1855; Winchell, 1869) = ***Upper Devonian and Kinderhookian***
Chemung rocks "at Kimmswick, east-central Missouri" (Weller, 1898) = ***Sulphur Springs Group***
Chemungian series (Keyes, 1914) = ***Snyder Creek Shale***, lower upper Devonian
Chemungan series (Keyes, 1915) - early Late Devonian (Frasnian)
Devonian and Mississippian Systems (Upper Devonian Series and Kinderhookian Series)

Chemung is an eastern term for part of the upper Devonian. It was used in Missouri until 1861 when Meek and Worthen (p. 167-178) recognized that the strata to which the term was applied are younger. They named the strata formerly in their "Chemung group" the "Kinderhook group," which later became the **Kinderhookian Series** of the Mississippian System

The term also was used by Keyes (1915, p. 253) for a series of Late Devonian ("Devonic") rocks represented by the Snyder (Creek) shale. It overlies the "Senecan series" (Middle Devonian Cedar Valley Limestone) and underlies the "Waverlyan series" (Grassy [Creek] shale).

Cherokee Group

Cherokee shale (Hinds, 1912; Hinds and Greene, 1915; McQueen and Greene, 1938) - may extend up to upper part of Marmaton Group
"shale and coal member of Cherokee formation" (Greene and Pond, 1926) = ***Cabaniss Subgroup of Cherokee Group?***
Cherokee formation (Greene, 1933; McQueen, 1943)
Lower Cherokee formation (McQueen and Greene, 1938) = ***Warner Sandstone***
Upper Cherokee formation (Clair, 1943)
Cherokee group (Branson, 1944b; Searight and Howe, 1961)
Cherokee Group (Jewett, et al., 1968; Baars ande Maples, 1998) - in Kansas
Cherokee Group (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type area: This group was named by Haworth and Kirk (1894) for rocks exposed in Cherokee County, southeastern Kansas.

The Cherokee Group is subdivided into two subgroups, the upper Cabaniss Subgroup, and the lower Krebs Subgroup. Thompson (1995, p. 97) stated "The Cherokee Group contains most of the mineable coal beds in Missouri, and is predominantly shale, with minor carbonate, and sandstone...The base is at the top of the Riverton Formation; the top is at the base of the Marmaton Group...the base of the Excello Shale...Thus, the Cherokee Group contains the strata of all of the Venteran and the early part of the Cygnian Stages."

Cherokee limestone

Cherokee limestone (Jenney, 1893) = **Keokuk-Burlington Limestones undifferentiated**
Mississippian System (Osagean Series)

A term used by Jenney (1893, p. 178, 186, 191-202) for a limestone he believed is representative of the Warsaw or St. Louis epoch. It forms the top division of the Subcarboniferous in southwestern Missouri except where locally subcarboniferous shales overlie it. Wilmarth (1938) says that it is practically the same as the Boone limestone, which is an older name, and it conflicts with Cherokee shale of Pennsylvanian age. It was named for Cherokee County, Kansas.

Cherryvale Formation of Linn Subgroup, Kansas City Group

Cherryvale shales of Erie limestone (**Haworth, 1896**) - in Kansas
Cherryvale shales (Adams, 1903) - in Kansas
Cherryvale shale (Haworth and Bennett, 1908) - in Kansas
Cherryvale shale member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917; Bartle, 1933)
Cherryvale shale member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Cherryvale shale member of Kansas City formation (Condra, 1927) - in Nebraska
Cherryvale shale (4 members) (Moore, 1932)
Cherryvale shale ("one foot above 2nd limestone from base") (Gunnell, 1933)
Cherryvale shale ("between 1st and 2nd limestones above base") (Gunnell, 1933) = ***Block Limestone Member***
Cherryvale shale (3 members) (McQueen and Greene, 1938; Branson, 1944b) = ***Fontana, Block and Wea Members only***
Cherryvale shale (4 members) (Clair, 1943) = ***Fontana, Block, Wea, and Westerville Members only***
Cherryvale shale formation (3 members) (Condra and Reed, 1943, 1959) - in Nebraska; = ***Fontana, Block and Wea Members only***
Cherryvale shale (5 members) (Moore, 1948; Moore, et al., 1951) - in Kansas
Cherryvale formation (5 members) (Searight and Howe, 1961)
Cherryvale Formation (3 members) (Landis and Van Eck, 1965) - in Iowa; = ***Fontana, Block, and Wea Members only***
Cherryvale Shale (5 members) (Jewett, et al., 1968; Pabian and Diffendal, 1989) - in Kansas
Cherryvale Formation (5 members) (Gentile, 1976; Howe, 1986; Thompson, 1995)
Cherryvale ? Shale (Heckel, et al., 1979) - in Kansas
Cherryvale Formation (5 members) (Swade, et al., 1981; Ravn, et al., 1984) - in Iowa
Cherryvale Shale (4 members) (Watney, et al., 1989; Watney and Heckel, 1994) - in Kansas; ***excluded Quivira Shale Member***

Pennsylvanian System (Missourian Series)

Type section: Named by Haworth (1898), Ver Wiebe and Vickery (1932, p. 116) located the type section as at Cherryvale, Montgomery county, Kansas, T. 32s, R. 17e."

Thompson (1995, p. 114-115) stated "The Cherryvale Formation is composed of a succession of limestone and shale that is extremely variable in thickness and in lithology. Its thickness variation is especially pronounced in the Fontana and Westerville Members...The average thickness of the Cherryvale Formation in western and northern Missouri exposures is about 45 ft." Previously comprised of 5 members (Thompson, 1995), Heckle and Watney (1994; in press) removed the upper member (Quivira Shale Member) and placed it in the overlying Dewey Formation.

The Cherryvale Formation is the basal formation of the Linn Subgroup. It overlies the Winterset Limestone Member of the Dennis Formation of the Bronson Subgroup, and is overlain by the Drum (or Dewey) Limestone.

Chester group - See Chesterian Series.

Chesterian Series

Chester limestone (Meek and Worthen, 1861a)
Chester group (Worthen, 1866)
Chester limestone (Worthen, 1866)
"Chester Stage of Genevievian age" (Williams, 1891)
Chester group (Buehler, 1907)
Chester division (Girty, 1915a)
Chester series (Weller, 1939)
Chesterian series (Weller, et al., 1948; Spreng, 1961) = ***Aux Vases - Vienna***
Chesterian Series (Swann, 1963) = ***Aux Vases - Vienna***
Chester Series (Yochelson and Saunders, 1967)
Chesteran Stage of Upper Mississippi Series (Goebel, 1968) - in Kansas
Chesterian Series (Thompson, 1971, 1979a, 1986) = ***Renault - Vienna***

Chesterian Series (Maples and Waters, 1987; Thompson, 1995) **=** ***Ste. Genevieve - Vienna***
Mississippian System

Type area: Worthen (1860, p. 312-313) designated the "Chester limestone" in Pope County, Illinois, the name derived from the town of Chester, Randolph County, Illinois. It was originally proposed as the "Chester group".

The uppermost (youngest) series of the Mississippian System, the Chesterian Series in Missouri comprises (ascending) the Ste. Genevieve, Aux Vases, Renault, Yankeetown, Paint Creek, Cypress, Golconda, Hardinsburg, Glen Dean, Tar Springs, and Vienna formations. The basal formation of the series was the Aux Vases Sandstone ("Ferruginous sandstone" of Worthen) until 1987 when the base was redefined (Maples and Waters, 1987) to correspond with the St. Louis - Ste. Genevieve formational boundary. In southwestern Missouri Chesterian strata include the Hindsville Limestone and Batesville Sandstone.

Chocolate limestone

Chocolate limestone (Swallow, 1867, 1868) **=** ***Tarkio Limestone Member of Zeandale Formation***
Chocolate limestone (Condra, 1910) - in Nebraska; **=** ***Tarkio Limestone Member of Zeandale Formation?***
Pennsylvanian System (Virgilian Series)

Chouteau Group

Chouteau Group (Broadhead, 1874) **-** proposed to replace "Chemung group"; **=** ***Kinderhookian Series?***
Chouteau group (Williams, 1891)
Chouteau group (Beveridge and Clark, 1952) = all Kinderhookian formations except Hannibal and Bachelor, = Kinderhookian part of St. Joe Group of southwestern Missouri and northwestern Arkansas
Hampton (Chouteau) Group (Carlson, 1963) **-** northeastern Missouri
Chouteau Group (Thompson, 1979a, 1986) **-** four formations, central and southwestern Missouri
Mississippian System (Kinderhookian Series)

Broadhead (1874, p. 26) proposed the term "Chouteau group" to replace the "Chemung" of old Missouri reports. His term included (ascending) the Lithographic (Louisiana) limestone, Vermicular sandstone and shale (Hannibal Formation), and Chouteau limestone. He said he named the group for the chief member of the group, the Chouteau limestone. This term is essentially synonymous with "Kinderhook group", which was older. Beveridge and Clark (1952, p. 71-73) followed Broadhead by using the Chouteau in an unrestricted sense and ranking it as a group, which includes (ascending) the Compton, Sedalia, and Northview formations. The term Kinderhookian as now defined is regarded as a time, or time-rock term (a series), and includes the Chouteau Group, Bachelor Formation, and Hannibal Formation. The Louisiana Limestone is Late Devonian in age, and is no longer part of either Kinderhookian or Chouteau. In southwestern Missouri, Chouteau strata comprise the Compton Limestone and Northview Formation.

Chouteau limestone, "Chouteau Limestone undifferentiated", "Chouteau Group undifferentiated"

Chouteau limestone (Swallow, 1855) = upper part of "Chemung Group" of early geologists
Upper Chouteau Limestone (Swallow, 1855) **=** ***Sedalia Formation of Chouteau Group***
Chouteau limestone (Meek and Worthen, 1861; Weller, 1898a; Bassler, 1950)
Chouteau limestone of Chemung group (Shumard, 1873) **=** ***Chouteau, Fern Glen, and Pierson***
Chouteau (Schuchert, 1897) **=** ***Compton Limestone***
Chouteau limestone (Shepard, 1898) **=** ***Pierson Limestone***
Chouteau limestone member of Kinderhook formation (Keyes, 1900a)
Chouteau limestone (Weller, 1906**;** Branson, 1918) **=** ***Compton Limestone***, in southwestern Missouri
Chouteau limestone (restricted) (Moore, 1928) **-** did not include Sedalia Formation
Chouteau (Laudon and Bowsher, 1949) **"=** ***Compton*****"**
Chouteau group (undifferentiated) (Koenig, 1958) **-** rejected Compton, Sedalia and Chouteau formation of Moore, 1928
"Chouteau group undifferentiated" (Spreng, 1961)

Chouteau formation (Collinson, 1961)
Chouteau group undifferentiated ("Chouteau limestone") (Koenig, et al., 1961a)
Chouteau Formation (Brill, 1965) "= McCraney of Illinois"
Chouteau Limestone (Yochelson and Saunders, 1967) = ***Compton Limestone***
Chouteau Limestone (restricted) (Thompson, 1979a) - northeastern Missouri
Chouteau Limestone undifferentiated (Thompson, 1986)
"Chouteau Group undifferentiated" (Thompson, 1995)
Mississippian System (Kinderhookian Series)

Type section: Swallow (1855, p. 101-103) proposed the name "Chouteau" for exposures at Chouteau Springs in Cooper County, central Missouri. He included beds between the "Encrinital limestone" (Burlington) above and the Vermicular sandstone and shale (Hannibal Formation) below.

Moore (1928, p. 78, 82-105, 149-158) restricted the Chouteau limestone to the lower member and designated the upper part as the Sedalia formation. Beveridge and Clark (1952, p. 71, 73) followed Broadhead (1874, p. 26) by using the Chouteau in an unrestricted sense and ranking it as a group, including both Moore's Chouteau (Compton Limestone), and Sedalia as part of the Chouteau.. In the area of Swallow's Chouteau, the Chouteau is often undifferentiated, and the entire carbonate succussion is called **"Chouteau Group (or Limestone) undifferentiated."**

Thompson (1986, p. 62) stated "In portions of northeastern Missouri, there are strata of the Chouteau Group identified only as 'Chouteau Group undifferentiated' or 'Chouteau Limestone.' These rocks are not lithologically part of the Compton, Sedalia, or 'unnamed limestone,' but constitute two distinct, separate limestone formations within the Chouteau Group. One of them closely resembles the McCraney Limestone of western Illinois, and is discussed under 'McCraney Limestone.'

"Lithologically the other Chouteau limestone is mostly finely to medium crystalline, even bedded and very fossiliferous, often crinoidal.... In sharp contrast, the 'McCraney Limestone' is a very irregularly to wavy bedded, fine-grained mudstone, with scattered pockets of fossils. At some sections in the vicinity of the Lincoln arch, in Pike and Ralls counties, the Chouteau is represented only by the crystalline limestone; at other sections, the crystalline limestone is overlain by the 'McCraney Limestone.'"

Church Limestone Member of Howard Formation, Sacfox Subgroup, Wabaunsee Group

Church limestone of Howard limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska
Church limestone member of Howard limestone (Moore, 1932)
Church limestone member of Howard limestone (Moore, et al., 1951) - in Kansas
Church member of Howard formation (Searight and Howe, 1961)
Church Limestone Member of Howard Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Church Limestone Member of Howard Limestone (Pabian and Diffendal, 1989) - in Nebraska
Church Limestone Member of Howard Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Proposed by Condra (1927), the Church limestone was named from exposures on Turner Creek where it crosses the Church farm southeast of Du Bois, Nebraska.

Thompson (1995, p. 128) stated "The Church Limestone Member...is a single bed of medium- to dark-bluish-gray, brittle limestone, which weathers to rusty-brown. It is fossiliferous and contains an abundance of gastropods, brachiopods, crinoids, and bryozoans. The member is about 18 in thick." The Church Limestone Member overlies the Aarde Shale Member, and is overlain by the Winzeler Shale Member of the Howard Formation.

Cincinnati group

Cincinnati group (Worthen, 1866; Broadhead, 1874) = ***Kimmswick and Maquoketa formations***
Ordovician System (Cincinnatian Series)

Cincinnati is an eastern term used by Broadhead (1874, p. 18) and other early Missouri geologists for strata now regarded as upper Ordovician (Cincinnatian Series) in age. It was also known as the "Hudson River group."

Cincinnatian Series

Ordovician System

Type area: The Cincinnatian Series was named from strata exposed in the southern Ohio region around Cincinnati.

This term was derived from the redefinition of Cincinnati "group" to a series. In southeastern Missouri it is represented by (ascending) the Cape Limestone, Maquoketa Group (Cape La Croix Shale, Thebes Sandstone, Orchard Creek Shale, and Girardeau Limestone) and Leemon Formation; in east-central and northeastern Missouri by the Maquoketa Shale, Cyrene Limestone, and Noix Limestone. Prior to the 1990's, "Cincinnatian" was synonymous with "Upper Ordovician." However, attempts at worldwide (international) correlation have moved the base of the Upper Ordovician down section to the St. Peter Sandstone, essentially making the terms "Middle" and "Upper Ordovician" meaningless. North American series "Mohawkian" and "Cincinnatian" are now used, with no reference to "Lower," "Middle" or "Upper" Ordovician.

City Bluffs shales

City Bluffs (Scranton) shales (Condra and Bengston, 1915) - in Nebraska; = ***White Cloud, Happy Hollow, and Cedar Vale Members of Scranton Formation***

Pennsylvanian System (Virgilian Series)

Clay Creek Limestone Member of Kanwaka Formation, Shawnee Group

Clay Creek limestone member of Kanwaka formation (**Moore, 1932**)
Clay Creek limestone member of Kanwaka shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Clay Creek limestone member of Kanawha (*sic.*) shale (Branson, 1944b)
Clay Creek member of Kanwaka formation (Searight and Howe, 1961)
Clay Creek Limestone Member of Kanwaka Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Clay Creek Limestone Member of Kanwaka Formation (Burchett, 1970) - in Nebraska
Clay Creek Limestone Member of Kanwaka Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type Section: Named by Moore (1932), Moore (1936, p. 171) located the type section "On Clay Creek, just west of Atchison [Atchison County, Kansas], [where] this rock forms a low falls. Its thickness is about 2 feet."

Thompson (1995, p. 124) stated "The Clay Creek Limestone Member...is a gray, argillaceous limestone, which is a persistent marker bed within the Kanwaka over wide areas of northern Kansas and northwestern Missouri. It is about 2 ft thick." The Clay Creek Limestone Member overlies the Jackson Park Shale Member, and is overlain by the Stull Shale Member of the Kanwaka Formation.

Clayton Formation of Midway Group

Clayton formation (Farrar, 1935)

Tertiary System (Paleocene Series)

Type area: The Clayton Formation was named for exposures near Clayton, Barbour County, Alabama. The Clayton was first recognized in Missouri by L.W. Stephenson, according to Matthes (1933, p. 1003), from an examination of fossils collected by Matthes near Ardeola, Stoddard County.

The basal formation of the Midway Group, of Paleocene age, the Clayton normally overlies the Owl Creek Formation, of Upper Cretaceous (Gulfian) age, and is overlain by the Porters Creek Clay. Thompson (1995, p. 138) stated "The Clayton Formation in its outcrop area is a fossiliferous, calcareous, glauconitic sand or clay, which contains varying amounts of limonite. The formation is distinctively green, which makes it noticeable and easy to recognize in the outcrop area. In the subsurface the Clayton becomes increasingly calcareous, and in the deeper parts of the Mississippi

Embayment within Missouri it becomes a fossiliferous, glauconitic limestone...The thickness ...varies from a few inches to 10 ft in the outcrop area, to as much as 20 ft in the subsurface."

Clear Creek Chert

Clear Creek limestone or chert (**Worthen, 1866**) = Grassy Knob, Little Saline (Backbone), and Clear Creek formations in Illinois

Clear Creek limestone or chert (Ulrich, 1904a, 1911) - first use of name in Missouri

Clear Creek formation (Savage, 1910) - restricted, from Keyes "Grand Tower"

Clear Creek chert of Ulsterian series (Savage, 1920a) - as presently used, upper chert only

Clear Creek limestone (Keyes, 1939d, 1940c) = ***Bailey and Clear Creek formations***

Clear Creek chert (Croneis, 1944) = ***Grassy Knob Chert and/or Clear Creek Chert***

Clear Creek chert of Ulsterian group (Weller, 1944)

Clear Creek formation of Middle Devonian Series (Koenig, 1961a)

Clear Creek Formation of Lower Devonian Series (Koenig, 1967)

Clear Creek Chert (Collinson, et al., 1967; Thompson, 1993, 1995)

Devonian System (Lower Devonian Series)

Type section: Worthen (1866, p. 126) named the "Clear creek limestone" for exposures on Clear Creek, northern Union County, Illinois.

The term was originally used by Worthen (1866, p. 126-129) in southwestern Illinois for the fossiliferous limestones overlying the Niagara (Bainbridge) limestone and underlying the Oriskany (Beauvais) sandstone. Ulrich (1904a, p. 110) restricted the Clear Creek limestone to beds said to be of Oriskany age, and named the beds of New Scotland (Helderberg) age the Bailey Limestone. This was the first use of Clear Creek in Missouri. Savage (1910, p. 116) divided the Grand Tower formation of Keyes in Missouri into the Grand Tower formation (restricted) and the Clear Creek formation. A formation of Lower Devonian age, the Clear Creek is overlain by the Middle Devonian Grand Tower Limestone and underlain by the Little Saline Limestone. The unit is often so cherty it is called the "Clear Creek Chert."

Clear Creek Sandstone

Clear Creek Sandstone (Broadhead, 1874) = ***Warner - Bluejacket formations***

Clear Creek sandstone (Greene, 1918) - "an extension of Bartlesville sandstone of Oklahoma"

Clear Creek sandstone member of Cherokee formation (Greene and Pond, 1926) = ***Warner - Bluejacket formations***

Clear Creek or Bartlesville sandstone member of Cherokee formation (Greene, 1933) = ***Warner - Bluejacket formations***

Pennsylvanian System (Desmoinesian Series)

Clear limestone - A shortened form of Clear Creek limestone used by Keyes (1941b).

Devonian System (Lower Devonian Series)

"Clement grainstone facies" **of Glaize Creek Member of Hager Limestone, Plattin Group**

Clement Member of Grand Detour Formation (Templeton and Willman, 1963)

"Clement grainstone facies" of Glaize Creek Member of Hager Limestone (Thompson, 1991)

Ordovician System (Mohawkian Series)

Templeton and Willman (1963, p. 86) named the Clement Member of their Grand Detour Formation "...for Clement Station, Ste. Genevieve County, southeastern Missouri. The type section is half a mile north of Zell..." This is the same type section as that of the Establishment Shale Member of the Bloomsdale Limestone. Thompson (1991) identified this unit informally as the **"Clement grainstone facies"** of the usually very fine-grained to mudstone Glaize Creek Member of the Hager Limestone.

Clement Member

Clement Member of Grand Detour Formation of Plattin Subgroup (Templeton and Willman, 1963) = ***Glaize Creek Member of Hager Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

Clifton City Intraclastic Limestone Physiofacies

Clifton City Intraclastic Limestone Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***part of Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

Clinton limestone

Clinton oolitic limestone (Rowley, 1907) = ***Noix Limestone and Bryant Knob Formation***, northeastern Missouri

Clinton limestone (Savage, 1908) = ***Sexton Creek and Bainbridge? formations***, southeastern Missouri

Ordovician and Silurian Systems (Cincinnatian and Llandoverian Series)

According to Wilmarth (1938), Clinton rocks formed the basal division of the Niagara group . The term "Clinton" was used in Missouri by Gallaher (1900, p. 143) and Rowley (1908, p. 20, 46) for the basal Silurian strata in Pike County. Later the beds which were considered Clinton were put in the **Alexandrian Series** after it was defined by Savage in 1908.

Coal City Limestone Member of Pawnee Formation, Appanoose Subgroup, Marmaton Group

Coal City limestone member of Pawnee limestone (**Cline, 1941**)

Coal City limestone member of Pawnee formation (Greene and Searight, 1949)

Laberdie limestone member of Pawnee limestone (Moore, et al., 1951) - in Kansas; "= **Coal City member** of Pawnee Formation"

Coal City member of Pawnee formation (Cline and Greene, 1950; Searight and Howe, 1961)

Coal City Limestone (Manos, 1967) = Bankston Fork Limestone in Illinois; Universal Limestone in Indiana

Coal City Limestone Member of Pawnee Formation (Gentile, 1976; Thompson, 1995)

Coal City Limestone Member of Pawnee Limestone (Price, 1981) - in Iowa

Coal City Limestone Member of Pawnee Limestone (Heckel, 1984)

Pennsylvanian System (Desmoinesian Series)

Type section: The Coal City Limestone Member was named by Cline (1941, p. 64), who stated "For Bain's 'Seventy-four limestone' the geographic name Coal City limestone is proposed. The type section is in the east bluff of the Chariton River in the SE¼ of Sec. 16, T. 67 N., R. 16 W., near Coal City in southeastern Appanoose County, Iowa."

Thompson (1995, p. 107) stated "The uppermost member of the Pawnee Formation, Coal City Limestone Member, is a light-gray, dense limestone in western Missouri, which becomes shaly northeastward. As it approaches the Iowa state line, it is split into two beds by shale...The member is 2 to 6.5 ft thick." The Coal City is overlain by the Bandera Shale, and overlies the Mine Creek Shale Member of the Pawnee Formation.

Coal Creek Limestone Member of Topeka Formation, Shawnee Group

Coal Creek limestone bed of Topeka limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska

Coal Creek limestone member of Topeka limestone (Moore, 1932)

Coal Creek limestone member of Topeka limestone (Moore, 1936; Moore, et al., 1951) - in Kansas

Coal Creek member of Topeka formation (Searight and Howe, 1961)

Coal Creek Limestone Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas

Coal Creek Limestone Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska

Coal Creek Limestone Member of Topeka Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Condra (1949, p. 20) stated that Coal Creek was "...named for Coal Creek north of Union, Nebraska; type locality about 3/4 miles north of Union, Cass County..."

Thompson (1995, p. 126) stated "The Coal Creek Limestone...is an argillaceous, brownish-weathering, wavy-bedded limestone whose beds are separated by shaly partings. The member is very fossiliferous and contains many fusuline foraminifera. Its thickness ranges from 4 to 5 ft." The Coal Creek Limestone Member overlies the Holt Shale Member of the Topeka Formation, and is overlain by the Severy Formation of the Wabaunsee Group.

<u>Coal Measures</u>

Coal Measures (of Carboniferous order) (Conybaere, 1822)
Upper Coal Measures (Broadhead, 1873; Winslow, 1891) = ***Missourian Series***
Coal Measures of Missouri (Broadhead, 1874)
Coal Measures <u>of Pennsylvanian series</u> (Williams, 1891)
Upper Carboniferous System (Pennsylvanian [Subsystem] System)

This is a term used by Swallow (1855 p. 78), Broadhead (1866), and Williams (1891).

<u>Coffeyville Formation</u>

Coffeyville formation (Schrader and Haworth, 1906; Schrader, 1908) = ***Lenapah - lower Pleasanton shales***
Coffeyville limestone (Haworth and Bennet, 1908; Moore and Haynes, 1917) - in Kansas; = ***Lenapah Formation***
Coffeyville limestone member <u>of Pleasanton formation</u> (McCourt, 1917) = ***Lenapah Formation***
Coffeyville Formation (Watney, et al., 1989) - in Kansas; = ***Holdenville Shale, Pleasanton - Kansas City Group?***
Pennsylvanian System (Desmoinesian Series)

<u>Cole Camp sandstone</u>

Cole Camp sandstone (Winslow, 1894) = ***Gunter Sandstone Member of Gasconade Dolomite?***
Ordovician System (Ibexian Series)

Winslow (1894, p. 331, 364-369) used the name "Cole Camp" for the sandstone underlying his Osage limestone and overlying the Proctor limestone (Eminence). For many years there was a controversy as to whether this was equivalent to the Gunter Sandstone Member of the Gasconade Dolomite. Mary McCracken of the Missouri Geological Survey says that it is later than Gunter and is probably a lenticular sandstone within the Cotter. However, consensus still is that it is probably the Gunter Sandstone Member of the Gasconade Dolomite.

<u>Columbus coal bed</u>

Columbus coal bed (Haworth and Crane, 1898) - in Kansas; = ***Rowe Coal Bed***
Columbus cyclothem (Abernathy, 1937; Moore, 1949) in Kansas; = ***Rowe Shale***
Columbus coal <u>of Columbus cyclothem</u> (Abernathy, 1937) = ***Bluejacket Coal Bed***
Pennsylvanian System (Desmoinesian Series)

<u>Commerce quartzite</u>

Commerce quartzite <u>of McNairy Formation</u> (McQueen, 1939)
Cretaceous System (Gulfian Series)

McQueen (1939, p. 72) named a hard quartzite, believed to be a persistent zone in the lower part of the McNairy Formation, the "Columbus quartzite.". This is the same as the "McNairy quartzite." It was named from Commerce, Scott County, southeastern Missouri, where it is exposed on the Mississippi River bluffs.

Compton Limestone of Chouteau Group

Compton limestone (Moore, 1928)
Compton member of Chouteau formation (Branson, 1944b)
Compton formation of Chouteau group (Beveridge and Clark, 1952) - in central and west-central Missouri
Compton formation of St. Joe group (Beveridge and Clark, 1952) - in southwestern Missouri
Sedalia-Compton transition beds (Clark and Beveridge, 1952) = ***"unnamed limestone" of Chouteau Group***
Compton formation of Chouteau group (Searight, 1954; Spreng, 1961)
Compton Formation (Thompson and Fellows, 1970)
Compton Formation of Chouteau Group (Thompson, 1979a)
Compton Limestone of Chouteau Group (Thompson, 1986; Thompson, 1995)
Compton Limestone (Thompson and Robertson, 1993)
Mississippian System (Kinderhookian Series)

Type section: Moore (1928, p. 108, 118-122) proposed the name Compton limestone for beds directly underlying the Northview shales in southwest Missouri. The original type area is along the James River in the vicinity of the now nonexistent Compton post office in Webster County. Beveridge and Clark (1952, p. 73) redesignated the type section as a section on the north side of a gravel road in SE E½ E½ Lot 2, NE sec. 3, 29N-19W, in Webster County, but that section also has been destroyed (Thompson and Fellows, 1970, p. 14). Thompson and Fellows (1970), and Thompson (1986), therefore, designated several reference sections for the Compton.

The lowest carbonate formation of the Chouteau Group of southwestern Missouri, the Compton rests on the Bachelor Formation, a very thin sandstone and/or shale, and is overlain by the Northview Formation. Prior to the proposal of Compton, it had been called the Lithographic, the name formerly applied to the Louisiana limestone. S. Weller (1905, p. 633) apparently included the Compton as a calcareous facies of the Northview formation and called it the Hannibal limestone. It has also been called the "King limestone" and "Sac limestone."

Concretionary limestone

Concretionary limestone (Owen, 1852) = ***Salem and St. Louis formations?***
Upper concretionary limestone (Gordon, 1895) = ***St. Louis Limestone***
Lower concretionary limestone (Gordon, 1895) = ***Salem Formation***
Mississippian System (Meramecian Series)

Concreto shale

Concreto shale (Adams 1904) - in Kansas; = ***Lane (Liberty Memorial) to Bonner Springs shales***
Concreto shale member of Wilson formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas;
= ***Lane (Liberty Memorial) to Bonner Springs shales***
Pennsylvanian System (Missourian Series)

Coon Creek Member

Coon Creek Member of Ripley formation (Wade, 1917; McQueen, 1939) = ***Ripley Formation***
Cretaceous System (Gulfian Series)

A part of the Ripley Formation underlying the McNairy member and overlying the Selma Chalk, the Coon Creek was named by Wade (1917, p. 74, 101; 1926) for exposures near Coon Creek, McNairy County, Tennessee. McQueen (1939, p. 73) suggested its occurrence in southeast Missouri.

Cooper facies of Cedar Valley Limestone

Cooper marble (Swallow, 1855) - included Cedar Valley in upper part
Cooper marble (Broadhead, 1891; Weeks, 1902) = ***part of Cedar Valley Limestone***
Cooper limestone (Greger, 1917; Wilson, 1922; Branson, 1922; Savage, 1925; Kindle and Miller, 1939; Keyes, 1940b, 1941f; Branson, 1941; Dott, 1941; Branson, 1944a, 1944b)

Cooper limestone (Keyes, 1939b, 1939c) - included "Mineola facies" within his Cooper limestone; rejected "Mineola"
Cooper marble(?) (Kindle and Miller, 1939) - questioned which facies it represented
Cooper formation (McQueen and Hinchey, 1941)
Cooper limestone (Cooper, et al., 1942) = Wapsipinicon limestone and shale in Iowa
Cooper (Stainbrook, 1945)
Cooper limestone facies of Callaway formation (Unklesbay, 1952a)
Cooper facies of Callaway formation (Koenig, 1961a) - included rocks identified by others as "Callaway facies"
Cooper Limestone of Hunton Limestone Megagroup (Swann and Willman (1961)
Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a)
Cooper facies of Cedar City Formation (Sleeman, 1967)
Cooper facies of Callaway Formation (Koenig, 1967)
Cooper facies of Cedar Valley Limestone (Collinson, et al., 1967a; Thompson, 1993, 1995)
Cooper lithofacies of Cedar Valley Formation (Schumacher, 1972)
Cooper Member of Cedar Valley Limestone (Kocken and Carozzi, 1991)

Devonian System (Middle Devonian Series)

A facies development within the Cedar Valley Limestone, the Cooper was first called "Cooper marble" by Swallow (1855, p. 196) when he described and named it from exposures in Cooper County, Missouri. Branson (1918) called it the "Cooper limestone," and stated that it is overlain by the Callaway limestone and rests on the Jefferson City Dolomite in most places, but in a few places on the St. Peter Sandstone. Unklesbay (1952a, p. 37-39) considered the Cooper limestone as a facies of the "Callaway formation." Thompson (1993) redefined the "Callaway Formation" as the Cedar Valley Limestone, and reinstated the name "Cooper" as the **Cooper facies of the Cedar Valley Limestone**.

Cooper marble - See "Cooper facies".

Cope Hollow Formation of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SW¼ NW¼ sec. 16, T. N., R. 2 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "The Cope Hollow Formation consists of interbedded maroon ash-flow tuffs and dark-gray to black cross-bedded air-fall tuffs. A dark gray air-fall tuff containing lithophysae is a good marker horizon. The formation crops out at Johnson Shut-Ins State Park in Reynolds County, where it is greater than 130 ft thick.

Coralville

Coralville limestone (Branson, 1941) - in Iowa, = ***Callaway facies of Cedar Valley Limestone***
Coralville Member of Cedar Valley Formation (Bunker, et al., 1985) - in Iowa
Coralville Formation of Cedar Valley Group (Woodruff, 1990) - northeastern Missouri

Devonian System (Middle Devonian Series)

Coralville is a term originating in Iowa used by Keyes (1941b, p. 156) for a formation in his "Linnian series" of Late "Yorkic" age. It is overlain by the "Rockford" and underlain by the "Callaway formations" in his chart. Today, this unit is the Coralville Formation of the Cedar Valley Group in Iowa (Bunker and Witzke, 1992).

Corbin City Limestone Member of Drum (Dewey) Limestone, Linn Subgroup, Kansas City Group

Corbin City limestone member of Drum limestone (**Moore, 1932**)
Corbin City limestone member of Drum limestone (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
"Corbin City limestone of Kansas" (Searight and Howe, 1961)

Corbin City Member of Drum Formation (Burchett, 1965) - in Nebraska
Corbin City Limestone Member of Drum Formation (Burchett and Reed, 1967; Burchett, 1971) - in Nebraska
Corbin City Limestone Member of Drum Limestone (Jewett, et al., 1968) - in Kansas
Corbin City Limestone Member of Drum Formation (Howe, 1986)
Corbin City Limestone of Kansas (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Moore (1932, p. 92) named the Corbin City member, and stated "It is proposed to use the Drum limestone as a formation name, and to recognize the light blue lower bed as the Cement City member and the upper bed of oolitic limestone as the Corbin City member..." The type section was at Corbin City, 2 miles south of Cherryvale, Montgomery County, Kansas.

Howe (1986, p. 22) stated that in Missouri "The member is thin, irregular, and apparently patchy in distribution, but is distinct from the underlying Cement City Limestone, from which it is separated by a shale or clay parting. In exposures, the Corbin City is an uneven, generally coarse-grained limestone composed of invertebrate and algal material. Thicknesses are as much as 2 or 3 ft in Missouri. In Platte County outcrops, the Corbin City are as much as 1 ft thick." The Corbin City overlies the Cement City Limestone Member of the Drum Formation, and is overlain by the Chanute Shale.

Corniferous

Corniferous and Onondaga beds (Meek and Worthen, 1866) = ***Clear Creek through Grand Tower formations***
"Corniferous and Hamilton" (Schuchert, 1897) = ***Cedar Valley Limestone (?)***
Corniferous limestone (Gallaher, 1900) = ***Grand Tower, Beauvais Sandstone, and St. Laurent Limestone***
Devonian System (Lower and Middle Devonian Series)

This is a descriptive term applied in early geologic reports in the eastern states to a limestone or dolomite of Devonian age. The name "corniferous" was derived from the balls of hornstone contained in the rock. The name was used in Missouri by Gallaher (1900, p. 151-153) for the formation overlain by Western Hamilton beds (including the Callaway limestone) and underlain by the Oriskany sandstone. He states that it makes up all except the base of the Grand Tower in the Mississippi River, which would make it the upper part of the Bailey formation.

Cottage Grove sandstone member

Cottage Grove sandstone member of Chanute shale (Moore, et al., 1951) - in Kansas
Cottage Grove Sandstone Member of Chanute Shale (Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Missourian Series)

Cotter Dolomite

Cotter formation (Ulrich, *in* Ulrich and Bassler, 1915; **Ulrich, *in* Purdue and Miser, 1916)** - in Arkansas
Cotter formation (Weller and St. Clair, 1928; Martin, et al., 1961)
Cotter limestone of Jefferson City group (Dake, 1921)
Cotter formation of Jefferson City Group (Cullison, 1944) = ***upper part of Cotter Dolomite***
Cotter Dolomite (Fellows, et al., 1971; Hedden, 1976; Thompson, 1982, 1991, 1995)
Ordovician System (Ibexian Series)

Type area: Proposed by Ulrich (*in* Purdue & Miser, 1916), the name was derived from outcrops near the town of Cotter on the White River in Baxter County, northern Arkansas.

The Cotter Dolomite overlies the Jefferson City Dolomite and underlies the Powell Dolomite, all in the Canadian (Ibexian) Series. Prior to 1916, it was included in the Jefferson City formation, but during field studies in the Ozark region of Missouri and Arkansas, Ulrich recognized a three-fold division of the Jefferson City as it was originally interpreted. He restricted the name Jefferson City to the lowermost of the three divisions. The middle became the Cotter, and the upper one the Powell. Ulrich did not publish this subdivision, but the terms were used by Ulrich and Bassler (1915) and by

Purdue and Miser (1916, p. 4-5) in northwest Arkansas. McKnight (1935) was the first to give a definite upper boundary for the formation in the type region. Cullison (1944) restricted the Cotter to include those beds which outcrop in the vicinity of the type locality. He included at least the lower half of what Weller and St. Clair (1928) called Cotter in his "Theodosia formation". It has also been called Winfield, Yellville, and possibly Finley.

Cow Creek

Cow Creek Member of Snyder Creek Formation (Waring, 1971)
Cow Creek lithofacies of Snyder Creek Shale (Schumacher, 1972)

Devonian System (Upper Devonian Series)

Cowen Member

Cowen Member of Grand Detour Formation of Plattin Subgroup (Willman and Kolata, 1978) = ***upper part of Beckett Limestone of Plattin Group***; = Walgreen and Dement Members of Grand Detour Formation of Plattin Subgroup (of Templeton and Willman, 1963)

Ordovician System (Mohawkian Series)

Craghead

Craghead [shale] = ***Snyder Creek Shale***,

Devonian System (Upper Devonian Series)

The name used on the 1922 geologic map of Missouri for "Craghead Creek" (**Snyder Creek Shale**).

Craghead Branch

Craghead Branch Member of Snyder Creek Formation (Waring, 1971)
Craghead Branch lithofacies of Snyder Creek Shale (Schumacher, 1972)

Devonian System (Upper Devonian Series)

Craghead Creek shale

Craghead Creek shale (Greger, 1909; Branson and Greger, 1915; Kindle and Miller, 1939) = ***Snyder Creek Shale***

Devonian System (Upper Devonian Series)

Greger (1909) proposed the name "Craghead Creek shale" for the lower Upper Devonian formation now called **Snyder Creek Shale**. Greger (1909, p. 375) restricted the "Callaway formation", and called the former upper member of the "Callaway" the "Craghead Creek shale," named from exposures along Craghead Creek, 6 miles south of Fulton, Callaway County, Missouri. However, Gallaher (1900, p. 153) had already named and defined this shale: "Following immediately after the Hamilton limestone are the Snyder creek Shales, another Devonian deposit which is limited almost exclusively to Callaway County."

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Cretaceous System

Cretaceous System (Farrar, 1935)

Mesozoic Era

The Cretaceous is the youngest system of the Mesozoic era, and the only one represented in Missouri. It is mainly in the region of the Missouri "bootheel," and usually underlies sands and shales of the Paleocene Series of the Tertiary System (Clayton Formation and/or Porters Creek Clay). Thompson (1995, p. 134-135) stated "...On the part of the Embayment that extends into southeastern Missouri, only the uppermost Gulfian formations occur...These include (from the base upward): 1) an incompletely-known subsurface succession, which is provisionally correlated with the Coffee and Selma formations of Tennessee, 2) the McNairy Formation, and 3) the Owl Creek Formation...The thickness of the Cretaceous System in southeastern Missouri exceeds 500 ft."

Cretacic - A variant of Cretaceous coined by Keyes.

Crinoidal limestone (Broadhead, 1873) = ***Kimmswick Limestone?***

Ordovician System (Mohawkian Series?)

This is a descriptive term applied by Broadhead (1873, p. 48) to a limestone he believed to be Upper Silurian in Warren and Montgomery counties, Missouri.

Critzer Limestone Member of Hertha Formation, Bronson Subgroup, Kansas City Group

Critizer (*sic.*) limestone member of Swope formation (**Jewett, 1932**) - in Kansas
Critizer (*sic.*) limestone member of Swope limestone (Moore, 1932)
Critzer limestone member of Hertha formation (Greene and Searight, 1949)
Critzer limestone member of Hertha limestone (Moore, et al., 1951) - in Kansas
Critzer member of Hertha formation (Searight and Howe, 1961)
Critzer Member of Hertha Formation (Payton, 1966)
Critzer Limestone Member of Hertha Limestone (Jewett, et al., 1968; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Critzer Limestone Member of Hertha Formation (Gentile, 1976; Thompson, 1995)
Critzer Limestone Member of Pleasanton shale (Pabian and Diffendal, 1989) - in Kansas
Critzer Limestone Member of Shale Hill Formation (Watney and Heckel, 1994) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: Jewett (1932, p. 100) named the Critzer Member and stated "The type locality is south of Critzer in Linn County [Kansas], in Sec. 17, T. 22, R. 23 E."

Thompson (1995, p. 112) stated "The Critzer Limestone Member...is a nodular, locally fossiliferous limestone which is absent in some areas. The limestone is commonly argillaceous or silty and appears to grade laterally into sandstone or siltstone. Where the limestone is absent, its stratigraphic position is occupied by maroon clay. The thickness of the Critzer is generally less than 1 ft." Recent correlations (Heckel and Watney, in press) have placed the Critzer at the top of the Pleasanton Group. The Critzer Limestone Member overlies the shales of the Pleasanton Group, and is overlain by the Mound City Limestone Member of the Hertha Formation.

Croixan Series

St. Croixian or Upper Cambrian (Buckley, 1908)
Croixan Series (Keyes, 1915) = ***Upper Cambrian Series***
Upper Cambrian (Croixian) Series (Howe, 1968; Howe, et al., 1972; Kurtz, et al., 1975)
Croixian Series (Upper Cambrian) (Kurtz, 1981)

Cambrian System (Upper Cambrian Series)

A variant of St. Croixan series used by Keyes (1915, p. 253) for what he considered to be the Mid-Cambrian section. He included (descending) Proctor dolomite, Eminence dolomite, Potosi dolomite, Doe Run dolomite, Derby dolomite, Davis shales, LeSueur dolomite, Fredericktown limestone, and LaMotte sandstone. In 1941 he restricted it to the formations below the top of the Derby dolomite. In other regions, "Croixian" is synonymous with "Upper Cambrian."

Crooked Creek chert

Crooked Creek chert (Cullison, 1944) = ***Cotter Dolomite***,

Ordovician System (Ibexian Series)

A layer of interbedded chert and dolomite was named by Cullison (1944, p. 35) for its occurrence near the Crooked Creek bridge on Arkansas Highway 101 near Cotter, Arkansas. It occurs as three distinct layers within the Cotter Dolomite.

Croweburg Coal Bed of Croweburg Shale, Cabaniss Subgroup, Cherokee Group

Croweburg coal (Pierce and Courtier, 1938) - in Kansas
Croweburg coal of Ardmore cyclothem (Moore, 1949) **-** in Kansas
Croweburg (Broken Arrow) coal of Ardmore cyclothem (Moore, et al., 1951) **-** in Kansas
Croweburg coal of Croweburg formation (Searight, et al., 1953)
Croweburg coal of Senora formation (Branson, 1954a) **-** in Oklahoma
Croweburg coal of Croweburg formation (Searight, 1959) = **Colchester (No. 2) coal** in Illinois
"immediately above the Croweburg coal" (Furnish, et al., 1962) **=** ***Verdigris Formation***
Croweburg coal bed of Cabaniss Formation (Jewett, et al., 1968; Heckel, et al., 1979) **-** in Kansas
Croweburg coal (Robertson (1973)
Croweburg coal of Croweburg Formation (Gentile, 1976)
Croweburg coal bed of Croweburg Formation (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Pierce and Courtier (1938, p. 74) stated "The exposures from which it is named are in strip pits about a mile east of Croweburg, particularly in the SE¼ sec. 34, T. 28 S., R. 25 E., and the NE¼ sec. 3, T. 29 S., R. 25 E." (Crawford County, Kansas).

Robertson (1971, p. 18) stated "The Croweburg is a thin coal bed which, because of its widespread distribution and persistent character, constitutes an important coal resource. The Croweburg has been stripped in western Missouri (Vernon, Bates, Henry, and Johnson Counties) where it ranges in thickness from 11 to 28 inches...The Croweburg is high in sulfur, averaging nearly 5 percent over its entire area of occurrence."

Croweburg Shale **of Cabaniss Subgroup, Cherokee Group**

Croweburg cyclothem (Abernathy, 1937) - in Kansas
Croweburg formation (Searight, et al., 1953; Searight and Howe, 1961)
Croweburg coal cycle of Senora formation (Branson, 1954a) **-** in Oklahoma
Croweburg Formation (Anderson and Wells, 1968; Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Abernathy (1937) as the "Croweburg cyclothem," Pierce and Courtier (1938, p. 74) stated "The exposures from which it is named are in strip pits about a mile east of Croweburg, particularly in the SE¼ sec. 34, T. 28 S., R. 25 E., and the NE¼ sec. 3, T. 29 S., R. 25 E." (Crawford County, Kansas).

Thompson (1995, p. 102) stated "Where it is complete in western Missouri the Croweburg Formation contains (from the base upward); 1) a thin, patchy, dark-gray, fossiliferous limestone; 2) a tough, black, massive shale, which grades upward into a medium-gray shale or silty shale; 3) a gray, micaceous siltstone or fine-grained, micaceous sandstone; 4) an underclay; and 5) the **Croweburg coal bed**." The Croweburg overlies the Mineral Shale and is in turn overlain by the Verdigris Formation.

Crowleyan series

Crowleyan series (Keyes, 1915) **=** ***Paleocene and Eocene Series***

Tertiary System

"Crowleyan series" is a term introduced by Keyes (1915, p. 252) for early Tertiary deposits of Missouri. It overlies his "Ripleyan series," underlies his "Poinsettan series" (Lafayette gravel), and includes the Wilcox shale and Porter (Porters Creek) clay. The name apparently comes from Crowleys Ridge although its derivation not stated.

Crystal sandstone

Ordovician System (Mohawkian Series)

This is a shortened form of **Crystal City sandstone**, employed by Keyes.

Crystal City sandstone

Crystal City sandstone (Winslow, 1894) = ***St. Peter Sandstone*** (in part) (Mohawkian Series)
Crystal City sandstone (Winslow, 1894) = ***Roubidoux Formation*** (in part) (Ibexian Series)
Ordovician System (Ibexian or Mohawkian Series)

An early name applied to the **St. Peter Sandstone,** named for exposures at Crystal City, Jefferson County, Missouri, where it has been extensively mined (Winslow, 1894). However, some localities identified as "Crystal City sandstone" by Winslow were actually sandstones in the Roubidoux Formation.

Crystalline limestone

Crystalline limestone (Shumard, 1855) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

A descriptive term used by Shumard (1855, p. 155, 156) for a limestone that at that time had not been formally named, which he stated is Upper Trenton. This unit later became known as the "Receptaculites limestone," and now is called the **Kimmswick Limestone**.

Cuivre Shale Member of Hannibal Shale

Cuivre shale (Mehl, 1960, 1961) = basal beds of Hannibal Shale
Cuivre Member of Hannibal Formation (Conkin and Conkin, 1973)
Mississippian System (Kinderhookian Series)

Type section: Mehl (1960, 1961) proposed the "Cuivre shale" (1961, p. 91) "...from Cuivre Township in Pike County, Missouri (type locality NE SE Sec. 35, T. 54 N., R. 3 W)..."

Mehl (1961, p. 91) added, the Cuivre shale "...is dark bluish-gray, blocky to fissile, with thin lenses of pyrite cemented sand. Its distribution is scattered and patchy varying in thickness in a short distance with a maximum of about 12 feet. At the type locality, it is set off from the Hannibal by a sharp color line and lithologic change with stringers of Hannibal penetrating the Cuivre...Some may choose to consider that the Cuivre represents a facies or is a member of the Hannibal rather than a formation." The Cuivre black shale "facies" has been seen in central Missouri (Randolph County) drill core samples at the base of the Hannibal, and should be regarded as a member of the Hannibal Shale.

Cullom limestone

Cullom limestone of Platte shales (Condra and Bengston, 1915) - in Nebraska; = ***Beil Limestone Member of Lecompton Formation***
Cullom Limestone of Lecompton limestone member of Shawnee formation (Condra, 1927) - in Nebraska; =***Beil Limestone Member of Lecompton Formation***
Pennsylvanian System (Virgilian Series)

Curzon Limestone Member of Topeka Formation, Shawnee Group

Curzen's limestone (Gallaher, 1900) = *Curzon, Jones Point, and Sheldon Members of Topeka Formation*
Curzen's limestone of Topeka limestone member of Shawnee formation (Condra, 1927) = ***Curzon, Jones Point, and Sheldon Members of Topeka Formation*** (in Kansas)
Curzen limestone member of Topeka limestone (Moore, 1932; Condra, et al., 1932) = ***Curzon, Jones Point, and Sheldon members***
Hartford (Curzon) limestone member of Topeka limestone (Condra, 1935) = ***Curzon, Jones Point, and Sheldon members***
Curzon limestone of Topeka limestone formation (Condra and Reed, 1937, 1943, 1959) - in Nebraska
Curzon limestone member of Topeka formation (Moore, 1948)
Curzon limestone member of Topeka limestone (Moore, et al., 1951) - in Kansas
Curzon member of Topeka formation (Searight and Howe, 1961)

Curzon Limestone Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Curzon Limestone Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
Curzon Limestone Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named the "Curzen's limestone" by Gallaher (1900), Condra and Reed (1937, p. 51) stated "The type locality of the Curzen limestone is east of Curzon Station, southeast of Forest City, Holt County, Missouri. The reason for the apparent change in spelling in the name of the station since the time of Gallaher has not been learned..." This is the third member from the base in the Topeka Formation.

Moore (1932) made the Curzen limestone a member of the Topeka limestone, and Condra and Reed (1937) restricted the Curzon (correct spelling) limestone to its present definition. Earlier it also contained the Sheldon limestone and Jones Point shale in some reports. Thompson (1995, p. 126) stated "The Curzon Limestone Member....consists of two beds of massive, earthy, brownish-weathering limestone that are separated by a shale parting. The member is 5 to 6 ft thick." The Curzon Limestone Member overlies the Iowa Point Shale Member, and is overlain by the Jones Point Shale Member of the Topeka Formation.

Cygne formation

Cygne formation (Keyes, 1941f) = ***Labette or Bandera Shale - Pleasanton Group***
Pennsylvanian System (Desmoinesian Series)

This is a short form of Marais des Cygnes used by Swallow (1866) and Keyes (1900b).

Cygnian Stage

Cygnian Stage of Desmoinesian Series (**Searight and Howe, 1961**; Thompson, 1995) = ***Cabaniss Subgroup of Cherokee Group and Marmaton Group***
Pennsylvanian System (Desmoinesian Series)

Thompson (1995, p. 99) stated "Rocks of Cygnian Stage range from the top of the Seville Formation to the base of the Missourian Series [base of the Pleasanton Group]. The sediments deposited during Cygnian time thus make up the strata of the Cabaniss Subgroup of the upper Cherokee Group as well as all of the beds of the Marmaton Group."

The name (Searight and Howe, 1961) was derived from the Marais des Cygnes River of eastern Kansas, an extension of the Grand River of western Missouri. This unit, as well as the Venteran Stage below it, were proposed by Searight and Howe (1961), but have not been generally used by other Pennsylvanian stratigraphers.

Cypress Formation

Cypress Sandstones (Englemann, 1862)
Cypress sandstone (Ulrich, 1904a; Weller, 1907) = ***Aux Vases Sandstone***
Cypress member of Kaskaskia formation (Schuchert, 1910) = ***Aux Vases Sandstone***
Cypress ("Big Clifty") sandstone (Butts, 1917)
Cypress sandstone (Weller, 1939)
Cypress sandstone (Weller, et al., 1948) - a shale in Missouri
Cypress (Elviran) sandstone (Potter, et al., 1958)
Cypress formation (Spreng, 1961) - a shale in Missouri
Cypress Formation (Thompson, 1979a, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Engleman (1862, p. 189-190) used the name "Cypress" for an important Chester sandstone which he found in Johnson and other southern counties of Illinois, and which he believed to be the equivalent of the "lower sandstone of the Chester Group" in western Illinois. It was named for its exposure along Cypress Creek in Union County, Illinois.

The Cypress Formation underlies the Golconda Formation and overlies the Paint Creek Formation. Engleman and Worthen and others, for a time, believed the Cypress of Engleman was the equivalent of the Aux Vases of Keyes. But Weller (1920, p. 286) showed that they are not equivalent. Spreng (1961, p. 75) stated "The Cypress Formation is composed of gray shale and mudstone and contains some red shale layers and a few thin limestone stringers. The limited exposures in east central Perry County are poor, and the contacts of the formation with the overlying Golconda and underlying Paint Creek formation are concealed." The formation becomes more silty to the east, and becomes a good sandstone 10 miles east of the Mississippi River in Illinois.

Cyrene Limestone of Edgewood Group

Cyrene member of Edgewood formation (Savage, 1913; Keyes, 1914; Rowley, 1916; Branson, 1944b)
Cyrene limestone member of Edgewood formation (Krey, 1924; McQueen, et al., 1941) = ***Bryant Knob Formation***
Cyrene of Edgewood limestone (Flint and Ball, 1926)
Cyrene limestone (Folger, 1928)
Cyrene formation (McQueen, et al., 1941) = ***Noix Limestone and Bryant Knob Formation***
Cyrene member of Edgewood limestone (Bassler, 1950) = ***Bryant Knob Formation***
Cyrene limestone member of Edgewood formation (Laswell, 1957) = ***Noix Limestone and Bryant Knob Formation***
Cyrene member of Edgewood formation (Martin, et al., 1961a; Koenig, et al., 1961) = ***Noix Limestone and Bryant Knob Formation***
Cyrene Member of Edgewood Formation (Koenig, 1967; Berry and Boucot, 1970) = ***Noix Limestone and Bryant Knob Formation***
Cyrene Limestone of Edgewood Group (Thompson and Satterfield, 1975; McCracken and Barnes, 1982) - as originally proposed by Savage
Cyrene Formation (Amsden, 1986; Ausich, 1987)
Cyrene Limestone of Edgewood Group (Thompson, 1991, 1993, 1995)
Ordovician System (Cincinnatian Series)

Type section: The lower member of the Edgewood formation as proposed by Savage (1913, p. 361, 376), the Cyrene was named for exposures at Cyrene, Pike County, Missouri.

Thompson (1995, p. 40) stated "The Cyrene Limestone is a gray to blue-gray, argillaceous, fossiliferous limestone restricted to a small area east of the town of Bowling Green, Missouri. It rests, possibly conform- ably, on the Maquoketa Shale, and is unconformably overlain by the Silurian-aged Bowling Green Dolomite. The upper 6 in. contains scattered oolites that were swept from the region of deposition of the Noix Limestone to the east and southeast and deposited in the Cyrene.

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Dakotan series

Dakotan series (Keyes, 1915)
Cretaceous System

A term introduced by Keyes to cover the Dakota sandstone and correlated deposits. He used it in regard to Missouri in 1915 (p. 252) for a "Mid-Cretacic" series overlying the "Missourian series" and underlying his "Ripleyan series" and represented by his "Nishnabotna sandstone."

Dashner? limestone member

Dashner? limestone member of Topeka limestone (Moore, 1937) - in Oklahoma; = ***Hartford Limestone Member of Topeka Formation***
Pennsylvanian System (Virgilian Series)

Davenport

Davenport/Spring Grove Members undifferentiated of Pinicon Ridge Formation of Wapsipinicon Group (Woodruff, 1990) - in northeastern Missouri

Devonian System (Middle Devonian Series)

Davis Formation of Elvins Group

Davis shale member of Elvins formation (**Buckley, 1907**)
Davis shales (Keyes, 1914)
Davis formation (Bridge, 1927)
Davis dolomite (Ireland, 1936)
Davis shale (Brightman, 1938)
Davis formation of Elvins group (Searight and Howe, 1961)
Davis Shale (Gerdemann and Myers, 1972)
Davis Formation of Elvins Group (Kurtz, et al., 1975; Thompson, 1995)
Davis Shale Member of Franconia Formation (Sargent, 1989) - in Illinois
"Davis Formation of Missouri" (*Elvinia* Zone) (Westrop, 1992)

Cambrian System (Upper Cambrian Series)

Type section: The term Davis was first used by Buckley (1907, p. 286) and defined by Buckley (1909, p. 33-34) as underlying the Derby Dolomite and overlying the Bonneterre Formation. It was named for outcrops on Davis Creek, St. Francois County, Missouri.

The lowest formation of the Elvins Group of Ulrich, it is overlain by the Derby-Doerun Dolomite and underlain by the Bonneterre Formation. Prior to 1908 the beds now referred to as the Davis Formation were variously designated as parts of the "St. Joseph limestone," "Fredericktown formation," "Potosi slates" and conglomerates, and "Elvins group." The latter has been retained, but is generally not used.

Dawson Coal Bed

Dawson coal horizon (McQueen and Greene, 1938; Clair, 1943)
Dawson Coal Bed of Memorial Shale (Heckel, 1991) = ***in Holdenville Shale***

Pennsylvanian System (Desmoinesian Series)

Heckel (1991) placed the **Dawson Coal Bed** at the top of the **Memorial Shale**, and considered the **Laredo Coal Bed** of Missouri to be a correlative of the Dawson Coal Bed. The black shale immediately above the Dawson coal was part of the **Lost Branch Formation** of Heckel (1991)

Dead Rock

Dead Rock (Gallaher, 1900) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

A term used by Gallaher (1900, p. 91-92) for the “third member” of his Cambrian. He also called it the "Second limestone." It is a part of the **Bonneterre Formation** of current nomenclature. It is underlain by his "White Lead" or "First limestone" and overlain by his "Black Lead." It was named at Mine LaMotte because it is not lead-bearing.

Decaturville chert

Decaturville chert (Scherer, 1905)

Ordovician System

A term used by Scherer (1905, p. 67) for the upper part of his "Richmond." He divided the Richmond of Greene and Camden counties into the "Maquoketa shale" and the "Decaturville chert," which rested on the Joachim limestone. He also called the chert the "Spencer chert." Apparently named from the community of Decaturville, Camden County, Missouri.

Decaturville limestone

Decaturville limestone (Shepard, 1904) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

This is a term used by Shepard (1904, p. 42) for what has been called the "Fourth Magnesian limestone." It was used by others as an equivalent of the **Bonneterre Formation**. It was named for exposures at Decaturville, Camden County, Missouri, most likely those exposed in the Decaturville structure..

Decorah Group

Decorah formation (Dake and Bridge, 1927; Grohskopf, 1948; Herbert, 1949)
Decorah shale (Weller and St. Clair, 1928; McQueen and Greene, 1938)
"Decorah" formation (Kay, 1929b, 1931) "= Spechts Ferry member of Decorah of Iowa"
Decorah and Plattin formations (Greene, 1945) = ***Joachim - Decorah formations***
Decorah formation (Larson, 1951; Martin, et al., 1961a) - all except Castlewood Limestone Member
Decorah Subgroup of Galena Group (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1986)
Decorah Shale (Echols and Levin, 1966)
Decorah (Barnhart) Formation (Sweet, et al., 1971)
Decorah Formation (Thompson, 1982)
Decorah Formation (Thompson, 1987) = ***Spechts Ferry Formation of Decorah Group***
Decorah Group (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Named by Calvin (1906) for exposures near Decorah, Winneshiek County, Iowa.

Rocks of the Decorah Group overlie the Plattin Limestone (or Group) and underlie the Kimmswick Limestone. Originally the Plattin was defined to include all the strata between the Joachim Dolomite below and the Kimmswick Limestone above, but the upper beds in this interval consist of shales and interbedded limestone and shale, and contain a characteristic assemblage of fossils. This shaley bed in Ste. Genevieve County was correlated with the Decorah of Iowa by Weller and St. Clair (1928, p. 109). Kay (1929, p. 639-71) divided the Decorah formation in Iowa into the Spechts Ferry, Guttenberg, and Ion members, in ascending order. He stated that the Missouri Decorah is equivalent to the Spechts Ferry member. But Larson (1951, p. 2064) noted the higher members have also been identified in Missouri. A limestone bed that previously had been included at the top of the Plattin Limestone (the Castlewood Member of the Spechts Ferry Formation) is now (Thompson, 1991) regarded as the basal unit of the Decorah. Current nomenclature of the Decorah (Thompson, 1991, 1995) includes the Spechts Ferry Formation (2 members), overlain by the Kings Lake Limestone (2 members), and in northeastern Missouri, the Guttenberg Limestone.

Dederick shale member

Dederick shale member of Cherokee formation (Greene and Pond, 1926) = ***Riverton and/or Drywood formations***

Pennsylvanian System (Atokan and Desmoinesian Series)

Greene and Pond (1916) named the Dederick shale for strata in eastern Vernon County that turned out to be equivalent to the Riverton Formation of Abernathy (1937). Their name would have had priority over Riverton if the section they had chosen for the type had not turned out to be the equivalent of the Drywood Shale, and not the Riverton.

Deer Creek Formation of Shawnee Group

Deer Creek system (**Bennett, 1896**) - in Kansas
Deer Creek limestone (Haworth, 1898; Beede, 1902; Adams, 1903; Haworth and Bennett, 1908) - in Kansas
Forbes (Deer Creek) limestone (Condra and Bengston, 1915) - in Nebraska
Deer Creek limestone member of Shawnee formation (Hinds and Greene, 1915)
Deer Creek limestone member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Deer Creek limestone (Tilton, 1921) - in Iowa

Deer Creek limestone member of Shawnee formation (Condra, 1927) - in Nebraska
Deer Creek limestone (5 members) (Moore, 1932; McQueen and Greene, 1938; Moore, et al., 1944; Branson, 1944b)
Deer Creek limestone formation (lower 5 members) (Condra and Reed, 1937, 1943, 1959) - in Nebraska
Deer Creek formation (7 members) (Moore, 1948; Condra, 1949)
Deer Creek formation (5 members) (Greene and Searight, 1949; Searight and Howe, 1961)
Deer Creek formation (7 members) (Moore, 1949; Jewett, 1949) - in Kansas
Deer Creek limestone (5 members) (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Deer Creek Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Deer Creek Limestone (5 members) (Jewett, et al., 1968; Heckel, et al., 1979; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Deer Creek Formation (5 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The "Deer Creek system" was name by Bennett (1896). Moore (1936, p. 182) stated the type section was "On Deer Creek, in northeastern Shawnee county, east of Topeka. Typically exposed in road cut in SE¼ sec. 36, T. 11 S., R. 17 E. [Kansas]."

Moore (1932) raised the Deer Creek to formation level, and named 5 members to comprise the formation, these members having originally been proposed as "beds" of the **Deer Creek limestone member of the Shawnee formation** by Condra (1927). One member present in some areas. but absent in others, the **Haynies Limestone Member**, separates two shales, the **Larsh and Burroak Shale Members**. Therefore, some authors, if the Haynies Limestone Member is present, include seven members within the Deer Creek Formation, while others, if it is absent, identify only five, and call the shale member the **Larsh-Burroak Shale Member**.

Thompson (1995, p. 125) stated "The Deer Creek Formation includes three limestone members and two shale members...

"The best exposures of the Deer Creek [in Missouri] are in southern Holt County. To the northeast glacial deposits conceal the formation except in those places along the One Hundred and Two River in Nodaway County and along the Nodaway River south of Maitland in east-central Holt County, where the Ervine Creek has been quarried for concrete aggregate and road surfacing material. The Deer Creek ...is about 40 ft thick." The Deer Creek overlies the Tecumseh Shale, and is overlain by the Calhoun Shale.

Deerpark or **Deerparkian**

Deerpark stage of Ulsterian Series (Cooper, et al., 1942) = ***middle part of Lower Devonian Series***
Deerparkian Stage of Lower Devonian Series (Amsden, 1988) = ***middle part of Lower Devonian Series***
Devonian System (Lower Devonian Series)

Deer Plain formation = ***Cambrian System***

Defiance Member of Joachim Dolomite

Defiance Member of Joachim Dolomite (**Templeton and Willman, 1963**)
Defiance Member of "middle Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Thompson (1991, p. 96) stated "Templeton and Willman...described the type section of the Defiance Member (the same as that for the Boles Member) as a 'Quarry in the north bluffs of the Missouri [River] Valley, one mile southwest of the village of Matson, St. Charles County, Missouri...'"

The Defiance and Boles Members are often difficult to distinguish. If chert is present, it is in the Boles (by definition; Templeton and Willman, 1963). Here, the term **"middle Joachim Dolomite"** can be especially useful, for the shaly Boles-Defiance package usually can readily be distinguished from the overlying massively-bedded Matson Member and the slabby-bedded, sandy Augusta Member below.

Deicke K-bentonite bed **of Castlewood Limestone Member, Spechts Ferry Formation, Decorah Group**

Deicke Bentonite Bed of Castlewood Member of Spechts Ferry Formation (**Willman and Kolata, 1978**)
Deicke K-bentonite bed of Spechts Ferry Formation (Kolata, et al., 1984)
Deicke K-bentonite Bed of Castlewood Member of Spechts Ferry Formation (Kolata, et al., 1986)
Deicke bentonite (Samson, et al., 1988)
Deicke K-bentonite Bed of Castlewood Limestone Member of Spechts Ferry Formation (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: The Deicke K-bentonite bed was named by Willman and Kolata (1978) from exposures along the Burlington-Northern Railroad track, ¼ mile northeast of Mincke Siding, on the south side of the Meramec River Valley at Washington University Research Center (Tyson Park), the same section as the type section for the Castlewood Limestone Member of the Spechts Ferry Formation - near the center of E½ SE¼ SE¼ sec. 21, T. 44 N., R. 4E., Manchester 7½' Quadrangle..

The Deicke K-bentonite is the basal unit of the Decorah Group, separating the Plattin Group from the Decorah. It is one of two prominent bentonites in the Spechts Ferry Formation of the Decorah Group.

De Kalb limestone

De Kalb limestone (Bain, 1898) - in Iowa; = ***Winterset Limestone Member of Dennis Formation***
De Kalb limestone of Kansas City formation? (Condra, 1927) - in Nebraska; = ***Winterset Limestone Member of Dennis Formation and/or Westerville Limestone Member of Cherryvale Formation***
De Kalb limestone (?) (Moore, 1929) = ***Breezy Hill Limestone Member of Mulky Shale***
De Kalb limestone (Dunbar and Condra, 1932; Condra, et al., 1932) - in Nebraska; = ***Westerville Limestone Member of Cherryvale Formation?***
De Kalb limestone member of Cherryvale shale (Moore, 1932) - in Kansas; = ***Westerville Limestone Member*** and/or ***Drum Limestone***

Pennsylvanian System (Desmoinesian or Missourian Series)

Delassus formation

Delassus formation (Keyes, 1941c) = ***Doerun part of Derby-Doerun Dolomite***

Cambrian System (Upper Cambrian Series)

This name was proposed by Keyes (1941c, p. 239) to substitute for Buckley's "Doe Run." Keyes said the "name (Doerun) was preoccupied long ago...for an Ordovicic terrane in Pennsylvania, so that its use in Missouri, in similar fashion, is altogether inhibited." He also objected to the term "Elvins" and therefore proposed "Delassus formation" from a railroad station near Doe Run.

Delthyris

Delthyris Shaley Limestone (Swallow, 1855; Shumard, 1855) = ***Sexton Creek, Bainbridge, and Bailey formations***
Delthyris shale = ***Bailey Formation***

Devonian System (Lower Devonian Series)

These terms were based on included fossils used in eastern New York to indicate the age of the New Scotland limestone. The terms were applied in Missouri by Swallow (1855), Shumard, and others for a limestone they considered to be Upper Silurian, now called **Bailey Formation**, that turned out to be Early Devonian in age.

Dement Member

Dement Member of Grand Detour Formation of Plattin Subgroup (Templeton and Willman, 1963) = ***upper part of Beckett Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

Dennis Formation of Bronson Subgroup, Kansas City Group

Dennis limestone (**Adams, 1903**; Haworth and Bennett, 1908) - in Kansas
Dennis limestone of Bronson formation ("Drum limestone" in text) (Adams, 1904) - in Kansas
Dennis limestone lentil of Coffeyville formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas
Dennis formation (3 members) (Jewett, 1932) - in Kansas
Dennis limestone (3 members) (Moore, 1936; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Dennis formation (3 members) (Condra and Scherer, 1937) - in Nebraska
Dennis limestone (2 members) (Clair, 1943)
Dennis formation (3 members) (Searight and Howe, 1961)
Dennis Formation (3 members) (Payton, 1966; Gentile, 1976; Thompson, 1995)
Dennis Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Dennis Formation (Mossler, 1971) - in Kansas
Dennis Limestone (3 members) (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Named by Adams (1903), Moore (1936, p. 91) located this formation as "Dennis, Labette County, Kansas. Typical outcrops are located near the northwest corner of sec. 14, T. 31 S., R. 18 E."

The Dennis Formation is the uppermost formation of the Bronson Subgroup. It overlies the Galesburg Shale, and is overlain by the basal shale of the Linn subgroup, the Fontana Shale Member of the Cherryvale Formation.

The Dennis Formation has been included in the "Bethany limestone" (= Bronson Subgroup) (Keyes, 1899, 1901b), and was identified as the "Winterset limestone member of Kansas City formation" by Hinds and Greene (1915) and the "Winterset limestone" by McQueen and Greene (1938). Branson (1944b) included the Dennis in the "Galesburg shale". Thompson (1995, p. 114) stated "The Dennis formation consists of two limestone members (Canville and Winterset) separated by a shale member (Stark). The thickness of the Dennis ranges from 30 to 40 ft in the outcrop areas of Missouri."

Derby

Derby formation (**Buckley, 1907**, 1908) = lower part of ***Derby-Doerun Dolomite***
Derby dolomite (Keyes, 1914)
Cambrian System (Upper Cambrian Series)

Type section: The term Derby was first used by Buckley (1907, p. 286) and described later (Buckley, 1909, p. 44-46). The formation was named for the Derby mine (now Federal mine), near Elvins, St. Francois County, Missouri.

The middle formation of the Elvins group of Ulrich, the Derby formation was underlain by the Davis formation and overlain by the Doerun formation. Present Missouri Geological Survey usage combines the Derby and Doerun formations into a compound formation, the **Derby-Doerun Dolomite**, which is overlain by the Potosi Dolomite. The beds were formerly included as parts of the St. Joseph, Fredericktown, Potosi slates and conglomerates, as well as the Elvins.

Derby-Doerun Dolomite of Elvins Group

Derby formation (**Buckley, 1907**)
Doe Run formation (**Buckley, 1907**)
Derby-Doerun formation (Weller and St. Clair, 1928)
Derby-Doe Run dolomite (Dake and Bridge, 1931; Bartram, et al., 1950)
Derby-Doerun limestone (Brightman, 1938)
Derby and Doe Run dolomites (Cullison and Ellison, 1944)
Derby formation (Branson, 1944b) - rejected "Doe Run"
Derby-Doerun (McCracken, 1955)
Derby-Doerun dolomite of Elvins group (Searight and Howe, 1961)
Derby-Doe Run (Wheeler, 1965)
Derby Dolomite, Doe Run Dolomite (Zimmerman and Amstutz, 1968, Chenoweth, 1968)
Derby Doerun Formation (Stinchcomb, 1972)

Derby-Doerun Dolomite Member of Franconia Formation (Sargent, 1989) - in Illinois
Derby-Doerun Dolomite of Elvins Group (Thompson, 1995)
Cambrian System (Upper Cambrian Series)

Type sections: The type section of the **Derby** was noted by Buckley to be "...on the Harris branch near the Derby mine (Federal Mine No. 2)." Federal Mine No. 2 was located in the NW 1/4 SE 1/4 SE 1/4 sec. 13, T. 36 N., R. 4 E., just south of the town of Elvins, at the small town of Derby in St. Francois County, Missouri, Flat River 7 1/2' Quadrangle.

As for the **Doerun**, Buckley (1908, p. 47) stated "The name 'Doerun' is from the Doe Run Lead Company, which owns the land upon which the type section occurs."

"The most typical and best exposed section of this formation occurs in the S. E. 1/4 of S. E. 1/4 of Sec. 12, T. 36 N., R. 4 E..." On page 49, Buckley located this section "...along the Gumbo branch of the Mississippi River and Bonne Terre Railroad in the southwest quarter of Sec. 12, T. 36 N., R. 4 E."

Thompson (1995, p. 20) stated "The Derby and overlying Doe Run were originally defined (1907) as separate formations from exposures in the vicinity of mines operated by the Derby Lead Company and the Doe Run Lead Company in what was then the Lead Belt area. However, the conformable relationship and similar lithology of the two units have since led most stratigraphers to consider them as a single unit, and the combination of the two names, Derby and Doe Run, is now accepted as the formation name - Derby-Doerun Dolomite." In this definition, the Derby-Doerun overlies the Davis Formation, and is overlain by the Potosi Dolomite, both of Upper Cambrian age.

<u>Derryan series</u>
Derryan series (Thompson, 1942) - in New Mexico; = ***Morrowan and Atokan Series***
Pennsylvanian System (Morrowan and Atokan Series)

Desmoinesian Series (Stage)

Des Moines formation (**Keyes, 1893a**) - in Iowa
Des Moines series (Keyes, 1896c) - in Iowa; = ***top of Mississippian to base of Kansas City Group***
Des Moines series (Moore, 1932; Moore, 1936) = ***base of Cherokee to base of Pleasanton Group***
Desmoinesian (McQueen and Greene, 1938) = ***base of Cherokee to top of Lenapah Formation***
Desmoinesian series (Cline, 1941) = ***base of Cherokee to base of Wayside sandstone***
Desmoinesian series (Clair, 1943) = ***base of Cherokee to top of Altamont Formation***
Desmoinesian series (Cline and Greene, 1950; Howe, 1953) = ***base of Cherokee to base of Pleasanton***
Desmoinesian Series (Gentile, 1976; Thompson, 1995) = ***base of Cherokee to base of Pleasanton Group***
Pennsylvanian System (Subsystem)

Type area: The Desmoinesian Series was named from the area of the Des Moines River, in Iowa.

Rocks of the Desmoinesian Series span from the top of the Marmaton Group (base of Pleasanton Group) to the base of the Cherokee Group. Most of the minable coal beds in Missouri occur within this series. It lies beneath rocks of the Missourian Series, and overlies those of the Atokan Series.

Devonian System

The Devonian System in the Paleozoic Era precedes the Mississippian and follows the Silurian Systems. The first report of Devonian rocks in Missouri was made by Owen (1852) when he reported tracing a Devonian limestone from Callaway County northward toward Iowa. Since then many workers have studied the Devonian rocks. The Devonian System is divided into three series, the Lower, Middle and Upper Series.

<u>Devonic</u>
Devonic (Keyes, 1914)

This is a variant of Devonian coined by Keyes (1914).

Dewey Limestone (Dewey Formation) **of Linn Subgroup, Kansas City Group - of Watney and Heckel, 1994**

Dewey limestone (**Ohern, 1910**) - in Oklahoma
Dewey (Cement City) limestone member of Drum limestone (Moore, 1949) - in Kansas; rejected "Cement City" as a junior synonym of "Dewey"
Dewey limestone member of Drum limestone (Moore, et al., 1951) - in Kansas
Dewey Limestone Member of Drum Limestone (Jewett, et al., 1968) - in Kansas; = ***Cement City LimestoneMember of Drum Limestone in Missouri***
"Drum - Quivira - Dewey" (Kidder, 1985) - reflects early concept of Drum with "lower and upper Drum limestones" (Westerville and Cement City limestones)
Dewey Limestone (Watney, et al., 1989) - in Kansas; = ***Drum Limestone, Cement City Limestone Member***
Dewey Limestone (Watney and Heckel, 1994) = ***Quivira Shale Member of Cherryvale Formation and Cement City Limestone Member of Drum Formation***
Dewey Limestone Member of Drum Limestone (Baars and Maples, 1998) - in Kansas; = ***Cement City Limestone Member of Drum Limestone***
Pennsylvanian System (Missourian Series)

The Dewey Limestone was named by Ohern (1910) from sections in Oklahoma. The type section is at an old quarry of the Dewey Portland Cement Company near Dewey, Washington County, Oklahoma (sec. 26, T. 27 N., R. 13 E.). Moore (1948) proposed to replace the name Cement City with Dewey, as the latter had priority over the former. However, other state Surveys choose to retain the name Cement City "until question of stratigraphic identity of the type of this unit (near Kansas City) and the Dewey is removed."

Recently Watney, et al. (1989) and Heckle and Watney (1994) have determined that the **Drum Limestone** is the same unit as the Dewey Limestone of Oklahoma. Many older reports seem to indicate that the Dewey was equivalent to the Cement City Member of the Drum. Therefore, if only one member is present it could be called Dewey. However, if the Corbin city is also present, then Drum is probably the correct name.

Heckel and Watney (1994) have proposed to redefine the Dewey Formation to include the Quivira Shale Member, and Cement City Limestone Member. Presently the Quivira Shale is the uppermost member of the Cherryvale Formation

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Doerun (Doe Run)

Doe Run formation (**Buckley, 1907**, 1908) = ***upper part of Derby-Doerun Dolomite***
Cambrian System (Upper Cambrian Series)

Type section: The Doe Run was first used by Buckley (1907, p. 286) and later described by him (1908, p. 47-50). The formation was named for the Doe Run Lead Company, which owns the lands in St. Francois County upon which occurs the type section.

This is the uppermost formation of the Elvins group of Ulrich, underlain by the Derby formation and overlain by the Potosi Dolomite. The current usage of the Missouri Geological Survey Thompson (1995) combines the Derby with the Doerun into a compound formation, called the **Derby-Doerun Dolomite**. The beds were formerly included as parts of the St. Joseph, Fredericktown, Potosi slates and conglomerates, as well as Elvins.

Dolbee Creek Member

Dolbee Creek Member of Burlington Limestone (Collinson, et al., 1979)
Mississippian System (Osagean Series)

This is the lowermost member of the three members of the Burlington Limestone in northeastern Missouri and southeastern Iowa, the other two being Cedar Fork Member (upper) and Haight Creek Member (middle).

Doniphan Shale Member **of Lecompton Formation, Shawnee Group**

Doniphan Shale of Lecompton limestone member of Shawnee formation (**Condra, 1927**)
Doniphan shale member of Lecompton limestone (Moore, 1932)

Doniphan shale member of Lecompton limestone (Moore, et al., 1951) - in Kansas
Doniphan member of Lecompton formation (Searight and Howe, 1961)
Doniphan Shale Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Doniphan Shale Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Doniphan Shale Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Doniphan Shale Member was named by Condra (1927) from exposures in the Missouri River bluffs in northeastern northern Doniphan County, Kansas (Baars and Maples, 1998). He stated (p. 47) that it "...has not been identified in the exposures of Nebraska..." Moore (1932) raised it to member rank of the Lecompton Formation.

Thompson (1995, p. 124) stated "The Doniphan Shale Member...is composed of gray, calcareous shale and claystone. In southern Holt County, the member is about 16 ft thick; elsewhere it is less than 10 ft thick." The Doniphan Shale Member overlies the Spring Branch Limestone Member, and is overlain by the Big Springs Limestone Member of the Lecompton Formation.

Douglas Group

Douglas formation (**Haworth, 1898**; Moore and Haynes, 1917) - in Kansas; = ***Stanton to Oread Formations***
Douglas stage (Haworth and Bennett, 1908) - in Kansas; = ***Stanton to Oread Formations***
Douglas formation (Hinds, 1912, 1926; Hinds and Greene, 1915, 1917) = ***Stanton to Oread Formations***
Douglas formation (Condra, 1927) - in Nebraska; = ***Stanton to Oread Formations***
Douglas group (**Moore, 1932**) = ***Stranger and Lawrence Formations***
Douglas group (Newell, 1936; Moore, et al., 1951) - in Kansas; = ***Stranger and Lawrence Formations***
Douglas group (Condra, et al., 1932) = ***Weston to Oread Formations (Pedee and Douglas Groups)***
Douglas group (Condra, 1935; Moore, 1948) = ***Stranger and Lawrence Formations***
Douglas group (Moore, et al., 1944) - in Kansas; = ***Stranger to Oread Formations***
Douglas group (Branson, 1944b) = ***Stranger to Oread Formations***
Douglas group (Searight and Howe, 1961) = ***Stranger and Lawrence Formations***
Douglas Group (O'Connor, 1963; Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas; = ***Pedee and Douglas Groups***
Douglas Group (Van Eck, 1965) - in Iowa; = ***Pedee and Douglas Groups***
Douglas Group (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska; = ***Pedee and Douglas Groups***
Douglas Group (Thompson, 1979; Howe, 1986; Thompson, 1995) = ***Stranger and Lawrence Formations***
Pennsylvanian System (Virgilian Series)

Type area: Named by Haworth (1898, p. 92-93), he stated "...It will be composed of the Lawrence shales [which included rocks now in the Stranger Formation] and the Oread limestone, to which the name Douglas formation may be given, an allusion to the historic county of Douglas located largely within their limits."

Thompson (1995, p. 120) added "The Douglas Group...is a dominantly clastic succession which extends upward from the base of the Stranger Formation to the base of the Toronto Limestone Member of the Oread Formation, the basal unit of the Shawnee Group....The contact of the Douglas and overlying Shawnee is conformable. [In Missouri] Outcrops of the Douglas Group extend from western Platte County northeastward through Buchanan, DeKalb, and Gentry counties. The group is commonly represented by a shale slope, which lies below a prominent limestone escarpment formed by the Oread Formation of the Shawnee Group. The thickness of the Douglas Group ranges from 110 to 150 ft."

Dover Limestone Member of Stotler Formation, Richardson Subgroup, Wabaunsee Group

Dover limestone (**Beede, 1898**, 1902) - in Kansas
Dover limestone of McKissick Grove shale member of Wabaunsee formation (Condra, 1927) - in Nebraska
Dover limestone member of McKissick Grove shale (Moore, 1932)
Dover limestone of McKissick shale formation (Ver Wiebe and Vickery, 1932)
Dover limestone member of McKissick shale (Condra, et al., 1932)
Dover limestone (Moore, 1936; Moore, et al., 1951) - in Kansas

Dover limestone (McQueen and Greene, 1938)
Dover limestone member of Stotler limestone (Moore and Mudge, 1956)
Dover member of Stotler formation (Searight and Howe, 1961)
Dover Limestone Member of Stotler Formation (Burchett and Reed, 1967; Burchett, 1970) - in Nebraska
Dover Limestone Member of Stotler Limestone (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Dover Limestone Member of Stotler Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Beede (1898), the type section is in the vicinity of Dover, Shawnee County, Kansas.

Until 1956, the Dover limestone was either part of the **McKissick Grove shale**, or was just called "Dover limestone." In Missouri, McQueen and Greene (1938) called it the **Dover limestone**, and Searight and Howe (1961) the **Dover member of the Stotler formation**. Thompson (1995, p. 131) stated "The Dover Limestone Member of the Stotler Formation is a sandy limestone that contains algae-coated shell debris and granules and pebbles of limonitic material....It is exposed in Atchison County along the bluffs of the Missouri River from Rock Port northward...The thickness of the member ranges from 2 in to almost 2 ft." The Dover Limestone Member of the Stotler Formation overlies the Pillsbury Shale and is overlain by the Dry Shale Member of the Stotler Formation.

Downeys Bluff Limestone Member of Paint Creek Formation

Downeys Bluff Limestone of Paint Creek Group (Swann, 1963) - in Illinois
Downeys Bluff Limestone Member of Paint Creek Formation (Thompson, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Atherton, et al. (1975, p. 153) stated the Downeys Bluff was "...named for Downeys Bluff, Hardin County [Illinois], and the type section is in a bluff along the Ohio River (NW SE 5, 13S-8E.)."

Thompson (1995, p. 89) stated "The Downeys Bluff Limestone Member of the Paint Creek Formation consists of light-gray, coarsely to finely crystalline limestone, and interbedded shale; in all 8 to 20 ft thick."
The basal member of the Paint Creek Formation, the Downeys Bluff overlies the Yankeetown Sandstone, and is overlain by the shale and thin limestones of the Bethel Member of the Paint Creek.

Dresbachian Stage

Dresbach formation (Bridge, 1936)
Dresbachian Stage (Palmer, 1989)
Cambrian System (Upper Cambrian Series)

Identified at its base by the first representatives of the *Cedaria* Zone and at the top by the changes from the *Apsotreta expansa* Zone to the *Elvinia* - *Linnarsonella* Zone of the overlying Franconian Stage, the Dresbachian Stage in Missouri includes strata from upper Lamotte Sandstone and the Bonneterre Formation, except for the uppermost part of the Whetstone Creek Member of the Bonneterre (Palmer, 1989).

Drift formation

Drift formation (Swallow, 1855)
Quaternary System (Pleistocene Series)

This term was used by Swallow (1855) for deposits of glacial origin in the northern part of Missouri.

Drum Limestone of Linn Subgroup, Kansas City Group

Drum limestone (**Adams, 1903**; Schrader and Haworth, 1906) - in Kansas
Drum limestone (Haworth and Bennett, 1908) - in Kansas; = ***Westerville and Cement City limestones?***

Drum limestone member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917; Bartle, 1933)
= ***Westerville Limestone Member of Cherryvale Formation***
Drum limestone member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Drum limestone (Sayer, 1930) = ***Westerville Limestone Member?***
Drum limestone (Newell, *in* Moore, 1932)
Drum (Westerville) limestone (Gunnell, 1933) = ***Westerville Limestone Member***
Drum limestone formation (2 members) (Condra, 1935) - in Nebraska
Drum limestone (2 members) (Moore, 1936; Jewett, 1949; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Drum formation (Condra and Scherer, 1939) - in Nebraska
Drum formation (2 members) (Searight and Howe, 1961)
Drum Formation (4 members) (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska
Drum Limestone (2 members) (Jewett, et al., 1968; Baars and Maples, 1998)
Drum Formation (2 members) (Howe, 1986)
Drum Limestone (2 members) (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Adams (1903) to replace the name "Independence," that was preoccupied by the Independence Shale of Iowa, Moore (1936, p. 104) located the type section along "Drum Creek, Montgomery county, Kansas. Typical exposures along highway east of Independence, along south line sec. 28, T. 32 S., R. 16 E., and at cement plant in NW¼ sec. 4, T. 33 S., R. 16 E."

The Drum Limestone is composed of two limestone members, the lower Cement City Limestone Member and the upper Corbin City Limestone Member. The Corbin City has not been identified at many sections in Missouri, but it is present. Recently Watney, et al. (1989) and Heckle and Watney (1994) have determined that the Drum is the same unit as the Dewey Limestone of Oklahoma. Many older reports seem to indicate that the Dewey was equivalent to the Cement City Member of the Drum. Therefore, if only one member is present it could be called Dewey. However, if the Corbin city is also present, then Drum is probably the correct name.

In Missouri, as occurred by several authors in Kansas and Nebraska, both Hinds and Greene (1915) and McCourt (1917) miss-identified the Westerville Limestone Member, and called it the "Drum limestone."

Dry Shale Member of Stotler Formation, Richardson Subgroup, Wabaunsee Group

Dry shale (**Moore, 1934**) - in Kansas
Friedrich-Dry shale member of Pony Creek shale formation (Condra, 1935) - in Nebraska
Dry shale (Moore, 1936, 1949; Moore, et al., 1951) - in Kansas
Dry-Friedrich shale (McQueen and Greene, 1938; Branson, 1944b; Moore, 1948)
Dry-Friedrich (?) shale (Jewett, 1941) - in Kansas
Dry shale formation (Condra and Reed, 1943, 1959) - in Nebraska
Dry formation (Condra, 1949)
Dry-Friedrich shale formation (Greene and Searight, 1949)
Dry shale member of Stotler limestone (Moore and Mudge, 1956)
Dry member of Stotler formation (Searight and Howe, 1961)
Dry Shale Member of Stotler Limestone (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Dry Shale Member of Stotler Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Dry Shale Member of Stotler Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1934), Moore (1936, p. 236) located the type section on "Dry Creek, southwest of Emporia [Lyon County], Kansas, in sec. 5, T. 20 S., R. 11 E."

Initially called the **Pony Creek shale of the McKissick shale member of the Wabaunsee formation** (Condra, 1927) in Iowa and Nebraska, this unit later was known as the **Dry-Friedrich shale**. When Moore and Mudge (1956) proposed the Stotler formation, this member was redefined as the Dry Shale Member (or Dry member) of the Stotler Formation. The Friedrich was a shale that overlies the Grandhaven Limestone Member in Kansas and Nebraska that in turn directly overlies the Dry Shale Member, neither of which (Friedrich and Grandhaven) apparently are present in Missouri. In Missouri, McQueen and Greene (1938), Branson (1944b), and Greene and Searight (1949) called it the **Dry-Friedrich shale** (or "shale formation"). Searight and Howe (1961) used the name **Dry member of Stotler formation**.

Thompson (1995, p. 131) stated "In Missouri the complete succession of the Dry Shale Member of the Stotler Formation apparently is fully exposed at only a single locality in Atchison County. Here, the lower and middle parts of the member are composed of medium-gray shale, which is overlain by thin-bedded to massive sandstone. A maroon clay is present at the uppermost part of the succession. It is believed that this clay lies at the approximate stratigraphic position of the Grandhaven [Howe, 1958, unpublished ms.]. The thickness of the Dry Member at the exposure in Atchison County is approximately 40 ft." The Dry Shale Member of the Stotler Formation overlies the Dover Limestone Member of the Stotler Formation, and is the uppermost Pennsylvanian formation recognized in Missouri.

Drywood Coal Bed of Drywood Shale, Krebs Subgroup, Cherokee Group

Dry Wood coal of Dry Wood formation (Searight, et al., 1953)
Drywood coal of Drywood formation (Searight, 1955)
Drywood coal (Searight, 1959) = Pope Creek coal in Illinois
Drywood Coal of Drywood Formation (Basson, 1968)
Drywood coal of Drywood Formation (Gentile, 1976)
Drywood coal bed of Krebs Formation (Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Drywood (Knifeton) coal (Robertson and Smith, 1981)
Drywood coal bed of Drywood Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Searight (1955, p. 35) stated "The type locality is below the spillway of the artificial lake on a tributary of Dry Wood Creek, in the SE¼ NE¼ sec. 4, T. 32 N., R. 33 W., 1¼ miles west of Liberal, Barton County, Missouri."

The Drywood Coal Bed is overlain by sandstones of the Bluejacket Sandstone, and marks the top of the Drywood Shale.

Drywood Shale of Krebs Subgroup, Cherokee Group

Dry Wood formation (Searight, et al., 1953)
Drywood formation (Searight, 1955) - may have included Rowe as well
Drywood formation (Searight and Howe, 1961)
Drywood Formation (Basson, 1968; Thompson, 1995)
Rowe - Drywood Formations (Gentile, 1976)
Pennsylvanian System (Desmoinesian Series)

Type section: Searight (1955, p. 35) stated "The type locality is below the spillway of the artificial lake on a tributary of Dry Wood Creek, in the SE¼ NE¼ sec. 4, T. 32 N., R. 33 W., 1¼ miles west of Liberal, Barton County, Missouri."

Thompson (1995, p. 98) stated "Where it is completely exposed in Barton and Vernon counties, the Drywood Formation contains (from the base upward): 1) locally developed, fossiliferous, marine limestone; 2) dark-gray to black shale, which weathers to brittle flakes; 3) fine-grained sandstone; 4) underclay; and 5) the **Drywood coal bed**. Units 1 and 3 are commonly absent..." The Drywood is overlain by the Bluejacket Sandstone, and overlies the Rowe Shale.

DuBois Limestone Member of Topeka Formation, Shawnee Group

Du Bois limestone bed of Topeka limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska
Dubois limestone member of Topeka limestone (Moore, 1932)
Du Bois limestone member of Topeka limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
DuBois limestone of Topeka limestone formation (Condra and Reed, 1937, 1943, 1959) - in Nebraska
DuBois limestone member of Topeka limestone (McQueen and Greene, 1938; Branson, 1944b)
Du Bois limestone member of Topeka formation (Moore, 1948; Greene and Searight, 1949)

DuBois limestone member of Topeka formation (Condra, 1949)
DuBois member of Topeka formation (Searight and Howe, 1961)
Du Bois Limestone Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Du Bois Limestone Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
DuBois Limestone Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Condra (1949, p. 21) stated the Du Bois was "...named for DuBois, Nebraska; type locality about 4 miles southeast of DuBois." This appears to be the same section as the type for the **Turner Creek Shale Member** of the Topeka Formation.

Thompson (1995, p. 126) stated "The DuBois Limestone Member...usually consists of a single bed of dark-bluish-gray limestone. The member contains a number of brachiopods, such as *Derbyia* and *Composita*, that are generally unbroken and filled with calcite spar. The average thickness of the DuBois is about 1 ft." The DuBois Limestone Member overlies the Turner Creek Shale Member, and is overlain by the Holt Shale Member of the Topeka Formation.

Dubuque Formation

Dubuque Formation of Kimmswick Subgroup of Galena Group (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***uppermost Kimmswick Limestone***
Dubuque Formation of Galena Group (Kay, 1970)
Ordovician System (Mohawkian Series)

This was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Dudley shale

Dudley shale (Adams, 1903) - in Kansas; = ***Nowata - Holdenville formations***
Ladore-Dudley shale member of Coffeyville formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***Holdenville Shale and lower Pleasanton group***
Dudley shale member of Pleasanton formation (Condra, 1927) - in Nebraska; = ***Holdenville Shale***
Dudley shale member of Pleasanton formation (Moore, 1932) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Dun (limestone) formation

Dun limestone (Hay, 1887) - in Kansas; = ***Plattsburg - Stanton Formations (Lansing Group)***
Dun formation (Keyes, 1937e) = ***Plattsburg Formation?***
Pennsylvanian System (Missourian Series)

Dunleith Formation

Dunleith Formation of Kimmswick Subgroup of Galena Group (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1986) = ***upper part of Kimmswick Limestone***
Ordovician System (Mohawkian Series)

This name was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois-southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Dutch Creek

Dutch Creek limestone (Kindle and Miller, 1939) = ***Grand Tower Limestone***, and possibly more
Dutch Creek sandstone (Savage, 1920)
Dutch Creek Sandstone Member of Grand Tower Limestone (in Illinois)
Devonian System (Middle Devonian Series)

The Dutch Creek sandstone was defined by Savage (1920,) as an iron-stained quartz sand cemented with iron oxide, which grades into the overlying Grand Tower limestone and rests on the Clear Creek chert. He stated that it outcrops at many places in Union and Alexander counties, Illinois, and is present in eastern Missouri. The formation was named for Dutch Creek southwest of Jonesboro, Union County, Missouri. In Illinois it is generally regarded as a sandy phase of the Grand Tower (**Dutch Creek Sandstone Member of the Grand Tower Limestone**), although some believe it may be the possible equivalent of the Beauvais Sandstone of Missouri.

Dutchtown Formation

Dutchtown formation (**McQueen, 1937**; Youngquist and Cullison, 1946; Martin, et al., 1961a)
Dutchtown Limestone (Templeton and Willman, 1963; Thompson, 1982)
Dutchtown Formation (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type Section: McQueen (1937) proposed the name from the village of Dutchtown in southern Cape Girardeau County, the type section being a small quarry (Geiser quarry) north of Highway 74 in Cape Girardeau County, in SE NW NW sec. 20, 30N-13E, Gordonville 7½' quadrangle (Thompson, 1993, p. 79).

The Dutchtown overlies the Everton and St. Peter formations, and is overlain by the Joachim Dolomite. Dutchtown strata were earlier (Dake, 1921) regarded to comprise a transition zone between the St. Peter and Joachim formations. The Dutchtown seems to be restricted to a small area in southeastern Missouri in Cape Girardeau and Perry counties.

"Dyson Hollow bed"

"Dyson Hollow bed" of Stanton Limestone (Heckel, et al., 1979) - in Kansas; = ***Eudora Shale Member of Stanton Formation***
Pennsylvanian System (Missourian Series)

E

Eagle Center Member

Eagle Center Member of Little Cedar Formation of Cedar Valley Group (Witzke, et al., 1988) - in Iowa
Eagle Center Member of Little Cedar Formation of Cedar Valley Group (Woodruff, 1990) - in northeastern Missouri
Devonian System (Middle Devonian Series)

Eagle Point Member

Eagle Point Member of Dunleith Formation of Kimmswick Subgroup (Templeton and Willman, 1963, Willman and Kolata, 1978) = ***lower part of "lower Kimmswick Limestone"***
Ordovician System (Mohawkian Series)

This was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Eangua limestone (King, 1844)
Cambrian and/or Ordovician System(s)

A term used by King (1844, p. 129) for a magnesian limestone in the vicinity of the "Eangua" River, Missouri. He stated that it is overlain by siliceous sandstone and underlain by an upheaval deposit of very ancient character, probably gneissoid. Apparently he was referring to the Niangua River in central Missouri. Bridge (1930, in a personal communication to Wilmarth, 1938) stated that this limestone probably extended from the base of the Bonneterre dolomite to the top of the Gasconade dolomite, but may have extended up only to the base of the Gunter sandstone. It is also possible that King was looking at strata in the vicinity of the Decaturville impact structure, which is just east of the Niangua River, and was referring to the highly disturbed rock types that are found in this structure (Offield and Pohn, 1979).

<u>**Earlton limestone**</u>

Earlton limestone (Adams, 1898, 1903; Haworth, 1898c) - in Kansas; = ***Plattsburg Limestone?***

Pennsylvanian System (Missourian Series)

<u>**Early Devonic Sub-Period**</u>

Early Devonic Sub-Period (Keyes, 1914) = ***Lower Devonian Series***

Devonian System (Lower Devonian Series)

<u>**Easley group**</u>

Easley group <u>of Kinderhookian series</u> (Weller, et al., 1948) = ***Kinderhookian Series***

Mississippian System (Kinderhookian Series)

Easley is a group term of the Kinderhookian series used by J.M. Weller (1948, p. 101) including the Chouteau, Sedalia, and Northview formations. The type section for this group is at Easley Station on the Missouri, Kansas, and Texas Railroad in Boone County, Missouri.

Eau Claire Formation

Eau Clair Formation (Howe, et al., 1972; Kurtz, 1989)

Eau Clair (Bonneterre) Formation (Sargent, 1989) - in Illinois

Cambrian System (Upper Cambrian Series)

Discussing sediments of the Upper Mississippi Valley region, Kurtz (1989) stated "The Eau Claire Formation is a unit of fine grained sandstones and shales, variably glauconitic and extensively burrowed. Unburrowed sediment is usually laminated suggesting relatively low energy levels of sedimentation. Basal sediments are coarse grained reflecting local derivation from the Mt. Simon. Most of the upper part of the Eau Claire has carbonate interbedded with clastics indicating proximity to the area dominated by carbonate generation to the south, the Bonneterre Formation. Uppermost Eau Claire sediments are entirely clastic."

Edgewood Group

Edgewood limestone (**Savage, 1909**; Flint and Ball, 1926; Branson, 1944b) = ***Leemon Formation*** (southeastern Missouri)

Edgewood limestone (Savage, 1913) = ***Leemon Formation*** (southeastern Missouri), ***and Noix, Bryant Knob, Bowling Green, and Cyrene formations*** (northeastern Missouri)

Edgewood formation (Martin, et al., 1961b) - included Noix oolite, Cyrene member and Bowling Green member

Edgewood Limestone (Amsden, 1963) "= Keel/Ideal Quarry of Oklahoma"

Edgewood Formation (Rexroad and Nicoll, 1971) = ***Noix, Bryant Knob, and Bowling Green formations***

Edgewood Formation (Thompson and Satterfield, 1971) = ***Leemon Formation***

Edgewood Limestone (Sable, 1979) = ***Leemon Formation***

Edgewood Group (Amsden, 1974) - from ms. of Thompson and Satterfield

Edgewood Group (Thompson and Satterfield, 1975; Thompson, 1991, 1993, 1995; Amsden, 1986) - northeastern Missouri only = ***Noix, Cyrene, Bryant Knob, and Bowling Green formations***

Ordovician and Silurian Systems (Cincinnatian and Llandoverian Series)

The Edgewood Formation was named by Savage (1909, p. 517-518) for exposures three miles north of Edgewood, Pike County, Missouri, in a study of rocks in Alexander County, Illinois and Cape Girardeau County, Missouri. Savage (1913, p. 111-112, 351-376) divided the Edgewood formation in northeastern Missouri into members, the upper member the Bowling Green, calling the lower member the Cyrene. An oolitic phase of the Cyrene was called the Noix oolite. In southeastern Missouri, the Edgewood Formation, considered at that time to be Silurian in age, overlies the Girardeau Limestone and is overlain by the Sexton Creek Limestone; all were considered a part of the Alexandrian series (lower Silurian).

However, Thompson and Satterfield (1975) found that in both northeastern and southeastern Missouri, where the Edgewood had been identified, the lower members (Cyrene and Noix, and Edgewood and Girardeau) were Late Ordovician, the upper ones (Bowling Green and Sexton Creek) Silurian in age. They restricted the use of the term Edgewood to the northeastern Missouri region, where it is a group comprising both upper Ordovician and lower Silurian strata. In southeastern Missouri, they renamed the former "Edgewood" strata the **Leemon Formation**, of Late Ordovician age, and removed it from the Edgewood Group.

Egypt sand

Egypt sand (Keyes, 1915)

Cretaceous System (Gulfian Series)

A term used by Keyes (1915, p. 252) for sands of Ripley (Late Cretaceous) age underlying the Porters Creek clays and overlying his Dakotan series.

Eleventh (11th) St. Limestone

11th Street Limestone (Parkinson, 1982) - in Oklahoma; = ***Norfleet Limestone Member of Lenapah Formation***

Eleventh St. Limestone (Heckel, 1991) - in Oklahoma; = ***Norfleet Limestone Member***

Pennsylvanian System (Desmoinesian Series)

Elk Falls limestone

Elk Falls limestone (Haworth, 1896, 1898b) - in Kansas; = ***Lecompton to Topeka Formations***

Pennsylvanian System (Virgilian Series)

Elm Branch Shale ("Ladore Shale") of Bronson Subgroup, Kansas City Group

Elm Branch shale member of Swope limestone (**Newell, *in* Moore, 1932**; Jewett, 1932) - in Kansas

Elm Branch Shale (Watney, et al., 1989; Pabian and Diffendal, 1989; Watney and Heckel, 1994) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: Watney, et al. (1989, p. 141) called this shale, exposed in Jackson County, Missouri, the **Elm Branch Shale**. It was originally named in Moore (1932), by Newell. Baars and Maples (1998) located the type section "Along steep roadcut near Elm Branch along east side of road, center east line NE sec. 19, T. 28 S., R. 24 E., Miami County, Kansas."

Watney, et al. (1989, p. 141) called this shale, called **Ladore Shale**, exposed in Jackson County, Missouri, the **Elm Branch Shale**. Apparently, the "true" Ladore Shale occurs above the Swope (Bethany Falls) limestone, and is associated in Kansas with the **Mound Valley Limestone** and overlying **Galesburg Shale**. The shale beneath the Swope, previously called Ladore, is the "Elm Branch" of Watney, et al. This shale overlies the Sniabar Limestone Member of the Hertha Formation, and is overlain by the Middle Creek Limestone Member of the Swope Formation. Most of the above references to Ladore Shale are actually ***"= Elm Branch Shale"***.

McQueen and Greene (1933) Branson (1944b) used Ladore in a broad since, that included the lower Ladore (Elm Branch) and the Middle Creek and Hushpuckney Members of the Swope Formation as members of their "Ladore." The overlying Bethany Falls limestone was a formation, and not a member in any other formation.

Elmo Coal Bed of Cedar Vale Shale Member, Scranton Formation, Sacfox Subgroup, Wabaunsee Group

Elmo coal of Cedar Vale shale member of Scranton shale (Branson, 1944b)

Elmo coal of Cedar Vale shale formation (Greene and Searight, 1949)

Elmo coal bed of Cedar Vale member of Scranton formation (Searight and Howe, 1961)

Elmo coal of Cedar Vale Shale (Van Eck, 1965) - in Iowa

Elmo coal bed of Cedar Vale Shale Member of Scranton Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Moore (1936, p. 212) stated "The Cedar Vale shale is bluish to yellowish brown, includes clayey and sandy beds and near the top contains the very persistent Elmo coal..." Thompson (1995, p. 129) added "...The **Elmo coal bed** and its associated underclay occur at the top of the member..."

Elmont Limestone Member of Emporia Formation, Nemaha Subgroup, Wabaunsee Group

Elmont limestone (**Beede, 1898**; Moore, 1936; Jewett, 1941; Moore, et al., 1951) - in Kansas
Elmont limestone member of Preston ("Emporia") limestone (Condra, 1935)
Elmont ("Emporia") or Preston limestone (McQueen and Greene, 1938)
Elmont limestone member of Emporia limestone (Branson, 1944b; Moore and Mudge, 1956)
Elmont limestone (Moore, 1948)
Elmont member of Emporia formation (Searight and Howe, 1961)
Elmont Limestone Member of Emporia Formation (Burchett and Reed, 1967; Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Elmont Limestone Member of Emporia Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Elmont Limestone Member of Emporia Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Beede (1898) named the Elmont limestone from exposures near Elmont, northern Shawnee County, Kansas.

In Missouri, Hinds and Greene (1938) called this limestone the **Elmont ("Emporia") or Preston limestone**, and Searight and Howe (1961) identified it as the **Elmont member of the Emporia formation**. Thompson (1995, p. 130) stated "The Elmont Limestone Member of the Emporia Formation is composed of medium to brownish-gray limestone, which occurs either as a massive layer or as a slabby, shaly bed. Its diversified fauna contains fusuline foraminifera. The member is about 2 ft thick." The Elmont Limestone Member overlies the Harveyville Shale Member of the Emporia Formation, and is overlain by the Willard Shale.

Elsey Formation

Elsey Formation (Robertson, 1967; Thompson and Fellows, 1970; Thompson, 1986,1995)

Mississippian System (Osagean Series)

Type section: Thompson (1986, p. 85) stated "Robertson (1967) located the type section of the Elsey Formation in a roadcut on the north side of Missouri Highway 248, a half mi south of a bridge over Dry Creek, 1.5 mi west of the junction with Highway 173, and 2.5 mi south of the town of Elsey, NW¼ SE¼ sec. 5, T. 24 N., R. 24 W., Stone County, Missouri..."

Thompson (1986, p. 87) added "Robertson (1967, p. 46) proposed the name 'Elsey' for the cherty limestone unit, above the Reeds Spring Formation in southwestern Missouri, that Clark and Beveridge (1952) referred to as 'Grand Falls.' He recommended (p. 38) that the name 'Grand Falls' be restricted to the chert body that crops out along Shoal Creek, near Joplin, Missouri, because he had determined that the chert at Grand Falls...resulted from silicification of more than one stratigraphic formation (Reeds Spring, Elsey, and possibly lower Burlington); therefore, the name 'Grand Falls' was not well chosen for the stratigraphic unit it was to represent elsewhere." The Elsey Formation overlies the Reeds Spring Formation, and is overlain by the Burlington Limestone.

Elvins Group Davis Formation and Derby-Doerun Dolomite

Elvins formation (**Bain and Ulrich, 1905**)
Elvins group (Bridge, 1936; Searight and Howe, 1961)
Elvins Group of Knox Dolomite Megagroup (Swann and Willman, 1961)
Elvins Group (Thompson, 1995)

Cambrian System (Upper Cambrian Series)

Type section: The term is derived from Ulrich's (Bain and Ulrich, 1905, p. 23-26) Elvins formation which he proposed for "the shales, shaley limestones, and more or less earthy dolomites in St. Francois County that intervene between the shaley top of the underlying Bonneterre limestone and the cherty limestones of the Potosi group above." The name is from exposures at Elvins, St. Francois County, Missouri.

The **Elvins Group** comprises the Davis Formation and Derby-Doerun Dolomite. It is overlain by the Potosi Dolomite, and overlies the Bonneterre Formation. This was also called "Fredericktown" (in part) and "Potosi slates and conglomerates."

Elvira (Elviran)

Elvira group of Chester series (Weller, 1939) = ***upper "third" of Chesterian Series*** (Tar Springs - Vienna)
Elvira group of Chesterian series (Weller, et al., 1948)
Elviran Stage of Chesterian Series (Swann, 1963) - in Illinois

Mississippian System (Chesterian Series)

Weller (1939) proposed the New Design, Homberg, and Elvira groups (in ascending order) for the Chester Series in southeastern Illinois. Later, Swann (1963) redefined these as stages of Chesterian Series. In both cases, Elvira strata were the uppermost Chesterian formations of southwestern Illinois and southeastern Missouri, including in Missouri the Tar Springs Sandstone and overlying Vienna Limestone.

Eminence Dolomite

Eminence chert (Buckley, 1907)
Eminence formation (**Buckley, 1908**; Weller and St. Clair, 1928; McQueen and Greene, 1938; Clair, 1943; Hayes and Knight, 1961)
Eminence formation (Ulrich, 1911) = ***lower part of Eminence Dolomite***
Eminence dolomite (Keyes, 1914; Ireland, 1936; Bartram, et al., 1950) = ***lower part of Eminence Dolomite***
Eminence (Tarr, 1918; McQueen, 1930) = ***lower part of Eminence Dolomite***
Eminence-Proctor dolomite (Dake and Bridge, 1927)
Eminence dolomite (Dake, 1930; Dake and Bridge, 1932)
Eminence Dolomite (Freeman, 1949; Kurtz, et al., 1973; Thompson, 1995)
Eminence Formation (Snyder, et al., 1965)

Cambrian System (Upper Cambrian Series)

Type section: Buckley (1907, p. 286) published a geologic column in which he used the term Eminence without defining it. Buckley (1908, p. 33-49) again mentioned the Eminence, saying that it had been recognized above the Potosi in Shannon County, by Ulrich. Ulrich (1911, p. 630-631) published a description of the formation. The formation was named for the numerous exposures in the vicinity of Eminence, Shannon County, Missouri.

The topmost formation of the Upper Cambrian series in Missouri, the Eminence Dolomite is underlain by the Potosi Dolomite and overlain by the Gasconade Dolomite. Ulrich defined it as a very cherty dolomite that overlies the Potosi and underlies the **"Proctor."** The "Proctor" was later proven to be part of the Eminence, and the name has been suppressed. Branson (1918, p. 40-49) stated that the Eminence overlies the Potosi and unconformably underlies the Gunter Sandstone Member of the Gasconade Formation. The beds which comprise the Eminence have been at times in the past included in the "Third Magnesian limestone," Gasconade, and Potosi formations.

Emporia Formation of Nemaha Subgroup, Wabaunsee Group

Emporia limestone (**Kirk, 1896**; Prosser, 1902; Haworth and Bennett, 1908; Moore and Haynes, 1917) - in Kansas
Emporia blue limestone (Smith, 1903) - in Kansas; = ***Reading Limestone Member of Emporia Formation***
Emporia limestone (Adams, 1903) - in Kansas; = ***Maple Hill Limestone Member of Zeandale Formation (and above?)***
Emporia limestone (Hinds and Greene, 1915; Moore, 1932)
Emporia limestone member of Wabaunsee formation (Condra, 1927) - in Nebraska
Emporia limestone member of Nemaha limestone (Condra, et al., 1932) - in Nebraska
Preston ("Emporia") limestone formation (3 members) (Condra, 1935)
Emporia limestone (2 members) (Branson, 1944b) = ***Harveyville and Elmont members of Emporia Formation***
Emporia limestone (Moore and Mudge, 1956)

Emporia formation (3 members) (Searight and Howe, 1961)
Emporia Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970; Pabian and Diffendal, 1989) **-** in Nebraska
Emporia Limestone (3 members) (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Emporia Formation (3 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Emporia limestone was named by Kirk (1896, p. 80 who noted "...In the road and ravines to the north of Wyckoff occurs the Emporia limestone. It was first seen in Chicago Mound, which is near Wyckoff, and is by far the largest hill in this vicinity...". Condra (1927, p. 78) stated "...As used in this paper, it denotes the first limestone unit below the Willard Shale..." Moore and Mudge (1956, p. 2276) added "A type section or locality was not defined clearly by Kirk but there are several good exposures along U.S. Highway 60 south a few miles east of Emporia. An excellent reference section, classifiable as a paratype section...is exposed in a road cut on Kansas Highway 10 in the NW.¼ of Sec. 31, T. 11 S., R. 14 E., Shawnee County, Kansas. This section was described by Jewett (1949, p. 9.)"

Branson (1944b) included the Reading Limestone Member at the top of his **Willard shale**. Thompson (1995, p. 129) added "The Emporia Formation includes (from the base upward): the Reading, Harveyville, and Elmont Members. The total thickness of the formation is about 20 ft." The Emporia Formation overlies the Auburn Shale, and is overlain by the Willard Shale.

Encrinital Group (or limestone)

Encrinital group of Burlington (Owen, 1852) - may also have included the Keokuk Limestone
"reddish brown encrinital group of Hannibal" (Owen, 1852) = ***Burlington Limestone***
Encrinital limestone (Swallow, 1855) = ***Burlington and Keokuk Limestones***
Encrinital or Burlington limestone (Englemann (1863) = ***Burlington Limestone***
Encrinital group of Burlington (Gordon, 1895) = ***Burlington Limestone***
Encrinital group of Hannibal (Gordon, 1895) = ***Burlington Limestone***
Mississippian System (Osagean Series)

A descriptive term applied in early reports on the Mississippi Valley to the Burlington Limestone, sometimes including the Keokuk Limestone. It was used in Missouri by Swallow (1855, p. 60, 97-100) and other early geologists of the state. The name was derived from the predominance of fossil crinoids and their debris.

Englevale Sandstone Member of Labette Shale, Appanoose Subgroup, Marmaton Group

Englevale channel sandstone (**Pierce and Courtier, 1935**) - in Kansas
Englevale sandstone member of Labette shale (Moore, 1936; Moore, 1949) - in Kansas
Englevale sandstone of Labette shale (Jewett, 1941) - in Kansas
Englevale sandstone member of Labette formation (Greene and Searight, 1949)
Englevale sandstone (Warrensburg sandstone) member of Labette shale (Moore, et al., 1951) - in Kansas
Englevale member of Labette formation (Searight and Howe, 1961)
Englevale Sandstone Member of Labette Shale (Jewett, et al., 1968) - in Kansas
Englevale Sandstone Member of Labette Formation (Labette Shale) (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Pierce and Courtier (1935, p. 1061) named the Englevale and stated "It is exposed typically near the town of Englevale, in northeastern Crawford County, Kansas." This is in the SE corner of sec. 13, 28S-24E.

Thompson (1995, p. 106) stated that above the basal underclay and Alvis Coal Bed or fossiliferous shaly limestone, "The western Missouri [Labette Shale] succession is completed by a shale, a siltstone, the **Englevale Sandstone Member**, and one or more thin coal smuts or bony coal..."

Eocene Series

Tertiary System

The time (epoch) and rocks (series) of the Tertiary System between the older Paleocene and younger Oligocene Epoch (Series). It is represented in Missouri by the Wilcox Group. Thompson (1995, p. 139) added "The Eocene Series in Missouri...is represented by two formations of the Wilcox Group, the Ackerman Formation below and the Holly Springs Formation above.

Eogenic - Tertiary System

This is a term used by Ulrich and others to include the Oligocene, Eocene, and Paleocene Series.

Eopaleozoic

Eopaleozoic (Ulrich, 1911) = ***lower Paleozoic***

This term was used by Ulrich (1911) for the lower part of the Paleozoic, including his Cambrian, Ozarkian, Canadian, and Ordovician systems.

Erian series

Erian series (Savage, 1920a) = middle "series" of ***Middle Devonian***
Erian series of Middle Devonian "Sub-System" (Savage, 1925)
Erian Series (Cooper, et al., 1942; Koenig, 1967)
Devonian System (Middle Devonian Series)

This term was used in Missouri by Keyes (1915, p. 253). It overlies his Oriskanian series and underlies his Senecan series. It is represented by his Wittenberg shale and the Grand Tower Limestone. The term is an adaptation of the Erie group or series of New York.

Erie limestone

Erie limestone (Haworth and Kirk, 1894) - in Kansas; = ***Kansas City Group "above Bourbon strata"***
Erie limestone (Haworth, 1895, 1898) - in Kansas; ***Kansas City Group "between Bourbon and Fontana-Chanute beds"***
Erie or Triple limestone (Haworth, 1895) = ***Sniabar, Bethany Falls and Winterset limestones***
Pennsylvanian System (Missourian Series)

Ervine Creek Limestone Member of Deer Creek Formation, Shawnee Group

Ervine Creek limestone bed of Deer Creek limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska; = ***Ervine Creek Limestone Member of Deer Creek Formation*** (some sections)
Ervine Creek limestone bed of Deer Creek limestone member of Shawnee formation (Condra, 1927, 1930, 1933) - in Nebraska; = ***Calhoun Shale and Hartford, Iowa Point, and Curzon members of Topeka Formation*** (some sections, 1927 only)
Ervine Creek limestone member of Deer Creek limestone (Moore, 1932)
Ervine Creek limestone member of Deer Creek limestone (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Ervine Creek member of Deer Creek formation (Searight and Howe, 1961)
Ervine Creek Limestone Member of Deer Creek Limestone (Jewett, et al., 1968; Heckel, et al., 1979; French, et al., 1988; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Ervine Creek Limestone Member of Deer Creek Formation (Burchett, 1970, 1971) - in Nebraska
Ervine Creek Limestone Member of Deer Creek Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1927) named the Ervine Creek for exposures (Moore (1936, p. 188) "on Ervine Creek, Cass county, Neb."

Thompson (1995, p. 125) stated "The Ervine Creek Limestone Member...is a light-gray, wavy-bedded limestone which contains a small amount of chert. It is the uppermost Pennsylvanian limestone unit that is suitable for quarrying in Missouri. The thickness...ranges from 15 to 20 ft." The Ervine Creek Limestone Member overlies the Larsh-Burroak Shale Member of the Deer Creek Formation, and is overlain by the Calhoun Shale.

Establishment Shale Member of Bloomsdale Limestone of Plattin Group

Establishment Member of Mifflin Formation (**Templeton and Willman, 1963**)
Establishment Shale Member of Plattin Limestone (Thacker and Satterfield, 1977; Thompson, 1991)
Establishment Shale Member of Plattin Formation (Thompson, 1987)
Establishment Shale Member of Bloomsdale Limestone of Plattin Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963), p. 82) stated "The Establishment Member...is here named for Establishment Creek in Ste. Genevieve County, southeastern Missouri. The type section is an exposure in a ravine just north of the village of Zell." Thompson (1991, p. 142) added "At its type section the Establishment Shale Member is exposed under a small waterfall..."

The Establishment Shale Member is the uppermost member of the Bloomsdale Limestone. It is overlain by the very pure, light-gray, highly burrowed Beckett Limestone, and underlain by the chocolate brown, dolomitic, and partially oolitic Brickeys Member of the Bloomsdale Limestone.

Eudora Shale Member of Stanton Formation, Lansing Group

Eudora limestone (Bennett, 1896, Haworth, 1896) - in Kansas; = ***Stanton Formation***
Eudora shale of Stanton limestone member of Lansing formation (**Condra, 1930**) - in Nebraska
Eudora shale member of Stanton limestone (Moore, 1932)
Eudora shale member of Stanton limestone (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Eudora shale of Stanton formation (Condra and Scherer, 1939) - in Nebraska
Eudora member of Stanton formation (Searight and Howe, 1961)
Eudora Shale Member of Stanton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Eudora Shale Member of Stanton Limestone (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
"Eudora" Shale Member of Stanton Limestone (Heckel, 1975) - in Kansas
Eudora Shale Member of Stanton Formation (Kidder, 1985; Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Condra (1930), Moore (1936, p. 133) located the type section at a "...road-cut exposure near NE cor. sec. 4, T. 13 S., R. 21 E., 1½ miles northeast and 2 miles east of Eudora [Douglas County], Kans."

Originally called the "Eudora shale of Stanton limestone member of Lansing formation "(Condra, 1930), Thompson (1995. p. 118) stated "The Eudora Shale Member...is a fissile shale, which is black in the basal and middle parts and gray in the upper part. Its average thickness is about 5 ft." The Eudora Shale Member overlies the Captain Creek Limestone Member, and is overlain by the Stoner Limestone Member of the Stanton Formation.

Eureka coal

Eureka coal (Robertson, 1973) - western Missouri, = ***Weir-Pittsburg Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Eureka limestone

Eureka limestone (Haworth, 1898) - in Kansas; = ***Burlingame Limestone Member of Bern Formation***

Pennsylvanian System (Virgilian Series)

Eureka shale

Eureka shale (Simonds, 1891) - in Arkansas; = ***Chattanooga Shale***

Eureka shale (Hershey, 1895; Weller, 1901) - in southwestern Missouri; = ***Chattanooga Shale***

Eureka or Black shale (Hamilton Stage) (Shepard, 1898) = ***Chattanooga Shale***

Devonian System (Upper Devonian Series)

This is an Arkansas term previously used for the black shale of southwest Missouri and adjacent areas. It was named by Branner and Simonds (1891, p. 26) from exposures at Eureka Springs, Carroll County, Arkansas. This name was preoccupied, and the name **"Noel shale"** was proposed. However, when this shale was found to be the equivalent of the Chattanooga Shale in Tennessee, the name **Chattanooga Shale** became the name of choice.

Eutaw formation

Eutaw formation (Wilson, 1922)

Cretaceous System

A term used in Tennessee and other parts of the Gulf Coastal Plain, the Eutaw group was defined by Hilgard (1860, p. 3, 61-68) in a report on Mississippi. Its presence in Missouri was suggested by Wilson (1922, p. 262) who believed it to be the oldest Cretaceous formation present in the subsurface of the southeast lowlands of Missouri. It was named for Eutaw, Greene County, Alabama.

Everton Formation

Everton limestone (**Ulrich, *in* Purdue, 1907**)

Everton formation (Ulrich, 1911; Purdue and Miser, 1916; Weller and St. Clair, 1928; Martin, et al., 1961a)

Everton formation (of St. Peter group) (Dake, 1921)

Everton (Ulrich, 1939)

Everton Group (Templeton and Willman, 1963)

Everton Dolomite (Thompson, 1982; Sargent and Norby, 1986)

Everton Formation (Thompson, 1991; 1995)

Ordovician System (Whiterockian Series)

Type section: The Everton was originally differentiated by Ulrich (*in* Purdue, 1907, p. 251-256), the type section being near the town of Everton in Boone County, northern Arkansas, where it is made up of the Kings River sandstone member at the base and the Everton limestone above.

A formation of the Chazyan Stage, the Everton is overlain by the St. Peter Sandstone and underlain by formations of the Ibexian Series. The formation was not recognized in Missouri prior to work during the summer of 1914 (Dake, 1918, p. 101-105; 1921, p. 15-20), before which it had been included with the St. Peter Sandstone in a single formation. The same two lithologic divisions recognized in the type area exist in southeastern Missouri (Weller and St. Clair, 1928, p. 91). The lower **"Kings River sandstone member"** is the thicker of the two, but more restricted geographically; the **"Everton limestone"** is the greater part of the formation in the type region in Arkansas.

"Everton limestone" **of Everton Formation**

Ordovician System (Whiterockian Series)

This is the upper carbonate part of the Everton Formation in Missouri. It overlaps the lower sandstone to the north, but pinches out in Jefferson County. It overlies the lower Everton Sandstone, and briefly Ibexian strata at its northern extremities, and is overlain by the St. Peter Sandstone.

Excello Shale of Fort Scott Subgroup, Marmaton Group

Excello formation (**Searight, et al., 1953;** Searight, 1955; Searight and Howe, 1961)
Excello Shale Member of Senora Formation (Branson, et al., 1965) - in Oklahoma
Excello Shale (James, 1969; James and Baker, 1971; Thompson, 1995)
Excello Formation (Neal, 1969; Gentile, 1976)
Excello Shale Member of Mouse Creek Formation (Ravn, et al., 1984) - in Iowa
"lower Ft. Scott - Excello" (Kidder, 1985) = ***Excello - Blackjack Creek formations***
Excello shale (Brenner, 1989) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Searight, et al. (1953) proposed the name Excello Shale for this unit, and located the type section as (p. 35) in the "...NW-¼ sec. 20, T. 56 N., R. 14 W., 2.6 miles west of U.S. Highway 63, west of Excello, Macon County, Missouri, in the highwall of a coal strip pit."

Thompson (1995, p. 105) stated "The Excello Shale consists mainly of black, thinly laminated, fissile shale, which contains flattened, drab-gray, phosphatic concretions...The thickness of the formation varies between 10 in. and 5 ft, but probably averages 3 to 4 ft." The Excello Shale overlies the Mulky Formation of the Cherokee Group, and is overlain by the Blackjack Creek Limestone.

Exline Limestone Member of Lees Summit Formation, Pleasanton Group - of Howe (1982)

Exline limestone member of Nowata shale (**Cline, 1941**)
Exline limestone (Clair, 1943)
Exline member of middle (unnamed) formation of Pleasanton group (Searight and Howe, 1961)
Exline Limestone member of Pleasanton Group (Landis and Van Eck, 1965) - in Iowa
Exline Member of Pleasanton Group (Gentile, 1976)
Exline Limestone Member of Lees Summit Formation (Howe, 1982)
Exline Limestone (Heckel, 1984; Watney, et al., 1989) - in Kansas
Exline Limestone of Pleasanton Group (Kidder, 1985)
Exline Limestone Member of "middle unnamed formation" of Pleasanton Group (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Cline (1941, p. 65) named the Exline limestone, and stated "The type locality of the Exline limestone is about 1½ miles south of the southwest corner of Exline, Appanoose County [Iowa]. The limestone is well exposed in a west-flowing tributary of North Shoal Creek, in the SE¼ of Sec. 6, T. 67 N., R. 17 W. Along this ravine the exposed section includes the Worland, Cooper Creek [Sni Mills], and Exline limestones and shale almost up to the horizon of the Hertha limestone."

This unit may or may not be correlative with the Checkerboard Limestone of Oklahoma.

Exline Limestone Member of Shale Hill Formation, Pleasanton Group - of Watney and Heckel (1994)

Pennsylvanian System (Missourian Series)

F

Fabius group

Fabius group (Weller, et al., 1948)

Devonian System (Upper Devonian Series)

"Fabius" was a term used by J.M. Weller, et al. (1948, p. 101) to include the Saverton and Grassy Creek formations. He thought the group was part of the Kinderhookian series; however, it is Upper Devonian, not Lower Mississippian, in age, correlative with the Chattanooga Shale of southwestern Missouri. The name is taken from the South Fabius River which flows from Knox through northern Marion County, Missouri.

"False Victory facies"

"False Victory facies" of Glaize Creek Member of Hager Limestone (**Spreng and McCart, 1994**) = ***Glaize Creek Member of Hager Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

Spreng and McCart (1994) proposed this unit for the very light-gray to white facies of the Glaize Creek Member of the Hager Limestone that closely resembles the lithology of the Victory Member of the Hager Limestone.

Fargo limestone member

Fargo limestone member of Nemaha formation (Condra and Bengston, 1915) - in Nebraska; = ***Wakarusa Limestone Member of Bern Formation***

Pennsylvanian System (Virgilian Series)

Farley Limestone Member of Wyandotte Formation, Zarah Subgroup, Kansas City Group

Farley limestone bed of Lane shale member of Lansing formation (**Hinds and Greene, 1915**)
Farley limestone member of Wyandotte limestone (Newell, in Moore, 1932; Moore, et al., 1951) - in Kansas
Farley limestone (Condra, et al., 1932)
Farley limestone member of Wyandotte limestone (Condra, 1935) - in Nebraska
Farley limestone member of Lane shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Farley limestone of Wyandotte formation (Condra and Scherer, 1939) - in Nebraska
Farley limestone of Wyandotte limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Farley limestone member of Wyandotte formation (Moore, 1948)
Farley member of Wyandotte formation (Searight and Howe, 1961)
Farley Member of Wyandotte Formation (Burchett, 1965) - in Nebraska
Farley Limestone Member of Wyandotte Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Farley Limestone Member of Wyandotte Limestone (Jewett, et al., 1968; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Farley Limestone Member of Wyandotte Formation (Howe, 1986; Thompson, 1995)
Farley Limestone (Pabian and Diffendal, 1989)
Farley Limestone Member of Lane Shale (Watney and Heckel, 1994) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: The type section for the Farley Limestone Member is in an exposure on the east bank of the Platte River, just north of an east-west road that intersects with Highway 45, 0.25 mile south of the Highway 45 bridge over Platte River; this section is 1 mile east-southeast of Farley, in Platte County, Missouri.

Thompson (1995, p. 117) stated "The Farley Limestone Member...contains two limestone units and an intervening shale bed in its type area. It is well-known only in Platte and western Clay counties in Missouri. The lower limestone unit is oolitic and extremely variable in thickness. The overlying shale contains a poorly-defined coal horizon in its upper part. The member is from 5 to 30 ft thick in Platte and Clay counties where the complete Farley succession is known. The upper limestone is largely composed of algal debris and ranges from a few in. to 2-3 ft in thickness. The member contains many gastropods and pelecypods..." The Farley Limestone Member of the Wyandotte Formation (or Lane Shale) overlies the Island Creek Shale Member, and is overlain by the Bonner Springs Shale Member (or Bonner Springs Shale).

Farmdale Loess

Quaternary System (Pleistocene Series, Wisconsinan Stage)

A loess recognized by Leighton in 1920 and described in a publication by him in 1926 (p. 167-174) was called the "Late Sangamon loess" but later renamed Farmdale from the exposure in the Farm Creek section near Farmdale, Tazewell County, Illinois (communication quoted by Wascher, Humbert, and Cady, 1948, p. 390). It was recognized in Missouri by Leighton and Willman (1950, p. 617) near Dexter, Advance, and Delta. The name is used in Illinois as **Farmdale Soil** and **Farmdalenian Substage** of the Wisconsinan Stage, the latter an interglacial period in the mid Wisconsinan.

Whitfield (*in* Thompson, 1995, p. 148) stated "The Farmdale Loess is herein treated as basal Peoria; however, in many places it can be differentiated from the remainder of the Peoria deposits only with difficulty. The Farmdale is present in Cape Girardeau and Stoddard counties and is presumed to be present at some localities in northwestern Missouri. Farmdale loess is commonly noncalcareous and has a distinctive pinkish cast. It is a medium to coarse silt which contains very fine- to coarse-grained sand. There is a thin accumulation of clay at the top of this unit. The thickest reported Farmdale in Missouri is 22 ft thick."

Fayetteville Shale

Fayetteville formation (Simonds, 1891) - in Arkansas
Fayetteville shale (Penrose, 1891) = ***Moorefield Formation***, in Arkansas
Fayetteville shale (Croneis, 1930) - in Arkansas
Fayetteville formation (Clark, 1941) - unpublished, first reference in Missouri
Fayetteville formation (Branson, 1944b; Spreng, 1961)
Fayetteville shale member of Carterville formation (Weller, et al., 1948)
Fayetteville Formation (Thompson, 1972, 1986)
Fayetteville Shale (Thompson, 1995)

Mississippian System (Chesterian Series)

Type section: The Fayetteville Shale was named by Branner and Simonds (1891, p. 26, 42-49) from exposures near Fayetteville, Washington County, Arkansas.

Clark (1941) was the first to report it from Missouri, exposed in an outlier of Chesterian formations preserved in a large graben-like block in otherwise Osagean bedrock, primarily in Barry County. It is principally in the area of the towns of Seligman and Washburn. The Fayetteville Shale is capped by a thick, resistant 30-ft sandstone, the **Wedington Sandstone Member**.

Fern Glen Formation

Fern Glen formation (Weller, 1906; Moore, 1928; Laudon, 1937; Weller, et al., 1948; Spreng, 1961)
Fern Glen formation (Weller, 1909) - "Kinderhookian in age"
Fern Glen limestone member of Kinderhook formation (Fenneman, 1911)
Fern Glen (St. Joe) (Girty, 1915b) = ***Compton, Northview, and Pierson formations*** in southwestern Missouri and northwestern Arkansas
Fern Glen formation (Ulrich, 1915) - "of Missouri and Arkansas" = ***Pierson Limestone***
Fern Glen (Pierson) (Fowler and Lyden, 1931) = ***Pierson Limestone***
Fern Glen limestone member of Boone formation (Giles, 1935) = ***Pierson Limestone***
Fern Glen (McQueen, 1939)
Lower Fern Glen or Sedalia (McQueen, 1939) = ***Meppen Limestone Member of Fern Glen Formation?***
Fern Glen member of Chouteau formation (Branson, 1944b)
"Fern Glen zone" of St. Joe limestone (Bassler, 1950) = ***Pierson Limestone***
Fern Glen Formation (Thompson, 1975, 1984, 1986; Atherton, et al., 1975)
Lower member of Fern Glen Formation (Thompson, 1975) = ***Meppen Limestone Member***

Mississippian System (Osagean Series)

Type section: The Fern Glen Formation was named by Weller (1906, p. 438) from a small resort area on the Meramec River called Fern Glen, in southwest St. Louis County, Missouri, where the formation is well exposed along a railroad track. Thompson (1975, 1986) redefined and redescribed the type section and located it as (1986, p. 69) "...a composite of two railroad cuts on either side of Fern Glen, on the north bank of the Meramec River, center SE¼ sec. 14, and NW¼ SW¼ SW¼ sec. 13, T. 44 N., R. 4 E., Manchester 7½' Quadrangle..."

The basal formation of the Osagean series in east central Missouri, the Fern Glen is overlain by the Burlington Limestone, and overlies either the limestone of the Kinderhookian-aged Chouteau Group (in northern St. Louis and St. Charles counties), or the thin basal Kinderhookian Bachelor Formation and underlying Upper Devonian Bushberg Sandstone (in southern St. Louis County and south as far as Ste. Genevieve County). In many older reports on the geology of east-central and southeast Missouri, the beds constituting the lower member of the Fern Glen (Meppen Limestone Member) were erroneously referred to as the Chouteau limestone (Shumard, 1873, p. 295, Canis, 1967).

Fernvale

Fernvale limestone (Savage, 1909)
Fernvale (Ulrich, 1911) - "southeastern Missouri"; = ***Cape Limestone***
Fernvale (Richmond) limestone (Dake, 1921)
Fernvale formation (Branson, 1944b) = ***Cape Limestone***
"Fernvale" limestone (Taylor, 1947; Twenhofel, et al., 1954; Gudstadt, 1958)
Fernvale Limestone (Sable, 1979)

Ordovician System (Cincinnatian Series)

A thin limestone overlying the Kimmswick Limestone and underlying the basal shale of the Maquoketa was initially correlated with the Fernvale formation, named from Fernvale, Williamson County, Tennessee. This name has since been supplanted by the term **Cape Limestone** in Missouri (Templeton and Willman, 1963).

The Fernvale formation was first differentiated by Hayes and Ulrich (1903, p. 2) in Tennessee. Early Missouri geologists did not separate this unit from the underlying "Receptaculites limestone," (Kimmswick) and although they did in some cases recognize some faunal difference between this bed and the underlying limestone, they failed to recognize it as a distinct geologic formation because of its limited thickness and similar lithologic character to that of the underlying strata. Ulrich (1904a), in his original definition of the Kimmswick limestone (which was the "Receptaculites limestone"), specifically excludes this bed of limestone from the Kimmswick, and points out the fact that its fauna allies it with the Fernvale. Gealy (1955, p. 83) named the formation the "LaCroix limestone."

Fernville

"Fernville Richmond fauna" (Ulrich, 1904a) = ***Cape Limestone***
Fernville formation (Buckley, 1909)

Ordovician System (Cincinnatian Series)

A term used by Ulrich (1904a) and Buckley (1909, p. 64), apparently misspelling or misprinting "**Fernvale**."

Ferrelview Formation

Quaternary System (Pleistocene State, Yarmouthian Stage)

Whitfield (*in* Thompson, 1995, p. 146-147) stated "According to Howe and Heim (1968), the Ferrelview consists of a thick, gray, clayey silt situated below the Loveland loess and above the youngest pre-Illinoian till. The Ferrelview is considered to comprise deposits formed in a continuum of environments, among which those of till-plain lakes and accretion-gley formation were most important...the typical Ferrelview does not include a recognizable Yarmouth soil profile. Late Kansan outwash silt probably was an important constituent.."

"A differing point of view has been suggested by Guccione (1982) who states that what has been called Ferrelview by others has developed from parent material in place by weathering and gleying of pre-Illinoian till and Illinoian loess (Loveland silt)..."

<u>Ferruginous sandstone</u>

Ferruginous sandstone (Hall, 1857; Worthen, 1866) = ***Aux Vases Sandstone***
"Ferruginous sandstone" (White, 1899) "= Millstone Grit of Illinois"
Aux Vases sandstone ("Ferruginous sandstone") (Weller, 1920)

Mississippian System (Chesterian Series)

This is a descriptive term used in early Missouri reports by Swallow and others for the Mississippian sandstone later named the **Aux Vases Sandstone**.

<u>Finley limestone</u>

Finley limestone (Shepard, 1904)

Ordovician System (Ibexian Series)

This was a term used by Shepard (1904, p. 42) for what he considered the "First Magnesian limestone," which he said was overlain by "Black River" and "Birdseye limestone" and underlain by "Marshfield sandstone" (Roubidoux). Bridge (1930, personal communication to Wilmarth, 1938) stated that the Finley limestone of Shepard is either Cotter or Powell dolomite.

<u>First Calciferous</u>

First Calciferous (Gallaher, 1900) = ***Gasconade Dolomite***

Ordovician System (Ibexian Series)

This term was used by Gallaher (1900, p. 116-124), for what is now called **Gasconade Dolomite**, overlain by his "St. Thomas sandstone" (Roubidoux) and underlain by his "Roubidoux sandstone" (Gunter).

<u>First Limestone</u>

First Limestone (Gallaher, 1900) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Gallaher (1900, p. 90-91) used "first limestone" for the second member of his Cambrian, which he also called the "White Lead." It is a part of the **Bonneterre Formation** of present nomenclature. It is underlain by his "Basal sandstone" (Lamotte) and overlain by his "Dead Rock" or "Second Limestone" (part of Bonneterre).

<u>First (1st) Magnesian limestone</u>

1st Magnesian limestone (Swallow, 1855) = ***Joachim Dolomite***
First Magnesian limestone (Folley limestone) (Keyes, 1896d) = ***Joachim Dolomite***

Ordovician System (Mohawkian Series)

This is a term used by Swallow and other early Missouri geologist (Keyes, 1896d) for the formation later called the **Joachim Dolomite**.

<u>First (1st), or Saccharoidal sandstone</u>

1st, or Saccharoidal sandstone (Meek, *in* Swallow, 1855) = ***St. Peter Sandstone***
First or Saccharoidal sandstone (Keyes, 1896d)
1st sandstone (Shepard, 1898) = ***St. Peter and Everton sandstones***

Ordovician System (Mohawkian or Whiterockian and Mohawkian Series)

This term was used by the early Missouri geologists for the sandstone later known as the **St. Peter Sandstone**.

"5-foot lime"

"5-foot lime" (Charles and Page, 1929) = ***Blackjack Creek Limestone***

Pennsylvanian System (Desmoinesian Series)

Fleming Coal Bed of Fleming Shale, Cabaniss Subgroup, Cherokee Group

Fleming coal (**Pierce and Courtier, 1938**) **-** in Kansas
Fleming coal of Fleming cyclothem (Moore, 1949; Moore, et al., 1951)
Fleming coal of Fleming formation (Searight, et al., 1953)
Fleming coal of Senora formation (Branson, 1954a) **-** in Oklahoma
Fleming coal of Fleming formation (Searight, 1959) = **Greenbush coal** in Illinois
Fleming coal bed of Fleming formation (Searight and Howe, 1961)
Fleming coal bed of Cabaniss Formation (Jewett, et al., 1968; Heckel, et al., 1969) **-** in Kansas
Fleming coal bed of Fleming Formation (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Pierce and Courtier (1938, p. 73) stated "The Fleming coal is so named from exposures in strip pits just north of the village of the same name, which is in southern Crawford county [Kansas] between the towns of Pittsburg and Cherokee."

The Fleming coal bed has been mined in Vernon County, as the "Middle coal" or "two-foot coal". Robertson (1971, p. 18) stated "The Fleming is a thin and very irregularly distributed coal bed of local importance in Bates and Vernon Counties and possibly Henry County...

..."it is known to contain abundant pyritic concretions in some localities, which would indicate that it is relatively high in sulfur content."

Fleming Shale of Cabaniss Subgroup, Cherokee Group

Fleming cyclothem (**Abernathy, 1937**; Moore, 1949; Moore, et al., 1951) **-** in Kansas
Fleming formation (Searight, et al., 1953; Searight and Howe, 1961)
Fleming Formation (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Abernathy (1937) as the "Flemming cyclothem", Pierce and Courtier (1938, p. 73) stated "The Fleming coal is so named from exposures in strip pits just north of the village of the same name, which is in southern Crawford county [Kansas] between the towns of Pittsburg and Cherokee."

Thompson (1995, p. 101-102) stated "The formation is continuous along the cropline from the Kansas border to western Henry County where it pinches out toward the east. It continues northward into the Forest City Basin. The formation varies in thickness from a featheredge up to 15 ft." The Fleming overlies the Robinson Branch Shale, and is overlain by the Croweburg Shale.

Flint Hill Sandstone Member of Little Osage Shale, Fort Scott Subgroup, Marmaton Group

Flint Hill sandstone of Little Osage shale member of Fort Scott formation (Greene and Searight, 1949)
Flint Hill sandstone (Unklesbay, 1952a)
Flint Hill sandstone member of Fort Scott formation (Searight, et al., 1953)
Flint Hill member of Little Osage formation of Fort Scott subgroup (Searight and Howe, 1961)
Flint Hill Sandstone (Wanless, et al., 1963) **"= Vernullunville Sandstone of Illinois"**
Flint Hill Sandstone Member of Little Osage Formation (Schenk, 1967)
Flint Hill Member of Little Osage Formation (Neal, 1969)
Flint Hill Sandstone Member of Little Osage Formation of Fort Scott Subgroup (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: The Flint Hill Sandstone was named by Unklesbay (*in* Greene and Searight, 1949), and the type section was located by Unklesbay (1952a, p. 96-97) as "...in the W½ SW¼ sec. 11, T. 50N., R. 13 W. (located by Greene and Searight, 1949, as "NW¼ SE¼ sec. 11...").

Thompson (1995, p. 106) stated "The Flint Hill Sandstone... is a blanket sandstone of wide lateral extent spreading northwestward from central Boone County. Locally, as in central Boone County it appears to be a channel type sandstone." The Flint Hill overlies the "Blackwater Creek Shale Member", and underlies the Higginsville Limestone, with only a few feet of shale separating the two in many sections.

<u>Foley limestone</u>

Foley limestone (Keyes, 1896d) = ***Joachim Dolomite***

Ordovician System (Mohawkian Series)

"Foley limestone" is a term used by Keyes (1896d, 1898c, p. 59-61) for what is now called the **Joachim Dolomite**. He stated that it underlies the Bryant (Plattin) limestone and overlies the Cap-au-Gres (St. Peter) sandstone in east central Missouri. It was named for Foley, Lincoln County, Missouri.

Fontana Shale Member of Cherryvale Formation, Linn Subgroup, Kansas City Group

Fontana shale member <u>of Cherryvale shale</u> (**Newell, *in* Moore, 1932**)
Basal Cherryvale shale (Fontana) (Gunnell, 1933)
Fontana shale (Newell, 1936; Moore, 1936) - in Kansas
Fontana shale member <u>of Cherryvale formation</u> (Moore, et al., 1951) - in Kansas
Fontana member <u>of Cherryvale formation</u> (Searight and Howe, 1961)
Fontana Formation (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska
Fontana Shale Member <u>of Cherryvale Shale</u> (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Fontana Shale Member <u>of Cherryvale Formation</u> (Gentile, 1976; Howe, 1986; Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Jewett, 1932), Moore (1936, p. 97) located the type section as "village of Fontana, Miami County, Kansas, typical exposures near NE cor. sec. 11, T. 18 S., R. 23 E., and near middle west side NW¼ sec. 36, T. 18 S., R. 23 E."

Thompson (1995, p. 115) stated "The Fontana Shale Member...contains silty, gray, micaceous shale and clay. A thin coal bed is present near the base of the member in some places. The Fontana is normally 2 to 5 ft thick, and consists mostly of clay, but in the Kingston area of Caldwell County it is between 10 and 15 ft thick and is represented principally by the shale described above." The Fontana Shale Member overlies the Winterset Limestone Member of the Dennis Formation, and is overlain by the Westerville Limestone Member of the Cherryvale Formation.

<u>Forbes limestone</u>

Forbes limestone (**Keyes, 1898a**, 1899, 1900b, 1901b, 1937b, 1937d; Gallaher, 1898; Smith, 1909) - in Kansas ***= Deer Creek to Topeka Formations***
Forbes (Deer Creek) limestone (Condra and Bengston, 1915) - in Nebraska

Pennsylvanian System (Virgilian Series)

This name was used by Keyes (1898a, 1899, 1900b, 1901b, 1937), Gallaher (1898), and Smith (1909) for the unit called **Deer Creek** in Kansas, described from good exposures north of the town of Forbes, in Holt County, Missouri. Deer Creek was adopted for Missouri over Forbes by Hinds and Greene (1915).

<u>Forreston Member</u>

Forreston Member <u>of Grand Detour Formation of Plattin Subgroup</u> (Willman and Kolata, 1978) = ***Hager Limestone and lower part of the Macy Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

Fort Scott coal

Fort Scott coal of "Upper shale member of Cherokee formation" (Greene and Pond, 1926) = ***Mulky Coal Bed***
Fort Scott or Mulky coal of Cherokee formation (Greene, 1933)
Fort Scott coal of Breezy Hill limestone member of Cherokee shale (Pierce and Courtier, 1938) - in Kansas; = ***Mulky Coal Bed***
Pennsylvanian system (Desmoinesian Series)

These were terms originally proposed by Swallow (1866) in the early attempts to name the Pennsylvanian succession. They are not related to the Fort Scott Subgroup, or its previous names in the Marmaton Group.

Fort Scott Subgroup of Marmaton Group

Fort Scott coal series (Swallow, 1866) = ***in Cherokee Group***
Fort Scott marble (Swallow, 1866) - in Cherokee Group
Fort Scott marble series (Swallow, 1866) - in Cherokee Group
Fort Scott limestone (Swallow, 1866) = ***Higginsville Limestone***
Fort Scott cement rock (Swallow, 1866) = ***Blackjack Creek Limestone***
Fort Scott group (Broadhead, 1874)
Fort Scott coal (Broadhead, 1874) = ***Summit Coal Bed of Little Osage Shale***
Fort Scott limestone (Adams, 1896) = ***Blackjack Creek Limestone***
Oswego or Fort Scott limestone (Bennett, 1896)
Fort Scott limestone member of Henrietta formation (Keyes, 1897b; Marbut, 1898; Hinds, 1912)
Fort Scott, or Upper Oswego limestone (Haworth, 1898) = ***Higginsville Limestone***
upper Fort Scott limestone (Haworth, 1898) = ***Higginsville Limestone***
Fort Scott limestone (Adams, 1903) - rejected "Oswego", as preoccupied
lower Fort Scott (Mulky cap-rock) (Hinds, 1912) = ***Blackjack Creek Limestone***
Fort Scott ("Oswego") limestone (Hinds and Greene, 1915)
Fort Scott limestone (Greene, 1918)
upper Fort Scott limestone, or "Twenty-foot lime" (Greene and Pond, 1926) = ***Higginsville Limestone***
lower Fort Scott limestone ("Cement Rock") (Greene and Pond, 1926) = ***Blackjack Creek Limestone***
Fort Scott limestone member of Marmaton formation (Condra, 1927) -in Nebraska
Upper Fort Scott limestone of Henrietta formation (Knight, 1928a, 1928b) = ***Higginsville Limestone***
Lower Fort Scott limestone of Henrietta formation (Knight, 1928a, 1928b) = ***Blackjack Creek Limestone***
lower Fort Scott (cement rock) limestone (Moore, 1929) = ***Blackjack Creek Limestone***
Upper Fort Scott limestone (Knight, 1930, 1931, 1933a) = ***limestone in Labette shale***
Middle Fort Scott coal (Knight, 1930) = ***Lexington Coal Bed***
Fort Scott member of Henrietta formation (Knight, 1930) = ***Higginsville Limestone***
Lower Fort Scott limestone (Knight, 1930, 1931, 1933a, 1933b, 1934a) = ***Higginsville Limestone***
Fort Scott member of Henrietta formation (Gunnell, 1931)
"shaly middle portion of the Fort Scott limestone" (Gunnell, 1931) = ***Little Osage Shale***
upper member of Fort Scott limestone (Greene, 1933) = ***Higginsville Limestone***
Upper Fort Scott limestone of Henrietta formation (Knight, 1934b) = ***Higginsville Limestone***
Lower Fort Scott limestone of Henrietta formation (Knight, 1934b) = ***Blackjack Creek Limestone***
Fort Scott limestone (McQueen and Greene, 1938; Cline, 1941)
upper Fort Scott limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Higginsville Limestone***
lower Fort Scott limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Blackjack Creek Limestone***
shale (with Summit coal) of Fort Scott limestone (McQueen and Greene, 1938) = ***Little Osage Shale***
shale including Rhomboidal limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Little Osage Shale***
middle shale of Fort Scott limestone (Pierce and Courtier, 1938) - in Kansas; = ***Little Osage Shale***
lower member of Fort Scott limestone (Pierce and Courtier, 1938) - in Kansas; = ***Blackjack Creek Limestone***
Fort Scott limestone (Jewett, 1941; Moore, 1948) - in Kansas
Fort Scott formation (Clair, 1943; Greene and Searight, 1949; Searight, et al., 1953)
"upper Fort Scott limestone" of Fort Scott limestone (Branson , 1944b) = ***Higginsville Limestone***
"shale within Fort Scott limestone" (Branson, 1944b) = ***Little Osage Shale***
limestone ("unit #3, p. 279) of Fort Scott limestone (Branson, 1944b) = ***Houx Limestone Member***
"lower Fort Scott limestone" of Fort Scott limestone (Branson, 1944b) = ***Blackjack Creek Limestone***

Fort Scott formation (Moore, et al., 1951) - in Kansas
shale of Fort Scott limestone (Branson, 1954a) - in Oklahoma
Fort Scott subgroup of Marmaton group (**Searight and Howe, 1961**)
Fort Scott Formation (Branson, et al., 1965) - in Oklahoma
Fort Scott Subgroup (of Marmaton Group) (Gentile, 1967; Neal, 1969; Thompson, 1995)
Fort Scott Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Ft. Scott Formation (Kidder, 1985)
"upper Ft. Scott" Limestone (Kidder, 1985) = ***Higginsville Limestone***
"lower Ft. Scott" Limestone (Kidder, 1985) = ***Blackjack Creek Limestone***
Pennsylvanian System (Desmoinesian Series)

Type area: Named by Broadhead (1874), the type locality is a railroad cut (Higginsville Limestone) in the north part of the town of Fort Scott on the Missouri-Pacific Railway, SW NE NW sec. 30, 25S-25E, Bourbon County, Kansas. Jewett (1941) designated exposures in a quarry in the NE 19, 25W-25E, as the type for the Fort Scott (mostly Blackjack Creek and basal Little Osage).

The term "Fort Scott limestone" was initially used independently for either the Higginsville Limestone (Swallow, 1866) or the Blackjack Creek Limestone (Adams, 1896). When Keyes (1897b) erected the Henrietta formation, the Fort Scott limestone became the basal member of the Henrietta formation. McQueen and Greene defined the Fort Scott limestone as a formation with three members. The name "Henrietta" was abandoned in favor of "Marmaton" for the group name (Greene and Searight, 1949), and the Fort Scott limestone became the basal formation of the Marmaton Group. Searight and Howe (1961) raised the Fort Scott to the subgroup level, raising the three former members of the Fort Scott limestone to formations of the Fort Scott Subgroup.

Fortune Formation

Fortune formation (Grohskopf, et al., 1943)
Fortune Formation (Thompson and Satterfield, 1975; Thompson, 1993, 1995)
Devonian System (Middle Devonian Series)

Type section: Grohskopf, et al. (1943, p. 10) stated "The name is taken from Fortune Branch located in the SE¼ sec. 4, T. 23 N., R. 26 W., Barry County, Missouri...about 9 miles northeast of Cassville...The type section forms a small bench in the private road or trail about 20 feet above the bottom of Fortune Branch."

The Fortune Formation is predominantly chert, usually highly brecciated, with a few localities containing a very black recrystallized limestone associated with the chert (Thompson and Satterfield, 1975). It occurs in a small area in Barry County, southwestern Missouri, and appears to be a remnant of thicker Middle Devonian strata still present to the south in northwestern Arkansas.

4th Calciferous limestone

4th Calciferous limestone (Gallaher, 1900) = ***Joachim Dolomite*** (eastern Missouri), ***and Jefferson City Dolomite?*** (southwestern Missouri)
Ordovician System (Ibexian or Mohawkian Series)

This term was used by Gallaher (1900, p. 134-135) for “the last member of the Calciferous group and of the Magnesian Lens.” It is underlain by the St. Peter and overlain by the Black River (Plattin) limestone. In eastern Missouri this was the "unrestricted Joachim", although the top boundary probably was lower than the top of the "Rock Levee." In south central and southwestern Missouri he was referring to the Jefferson City.

Fourth Limestone

Fourth Limestone (Gallaher, 1900) = ***Bonneterre Formation?***
Cambrian System (Upper Cambrian Series)

This term was used by Gallaher (1900, p. 93-96) for the “fifth member of our Cambrian section.” He also called it the "Massive Crystalline Cap-Rock of the lower Cambrian"; underlain by the "Third limestone" or "Black Lead" and overlain by his "Lower Green shales" (Davis Formation).

Fourth (4th) Magnesian limestone

Fourth Magnesian limestone *(*early geologists) = ***Eminence Dolomite - Davis Formation***
4th Magnesian Limestone (Swallow, 1855) = ***Gasconade? and Potosi Dolomites***
Cambrian System (Upper Cambrian Series)

A term used by Swallow and other early Missouri geologists for the formation later called Proctor. The Proctor later proved to be the Eminence. It included rocks from the top of the Bonneterre to the top of the Eminence.

Fragmental limestone

Fragmental limestone (Keyes, 1937f) = ***Hertha Formation***
Pennsylvanian System (Missourian Series)

Fraileys Shale Member of Golconda Formation

Fraileys Shale of Golconda Group (Swann, 1963) - in Illinois
Fraileys Member of Golconda Formation (Shaver, et al., 1970) - in Illinois, "= Big Clifty Formation of Indiana"
Fraileys Shale Member of Golconda Formation (Thompson, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Atherton, et al. (1975, p. 156) stated "The Fraileys Shale...is named for Fraileys Landing (abandoned), Hardin County [Illinois], about 1 mile northeast of the type section in a bluff along Haney Creek (NE NE SE 9, 12S-10E), where the formation is 94 feet thick. It is dominantly shale, with minor amounts of limestone and, locally, sandstone."

Thompson (1995, p. 90) added that in Missouri "The Fraileys Shale Member of the Golconda Formation, 70-90 ft thick, is composed of shale, which contains beds of dark-colored, crinoidal limestone." The Fraileys Shale Member overlies the Beech Creek Limestone Member, and is overlain by the Haney Limestone Member of the Golconda Formation.

Francoisian series

Francoisian series (Keyes, 1915)
Precambrian Erathem

A term introduced by Keyes (1915, p. 253) to include from youngest to oldest the **Skrainka diabase**, **Iron Mountain porphyry**, and **Knob Lick granite** of southeast Missouri, which are now commonly considered to be Precambrian. The derivation of the name is not stated, but it is probably named from the St. Francois Mountains.

Franconia Formation

Franconia formation (Elvins) (Bridge, 1936) = ***upper Bonneterre to Elvins***
Lower Franconia Formation (Davis Formation) (Howe, et al., 1972)
Reno Member
Tomah Member
Birkmose Member
Franconia Formation (Kurtz, 1989)
Reno Member = ***Derby-Doerun Dolomite*** (Kurtz, 1989)
Tomah Member = ***Davis Formation*** (Kurtz, 1989)
Birkmose Member = ***Whetstone Creek Member of Bonneterre Formation*** (Kurtz, 1989)
Cambrian System (Upper Cambrian System)

The Franconia Formation was originally proposed by Bridge (1936) as equivalent to the Elvins group Missouri (Davis and Derby-Doerun Formations). Howe, et al. (1972) recognized the Birkmose, Tomah, and Reno Members of the Franconia Formation in the subsurface of northeastern Missouri, occurring as northern facies of the Davis and lower Derby-Doerun sequence (Elvins) typical of the central and southern Missouri section. The Birkmose and Reno Members are recognized as far south as Audrain County, Missouri, the Tomah Member recognized in Clark County, but not extending to the Audrain County well.

Franconian Stage

Franconia formation (Bridge, 1936) = ***Elvins Group***
Franconia Stage (Howell and Lochman, 1938)
Franconian Stage (Howell, et al., 1944)
Franconian Stage (Howe, et al., 1972) = ***Elvins Group and lowermost Potosi Dolomite***
Franconian stage (Kurtz, et al., 1975) = ***uppermost Bonneterre (Whetstone Creek), Elvins Group, and lowermost Potosi Dolomite***
Cambrian System (Upper Cambrian Series)

This is the middle of three stages of the Upper Cambrian Series. It overlies the Dresbachian Stage, and is overlain by the Trempealeauan Stage.

Fredericktown limestone (dolomite)

Fredericktown limestone (**Keyes, 1896d**) = ***Bonneterre Formation - Derby-Doerun Dolomite***
Fredericktown dolomite (Keyes, 1901a) = ***Bonneterre Formation***
Fredericktown limestone (Keyes, 1914) = ***Bonneterre Formation***
Cambrian System (Upper Cambrian Series)

The term used by Keyes (1896d, p. 48-52) for everything between the Lamotte and his "La Sueur" (Potosi). It is equivalent to the "St. Joseph limestone" of Winslow. These rocks are now divided into the Derby-Doerun and Davis (Elvins Group) and the Bonneterre Formation. It was named for exposures at Fredericktown, Madison County, Missouri. Keyes (1901a,1914) used "Fredericktown" in a restricted sense, equal to Bonneterre Formation.

French Creek shale

French Creek shale (Wanless, 1955) - in Illinois; = ***Severy Formation***
Pennsylvanian System (Virgilian Series)

Dry-Friedrich shale

Friedrich-Dry shale member of Pony Creek shale formation (Condra, 1935) - in Nebraska; = ***Dry Shale Member of Stotler Formation***
Dry-Friedrich shale (McQueen and Greene, 1938) = ***Dry Shale Member of Stotler Formation***
Dry-Friedrich (?) shale (Jewett, 1941) - in Kansas; = ***Dry Shale Member of Stotler Formation***
Dry-Friedrich shale (Branson, 1944b; Moore, 1948) = ***Dry Shale Member of Stotler Formation***
Dry-Friedrich shale formation (Greene and Searight, 1949) = ***Dry Shale Member of Stotler Formation***
Pennsylvanian System (Virgilian Series)

Frisbie Limestone Member of Wyandotte Formation, Zarah Subgroup, Kansas City Group

Frisbie limestone member of Wyandotte limestone (**Newell, *in* Moore, 1932**)
Frisbie limestone member of Wyandotte limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Frisbie limestone member of Iola limestone (McQueen and Greene, 1928; Clair, 1943; Branson, 1944b)
Quindaro-Frisbie limestone of Wyandotte limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Frisbie limestone member of Wyandotte formation (Moore, 1948)
Frisbie member of Wyandotte formation (Searight and Howe, 1961)
Frisbie Member of Wyandotte Formation (Burchett, 1965) - in Nebraska
Frisbie Limestone Member of Wyandotte Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Frisbie Limestone Member of Wyandotte Limestone (Jewett, et al., 1968; Watney, et al., 1989, Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas

Frisbie Limestone Member of Wyandotte Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 120) described the type section at "Frisbie, center N. side sec. 17, T. 12 S., R. 23 E., in northern Johnson county, Kansas."

Thompson (1995, p. 116) stated "The Frisbie Limestone Member..., in areas of the Missouri River is a single, thin, more-or-less uniform bed of medium- to dark-gray limestone. Southward it thickens and becomes more complex, as in the Kansas City area, where it contains several beds of limestone interbedded with calcareous shale. The thickness...ranges from 1 to 3 ft." The Frisbie Limestone Member overlies the Lane (or Liberty Memorial) Shale, and is overlain by the Quindaro Shale Member of the Wyandotte Formation.

"Fusulina" limestone

"Fusulina" limestone (Bennett, 1896) - in Kansas; = ***Spring Branch Limestone Member of Lecompton Formation***
Pennsylvanian System (Virgilian Series)

G

Gabouri limestone

"oolitic limestone of the Gabouri" (Nicollet, 1843) = ***Salem Formation***, Ste, Genevieve County
Gabouri limestone (Keyes, 1925c) - proposed to replace name "Salem"
Gabouri oolite (Keyes, 1938b) = ***Salem Formation***
Mississippian System (Meramecian Series)

This term was used once casually by Nicollet (1843, p. 33) for what he, a few sentences farther along, called "oolitic limestone of the Gabouri," exposed at Ste. Genevieve, Missouri. According to Keyes (1925c, p. 149-150) the Gabouri limestone of Nicollet is Spergen limestone (Salem), and he revived Nicollet's name to replace "Salem." The only known uses of "Gabouri" in literature are Nicollet's casual use and Keyes (1925c, 1938c) proposed revival of the term (Wilmarth, 1938).

Gainesville sandstone

Gainesville sandstone of Blackjack Knob member of Theodosia formation **(Cullison, 1944)** = ***Cotter Dolomite***
Ordovician System (Ibexian Series)

Cullison used this name (1944, p. 31) for a sandstone within his Blackjack Knob member of his Theodosia formation. He states that it lies above and practically grades into the gray coarsely crystalline *Orospira*-bearing dolomite which in turn overlies a thin desiccation-cracked, ripple-marked sandstone which marks the base of the Blackjack Knob member. This sandstone, apparently named for Gainesville, Arkansas, is within the **Cotter Dolomite** succession in southwestern Missouri (Thompson, 1991, p. 49).

Galena limestone (Group)

Galena limestone of upper Trenton Group (Worthen, 1866) - in Illinois; = ***Kimmswick Limestone***
Galena series (Sardeson, 1897)
Galena-Trenton formation (Savage, 1908) - "resembles Kimmswick limestone of Ulrich"
Galena Group (Templeton and Willman, 1963) = ***Kimmswick Limestone and Decorah Group***
Galena Group ("upper part") (Kay, 1970) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

This unit was named for the town of Galena, in Jo Daviess County, northern Illinois, for strata that are equivalent to the Kimmswick Limestone of Missouri. The term is mentioned by Shumard (1873, p. 266, 276) in Cape Girardeau County, Missouri, as equivalent to the "Receptaculites limestone," the term he preferred. In Templeton and Willman

(1963), the unit in Illinois (Galena Group) had been broadened to include both the Decorah Group and overlying Kimmswick Limestone.

Galesburg Shale of Bronson Subgroup, Kansas City Group

Galesburg shale of Bronson formation (**Adams, 1903**) - in Kansas
Galesburg shale ("Cherryvale shale" in text) (Adams, 1904) - in Kansas
Galesburg shale member of Coffeyville formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas
Galesburg shale (Haworth and Bennett, 1908; Moore, et al., 1951) - in Kansas
Galesburg shale member of Kansas City Formation (Hinds and Greene, 1915)
Galesburg formation (Jewett, 1932) - in Kansas
Galesburg shale (Gunnell, 1933) - between Bethany Falls limestone and Stark shale
Galesburg shale of Bronson Group (Moore, 1936) - in Kansas
Galesburg shale (McQueen and Green, 1938; Branson, 1944b) = ***Galesburg and Dennis formations***
Galesburg formation (Condra and Scherer, 1939) - in Nebraska
Galesburg shale (Clair, 1943)
Ladore-Galesburg shale (Jewett and Muilenburg, 1957) - in Kansas, where Mound Valley limestone is absent
Galesburg formation (Searight and Howe, 1961)
Galesburg Formation (Payton, 1966; Gentile, 1976)
Galesburg Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Galesburg Shale (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Galesburg Clay (Whitfield, 1981)
Galesburg Shale Member of Swope Limestone (Watney, et al., 1989) - in Kansas
Galesburg Shale (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Named by Adams (1903) as the "Galesburg shale of Bronson formation", Moore (1936, p. 89) defined the type section as being at "Galesburg, Neosho County, Kansas. Galesburg is built largely on Winterset limestone. The Galesburg shale makes the slope north of town in sec. 5, T. 30 S., R. 19 E."

Thompson (1995, p. 114) stated "The Galesburg Shale is composed of clay and shale and in some places in western Missouri has a thin coal at the top. At most localities, the basal part of the formation is a gray shale, which contains irregularly shaped calcareous concretions [Mound Valley Limestone??] that appear to be closely related to the limestone of the Bethany Falls. The thickness of the formation averages less than 10 ft."

The Galesburg Shale overlies the Bethany Falls Limestone Member of the Swope Formation, and is overlain by the Canville Limestone Member of the Dennis Formation.

Garnavillo Member

Garnavillo Member of Guttenberg Formation of Decorah Subgroup (Templeton and Willman, 1963)

Ordovician System (Mohawkian Series)

This is the lower of two members of the Guttenberg Limestone proposed by Templeton and Willman (1963). It is not been ascertained if these members are present in Missouri.

Garnett limestone

Garnett limestone (Haworth and Kirk, 1894; Haworth 1894) - in Kansas; = ***Plattsburg - Stanton formations***
Garnett limestone (Haworth, 1894; Kirk, 1896) - in Kansas; = ***Oread Formation?***
Garnett limestone (Haworth, 1895) - in Kansas; = ***Wyandotte - Stanton formations***
Garnett limestone (Adams, 1903) - in Kansas; = ***Plattsburg - Stanton formations***; "= Stanton limestone of Keyes [1900b]"

Pennsylvanian System (Missourian Series)

Gasconade Dolomite

Gasconade limestone (**Nason, 1892**; Weeks, 1902; Ball and Smith, 1903)
Gasconade formation (McQueen, 1929) = ***upper Gasconade only*** - does not include Van Buren
Gasconade (Branson and Mehl, 1933a) = ***upper Gasconade only*** - does not include Van Buren
Gasconade formation (1 member) (Martin, et al., 1961a)
Gasconade Formation (Kay, 1970) = ***upper Gasconade only*** - does not include Van Buren
Gasconade Dolomite (Ross, et al., 1982)
Gasconade Dolomite (1 member) (Thompson, 1991, 1995)
Ordovician System (Ibexian Series)

Type section: Nason (1892, p. 114-115) was the first to apply the name Gasconade to "the great series of limestone beds, interstratified with thin beds of sandstone, which underlie the Roubidoux." The name was derived from the type area along the Gasconade River in east central Missouri.

The basal formation of the Ibexian Series, the Gasconade Dolomite is overlain by the Roubidoux Formation and overlies the Upper Cambrian Eminence Dolomite. Ball and Smith (1903, p. 30-50) defined the Gasconade as lying above the Gunter sandstone and beneath the St. Elizabeth (Roubidoux) formation. Marbut (1907, p. 26-32) followed Ball and Smith, except he placed the base of the Gasconade at the base of the Gunter sandstone. In 1922, Ulrich suggested the separation of the lower Gasconade strata (Van Buren formation), and in 1929 the Missouri Geological Survey adopted this term. Bridge (1930, p. 98-99, 109) then defined the formation as the cherty beds of dolomite lying between the Roubidoux Formation above and the Van Buren Formation below. Today, Van Buren has been dropped, and the Missouri Geological Survey now defines the Gasconade essentially as Marbut did, between the base of the Roubidoux and the base of the Gunter Sandstone Member.

If **Van Buren Formation** is identified in a report, then the Gasconade Dolomite (or formation) refers only to the upper part of the entire formation as viewed today. The Gunter Sandstone will then be a member of the Van Buren, not the Gasconade.

Gasperian Stage

Gasperian Stage of Chesterian Series (Swann, 1963) in Illinois; = ***lower "third" of Chesterian Series***
Mississippian System (Chesterian Series)

This may be equivalent to the **New Design Group** of Weller (1939) and Weller, et al. (1948).

Gaylor Sandstone

Gaylor Sandstone (Gordon, 1964) - in Arkansas; = ***Bachelor Formation***
Mississippian system (Kinderhookian Series)

Geiser Quarry member

Geiser Quarry member of Dutchtown Formation (McQueen, 1937)
Ordovician System (Mohawkian Series)

McQueen (1937) subdivided the Dutchtown Formation at its type section (the Geiser Quarry) into three members, the middle of which he named "Geiser Quarry member," the units identified from a study of insoluble residues. In 1963, Templeton and Willman (p. 53-54) recognized two members, combining the Geiser Quarry and upper unnamed member into the "Sharpsboro Member," overlying the "Gordonville Member" below.

Genessee Black Shale

Genessee division "Black slate" and grayish shale (Meek and Worthen, 1866) = ***Grassy Creek Shale***; may have included the Saverton Shale
Genessee Black Shale (Gallaher, 1900) = ***Grassy Creek, and possibly Saverton, Shale***
Devonian System (Upper Devonian Series)

Genessee is an eastern (New York) term used by Gallaher (1900, p. 153) in Missouri for the black shales exposed in Lincoln, Pike, and Marion counties, northeastern Missouri, beneath the Louisiana Limestone.

<u>**Genevieve group**</u>

Genevieve group (Williams, 1891) = ***Meramecian and Chesterian***, excluded Warsaw; replaced "Archimedes limestone"
Ste. Genevieve epoch (Weller, 1898a, 1898b) = ***Meramecian and Chesterian Series***
Ste. Genevieve group (Williams, 1922) = ***Meramecian and Chesterian Series***
Mississippian System (Meramecian and Chesterian Series)

This was a term used by H.S. Williams (1891, p. 169) after reviewing the classification of the Mississippian, for a subdivision of the Mississippian System that included the Warsaw limestone (in part), the St. Louis, and the Chester. It is the "Archimedes group" of Shumard. It includes Chesterian and Meramecian Series of present terminology. It was named for exposures in Ste. Genevieve County, Missouri.

<u>**Genevieve limestone**</u>

Genevieve limestone (Keyes, 1931)
Genevieve oolite (Keyes, 1938b)
Mississippian System (Chesterian Series)

Thisa is an abbreviated form of **Ste. Genevieve Limestone**, employed by Keyes.

<u>**Genevievian Stage**</u>

Genevievian Stage <u>of Valmeyeran Series</u> (Swann, 1963; Johnson and Vondra, 1968) = ***Ste. Genevieve and Aux Vases formations***
Mississippian System (Chesterian Series)

The Genevievian Stage was proposed by Swann (1963) for strata he considered the youngest representatives of the Valmeyeran Series (upper Mereamecian Series) in the Illinois Basin.

<u>**geode beds**</u>

geode beds (Hall, 1857) = ***Warsaw Formation***, northeastern Missouri
Geode bed (Keyes, 1894a) = ***Warsaw Formation***, northeastern Missouri
geodiferous beds (Gordon, 1895) = ***Salem Formation***
Mississippian System (Meramecian Series)

Gilmore City Formation of Chouteau Group

Gilmore City formation (McQueen and Greene, 1938) - in northwestern Missouri subsurface
Gilmore City and/or Chouteau (Searight and Howe, 1961) - in northwestern Missouri
Gilmore City facies <u>of Chouteau Group</u> (Carlson, 1963) - northwestern Missouri
Gilmore City Limestone <u>of Chouteau Group</u> (Thompson, 1986)
Mississippian System (Kinderhookian Series)

Type section: Thompson (1986, p. 64) stated "The Gilmore City Formation was named from the Gilmore Portland Cement Company Quarry, 1.5 mi northwest of Gilmore City (now Midwest Limestone Company quarry), ... Pocahontas County, Iowa." The name was first used by Van Tuyl (1925, p. 113-114).;

Recognized in the subsurface in northwestern Missouri, the Gilmore City is considered the upper part of the Chouteau by the Missouri Geological Survey. It has distinctive oolite, and lies on dolomitic limestone or shale. McQueen (1938, p. 33) suggested its presence in northwest Missouri subsurface, and he considered it correlative to the Chouteau.

Girardeau Limestone of Maquoketa Group

Cape Girardeau limestone (**Shumard, 1855**; Schuchert, 1897) = ***Girardeau Limestone***
Cape Girardeau limestone (Swallow, 1855) = ***Sexton Creek, and possibly Girardeau, Limestone***
Girardeau (Keyes, 1898c)
Girardeau limestone (Weeks, 1902; Savage, 1909; Ireland, 1936; Grohskopf, 1955) - "Silurian in age"
Cape Girardeau limestone (Buehler, 1907) = ***Sexton Creek, and possibly, Girardeau, Limestone***
Cape Girardeau limestone (Savage, 1908) = ***Girardeau and Leemon formations***
"Cape Girardeau or Alexandrian formation" (Savage, 1909) = ***Girardeau Limestone?***
Cape Girardeau (Girardeau) limestone (Alexandrian series) (Scoby, 1938) = ***Girardeau Limestone?***
Girardeau limestone (Twenhofel, et al., 1954; Martin, et al., 1961a) - "Ordovician in age"
Girardeau Limestone (Templeton and Willman, 1963) - "Silurian in age"
Girardeau Limestone (Satterfield, 1971; Thompson and Satterfield, 1975; Thompson, 1982; Amsden, 1986) - "Ordovician in age"
Girardeau Limestone of Maquoketa Group (Kolata and Guensburg, 1979) - in Illinois
Girardeau Limestone of Maquoketa Group (Thompson, 1991, 1995)
Ordovician System (Cincinnatian Series)

Type section: The Girardeau Limestone was named by Shumard (1855, p. 154-155; originally as the "Cape Girardeau limestone") from exposures in the Mississippi River bluffs one to two miles above Cape Girardeau, Missouri, at Cape Rock Park. The type section comprises exposures on the west bank of the Mississippi River below track level and railroad cuts along the St. Louis- San Francisco Railroad at Cape Rock Park (Thompson, 1991, p. 233-234; W/2 NE SE 28, 31N-14E).

Originally regarded as lower Silurian (Alexandrian), the Girardeau Limestone (the name shortened by Keyes, 1894a, p. 40) was assigned to the late Ordovician (Cincinnatian) by Thompson and Satterfield (1975) and defined as the uppermost formation of the Maquoketa Group because of its transitional relationship with the underlying Orchard Creek Shale of the Maquoketa Group. The top of the Girardeau is often unconformable. It may be overlain by strata from the Late Ordovician Leemon Formation to Early Silurian Sexton Creek Limestone.

Gizzard Creek Member

Gizzard Creek Member of Coralville Formation of Cedar Valley Group (Witzke, et al., 1988) - in Iowa
Gizzard Creek Member of Coralville Formation of Cedar Valley Group (Woodruff, 1990) - in northeastern Missouri
Devonian System (Middle Devonian Series)

Glaize Creek Member of Hager Limestone of Plattin Group

Glaize Creek Member of Hager Limestone (**Thompson and Spreng, 1988**; Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Proposed by Thompson and Spreng (1988), Thompson (1991, p. 158) stated "The type section of the Glaize Creek Member of the Hager Limestone is a roadcut on the northwest frontage road at the junction of Jefferson County road M and I-55, SE¼ NW¼ sec. 30 (projected), T. 42 N., R. 6 E...Jefferson County, Missouri..."

Thompson (1991, p. 158) added "The Glaize Creek Member is a medium- to thick-bedded calcareous mudstone, often interbedded with thinner fine grainstones, with usually one bed of discontinuous large (6-8-in.) brown chert nodules near the base. It is unburrowed, and weathers to smooth light gray to nearly white ledges." (p. 159) "A distinctive straight actinocerid nautiloid...is common in the upper beds of the Glaize Creek, but has not been found in the Victory Member."

At some exposures, a cross-stratified coarse-grained calcarenite is part of the Glaize Creek, and because Templeton and Willman (163, p. 86) had named a grainstone member in the same stratigraphic position the "Clement Member," Thompson (1991) called it the **"Clement grainstone facies"** of the Glaize Creek Member.

<u>Glencoe marble</u>

Glencoe marble (Schuchert, 1910) = ***Kimmswick Limestone***

Ordovician System (Mohawkian Series)

"Glencoe marable" was a trade name for a marble quarried from the Kimmswick Limestone at Glencoe, St. Louis County, Missouri (according to Bridge, letter dated July 10, 1936 to Wilmarth, 1938).

Glencoe Shale Member of Spechts Ferry Formation of Decorah Group

Glencoe Member <u>of Spechts Ferry Formation of Decorah Subgroup</u> (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1986)

Glencoe Shale Member <u>of Spechts Ferry Formation of Decorah Group</u> (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: The Glencoe Shale Member was named by Templeton and Willman (1963). Thompson (1991, p. 188) stated "The Glencoe Member of the Spechts Ferry Formation was named from the village of Glencoe, St. Louis County, Missouri. The type section (3 mi east of Glencoe), the Mincke section, is an exposure in the south bluff of the Meramec River, along the Burlington-Northern Railroad, 0.25 mi northeast of Mincke Siding." This is the same section as the type section for the Castlewood Limestone Member of the Spechts Ferry Formation and the Deicke K-Bentonite Bed, near the center of E½ SE¼ SE¼ sec. 21, T. 44 N., R. 4E., Manchester 7½' Quadrangle.

Thompson (1995, p. 35) stated "The Glencoe Shale Member...consists of green shales and numerous, thin, interbedded limestone layers. The limestone beds are highly fossiliferous, comprised predominately of the brachiopods *Pionodema subaequata* and *Rafinesquina*. A prominent thin, yellow-brown clay bed beneath a nodular limestone bed is the **Millbrig K-bentonite bed**..." The Glencoe Member overlies the Castlewood Limestone Member of the Spechts Ferry Formation, and is overlain by the Kings Lake Limestone.

Glen Dean Limestone

Glen Dean limestone (Butts, 1917) - in Kentucky

Glen Dean limestone (Ulrich, 1917) in Kentucky, = ***Vienna Limestone***

Glen Dean limestone (Flint, 1925) - unpublished, but first use in Missouri

Glen Dean Member <u>of Lower Okaw Formation</u> (Sutton, 1934) - in Illinois

Glen Dean formation (Spreng, 1961)

Glen Dean Limestone <u>of Okaw Group of Hombergian Stage</u> (Swann, 1963) - in Illinois

Glen Dean Limestone (Thompson, 1979a, 1986, 1995)

Mississippian System (Chesterian Series)

Type section: The Glen Dean Limestone was named by Butts (1917, p. 97) from exposures along an abandoned railroad on either side of the town of Glen Dean, Breckinridge County, Kentucky.

Overlying the Hardinsburg Formation and underlying the Tar Spring Sandstone, the Glen Dean Limestone in Missouri consists of light-gray, coarsely to finely crystalline limestone and interbedded layers of shale. It was first recognized near Wittenberg in east-central Perry County, Missouri, by Flint (1925, p. 161) where it is well exposed.

<u>Glen Park limestone</u>

Glen Park limestone = ***Horton Creek Limestone***

"thin wavy beds of dolomite" in Hannibal Formation ('Glen Park of Illinois") (Williams, 1943) = ***Horton Creek Limestone*** of Mississippian age

Glen Park (Collinson, et al., 1959) = ***Horton Creek Limestone*** of Mississippian age

"Glen Park" formation (Collinson, 1961a) = ***Horton Creek Limestone*** of Mississippian age

"Glen Park" (Collinson, et al., 1962a; Conkin and Conkin, 1968) = ***Horton Creek Limestone*** of Mississippian age

Glen Park Formation (Fraunfelter, 1965) = ***Horton Creek Limestone*** of Mississippian age

Glen Park Limestone Member (of Hannibal Group) (Conkin and Conkin, 1968) = ***Horton Creek Limestone*** of Mississippian age
"Glen Park" Formation (Collinson, et al., 1967b; Sandberg, et al., 1972; Sandberg, 1981) = ***Horton Creek Limestone*** of Mississippian age
"Glen Park Limestone" (Collinson, et al., 1971) = Horton Creek Limestone of Mississippian age
Glen Park Formation (Carter, 1988) **-** part is Horton Creek Limestone of Mississippian age, part is true Glen Park; considered both to be Mississippian in age
Mississippian System (Kinderhookian Series)

Originally proposed as the "Hamburg oolite" (Weller, 1906), this oolitic conglomeratic limestone became known as the "Glen park" limestone, "Glen park of Illinois," or Glen Park Limestone Member of Hannibal Group, to differentiate it from the Upper Devonian Glen park Limestone of the Sulphur Springs Group in east-central Missouri. Conkin and Conkin (1973) renamed it the **Horton Creek Limestone Member of the Hannibal Shale** to separate it from the "Missouri Glen Park."

Glen Park Limestone of Sulphur Springs Group

Glen Park limestone member of Sulphur Springs formation (Ulrich, 1904a)
Glen Park limestone (Weller, 1906, 1911)
Glen Park limestone member of Sulphur Springs formation (Weller and St. Clair, 1928)
Glen Park formation (Mehl, 1960, 1961)
Glen Park formation of Sulphur Springs group (Koenig, 1961a)
Glen Park (Collinson, et al., 1962b)
Glen Park Member of Sulphur Springs Formation (Chauff and Dombrowski, 1977)
Glen Park Limestone Member of Sulphur Springs Formation (Sable, 1979)
Glen Park Formation (Carter, 1988) **-** part is Horton Creek Limestone of Mississippian age, part is true Glen Park; considered both to be Mississippian in age
Glen Park Limestone of Sulphur Springs Group (Thompson, 1993, 1995)
Devonian System (Upper Devonian Series)

Type section: The type section for the Glen Park Limestone (Ulrich, 1904a) is the same as that for the Sulphur Springs Group and Bushberg Sandstone, exposures along the Missouri Pacific Railroad, including an old quarry face, at Glen Park, Jefferson County, eastern Missouri SE SE NE 5, 41N-6E.

The Glen Park Limestone is part of the Sulphur Springs Group, of Late Devonian age. It overlies a thin unnamed black shale (probably equivalent to the Grassy Creek Shale to the north), and lies beneath, and sometimes is transitional with, the Bushberg Sandstone (Thompson, 1993, p. 198-200).

Glenhaven Member

Glenhaven Member of Guttenberg Formation of Decorah Subgroup (Templeton and Willman, 1963)
Ordovician System (Mohawkian Series)

This is the upper of two members of the Guttenberg Limestone proposed by Templeton and Willman (1963). It is not certain if these members are present in Missouri, or not.

Golconda Formation

Golconda formation (Ulrich, 1915) **-** in oral presentation
Golconda formation (Brokaw, 1916; Weller, et al., 1948; Spreng, 1961)
Golconda formation (Weller and St. Clair, 1928) = ***Golconda and Hardinsburg formations***
Golconda Group (3 members) (Swann, 1963) **-** in Illinois
Golconda Formation (3 members) (Thompson, 1979a, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: The Golconda Formation was named by Brokaw (1916) for exposures just north of Golconda, Pope County, Illinois, in the Ohio River bluffs in secs. 5, 8, and 18, 13S-7E (Thompson, 1986, p. 137-138).

The Golconda Formation overlies the Cypress Formation and underlies the Hardinsburg Formation. Weller and St. Clair (1928, p. 242) extended the name from the Ohio Valley section to include the equivalent beds in the section exposed along the Mississippi River in Missouri. The Golconda, a limestone and shale succession in Missouri, has been subdivided into three members which have been recognized in Missouri (Thompson, 1986): the Haney Limestone Member (upper), Fraileys Member, and Beech Creek Limestone Member (basal member).

Gordonville Member

Gordonville Member of Dutchtown Limestone (Templeton and Willman, 1963)

Ordovician System (Mohawkian Series)

McQueen (1937) subdivided the Dutchtown Formation at its type section (the Geiser Quarry) into three members, the "upper unnamed member," "Geiser Quarry member," and "lower unnamed member", the units identified from a study of insoluble residues. In 1963, Templeton and Willman (p. 53-54) recognized two members, combining the Geiser Quarry and "upper unnamed member" into the Sharpsboro Member, overlying the **Gordonville Member** below.

Goweran series

Goweran series (Keys, 1915) = ***Sexton Creek Limestone***

Silurian System (Llandoverian Series)

This term was used by Keyes (1915, p. 253) for a series of Late Siluric age, represented by the Sexton dolomite. It overlies the Niagaran series and underlies the Helderbergian series. Apparently the term is derived from the Gower dolomite of Iowa, originally defined by Norton (1899, p. 422, 423).

Grand Detour Formation

Grand Detour Formation of Plattin Subgroup of Platteville Group (**Templeton and Willman, 1963**; Willman and Kolata, 1978) = ***lower part of Macy Limestone, Hager Limestone, and upper part of Beckett Limestone***

Grand Detour of Plattin Sub-Group (Shourd and Levin, 1976)

Ordovician System (Mohawkian Series)

The Grand Detour Formation was proposed for Platteville strata of the Illinois Basin, and was extended into Missouri by Templeton and Willman (1963). However, the nomenclature proposed in 1951 by Larson was found by Thompson (1991) to more adequately represent Plattin strata in Missouri, and Grand Detour was not used.

Grand Falls Chert

Grand Falls chert (Winslow, 1894)

Grand Falls chert member of Boone formation (Smith and Siebenthal, 1907)

Grand Falls chert (Branson, 1944b) - some sections

Grand Falls chert member of Reeds Spring formation (Kaiser, 1950; Barney, 1959) - local chert facies of Reeds Spring

Grand Falls chert (Robertson, 1952; Robertson, 1967) - local chert development of Reeds Spring Formation in Joplin area

Grand Falls Chert of Boone Formation (Sable, 1979)

Grand Falls Chert (Thompson, 1986; 1995)

Mississippian System (Osagean Series)

Type section: The Grand Falls was named by Winslow (1894) for an exposure of chert at Grand Falls on Shoal Creek, just west of Joplin, N½ S½ sec. 28, T. 27 N., R. 33 W., Joplin West 7½' Quadrangle, in Newton County, Missouri.

Siebenthal (*in* Smith and Siebenthal, 1907) expanded the term Grand Falls to include the "Grand Falls chert member" of the Boone formation, and stated that it lies about 100 feet below the Short Creek oolite member of the Boone (the top of the Keokuk Limestone), and about 25 to 200 feet above the base of the Boone. The use of this name was then extended beyond the region of the dense, hard chert development and used as the Grand Falls Formation (Clark and Beveridge, 1952). Robertson (1967) recognized this dual use of Grand Falls, and renamed the "Grand Falls Formation" the Elsey Formation. According to Thompson (1986, p. 87) Robertson "...recommended (p. 38) that the name 'Grand Falls' be restricted to the chert body that crops out along Shoal Creek, near Joplin, Missouri, because he had determined that the chert at Grand Falls...resulted from silicification of more than one stratigraphic formation (Reeds Spring, Elsey, and possibly lower Burlington); therefore, the name 'Grand Falls' was not well chosen for the stratigraphic unit it was to represent elsewhere."

Grand Falls formation

Grand Falls formation (Cline, 1934) = ***Reeds Spring Formation***
Grand Falls chert member of Boone limestone (Giles, 1935) = ***Elsey Formation***
Grand Falls member of Reeds Spring formation (Clark, 1941) - unpublished, = ***Elsey Formation***
Grand Falls (Branson, 1944b) = ***Elsey Formation***
Grand Falls Chert (Weller, et al., 1948) = ***Elsey Formation***
Grand Falls member of Boone formation (Bretz, 1950) = ***Elsey Formation***
Grand Falls formation (Clark and Beveridge, 1952; Spreng, 1961) = ***Elsey Formation***

Mississippian System (Osagean Series)

These references represent an expanded definition of the "Grand Falls Chert," originally proposed for a chert development in the Joplin region of Newton County, Missouri. Clark and Beveridge (1952) used Grand Falls formation, a formation of limestone and chert between the Reeds Spring Formation below and the Burlington (or Keokuk) Limestone above. Robertson (1967) renamed the limestone and chert formation the **Elsey Formation**, restricting "Grand Falls" to the chert unit as exposed at Grand Falls.

Grandhaven Member

Grandhaven Member of Stotler Formation (Howe, 1958) **Richardson Subgroup, Wabaunsee Group**

Pennsylvanian System (Virgilian Series)

In Atchison County, Missouri, on the top of the Dry Shale Member of the Stotler Formation, is a maroon clay. Thompson (1995, p. 131) stated "...It is believed that this clay lies at the approximate stratigraphic position of the Grandhaven..." This unit was first described by Howe (1958, unpublished Ms.).

Grand Tower Limestone

Grand Tower limestone (**Keyes, 1894a**) = ***Clear Creek - Grand Tower formations***
Grand Tower limestone (Ulrich, 1904a) - restricted - excluded Clear Creek interval
Grand Tower limestone (Savage, 1910; Ulrich, 1911) - restricted to present definition
Grand Tower formation (Kindle and Miller, 1939) - used several other names for Grand Tower interval, as well (Dutch Creek, Kings, Perry, Wittenberg shale)
Grand Tower limestone (Lower Devonic) (Keyes, 1941e, 1941i) - and Wittenberg shales
Grand Tower formation (Branson, 1944a) = ***Clear Creek - Grand Tower formations***
Grand Tower limestone (Cooper, et al., 1942) - may include some Lower Devonian
Grand Tower formation (Croneis, 1944; Koenig, 1961a)
Grand Tower limestone of Ulsterian group of Middle Devonian (Weller, 1944)
Grand Tower Limestone (Collinson, et al., 1967; North, 1969; Kocken and Carozzi, 1991; Thompson, 1993, 1995)

Devonian System (Middle Devonian Series)

Type section: As stated by Thompson (1993, p. 95) "Croneis (1944, p. 115-116) stated, 'Keyes (1894a) proposed the name Grand Tower for the limestones in southeastern Missouri, 'below those beds containing the fossils of the western Hamilton,'...The name, although first applied to Missouri strata, was based on Illinois exposures near Grand Tower, and presumably those outcrops in the isolated Bake Oven hill north of the town." Jackson County, Illinois.

The Grand Tower Limestone is overlain by the Beauvais Sandstone and overlies the Lower Devonian Clear Creek Formation or Little Saline Limestone. Keyes (1894a, p. 42) stated "...that the beds had commonly been referred to the Onondaga and Oriskany by Meek and Worthen and other writers." Savage (1910, p. 116-132) amended the definition of the formation to include "only that portion of the Devonian strata in southwest Illinois and adjacent parts of Missouri, which is the western representative of the Onondaga limestone of New York." He divided the Grand Tower of Keyes into the Grand Tower (restricted) and the Clear Creek.

Graniteville Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Graniteville granite (Graves, 1938; Tolman and Robertson, 1969)
Graniteville Granite (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Robertson (*in* Thompson, 1995, p. 12) stated "The Graniteville crops out near the town of Graniteville in sections 10, 11, 14, and 15, T. 34 N., R. 3 E." (Iron County, Missouri)

This term was first used by Graves (1938, p. 119) for granites which appear to be related to the granites occurring at Graniteville, Iron County, Missouri. Tolman and Robertson (1969) added "The Graniteville is a central pluton that was intruded into a resurgent collapsed caldera."

Grassy Creek Shale

Grassy Creek shale (Keyes, 1898c) **=** ***Grassy Creek and Saverton Shales, and Chattanooga Shale in south-western Missouri***
Grassy Creek shale (Ulrich, 1911) **-** "Mississippian in age"; may have included Saverton Shale
Grassy (black) shales (Keyes, 1913)
Grassy Creek shale (Branson, 1914, 1923; Branson and Mehl, 1933d, 1934) **-** "Mississippian in age", **=** ***Grassy Creek and Saverton Shales, and "unnamed lower shale" of Sulphur Springs Group***
Grassy Creek shale (Moore, 1928) **-** "Mississippian in age"
Grassy Creek shale (Branson, 1941, 1944a; Mehl, 1960, 1961) **-** restricted to lower black shale only, excluded Saverton Shale
Grassy Creek shale (Branson, 1944b) = included in part the Chattanooga Shale of southwestern Missouri
Grassy Creek shale (Thomas, 1949) "= Maple Mill of Iowa"
Grassy Creek formation (Koenig, 1961a; Koenig, et al., 1961)
Grassy Creek Shale (Thompson, 1979; Woodruff, 1990; Thompson, 1993, 1995)
"upper Grassy Creek Shale" (Woodruff, 1990) "=Maple Mill Shale of southeastern Iowa"
"lower Grassy Creek Shale" (Woodruff, 1990) "=Sheffield Formation of southeastern Iowa"
Devonian System (Upper Devonian Series)

Type section: The Grassy Creek was named by Keyes (1898c, p. 58-63) from its typical development on the headwaters of Grassy Creek, Pike County, Missouri, to replace the name "Black shale" that had been used previously.

In 1913 Keyes suggested subdividing the shale into two units, retaining the name "Grassy" for the lower black shale and applying the name "Saverton" to the upper green shales. J.M. Weller in 1935 (p. 191-192) used only the term Saverton and interpreted the black shales at the type locality along Grassy Creek to be part of the Maquoketa. J.S. Williams (1943, p. 35-36, 46) recognized both the Saverton and Grassy Creek units. Weller was correct in that the type Grassy Creek was Maquoketa Shale, not Grassy Creek (Mehl, 1961, p. 92), and therefore, Mehl designated a new type section just above the bridge over the Mississippi River at Louisiana. However, this section seems to be completely covered with float from the overlying Louisiana Limestone (Thompson, 1993, p., 166).

Thompson (1995) noted, "Exposures of the Grassy Creek are almost entirely restricted to the flanks of the Lincoln Fold in Marion, Ralls, and Pike counties. Scattered exposures of black shale [unnamed lower shale of Sulphur Springs Group], presumably correlative with the Grassy Creek, occur in the counties bordering the Mississippi River as far south as Ste. Genevieve County..."" Grassy Creek Shale overlies formations of Late Ordovician (Maquoketa Shale) and Early Silurian (Bowling Green Dolomite) age, not including the thin Late Devonian Turpin Sandstone which is usually present at the base of the shale.

Grassy Knob Chert

Grassy Knob chert (Savage, 1925) - in Illinois
Grassy Knob Chert (Amos, 1985, 1986; Thompson, 1993, 1995)
Devonian System (Lower Devonian Series)

Thompson (1995, p. 49-50) stated "Amos (1985) introduced the name Grassy Knob into Missouri by mapping it in the southeastern region. He stated...'A light- to medium-gray, fine-grained limestone and white, thick-bedded, novaculitic chert...overlies transitionally the Bailey. The unit, which is deeply leached and weathered, yields a thick residuum of white, unfossiliferous, angular cherty fragments. Earlier workers...failed to recognize the Grassy Knob in the study area.

"As it occurs in isolated outcrops, it is difficult to distinguish Grassy Knob Chert from Clear Creek Chert, or even from residual Bailey chert...Much study is still required to clear up this stratigraphic puzzle."

Grassy Mountain Ignimbrite of Butler Hill Group, St. Francois Mountains Volcanic Supergroup

Grassy Mountain Ignimbrite (**Sides, 1976**; Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Named by Sides (1976), this unit is it widely exposed on Grassy Mountain and in adjacent areas. No specific type section was proposed.

Robertson (*in* Thompson, 1995, p. 11) stated "The homogeneous distinctive appearance of the Grassy Mountain Ignimbrite makes it an excellent stratigraphic marker...It has a black to very dark maroon matrix with prominent phenocrysts of quartz and reddish alkali feldspar. Pumice fragments are not common, but when present, are weathered to a pinkish color and thus stand out...The formation ranges in thickness from approximately 900 ft to more than 6,000 ft."

<u>Gravoisan glacial epoch</u>

Gravoisan glacial epoch (Keyes, 1925)
Quaternary System (Pleistocene Series)

Proposed by Keyes (1925b, p. 140-141): the Gravoisan glacial epoch is the time covered by isolated patches of a bouldery till of Pleistocene age lying beyond the limit of Kansan till in Missouri, and which "appears to be older than the Nebraskan till." The deposits were first noted by Meek (1855). The name is derived from the occurrence of deposits on Gravois Creek, near Osage River, Morgan County, Missouri. Other names for this include **Gravoisan series** and **Gravoisan till**.

Graydon Conglomerate

Graydon Spring sandstone and conglomerate (**Winslow, 1894**) = ***Warner Sandstone and Graydon Conglomerate***
Graydon formation (Shepard, 1898)
Graydon sandstone (Branson, 1944b)
"Graydon" Formation" (Gentile, 1976)
Graydon Conglomerate (Thompson, 1995)
Pennsylvanian System (Atokan and/or Desmoinesian Series)

Type section: Winslow (1894, p. 422) stated "Because of the abundance of excellent exposures of these rocks at Graydon Springs, we apply the name of Graydon Spring sandstone and conglomerate, a name originally proposed by Dr. D.W. Jenney." This exposure is in the Center sec. 31, 32N-23W, Polk County, Missouri.

Shepard (1898) included coarse, friable, micaceous, ferrugineous sandstone, scattered gray shale, and thin coals within the Graydon formation. More recent work has shown confusion by different geologists on just what the lithology of the Graydon Formation is. Some identify the basal Pennsylvanian shales as Graydon, or the basal sandstone, and others identify only the basal chert conglomerate (composed of Mississippian cherts cemented with a sandstone matrix) as the Graydon. Consensus of presently active geologists indicates the sandstone, once called "Graydon," may be Warner, and the shales may be Riverton. Thus, **only the conglomerate** remains as a distinctive unit that retains the name "Graydon," synonymous with the term **"basal Pennsylvanian conglomerate."** It occurs in widespread localities from central Missouri to far western Missouri, and may actually be different ages at different localities.

Green shales

Green shales (Gallaher, 1900) = ***Davis Formation***

Cambrian System (Upper Cambrian Series)

This term was used by Gallaher (1900, p. 97) as part of the Upper Cambrian section. His "Lower Green shales" and "Upper Green shales" were separated by his "Lower Mud Rock." These three units comprise the **Davis Formation** of the present.

Greens River Limestone Member

Greens River Limestone Member of Moccasin Springs Formation (Ball, 1942) = ***lower part of Moccasin Springs Member of Bainbridge Formation***

Silurian System (Wenlockian and Ludlovian Series)

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gritstones

gritstones (Gordon, 1895) = ***Salem and St. Louis formations***

Mississippian System (Meramecian Series)

Grover gravel

Grover gravel (**Rubey, 1952**) **-** in St. Louis County, Missouri
Grover gravel (Searight and Howe, 1961)
Grover Gravel (Thompson, 1995)

Tertiary System? (Pliocene? Series)

A gravel veneering the upland surfaces in parts area of St. Louis County, these deposits are composed preponderantly of chert, but contain abundant quartz pebbles, sparse boulders of pink to purple quartzite, and exceedingly rare pebbles and cobbles of deeply weathered, coarse-grained igneous rocks. The name was coined by Rubey (1952) and continued by Willman and Frye (1958, p. 9). Although the gravels are commonly assigned to the Tertiary, the presence of certain boulders suggests glacial transportation. They may or may not be related to the **Mounds Gravel** deposits in the Mississippi Embayment area.

Gulfian Series

Gulf Series (Farrar, 1935)

Cretaceous System

The Gulfian Series is the youngest series for Cretaceous sediments of the Gulf Coastal Plain and the time covered by their deposition. In Missouri the Gulfian includes the Owl Creek Formation, the McNairy Formation, as well as any pre-McNairy Cretaceous present in the Subsurface.

Gunter Sandstone Member of Gasconade Dolomite

Gunter sandstone (Ball and Smith, 1903)
Gunter sandstone (Cole Camp sandstone) (Bain and Ulrich, 1905a,b)
Gunter sandstone member of Gasconade formation (Marbut, 1907)
Gunter sandstone member of Van Buren formation (McQueen, 1929)

Gunter member of Gasconade formation (Martin, et al., 1961a)
Gunter Sandstone Member of Gasconade Dolomite (Thompson, 1982, 1991, 1995)
Ordovician System (Ibexian Series)

Type section: According to Thompson (1991, p. 24) "The Gunter Sandstone was named from Gunter Spring (Hahatonka Spring, Ha Ha Tonka State Park)..." E/2 W/2 2, 37N-17W "...Camden County, Missouri. The name was derived from the abandoned Gunter post office in Miller County, and from Gunter Spring..."

A prominent marker at the base of the Gasconade Dolomite, Ball and Smith (1903, p. 26) proposed the Gunter sandstone for the "Third sandstone" of Swallow, overlain by the dolomite and chert of the Gasconade and underlain by the "Proctor" (later renamed Eminence Dolomite). For a while the Van Buren formation was split off the base of the Gasconade, and the Gunter was generally considered as the basal member of the Van Buren. However, now the term Van Buren is no longer used, and the Gunter is now considered the basal member of the Gasconade.

Guttenberg Limestone of Decorah Group

Guttenberg formation (Kay, 1928) - in Iowa
Guttenberg Formation of Decorah Subgroup (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1986)
Guttenberg Limestone of Decorah Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 112) stated "The Guttenberg Formation was named for the town of Guttenberg, Clayton County, Iowa (Kay, 1928, p. 16). The type section is in a ravine half a mile north of town, but at present the Guttenberg is better exposed in a nearby roadcut on U.S. Highway 52..."

Thompson (1991, p. 194) stated "Guttenberg strata in Missouri are exposed in Lincoln, Pike, and Ralls counties, between the underlying Kings Lake Limestone and overlying Kimmswick Limestone. From Lincoln County southward the Guttenberg thins until it pinches out north of St. Louis County...Basal Guttenberg strata are conformable with the underlying Kings Lake strata...The disconformable Guttenberg-Kimmswick contact is marked by rounded pieces of Guttenberg material incorporated in basal Kimmswick sediments..."

H

Hager Limestone of Plattin Group

Hager limestone of Plattin group (Larson, 1951; Twenhofel, et al., 1954)
Hager Formation of Plattin Subgroup of Platteville Group (McCart, 1986)
Hager Limestone of Plattin Group (Thompson and Spreng, 1988; Thompson, 1991, 1995; Spreng and McCart, 1994)
Ordovician System (Mohawkian Series)

Type section: Larson (1951, p. 2053-2058) applied the name Hager limestone to "the generally fine-textured calcite rock between the underlying Beckett and succeeding Macy formations." The name is derived from Hager School in Perry County, Missouri. He located the type section "along a small stream extending northward from Hager School," N/2 NE NE 30, 35N-12E, Perry County, Missouri.

Thompson (1991) revived the nomenclature originally proposed by Larson (1951) for the Plattin Group, and included the formations he had defined, the Hager Limestone lying beneath the Macy Limestone and overlying the Beckett Limestone. Thompson included three members in the Hager, the Glaize Creek, Hely, and Victory Members.

Haight Creek Member

Haight Creek Member of Burlington Limestone (Collinson, et al., 1979)
Mississippian System (Osagean Series)

This is the middle of the three members of the Burlington Limestone in northeastern Missouri, the other two being Cedar Fork Member (upper) and Dolbee Creek Member (basal).

Hale formation

Hale formation (Clark, 1941) - unpublished map in southwestern Missouri = ***Wedington Sandstone Member of Fayetteville Shale***

Hale formation (Clark and Beveridge, 1952; Searight and Howe, 1961) - southwestern Missouri; = ***Wedington Sandstone Member of Fayetteville Shale***

Cane Hill Sandstone Member of Hale Formation (Thompson, 1972) - southwestern Missouri

Mississippian System (Chesterian Series)

Originally thought to be basal Pennsylvanian (**Cane Hill Sandstone Member of the Hale Formation**) in age, this sandstone was identified to be late Mississippian (Chesterian) in age by Thompson (1986, 1995), and correlated with the **Wedington Sandstone Member of the Fayetteville Shale** of northwestern Arkansas.

Hamburg oolite

Hamburg oolite (Weller, 1906) = ***Horton Creek Limestone***

"Hamburg oolite" (Koenig, 1961a) "= "Glen Park of Illinois", = ***Horton Creek Limestone***

Mississippian System (Kinderhookian Series)

Weller (1906) named the Hamburg oolite for a limestone exposed in the town of Hamburg in Calhoun County, Illinois. Later, it was called the Glen Park formation, "Glen Park" formation, or "Glen Park of Illinois." Because the name "Glen Park" was also used for a limestone in the Sulphur Springs Group in east-central Missouri, Conkin and Conkin (1973) renamed this limestone the **Horton Creek Limestone Member of the Hannibal Shale**. This unit is significant in that it contains reworked, rounded pebbles of the Late Devonian Louisiana Limestone along with the Early Mississippian oolitic carbonate matrix.

Hamilton

Hamilton group (Swallow, 1855) = ***Grassy Creek and Saverton Shales***

Hamilton beds (Meek and Worthen, 1866) = ***St. Laurent and Cedar Valley Limestones***

Hamilton group (Miller, 1894) = ***Cedar Valley Limestone***

Hamilton stage (Shepard, 1898) - Middle and lower Upper Devonian Series, Devonian System

Hamilton group of Missouri (Monroe and Teller, 1899) = ***Cedar Valley Limestone***

Western Hamilton (Callaway) Limestone (Gallaher, 1900) = ***Cedar Valley Limestone***

Hamilton (Callaway) (Nickles and Bassler, 1900) = ***Cedar Valley Limestone***

Hamilton shale (Rowley, 1907) = ***Grassy Creek and Saverton Shales***

Devonian System (Middle Devonian Series)

A term originally proposed in the east (New York) for a group within the Middle Devonian, Hamilton was used by early geologists in Missouri for what is now the Cedar Valley Limestone and/or the Snyder Creek Shale. Swallow (1860, p. 635-660) described several species of fossils from the Snyder Creek Shale and Callaway limestone (now Cedar Valley Limestone) of Callaway County but called the shales Hamilton. Broadhead (1873, p. 46-48) identified the Callaway in Warren County as Hamilton in some places. Shepard (1898, p. 49) used "Hamilton stage" incorrectly to include (descending) Phelps sandstone, Sac limestone, King limestone, and Black shale, all but the last now known to be Mississippian (Kinderhookian) in age (Thompson, 1986).

Hampton

Hampton (Chouteau) Group (Carlson, 1963) - in northeastern Missouri

Mississippian System (Kinderhookian Series)

The term Hampton is an Iowa name for Kinderhookian-aged limestones. It is essentially the same as the Chouteau of Missouri.

Haney Limestone Member of Golconda Formation

Haney Limestone of Golconda Group (Swann, 1963) - in Illinois
Haney Limestone Member of Golconda Formation (Shaver, et al., 1970) - in Illinois, "= Golconda Limestone of Indiana"
Haney Limestone Member of Golconda Formation (Thompson, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Atherton, et al. (1975, p. 157) stated "The Haney Limestone is...named for Haney Creek, Hardin County [Illinois]. It is 35.5 feet in the type section, which overlies the type section of the Fraileys Shale...It is dominantly limestone, with a little interbedded shale."

Thompson (1995, p. 90) added "The Haney Limestone Member of the Golconda Formation is a 50-ft thick, very-light-gray, oolitic, cross-bedded limestone." Exposures, like those of all Chesterian strata above the Ste. Genevieve in southeastern Missouri, are limited to eastern sides of Ste. Genevieve and Perry counties.

Hannibal Shale

Encrinital Group of Hannibal (Owen, 1852) = ***Burlington Limestone***
Hannibal shales (Keyes, 1892)
Hannibal shale (Keyes, 1897a) - "Devonian in age"
Hannibal shale (Shepard, 1898; Keyes, 1902) = ***Northview Formation***
Hannibal limestone (Weller, 1905) = ***Compton Limestone***
"Hannibal shale" (Giles, 1933) = ***Chattanooga Shale*** in Joplin area
Hannibal shales of Kinderhook formation (Keyes, 1900a)
Hannibal shale (Reed, 1946) "= Boice shale of Nebraska"
Hannibal formation (Spreng, 1961)
Hannibal Formation (Conkin and Conkin, 1973)
Hannibal Shale (Thompson, 1984, 1986)
Mississippian System (Kinderhookian Series)

Type section: Keyes (1892) proposed the "Hannibal shales (Vermicular shales of Swallow)" for 75 feet of shale and siltstone exposed in the east bluff of the Mississippi River Valley immediately south of the town of Hannibal, in the NW¼ SE¼ sec. 28, T. 57 N., R. 4 W., Hannibal East 7½' Quadrangle, Marion County, Missouri.

In the type area, the Hannibal Shale overlies the Late Devonian Louisiana Limestone and lies beneath limestone of the basal Osagean Burlington Limestone. To the west limestone of the Kinderhookian-aged Chouteau Group appears between the Burlington and Hannibal, and eventually completely replaces the Hannibal. Swallow (1855) had called the formation the "Vermicular sandstone and shale," but also applied this same name to the similar-appearing but not quite equivalent Northview Formation in southwestern Missouri.

Happy Hollow Limestone Member of Scranton Formation, Sacfox Subgroup, Wabaunsee Group

Happy Hollow limestone in White Cloud shale of Scranton shale member of Shawnee formation (**Condra, 1927**) - in Kansas
Happy Hollow limestone member of Scranton shale (Condra, 1930, 1935) - in Nebraska
Happy Hollow limestone member of Scranton shale (Moore, 1932; Condra, et al., 1932; Branson, 1944b; Moore and Mudge, 1956)
Happy Hollow limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Happy Hollow limestone (McQueen and Greene, 1938; Moore, 1948)
Happy Hollow member of Scranton formation (Searight and Howe, 1961)
Happy Hollow Limestone (Van Eck, 1965) - in Iowa
Happy Hollow Limestone Member of Scranton Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Happy Hollow Limestone Member of Scranton Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska

Happy Hollow Limestone Member of Scranton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Baars and Maples (1998, p. 100) gave two possible type sections for the "Happy Hollow limestone"; "Vicinity of Happy Hollow ravine, below mouth of Big Nemaha River, southwest of Rulo, Richardson County, Nebraska [Condra, 1927?]. Moore (1936) gave type locality as Happy Hollow Creek, northeastern Doniphan County, Kansas."

Thompson (1995, p. 129) stated "The Happy Hollow Member...contains three, rubbly beds of argillaceous limestone that are interbedded with calcareous, gray and green clay. A poorly-defined coal horizon is present above the uppermost limestone bed. A clayey shale a few feet thick is present in the lower part of the member. The average thickness...is about 15 ft." The Happy Hollow Limestone Member overlies the White Cloud Shale Member, and is overlain by the Cedar Vale Shale Member of the Scranton Formation.

Hardin sandstone

Hardin sandstone (Mehl, 1961) = ***Sylamore Sandstone*** in southeastern Missouri
Devonian System (Upper Devonian Series)

Hardinsburg Formation

Hardinsburg sandstone (Brokaw, 1916) **-** in Kentucky
Hardinsburg sandstone (Ulrich, 1917) in Kentucky, **=** ***Tar Springs Sandstone***
Hardinsburg sandstone member of Golconda formation (Weller and St. Clair, 1928)
Hardinsburg Member of Lower Okaw Formation (Sutton, 1934) **-** in Illinois
Hardinsburg formation (Spreng, 1961) **-** a shale in Missouri
Hardinsburg Sandstone of Okaw Group of Hombergian Stage (Swann, 1963) **-** in Illinois
Hardinsburg Formation (Thompson, 1979a, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: Brokaw (1916; 1917) used the term Hardinsburg sandstone for the yellowish-brown sandstone underlying the Sloans Valley (Glen Dean limestone) and overlying the Golconda formation in southeast Illinois. The formation was named for Hardinsburg, Breckinridge County, Kentucky, which is built on this sandstone.

In Missouri, Weller and St. Clair (1928, p. 242) recognized the formation in Ste. Genevieve County, Missouri, although it was not a sandstone, but mainly a (Spreng, 1961, p. 76) "...dark gray shale or plastic clay which contains quartzose sandstone streaks in the upper part." Exposures in Missouri are generally poor, but regionally Hardinsburg strata are overlain by the Glen Dean Formation and underlain by the Golconda Formation.

Hartford limestone

Hartford limestone (Haworth and Kirk, 1894) **-** in Kansas; **=** ***Deer Creek and Topeka formations?***
Hartford limestone (Kirk, 1896; Adams, 1903) **-** in Kansas; **=** ***Topeka Formation***
Hartford (Topeka) limestone (Beede, 1902) **-** in Kansas
Pennsylvanian System (Virgilian Series)

Hartford Limestone Member of Topeka Formation, Shawnee Group

Hartford limestone member of Topeka limestone (Moore, 1932, 1936; Branson, 1944b) **=** ***Curzon, Jones Point, and Sheldon Members of Topeka Formation***
Hartford (Curzon) limestone member of Topeka limestone (Condra, 1935; McQueen and Greene, 1938) **=** ***Curzon, Jones Point, and Sheldon Members***
Hartford limestone member of Topeka formation (Moore, 1948; Greene and Searight, 1949)
Hartford limestone (Wolf River) member of Topeka formation (Condra, 1949) **-** in Nebraska
Hartford limestone member of Topeka limestone (Moore, et al., 1951) **-** in Kansas
Hartford member of Topeka formation (Searight and Howe, 1961)
Hartford Limestone Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas

Hartford Limestone Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
Hartford Limestone Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Kirk (1896), Moore (1936, p. 195) located the type section at "Hartford, Coffey county, Kansas. Well exposed below highway bridge at north edge of town."

Due to early miscorrelation of the members of the Topeka Formation, both McQueen and Greene (1938) and Branson (1944b) called the limestone in Missouri now known as Hartford the **"Sheldon limestone member of Calhoun shale.**" The horizon they did call "Hartford" was also miscorrelated, and was actually the **Curzon-Sheldon limestone** interval of the Topeka, the next two limestone above the true Hartford. Thompson (1995, p. 126) stated "The Hartford Limestone Member...consists of one or more beds of fossiliferous brownish-gray limestone and associated calcareous shale. The member is 3 to 4 ft thick." The Hartford Limestone Member is the basal member of the Topeka Formation, overlying the Calhoun Shale, and overlain by the Iowa Point Shale Member of the Topeka Formation.

Hartshorne (?) Formation

Hartshorne formation (Taff, 1899) - in Oklahoma
Hartshorne (?) formation (Searight and Howe, 1961) = ***Riverton and lower Cherokee formations***
Hartshorne Formation (Branson, 1962) = ***Riverton and Hartshorne formations***, in Oklahoma
Hartshorne Formation (Anderson and Wells, 1968)
Hartshorne (?) Formation (Thompson, 1995)
Pennsylvanian System (Atokan and/or Desmoinesian Series)

Type section: Taff (1899) named this formation for Hartshorne, Pittsburg County, Oklahoma.

Thompson (1995, p. 97) stated "Beds of sandstone and shale, some of which are red, that locally lie between the Warner Formation and the black shale and coal succession assigned to the Riverton are tentatively assigned to the Hartshorne, which in Oklahoma is included in the Desmoinesian. These beds have been identified only in the subsurface of Vernon County and in the Forest City Basin. The succession is absent in many places, but attains a thickness of up to approximately 20 ft."

Harveyville Shale Member of Emporia Formation, Nemaha Subgroup, Wabaunsee Group

Harveyville shale member of Preston ("Emporia") limestone (**Condra, 1935**)
Harveyville shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Harveyville shale (McQueen and Greene, 1938; Moore, 1948)
Harveyville shale member of Emporia limestone (Branson, 1944b; Moore and Mudge, 1956)
Harveyville member of Emporia formation (Searight and Howe, 1961)
Harveyville Shale Member of Emporia Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Harveyville Shale Member of Emporia Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Harveyville Shale Member of Emporia Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1935), Moore (1936, p. 226) located the type section "Near Harvey- ville, southeastern Wabaunsee county, Kansas. A good section is seen in sec. 25, T. 15 S., R. 13 E."

In Missouri, Hinds and Greene (1915) referred to this unit as a formation. the **Harveyville shale**. Searight and Howe (1961) labeled it the **Harveyville member of the Emporia formation**. Thompson (1995, p. 130) stated "The Harveyville Shale Member...consists mostly of maroon shale and contains a coal horizon above its middle part. The shale above the coal horizon is calcareous and somewhat darker than that below. The member is 15 to 18 ft thick." The Harveyville Shale Member overlies the Reading Limestone Member, and is overlain by the Elmont Limestone Member of the Emporia Formation.

Haskell Limestone Member of Stranger Formation, Douglas Group

Haskell limestone (**Moore, 1932**) - in Kansas
Haskell limestone member <u>of Stranger formation</u> (Moore, 1936, 1937, 1948; Moore, et al., 1951) - in Kansas
Haskell limestone (McQueen and Greene, 1938; Moore, et al., 1944; Branson, 1944b)
Cass (Haskell?) limestone <u>of Stranger formation</u> (Condra and Scherer, 1939; Condra and Reed, 1943,1959) - in Nebraska
Haskell member? <u>of Stranger formation</u> (Searight and Howe, 1961)
Haskell Limestone Member <u>of Lawrence Formation</u> (O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Haskell Limestone Member <u>of Cass Formation</u> (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Vinland-Haskell Members (undifferentiated) <u>of Stranger Formation</u> (Howe, 1986)
Haskell Limestone Member <u>of Cass Limestone</u> (Goebel, et al., 1989) - in Iowa and Nebraska
Haskell Limestone Member <u>of Stranger Formation</u> (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 153) located the type section "...on Fifteenth street, NE¼ sec. 5, T. 13 S., R. 20 E., at east edge of Lawrence [Douglas County, Kansas]. Named from Haskell Institute, Lawrence,"

Thompson (1995, p. 121) stated "The Haskell Limestone Member..., the crinoidal limestone at the top of the succession, is from a few inches to approximately 2 ft thick in Missouri." Searight and Howe (1961) were the first to place it in the Stranger Formation in Missouri, and Howe (1986) combined it with the underlying shale as the "Vinland-Haskell Members (undifferentiated) of the Stranger Formation." The Haskell Limestone Member overlies the Vinland Shale Member of the Stranger Formation, and is overlain by the "lower unnamed member" of the Lawrence Shale.

Haynies Limestone Member of Deer Creek Formation, Shawnee Group

Haynies limestone bed <u>of Deer Creek limestone member of Shawnee formation</u> (**Condra, 1927**) - in Nebraska
Haynies limestone member <u>of Deer Creek limestone</u> (Moore, 1932) = ***Rock Bluff Limestone Member of Deer Creek Formation***
Haynies limestone member <u>of Deer Creek limestone</u> (Condra, et al., 1932) - in Nebraska and Iowa
Haynies limestone member <u>of Deer Creek limestone formation</u> (Ver Wiebe and Vickery, 1932) = ***Rock Bluff Limestone Member***
Haynies limestone <u>of Deer Creek limestone formation</u> (Condra and Reed, 1937, 1943, 1959) - in Nebraska
Haynies limestone member <u>of Deer Creek formation</u> (Moore, 1948; Condra, 1949; Moore, 1949; Jewett, 1949) - mostly in Nebraska
"Haynies" Limestone <u>of Deer Creek Limestone</u> (Heckel, et al., 1979)

Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 49) named the Haynies limestone from an outcrop at the foot of bluffs southeast of Haynies Station, Mills County, Iowa.

The Haynies Limestone Member occurs in Iowa and Nebraska, and possibly in a few places in Kansas, between the Larsh Shale Member below and the Burroak (formerly **Mission Creek**) Shale Member above. Condra (1927) indicated it also occurred in northern Kansas and northwestern Missouri, but was quite thin where found. If the Haynies limestone is not present, as is the case generally in Missouri, this interval is called the **Larsh-Burroak Shale Member**.

<u>Hazelwood Member</u>

Hazelwood Member <u>of Mifflin Formation of Plattin Subgroup</u> (Templeton and Willman, 1963) = ***lower part of Beckett Limestone of Plattin Subgroup***

Ordovician System (Mohawkian Series)

Heebner Shale Member of Oread Formation, Shawnee Group

Heebner shale of Oread limestone member of Douglas formation (**Condra, 1927**) - in Nebraska
Heebner shale member of Oread limestone (Moore, 1932)
Heebner shale of Oread formation (Condra and Scherer, 1939) - in Nebraska
Heebner shale member of Oread limestone (Moore, et al., 1951) - in Kansas
Heebner member of Oread formation (Searight and Howe, 1961)
Heebner Shale Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas)
Heebner Shale Member of Oread Formation (Burchett, 1970) - in Nebraska
Heebner Shale Member of Oread Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 37) stated "2. Heebner Shale, for the first shale below the Plattsmouth Limestone, from Heebner Creek and the Heebner farm [2½ mile] west [1½ mile north] of Nehawka, [Cass County] Nebraska." The top portion of the bed is bluish and argillaceous; the lower portion is black. The thickness is 5 feet or more.

Thompson (1995, p. 123) stated "The Heebner Shale Member...is extremely persistent. It is a dark-gray to black, fissile core-shale in the lower part, and is a lighter-gray, nonfissile shale in the upper part. The member is 4 to 5 ft thick." The Heebner Shale Member overlies the Leavenworth Limestone Member and is overlain by the Plattsmouth Limestone Member of the Oread Formation.

Helderberg

Lower Helderberg group (Meek and Worthen, 1866) = ***Bailey and Little Saline formations***
Upper Helderberg period (Meek and Worthen, 1866) = ***Middle Devonian Series***
Lower Helderberg limestone (Worthen, 1868) = ***Bainbridge and Bailey formations***
Helderbergian Series of Early Devonic Sub-Period (Keyes, 1914) = ***lower part of Upper Devonian Series***
Helderbergian Series of Lower Devonian (Savage, 1920a, 1920b) = ***lower part of Upper Devonian Series***
Helderberg stage of Ulsterian Series (Cooper, et al., 1942) = ***lower part of Lower Devonian Series***
Helderbergian Group of Lower Devonian Series (Weller, 1944) = ***lower part of Lower Devonian Series***
Helderbergian Stage of Lower Devonian Series (Amsden, 1988) = ***lower part of Lower Devonian Series***

Devonian System (Lower and Middle Devonian Series)

Helderberg or Helderbergian is an eastern term that was used in Missouri by the early geologists for what is now called the **Bailey Formation**. It was also called "Delthyris shaley limestone", a name based on the prominence of the brachiopod *Delthyris* in the formation.

Hely Member of Hager Limestone, Plattin Group

Hely Member of Grand Detour Formation (**Templeton and Willman, 1963**)
Hely Member of Hager Formation (McCart, 1986)
Hely Member of Hager Limestone (Thompson and Spreng, 1988; Thompson, 1991, 1995; Spreng and McCart, 1994)

Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 86) stated "The Hely Member ... is here named for Hely's upper quarry, which, with the adjoining Federal and Marquette quarries, constitutes the type section, at the southern outskirts of Cape Girardeau, Missouri..."

Thompson (1995, p. 34) stated "The Hely Member of the Hager Limestone is a thinner, dark-gray, burrowed limestone between the massive unburrowed, light-gray to white Victory and Glaize Creek Members. Its appearance is more like that of "typical" Plattin. If the Glaize Creek Member is not present, as along I-44, the Hely cannot be separated from the underlying Beckett."

Henrietta formation (group)

Henrietta formation (Keyes, 1897b) = ***Marmaton strata above Pawnee Formation***
Henrietta formation (Marbut, 1898) = ***Fort Scott - Pawnee***
Henrietta formation (Hinds, 1912) = ***Lexington Coal Bed and above***
Henrietta formation (Hinds and Greene, 1915) = ***Marmaton and lower Pleasanton strata***
Henrietta Formation (McCourt, 1917) = ***Appanoose Subgroup of Marmaton Group***
Henrietta group (McQueen and Greene, 1938) = ***upper part of Marmaton to base of Sni Mills Limestone***
Henrietta group (Cline, 1941) = ***Fort Scott - Lenapah formations***
Henrietta group (Clair, 1943; Branson, 1944b) = ***Marmaton Group***
Marmaton (Henrietta) group (Condra and Reed, 1943, 1959) - in Nebraska
Henrietta group (Moore, 1948) = ***upper Cherokee and Marmaton groups***

Pennsylvanian System (Desmoinesian Series)

Henrietta was an early name used by Keyes (1897b) for first the upper part of the Marmaton Group, then later redefined (Marbut, 1898; Hinds ,1912; Hinds and Greene, 1915) for essentially what is the entire Marmaton Group today. It was named from exposures near the town of Henrietta, in southern Ray County, Missouri. "Henrietta" was abandoned "officially" in Missouri by Greene and Searight (1949).

Hepler Formation of Pleasanton Group - of Watney and Heckel (1994) and Heckel and Watney (in press)

Pennsylvanian System (Missourian Series)

See the discussion under **Seminole Formation.**

Hepler Sandstone Member of Seminole Formation, Pleasanton Group - of Howe (1982)

Hepler sandstone (**Jewett, 1940a**, 1940b; Moore, et al., 1951) - in Kansas
Hepler sandstone member of Seminole formation (Oaks and Jewett, 1943) - in Kansas
Hepler sandstone (Greene and Searight,. 1949)
Hepler sandstone ("Wayside") (Cline and Greene, 1950)
Hepler member of Lower formation of Pleasanton group (Searight and Howe, 1961)
Hepler Sandstone Member of Seminole Formation (Jewett, et al., 1965, 1968; Baars and Maples, 1998) - in Kansas
Hepler ("Wayside") sandstone of Pleasanton Group (Anderson and Wells, 1968)
Hepler sandstone of Pleasanton Group (Gentile, 1976)
Hepler Sandstone Member of Seminole Formation (Howe, 1982)
Hepler Sandstone ("Hepler-A" and "Hepler-B") (Sutton, 1985) - at the type section = ***Perry Farm Member of Lenapah Formation***
Hepler Sandstone ("Hepler-C") (Sutton, 1985) = ***Hepler Sandstone***
"Hepler unit" (Heckel, 1991)
Hepler Sandstone Member of "lower unnamed formation" of Pleasanton Group (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Jewett (1940a, p. 9) named the Hepler sandstone, and stated "The name is taken from the town of Hepler, in southwestern Crawford County, Kansas, and the type exposure is in the center of sec. 14, T. 27 S., R. 322 E., 1.5 miles [2 miles according to Heckel, 1991] north of Hepler in Bourbon County, on highway 39."

Thompson (1995, p. 110) stated "The Hepler Sandstone Member is a thin-bedded, medium-grained, micaceous sandstone. In many places it is cemented with calcium carbonate. It rests unconformably on upper Marmaton limestones and shales. The member has a maximum thickness of about 15 ft in western Missouri, but it is much thinner and locally absent in the northern part of the state."

Heckel (1991, p. 26) stated "The original type section of the Hepler sandstone..is currently poorly exposed, but Jewett (1940a) placed its base 16 ft...above the Lenapah Limestone...now known to be the Norfleet Limestone Member, the lower member of the Lenapah, and the sandstone appears to be overlain by Idenbro [Sni Mills] float...This places the type Hepler sandstone within the Perry Farm Shale Member of the Lenapah...the higher sandstone that crops out...westward along K-39...lies in the position traditionally accorded the name Hepler..."

Hercules Tower sandstone

Hercules Tower sandstone of Lutie Member of Theodosia Formation (**Cullison, 1944**) = ***"Swan Creek sandstone" of Cotter Dolomite***

Ordovician System (Ibexian Series)

Cullison (1944, p. 29) proposed "Hercules Tower sandstone" for a prominent sandstone within his Theodosia formation. The sandstone is well exposed on Missouri Highway 125 south of Brush Creek about midway between the village of Hercules and the Hercules fire lookout tower, Taney County, Missouri. This sandstone is usually referred to today as the **"Swan Creek sandstone"** of the Cotter Dolomite.

Hertha Formation of Bronson Subgroup, Kansas City Group

Hertha limestone (**Adams, 1903**) - in Kansas
Hertha limestone member of Kansas City formation (Hinds and Greene, 1915)
Hertha limestone (Condra, et al., 1932; Bergstrom, 1956)
Sniabar (Hertha) limestone formation (Condra, 1935) = ***Hertha Formation***
lower limestone of Sniabar (Hertha) limestone formation (Condra, 1935) = ***Critzer Limestone Member***
Hertha limestone member of Bronson formation (Newell, 1936) - in Kansas
Hertha limestone of Bronson group (Moore, 1936) - in Kansas
Hertha formation (3 members) (Greene and Searight, 1949; Searight and Howe, 1961)
Hertha limestone (3 members) (Moore, et al., 1951) - in Kansas
Hertha limestone (of Coffeyville formation) (Jewett and Muilenburg, 1957) - in Kansas
Hertha Formation (3 members) (Payton, 1966; Gentile, 1976; Thompson, 1995)
Hertha Limestone (3 members) (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Hertha Formation (Burchett, 1970) - in Nebraska
Hertha Limestone (2 members) (Pabian and Diffendal, 1989; Watney and Heckel, 1994) - in Kansas; = ***Mound City and Sniabar members only***

Pennsylvanian System (Missourian Series)

Type section: The Hertha limestone was named by Adams (1903). Moore (1936, p. 78) stated that the formation was named from "Hertha, Neosho County, Kansas. The limestone is exposed just east of the town, but the best outcrops are in northeast corner sec. 20, T. 29 S., R. 20 E., and in roadcut 2 miles north and 1 mile west of Hertha. Adam's description of type locality is indefinite, but his map shows clearly the limestone of which he intended to apply the name Hertha."

The basal formation of the Kansas City Group, the Hertha Formation overlies the uppermost shales of the Pleasanton Group, and is overlain by the Ladore (Elm Branch) Shale. Thompson (1995, p. 112) stated "The Hertha Formation includes two limestone members [**Critzer and Sniabar Limestone Members**]...separated by the Mound City Shale Member. The average thickness of the Hertha is approximately 15 ft." Watney and Heckel (1994) have proposed the place the Critzer Limestone Member in the underlying, newly proposed **Shale Hill Formation of the Pleasanton Group**. This has not as of yet been formalized, or accepted by most Pennsylvanian stratigraphers in the Midcontinent..

Heumader Shale Member of Oread Formation, Shawnee Group

Heumader shale member of Oread limestone (**Moore, 1932**; Condra, 1935)
Heumader shale member of Oread limestone (Moore, et al., 1951) - in Kansas
Heumader member of Oread formation (Searight and Howe, 1961)
Heumader Shale Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998)
Heumader Shale Member of Oread Formation (Burchett, 1970) - in Nebraska
Heumader Shale Member of Oread Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: The type section for the Heumader Shale Member is in the Heumader Quarry, in the bluffs of the Missouri River valley just north of St. Joseph, Buchanan County, Missouri; 2 miles north of Aviation Field, NE NW 30, 58N-35W.

Thompson (1995, p. 124) stated "The Heumader Shale Member...is a silty, drab to gray shale, which is absent in those areas where the Plattsmouth and Kereford are in contact. Where it is present, its thickness ranges from less than 1 ft to about 3 ft." The Heumader Shale Member overlies the Plattsmouth Limestone Member, and is overlain by the Kereford Limestone Member of the Oread Formation.

Hickory Creek Shale Member of Plattsburg Formation, Lansing Group

Hickory Creek shale member of Plattsburg limestone (**Newell, *in* Moore, 1932**)
Hickory Creek shale member of Plattsburg limestone (Moore, et al., 1951) - in Kansas
Hickory Creek shale of Plattsburg formation (Condra and Scherer, 1939) - in Nebraska
Hickory Creek member of Plattsburg formation (Searight and Howe, 1961)
Hickory Creek Shale Member of Plattsburg Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Hickory Creek Shale Member of Plattsburg Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Hickory Creek Shale Member of Plattsburg Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Newell (*in* Moore, 1932) named the Hickory Creek shale member of the Plattsburg limestone. Moore (1936, p. 129) located the type section along "Hickory Creek in eastern Franklin county, Kansas. Typically exposed in roadcuts in SE¼ sec. 1, T. 17 S., R. 29 E."

Thompson (1995, p. 117) stated "The Hickory Creek Shale Member...is a calcareous, fossiliferous shale which is generally less than 2 ft thick in most outcrops. In unweathered exposures the upper part of the shale is dark-gray to black, while the basal part is light- to medium-gray." The Hickory Creek overlies the Merriam Limestone Member and is overlain by the Spring Hill Limestone Member of the Plattsburg Formation.

Higginsville Limestone of Fort Scott Subgroup, Marmaton Group

Higginsville limestone member of Fort Scott limestone (**Cline, 1941**)
Higginsville limestone member of Fort Scott limestone (Jewett, 1941) - in Kansas
Higginsville limestone member of Fort Scott formation (Clair, 1943; Greene and Searight, 1949)
Higginsville limestone member of Fort Scott formation (Moore, et al., 1951) - in Kansas
Higginsville formation of Fort Scott subgroup (Searight and Howe, 1961)
Higginsville Limestone Member of Fort Scott Formation (Branson, et al., 1965) - in Oklahoma
Higginsville Limestone Member of Fort Scott Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Higginsville Formation of Fort Scott Subgroup (Neal, 1969; Gentile, 1976)
Higginsville Limestone Member of Stephens Forest Formation (Ravn, et al., 1984) - in Iowa
Higginsville Limestone (Heckel, 1984)
Higginsville Limestone of Fort Scott Subgroup (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Cline (1941), Jewett (1941, p. 309) stated "Cline (1941, p. 36) states that the Higginsville limestone is well exposed east of Higginsville, which is in Lafayette county, Missouri...No exact location is given." Jeffries (1958, p. 66) stated "Although Cline did not specify an exact location, he indicated that good exposures east of Higginsville might serve as the type section. Because no good exposures were found in that area, the type is here designated as the exposure about 4 miles southwest of Higginsville in a small drain just north of a gravel road near the center of the NW¼ SW¼ SE¼ sec. 15, T. 49 N., R. 26 W."

The Higginsville Limestone is the "upper Fort Scott limestone," overlying the Little Osage Shale, and in turn overlain by the basal Appanoose Subgroup formation, the Labette Shale. It is thickest in extreme west-central and east-central Missouri, thinner in the mid portions of the state.

Hindsville Limestone

Hindsville limestone member of Batesville sandstone (**Purdue and Miser, 1916**; Croneis, 1930) **-** in Arkansas
Hindsville formation (Clark, 1941) **-** unpublished, first use in Missouri
Hindsville limestone (Branson, 1944b; Beveridge and Clark, 1952) **-** first published reference in Missouri
Hindsville limestone member of Carterville formation (Weller, et al., 1948)
Hindsville formation (Spreng, 1961)
Hindsville Limestone (Thompson, 1972, 1979a, 1986, 1995)
Carterville (Hindsville) Formation (Thompson, 1972) = ***Hindsville Limestone***

Mississippian System (Chesterian Series)

Type section: Purdue and Miser (1916) named the Hindsville from exposures near the town of Hindsville, Madison County, Arkansas. Thompson (1986, p. 147) stated "The exposure nearest the town is on the north end of Keefer Mountain, NW¼ NW¼ sec. 22, T. 17 N., R. 27 W...."

Clark (1941) mapped the aerial distribution of the Hindsville and related formations in the southwest corner of the Cassville 15' quadrangle, in Barry County, Missouri, where it is preserved in a down-faulted area. It has also been found in Newton County, Missouri, preserved as sink-fill material in the Keokuk Limestone. It is easily differentiated from the Osagean limestones of the area because it is a coarse calcarenitic limestone (a calcareous sandstone), and is quite different in appearance from the other units.

Hinkle Member

Hinkle Member of Little Cedar Formation of Cedar Valley Group (Witzke, et al., 1988) **-** in Iowa
Hinkle Member of Little Cedar Formation of Cedar Valley Group (Woodruff, 1990) **-** in northeastern Missouri

Devonian System (Middle Devonian Series)

Hoing Sandstone Member of Cedar Valley Limestone

Devonian System (Middle Devonian Series)

In central and east-central Missouri the basal beds of the Cedar Valley Limestone are noticeably sandy, either as a sandy limestone or a quartz sandstone. Thompson (1995, p. 53) stated "A white, friable, quartzose sand cemented with calcium carbonate generally lies at or near the base of the Cedar Valley... Where the Mineola facies is present, the sand separates it from the remainder of the overlying formation. Where the sand is absent, the basal limestone of the Cedar Valley is sandy. The thickness of this sand varies from 1 to 5 ft, averaging 2 ft, and the sand is persistent in the Devonian outcrop area in Callaway County. It has been tentatively traced northeastward in the subsurface top exposures in Ralls Country." This is the **Hoing Sandstone Member** of western Illinois.

Holdenville Shale of Appanoose Subgroup, Marmaton Group

Holdenville shale (**Taff, 1901**) **-** in Oklahoma
Holdenville formation (Oaks, 1953) **-** in Oklahoma
Holdenville formation (Searight, et al., 1953; Searight and Howe, 1961)
Holdenville Formation ("Wayside" sandstone) (Wells and Anderson, 1968)
Holdenville Shale (Jewett, et al., 1968)
Holdenville Formation (Gentile, 1976)
Holdenville Shale (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: The Holdenville was named by Taff (1901) from sections in the vicinity of Holdenville, Oklahoma.

Thompson (1995, p. 109) stated "The Holdenville Shale is the youngest recognized unit of the Marmaton Group in Missouri, and is composed mostly of gray shale. Locally, it is dark-gray to black and fissile [Nuyaka Creek Shale Member of Lost Branch Formation], and has phosphatic concretions near the base...The thickness of the formation ranges from a feather edge to 15 ft or more." The Holdenville Shale overlies the Sni Mills Limestone Member of the Lenapah Shale, and is overlain by the basal beds of the Pleasanton Group. This unit appears to be equivalent to the "Memorial formation" of Cline and Greene (1950, p. 26-27). Holdenville strata are equivalent to the **Memorial Shale** and **Lost Branch Formation** of Heckel (1991) and Watney and Heckel (1994).

Holly Springs Formation of Wilcox Group

Holly Springs Formation (Thompson, 1995)

Tertiary System (Eocene Series)

Type section: The Holly Springs was named from exposures at and for several miles east of Holly Spring, Marshall County, northeast Mississippi.

A formation of the Wilcox Group of Eocene age, the Holly Springs overlies the Ackerman Formation and is overlain by the Mounds Gravel (formerly called "Lafayette gravel") or alluvium. Typical development in Missouri is at the Benton Hills area, Scott County, and on Crowley's Ridge, Stoddard County. Thompson (1995, p. 140) added "The Holly Springs Formation is quite variable in composition. It is essentially a loosely-consolidated sandstone that varies in texture from fine- to coarse-grained and contains large quantities of sandy clay, clay, and gravel. It is commonly cross-bedded and is variably sorted..." The sandstone, colorless or white when fresh, varies from orange to dark-red when weathered. The clay is erratically distributed, as thin beds and lenses within the sandstone. It is multicolored, from white, gray, yellow, red, lavender, green, brown, and black. Holly Springs varies from a few inches southward to more than 250 ft thick, and is exposed in an almost continuous belt along the southeastern edge of Crowley's Ridge.. It is difficult to distinguish from the Ackerman in the subsurface.

Holt Shale Member of Topeka Formation, Shawnee Group

Holt shale bed of Topeka limestone member of Shawnee formation (**Condra, 1927**)
Holt shale member of Topeka limestone (Moore, 1932)
Holt shale member of Topeka limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Holt member of Topeka formation (Searight and Howe, 1961)
Holt Shale Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Holt Shale Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
Holt Shale Member of Topeka Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Condra (1949, p. 21) stated the Holt shale was "...named for Holt County, Missouri; type locality in the Missouri River bluff SE of Forest City..." The type section is essentially the same as that for the **Curzon Limestone Member** of the Topeka Formation.

Thompson (1995, p. 126) stated "The Holt Shale Member...is a tan to gray, calcareous shale, which is gray to black at and near the base of the unit. The thickness of the Holt ranges from 2 to 3 ft." The Holt Shale Member overlies the DuBois Limestone Member, and is overlain by the Coal Creek Limestone Member of the Topeka Formation.

Holts Summit Sandstone

Holts Summit formation (Mehl, 1960)
Holts Summit sandstone (Mehl, 1961)
"Holts Summit Formation or Massie Creek Sandstone" (Huddle and Repetski, 1981)
Holts Summit Sandstone (Thompson, 1993, 1995)

Devonian System (Upper Devonian Series)

Type section: Mehl (1960, p. 78) stated "The Holts Summit is proposed for a sandstone-shale suc- cession that crops out near the village of Holts Summit in the southwestern part of Callaway County, Missouri.

"The NE SE SE sec. 11, T. 45 N., R. 11 W... on a major branch of Clifton Creek about 2.3 miles north and 0.5 mile west of Holts Summit, is designated as the type locality for the formation."

Thompson (1993, p. 158) noted, "Mehl (1960) identified Holts Summit over a 30-square mile region in southwestern Callaway County, Missouri. He also recognized a single outcrop in Benton County, and one in Boone County. He gave the average thickness as about 4 ft, with a maximum of not more than 8 to 10 ft...

"Although roughly the same age as the Turpin Sandstone and Grassy Creek and Saverton Shales (Famennian), the Holts Summit appears to be of local derivation, and has not been linked directly with the other Late Devonian clastic units to the east. Mehl (1961, p. 92) indicated...the Holts Summit was younger than the Chattanooga-Grassy Creek sequence, equivalent to the Glen Park Limestone of eastern Missouri. The sand grains were most likely derived from the St. Peter Sandstone..."

Homberg group

Homberg group of Chester series (Weller, 1939) = ***middle "third" of Chesterian Series*** (Golconda - Glen Dean Formations)
Homberg group of Chesterian series (Weller, et al., 1948)
Hombergian Stage of Chesterian Series (Swann, 1963) - in Illinois
Mississippian System (Chesterian Series)

This is the middle of three groups for the Chester Series in Illinois proposed by Weller (1939), between the Elvira Group above and the New Design Group below. Weller (1948) and Swann (1963) also used these group designations, but they have no been applied to Missouri Chesterian strata.

Homer (School) limestone

Homer limestone member of Holdenville shale (Morgan, 1924) - in Oklahoma; = ***Sni Mills Limestone Member of Lost Branch Formation***
Homer School limestone bed (Bennison, 1981) = ***Sni Mills Limestone Member of Lost Branch Formation***
Pennsylvanian System (Desmoinesian Series)

Hook Member of Macy Limestone, Plattin Group

Hook limestone member of Macy limestone (Larson, 1951)
Hook Member of Macy Limestone (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Larson (1951, p. 2060) named the lower member of the Macy Limestone, the Hook Member, from a roadcut on U.S. Highway 61, SE NE SE 28, 38N-8E, Ste. Genevieve County, Missouri. This is also the type section for the overlying Zell Member.

This name, proposed by Larson (1951), was rejuvenated by Thompson (1991), who adopted Larson's subdivision of the Plattin Group for the southeastern Missouri succession. It can be distinguished from the overlying Zell Member in that its burrowing is predominantly vertical or unoriented, whereas burrowing in the Zell is predominantly horizontal. The Hook Member overlies the Victory Member of the Hager Limestone.

Hopkintonian series

Hopkintonian series (Keyes, 1941a) = ***Edgewood Group***
Ordovician (Cincinnatian Series) and Silurian Systems (Llandoverian Series)

This is a term used by Keyes (1941b, p. 157) in a chart that included the Bowling Green Dolomite (Lower Silurian) and the Noix Limestone (Upper Ordovician). It is succeeded by his Goweran series and preceded by his Maquoketan series.

Horton Creek Limestone

Horton Creek Limestone Member of Hannibal Shale (**Conkin and Conkin, 1973**)
Horton Creek Formation (Collinson, et al., 1979)
Horton Creek Limestone (Thompson, 1986, 1995)
Mississippian System (Kinderhookian Series)

Type section: Conkin and Conkin (1973, p. 14) stated "The type locality of the Horton Creek member is the hillside on the south bank of Horton Creek..., Pike County, Illinois, where exposures of the member are better than those at Hamburg, Calhoun County." This is in the NW NW NW (NW corner) sec. 6, 6S-5W.

This unit was named "Hamburg oolite" by Weller (1906) from exposures at the town of Hamburg, in Calhoun County, Illinois. Later, Williams (1943), Collinson (1961) and Conkin and Conkin (1968) referred this as the Glen Park Limestone, "Glen Park" Limestone, or "Glen Park of Illinois" - the "of Illinois" to distinguish it from the Glen Park Limestone of the Sulphur Springs Group of east-central Missouri. Conkin and Conkin (1973) renamed it to differentiate it from the Missouri Glen Park, and demonstrated its relationship to the Hannibal Shale.

The Horton Creek is an oolitic limestone that contains rounded clasts of reworked Louisiana Limestone incorporated into it. As the Hannibal Shale lies directly on the Louisiana Limestone, the Horton Creek was defined as the basal member of the Hannibal. In Missouri, the Horton Creek is known at only a few localities around the town of Louisiana, in Pike County

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House Springs K-bentonite bed of Kimmswick Limestone

House Springs K-bentonite Bed of Dunleith Formation of Kimmswick Subgroup (Kolata, et al., 1986) = ***lower part of Kimmswick Limestone***
House Springs K-bentonite Bed of "lower Kimmswick Limestone" (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Kolata, et al. (1986) identified a prominent K-bentonite bed that occurs about 3 ft above the base of the Kimmswick Limestone, and named it the **House Springs K-bentonite bed**. The type section is a roadcut on the east side of Highway 30 just north of the town of House Springs. This bentonite is widespread throughout east-central Missouri, from exposures on I-55 south of St. Louis in Jefferson County to those on I-44 in western St. Louis County.

Housefield metabentonite

Housefield metabentonite of "Decorah" formation (Kay, 1931) = ***Millbrig K-bentonite bed? of Glencoe Shale Member of spechts Ferry Formation***
Ordovician System (Mohawkian Series)

Houx Limestone Member of Little Osage Shale, Fort Scott Subgroup, Marmaton Group

Houx limestone member of Fort Scott limestone (**Cline, 1941**)
Houx limestone bed of Little Osage shale member of Fort Scott limestone (Jewett, 1941) - in Kansas
Houx limestone bed of Backwater (*sic.*) Creek shale member of Fort Scott formation (Clair, 1943)
Houx limestone of Little Osage member of Fort Scott formation (Greene and Searight, 1949)
Houx limestone of Little Osage shale member of Fort Scott formation (Moore, et al., 1951) - in Kansas
Houx limestone (=Rhomboidal limestone) bed of Little Osage shale member of Fort Scott formation (Unklesbay, 1952a)
Houx limestone of Little Osage member of Fort Scott formation (Searight, 1959) "= St. David limestone in Illinois"
Houx member of Little Osage formation of Fort Scott Subgroup (Searight and Howe, 1961)
Houx Limestone Member of Fort Scott Formation (Landis and Van Eck, 1965) - in Iowa
Houx limestone bed (?) of Little Osage Shale Member of Fort Scott Limestone (Jewett, et al., 1968) - in Kansas
Houx Member of Little Osage Formation of Fort Scott Subgroup (Neal, 1969)
Houx Limestone Member of Little Osage Formation of Fort Scott Subgroup (Gentile, 1976; Thompson, 1995)
Houx Limestone Member of Stephens Forest Formation (Ravn, et al., 1984) - in Iowa
Houx Limestone (Heckel, 1984)

Houx limestone bed in Little Osage Shale Member of Fort Scott Limestone (Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Type section: The Houx Limestone Member was named by Cline (1941, p. 36) who stated "It is well exposed at Houx Ranch, in [NE¼] Sec. 15, T. 46 N., R. 27 W., Johnson County, Missouri."

Thompson (1995, p. 106) stated "The Houx Limestone Member...is a single 6-in. to 1-ft dense limestone bed in north-central Missouri. It is split into thin beds of limestone by a thin shale parting which thickens northward." The Houx is overlain by dark-gray to black shale ("Blackwater Creek Shale Member") and underlain by dark-gray to black shale, both shales part of the Little Osage Shale.

Howard Formation of Sacfox Subgroup, Wabaunsee Group

Howard limestones (**Haworth, 1898**) - in Kansas
Howard limestone (Beede, 1902; Adams, 1903; Haworth and Bennett, 1908) - in Kansas
Howard limestone member of Shawnee formation (Hinds and Greene, 1915)
Howard limestone member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Howard limestone member of Shawnee formation (Condra, 1927) - in Nebraska
Howard limestone (Moore, 1932; Ver Wiebe and Vickery, 1932; McQueen and Greene, 1938; Branson, 1944b)
Howard limestone formation (Condra, 1935) - in Nebraska
Howard limestone (of Shawnee Group) (Moore, et al., 1944)
Howard formation (5 members) (Jewett, et al., 1949) - in Kansas
Howard limestone (5 members) (Moore, et al., 1951) - in Kansas
Howard formation (5 members) (Searight and Howe, 1961)
Howard Limestone (5 members) (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Howard Formation (Burchett, 1970) - in Nebraska
Howard Limestone (3 members) (Pabian and Diffendal, 1989) - in Nebraska
Howard Formation (5 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Howard limestone was named by Haworth (1898). Ver Wiebe and Vickery (1932, p. 111) described the type section as being near "Howard, Elk county, Kansas, T. 30s, R. 10e." However, Moore (1936, p. 204) described it as "Near Howard, Elk county, Kansas. Typically exposed in NE¼ sec. 7, T. 20 S., R. 11 E." The correct township was that given by Ver Wiebe and Vickery (T. 30 S.).

Thompson (1995, p. 127) stated "Where the Howard Formation is fully developed...it contains five members...However, the basal member ...is absent in all but one locality in Missouri. Because of this, in all other areas of the state, the formation's lower boundary is placed at the base of the underclay which lies beneath the **Nodaway coal**, which in turn lies near the base of the next higher member, the Aarde. The lithologic characteristics and thicknesses of the formation's members are so unusually persistent that the formation serves as a useful datum throughout the northern Midcontinent. Its average thickness is between 10 and 15 ft." The Howard Formation overlies the Severy Formation, and is overlain by the Scranton Formation.

Hudson River shales (group)

Hudson River Group (Swallow, 1855) = ***Maquoketa Shale (Group)***
Hudson River shales (Broadhead, 1874) = ***Maquoketa Shale (Group)***
Hudson River group (Winslow, 1894; Marbut, 1898) = ***Maquoketa Shale (Group)***
Hudson shales (Keyes, 1896d) = ***Maquoketa Shale (Group)***
Hudson River beds (Lorraine shale) (Gallaher, 1900) = ***Maquoketa Shale (Group)***
Hudson River or Thebes (Buckley and Buehler, 1904) = ***Maquoketa Shale (Group)***
Ordovician System (Cincinnatian Series)

These are terms originating in New York and used in Missouri by early geologists (Swallow, 1855, to Buckley and Buehler, 1904) for the stratigraphic succession that later became the Maquoketa Group (southeastern Missouri) or Maquoketa Shale (northeastern Missouri).

<u>Humphrey shale</u>

Humphrey shale member <u>of Wabaunsee formation</u> (Smith, 1905) - in Kansas; = ***Soldier Creek and Wakarusa members of Bern Formation to Willard Shale***

Humphrey shale (Condra, 1927; Bass, 1929) = ***Soldier Creek Shale Member of Bern Formation to Auburn Shale***

Auburn shale <u>of Humphrey shale member of Wabaunsee formation</u> (Condra, 1927) = ***Auburn Shale***

Soldier Creek shale <u>of Humphrey shale member of Wabaunsee formation</u> (Condra, 1927) - in Nebraska; = ***Soldier Creek Shale Member of Bern Formation***

Soldier Creek shale member <u>of Humphrey Creek shale</u> (Moore, 1932) = ***Soldier Creek Shale Member of Bern Formation***

Auburn shale member <u>of Humphrey Creek shale</u> (Moore, 1932) = ***Auburn Shale***

Auburn shale member <u>of Humphrey shale formation</u> (Ver Wiebe and Vickery, 1932) = ***Auburn Shale***

Pennsylvanian System (Virgilian Series)

Hushpuckney Shale Member of Swope Formation, Bronson Subgroup, Kansas City Group

Hushpuckney shale member <u>of Swope limestone</u> (**Newell, in Jewett, 1932**; Moore, et al., 1951) - in Kansas

Hushpuckney shale member <u>of Ladore shale</u> (McQueen and Greene, 1938; Branson, 1944b)

Hushpuckney shale member <u>of Swope limestone</u> (Clair, 1943)

Hushpuckney member <u>of Swope formation</u> (Searight and Howe, 1961)

Hushpuckney Shale Member <u>of Swope Formation</u> (Payton, 1966; Gentile, 1976; Kidder, 1985; Thompson, 1995)

Hushpuckney Shale Member <u>of Swope Limestone</u> (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas

Hushpuckney Shale Member <u>of Swope Formation</u> (Burchett, 1970) - in Nebraska

Hushpuckney Shale Member <u>of Swope Formation</u> (Mossler, 1971) - in Kansas

Hushpuckney Shale Member <u>of Coffeyville Formation</u> (Watney, et al., 1989) - in southern Kansas

Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Jewett, 1932), Moore (1936, p. 85) stated the type section was "On Hushpuckney Creek, typically exposed at railroad cut center north line sec. 22, T. 18 S., R. 24 [E], in creek bed [Miami County, Kansas]."

Thompson (1995, p. 114) stated "The Hushpuckney Shale Member...consists of dark-gray to black, fissile shale in its lower and middle parts and becomes a gray shale in its upper part. The thickness of the member ranges from 1 to 3 ft." McQueen and Greene (1938) and Branson (1944b) identified the Hushpuckney as the upper member of the "Ladore shale." The Hushpuckney Shale Member overlies the Middle Creek Limestone Member, and is overlain by the Bethany Falls Limestone Member of the Swope Formation.

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Iatan Limestone of Pedee Group

Iatan limestone member <u>of Lawrence shale</u> (**Keyes, 1899**, 1900b)

Iatan limestone member <u>of Douglas formation</u> (Hinds and Greene, 1915)

Iatan limestone member <u>of Douglas formation</u> (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Iatan and Haskell limestones***

Iatan limestone member <u>of Douglas formation</u> (Condra, 1927)

Iatan limestone <u>of Pedee group</u> (**Moore, 1932)**

Iatan limestone (Ver Wiebe and Vickery, 1932; Moore, et al., 1951) - in Kansas

Iatan limestone (McQueen and Green, 1938; Ellison, 1941)

Iatan formation <u>of Pedee group</u> (Searight and Howe, 1961)

Iatan Limestone Member <u>of Stranger Formation of Douglas Group</u> (O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas

Iatan Formation (Howe, 1986)

Iatan Limestone (Goebel, et al., 1989)

Iatan Limestone <u>of Pedee Group</u> (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Named by Keyes (1899) as part of the Lawrence shale, no specific section was designated as the type for the Iatan. Therefore, a composite section of outcrops in the SE NW and near center NW SE sec. 19, 54N-36W, at Iatan, Platte County, Missouri, composed of exposures along the Burlington Northern tracks north of the town and in the low bluff opposite the tracks just south of Iatan, can serve as a principal reference section of the Iatan (Gentile, et al., ms in preparation).

Thompson (1995, p. 120) stated "The Iatan Limestone consists of a single, massive bed of light-gray, algal limestone, which has a brecciated appearance when weathered. Locally, a few inches of thin-bedded limestone overlie the thick, massive bed. The thickness...ranges from less than 5 ft in the St. Joseph area, to more than 15 ft in west-central Platte County." The Iatan overlies the Weston Shale, and is overlain by the basal beds of the Stranger Formation, either the Tonganoxie Sandstone Member, or the Westphalia Limestone Member.

Ibexian Series

Ordovician System

Because of incompleteness of the exposures in the stratotype region, the "Canadian Series" has been replaced by the Ibexian Series, represented by a more complete succession of strata in Utah, where the upper and lower boundaries of this important series can be evaluated and correlated on a worldwide basis.

Idalia clay

Idalia clay (Marbut, 1902)

Tertiary System

This is a term used by Marbut (1902, p. 18, 21-23) for the black or dark gray to drab clay shale found only in Crowleys Ridge and usually only in the lower part. It is overlain by his Benton sands and underlain by Paleozoic formations. He assigned it to the Tertiary. It was named for exposures at Idalia, Stoddard County, Missouri.

Idenbro Limestone Member of Lenapah Formation, Appanoose Subgroup, Marmaton Group

Idenbro limestone member of Lenapah limestone (**Jewett, 1941**; Moore, et al., 1951) - in Kansas
Idenbro Limestone Member of Lenapah Limestone (Jewett, et al., 1968; Watney, et al., 1989; Heckel, 1991; Baars and Maples, 1998) - in Kansas
Idenbro Limestone (Parkinson, 1982; Greenberg, 1986)
Idenbro Limestone Member of Memorial Shale (Heckel, 1991) - in Oklahoma

Pennsylvanian System (Desmoinesian Series)

According to Heckel (1991) Missouri geologists adopted the name **Sni Mills** for the upper limestone of the Lenapah, and mistakenly correlated it with the **Idenbro Limestone** of Jewett (1941). Heckel does not equate the Sni Mills with the **Cooper Creek** of Iowa. He identifies the Cooper Creek as the upper limestone member of the **Lost Branch Formation**, and identifies the lower limestone member as the **Sni Mills**, the two limestones separated by a black "core" shale.

Illinoian alluvium

Quaternary System (Pleistocene Series)

Whitfield (*in* Thompson, 1995, p. 147) stated "Illinoian alluvium grades upward from well-sorted sand and gravel at the base to medium and coarse silt. The upper few feet are clayey, and the distinctive reddish-brown Sangamon Geosol is present. The material is noncalcareous,. Stratification is obscure, but jointing is common. Thicknesses of 30 ft or more are common. The alluvium is always found at low topographic position and is generally confined to stream valleys tributary to the Missouri and Mississippi rivers.

"In north St,. Louis County, fine sand, silt, and clay up to 100 ft in thickness, were deposited in a lacustrine environment in front of the Illinoian glacier."

Illinoian Stage

Illinoisan age (stage) (Buckley, 1908)
Illinoian drift
Quaternary System (Pleistocene Series)

These are terms applied to the time and deposits of the glacial interval next following the Yarmouthian interglacial age (stage), and followed by the Sangamonian age (stage). The name was proposed by Leverett, but was first published by Chamberlin (1896, p. 872-876), who credited it to Leverett, as the Illinois till sheet. Leverett later defined the term (1897, p. 11-16, 1898a, p. 173). The name was applied in Missouri by Buckley (1908, p. 69). The name was derived from its extensive development in Illinois.

Whitfield (*in* Thompson, 1995, p. 147) stated "Illinoian loess, commonly referred to as the Loveland loess, and Illinoian alluvium are approximately contemporaneous in age, but they occur in different topographic positions."

Stratigraphic units included within the Illinoian Stage include the **Loveland Loess**, **Yarmouth-Sangamon Paleosol**, **Illinoian alluvium**, and **Illinoian till**.

Illinoian till

Quaternary System (Pleistocene Series)

Whitfield (*in* Thompson, 1995, p. 147) stated "Till which is regarded as Illinoian in age has been reported to be present in the vicinity of St. Louis. It is buff to gray, clay-like and contains numerous small pebbles. It is leached, but possibly contains secondary calcium carbonate nodules.

"Erratics on the uplands in the vicinity of Ste. Genevieve suggest Illinoian glaciation. No till has been found in this locality."

Independence limestone

Independence limestone (Haworth and Piatt, 1894; Adams, 1896; Haworth, 1898) - in Kansas; **= *Drum (or Dewey) Limestone***
Pennsylvanian System (Missourian Series)

Haworth and Piatt (1894) proposed the "Independence limestone" for the unit now called "Drum." Adams (1903) renamed this unit the Drum, because the name "Independence" was preoccupied (Independence Shale of Iowa).

Indian Cave Sandstone

Indian Cave sandstone (Searight and Howe, 1961) Permian in age?
Indian Cave Sandstone (Thompson, 1995)
Pennsylvanian System (Virgilian Series, or younger)

Thompson (1995, p. 131) stated "In the northwestern corner of the state, in northwestern Atchison County, a few exposures of massive sandstone have been named the Indian Cave Sandstone...This sandstone occupies deep channels that have been cut into upper Pennsylvanian beds. The sandstone is fine- to medium-grained, micaceous, and strongly cross-bedded. Fragments of clay-ironstone and limestone occur near the base. Casts and molds of fossil wood also occur in the rock. The sandstone has a maximum thickness of more than 50 ft in northwestern Missouri exposures.

"In 1960 [Searight and Howe], this sandstone was identified as Early Permian (Wolfcampian) in age. Today, this sandstone is considered Pennsylvanian in age, but little more is known about it."

Infusorial sandstones

Infusorial sandstones (Gallaher, 1900)
Cambrian and Ordovician Systems

This is a term used by Gallaher (1900) for the sandstones between the magnesian limestones of his Calciferous group (Cambrian and Ordovician formations). He used it in an adjectival sense.

Inola limestone

Inola limestone member of Boggy formation (Condra, 1949) - in Oklahoma; = ***Seville Formation***
Inola limestone and coals (Branson, 1957) - in Oklahoma; limestone = ***Seville limestone***
Pennsylvanian System (Desmoinesian Series)

Iola Formation of Linn Subgroup, Kansas City Group

Iola limestone (**Haworth and Kirk, 1894**) - in Kansas
Iola limestone (Adams, 1896) - in Kansas; = ***Stanton Formation***
Iola limestone (Adams, 1903; Haworth and Bennett, 1908) - in Kansas; = ***Wyandotte Formation***
Iola limestone member of Wilson formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas
Iola limestone member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917) = ***Argentine Limestone Member of Wyandotte Formation***
Iola limestone member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Iola limestone member of Kansas City formation (Condra, 1927) - in Nebraska; = ***Argentine Limestone Member of Wyandotte Formation***
Iola limestone (3 members) (Newell, *in* Moore, 1932; Moore, et al., 1951) - in Kansas
Iola limestone member of Kansas City formation (Bartle, 1933) = ***Argentine Limestone Member of Wyandotte Formation***
Iola limestone (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b; Moore, et al., 1944) = ***Wyandotte Formation***
Iola formation (Condra and Scherer, 1939) - in Nebraska
Iola formation (Moore, 1948; Searight and Howe, 1961)
Iola Formation (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska
Iola Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Iola Formation (Kidder, 1985; Howe, 1986; Thompson, 1995)
Iola Limestone (Watney, et al., 1989) - in Kansas; = ***Iola Formation and Lane (Liberty Memorial) Shale***
Iola Limestone of Zarah Subgroup (Watney and Heckel, 1994) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Haworth and Kirk (1894, p. 109) named the Iola Formation, stating "Above the Chanute shales lies the heavy system of limestone in which the Iola quarries are situated, the so-called Iola marble. For this reason it may be called the Iola limestone..." Ver Wiebe and Vickery (1932, p. 116) located the type as "Iola, Kansas, T. 24s, R. 16e." Moore (1936, p. 112) located it at "Iola, Kansas. Well exposed at the cement plant quarry, NE¼ sec. 2, T. 25 S., R. 18 E. [Allen County]."

Early Missouri reports placed the Iola within the "Chanute shale member of the Kansas City formation" (Hinds and Greene, 1915), the Chanute shale (McQueen and Greene (1938), and Iola limestone (Clair, 1943). None of these reports recognized that the Iola and Wyandotte were separate formations, separated by a shale Clair (1943) called the **Liberty Memorial shale** (the Lane Shale of later reports).

Thompson (1995, p;. 115-116) stated "The Iola Formation contains two limestone members, the lower Paola and upper Raytown, separated by the Muncie Creek Shale Member. The succession is uniform throughout northeastern Kansas and northwestern Missouri, and has an average thickness of about 8 ft." The Iola Formation overlies the Chanute Shale, and is overlain by the Lane (or Liberty Memorial) Shale.

Iowa City Member

Iowa City Member of Coralville Formation of Cedar Valley Group (Witzke, et al., 1988) - in Iowa
Iowa City Member of Coralville Formation of Cedar Valley Group (Woodruff, 1990) - in northeastern Missouri
Devonian System (Middle Devonian Series)

Iowa Point Shale Member of Topeka Formation, Shawnee Group

Iowa Point shale of Calhoun shale member of Shawnee formation (**Condra, 1927**) **-** in Nebraska (some sections)
Iowa Point shale of Calhoun shale member of Shawnee formation (Condra, 1927) **-** in Nebraska; **=** ***Turner Creek Shale Member of Topeka Formation*** (some sections)
Iowa Point shale of Calhoun shale member of Shawnee formation (Condra, 1930) **-** in Nebraska; **=** ***Turner Creek Shale Member of Topeka Formation***
Iowa Point shale member of Calhoun shale (Moore, 1932; Condra, et al., 1932; Condra, 1935)
Iowa Point shale member of Calhoun shale (Moore, 1936) **-** in Kansas
Iowa Point shale of Topeka limestone formation (Condra and Reed, 1937, 1943, 1959) **-** in Nebraska
Iowa Point shale member of Calhoun shale (McQueen and Greene, 1938; Branson, 1944b)
Iowa Point shale member of Topeka formation (Moore, 1948)
Iowa Point shale member of Topeka limestone (Moore, et al., 1951) **-** in Kansas
Iowa Point member of Topeka formation (Searight and Howe, 1961)
Iowa Point Shale Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) **-** in Kansas
Iowa Point Shale Member of Topeka Formation (Burchett, 1970, 1971) **-** in Nebraska
Iowa Point Shale Member of Topeka Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), the type section is at Iowa Point, on the Missouri River bluff in northwestern Doniphan County, Kansas.

Both McQueen and Green (1938) and Moore (1944) identified this unit in Missouri as the "Iowa Point shale member of the Calhoun shale." Condra and Reed (1937) redefined the unit to be a member of the Topeka Formation. Thompson (1995, p. 126) stated "The Iowa Point Shale Member...is composed of sandstone and sandy shale. A thin coal is present near the top of the member. The sandstone is locally a channel-fill deposit. The average thickness of the member is about 10 ft." The Iowa Point Shale Member overlies the Hartford Limestone Member, and is overlain by the Curzon Limestone Member of the Topeka Formation.

Iowa series

Iowa series (Weller, 1920; Weller and Sutton, 1940) = ***Kinderhookian through Meramecian Series***

Mississippian System (Kinderhookian through Meramecian Series)

This term was used by S. Weller (1920, p. 282, 408-416) and Weller and Sutton (1940) for lower Mississippian formations extending from the top of the Ste. Genevieve limestone to the base of the Kinderhook group.

Iowan

Iowan loess (Buckley, 1908) = ***Peoria Loess***
Iowan stage
Iowan drift

Quaternary System (Pleistocene Series, Wisconsinan Stage)

These are terms applied to the third drift of the Keewatin part of the Laurentide ice sheet; Iowan stage being the name applied to the time during which this drift was deposited. The name East Iowan was originally applied by Chamberlin (1894, p. 724-775) to the second drift sheet. In 1895 (p. 270-277), at the suggestion of Uphan, he shortened the name of the second drift sheet to Iowan. In 1896 (p. 872-876) as a result of further studies, he shifted the name Iowan to a younger drift (supposed to be the fourth drift). The Iowan drift was generally regarded as later than Illinoisan drift, but Leverett later expressed the opinion that the Iowan drift, also the loess to which the names Iowan and Peorian have been applied, may be of the same age as Illinoian drift. Kay and Leighton (1933, p. 669-673) now include the Peorian loess and Iowan glacial stage in the Wisconsinan stage and recognize the Iowan loess as a part of the Peorian loess. The term Iowan loess was applied in Missouri by Buckley (1908, p. 14)

Iron Mountain conglomerate

Iron Mountain conglomerate (Winslow, 1894) = ***Lamotte Sandstone***

Cambrian System (Upper Cambrian Series)

This term was proposed by Winslow (1894, p. 331, 354) for the conglomerate underlying the LaMotte Sandstone and resting on the eroded Precambrian surface. It is the same as the Pilot Knob conglomerate. It was named for Iron Mountain, St. Francois County, Missouri. Today, it is generally regarded as the basal part of the **Lamotte Sandstone**.

Iron Mountain porphyry

Iron Mountain porphyry (Keyes, 1894b)

Precambrian Erathem

Keyes (1894b, p. 30-31) proposed this term for a quartz porphyry in the rugged hills near the eastern limit of the Ozark region. He assigned it to the Archean and stated that it is older than Pilot Knob conglomerate and younger than Knob Lick granite. It was named for Iron Mountain, St. Francois County, Missouri.

Ironton granite

Ironton granite (Graves, 1938)

Precambrian Erathem

This term was used by Graves (1938, p. 119) for a fine-grained, red granite, occurring in two outcrops west of Ironton, Iron County, Missouri.

Ironton Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SW¼ sec. 33, T. 34 N., R 3 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The Ironton Rhyolite is a dark maroon to black ash-flow tuff with conchoidal fracture containing 5-15 percent phenocrysts of quartz and alkali feldspar. Total thickness is not known, but it is more than 1,000 ft." Anderson (1962) called this unit the "Lindsey Mountain composite ash flows; High Top bedded tuff", and in 1970, "Unit A, tiff of Stouts Creek".

Ironton slate

Ironton slate (Keyes, 1915)

Precambrian Erathem

Keyes (1915, p. 252) proposed this name for slates overlying the Pilot Knob conglomerate and underlying the LaMotte Sandstone. They were later identified as Precambrian volcanic tuffs. They overlie the Pilot Knob formation of Buckley. They were probably named for Ironton, Iron County, Missouri.

Island Creek Shale Member of Wyandotte Formation, Zarah Subgroup, Kansas City Group

Island Creek shale member of Wyandotte limestone (**Newell, *in* Moore, 1932**; Moore, et al., 1951) - in Kansas
Island Creek shale (Condra, et al., 1932)
Island Creek shale member of Wyandotte limestone (Condra, 1935) - in Nebraska
Island Creek shale member of Lane shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Island Creek shale of Wyandotte formation (Condra and Scherer, 1939) - in Nebraska
Island Creek shale of Wyandotte limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Island Creek shale member of Wyandotte formation (Moore, 1948)
Island Creek member of Wyandotte formation (Searight and Howe, 1961)

Island Creek Member of Wyandotte Formation (Burchett, 1965) - in Nebraska
Island Creek Shale Member of Wyandotte Formation (Burchett and Reed, 1967; Burchett, 1970, 1971)
Island Creek Shale Member of Wyandotte Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Island Creek Shale Member of Wyandotte Formation (Howe, 1986; Thompson, 1995)
Island Creek (Lane) Shale Member of Wyandotte Limestone (Watney, et al., 1989) - in Kansas
Lane/Island Creek Shale (Pabian and Diffendal, 1989) - in Kansas
Island Creek Shale Member of Lane Shale (Watney and Heckel, 1994) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 122) located the type section at "Island Creek, in quarry at NW cor. sec. 11, T. 10 S., R. 23 E., near Wolcott, Wyandotte county, Kansas."

Thompson (1995, p. 116-117) stated "The Island Creek Shale Member...is a sandy or silty shale, which averages about 30 ft in thickness in the area of Jackson, Platte, and Clay counties, but is very thin or absent in parts of northwestern Cass County." The Island Creek Shale Member overlies the Argentine Limestone Member of the Wyandotte Formation, and is overlain by the Farley Limestone Member of the Wyandotte (or Lane Shale) Formation.

Recently Watney and Heckel (1994) proposed to remove the Island Creek and Farley Members from the Wyandotte Formation, and place them as lower member of the Lane Shale (redefined). At this time it is not certain just how successfully this redefinition will be received by Midcontinent Pennsylvanian stratigraphers.

Izard limestone

Izard limestone (Penrose, 1891) - in Arkansas; = ***Joachim Dolomite and Plattin Limestone***
Izard limestone (Keyes, 1932a) = ***Joachim Dolomite*** in Missouri, rejected name "Joachim"
Ordovician System (Mohawkian Series)

Izard is an Arkansas term originally suggested by Branner (*in* Penrose, 1891) for what is now identified as Joachim Dolomite and Plattin Limestone in Missouri. Keyes (1932a, p. 145-146) thought the term Izard should be extended to Missouri. He said it is equivalent to the Joachim, and the term Joachim should be dropped. The name was derived from Izard County, Arkansas, which contains the type locality.

J

Jackfork shale

Jackfork shale (Keyes, 1941b)
Pennsylvanian System?

This is a term used by Keyes (1941b, p. 156) for the formation at the top of his Oshawanan series. It overlies the Kaskaskia limestone and underlies his Chetopa shale of the Des Moines series.

Jackson Park Shale Member of Kanwaka Formation, Shawnee Group

Jackson Park shale member of Kanwaka shale (**Moore, 1932**)
Jackson park shale member of Kanawha (*sic.*) shale (Branson, 1944b)
Jackson Park shale member of Kanwaka shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Jackson Park member of Kanwaka formation (Searight and Howe, 1961)
Jackson Park Shale Member of Kanwaka Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Jackson Park Shale Member of Kanwaka Formation (Burchett, 1970) - in Nebraska
Jackson Park Shale Member of Kanwaka Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore, (1936, p. 170) located the type section as at "Jackson Park, southeastern part of Atchison, Atchison County, Kansas."

Thompson (1995, p. 124) stated "The Jackson Park Shale Member...is a gray, silty, micaceous shale. It is 10 to 15 ft thick," The Jackson park Shale Member overlies the Kereford Limestone Member of the Oread Formation, and is overlain by the Clay Creek Limestone Member of the Kanwaka Formation.

James River shale

James River shale (Ulrich, 1911) = ***Chattanooga Shale***, southwestern Missouri
James River shale (Kindel and Miller, 1939) = ***Chattanooga Shale***, also used Chattanooga shale and Noel shale
Devonian System (Upper Devonian Series)

"James River shale" was used by Ulrich (1911, p. 29) for outcrops of black shale observed on the James River in Greene and Christian counties, Missouri. The term had previously been used by Shepard (1905, p. 56, 67) who said it is the same as the Eureka shale in Arkansas. Moore (1928, p. 108) stated that there seems to be no reason for regarding this shale as different from the **Chattanooga Shale**.

Jasper Limestone

Jasper Limestone of Everton Group (Templeton and Willman, 1963) - in Arkansas
Ordovician System (Whiterockian Series)

This is the upper part of the of Everton Group in Arkansas.

Jefferson dolomite

Jefferson dolomite (Keyes, 1915) = ***Jefferson City Dolomite***
Ordovician System (Ibexian Series)

This was an abbreviated form of **Jefferson City Dolomite**, employed by Keyes (1915, p. 253).

Jefferson City Dolomite

Jefferson City limestone (Winslow, 1894) = ***Cotter and Jefferson City Dolomites***
Jefferson City formation (Ball and Smith, 1903; Tarr, 1918; Branson, 1918; Dake, 1918) = ***Cotter and Jefferson City Dolomites***
Jefferson City limestone (Bain and Ulrich, 1905) = ***Smithville - Jefferson City Dolomites***
Jefferson City dolomite (Ulrich, 1911) = ***Cotter and Jefferson City Dolomites***
Jefferson City formation (Ulrich, *in* Ulrich and Bassler, 1915; Martin, et al., 1961)
Jefferson City limestone (Ulrich, *in* Purdue and Miser, 1916)
Jefferson City limestone of Jefferson City group (Dake, 1918)
Jefferson City group (Dake, 1921; Krey, 1924; Cullison, 1944) = ***Powell, Cotter and Jefferson City Dolomites***
Jefferson City Dolomite (Thompson, 1982, 1991, 1995)
Ordovician System (Ibexian Series)

Type section: The name Jefferson City was first applied to a series of cherty dolomites exposed along the Missouri River in the vicinity of Jefferson City by Winslow (1894, p. 331, 373, 375).

In 1911, Ulrich (pl. 27) divided the beds previously called the Jefferson City by Winslow into the Everton, Yellville limestone, and Jefferson City, the latter which he placed immediately above the Roubidoux. In 1915, Ulrich (pl. 2) modified his earlier division of the Jefferson City for the central Ozarks by dividing the original Jefferson City into three formations which are (ascending) the Jefferson City (restricted), Cotter, and Powell formations. In this usage the term Jefferson City replaced exactly the old term "Second Magnesian limestone." Today, the Jefferson City Dolomite is overlain by the Cotter Dolomite and underlain by the Roubidoux Formation. In addition, Cullison (1944) elevated the term Jefferson City to group rank and divided it into the Rich Fountain and Theodosia formations.

Jenkins Branch chert bed

Jenkins Branch chert bed (Cullison, 1944) = ***Cotter Dolomite*** (part)

Ordovician System (Ibexian Series)

Cullison (1944, p. 35) named a chert bed within the Cotter formation the "Jenkins Branch chert bed." This chert forms an encrustation as the crystalline dolomite weathers. The texture is very open and porous. It was named for its occurrence near Jenkins Branch, Barry County, Missouri..

Joachim Dolomite

Joachim dolomite (**Winslow, 1894**) = ***Dutchtown and Joachim formations***
Joachim limestone (Weeks, 1902) - considered to be "Silurian" in age
Joachim formation (Van Horn and Buckley, 1905) = ***Dutchtown and Joachim formations***
Joachim limestone (Bain and Ulrich, 1905a, 1905b)
Joachim limestone of St. Peter group (Dake, 1921)
Joachim limestone member of St. Peter sandstone (Bassler and Kellett, 1934) = "Buffalo River series"
Joachim dolomite (McQueen, 1937) - restricted to current usage
Joachim formation (Grohskopf, 1948; Martin, et al., 1961a) - upper part, included "Rock Levee formation"
Joachim Dolomite (Templeton and Willman, 1963) - rejected "Rock Levee formation," current usage
Joachim-Rock Levee Formations (Martin and Wells, 1966) = ***Joachim Dolomite*** of modern usage
Joachim Dolomite (Thompson, 1982, 1991, 1995; Okhravi and Carozzi, 1983) - "Rock Levee" abandoned

Ordovician System (Mohawkian Series)

Type section: Winslow (1894, p. 331) applied the name Joachim limestone to this formation from exposures along Joachim Creek in Jefferson County,

In the early reports on the geology of Missouri, the strata immediately overlying the “saccharoidal sandstone” (St. Peter) were designated as the "First Magnesian limestone." and the name has been generally used by later writers. Ulrich (1904a, p. 111) extended Winslow’s term Joachim, making it the new name for the First Magnesian of earlier authors. Originally it included all beds in eastern Missouri above the St. Peter Sandstone and below the Plattin. McQueen (1937) placed the limestones at the base of the “Joachim” formation in Cape Girardeau County in a new unit, the Dutchtown Formation. Also from Cape Girardeau County exposures, Grohskopf (1948) defined a thick succession of limestone and dolomitic limestone and dolomite below the Plattin and above the "normal" Joachim the "Rock Levee Formation." Rock Levee, however, is very restricted, and along with the Dutchtown, does not extend much farther north than Perry County, Missouri. Thus, the Joachim Dolomite is overlain by the Plattin Limestone (locally by the Rock Levee ['Pecatonica"] Formation), and underlies the St. Peter Sandstone (or locally the Dutchtown Formation).

Templeton and Willman (1963) divided the Joachim Dolomite into 6 members, in ascending order the Abernathy, Augusta, Boles, Defiant, Matson, and Metz Members, all dolomites.

Joe shale bed

Joe shale bed of Coal City Limestone Member of Pawnee Limestone (Price, 1981)
Joe shale bed of Laberdie Limestone Member of Pawnee Limestone (Price, 1981) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Johnson ash-flow and air-fall tuffs (lower part)

Johnson ash-flow and air-fall tuffs (lower part) of Proffit Mountain Formation, Taum Sauk Group, St. Francois Mountains Volcanic Supergroup (Anderson, 1962, 1970)
tuff on Johnson Shut-Ins (lower part)

Precambrian Erathem

This name was used by Anderson (1962, 1970), the lower part of which is included in the **Proffit Mountain Formation** of Berry (1976).

Johnson ash-flow and air-fall tuffs (middle part)

Johnson ash-flow and air-fall tuffs (middle part) of Proffit Mountain Formation, Taum Sauk Group, St. Francois Mountains Volcanic Supergroup (Anderson, 1962, 1970)

tuff on Johnson Shut-Ins (middle part)

Precambrian Erathem

This name was used by Anderson (1962, 1970), the middle part of which is included in the **Johnson Shut-Ins Rhyolite** of Berry (1976).

Johnson ash-flow and air-fall tuffs (upper part)

Johnson ash-flow and air-fall tuffs (upper part) of Cope Hollow Formation, Taum Sauk Group, St. Francois Mountains Volcanic Supergroup (Anderson, 1962, 1970)

tuff on Johnson Shut-Ins (upper part)

Precambrian Erathem

This name was used by Anderson (1962, 1970), the upper part of which is included in the **Cope Hollow Formation** of Berry (1976).

Johnson Shut-Ins Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the NW¼ SW¼ sec. 16, T. 33 N., R. 2 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "A gray ash-flow tuff with 15-20 percent quartz and feldspar phenocrysts and abundant lithophysae marks the top of the Johnson Shut-Ins Rhyolite...The remainder of the formation consists of cross-bedded water laid tuff and maroon ash-flow tuff with abundant lithophysae. The total thickness of the formation is greater than 170 ft."

"Joliet Limestone"

Joliet Formation (Willman and Atherton, 1975) - in western Illinois

"Joliet Limestone" (Thompson and Satterfield, 1975; Thompson, 1993, 1995)

Silurian System (Llandoverian Series)

Thompson (1995, p. 44) stated "Identified as the Sexton Creek Limestone in northeastern Missouri by Martin, et al. (1961b), the distribution of the "Joliet Limestone" was described as (p. 35) '...limited to one or possibly two outliers situated along the Mississippi River bluffs near the Lincoln-Pike county line. Here the formation is a white to light gray, finely crystalline, siliceous limestone which contains a small amount of thin, slabby, milk white chert Its thickness is estimated to be between 10 and 15 feet...the formation is unconformably overlain by Devonian strata...'

"Thompson (1993) correlated this unit with the Joliet Limestone immediately across the Mississippi River in west-central Illinois, rather than with the Sexton Creek Limestone of southeastern Missouri, which is a correlative with the underlying Bryant Knob and/or Bowling Green formations.'"

Jones Point Shale Member of Topeka Formation, Shawnee Group

Jones Point shale of Calhoun shale member of Shawnee formation (**Condra, 1927**; 1930) - in Nebraska; some sections

Jones Point shale of Calhoun shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Calhoun Shale*** (some sections)

Jones Point shale member of Calhoun shale (Moore, 1932, 1936, 1937; Ver Wiebe and Vickery, 1932; Condra, et al., 1932; Condra, 1935) - in Kansas and Nebraska; = ***Calhoun Shale***

Jones Point shale member of Deer Creek limestone (Condra, 1933) - in Iowa
Jones Point shale of Topeka limestone formation (Condra and Reed, 1937, 1943, 1959) - in Nebraska
Jones Point shale member of Calhoun formation (McQueen and Greene, 1938; Branson, 1944b) = ***Calhoun Shale***
Jones Point shale member of Topeka limestone (Moore, et al., 1951) - in Kansas
Jones Point shale member of Topeka formation (Moore, 1948)
Jones Point member of Topeka formation (Searight and Howe, 1961)
Jones Point Shale Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1989; Baars and Maples, 1998) - in Kansas
Jones Point Shale Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
Jones Point Shale Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Condra (1949, p. 21) stated this unit was "...named for Jones Point in the Missouri River bluffs about 4 miles east of Union, Cass County, Nebraska."

Both McQueen and Greene (1938) and Moore (1944) misidentified the Calhoun Shale in Missouri as the Jones Point shale; the true Jones Point shale they included in their "Hartford limestone member of the Topeka formation". Until Condra and Reed (1937) straightened this out, "Jones Point shale" was being used for the Calhoun Shale.

Thompson (1995, p. 126) stated "The Jones Point Shale Member...is composed of medium-gray shale and calcareous clay, which is present in the uppermost part of the unit. The clay contains limestone con- cretions, and is from 3 to 5 ft thick." The Jones Point Shale Member overlies the Curzon Limestone Member, and is overlain by the Sheldon Limestone Member of the Topeka Formation.

Joplin Member

Joplin Member of Boone Formation (McKnight and Fischer, 1970) = ***Keokuk Limestone***
Mississippian System (Osagean Series)

Jordan Sandstone

Cambrian System (Upper Cambrian Series)

In a discussion of Upper Cambrian strata in the Upper Mississippi Valley, Kurtz (1989, p. 78) stated "A thin layer of sandstone between the Eminence and Potosi formations represents a tongue of Jordan in northern Missouri and was referred to as "Momence" in Howe, Kurtz, and Anderson (1972). It is probable that an upper dolomitic sandstone unit, the Sunset Point, that has been included in the Jordan (Ostrom, 1966), is, in part, early Ordovician in age."

Julian limestone

Julian limestone (Keyes, 1922) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

K

Kaaterskillian series

Kaaterskillian series (Keyes, 1941b) = ***Grand Tower Limestone and Clear Creek Formation***
Devonian System (Lower and Middle Devonian Series)

This is a term used by Keyes (1941b, p. 157) in a chart for a series including (descending) his Wittenberg shales, Grand Tower limestone, and Clear limestone. Keyes (1941d, p. 311) stated "For the Eastern Devonic the name Kaaterskillian series is reserved, and for the Western Devonic the term Linnian series. These two series overlap at the Mississippi River in Missouri."

Kanawha (*sic.*) shale

Kanawha (*sic.*) shale (Branson, 1944b) = ***Kanwaka Formation***

Pennsylvanian System (Virgilian Series)

Kankakee limestone

Kankakee limestone (Savage, 1916) = ***Sexton Creek Limestone***

Silurian System (Llandoverian Series)

This is a name proposed by Savage (1916, p. 315-316) for the limestone of Brassfield age, in northeast Illinois, western Illinois, and northeastern Missouri north of St. Louis. He stated that it is contemporaneous with the Sexton Creek limestone of southwestern Illinois and eastern Missouri, but it was deposited in a separate basin. This name has not been used in Missouri, but rather the Sexton Creek. The name was derived from development and exposures along the Kankakee River about five miles south of Richey, Macon County, central Illinois.

Kansan

Kansan stage (age)
Kansan drift (Buckley, 1908)
Kansan till
Kansas till
Kansas formation

Quaternary System (Pleistocene Series, Kansan Stage)

These terms were applied to the second drift of the eastern, as well as the western, part of the area covered by the Laurentide ice sheet; the name **Kansan stage** being applied to the time during which this drift was deposited. The name Kansas was originally applied by Chamberlin (1894, p. 724-775; 1895, p. 270-277) to the oldest drift of the western or Keewatin part of the Laurentide ice sheet, the name "East Iowan" being applied to the second drift; but in 1896, Chamberlin (p. 872-876), as a result of further studies, shifted the name Kansas to the second drift (which is the drift that covers northeast Kansas), and shifted the name Iowan to a younger drift. The name was derived from its development in Kansas. The Kansan stage (age) succeeds the Aftonian interglacial stage and precedes the Yarmouthian stage. The term Kansas drift was first used in Missouri by Buckley (1908, p. 69).

Kansas City Group

Kansas City limestone (Gallaher, 1898)
Kansas City limestone (Hinds, 1912) = ***Hertha to Argentine limestones***
Kansas City formation (**Hinds and Greene, 1915**)
Kansas City group (Moore, 1932) = ***Winterset to Lane***
Kansas City group (Condra, et al., 1932) **-** in Nebraska; **=** ***Hertha to Argentine***
Kansas City formation (Greene, 1933) = ***Hertha to Iola***
Kansas City formation (Newell and Jewett, 1936) **-** in Kansas; **=** ***Winterset to Lane***
Kansas City group (Moore, 1936) **-** in Kansas; **=** ***Fontana to Bonner Springs; Linn and Zarah Subgroups***
Kansas City group (Moore, 1937) **-** in Kansas; **=** ***Cherryvale to Bonner Springs***
Kansas City group (McQueen and Greene, 1938) = ***Hertha to Iola***
Kansas City group (Ellison, 1941) = ***Fontana to Bonner Springs***
Kansas City group (Condra and Reed, 1943, 1959) **-** in Nebraska; = ***Cherryvale to Bonner Springs***
Kansas City group (Clair, 1943) = ***Hertha to Iola***
Kansas City group (Moore, et al., 1944) -in Kansas; **=** ***Hertha to Iola***
Kansas City group (Branson, 1944b) = ***Hertha to Argentine***
Kansas City group (Moore, 1948) **-** in Kansas; **=** ***Hertha to Iola***
Kansas City group (**Condra, 1949**) **-** in Nebraska; **=** ***Hertha to Bonner Springs*** (as presently defined)
Kansas City group (Moore, et al., 1951; Jewett and Muilenburg, 1957; Jewett, et al., 1968) **-** in Kansas
Kansas City group (Searight and Howe, 1961)
Kansas City Group (Payton, 1966)

Kansas City Group (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) **-** in Kansas
Kansas City Group (Burchett, 1970, 1971) **-** in Nebraska
Kansas City Group (Gentile, 1976; Howe, 1986; Thompson, 1995)
Kansas City Group (Ravn, et al., 1984) **-** in Iowa; **= *Fontana to Bonner Springs, Linn and Zarah Subgroups only***
Pennsylvanian System (Missourian Series)

Type area: Proposed by Hinds and Greene (1915), the Kansas City Group was named from exposures in the vicinity of Kansas City, Missouri.

The Kansas City Group has been divided into three subgroups, the Bronson, Linn, and Zarah.

Kansas City oolite

Kansas City oolite (Broadhead, 1866) **= *Westerville Limestone Member of Cherryvale Formation***
Pennsylvanian System (Missourian Series)

Kanwaka Formation of Shawnee Group

Kanwaka shales (**Adams, 1903**, 1904) **-** in Kansas
Kanwaka shale (Haworth and Bennett, 1908) **-** in Kansas
Kanwaka shale member of Shawnee formation (Hinds and Greene, 1915)
Kanwaka shale (Condra and Bengston, 1915) **-** in Nebraska
Kanwaka shale member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) **-** in Kansas
Kanwaka shale member of Shawnee formation (Condra, 1927) **-** in Nebraska; **= *Kereford Limestone Member of Oread Formation and Kanwaka Formation***
Kanwaka shale (3 members) (Moore, 1932; Ver Wiebe and Vickery, 1932; McQueen and Greene, 1938)
Kanawha (*sic.*) shale (Branson, 1944b) **= *Kanwaka Formation***
Kanwaka formation (3 members) (Moore, 1948; Searight and Howe, 1961)
Kanwaka shale (3 members) (Moore, 1936) **-** in Kansas
Kanwaka Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Kanwaka Shale (3 members) (Jewett, et al., 1968; Baars and Maples, 1998)
Kanwaka Formation (3 members) (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Adams (1903) proposed the name "Kanwaka shales" for the formation previously called "Lecompton shales" by Haworth (1898), a name that was preoccupied. Moore (1936, p. 169) located the type section as in "Kanwaka township, exposures east of Stull, about 9 miles west of Lawrence. Best exposed near SE cor. sec . 26, T. 12 S., R. 18 E., Douglas County [Kansas]."

Thompson (1995, p. 124) stated "The Kanwaka Formation is composed of two relatively thick shale beds and a thin intervening limestone unit...Exposures of the complete formation are present only in southern Holt County. In Andrew County, only the Jackson Park and Clay Creek Members are exposed in a number of quarries. The formation is 30 to 40 ft thick." The Kanwaka Formation overlies the Kereford Limestone Member of the Oread Formation, and is overlain by the Spring Branch Limestone Member of the Lecompton Formation. The three members of the Kanwaka Formation were originally defined by Moore (1932).

Kaskaskia limestone

Kaskaskia limestone (**Hall, 1857**) **= *Aux Vases Sandstone and Chesterian Series***
Kaskaskia group or "Chester" beds (Williams, 1891) **= *Chesterian Series***, excluded Aux Vases
Kaskaskia limestone and shales (Keyes, 1892) **= *Chesterian Series***
Kaskaskia or Chester formation (Weller, 1898a) **= *Chesterian Series***
Kaskaskia limestone (Weller, 1898; Girty, 1915a)
Kaskaskia member of Chester group (Buehler, 1907) **= *upper part of Chesterian Series***, Yankeetown and above

Kaskaskia Limestone (Yochelson and Saunders, 1967) = ***Chesterian Series?***

Mississippian System (Chesterian Series)

Hall (1857a, p. 55-56) defined the Kaskaskia limestone or Upper Archimedes limestone as an extensive and important limestone formation, constituting the limestones of Kaskaskia and Chester, Illinois, and those below Ste. Genevieve, Missouri. He stated that they are overlain by the coal measures and underlain by the Ferruginous (Aux Vases) sandstone. The term was replaced by the more widely established term Chester group, which became the Chesterian Series of the present. The name was derived from Kaskaskia, Illinois, near the mouth of the Kaskaskia River.

Kaskaskian series

Kaskaskian series (Keyes, 1931) = ***Chesterian Series***

This is a term used by Keyes to cover the same rocks as the **Chesterian Series**.

Mississippian System

Keiwitz shale

Keiwitz shale of Howard limestone member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Eudora Shale Member of Stanton Formation?*** - some sections

Keiwitz shale of Howard limestone member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Winzeler Shale Member of Howard Formation?***- some sections

"Keiwitz shale" of Stanton Limestone (Heckel, et al., 1979) - in Kansas; = ***Eudora Shale Member of Stanton Formation***

Pennsylvanian System (Missourian Series)

Kenosha Shale Member of Tecumseh Shale, Shawnee Group

Kenosha shale of Tecumseh shale member of Shawnee formation (**Condra, 1930**) - in Nebraska
Kenosha shale member of Tecumseh shale (Moore, 1932)
Kenosha shale member of Tecumseh shale (Moore, 1936) - in Kansas
Kenosha shale member of Tecumseh shale formation (Condra, 1949) - in Nebraska
Kenosha Shale Member of Tecumseh Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Kenosha Shale Member of Tecumseh Formation (Howe, 1968)

Pennsylvanian System (Virgilian Series)

Type section: The Kenosha Shale Member was named by Condra (1930) from exposures on Kenosha Creek, the second creek entering the Missouri River south of King Hill, Cass County, Nebraska.

The members of the Tecumseh Shale, other than the Ost Limestone Member, were not recognized in Missouri until Howe (1968) recognized their presence in Andrews County, northwestern Missouri.

Kenwood Member

Kenwood Member of Pinicon Ridge Formation of Wapsipinicon Group (Woodruff, 1990) - northeastern Missouri

Devonian System (Middle Devonian Series)

Keokuk Limestone

Keokuck [*sic.*] cherty limestone (Owen, 1852)
Keokuk limestone (Meek and Worthen, 1861a) - in Illinois
Keokuk group (Worthen, 1866; Broadhead, 1874) = ***Osagean Series***
Keokuk limestone (Broadhead, 1874; Keyes 1895a; Branson, 1944b; Spreng, 1961) - in Missouri
Keokuk stage of Osage age (Williams, 1891)
Keokuk formation (Weller, 1898a)
Keokuk limestone member of Boone formation (Moore, 1928)
Keokuk limestone of Boone group (Barney, 1959)

Keokuk Limestone (Thompson and Fellows, 1970; Thompson, 1979a, 1979b, 1986)
Mississippian System (Osagean Series)

Type section: The Keokuk Limestone was named by Hall (1857 p. 187-203) from the town of Keokuk in southeastern Iowa. According to Willman, et al. (1975, p. 138) the type locality is along and at the mouth of Soap Creek, in the western bluff of the Mississippi River valley, in Lee County, Iowa.

The Keokuk is the uppermost formation of the Osagean Series, underlain by the Burlington Limestone in all but extreme southwestern Missouri, and overlain by the Warsaw Formation except for again extreme southwestern Missouri where the Warsaw has been eroded off, and Chesterian strata (Hindsville Limestone) lie directly on the Keokuk. It is almost impossible to separate the Burlington and Keokuk in some places, and the compound term Burlington-Keokuk (or Keokuk-Burlington) is often used. The Keokuk was defined to include the "Keokuk cherty limestone," shell beds and "Lower Archimedes limestone," of Owen (1857, p. 91-92). The overlying geode beds were included and excluded from the Keokuk many times by various authors as were the "cherty beds of passage" believed to be the "Keokuk cherty limestones" of Owen and which are the "Montrose cherts" of Keyes. The latter beds are considered a part of the Keokuk now, but the geode beds are considered a part of the Warsaw. It was previously called the "Encrinital limestone" together with the Burlington. In northwestern Arkansas the Burlington and Keokuk make up the Boone formation, at least in part. In western and southwestern Missouri, the top of the Keokuk is identified by the **Short Creek Oolite Member**. Limestone above this oolitic limestone belongs to the Warsaw Formation. A similar unit in eastern Missouri is the **Peerless Park Member**.

Keokuk-Burlington Limestones undifferentiated
Mississippian System (Osagean Series)

A compound term used in places where the Burlington and Keokuk Limestones are difficult to impossible to separate. Greene and Pond (1926, p. 32) called these beds the "Osage group."

Kereford Limestone Member of Oread Formation, Shawnee Group
Kereford limestone of Kanwaka shale member of Shawnee formation (**Condra, 1927**) - in Nebraska
Kereford limestone member of Oread limestone (Moore, 1932)
Kereford-Plattsmouth limestone of Oread formation (Condra and Scherer, 1939) - in Nebraska; = ***Plattsmouth to Kereford Members of Oread Formation***
Kereford limestone member of Oread limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Kereford member of Oread formation (Searight and Howe, 1961)
Kereford Limestone Member of Oread Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Kereford Limestone Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Kereford Limestone Member of Oread Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Kereford Limestone Member was named for Kereford County, at the south edge of Atchison, Kansas.

Thompson (1995, p. 123) stated "The Kereford Limestone Member...is a limestone which is composed mostly of "*Osagia*"-coated shell material. The member is extremely variable in thickness and may occur either as a thin-bedded unit or as a massive ledge. It is commonly cross-bedded. Its thickness ranges from less than 2 ft to more than 10 ft." The Kereford Limestone Member overlies the Heumader Shale Member, and is overlain by the Jackson Park Shale Member of the Kanwaka Formation.

Key sandstone
Key sandstone (Adams and Ulrich, 1904) = ***St. Peter Sandstone***
Ordovician System (Mohawkian Series)

This was a term used by Adams and Ulrich (1904, p. 20, 95-97) as a local name for the **St. Peter Sandstone**. The name was abandoned. It was named for Key, near Rogers, Benton County, Arkansas.

Kickapoo limestone

Kickapoo limestone (Haworth and Bennett, 1908) **-** in Kansas; **=** ***Iatan, Haskell, and Amazonia limestones***

Pennsylvanian System (Missourian and/or Virgilian Series)

Kimmswick Limestone

Kimmswick limestone (**Ulrich, 1904a**; Schuchert, 1910; Dake, 1921; Taylor, 1947; Twenhofel, et al., 1954; Martin, et al., 1961a)

Kimmswick limestone (Bradley, 1925) "= 'Receptaculites limestone,' or Trenton"

Kimmswick Limestone (Thompson, 1987) **=** ***Kimmswick and upper beds of the Decorah Group***

Kimmswick formation (Scott, 1933) "= Galena of northwestern Illinois"

Kimmswick (Kay, 1937)

Kimmswick Subgroup of Galena Group (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1986; Bakush and Carozzi, 1986)

Kimmswick Limestone (Echols and Levin, 1966; Offield and Pohn, 1979; Thompson, 1991, 1995)

Kimmswick Formation (Stinchcomb and Fellows, 1968; Sweet, et al., 1975; Thompson and Satterfield, 1975a; Thompson, 1982)

Kimmswick Limestone (Thompson, 1987) **=** ***Kings Lake Limestone and Kimmswick Limestone***

Ordovician System (Mohawkian Series)

Type section: The Kimmswick Limestone was named by Ulrich (1904a, p. 111) from exposures in the vicinity of Kimmswick, Jefferson County, Missouri.

The Kimmswick Limestone overlies the uppermost formation of the Decorah Group (Guttenberg Limestone in northeastern Missouri, Kings Lake Limestone in central and southeastern Missouri) and is overlain by the Cape Limestone or Maquoketa shales, both of Cincinnatian age. The name is essentially a geographic substitute for the name "Receptaculites (Receptaculite) limestone" which was used by the early Missouri geologists. Ulrich originally defined the Kimmswick as the limestone between the Plattin formation at the base and the bed bearing the Fernvale fauna at the top. The Fernvale bed is now called the Cape Limestone and the Decorah Group now separates the Plattin from the Kimmswick at the base. The Kimmswick has also been called Trenton, Prosser, Charette, and McCune.

Kinderhookian Series

Kinderhook group (Meek and Worthen, 1861; Weller and St. Clair, 1928) **=** ***Late Devonian and early Mississippian***

Kinderhook stage (Williams, 1891) "= Chouteau age"; Louisiana Limestone and Kinderhookian Series

Kinderhook limestone (group) (Weller, 1898) **=** ***Chouteau Group***

Kinderhook beds (Weller, 1907) **=** ***Kinderhookian and lower Osagean (Fern Glen) strata***

Kinderhook shales (Weller, 1909) **-** included Grassy Creek and Saverton Shales, as well as Hannibal

Kinderhook group (Weller, 1914)

Kinderhook group (Branson, 1944b) **-** lower part of "Lower Mississippian series"

Kinderhookian series (Scott and Collinson, 1961)

Kinderhookian Series (Thompson and Fellows, 1970; Thompson, 1986)

Mississippian System (Kinderhookian Series)

Type section: Thompson (1986, p. 14) stated "Exposures in the east bluffs of the Mississippi River Valley immediately north of the town of Kinderhook..., Pike County, Illinois constitute the type locality for the Kinderhookian Series...Keyes (1941[h]) proposed a new type section at Burlington, Iowa, but it was not accepted by later stratigraphers.""

A term encompassing the basal Mississippian formations, rocks within this series were considered to be Devonian (Chemung) in age until 1861 when Meek and Worthen (p. 167-177) recognized that these strata are younger than the Chemung, and named the "Kinderhook group" from exposures near Kinderhook, Illinois. The Fern Glen formation was formerly treated as the top formation, but is now considered the basal formation of the overlying Osagean series. Kinderhookian strata in Missouri overly rocks of varying ages from Lower Ordovician (Ibexian) to Upper Devonian. It is usually overlain by rocks of the Osagean Series.

"Kinderhook shale"

"Kinderhook shale" (Koenig, 1961)
"Kinderhook Shale" (Thompson, 1986)
Devonian and Mississippian Systems (Upper Devonian and Kinderhookian Series)

This is a term used for shale and carbonaceous material found in the subsurface of the Forest City Basin in northwestern Missouri. It appears to be in part equivalent to the Chattanooga Shale, and also possibly to the Hannibal Formation.

Thompson (1995, p. 70) added "In Missouri, the upper part of the 'Kinderhook shale,' which has been referred by Reed (1946) and Lee (1940, 1943) to the **Boice Shale** in Nebraska and Kansas, consists of a grayish-green shale which is in part carbonaceous and interbedded with dolomitic shale. The basal part contains beds of oolitic limonite and hematite, or dark-red shale..."

Kingdom Member of St. Peter Sandstone

Kingdom Sandstone Member of Glenwood Formation (Templeton and Willman, 1963)
Kingdom Member of St. Peter Sandstone (Thompson, 1991)
Ordovician System (Mohawkian Series)

The **Kingdom Member** is a sandy to shaly unit that forms the lower beds of the Glenwood Formation to the north and separates the Starved Rock and Tonti Members of the St. Peter Sandstone to the south.

King Hill Shale Member of Lecompton Formation, Shawnee Group

King Hill Shale of Lecompton limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska
King Hill shale member of Lecompton limestone (Moore, 1932)
King Hill shale member of Lecompton limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
King Hill member of Lecompton formation (Searight and Howe, 1961)
King Hill Shale Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
King Hill Shale Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
King Hill Shale Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Moore (1936, p. 177) located the type section at "King Hill southeast of Rock Bluff, T. 11 N., R. 14 E., Nebraska."

Thompson (1995, p. 124) stated "The King Hill Shale Member...is a gray shale, which is silty in the upper part and calcareous near the base. Its thickness ranges from 6 to 8 ft." The King Hill Shale Member overlies the Beil Limestone Member, and is overlain by the Avoca Limestone Member of the Lecompton Formation.

King(s) (Branch) limestone

King formation (Shepard, 1898) = ***Compton Limestone (and Cotter Dolomite?)***
King limestone (Keyes, 1902) = ***Jefferson City Dolomite***
Kings limestone (Shepard, 1904) = ***Compton Limestone***
Kings Branch limestone (Shepard, 1905) = ***Compton Limestone***
Kings limestone (Kindle and Miller, 1939) - at least in part equivalent to the Grand Tower Limestone
Ordovician, Devonian and/or Mississippian Systems (Ibexian, Middle Devonian, and/or Kinderhookian Series)

Shepard (1989, p. 49, 71-74) proposed the name "King limestone" for the limestone between the Black shale below and the Sac limestone above. He considered it Devonian, but other geologists assigned this formation to the Kinderhook group. It was named for outcrops on King Branch and King Mound, Greene County, Missouri. Shepard also called it Kings limestone and Kings Branch limestone later. This unit is now regarded as being **Compton Limestone**, named in an area where the Compton is more dolomitic than usual, and where it could be regarded as different from the Compton to the south without having the vastly more plentiful field data to draw from we have today.

Kings Lake Limestone of Decorah Group

Kings Lake member of Decorah formation (Herbert, 1949)
Kings Lake Formation of Decorah Subgroup (Templeton and Willman, 1963; Kolata, et al., 1986)
Kings Lake Limestone of Decorah Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: The Kings Lake Limestone was named by Herbert (1949, unpublished thesis), and proposed formally by Templeton and Willman (1963, p. 236). Thompson (1991, p. 190) stated "The type section for the Kings Lake Limestone...is an exposure in the west bluff of the Mississippi River Valley, 1.6 mi north of Foley, Lincoln County, Missouri, about 500 ft north of the road junction at Kings Lake..." There is a large quarry operation in this bluff.

Thompson (1995, p. 35) added "The Kings Lake Limestone is a light-gray, very finely crystalline to sublithographic, thin- to medium-bedded, fossiliferous limestone which contains thin, fossiliferous shale partings....Beds are thinner and less pure than those of the overlying Guttenberg Limestone." Templeton and Willman (1963) proposed two members for the Kings Lake, the lower Mincke Member, and the upper Tyson Member.

Kings River sandstone member

Kings River sandstone member of Everton formation (Weller and St. Clair, 1928) = ***lower sandstone of Everton Formation***
Ordovician System (Whiterockian Series)

Purdue and Miser (1916) coined this name for the basal sandstone unit of the Everton Formation for exposures along the Kings River, Carroll County, Arkansas, where it overlies the "Sneeds limestone lentil" (Canadian dolomite) and is overlain by the white, light-gray, and dove-colored non-magnesian limestone forming the major part of the Everton in Arkansas. The Everton Formation was recognized in southeastern Missouri in 1914, and Weller and St. Clair (1928, p. 91) state that the lower sandstone member, *i.e.* the "Kings River", is the thicker member in Missouri.

Kissenger Limestone Member of Bryant Knob Formation

Kissenger Limestone Member of Bryant Knob Formation (Amsden, 1974) - from ms. of Thompson and Satterfield
Kissenger Limestone Member of Bryant Knob Formation (Thompson and Satterfield, 1975; Thompson, 1993, 1995)
Silurian System (Llandoverian Series)

Type section: Thompson and Satterfield (1975, p. 98) stated "We designate the Kissenger roadcut...less than 1 mile northeast of the topographic feature known locally as Bryant Knob, to be the type section for the Bryant Knob Formation, and the Kissenger Limestone Member of the Bryant Knob." Thompson (1993, p. 14) added "This is a roadcut on the west side of Missouri Highway 79, approximately 3 mi south of Clarksville, SW¼ sec. 35, T. 53 N., R. 1 E., Pike County, Missouri."

Thompson (1995, p. 43) stated "Identified as the 'Cyrene member of the Edgewood formation' by Martin et al. (1961a), the Bryant Knob Formation was named by Thompson and Satterfield (1975) from exposures in Pike County. They stated (p. 98): 'We define the Bryant Knob Formation as the bioclastic limestone and dolomitic limestone and shale between the Noix Limestone and the Bowling Green Dolomite. The predominate rock type is the bioclastic limestone, and this is named the Kissenger Limestone Member of the Bryant Knob.'"

Knifeton coal

Knifeton coal cyclothem (Moore, 1949) - in Kansas; = ***Drywood Shale***
Knifeton coal of Knifeton cyclothem (Moore, 1949) - in Kansas; = ***Drywood Coal Bed***
Drywood (Knifeton) coal (Robertson and Smith, 1981)
Pennsylvanian System (Desmoinesian Series)

Knoblick Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Knoblick granite (**Keyes, 1896b**; Tolman and Robertson, 1969)
Knoblick Granite (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: A term used by Keyes (1896b) for a granite underlying the Iron Mountain porphyry in the Mine Lamotte district of southeastern Missouri. It was named for Knob Lick, St. Francois County, Missouri. According to Robertson (*in* Thompson, 1995, p. 13), the name may have come from Knob Lick Mountain, as Tolman and Robertson (1969, p. 44) state "...it is well exposed on the southeast and east flanks of Knob Lick Mountain."

Tolman and Robertson (1969, p. 44) stated "The Knoblick granite shows greater variations in mineralogy and texture over relatively shorter distances than any of the other granites. A wide range of mineral composition - from the mottled gray and red contact granite on Knob Lick Mountain to the 'blue' granite exposed north of the Knob Lick-Syenite road..."

Knobtown sand (?)

Knobtown sand (?) (McQueen and Greene, 1938)
Pennsylvanian System (Missourian Series)

Knobtown Limestone Member of Shale Hill Formation, Pleasanton Group - of Howe (1982)

Knobtown sand zone (Greene, 1933)
Knobtown sandstone (McQueen and Green, 1938)
Knobtown sandstone (Moore, et al., 1951) - in Kansas
"Knobtown facies" of Warrensburg member of unnamed formation of Pleasanton group (Searight and Howe, 1961)
Knobtown sandstone bed of Tacket Formation (Jewett, et al., 1968) - in Kansas
"Knobtown" sandstone of Pleasanton Group (Anderson and Wells, 1968)
"Knobtown facies" of Pleasanton Group (Gentile, 1976)
Knobtown Limestone Member of Shale Hill Formation (Howe, 1982)
"marine Knobtown" and "lower Knobtown sandstone" of "upper unnamed formation" of Pleasanton Group (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Howe (1982) named this member and the overlying Blue Mound Shale Member for the units above the basal channel-fill sandstone units in the former "upper unnamed formation" of the Pleasanton Group.

Knox dolomite

Knox dolomite (Oder, 1933) = ***Ibexian Series***
Ordovician System (Ibexian Series)

Krebs Subgroup of Cherokee Group

Krebs group (**Oakes, 1953**)
Krebs formation (Wanless, 1955)
Krebs subgroup of Cherokee group (Howe, 1956; Searight and Howe, 1961)

Krebs Formation of Cherokee Group (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Krebs Subgroup of Cherokee Group (Thompson, 1995) - in Missouri
Pennsylvanian System (Desmoinesian Series)

Type section: Oakes (1953, p. 1523) stated "The Krebs group is named from the town of Krebs, in T. 5 N., R. 15 E., central Pittsburg County, Oklahoma; includes all rocks that crop out between the top of the Atoka formation, below, and the top of the Boggy formation, above..."

Thompson (1995, p. 97) stated "Rocks of the Krebs Subgroup...include sandstone, siltstone, shale, clay, limestone, and coal beds; clastics predominate...In western Missouri, the Krebs is essentially coextensive with the cropline of the Pennsylvanian....In northwestern Missouri, it extends across the Forest City Basin into Kansas, Nebraska, and Iowa."

Kress Member of St. Peter Sandstone

Ordovician System to Pennsylvanian System

Type section: Templeton and Willman (1963, p. 45) stated "The Kress Member of the St. Peter Sandstone was named for Kress Creek, northwest of West Chicago, in DuPage County [Illinois], near which a well of the Elgin, Joliet, and Eastern Railroad encountered 64 feet of typical conglomerate..."

Templeton and Willman (p. 45) added "The Kress Member in places is a coarse basal conglomerate consisting largely of a rubble-like deposit of irregular blocks of chert with a matrix of clay, sand, or chert. This material is residual from solution of the underlying cherty dolomites and sandstone and is concentrated in solution depressions or along valley channels." The Kress is the **residual section on top of the Ibexian Series** when it lies beneath Paleozoic strata. It, therefore, can probably be as young as early Pennsylvanian in some places, where the rest of the St. Peter Sandstone has been removed by erosion.

L

Laberdie Limestone Member

Laberdie limestone member of Pawnee limestone (**Jewett, 1941**; Moore, et al., 1951) - in Kansas; = ***Coal City Limestone Member of Pawnee Formation***
Labirdie (*sic.*) limestone member of Pawnee formation (Clair, 1943) - in Missouri; = ***Coal City Limestone Member of Pawnee Formation***
Laberdie limestone member of Pawnee formation (Condra, 1949) - in Nebraska; = ***Coal City Limestone Member of Pawnee Formation***
Laberdie limestone member of Pawnee formation (Moore, 1949) - in Kansas; = ***Coal City Limestone Member of Pawnee Formation***
Laberdie Limestone Member of Pawnee Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Price, 1981; Baars and Maples, 1998) - in Kansas; = ***Coal City Limestone Member of Pawnee Formation***
Laberdie Limestone Member of Oologah Limestone (Price, 1981) - in Oklahoma; = ***Coal City Limestone Member of Pawnee Formation;***
Pennsylvanian System (Desmoinesian Series)

This name was used in Kansas, and at times in Oklahoma and Nebraska, for the **Coal City Limestone Member of the Pawnee Formation**.

Labette Shale of Appanoose Subgroup, Marmaton Group

Labette shales (**Haworth, 1898**) - in Kansas; **includes Anna Shale Member** of Pawnee Formation
Labette shale member of Henrietta formation (Hinds and Greene, 1915; Greene, 1933)
Labette shale member of Marmaton formation (Moore and Haynes, 1917)
Labette shale of Henrietta formation (Knight, 1930)

Labette shale (Knight, 1931, 1933a, 1934b; McQueen and Greene, 1938; Cline, 1941)
Labette shale (Miller and Owen, 1939) = ***Labette and Anna shales***
Labette shale (Jewett, 1941; Moore, 1949; Moore, et al., 1951) - in Kansas
Labette shale (Clair, 1943) = ***Labette and Anna shales***
Labette formation (Greene and Searight, 1949; Searight and Howe, 1961)
Labette shale (Branson, 1954a) - in Oklahoma
Labette Shale (Branson, et al., 1965) - in Oklahoma
Labette Shale (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Labette Formation (Gentile, 1976)
Labette Formation (Labette Shale) (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Haworth (1898, p. 36) as; "First above, the Oswego limestone is a bed of shale varying from 30 to 60 feet in thickness for which the name Labette shales is adopted." The village of Labette, in Labette County, Kansas, is the type area. Jewett (1941, p. 312) designated as the type section a poor exposure "...beginning near the middle of the north line and extending to a point near the northeast corner of [along the north line of; Jeffries, 1958, p. 89] sec. 22, T. 33 S., R. 20 E., near the town, Labette."

The Labette Shale is the basal formation of the Appanoose Subgroup of the Marmaton Group. It overlies the Higginsville Limestone of the Fort Scott Subgroup, and is overlain by the **Anna Shale Member** of the overlying Pawnee Formation. The top of the formation is marked by the **Lexington Coal Bed**, where present. If the Lexington coal is absent, often the Anna - Labette contact cannot be discerned, and the two are combined into the **Anna - Labette Shales undifferentiated.**

<u>Laclede sandstone</u>

Laclede sandstone (Scherer, 1905) = ***Roubidoux Formation?*** (part)
Ordovician System (Ibexian Series)

This term was published by Scherer (1905, p. 59, 61, 62) for a friable sandstone, weathering dark brown, which he stated was named by Shepard. He included it in the Elvins formation (Cambrian) and thought it was probably equivalent to the Fourth sandstone of Swallow. Shepard (in a letter dated Jan. 29, 1916) stated that this term was not published by him, but was provisionally used in carbon prints given his students for field work. It was probably named for Laclede County, Missouri, and probably was named from sandstone in the **Roubidoux Formation**.

<u>LaCroix Limestone</u>

LaCroix Limestone (Gealy, 1955) = ***Cape Limestone***
Ordovician System (Cincinnatian Series)

This is a name given by Gealy (1955, p. 83) to beds in the Cape Girardeau area previously called "Fernvale formation," now called the **Cape Limestone** (Templeton and Willman, 1963). It is a thin limestone unit overlying the Kimmswick Limestone and underlying the basal shale of the Maquoketa. He stated that the Fernvale fauna is a recurring one, and until such time as a rock unit bearing it can be shown to be lithologically continuous with the type Fernvale formation, the name should be restricted to central Tennessee and dropped in all other areas. His name was derived from Cape La Croix Creek, near which the formation is exposed.

<u>La Cygne shale</u>

La Cygne shale member <u>of Marmaton formation</u> (Moore, 1920) - in Kansas; = ***Holdenville Shale***
La Cygne shale (Moore, 1920) = ***Pleasanton Group***
Pennsylvanian System (Desmoinesian Series)

"<u>Ladden Branch limestone</u>" **of Riverton Formation**

"Ladden Branch limestone" <u>of Riverton Formation</u> (Lambert and Thompson, 1990)
Pennsylvanian System (Atokan Series)

Type section: The Ladden Branch was named (Lambert and Thompson, 1990) from an excellent exposure in a small drainage northward into the Sac River called Ladden Branch on the south bluff of the Sac River due south of the large bluff called Venter bluff on the north side of the valley, NE NE NE 22, 36N-26W, in southern St. Clair County, Missouri.

This coarsely calcarenitic limestone has yielded Atokan-aged conodonts that may prove a correlation of this unit with the Burgner limestone to the south in Jasper County. It probably should be regarded as a member of the Riverton Formation, and has called the "Riverton limestone."

"Ladore Shale" (Elm Branch Shale) of Bronson Subgroup, Kansas City Group

Ladore shale ("Galesburg shale" in text) (Adams, 1904) - in Kansas; may = ***Ladore, Swope, and Galesburg formations***
Ladore-Dudley shale member of Coffeyville formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***Holdenville Shale and lower Pleasanton group***
Ladore shale (Haworth and Bennet, 1908) - in Kansas
Ladore shale member of Kansas City formation (Hinds and Greene, 1915)
Ladore shale (Moore, 1932) = ***shale in Pleasanton Group***
Ladore shale (Condra, et al., 1932; Clair, 1943)
Ladore shale (Newell, 1936; Moore, 1936; Moore, et al., 1951) - in Kansas
Ladore shale (McQueen and Greene, 1938; Branson, 1944b) = ***Ladore Shale and lower two members of the Swope Formation***
Ladore shale member of Ladore shale (McQueen and Greene, 1938)
Ladore shale formation (Greene and Searight, 1949)
Ladore-Galesburg shale (Jewett and Muilenburg, 1957) - in Kansas; = ***Ladore, Swope, and Galesburg formations***
Ladore formation (Searight and Howe, 1961)
Ladore Formation (Payton, 1966; Gentile, 1976)
Ladore Shale (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Ladore Formation (Burchett, 1970) - in Nebraska
Ladore Shale (lower Layton sandstones) Member of Coffeyville Formation (Watney, et al., 1989) - in southern Kansas
Ladore Formation (Ladore Shale) (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Adams (1904, p. 18) proposed the name Ladore shale, but referred to it as the "Galesburg shale--". Moore (1936, p. 82) stated that the formation was named from "Ladore, southern Neosho County, Kansas. The town, located in sec. 27, T. 30 S., R. 19 E., is built on Hertha. The Swope scarp crosses NW. corner of same section, so that the thick shale between the two in sec. 27., may be regarded as the type of this unit."

Watney, et al. (1989, p. 141) called this shale, exposed in Jackson County, Missouri, the **Elm Branch Shale**. Apparently, the "true" Ladore Shale occurs above the Swope (Bethany Falls) limestone, and is associated in Kansas with the **Mound Valley Limestone** and overlying **Galesburg Shale**. The shale beneath the Swope, previously called Ladore, is the "Elm Branch" of Watney, et al. This shale overlies the Sniabar Limestone Member of the Hertha Formation, and is overlain by the Middle Creek Limestone Member of the Swope Formation. Most of the above references to Ladore Shale are actually ***"= Elm Branch Shale"***.

McQueen and Greene (1933) Branson (1944b) used Ladore in a broad since, that included the lower Ladore (Elm Branch) and the Middle Creek and Hushpuckney Members of the Swope Formation as members of their "Ladore." The overlying Bethany Falls limestone was a formation, and not a member in any other formation.

"Lafayette" gravel"

"Lafayette" formation (Farrar, 1935; Koenig, 1961)
"Lafayette" gravel (Fisk, 1938) = ***Mounds Gravel***

Tertiary System (Pliocene Series?)

This is a formation believed to be of Pliocene age which in Missouri includes gravel and interbedded sand and clay which lie between the top of the Wilcox Group and the base of the Pleistocene loess. It occurs in the Benton Hills area

(Scott County) and at Crowleys Ridge (Stoddard County). It was recognized by some of the earliest observers. Fisk (1938, p. 151) stated that by 1891 so many different names had been applied to the gravel beds of the Gulf Coast region that a meeting of eminent geologists was held in San Francisco to establish a suitable name. The term Lafayette was chosen. Hilgard had used the term for several years in his field notes. He published the name in 1891 (p. 130). Previous terms were "Orange sand" and "Appomattox formation." In Missouri Marbut (1902, p. 27-28) had called it **Piketon gravel**. Keyes (1915, p. 252) put the Lafayette gravel in his Poinsettan series. Berry (1911, p. 249-256) showed that the term "Lafayette" has been applied to beds of various ages ranging from Cretaceous to recent. The name was derived from Lafayette County, Mississippi, where Hilgard first discriminated it from Eocene sands. This unit is now called the **Mounds Gravel**.

Lagonda Formation of Cabaniss Subgroup, Cherokee Group

Lagonda sandstone and shale (**Gordon, 1896**) = ***Bevier and Lagonda formations***
Lagonda sandstone (Weeks, 1902) = ***Squirrel Sandstone Member of Lagonda Formation***
Lagonda shale and sandstone <u>of Upper Cherokee formation</u> (McQueen and Green, 1938) = ***Bevier and Lagonda formations***
Lagonda formation (McQueen, 1943) - may include ***Mulky Formation***
Lagonda sands and shales <u>of Upper Cherokee formation</u> (Clair, 1943) - ***excluded Bevier and Mulky coals***
Lagonda formation (Branson, 1944b) = ***Bevier, Lagonda, and Mulky formations***
Lagonda formation (Moore, 1948) - in Kansas
Lagonda formation (Unklesbay, 1952a) = ***Lagonda and Mulky formations***
Lagonda formation (Searight, et al., 1953; Searight and Howe, 1961)
Lagonda formation (Howe and Searight, 1953) = ***Lagonda and Mulky formations***
Lagonda shale member <u>of Senora formation</u> (Branson, 1954a) - in Oklahoma
Lagonda (Prue) Sandstone (Wanless, et al., 1963) "= Pleasantview Sandstone of Illinois"; = ***Squirrel Sandstone Member***
Lagonda zone <u>of Senora Formation</u> (Branson, et al., 1965) - in Oklahoma
sandstone of Lagonda Formation (Gentile, 1967) = ***Squirrel Sandstone Member***
Lagonda Formation (Neal, 1969; Thompson, 1995)
Bevier - Lagonda Formations (Gentile, 1976) = ***Bevier and Lagonda formations***
"Lagonda member" <u>of Banzet formation</u> (Brenner, 1989) - in Kansas
Lagonda Member <u>of Banzet Formation</u> (Baars and Maples, 1998) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Gordon (1896) named the "Lagonda sandstones and shale" from the village of Lagonda, Chariton County, Missouri. No type section was designated. Gentile (1967, p. 35) described a section of the Lagonda about 10 miles east of the town that may serve as a reference for this formation in the type area. This is located in the SW NE sec. 35, 56N-15W, Macon County, Missouri.

Unklesbay (1952a, p. 86) stated "McQueen used the term in a formational sense to include the shales between the Bevier coal and the 'Squirrel' sandstone, and used the base of the 'Squirrel' sandstone as the top of the Cherokee group. At the Lawrence conference, it was agreed to define the top of the Cherokee as the base of the Fort Scott limestone, thereby placing the 'Squirrel' sandstone, Breezy Hill limestone, and Mulky coal in the Cherokee...In this report...the term Lagonda is not used in the original sense as defined by Gordon but it includes beds between the Bevier coal... and the top of the Cherokee (to the base of the Fort Scott). It here includes the 'Squirrel' sandstone, the Mulky coal, and the Breezy Hill limestone."

Searight, et al. (1953) redefined the Lagonda Formation by removing the Mulky coal and Breezy Hill limestone, confining the Lagonda to strata between the top of the Bevier Coal Bed and (Thompson, 1995, p. 103) "...the top of the lowermost of three thin coal beds or coal smuts, which lie below the Mulky underclay..."

<u>Lagrange formation</u>

Lagrange formation <u>of Wilcox Group</u>
"Orange sand or Lagrange group" (Safford, 1869)

Tertiary System (Eocene Series)

The name "Lagrange" was used in early reports for the Wilcox Group in the southeast lowlands. Safford (1869, p. 424) revised his earlier description and used the name "Orange sand or Lagrange group." The term "Lagrange formation" became widely used in the northern part of the Mississippi embayment and was used in published reports as recently as 1930. It was named for exposures at Lagrange, Fayette County, Tennessee.

Lake Killarney Formation of Butler Hill Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: According to Sides (1976, p. 110) this unit was..."named for typical exposures in the vicinity of Lake Killarney..."

Sides (1976, p. 110) stated this unit "is the most difficulty volcanic-rock unit to characterize. It consists of three distinct zones, but the writer was unable to define mappable contacts between them, and so they are not given separate names." Robertson (*in* Thompson, 1995, p. 11) added "The thickness of Lake Killarney is probably between 1,600 and 5,000 ft."

Lake Neosho Shale Member of Altamont Formation, Appanoose Subgroup, Marmaton Group

Lake Neosho shale member <u>of Altamont limestone</u> (**Jewett, 1941**; Moore, 1948; Moore, et al., 1951) - in Kansas
Lake Neosho shale member <u>of Altamont formation</u> (Greene and Searight, 1949; Cline and Greene, 1950)
Lake Neosho member <u>of Altamont formation</u> (Searight and Howe, 1961)
Lake Neosho Shale Member <u>of Altamont Limestone</u> (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Lake Neosho Shale Member <u>of Altamont Formation</u> (Gentile, 1976; Kidder, 1985; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Jewett (1941, p. 331) named the Lake Neosho Shale Member, and stated "The exposure southeast of Lake Neosho in Neosho County State Park (SW sec. 23, T. 30 S., R. 20 E., Neosho County, Kansas) is chosen as the type section."

Thompson (1995, p. 108) stated "In Bates County, the Lake Neosho Shale Member... consists of a calcareous, fossiliferous, greenish-gray shale, which contains a zone of dark-gray to black shale that has large, subspherical phosphatic concretions. The fossiliferous shale extends across Livingston, Sullivan, and Adair counties, where a coal smut resting on underclay appears below it. In northern localities the upper, fossiliferous shale beds contain a considerable amount of thin limestone beds...The member ranges from 2 to 10 ft in thickness." The Lake Neosho Shale Member overlies the Amoret Limestone Member, and is overlain by the Worland Limestone Member of the Altamont Formation. Where the Amoret Limestone Member is absent, the Lake Neosho and Bandera Shales are often identified together as the **Lake Neosho - Bandera Shales undifferentiated**.

Lake Neosho-Bandera Shales undifferentiated of Appanoose Subgroup, Marmaton Group

Pennsylvanian System (Desmoinesian Series)

This term has been used when the lower limestone of the Altamont Formation, the Amoret Limestone Member, is absent, and the Lake Neosho and Bandera shales cannot be differentiated.

<u>Lamine River Conglomerate Physiofacies</u>

Lamine River Conglomerate Physiofacies <u>of Cooper Lilthofacies of Cedar City Formation</u> (Fraunfelter, 1967a)
= part of Cedar Valley Limestone

Devonian System (Middle Devonian Series)

Lamotte Sandstone

La Motte sandstone (**Winslow, 1894**)
Lamotte sandstone (Dake and Bridge, 1927)
Lamotte formation (Weller and St. Clair, 1928; Hayes and Knight, 1961)
La Motte sand (McQueen and Greene, 1932)
"Lamotte? Sandstone" (Skillman, 1948; Gentile, 1976)
Lamotte (Mt. Simon) Sandstone (Howe, et al., 1972)
Lamotte Sandstone (Thompson, 1995)
Cambrian System (Upper Cambrian Series)

Type section: Dake (1930, p. 44) stated "The name is derived from old Mine La Motte [Madison County, Missouri], and was proposed by Winslow for the series of basal sandstones overlying the crystallines and below the limestone beds [Bonneterre Formation] in which lead ores are found." A specific type section has never been designated.

Winslow (1894, p. 347) stated "Immediately overlying the Archean [Precambrian] crystallines is a great body of sandstone. This sandstone we have named the La Motte sandstone, and we consider it the basal member of the series." He regarded the "La Motte" to be Silurian in age. The lowest (and oldest) formation of the Upper Cambrian Series, the Lamotte is overlain by carbonates of the Bonneterre Formation and underlain by Precambrian rocks. It has been used essentially the way it was first defined, except that it is now written "Lamotte" instead of "La Motte." It is equivalent to the **Mt. Simon Sandstone** of states to the north.

<u>**Lamotte? Sandstone**</u>

Lamotte? Sandstone (Skillman, 1948; Gentile, 1976) = ***Reagan Sandstone***
Cambrian System (Upper Cambrian Series)

Skillman (1948) in Vernon County, and Gentile (1976) in Bates County called the basal Cambrian sandstone the "Lamotte? Sandstone". Although a lateral continuation of the Lamotte Sandstone to the east, the Reagan is much younger. Kurtz, et al. (1975, p. 15) said of the Reagan; "This unit is a nearshore facies of the Bonneterre and Davis Formations and is also known to be the nearshore equivalent of formations as young as the Roubidoux Formation, of early Ordovician age in Tulsa County, Oklahoma. It is generally a poorly sorted unit, made up of a mixture of shale, silty, and poorly sorted sandstones, and may be slightly dolomitic..."

<u>**Lampasas series**</u>

Lampasas series (Cheney, 1940) - in Texas; = ***Atokan Series***
Lampasas series (Moore, et al., 1944) = ***Atokan Series***
Pennsylvanian System (Atokan Series)

Lane Shale (proposed) of Zarah Subgroup, Kansas City Group - of Watney and Heckel (1994)

Lane shale <u>of Parkville shales</u> (**Keyes, 1889**) = ***Lane Shale***
Lane shale (Haworth and Kirk, 1894; Haworth and Bennett, 1908; Newell, *in* Moore, 1932) - in Kansas
Lane shale (Kirk, 1896; Haworth, 1896) - in Kansas; = ***Weston Shale***
Lane shale (Adams, 1903) = ***Vilas Shale?***
Lane shale member <u>of Lansing formation</u> (Hinds and Greene, 1915; McCourt, 1917) = ***Lane Shale***
Lane shale member <u>of Lansing formation</u> (Condra, 1927) - in Nebraska; = ***Lane Shale***
Chanute shale (Lane shale) (Gunnell, 1933) = ***Liberty Memorial Shale***
Lane shale (Moore, 1936; Moore, et al., 1951) - in Kansas; = ***Liberty Memorial Shale***
Lane-Bonner Springs shale (Moore, 1937)
Lane shale member <u>of Chanute shale</u> (McQueen and Greene, 1938) = ***Liberty Memorial Shale***
Lane shale (McQueen and Green, 1938; Clair, 1943) = ***Upper Wyandotte Formation and Bonner Springs Shale***
Lane formation (Condra and Scherer, 1939) - in Nebraska; = ***Liberty Memorial Shale***
Lane shale (Moore, 1948) = ***Liberty Memorial Shale***

Lane formation (Searight and Howe, 1961) = ***Liberty Memorial Shale***
Lane Formation (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska; = ***Liberty Memorial Shale***
Lane Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas; = ***Liberty Memorial Shale***
Lane-Bonner Springs Shale (Heckel, et al., 1979; Pabian and Diffendal, 1989) - in southern Kansas; = ***from Lane (Liberty Memorial) to Bonner Springs***
Lane Shale (Howe, 1986; Thompson, 1995) = ***Liberty Memorial Shale***
Lane Shale (Liberty Memorial Shale) Member of Iola Limestone (Watney, et al., 1989) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Moore (1936, p. 117) located the type section of the Lane Shale near "Lane, Franklin county, Kansas. Comprises thick shale above flood plain level in river bluffs in S½ sec. 33, T. 18 S., R. 21 E."

Keyes (1889) named the "Lane shale of Parkville shales" for a succession later considered to be equivalent to the Bonner Springs Shale. Hinds and Greene (1915) discussed the **Lane shale member of the Lansing formation**, which equals the Island Creek and/or Bonner Springs shales. McQueen and Green (1938) also were working with the Bonner Springs horizon when they used the name "Lane shale". Clair (1943) proposed the name **Liberty Memorial Shale of Chanute shale** for the shale interval between the Iola and Wyandotte formations, below the Bonner Springs (original Lane) horizon.

According to Moore (1932), Haworth and Kirk (1894) proposed the **Lane Shale** for the interval between what later became known as the Iola and Wyandotte Formations. Therefore, two shales were identified as Lane, one the Bonner Springs horizon above the Wyandotte Formation, the other the shale Clair (1943) called Liberty Memorial below the Wyandotte. Of this unit, Thompson (1995, p. 116) stated "The Lane Shale [Liberty Memorial Shale] is a gray, silty, micaceous shale at most of its localities in northern and western Missouri. Thin-bedded sandstone and in some places a thin coal bed are present in the upper part of the formation in Caldwell and probably other counties of north-central Missouri. The thickness ...ranges from 5 to 30 ft." The Liberty Memorial Shale overlies the Raytown Limestone Limestone Member of the Iola Formation, and is overlain by the Frisbie Limestone Member of the Wyandotte Formation.

Laneville shales

Laneville shales (Haworth and Kirk, 1894) = ***Labette Shale to lower Pleasanton formations***
Pennsylvanian System (Desmoinesian Series)

Langdon shale

Langdon shale formation (Condra and Reed, 1943, 1959) - in Nebraska; = ***Wamego Shale Member of Zeandale Formation*** (some sections)
Langdon shale formation (Condra and Reed, 1943, 1959) - in Nebraska; = ***Pillsbury Shale*** (some sections)
Table Creek (Langdon) shale (Branson, 1944b) = ***Pillsbury Shale***
Langdon formation (Condra, 1949) = ***Pillsbury Shale***
Langdon shale formation (Greene and Searight, 1949) = ***Pillsbury Shale***
Langdon shale (Moore, 1949; Moore, et al., 1951) - in Kansas; = ***Pillsbury Shale***
Pennsylvanian System (Virgilian Series)

Greene and Searight (1949) used the name **Langdon shale** formation for strata renamed **Pillsbury Shale** by Moore and Mudge (1956).

Lansingham series

Lansingham series (Keyes, 1941a) - in Iowa
Cambrian System (Upper Cambrian Series)

This is a term proposed by Keyes (1941a) in Iowa and extended to Missouri. He stated that in eastern Missouri, the Delassus sandstone, the Potosi dolomite, and the Eminence cherty dolomite may properly be assigned to the "Lansingham series." He does not state the derivation of the term.

Lansing Group

Lansing formation (**Hinds, 1912**; Hinds and Greene, 1915; McCourt, 1917) = ***Island Creek shale to Stanton formation***
Lansing formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Island Creek shale to Stanton Formation***
Lansing formation (Condra, 1927; Condra, et al., 1932) - in Nebraska; = ***Island Creek shale to Stanton Formation***
Lansing formation (Savage, 1924; Gunnell, 1933; Shimer, 1934; Bassler, 1950)
Lansing group (Moore, 1932) - in Kansas; = ***Wyandotte Formation of Zarah Subgroup of Kansas City Group and Lansing Group***
Lansing group (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b) = ***Island Creek shale to Stanton Formation***
Lansing group (Condra, 1935) - in Nebraska; = ***Plattsburg - Stanton Formations***
Lansing group (Moore, 1936; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Lansing group (Ellison, 1941, Moore, 1948)
Lansing group (Searight and Howe, 1961) = ***Plattsburg - Stanton Formations***
Lansing Formation (Yochelson and Saunders, 1967)
Lansing Group (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Lansing Group (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Lansing Group (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type area: Hinds (1912) proposed the "Lansing formation" for strata from the base of the Island Creek Shale to the top of the Stanton Formation. The type area was in the vicinity of Lansing, Leavenworth County, Kansas.

Condra (1935) restricted the "Lansing group" to its present definition, Plattsburg - Stanton; most previous classifications used the "mid-Wyandotte - Stanton succession proposed by Hinds (1912). Thompson (1995, p. 117) stated "The Lansing Group is composed of three formations...The lower and upper formations, Plattsburg and Stanton respectively, are predominantly limestone. The intervening Vilas formation is composed mostly of shale and some sandstone. The Lansing Group as a unit is set off sharply by the thick shale formations which lie above and below it; the Weston above and the Bonner Springs [Lane] below. In northwestern Missouri the Lansing Group is 60 ft thick."

Laredo Coal Bed of Nowata Shale, Appanoose Subgroup, Marmaton Group

Laredo coal of Nowata formation (**Howe, 1953**; Searight and Howe, 1961)
Laredo coal bed of Nowata Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Howe (1953, p. 26-27) described a section exposed in a tributary to Medicine Creek, near the boundary between secs. 23 and 24, 60N-23W, extending from the bend in the section line road into the E½ SE SE sec. 5, 60N-22W; about 2 miles south of Laredo, as the type section for the Laredo Coal Bed.

The Laredo Coal Bed and its underclay are at the base of the Nowata Shale, the underclay overlying the Worland Limestone Member of the Altamont Formation. The Laredo Coal Bed often has a thin limestone "cap rock".

Larsh Shale Member of Deer Creek Formation, Shawnee Group

Larsh shale bed of Deer Creek limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska; = ***Larsh-Burroak Shale Member of Deer Creek Formation***
Larsh shale member of Deer Creek limestone (Moore, 1932) = ***Oskaloosa Shale Member of Deer Creek Formation***
Larsh shale member of Deer Creek limestone (Condra, et al., 1932; Condra, 1935) - in Nebraska
Larsh - Mission Creek shale member of Deer Creek limestone (Moore, 1936, 1937) = ***Larsh-Burroak Shale Member of Deer Creek Formation***
Larsh shale of Deer Creek limestone formation (Condra and Reed, 1937, 1943, 1959) - in Nebraska

Larsh-Mission Creek shale member of Deer Creek limestone (McQueen and Greene, 1938; Branson, 1944b) = ***Larsh-Burroak Shale Member of Deer Creek Formation***
Larsh shale member of Deer Creek formation (Moore, 1948; Condra, 1949; Moore, 1949; Jewett, 1949) **-** in Nebraska
Larsh Shale Member of Deer Creek Formation (Burchett, 1970) **-** in Nebraska
Larsh Shale Member of Deer Creek Limestone (Heckel, et al., 1979)
Pennsylvanian System (Virgilian Series)

Type section: **Larsh Shale -** Larsh farm, on Ervine Creek, northeast of Union, Nebraska (Condra, 1927, p. 50).

The **Haynies Limestone Member** occurs in Iowa and Nebraska, and possibly in a few places in Kansas, between the **Larsh Shale Member** below and the **Burroak Shale Member** (formerly **Mission Creek**) above. Condra (1927) indicated it also occurred in northern Kansas and northwestern Missouri, but was quite thin where found. If the Haynies limestone is not present, this interval is called the **Larsh-Burroak Shale Member**. However, in Nebraska and Iowa (and possibly in northwestern Missouri), the three members can be separately identified as the **Larsh, Haynies and Burroak Members of the Deer Creek Formation**.

Larsh-Burroak Shale Member of Deer Creek Formation, Shawnee Group

Larsh-Burroak shale of Deer Creek limestone (Ellison, 1941) **-** in Kansas
Larsh-Burroak shale member of Deer Creek formation (Greene and Searight, 1949)
Larsh-Burroak shale member of Deer Creek limestone (Moore, et al., 1951) **-** in Kansas
Larsh-Burroak member of Deer Creek formation (Searight and Howe, 1961)
Larsh and Burroak Shale Members of Deer Creek Limestone (Jewett, et al., 1968) **-** in Kansas
Larsh-Burroak Shale Member of Deer Creek Limestone (Heckel, et al., 1979; French, et al., 1988; Baars and Maples, 1998) **-** in Kansas
Larsh/Burroak Shale Member of Deer Creek Limestone (Pabian and Diffendal, 1989) **-** in Kansas
Larsh-Burroak Shale Member of Deer Creek Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type sections: There are four separate type sections for this unit;
Larsh Shale - Larsh farm, on Ervine Creek, northeast of Union, Nebraska (Condra, 1927, p. 50).
Mission Creek Shale - exposures on Mission Creek, southeast of Iowa Point, Kansas (Condra, 1927, p. 49).
Haynies Limestone - outcrop at foot of bluffs southeast of Haynies Station, Mills County, Iowa (Condra, 1927, p. 49).
Burroak Shale - "road cuts and ravines near Burr Oak school (E½ sec. 21, T. 71 N., R. 43 W., Fremont Co., Iowa), about 6 miles south of Pacific Junction, Iowa." (Condra and Reed, 1937, p. 54).

Condra (1927) proposed the **Mission Creek shale bed**, **Haynies limestone bed**, and **Larsh shale bed of the Deer Creek limestone member of the Shawnee formation** in Nebraska. The **Haynies Limestone**, which is known to be present between the Larsh and Mission Creek (later Burroak) Members in Iowa and Nebraska, appears to be absent in Kansas and Missouri; therefore, the unit was called **Larsh-Mission Creek Shale member** by Moore (1936). Condra and Reed (1937) in Nebraska renamed the Mission Creek shale the **Burroak shale member** when it was found that it (Missouri Creek) actually correlated with the Larsh shale. Thus, the final unit in Missouri and Kansas became known as the **Larsh-Burroak Shale Member of the Deer Creek Formation.**

Thompson (1995, p. 125) stated "The Larsh-Burroak Shale Member...is comprised of dark-gray to black, fissile shale in the lower part and of gray shale in the upper part. The member is about 4 ft thick." The Larsh-Burroak Shale Member overlies the Rock Bluff Limestone Member, and is overlain by the Ervine Creek Limestone Member of the Deer Creek Formation.

La Sueur limestone (dolomite)

La Sueur limestone (**Keyes, 1896d**) = ***Eminence and Potosi Dolomites***
La Sueur dolomite (Keyes, 1914, 1941b) = ***Bonneterre Formation***
La Sueur limestone of St. Francois limestone (Bain and Ulrich, 1905b) = ***Eminence and Potosi Dolomites***
Cambrian System (Upper Cambrian Series)

"La Sueur" was a term used by Keyes (1896d, p. 18, 52-53, 190) for a very cherty dolomite overlying the "Fredericktown limestone" and underlying recent alluvium in the Mine Lamotte district. He also used this name for at least part of the Bonneterre Formation in 1914 and 1941. Bain and Ulrich (1905) used "La Sueur limestone of St. Francois limestone" for the Eminence and Potosi Dolomites. Bridge (1930, personal communication to Wilmarth, 1938) stated it included some Gasconade at the top and Eminence and Potosi at the base. It was named for Lesueur Hill, St. Francois County, Missouri.

Laurel member

Laurel member of Bainbridge formation (Ball, 1942) = ***upper part of St. Clair Limestone Member of Bainbridge Formation***
Silurian System (Wenlockian and Ludlovian Series)

Ball (1942) subdivided the Bainbridge in the the Laurel and Osgood members, which are both equivalent to the St. Clair Limestone Member of the Bainbridge Formation of southeastern Missouri.

Lawrence oolite

Lawrence oolite (Beede and Rogers, 1900) - in Kansas; = ***Haskell Limestone Member of Stranger Formation***
Pennsylvanian System (Virgilian Series)

Lawrence Shale of Douglas Group

Lawrence shale (**Haworth, 1894**, 1895, 1896; Hall, 1896; Bennett, 1896; Haworth and Bennett, 1908) - in Kansas; = ***Weston to Lawrence shales***
Lawrence shale (Keyes, 1901b, 1941f) = ***Weston to Lawrence shales***
Andrew (Lawrence) shales (Condra and Bengston, 1915) - in Nebraska; ***Weston to Lawrence Shales***
"IV. Shale" of Andrew (Lawrence) shales (Condra and Bengston, 1915) - in Nebraska; = ***Snyderville Shale Member of Oread Formation***
Lawrence shale member of Douglas formation (Hinds and Greene, 1915) = ***Weston to Lawrence Shales***
Lawrence shale member of Douglas formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Weston to Lawrence Shales***
Lawrence shale member of Douglas formation (Condra, 1927) - in Nebraska; = ***Weston to Lawrence Shales***
Lawrence formation (Moore, 1932, 1949; Jewett, 1949) - in Kansas
Lawrence shale formation (Ver Wiebe and Vickery, 1932) - in Kansas
Lawrence shale (Condra, et al., 1932; Condra, 1949) = ***Weston to Lawrence Shales***
Lawrence-Stranger formation (Condra, 1935) = ***Weston to Lawrence Shales***
Lawrence shale (Moore and Newell, *in* Moore, 1936; Moore, 1937; Moore, et al., 1951) - in Kansas; = ***Lawrence Formation***
Lawrence shale (McQueen and Greene, 1938; Moore, et al., 1944; Branson, 1944b; Moore, 1948)
"Not named" member of Lawrence formation (McQueen and Greene, 1938) = ***"lower unnamed shale member" of Lawrence Formation***
Lawrence formation (Condra and Scherer, 1939) - in Nebraska
Lawrence shale formation (Condra and Reed, 1943, 1959) - in Nebraska
not named shale member of Lawrence shale (Branson, 1944b) = ***"lower unnamed shale member" of Lawrence Formation***
Lawrence formation (Greene and Searight, 1949; Searight and Howe, 1961)
Lower shale of Lawrence formation (Condra, 1949) = ***"lower unnamed shale member" of Lawrence Formation***
Upper member of Lawrence formation (unnamed) (Searight and Howe, 1961) = ***"upper unnamed shale member" of Lawrence Formation***
Lower member of Lawrence formation (unnamed) (Searight and Howe, 1961) = ***"lower unnamed shale member" of Lawrence Formation***
Lawrence Formation (O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas; = ***upper Stranger and Lawrence Formation***
Lawrence Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska

Lawrence Formation (Howe, 1986; Thompson, 1995)
Lawrence Shale (Goebel, et al., 1989) - in Iowa and Nebraska; = ***"upper unnamed shale member" of Lawrence Formation***
"upper unnamed shale member" of Lawrence Formation (Thompson, 1995)
"lower unnamed shale member" of Lawrence Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Haworth (1894), Ver Wiebe and Vickery (1932) located the type section as "Lawrence, Douglas county, Kansas, T. 12s., R. 12e."

Moore (1936, p. 155) stated "The term Lawrence has customarily been applied to those strata between the Haskell and Oread limestones..." Thompson (1995, p. 121) added "In Missouri...the Lawrence Formation...consists of two unnamed shale members separated by a limestone unit...In Kansas...the Ireland Sandstone Member is the highest unit of the Stranger. Although there is a sandstone locally present within the "lower unnamed shale unit"...that is tentatively regarded as equivalent to the Ireland Member of Kansas, it is not extensive enough or sufficiently pronounced to be recognized throughout the area of occurrence of the Lawrence Formation..." For this reason the Lawrence Formation in Missouri between the top of the Haskell and the base of the Amazonia is called "lower unnamed shale member. "...although it is realized that the lower part of this unit may be equivalent in part to the Robbins Shale Member of the Stranger Formation in Kansas."

Leaf member

Leaf member (McQueen, 1939) = ***McNairy Formation***
Cretaceous System (Gulfian Series)

For a clay bed in the McNairy formation, McQueen (1939, p. 70, 72) stated "Fossil leaves have been obtained from the upper Cretaceous beds...and have lead to the temporary designation of this clay as the 'leaf-bearing member.' It immediately underlies the Owl Creek formation..." in Scott County, Missouri. This is a local informal term. The McNairy has been considered a member of the Ripley Formation.

Leavenworth Limestone Member of Oread Formation, Shawnee Group

Leavenworth limestone of Oread limestone member of Douglas formation (**Condra, 1927**) - in Nebraska
Leavenworth (middle Oread) limestone (Moore, 1929)
Leavenworth limestone member of Oread limestone (Moore, 1932)
Leavenworth limestone of Oread formation (Condra and Scherer, 1939) - in Nebraska
Leavenworth limestone member of Oread limestone (Moore, et al., 1951) - in Kansas
Leavenworth member of Oread formation (Searight and Howe, 1961)
Leavenworth Limestone Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Leavenworth Limestone Member of Oread Limestone (Toomey, 1969a, 1969b)
Leavenworth Limestone Member of Oread Formation (Burchett, 1970) - in Nebraska
Leavenworth Limestone (Toomey, 1972)
Leavenworth Limestone Member of Oread Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 38)) named this member, and stated "3. Leavenworth Limestone, for the 'middle limestone' of the [Oread] member, from a roadside exposure high in the upland spur northwest of the Federal Penitentiary at Leavenworth, Kansas. The stone is dark gray, dense, vertically jointed, fossiliferous, and in one or two beds. Its thickness averages about 2 feet."

In Missouri, Thompson (1995, p. 123) added "The Leavenworth Limestone Member...is a dense, dark-gray limestone. It consists of two or more beds and is commonly 2 to 3 ft thick." The Leavenworth Limestone Member overlies the Snyderville Shale Member and is overlain by the Heebner Shale Member of the Oread Formation.

<u>Leaver limestone</u>

Leaver limestone (Keyes, 1896a) = ***in part the Gasconade Dolomite***

Ordovician System (Ibexian Series)

This is a term used by Keyes (1896a) that included the Gasconade Dolomite.

<u>Lebanon limestone</u>

Lebanon limestone (Safford, 1851) = ***Plattin Limestone***

Ordovician System (Mohawkian Series)

Safford (1851, p. 353, 354-356) described the Lower Lebanon limestone and the Upper Lebanon limestone of the Stones River group, named for exposures at Lebanon, Wilson County, Tennessee. In 1901 he substituted the term Lebanon limestone for what was the Lower Lebanon limestone. Grohskopf (1955, p. 62) says that Dr. J. Bridge stated orally on September 5, 1941 to H.S. McQueen that the beds overlying the Ridley ("Pecatonica" Formation) at Cape Girardeau were correlative with the Lebanon of Tennessee, and that the Stones River was really Black River. These beds are now included in the present **Plattin Limestone.**

Lecompton Formation of Shawnee Group

Lecompton limestone (**Bennett, 1896**; Beede, 1902) **-** in Kansas
Lecompton limestone member <u>of Shawnee formation</u> (Hinds and Greene, 1915)
Lecompton limestone member <u>of Shawnee formation</u> (Moore and Haynes, 1917; Moore, 1920) **-** in Kansas
Lecompton limestone member <u>of Shawnee formation</u> (7 beds) (Condra, 1927) **-** in Nebraska
Lecompton limestone (7 members) (Moore, 1932; McQueen and Greene, 1938; Moore, et al., 1944; Branson, 1944b)
Lecompton limestone (6 members) (Ver Wiebe and Vickery, 1932)
Lecompton limestone (5 members) (Condra, et al., 1932)
Lecompton formation (7 members) (Condra, 1935)
Lecompton limestone formation (7 members) (Condra and Reed, 1943, 1959) **-** in Nebraska
Lecompton limestone (7 members) (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Lecompton formation (7 members) (Searight and Howe, 1961)
Lecompton Formation (7 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Lecompton Limestone (7 members) (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas
Lecompton Limestone (6 members) (Heckel, et al., 1979)
Lecompton Formation (7 members) (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Originally named by Bennett (1896), the type section is near Lecompton, in Douglas County, Kansas.

Thompson (1995, p. 124) stated "The Lecompton Formation contains four limestone members alternating with three shale members...The principal outcrop areas of the formation are in southern Holt and in western Andrew counties. the succession is concealed by glacial deposits in eastern Nodaway County. The thickness of the Lecompton Formation is about 35 ft." The Lecompton Formation overlies the Stull Shale Member of the Kanwaka Formation, and is overlain by the Tecumseh Shale. **Moore (1932)** raised the rank of the Lecompton from a member of the Shawnee formation to a formation, and formally subdivided the Lecompton into the seven named members, the names originally proposed by Condra (1927) as "beds" within his Shawnee formation.

<u>Lecompton shales</u>

Lecompton shales (Haworth, 1898) **-** in Kansas; **=** ***Kanwaka Formation***

Pennsylvanian System (Virgilian Series)

The name "Lecompton" was preoccupied by the Lecompton Formation of Bennett (1896)

Leeic period

Leeic period (Keyes, 1941b) = ***Mississippian Period (System)***

Mississippian System

Leeic is a term used by Keyes (1941b, p. 156) for what is approximately the Mississippian Period or System. He restricted the term Mississippian to a series including (descending) the Warsaw, Keokuk, Burlington, and Chouteau (essentially the lower half of the present usage).

Leemon Formation

Leemon Formation (Amsden, 1974) **-** from ms. of Thompson and Satterfield
Leemon Formation (Thompson and Satterfield, 1975; Thompson, 1991, 1995)
Leemon Limestone (Thompson, 1982)
Leemon Formation of Edgewood Group (Amsden, 1986)

Ordovician System (Cincinnatian Series)

Type section: Named by Thompson and Satterfield (1975, p. 77), they stated "The section designated as the type for the Leemon Formation is about 100 m below the head of the drainage 100 m east of the barn in the SE¼ NE¼ SW¼ sec. 21, T. 32 N., R. 13 E., Cape Girardeau County, Missouri...At this section..,also known as the 'Short's farm section,' the Leemon lies on Maquoketa (Orchard Creek Shale), and is overlain by the Sexton Creek Limestone."

Thompson (1995, p. 40) stated "the Leemon Formation is a sparsely oolitic, often very fossiliferous, gray, thin- to massive-bedded, argillaceous to calcarenitic limestone, often containing small clasts of Girardeau Limestone in the basal part. Some sections have shale interbedded with the limestone, and [the formation occurs]...as small bioherms in others. This unit rests on the Orchard Creek Shale at most localities (the Girardeau Limestone removed prior to deposition of the Leemon) and is overlain by the Silurian Sexton Creek Limestone.

"Identified in 1961 (Martin, et al.) as the "Cyrene member of the Edgewood formation," Silurian in age, this formation was assigned to the Late Ordovician by Thompson and Satterfield (1975) and renamed the Leemon Formation. They restricted the units within the Edgewood (Group) to rocks exposed in northeastern Missouri." The Leemon Formation is not considered to be part of the Edgewood Group, restricting "Edgewood" to northeastern Missouri.

Lees Summit Formation of Pleasanton Group - of Howe (1982)

Lees Summit Formation (Howe, 1982)

Pennsylvanian System (Missourian Series)

Howe (1982) proposed the Lees Summit Formation to replace the **"middle unnamed formation"** of the Pleasanton Group. This would be part of the Shale Hill Formation of Watney and Heckel (1994).

Lenapah Shale of Appanoose Subgroup, Marmaton Group

Lenapah limestone (**Ohern, 1910**) **-** in Oklahoma
Lenapah limestone member of Marmaton formation (Moore, 1920) **-** in Kansas; **=** ***Norfleet Limestone Member of Lenapah Formation***
Lenapah limestone member of Pleasanton formation (Condra, 1927) **-** in Nebraska; **=** ***Norfleet Limestone Member of Lenapah Formation***
Lenapah limestone (Moore, 1936) **=** ***Norfleet Limestone Member of Lenapah Formation***
Lenapah limestone of Henrietta group (McQueen and Greene, 1938) - considered to be **"absent in Missouri"**
Lenapah limestone of Marmaton group (3 members) (Jewett, 1941; Moore, et al., 1951) - in Kansas
Lenapah formation of Marmaton group (3 members) (Greene and Searight, 1949; Cline and Greene, 1950; Searight and Howe, 1961)
Lenapah Limestone of Marmaton Group (3 members) (Jewett, et al., 1968; Heckel, 1984; Baars and Maples, 1998)
Lenapah Formation of Marmaton Group (3 members) (Gentile, 1976; Thompson, 1995)

Lenapah Formation (Ravn, et al., 1984) - in Iowa
Lenapah Formation (Kidder, 1985)
"lower" limestone of Lenapah Formation (Kidder, 1985) = ***Norfleet Limestone Member***
Lenapah Limestone of Marmaton Group (3 members) (Watney, et al., 1989; Heckel, 1991) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Type section: Ohern (1910) named the Lenapah from exposures in Nowata County, Oklahoma. Jewett (1941, p. 337) stated "The type exposure of the Lenapah limestone is in the old quarry in the NW¼ NE¼ sec. 30, T. 28 N., R. 16 E., Nowata County, Oklahoma, at Bell Spur, a short distance north of Lenapah."

Thompson (1995, p. 108) stated "The Lenapah is typically composed of two limestone members, the Norfleet and Sni Mills, and an intervening shale, the Perry Farm." The original name applied principally to one limestone, which is now the Norfleet. The Lenapah Shale overlies the Nowata Shale, the contact at the base of the Norfleet Limestone Member, and is overlain by the Holdenville (or Memorial) Shale, the contact at the top of the Sni Mills Limestone Member

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Le Roy (Leroy) shale
Le Roy shale (Haworth and Bennett, 1908) - in Kansas; = ***Weston Shale?***
Leroy shale (Keyes, 1941f) = ***Weston and Lawrence shales***
Pennsylvanian System (Missourian Series)

Lexington
Lexington cap rock (early geologists; Hinds, 1912) = ***Myrick Station Limestone Member of Pawnee Formation***
Lexington bottom-rock (Haworth, 1898) = ***Higginsville Limestone***
Lexington formation (Keyes, 1933) = ***Marmaton Group***
Pennsylvanian System (Desmoinesian Series)

Before the Myrick Station lilmestone was named (Cline, 1941), it was known as the cap rock for the Lexington Coal Bed (Hinds, 1912; Cline, 1941). Several other units were also called "Lexington," as well, including the Higgsinville Limestone, and apparently the whole succession now within the Marmaton Group.

Lexington Coal Bed of Labette Shale, Appanoose Subgroup, Marmaton Group
Lexington coal (Broadhead, 1874)
Lexington coal bed of Cherokee shale (Hinds, 1912)
Lexington coal (Mystic coal) (Hinds and Greene, 1915)
"red" or Lexington coal (?) (Moore, 1929) = ***Mulky Coal Bed***
Lexington coal (Knight, 1930) = ***Summit Coal Bed of Little Osage Shale***
Lexington coal of Labette shale member of Henrietta formation (Greene, 1933)
Lexington coal (Miller and Owen, 1934) = ***Croweburg Coal Bed***
Lexington (Mystic) coal of Labette shale (Cline, 1941)
Lexington coal of Labette shale (Jewett, 1941) - in Kansas
Lexington coal horizon of Labette shale (Clair, 1943)
Lexington coal of "upper Fort Scott limestone" of Fort Scott limestone (Branson, 1944b)
Lexington coal of Labette formation (Greene and Searight, 1949)
Lexington coal bed of Pawnee formation (Moore, 1949) - in Missouri
Lexington coal of Labette formation (Searight, 1959) **"= Herrin (No. 6) coal in Illinois"**
Lexington coal of Labette Shale (Branson, et al., 1965) - in Oklahoma
Anna Shale Member of Pawnee Formation (**"Lexington coal zone"**) (Merrill, 1973)
Lexington coal of Labette Formation (Gentile, 1976)
"unnamed shale above Lexington Coal" (Frest, et al., 1981) = ***Anna Shale Member of Pawnee Formation***
Lexington coal bed of Labette Formation (Labette Shale) (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: The Lexington Coal Bed was named by Broadhead (1898, p. 324) who stated that the Lexington coal cropped out near a "...regular boat-landing..." in the vicinity of Lexington, Lafayette County, Missouri.

The Lexington Coal Bed marks the top of the Labette Shale. Where it is absent the black shale of the Anna Shale Member of the Pawnee Formation above often cannot be distinguished from the black shales of the pre-Lexington Labette.

Liberal limestone

Liberal limestone (Greene and Pond, 1926) = ***Seville limestone of Seville Formation***

Pennsylvanian System (Desmoinesian Series)

Liberty Memorial Shale of Zarah Subgroup of Kansas City Group

Liberty Memorial shale member of Chanute shale (Clair, 1943) = ***Lane Shale of current nomenclature***

Lane Shale (Liberty Memorial Shale) Member of Iola Limestone (Watney, et al., 1989) - in Kansas

Pennsylvanian System (Missourian Series)

Keyes (1889) named the "Lane shale of Parkville shales" for a succession later considered to be equivalent to the Bonner Springs Shale. Hinds and Greene (1915) discussed the **Lane shale member of the Lansing formation**, which equals the Island Creek and/or Bonner Springs shales. McQueen and Green (1938) also were working with the Bonner Springs horizon when they used the name "Lane shale". Clair (1943) proposed the name **Liberty Memorial Shale member of Chanute shale** for the shale interval between the Iola and Wyandotte Formations, *i.e.*, the unit today identified as Lane Shale.

Watney and Heckel (1994) revived the Liberty Memorial because (Baars and Maples, 1998, p. 141) the "Type Lane Shale as defined by Moore (1948) is not shale between Iola and Wyandotte Limestones, but above Wyandotte Limestone. Lane Shale of Kansas City area is below Wyandotte Limestone." Therefore, the Lane shale, based on its type section, would be the **Island Creek- Bonner Springs Shale interval**. The shale called "Lane," below the Wyandotte Formation, is reverted back to the **Liberty Memorial Shale**, as proposed by Clair (1943) and used in Missouri until Moore (1948) suppressed its usage.

Lightning Creek coal

Lightning Creek coal of Fleming cyclothem (Abernathy, 1937) = ***Fleming Coal Bed of Fleming Shale***

Pennsylvanian System (Desmoinesian Series)

Lindsey Mountain

Lindsey Mountain ash flow (Anderson, 1962) = ***Lindsey Mountain Rhyolite***

Lindsey Mountain Rhyolite (Berry, 1976)

Precambrian Erathem

This unit was named by Anderson (1962), who also called it "Unit B, tuff of Stouts Creek" in 1970. Berry (1976) named it the **Lindsey Mountain Rhyolite**

Lindsey Mountain composite ash flows

Lindsey Mountain composite ash flows (Anderson, 1962)

Precambrian Erathem

This name was used by Anderson (1962) for the unit Berry (1976) named the **Ironton Rhyolite**. Anderson (1970) called it "Unit A, tuff of Stouts Creek". The very base of this unit is part of the **Buck Mountain Shut-Ins Formation** of Berry (1976).

Lindsey Mountain Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Lindsey Mountain ash flow (Anderson, 1962) = ***Lindsey Mountain Rhyolite***

Lindsey Mountain Rhyolite (Berry, 1976)

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the S½ NW¼ sec. 4, T. 33 N., R. 3 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The Lindsey Mountain Rhyolite is a violet-gray, blackish or light maroon ash-flow tuff with 5-20 percent quartz and feldspar phenocrysts, and conchoidal fracture. It ranges in thickness between 1,600 and 2,300 ft. It is widely exposed in the western part of the Taum Sauk area, especially on Lindsey and Bell Mountains." Anderson (1962) called this unit the "Lindsey Mountain ash flow", and in 1970 "Unit B, tuff of Stouts Creek".

Lingle Limestone

Lingle Limestone (**Savage, 1920a**) - in Illinois; = ***St. Laurent Limestone***

Devonian System (Middle Devonian Series)

This term was proposed by Savage (1920a, p. 171, 176) for a dark colored limestone along a branch of Lingle Creek, Union County, Illinois. He stated that in eastern Missouri it is overlain by post-Devonian rocks and underlain by the Grand Tower limestone. It is equivalent to the lower part of the **St. Laurent Limestone** of Missouri.

Linnian series

Linnian series (Keyes, 1939a, 1941b) = ***Middle and Upper Devonian Series***

Devonian System (Middle and Upper Devonian Series)

This is a term employed by Keyes for beds he considered to represent the Western "Devonic." Keyes (1939a, p. 64) stated "The time seems now to have arrived when the entire section should be given full genetic significance; and it is proposed to offer the term Linnian Series so as to cover the entire Devonic deposition of the Iowa-Missouri region and northwestward." Keyes (1941b, p. 156) used the term to include (descending) the Rockford shale, Coralville limestone, Callaway limestone, and Solen limestone. It is overlain by his Kinderhookian series and underlain by his Kaaterskillian series. Keyes (1941d, p. 311) stated "For the Eastern Devonic the name Kaaterskillian series is reserved, and for the Western Devonic the term Linnian series. These two series overlap at the Mississippi River in Missouri."

Linn Subgroup of Kansas City Group

Linn subgroup of Kansas City group (**Moore, 1948**; Searight and Howe, 1961)
Linn subgroup of Kansas City group (Moore, et al., 1951) - in Kansas
Linn Subgroup of Kansas City Group (Jewett, et al., 1968; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Linn Subgroup of Kansas City Group (Gentile, 1976; Howe, 1986; Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type area: Moore (1948) proposed the "Linn subgroup" as the middle part of the Kansas city group, and (p. 2030) located the type locality as "...named from Linn County, Kansas."

Comprising four formations, the Linn Subgroup is (Thompson, 1995, p. 114) "The succession of strata that lies between the top of the Winterset Limestone Member of the Dennis Formation and the base of the Lane [Liberty Memorial] Shale...This succession, except for the uppermost formation, is one of the most variable in the upper Pennsylvanian succession of Missouri...The subgroup is about 70 ft thick in the Kansas City area and nearly 100 ft thick in northern Missouri."

Linwood shales

Linwood shales (Keyes, 1937c, 1938b, 1941f) = ***Linn and Zarah Subgroups? of Kansas City Group***

Pennsylvanian System (Missourian Series)

<u>Lithograph City Formation</u>

Lithograph City Formation <u>of Cedar Valley Group</u> (Witzke, et al., 1988) - in Iowa

Lithograph City Formation <u>of Cedar Valley Group</u> (Woodruff, 1990) - in northeastern Missouri; = ***upper part of Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

<u>Lithographic limestone</u>

Lithographic limestone <u>of Chemung group</u> (Swallow, 1855) = ***Louisiana Limestone***

Lithographic limestone (Swallow, 1855) - in southwestern Missouri, = ***Compton Limestone***

Lithographic limestone <u>of Chouteau group</u> (Broadhead, 1874) = ***Louisiana Limestone***

Lithographic or Louisiana limestone (Rowley, 1895) = ***Louisiana Limestone***

Lithographic limestone (Keyes, 1900a) - "not equivalent to the Louisiana limestone of northeastern Missouri", = ***Compton Limestone***

Devonian and Mississippian Systems (Upper Devonian and Kinderhookian Series)

A descriptive term applied in early Missouri reports to the formation later named **Louisiana Limestone** by Keyes (1892), and to the Lower Mississippian Compton Limestone.

<u>Lithostrotion limestone</u>

Lithostrotion limestone (early geologists) = ***St. Louis Limestone***

Mississippian System (Meramecian Series)

<u>Little Cedar Formation</u>

Little Cedar Formation <u>of Cedar Valley Group</u> (Witzke, et al., 1988) - in Iowa

Little Cedar Formation <u>of Cedar Valley Group</u> (Woodruff, 1990) - in northeastern Missouri; = ***lower part of Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

<u>Little Kaw limestone</u>

Little Kaw limestone member <u>of Stanton limestone</u> (Newell, 1936; Moore, 1936) - in Kansas; = ***South Bend Limestone Member of Stanton Formation***

South Bend or Little Kaw limestone member <u>of Stanton limestone</u> (McQueen and Green, 1938) = ***South Bend Limestone Member of Stanton Formation***

` **South Bend ("Little Kaw") limestone** <u>of Stanton limestone formation</u> (Condra and Reed, 1943, 1959) - in Nebraska; = ***South Bend Limestone Member of Stanton Formation***

Little Kaw limestone (Thompson, 1949?) = ***South Bend Limestone Member of Stanton Formation***

Pennsylvanian System (Missourian Series)

Little Osage Shale of Fort Scott Subgroup, Marmaton Group

Little Osage shale member <u>of Fort Scott limestone</u> (Jewett, 1941) - in Kansas

unnamed shale (upper part of Little Osage shale member of Kansas) <u>of Fort Scott limestone</u> (Moore, 1948)

unnamed shale (lower part of little Osage shale member of Kansas) <u>of Fort Scott limestone</u> (Moore, 1948)

Little Osage shale member <u>of Fort Scott formation</u> (Condra, 1949) - in Nebraska

Little Osage shale member <u>of Fort Scott formation</u> (Greene and Searight, 1949; Unklesbay, 1952a)

Little Osage shale member <u>of Fort Scott formation</u> (Moore, et al., 1951) - in Kansas

Little Osage member <u>of Fort Scott formation</u> (Searight, 1959)

Little Osage formation <u>of Fort Scott subgroup</u> (Searight and Howe, 1961)

Little Osage Shale Member <u>of Fort Scott Formation</u> (Branson, et al., 1965) - in Oklahoma

Little Osage Shale Member <u>of Fort Scott Limestone</u> (Jewett, et al., 1968; Heckel, 1979; Baars and Maples, 1998) - in Kansas

Little Osage Formation of Fort Scott Subgroup (Neal, 1969; Gentile, 1976; Thompson, 1995)
Little Osage Shale Member of Stephens Forest Formation (Ravn, et al., 1984) **-** in Iowa; **= pre-Houx Little Osage Shale**
Pennsylvanian System (Desmoinesian Series)

Type section: The Little Osage was named by Jewett (1941, p. 308) who stated "The exposure in the northeast part of the SE sec. 2, T. 24 S., R. 25 E., Bourbon County, Kansas, on the south valley wall of Little Osage river is the type exposure of the Little Osage shale." Jeffries (1958) located this section along a north-south road and around the entrance to a mine.

The Little Osage Shale is the "meat" in the sandwich between the upper (Higginsville Limestone) and lower (Blackjack Creek Limestone) Fort Scott limestones. It is in turn subdivided into one named member (H**oux Limestone Member**) and another that is resurrected in this report (**Blackwater Creek Shale Member**), and also contains the **Summit Coal Bed**, which has been mined in several counties.

Little Pawnee Shale Member
Little Pawnee Shale Member of Cass Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska; *= **Vinland Shale Member of Stranger Formation***
Little Pawnee Shale Member of Cass Limestone (Goebel, et al., 1989) **-** in Iowa and Nebraska; **= *"lower unnamed shale member" of Lawrence Formation?***
Pennsylvanian System (Virgilian Series)

Little Saline Limestone

Little Saline limestone (**Dake, 1918**) **-** from umpub. ms. of S. Weller
Little Saline River limestone (Savage, 1920a) = ***Backbone ("Back-bone") formation in Illinois***
Little Saline limestone (Stewart, 1923) - first detailed description
Little Saline formation (Weller and St. Clair, 1928; Branson, 1944a; Croneis, 1944; Koenig, 1961a)
Little Saline Formation (Amsden, 1962)
Little Saline Formation - Backbone Limestone (Collinson, et al., 1967)
Little Saline Limestone (Thompson, 1993, 1995)
Devonian System (Lower Devonian Series)

Type section: Croneis (1944, p. 111) stated "The Little Saline formation was named by S. Weller [Weller and St. Clair] (1928) from exposures of the limestone at the quarries of the Ozora Marble Company in Quarry Hill, on the east bank of Little Saline Creek, about 1½ mi west of Brown's Ford south of Ozora." (center east line SE 5, 36N-9E.).

The Little Saline Limestone overlies the Bailey Formation and generally lies beneath the Clear Creek Formation. At Quarry Hill it directly underlies the Middle Devonian Grand Tower Limestone. The formation was previously called Oriskany. Of very limited extent in Missouri, the Little Saline is found only in about 5 square miles in the vicinity of its type section, preserved through faulting.

Little Shaver Creek Laminated Limestone Physiofacies
Little Shaver Creek Laminated Limestone Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***part of Cedar Valley Limestone***
Devonian System (Middle Devonian Series)

Little Spice Creek Brecciated Limestone Physiofacies
Little Spice Creek Brecciated Limestone Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***part of Cedar Valley Limestone***
Devonian System (Middle Devonian Series)

Llandoverian Series

Llandoverian Series (Amsden, 1974; Thompson and Satterfield, 1975; Thompson 1991, 1995)

Silurian System (Llandoverian Series)

Essentially equivalent to the former Alexandrian Series, named from Alexander County, Illinois, the Lower Silurian (Llandoverian) Series comprises all Silurian formations in Missouri except for the Bainbridge Formation, which is Wenlockian - Ludlovian in age, *i.e.*, Middle and Upper Silurian.

Lorraine shales

Lorraine shales (Gallaher, 1900) = ***Maquoketa Shale or Maquoketa Group***

Ordovician System (Cincinnatian Series

A term used in the east generally as a synonym of the Hudson River group, "Lorraine" was used in this sense by Gallaher (1900, p. 137-138), who applied the term in Missouri for the closing (upper) member of his Ordovician Division.

Lost Branch Formation of Appanoose Subgroup, Marmaton Group

"Lost Branch" Formation (Ravn, et al., 1984) - in Iowa; = ***Lost Branch and Holdenville formations?***

"Lost Branch" Formation (Heckel, 1984) = ***Lost Branch and Holdenville formations?***

"Lost Branch" Formation (Kidder, 1985)

"Lost Branch" shale member of "Lost Branch" Formation (Kidder, 1985) = ***Nuyaka Creek Shale Member of Lost Branch Formation***

Lost Branch Formation (Watney, et al., 1989; **Heckel, 1991**) "= Lonedale and West Franklin Limestone Members of the Illinois Basin"

Pennsylvanian System (Desmoinesian Series)

The Lost Branch Formation is a unit that is in part a new formation between the Marmaton and Pleasanton Groups, but is also in part equivalent to (or a facies of) the Holdenville Shale.

Louis limestone

Louis limestone (Keyes, 1933) = ***St. Louis Limestone***

Mississippian System (Meramecian Series)

This was an abbreviated form of **St. Louis Limestone** employed by Keyes.

Louisian series

Louisian series (Keyes, 1919a) = **Osagean and Meramecian Series?**

Mississippian System (Osagean and Meramecian Series?)

This was a title for a period of geologic time used by Keyes (1919a, p. 74) which he says has ten years priority over "Mississippian." Wilmarth (1938) says he probably was referring to the early use of "St. Louis group," which covered the rocks later named Meramec group.

Louisiana Limestone

Louisiana limestone (**Keyes, 1892**, 1897a; Branson, 1941; Williams, 1943; Mehl, 1960, 1961)

Louisiana limestone (Keyes, 1894a, 1902; Shepard, 1898) - in southwestern Missouri, = ***Compton Limestone***

Lithographic or Louisiana limestone (Rowley, 1895)

Louisiana limestone (at Kimmswick) (Weller, 1898) = ***Glen Park Limestone of Sulphur Springs Group***

Louisiana ("Lithographic") limestone (Girty, 1909)

Louisiana limestone (Branson, 1944a, 1944b) - part; also considered the Glen Park Limestone to be lenses of Louisiana Limestone in the Grassy Creek shale

Louisiana formation (Koenig, 1961a; Koenig, et al., 1961)
Louisiana Limestone (Scott and Collinson, 1961) **- Late Devonian in age**
Louisiana Limestone (Ziegler and Sandberg, 1984; Thompson, 1986, 1993, 1995)
Devonian System (Upper Devonian Series)

Type section: The Louisiana Limestone was proposed by Keyes (1892, p. 283-300) for a limestone unit previously known as the "Lithographic limestone," named for exposures at the south of edge of Louisiana, Pike County, Missouri, at a roadside park on Missouri Highway 79 at Clinton Spring.

The Louisiana Limestone is overlain by the Hannibal Formation and underlain by the Saverton and Grassy Creek Shales. Its age has long been in dispute, either Late Devonian, or Early Mississippian. The consensus today, based on conodonts (Scott and Collinson, 1961), is that it is Late Devonian in age.

Louisville limestone

Louisville limestone (Condra and Bengston, 1915) - in Nebraska; **= *Utopia Limestone member of Howard Formation***
"Louisville" limestone of Howard limestone member of Shawnee formation (Condra, 1927) - in Nebraska; **= *Utopia Limestone Member of Howard Formation?***
"Louisville" limestone of Howard limestone member of Shawnee formation (Condra, 1927) - in Nebraska; **= Stoner Limestone Member of Stanton Formation?**
Pennsylvanian System (Missourian Series)

Loutre formation

Loutre formation (McQueen, 1943; Branson, 1944b) = ***Cheltenham Formation***
Loutre formation (McQueen, 1943) = ***Tiawah Limestone Member of Scammon Shale***
Loutre formation (Jewett, 1949) - in Kansas; = ***Croweburg Shale***
Loutre formation (Unklesbay, 1952a) = ***Scammon Shale***
Pennsylvanian System (Atokan or Desmoinesian Series)

McQueen (1943) and Branson (1944b) associated the Loutre formation with the Cheltenham formation. It was also used for strata as high as the Scammon Shale of the Cherokee Group.

Loveland Loess

Loveland Joint clay (Shimek, 1909; Grohskopf, 1955)
Loveland loess (Heim, 1961)
Loveland Loess (Whitfield, *in* Thompson, 1995)
Quaternary System (Pleistocene Series, Illinoisian Stage)

Type area: Shimek (1909, p. 405) used the term "Loveland Joint clay" for a deposit he believed was related to the Kansas drift. Its presence in Missouri was suggested by Clark in a personal communication to Grohskopf (1955, p. 24-25). Davis (1954) identified the Loveland loess on the uplands of Platte County, Missouri. It was named for Loveland, Pottawattamie County, Iowa.

Whitfield (*in* Thompson, 1995, p. 147) stated "The Loveland Loess is a medium- to coarse-grained, noncalcareous silt, which contains very fine grains of sand. The amount of sand is greatest near the base of the loess. The Loveland is commonly dark-brown, but its upper part is often a very distinctive reddish-brown...Generally, the Loveland loess does not exceed a thickness of 20 ft. It is commonly found at high topographic positions near the Missouri River."

"lower Bonneterre Formation"

"lower Bonneterre Formation" (Howe, et al., 1972) = ***"Bonneterre-Lamotte transition Zone"***
Cambrian System (Upper Cambrian Series)

This term was used by Howe, et al. (1972) for the interval of interbedded sandstone and dolomite that comprises the **"Bonneterre-Lamotte Transition zone."**

"lower (brown) shale"

"lower brown shale member" of Maquoketa formation (Willman and Payne, 1942) = ***Maquoketa Group below Girardeau Limestone***

"lower shale zone" of Maquoketa formation (DuBois, 1945) = ***Maquoketa Group below Girardeau Limestone***

Ordovician System (Cincinnatian Series)

Lower concretionary limestone

Lower concretionary limestone (Gordon, 1895) = ***Salem Formation***

Mississippian System (Meramecian Series)

Lower Devonian Series

Early Devonic Sub-Period (Keyes, 1914) = ***Lower Devonian Series***

Lower Devonian (Savage, 1920a, 1920b)

Lower Devonian Series (Weller, 1944; Koenig, 1961a; Collinson, et al., 1967; Amsden, 1988; Thompson, 1993, 1995)

Devonian System (Lower Devonian Series)

Lower Devonian strata in Missouri are confined to the southeastern part of the State, and include the Bailey Formation, Little Saline Limestone, and Clear Creek Formation.

"lower" Gasconade Dolomite of Gasconade Dolomite

"lower" Gasconade Dolomite (Thompson, 1991)

Ordovician System (Ibexian Series)

The lower part of the Gasconade Dolomite between the relatively chert-free "upper" Gasconade and the Gunter Sandstone Member at the base has been identified as the "lower" Gasconade Dolomite, which is generally coarsely crystalline and may have up to 50 percent chert by volume (Thompson, 1991, p. 21).

"lower Joachim Dolomite" of Joachim Dolomite

"lower Joachim dolomite" of Joachim Dolomite (Thompson, 1991, 1995) = ***Abernathy and Augusta Members of Joachim Dolomite***

Ordovician System (Mohawkian Series)

This is an informal unit proposed by Thompson (1991) that includes the two basal members of the Joachim Dolomite (Abernathy and Augusta Members), originally proposed by Templeton and Willman (1963), that comprise thin-bedded dolomite interbedded with sandstone and sandy dolomite. It reflects the transition from the underlying St. Peter Sandstone into the Joachim Dolomite.

"lower Kimmswick Limestone" of Kimmswick Limestone

"lower Kimmswick Limestone" of Kimmswick Limestone (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Thompson (1991) informally divided the Kimmswick Limestone in northeastern Missouri, where the greatest percentage of original Kimmswick is preserved, into (p. 34-35) "...a **'lower Kimmswick Limestone,'** a heavily burrowed, bioclastic, coarse grainstone, represented by the type Kimmswick [in eastern Jefferson County], and the lower part of the Kimmswick throughout its extent...The boundary between the 'upper' and 'lower' Kimmswick is a thin K-bentonite bed (altered volcanic ash bed) exposed on U.S. Highway 61 in eastern Ralls and northern Pike counties."

"lower Pecatonica" of "Pecatonica Formation"

"lower Pecatonica" of "Pecatonica Formation" (Thompson, 1991)
lower "Pecatonica Formation" (Thompson, 1995)
Ordovician System (Mohawkian Series)

Identified by Thompson (1991), the "lower Pecatonica" are beds of dolomite, dolomitic limestone, and shales comprising the lower half of the "Pecatonica Formation" that are essentially like those of the underlying Joachim Dolomite, and are in stark contrast to the nearly pure limestone of the "upper Pecatonica."

Lower series
Lower series of Mississippian System (Gordon, 1895) = ***Kinderhookian and Osagean Series***
Mississippian System (Kinderhookian and Osagean Series)

Lower Silurian Series (Llandoverian Series)

Silurian System

Essentially equivalent to the former **Alexandrian Series**, named from Alexander County, Illinois, the Lower Silurian (Llandoverian) Series comprises all Silurian formations in Missouri except for the Bainbridge Formation, which is Wenlockian - Ludlovian in age, *i.e.*, Middle and Upper Silurian.

Lower Silurian system
Lower Silurian system (early geologists) = ***Ordovician System***
Ordovician System

A term applied in early reports to the **Ordovician System** of present terminology, the Silurian of present usage being previously designated "Upper Silurian." Initially, lower Paleozoic strata were within the Cambrian or Silurian Systems. Lapworth (1879) proposed the name Ordovician to replace those strata of "Lower Silurian age", thus bringing us to the present usage of Cambrian, Ordovician, and Silurian Systems.

"lower unnamed formation" of Pleasanton Group

Lower formation of Pleasanton group (Searight and Howe, 1961) = ***Seminole Formation***
"lower unnamed formation" of Pleasanton Group (Thompson, 1995) = ***Seminole Formation***
Pennsylvanian System (Missourian Series)

Reference section: Cline and Green (1950, p. 63-64) described an exposure of the "Pleasanton group" in Ray County, Missouri, illustrative of this formation. It is located as an "Outcrop in north side cutbank of creek and adjacent gully just south of Missouri Highway 10, in the NW¼ sec. 20, T. 52 N., R. 28 W., Ray County, Missouri."

Thompson (1995, p. 110) stated "The "lower unnamed formation" of the Pleasanton Group includes the Hepler Sandstone Member and all overlying beds up to the base of the Exline Limestone Member of the next higher formation." This unit is essentially synonymous with the **Seminole Formation** as defined by Jewett, et al. (1968) and Howe (1982).

"lower unnamed shale member" of Lawrence Formation, Douglas Group

Pennsylvanian System (Virgilian Series)

Thompson (1995, p. 121-122). stated "The "lower unnamed shale member" of the Lawrence Formation is in most exposures and drill holes a continuous succession of shale which is medium gray in the lower and middle parts and dark gray in the upper part...Locally, in southwestern Buchanan County, sandy shale and sandstone are present in the upper part of the unit. This material contains plant fossils and is tentatively regarded as the possible equivalent of the Ireland

Member of Kansas. Thus it is possible that the medium-gray shale, which forms the lower and middle parts of the "lower unnamed shale member" may be equivalent to the Robbins Shale Member of the Stranger Formation in Kansas." The thickness of this unit varies from 50 to 80 feet.

"lower unnamed member"

"lower unnamed member" of Dutchtown formation (McQueen, 1937) = ***Gordonville Member of Dutchtown Limestone*** (Templeton and Willman, 1963)

Ordovician System (Mohawkian Series)

McQueen (1937) subdivided the Dutchtown Formation at its type section (the Geiser Quarry) into three members, the "upper unnamed member," "Geiser Quarry member," and "lower unnamed member", the units identified from a study of insoluble residues. In 1963, Templeton and Willman (p. 53-54) recognized two members, combining the Geiser Quarry and "upper unnamed member" into the **Sharpsboro Member**, overlying the basal Dutchtown **Gordonville Member**.

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lower (unnamed) shale

lower (unnamed) shale of Sulphur Springs formation (Ulrich, 1904a) = ***unnamed lower shale of Sulphur Springs Group***

Devonian System (Upper Devonian Series)

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lower Worland limestone

lower Worland limestone of Bandera shale member of Pleasanton Formation (Greene, 1933) = ***Amoret Limestone Member of Altamont Formation***

Pennsylvanian System (Desmoinesian Series)

Greene (1933) called the two limestones of the present Altamont formation the "upper Worland limestone" and "lower Worland limestone" of the Bandera shale member of the Pleasanton formation. The "upper Worland" is the present Worland Limestone Member of the Altamont Formation, the "lower Worland" is the **Amoret Limestone Member of the Altamont Formation**.

Lowville group

Lowville group (Savage, 1909) = "lower Black River"

Ordovician System (Mohawkian Series)

A term used in the east for a part of the Black River group, Lowville was occasionally used in Missouri (Ulrich, 1911) for equivalent "middle Ordovician" strata.

Lupus Sandstone Physiofacies

Lupus Sandstone Physiofacies of Callaway Limestone Physiofacies of Cedar City Formation (Fraunfelter, 1967a) = ***Hoing sandstone of Callaway facies of Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

Lutie Member

Lutie Member of Theodosia Formation of Jefferson City Group (Cullison, 1944) = ***lower part of Cotter Dolomite***

Lutie Member of Cotter Dolomite (Hedden, 1976)

Ordovician System (Ibexian Series)

The name Lutie was proposed by Cullison (1944, p. 25) for the lower member of his Theodosia Formation. It was named for outcrops between the post offices of Theodosia and Lutie in the western part of Ozark County, Missouri. The Lutie Member was overlain by the Blackjack Knob Member, and overlies the Jefferson City Dolomite. It contained within it the marker unit we still identify as the "Swan Creek sandstone."

M

Macon City

Mulky (Macon City) coal of Cherokee shale (Hinds and Greene, 1915)

Pennsylvanian System (Desmoinesian Series)

Macy Limestone of Plattin Group

Macy limestone of Plattin Group (Larson, 1951; Twenhofel, et al., 1954) = ***Macy Limestone and Castlewood Limestone Member of Spechts Ferry Formation***

Macy Formation of Plattin Group (McCart, 1986)

Macy Limestone of Plattin Group (2 members) (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: The name Macy was taken from the town of that name in Ste. Genevieve County, Missouri, the type section being a roadcut on Highway 61, SE NE SE sec. 28, 38N-8E, 3 miles west of Macy.

The Macy Limestone, the top formation of the Plattin Group, was proposed by Larson (1951, p. 2058-2060) for "a formation of fine-textured calcite limestone between the underlying Hager [Limestone] and the succeeding Decorah [Group].... The Hook Member of fucoidal fine calcite, the lower part of the formation, is overlain by the Zell Member of slabby fine-textured calcite with green shale partings." The Macy Limestone and its two members, Zell and Hook, were reproposed by Thompson (1991, 1995) for use in Missouri.

Magnesian Lens

Magnesian Lens (Gallaher, 1900) = ***Cambrian and Ordovician Systems***

Cambrian and Ordovician Systems

This term was used by Gallaher (1900, p. 77-82) for what was called the "Magnesian Limestone series" by other early geologists in Missouri. It was made up of 18 individual members, the lower 10 he considered Cambrian and the upper 8 as Calciferous. There were 5 infusorial sandstones, 2 shale beds, and 11 magnesian limestones.

Magnesian (Limestone) series

Magnesian Limestone series (early geologists; Swallow, 1855) = ***Cambrian and Ordovician Systems***

"Magnesian limestone" (Hall, 1857) = ***Salem Formation***

"magnesian series" (Nason, 1893b) = ***Ibexian Series?***

Magnesian series (White, 1893) = ***Cotter and Jefferson City Dolomites*** (and perhaps above)

Lower Magnesian series (Hovey, 1894) - Ozark series of Broadhead; = ***Ibexian Series?***

magnesian limestone and shale (Gordon, 1895) = ***Salem Formation***

Cambrian to Mississippian Systems

"Magnesian" was a term used by Swallow and other early Missouri geologists for formations of the Cambrian and part of the Ordovician Systems, consisting of the first, second, third, and fourth Magnesian limestones and the first, second, and third sandstones between the limestones. Occasionally it would also refer to younger dolomitic units.

Maple Hill Limestone Member of Zeandale Formation, Richardson Subgroup, Wabaunsee Group

Maple Hill limestone of McKissick Grove shale member of Wabaunsee formation (**Condra, 1927**) - in Nebraska

Maple Hill limestone member of McKissick Grove shale (Moore, 1932)

Maple Hill limestone member of McKissick shale formation (Ver Wiebe and Vickery, 1932; Condra, 1935)

Maple Hill limestone member of McKissick shale (Condra, et al., 1932)

Maple Hill limestone (Moore, 1936; Moore, et al., 1951) - in Kansas

Maple Hill limestone (McQueen and Greene, 1938)
Maple Hill limestone member of Zeandale limestone (Moore and Mudge, 1956)
Maple Hill member of Zeandale formation (Searight and Howe, 1961)
Maple Hill Limestone Member of Zeandale Limestone (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Maple Hill Limestone Member of Zeandale Formation (Burchett, 1970) - in Nebraska
Maple Hill Limestone Member of Zeandale Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 80) named the **Maple Hill limestone of the McKissick Grove shale member of the Wabaunsee formation**, and stated "*Maple Hill Limestone*, named from exposures south of Maple Hill, Kansas; bluish gray, somewhat arenaceous, irregular; thickness 2 to 4 feet. This bed forms a small fall in Maple Creek about 2 miles southwest of Maple Hill [eastern Wabaunsee County, Kansas]."

In Missouri, McQueen and Greene (1938) identified this unit as the **Maple Hill limestone**, and Searight and Howe (1961) called it the **Maple Hill member of Zeandale formation**. Thompson (1995, p. 130) stated "The Maple Hill Limestone Member of the Zeandale Formation is composed of two beds of brownish-gray, argillaceous limestone, which contain many brachiopods, such as, *Marginifera lasallensis* and *Dictyoclostus americanus*, as well as the fusuline *Triticites*. The Maple Hill Member was formerly regarded as the **Dover limestone** [Howe, 1958, unpub. ms.] in Missouri. The thickness of the member ranges from 1 to 2 ft." The Maple Hill Limestone Member overlies the Wamego Shale Member of the Zeandale Formation, and is overlain by the Pillsbury Shale.

Maple Mill shale

Maple Mill shale (Hannibal shale) (Weller, et al., 1948) = ***Hannibal Shale***
Maple Mill shale (Koenig, 1961a) - "north of Marion County" = ***Grassy Creek Shale***
Devonian and/or Mississippian System (Upper Devonian and/or Kinderhookian Series)

Maquoketa Group, Maquoketa Shale

Maquoketa shales (**White, 1870**) - in Iowa
Maquoketa series (Sardeson, 1897)
Maquoketa shale (Weller, 1907; Dake, 1921)
Maquoketa-Thebes (Branson and Mehl, 1933c)
Maquoketa ("Sylvan") formation (Grohskopf, et al., 1939)
Maquoketa (McQueen, 1939) = ***Cape La Croix Shale of Maquoketa Group***
Maquoketa shale (Dott, 1941) - lower part? of Maquoketa group
Maquoketa formation (Branson, 1944b)
"Maquoketa - Thebes formation of Missouri" (Rhodes, 1953)
Maquoketa shale (restricted, southeastern Missouri) (Twenhofel, et al., 1954) = ***Cape La Croix Shale***
Maquoketa group (Gudstadt, 1958)
Maquoketa formation (Martin, et al., 1961a) - northeastern Missouri
Maquoketa formation (Martin, et al., 1961a) - southeastern Missouri; = ***Cape La Croix Shale***
Maquoketa Group (Templeton and Willman, 1963) - Scales - Cape Limestone
Maquoketa Shale (Echols and Levin, 1966; Thompson and Satterfield, 1975, 1997); Thompson, 1982, 1991, 1995) - northeastern Missouri
Maquoketa Formation (Berry and Satterfield, 1972) - east-central Missouri
Maquoketa Shale (Amsden, 1971) = ***Orchard Creek Shale of Maquoketa Group***
Maquoketa Shale (restricted) (Thompson and Satterfield, 1975; Thacker and Satterfield, 1977, 1997; Thompson, 1982) = ***Cape La Croix Shale***, southeastern Missouri
Maquoketa Group (Brezinski, 1986) - northeastern Missouri
Maquoketa Group (Thompson, 1991, 1995) - southeastern Missouri; = ***Cape La Croix to Girardeau***
Ordovician System (Cincinnatian Series)

Type section: Thompson (1991, p. 221) stated "The Maquoketa Shale was named for exposures in the Little Maquoketa River Valley, Dubuque County, Iowa. The name was first used by White (1870, p. 180-182).

In Missouri, this formation was recognized first as the "Hudson River shale," but since 1900 it has been referred to as either the Maquoketa formation (Dake, 1921; Weller and McQueen, 1939), the Thebes formation (Ulrich, 1904a; Savage, 1909, 1910), or by both names together (Weller and St. Clair, 1928). Today, in northeastern Missouri the **Maquoketa Shale** overlies the Mohawkian Kimmswick Limestone, and in turn is overlain by the Cincinnatian-aged Noix or Cyrene Limestones, and occasionally rocks as young as the Late Devonian Grassy Creek Shale.

In southeastern Missouri, the Maquoketa succession is more complex. There the **Maquoketa Group** is composed of (in ascending order), the Cape La Croix Shale, Thebes Sandstone, Orchard Creek Shale, and Girardeau Limestone. The base of the group rests on the Cape Limestone, and the top is overlain either by the Cincinnatian-aged Leemon Formation, or the Early Silurian Sexton Creek Limestone.

"marble"

"marble" (Swallow (1855) = ***Bonneterre Formation***
"**marble in St. Francois area"** (Broadhead, 1872)

Cambrian System (Upper Cambrian Series)

These were early terms for the Bonneterre Formation.

"Marble boulder bed" **of Davis Formation**

"Marble boulder bed" of Davis formation (Hayes and Knight, 1961)
"Marble boulder bed" of Davis Formation (Thompson, 1995)

Cambrian System (Upper Cambrian Series)

Thompson (1995, p. 20) stated "Rounded, boulder-size masses of light-colored, finely crystalline, mottled limestone are present about 60 ft below the top of the Davis in the St. Francois Mountain area. This horizon is informally referred to as the **'Marble boulder bed'**"

Marais des Cygnes

Marais des Cygnes coal series (Swallow, 1866) = ***Bandera - Holdenville formations***
Marais des Cygnes shale (Keyes, 1900b) **-** ***Bandera? - Holdenville formations***

Pennsylvanian System (Desmoinesian Series)

Marlbrook

Marlbrook-Columbus marl (Hill, 1888) **-** in Arkansas; = ***Marlbrook marl***
Marlbrook-Saratoga units (Grohskopf, 1955)

Cretaceous System (Gulfian Series?)

Hill (1888, p. 72, 84-86, 188) used the term Marlbrook-Columbus marl for a Cretaceous marl in southwest Arkansas. It was later called the Marlbrook marl. Branner (1898, p. 52-59) used the term **Saratoga chalk** for a Cretaceous chalk overlying the Marlbrook marl. Grohskopf (1955, p. 20) stated that wells in the deeper portion of the embayment in Missouri encounter Cretaceous beds below the McNairy that roughly correlate with the Ozan and Marlbrook-Saratoga units of the Arkansas section. The names are from exposures along Marlbrook Creek and near Saratoga, Hempstead County, Arkansas.

Marmaton Group

Marmaton shale (Keyes, 1897b; Marbut, 1898) = ***Labette Shale and Anna Shale Member of Pawnee Formation***
Marmaton formation (Haworth, 1898) = ***Marmaton and Pleasanton Groups***
Marmaton stage (Haworth and Bennett, 1908) = ***Marmaton and Pleasanton Groups***
Marmaton group (Moore, 1932) **-** as currently defined
Marmaton group (Moore, 1936; Jewett, 1941, 1945; Moore, et al., 1951) **-** in Kansas, as presently defined
Marmaton (Henrietta) group (Condra and Reed, 1943) **-** in Nebraska
Marmaton group (Condra, 1949) **-** in Nebraska

Marmaton group (Greene and Searight, 1949) **-** "Henrietta" abandoned
Marmaton group of Cygnian substage (Howe and Searight, 1953)
Marmaton group (Searight and Howe, 1961)
Marmaton Group (Jewett, et al., 1968; Heckel, et al., 1979; Hatch, et al., 1989; Baars and Maples, 1998) **-** in Kansas
Marmaton Group (Neal, 1969; Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type area: Haworth (1898, p. 92) stated "As the Marmaton river crosses this formation almost at right angles, and has cut its channel into the upturned edges of them, revealing a good section of them from base to summit entirely within the state, the name Marmaton formation will be given, with stratigraphic limits as just outlined." Jeffries (1958) clarified this area as along the Marmaton River from Fort Scott to Uniontown, Bourbon County, Kansas.

The Marmaton Group consists of two subgroups, the lower Fort Scott Subgroup and the upper Appanoose Subgroup, and includes all strata from the top of the underlying Cherokee Group to the base of the overlying Pleasanton Group. Originally this was from the base of the Blackjack Creek Limestone to the top of the Holdenville Shale. According to Thompson (1995, p. 104), however, "Ravn et al. (1894) redefined the base of the Marmaton Group in Iowa...to coincide with the base of the Excello Shale, the shale below the Blackjack Creek, thus placing the base of the Marmaton at the beginning of a marine cyclothem. This concept has been adopted by Missouri.

Marshfield sandstone

Marshfield sandstone (Shepard, 1904**) =** ***Roubidoux Formation***
Ordovician System (Ibexian Series)

Shepard (1904, p. 8, 42) proposed the name "Marshfield" for a sandstone, 100 feet thick, which he felt was the equivalent of the Bolivar sandstone (Roubidoux?), First sandstone (St. Peter), Pacific sandstone (St. Peter), and Crystal City sandstone (St. Peter). It underlies the Finley limestone (Powell - Cotter) and overlies the Jefferson City limestone. Bain and Ulrich (1905a, p. 234; 1905, p. 12) correlated the Marshfield sandstone with either a sand in the Jefferson City Dolomite or the Roubidoux Formation, considering it older than St. Peter Sandstone.

Massive Crystalline Cap-rock

Massive Crystalline Cap-rock of the lower Cambrian (Gallaher, 1900) = ***Bonneterre Formation***
Cambrian System (Upper Cambrian Series)

A descriptive term used by Gallaher (1900, p. 93-96) for what he also called the Fourth limestone. Mrs. McCracken says this is probably the upper Bonneterre.

Matson Member of Joachim Dolomite

Matson Member of Joachim Dolomite (**Templeton and Willman, 1963**)
Matson Member of "upper Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Thompson (1991, p. 97) stated "Templeton and Willman (1963, p. 228) described the type section of the Matson Member as a 'Quarry and bluff exposure in north bluff of Missouri [River] Valley, half a mile west of the village of Matson, St. Charles County, Missouri (NE NE NE 4 projected, 44N-2E...).'"

Templeton and Willman (1963, p. 61-62) stated "The Matson Member consists mainly of relatively pure, gray to light brown, laminated, thick-bedded algal dolomite that grades southward into dark brown limestone having the same features...Purity, massiveness, and relatively strong resistance to weathering distinguish the Matson from any other member of the Joachim..." However, it was these same characteristics that lead to the confusion of Matson with the "Rock Levee" at its type area, allowing "Rock Levee" to be identified much farther north that it actually goes. The Marson Member overlies the much shalier Defiance Member, and is overlain by the thinner and generally shalier Metz Member.

McAlester formation

McAlester formation (Branson, 1957) - in Oklahoma; = ***Rowe and Drywood Shales***

Pennsylvanian System (Desmoinesian Series)

McClure Limestone of Bainbridge Group

McClure Limestone of Bainbridge Group (Satterfield, 1982)

Silurian System (Wenlockian and Ludlovian Series)

This name was in the running for use in Missouri for what is known as the St. Clair Limestone in Illinois. However, after the name was used in an open-file map by Satterfield (1982), it was decided by Thompson and Satterfield (1975) not to introduce another name into the literature, but to use the St. Clair Limestone as a member of the Bainbridge Formation of Missouri.

"McCraney Limestone" **of "Chouteau Limestone undifferentiated"**

McKerney [*sic.*] member (or beds) of the Hannibal formation (Moore, 1928) - in western Illinois
McKerney [*sic.*] limestone of the North Hill Member of the Hampton formation (Moore, 1935) - in Iowa
McKerney [*sic.*] limestone (Keyes, 1940a) "= Earthy ledge of the Burlington limestone"
McCraney limestone (Thomas, 1949) - in Iowa
McCraney formation (Scott and Collinson, 1961) - in northwestern Missouri
"McCraney Limestone" (Thompson, 1986, 1995) - in northeastern Missouri

Mississippian System (Kinderhookian Series)

Thompson (1986, p. 62) stated "In portions of northeastern Missouri, there are strata of the Chouteau Group identified only as 'Chouteau Group undifferentiated' or 'Chouteau Limestone.' These rocks are not lithologically part of the Compton, Sedalia, or 'unnamed limestone,' but constitute two distinct, separate limestone formations within the Chouteau Group. One of them closely resembles the McCraney Limestone of western Illinois, and is discussed under 'McCraney Limestone.'

"Lithologically the other Chouteau limestone is mostly finely to medium crystalline, even bedded and very fossiliferous, often crinoidal.... In sharp contrast, the 'McCraney Limestone' is a very irregularly to wavy bedded, fine-grained mudstone, with scattered pockets of fossils. At some sections in the vicinity of the Lincoln arch, in Pike and Ralls counties, the Chouteau is represented only by the crystalline limestone; at other sections, the crystalline limestone is overlain by the 'McCraney Limestone.'"

McCune limestone

McCune limestone of Trenton limestone (Keyes, 1898c) = ***Kimmswick Limestone*** (upper part)
McCune limestone (Keyes, 1914; Shimer, 1934) = ***Kimmswick Limestone*** (upper part)
McCune limestone (Keyes, 1923a) - rejected "Kimmswick"
McCune (Kay, 1937) "= Stewartville; upper Trenton"; = ***Kimmswick Limestone*** (upper part)

Ordovician System (Mohawkian Series)

A term proposed by Keyes (1898c, p. 59, 61) for a dolomitic limestone forming the upper part of what was previously called "Trenton" in northeastern Missouri, the "McCune limestone" overlies the "Bryant limestone" and underlies the "Buffalo shale" (Maquoketa Shale) in Pike and Lincoln counties. Others, including Keyes, later stated that the Kimmswick (broad usage) is equivalent to the McCune limestone of Keyes. It was named for exposures near McCune Station, Pike County, Missouri. Templeton and Willman (1963, p. 128) stated that the "McCune" of Keyes could be a young as Dubuque, or Stewartville, and could be early Cincinnatian in age.

McKerney [*sic.*] limestone

McKerney [*sic.*] member (or beds) of the Hannibal formation (Moore, 1928) - in western Illinois; = ***McCraney Limestone***
McKerney [*sic.*] limestone of the North Hill Member of the Hampton formation (Moore, 1935) - in Iowa; = ***McCraney Limestone***

McKerney [*sic.*] limestone (Keyes, 1940a) "= Earthy ledge of the Burlington limestone"; = ***McCraney Limestone***
Mississippian System (Kinderhookian Series)

McKissick (Grove) shale
McKissick Grove shales (Condra and Bengston, 1915) - in Nebraska; = ***Wamego to Dry shales***
McKissick Grove shale member of Wabaunsee formation (Condra, 1927) - in Nebraska; = ***Wamego to Dry Shales*** (top of Pennsylvanian in Missouri)
McKissick Grove shale (Moore, 1932) = ***Wamego Shale Member of Zeandale Formation to base of Brownsville Limestone*** (in Kansas)
McKissick shale formation (Ver Wiebe and Vickery, 1932; Condra, 1935) = ***Wamego Shale to top of Pennsylvanian in Missouri***
McKissick shale (Condra, et al., 1932) = ***Wamego Shale to top of Pennsylvanian in Missouri***
Pennsylvanian System (Virgilian Series)

The McKissick Grove, or McKissick, formation included all strata above the Tarkio Limestone Member of the Zeandale Formation to the top of the Pennsylvanian succession in Missouri.

McLouth Formation

McLouth sand (**Lee, 1941**) **-** in Kansas
McLouth formation (Searight and Howe, 1961)
McLouth Formation (Thompson, 1995)
Pennsylvanian System (Atokan Series)

Type section: The McLouth Formation was named by Lee (1941) as a subsurface formation, the name coming from the McLouth gas and oil field of Jefferson and Leavenworth counties, northeastern Kansas.

In Missouri, the McLouth has been described only from subsurface "exposures" from wells in northwestern Missouri. Its relationship to other basal Pennsylvanian strata is not clearly understood, although W.B. Howe was developing a possible relationship of McLouth to the Riverton Formation of west-central Missouri at the time of his untimely passing.

McNairy Formation

McNairy sand member of Ripley formation (Stephenson, 1914, Farrar, 1935)
McNairy (Ripley) formation (Grohskopf, 1955)
McNairy formation (Grohskopf and Howe, 1961)
McNairy Formation (Thompson, 1995)
Cretaceous System (Gulfian Series)

Type section: The name "McNairy sand member" was proposed by Stephenson (1914, p. 17-18) for extensions northward into Tennessee of the typically marine beds of the Ripley formation of Mississippi. It is named from a section in McNairy County, Tennessee.

The McNairy originally included the overlying Owl Creek formation, but in 1926 Wade (p. 7-8) redefined the Ripley formation in Tennessee and placed the McNairy sand member between the Owl Creek beds above and the Coon Creek horizon below. The beds of the McNairy sand member of the Ripley formation were first recognized in southeast Missouri by Stephenson in 1932 (Matthes, 1933, p. 1003-1009). In 1942 Stephenson, in a written communication to McQueen (Jan. 16) stated that it seemed justifiable to raise the term McNairy to formational rank for use in southeast Missouri. Grohskopf (1955, p. 19-20) used the term "McNairy (Ripley) formation." McQueen (1939, p. 50-76) made several divisions in the McNairy which cannot be traced very far in the subsurface, and are not generally used except as local terms. The McNairy is now regarded as a formation, and in Missouri "Ripley" is no longer used.

Thompson (1995, p. 135) stated "In its outcrop area in Scott and Stoddard counties, the McNairy Formation is composed of a succession of nonmarine sand, sandy clay, and clay..At the surface the formation is roughly divisible into a lower and upper part. The lower part contains (in ascending order): 1) a basal gravel, 2) a thin-bedded ,light-gray clay, interbedded with thin layers of fine- to medium-grained orange sand, and 3) a sandstone composed of light-yellow to orange, medium- to coarse-grained, subangular sand with little or no mica. The upper part of this sandstone is usually silicified and is locally named the **"Commerce quartzite."** The upper part of the McNairy is made up of a succession of five alternating beds of sandstone and clay...3) a light-gray to brownish-black, lignitic clay [is] locally known as the **"Zodoc clay"** and mined for ceramic clay...The McNairy is an important aquifer in the Embayment area and is also a source of sand. Its thickness ranges from 100 to 250 ft."

McPherson marble

McPherson marble of Birds-Eye limestone (Shumard, 1873) = ***Brickeys Member of Bloomsdale Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

This is a term used by Shumard (1873, p. 307) for a light drab, brittle limestone, with bluish cloudings, which forms a handsome and durable building rock. It was included in the lower part of the "Bird's Eye limestone," a bed in the Plattin Limestone. It was named for McPherson's marble quarry, Jefferson County, Missouri.

Meadow limestone (member)

Meadow limestone member of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Sheldon Limestone Member of Topeka Formation?***
Meadow limestone of Calhoun shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Hartford Limestone Member of Topeka Formation*** (some sections)
Meadow limestone of Calhoun shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Sheldon Limestone Member of Topeka Formation*** (some sections)
Meadow limestone bed of Stanton limestone member of Lansing formation (Condra, 1930) - in Nebraska; = ***Captain Creek Limestone Member of Stanton Formation***
Meadow limestone member of Stanton limestone (Moore, 1932) - in Kansas; = ***Captain Creek Limestone Member of Stanton Formation***
Meadow limestone member of Stanton limestone (Condra, et al., 1932) = ***Captain Creek Limestone Member of Stanton Formation***
Captain Creek ("Meadow") limestone member of Stanton limestone (Condra, 1935)

Pennsylvanian System (Virgilian Series)

Meramec group

Meramec group (Ulrich, 1904b) = ***Meramecian Series***

Mississippian System (Meramecian Series)

Meramec group was a term proposed by Ulrich (1904b, p. 90-113) to include the Warsaw, Spergen and St. Louis formations which are exposed on the Meramec River near St. Louis. It was previously called the St. Louis group.

Medusa Limestone Member of "Pecatonica Formation"

Medusa Member of Pecatonica Formation (Templeton and Willman, 1963)
Medusa Member of "upper Pecatonica" of "Pecatonica Formation" (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Thompson (1991, p. 107) stated "A conspicuous fucoidal zone with dolomite mottling...in the middle part of the upper limestone [of the "Pecatonica Formation"] was identified as the **Medusa Member** by Templeton and Willman (1963). Other than the Medusa Member, however, the "upper Pecatonica" limestone is difficult to distinguish from limestone of the Plattin Group above the Establishment Shale."

Memorial shale

Memorial shales (Dott, 1936) - unpublished, - in Oklahoma
Memorial shale (Moore, 1936; Jewett, 1941; Moore, et al., 1951) - in Kansas; = ***Holdenville Shale?, = Lost Branch Formation?***

Memorial shale (Dott, 1941) - in Oklahoma; = ***Holdenville Shale***
Memorial formation (Greene and Searight, 1949) = ***Memorial and Lost Branch Formations***
Memorial shale (Cline and Greene, 1950) = ***Lost Branch Formation***
Memorial Shale (Heckel, 1991) = ***from top of Norfleet Limestone Member to top of Dawson Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Named from sections near Tulsa, Oklahoma, Cline and Greene (1950, p. 26-27) identified the Memorial formation as "All rocks lying above the Lenapah formation and below the Desmoinesian-Missourian unconformity..."

"The Memorial is thin or absent in the Missouri outcrops. The formation is represented by eight feet of gray shale, dark-gray below and lighter with maroon mottling above. At Archie in Cass County...it is overlain by a sandstone which is assigned to the Hepler....In northwestern Lafayette County...it consists of 17 feet of shale and clay...Near the middle of the formation there is a four-foot green and red mottled clay that weathers to a red soil..."

Meppen Limestone Member of Fern Glen Formation

Meppen Formation (Collinson, et al., 1971) = ***basal part of Fern Glen***, replaced "Sedalia" in Illinois
Meppen Limestone of Fern Glen Formation (Atherton, et al., 1975; Collinson, et al., 1979) - in Illinois
Meppen Limestone Member of Fern Glen Formation (Thompson, 1984, 1986, 1995)
Mississippian System (Osagean Series)

Type section: Atherton, et al. (1975) stated "The Meppen Limestone is named for the village of Meppen, Calhoun County (Illinois), and the type section is in a quarry 0.6 mile north of Meppen (SW NE 23, 12S-2W)..."

Thompson (1986, p. 75) stated "Named to replace the 'Sedalia' in Illinois, the Meppen Limestone [Member of the Fern Glen Formation] is equivalent to the lower Fern Glen limestone in Missouri, and also to the 'lower brown beds of the Burlington' [Pierson] in central Missouri...The Meppen Limestone in many places is a brick-red, very fossiliferous limestone that breaks down readily on weathering...Typically it is a dense, hard, buff limestone that forms resistant ledges."

Meramecian Series

Meramec group (Ulrich, 1904b; Weller and St. Clair, 1928)
Meramecian series of Tennesseic Period (Schuchert, 1910) = ***Warsaw - St. Louis formations***
Meramecian series of Tennessean Period (Ulrich, 1911) = ***Warsaw - St. Louis formations***
Meramec group (Weller, 1914) - excluded Warsaw and Ste. Genevieve; = ***Salem and St. Louis Limestones***
Meramecian series of Lower Mississippian subsystem (Krey, 1924)
Meramec subseries (Laudon, 1937) - rejected "Valmeyer" of Weller and Sutton (1933)
Meramec group (Weller and Sutton, 1940) - excluded Warsaw; upper part of "Iowa series"
Meramec series (of Middle Mississippian) (Cheney, et al., 1945)
Meramecian series (Spreng, 1961) - Warsaw - Ste. Genevieve
Meramecian Series (Thompson, 1966, 1979a; Lane and Brenckle, 1977) = ***Warsaw - Ste. Genevieve***
Meramec Series (Sable, 1979) = ***Warsaw - Aux Vases***
Meramecian Series (Thompson, 1986) = ***Warsaw - Aux Vases***
Meramecian Series (Maples and Waters, 1987) = ***Warsaw - St. Louis***
Meramecian Series (Kammer, et al., 1991) = ***middle Warsaw - St. Louis***
Mississippian System

Type area: Initially the Meramecian Series was derived from the Meramec group with the Ste. Genevieve formation added at the top. It was named for Meramec Highlands and Meramec River, west of St. Louis.

Thompson (1986, p. 99) stated "The upper boundary of the Meramecian (and Valmeyeran) Series was originally defined as the top of the Ste. Genevieve Formation. As defined by Spreng (1961), the upper boundary of the Meramecian (or Valmeyeran) Series is at the top of the Ste. Genevieve Limestone, where Chesterian strata occur, at the base of the Aux Vases Sandstone...Recently, in the southern part of the Illinois basin this boundary was moved upward...into the middle of the Renault Formation (Swann, 1963...)"

In 1987, Maples and Waters (p. 647) again redefined the Meramecian/Chesterian boundary to the base of the Ste. Genevieve, and stated "This change in definition places the Ste. Genevieve Limestone (Genevievian Stage) in the lowermost part of the Chesterian Series, with which it is biotically and sedimentologically more allied than with the underlying St. Louis Limestone." To add to this, Kammer, et al. (1991) redefined the base of the Meramecian Series in the St. Louis area (type Meramecian area) to the approximate middle of the Warsaw Formation, rather that at its base as previously defined.

Merriam Limestone Member of Plattsburg Formation, Lansing Group

Merriam limestone member of Plattsburg limestone (**Newell, *in* Moore, 1932**; Moore, et al., 1951) - in Kansas
Merriam limestone of Plattsburg formation (Condra and Scherer, 1939) - in Nebraska
Merriam (Meadow) limestone member of Plattsburg formation (Condra, 1949) - in Nebraska
Merriam limestone member of Plattsburg formation (Greene and Searight, 1949)
Merriam member of Plattsburg formation (Searight and Howe, 1961)
Merriam Limestone Member of Plattsburg Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Merriam Limestone Member of Plattsburg Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Merriam Limestone Member of Plattsburg Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Newell (*in* Moore, 1932) named the Merriam Limestone Member. Moore (1936, p. 128) located the type section at the "...village of Merriam, in quarry at NW cor. sec. 7, T. 12 S., R. 25 E., in northern Johnson county, Kansas."

Thompson (1995, p. 117) stated "The Merriam Limestone Member ...is composed of beds of limestone, which are interbedded with calcareous shale. The individual limestone beds have distinctive lithologic and paleontologic characteristics, which make it possible to trace the beds for considerable distances. Large, mayilinid pelecypods are generally present in the lower part of the member. The Merriam is 1 to 3 ft thick." The Merriam Limestone Member overlies the Bonner Springs Shale (or Member of the Lane Shale), and is overlain by the Hickory Creek Shale Member of the Plattsburg Formation.

Mesozoic Era

Mesozoic is a major time term, meaning middle life, based on the life (*zoic*) contents of the rocks. It includes the Cretaceous, Jurassic, and Triassic periods, but only rocks of Cretaceous age are present in Missouri.

Thompson (1995, p. 133) stated "In Missouri, Mesozoic rocks are restricted to that part of the Mississippi Embayment which extends into the extreme southeastern part of the state. Here, the Era is represented only by rocks of the Cretaceous System..."

"Farther north, in Ste. Genevieve and St. Francois counties, a total of 78 known, **ultrabasic diatremes** are exposed that are tentatively regarded as being Cretaceous in age. At least one of the diatremes is definitely known to be post-Devonian in age, because Devonian fossils have been found in limestone inclusions within it."

Metz Member of Joachim Dolomite

Metz Member of Joachim Dolomite (**Templeton and Willman, 1963**)
Metz Member of "upper Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 62) named the Metz Member of the Joachim Dolomite from "...a quarry just north of West Point Creek and Landing. Calhoun County, Illinois...", named from "Metz Lake on the floodplain of the Mississippi River, 5 miles north of the type section..." This quarry is also the type section for the Victory Member of the Hager Limestone of the Plattin Group.

The Metz Member of the Joachim Dolomite is (Thompson, 1991, p. 102) "...readily distinguished from the underlying Matson Member, because it is less resistant and is composed of yellow-brown shaly laminated dolomite, with prominent 'birdseye' structures, a lithology that occurs as minor beds in the Matson but constitutes most of the Metz. The overlying Brickeys Member of the Bloomsdale Limestone is distinctive in being a chocolate brown oolitic lithographic limestone and interbedded dolomite." The contact between the Metz and overlying Plattin Group is disconformable, and regionally unconformable.

"Middle coal"

"Middle coal" or two-foot coal" of "Shale and coal member of Cherokee formation" (Greene and Pond, 1926)

= Fleming Coal Bed of Fleming Shale

Pennsylvanian System (Desmoinesian Series)

Middle Creek Limestone Member of Swope Formation, Bronson Subgroup, Kansas City Group

Middle Creek limestone member of Swope limestone (**Newell, in Jewett, 1932**; Moore, et al., 1951) - in Kansas
Middle Creek limestone member of Bethany Falls limestone (Condra, et al., 1932)
Middle Creek limestone member of Ladore shale (McQueen and Greene, 1938; Branson, 1944b)
Middle Creek limestone member of Swope limestone (Clair, 1943)
Middle Creek member of Swope formation (Searight and Howe, 1961)
Middle Creek Limestone Member of Swope Formation (Payton, 1966; Gentile, 1976; Thompson, 1995)
Middle Creek Limestone Member of Swope Limestone (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: The name Middle Creek was proposed by Newell (*in* Jewett, 1932). Moore (1936, p. 85) located the type section as "SW sec. 22, T. 18 S., R. 24 E., on Middle Creek at crossing of main Highway 3 miles east of La Cygne, northern Linn County [Kansas]."

Thompson (1995, p. 114) stated "The Middle Creek Limestone...contains one to two thin beds of dark-gray limestone that have well-developed vertical joints. Locally, a great many bryozoa are present in the thin beds of gray shale which are associated with the limestone. The average thickness of the member is less than 1 ft." McQueen and Greene (1938) and Branson (1944b) placed this limestone in the Ladore shale (broad since), instead of the Swope formation. The Middle Creek Limestone Member overlies the Elm Branch (formerly Ladore) Shale, and is overlain by the Hushpuckney Shale Member of the Swope Formation.

Middle Devonian Series

Middle Devonian (Schuchert, 1897)
Middle Devonian "Sub-System" (Savage, 1925)
Middle Devonian series (Koenig, 1961a)
Middle Devonian Series (Collinson, et al., 1967; Thompson 1993, 1995)

Devonian System (Middle Devonian Series)

Middle Devonian formations in Missouri are exposed mainly in southeastern and north-central and northeastern Missouri. They are more widespread in the subsurface of northern Missouri.

"middle Joachim Dolomite" of Joachim Dolomite

"middle Joachim Dolomite" of Joachim Dolomite (Thompson, 1991, 1995) = ***Boles and Defiance Members***

Ordovician System (Mohawkian Series)

The "middle Joachim Dolomite" is basically a succession of thin bedded, shaly dolomite, overlying the sandy dolomites of the "lower Joachim", and overlain by the massive-bedded reef of the Matson Member of the "upper Joachim." This unit is useful when it is difficult to distinguish the Boles and Defiance Members, which is often the case.

Middle Ordovician

Middle Ordovician (Bridge and Ingerson, 1923; Branson and Mehl, 1933; Branson, 1941; Larson, 1951) = ***Whiterockian***

Ordovician System (Whiterockian Series)

The Middle Ordovician in Martin, et al. (1961a) was identified as the "Champlainian Series," overlying the Canadian Series and underlying the Cincinnatian Series. By the time of Thompson (1991), Champlainian was no longer used, and the "Middle Ordovician" comprised the lower Whiterockian Series and upper Mohawkian Series. Webby (1998) outlined the most recent international classification for Ordovician strata, and now Middle Ordovician includes only the lower three-fourths of the Whiterockian Series, the upper Whiterockian and Mohawkian now in the Upper Ordovician. Therefore, if one must use "Middle Ordovician", it lies above the Ibexian Series, and the top is in the upper part of the Whiterockian Series.

"middle unnamed formation" of Pleasanton Group

Middle formation of Pleasanton group (Searight and Howe, 1961) = ***Lees Summit Formation*** of Howe (1982)

"middle unnamed formation" of Pleasanton Group (Thompson, 1995) = ***Lees Summit Formation*** of Howe (1982)

Pennsylvanian System (Missourian Series)

As of this time, no formally proposed name has been published for the middle interval of the Pleasanton Group. In Kansas, Jewett, et al. (1965, 1968) placed this interval in the lower part of their **Tacket Formation**. Howe (1982) proposed to name the middle portion of the Pleasanton the **Lees Summit Formation**.

The base of this unit is at the base of the Exline Limestone Member, the top is at the base of the Warrensburg (or Moberly) Sandstone Members. This is the lower part of the **Shale Hill Formation** of Watney and Heckel (1994)

Midway Group

Midway group (Farrar, 1935; Koenig, 1961)

Midway Group (Thompson, 1995)

Tertiary System (Paleocene Series)

Type section: The term Midway was originally applied by E.A. Smith (1886, p. 7-14) to exposures of limestone and marl of basal Cenozoic age that crop out at Midway Landing on the Alabama River, Wilcox County, Alabama. Later Harris (1894, p. 303-304) proposed a redefinition to include all the strata between the Wilcox above and the Cretaceous below. This later usage has been generally accepted.

Thompson (1995, p. 138) stated "The Midway Group in Missouri is composed of two formations, the Clayton below and the Porters Creek above. The Midway Group varies in thickness from a few inches in some places in its outcrop area long Crowley's Ridge in Scott and Stoddard counties to more than 650 ft in the subsurface beneath Pemiscot County. The group lies unconformably beneath the Wilcox Group (Eocene) and unconformably upon the eroded surface of the Owl Creek Formation (Cretaceous). The contact between the Clayton and Porters Creek is conformable."

Mifflin Formation

Mifflin Formation of Plattin Subgroup of Platteville Group (Templeton and Willman, 1963; Willman and Kolata (1978) = ***Bloomsdale and lower part of Beckett Limestones of Plattin Group***

Mifflin of Plattin Sub-Group (Shourd and Levin, 1976)

Ordovician System (Mohawkian Series)

The Mifflin Formation was proposed for Platteville strata of the Illinois Basin, and was extended into Missouri by Templeton and Willman (1963). However, the nomenclature proposed in 1951 by Larson was found by Thompson (1991) to more adequately represent Plattin strata in Missouri, and Mifflin was not used.

Millbrig K-bentonite bed of Glencoe Shale Member, Spechts Ferry Formation, Decorah Group

Millbrig Bentonite Bed of Glencoe Member of Spechts Ferry Formation (Willman and Kolata, 1978)
Millbrig K-bentonite Bed of Spechts Ferry Formation (Kolata, et al., 1984)
Millbrig K-bentonite Bed of Glencoe Member of Spechts Ferry Formation (Kolata, et al., 1986) "= Housefield metabentonite of Chaumont Formation of New York"
Millbrig bentonite (Samson, et al., 1988)
Millbrig K-bentonite Bed of Glencoe Shale Member of Spechts Ferry Formation (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Thompson (1991, p. 188) noted, "Willman and Kolata (1978, p. 59) named the **Millbrig Bentonite Bed** of the Glencoe Member... from a section in Jo Daviess County, northern Illinois, the type section being a 'Cutbank along east side of Galena River, 1 mi southeast of Millbrig,...'" This bentonite (a volcanic ash bed) has been correlated with a bentonite bed in New York.

Mincke Member of Kings Lake Limestone, Decorah Group

Mincke Member of Kings Lake Formation (Templeton and Willman, 1963)
Mincke Member of Kings Lake Limestone (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963) named both the Mincke and Tyson Members of the Kings Lake Limestone from the exposure on the Burlington-Northern Railroad tracks near Mincke Siding, St. Louis County, Missouri. This is also the type section for the Deicke K-bentonite Bed and the Castlewood Limestone member of the Spechts Ferry Formation, in the south bluff of the Meramec River, along the Burlington-Northern Railroad, ¼ mi northeast of Mincke Siding, near the center of E½ SE¼ SE¼ sec. 21, T. 44 N., R. 4E., Manchester 7½' Quadrangle.

The two members of the Kings lake Limestone are quite similar. Thompson (1991, p. 191) stated "The lower, Mincke Member is more silty and argillaceous than the Tyson Member. In northeastern Missouri the latter..is more argillaceous and silty than the overlying Guttenberg Limestone. The Tyson is more or less transitional between the Mincke and the basal Guttenberg beds, but it is much thinner bedded than the latter and more like the former."

Mine Creek Shale Member of Pawnee Formation, Appanoose Subgroup, Marmaton Group

Mine Creek shale member of Pawnee limestone (**Jewett, 1941**; Moore, et al., 1951) - in Kansas
Mine Creek shale member of Pawnee formation (Greene and Searight, 1949)
Mine Creek member of Pawnee formation (Cline and Greene, 1950; Searight and Howe, 1961)
Mine Creek Shale (Manos, 1967) "= Anvil Rock Sandstone in Illinois and Indiana"
Mine Creek Shale Member of Pawnee Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Mine Creek Shale Member of Pawnee Formation (Gentile, 1976; Thompson, 1995)
"Missouri" Mine Creek Shale Member of Pawnee Limestone (Price, 1981)
"Iowa" Mine Creek Shale Member of Pawnee Limestone (Price, 1981) - in Iowa
Pennsylvanian System (Desmoinesian Series)

Type section: The Mine Creek Shale Member was named by Jewett (1941, p. 318), who stated "The type exposure of the Mine Creek shale is near the middle of the south line of sec. 23, T. 21 S., R. 25 W., on a tributary of Mine Creek in Linn county, Kansas."

Thompson (1995, p. 107) stated "The Mine Creek Shale...is mostly a medium- to dark-gray shale, with shades of green and brown. It is commonly calcareous and contains limestone nodules in many places. Where the member is thickest, it contains some sandstone...The thickness of the member varies from 5 to 30 ft." The Mine Creek is overlain by the Coal City Limestone Member, and overlies the Myrick Station Limestone Member of the Pawnee Formation."

Mineola facies of Cedar Valley Limestone

"Crinoidal limestone" near Mineola (Broadhead, 1874) = ***Mineola facies of Cedar Valley Limestone***
Mineola limestone (Branson, 1922, 1924, 1941, 1944a, 1944b; Savage, 1925; Kindle and Miller, 1939; Dott, 1941; Croneis, 1944)
Mineola limestone (Cooper, et al., 1942) "= Rapid limestone of Iowa"
Mineola facies of Callaway Formation (Unklesbay, 1955)
Mineola facies of Callaway formation (Koenig, 1961a)
Mineola Crinoidal, Arenaceous, Coarse-grained Limestone Lithofacies of Cedar City Formation (Fraunfelter, 1967a)
Mineola facies of Cedar City Formation (Sleeman, 1967)
Mineola lithofacies of Cedar Valley Formation (Schumacher, 1972)
Mineola Limestone (Huddle and Repetski, 1981; Rogers and Pitrat, 1987)
Mineola facies of Cedar Valley Limestone (Thompson, 1993, 1995)
Devonian System (Middle Devonian Series)

The Mineola was originally defined by Branson (1920, p. 267-276) as a limestone formation underlying the Callaway limestone and overlying formations ranging from Kimmswick to Jefferson City. It was named for exposures in the vicinity of Mineola, Montgomery County, Missouri. It later became to be regarded as a facies of the Callaway formation, which was itself a facies of the complex limestone unit collectively called "Callaway." Thompson (1993) redefined the "Callaway" as the **Cedar Valley Limestone**, and regarded the various named lithologic types as "facies" of the Cedar Valley, thus the **"Mineola facies of the Cedar Valley Limestone."**

Mineral Coal Bed of Mineral Shale, Cabaniss Subgroup, Cherokee Group

Mineral coal bed of Mineral cyclothem (**Abernathy, 1937**) - in Kansas
Mineral coal of Mineral formation (Searight, et al., 1953)
Mineral coal of Senora formation (Branson, 1954a) - in Oklahoma
Mineral coal (Searight, 1959) "= Wiley coal in Illinois"
Mineral coal bed of Mineral formation (Searight and Howe, 1961)
Mineral coal bed of Cabaniss Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Mineral coal of Mineral Formation (Gentile, 1976) = "lower Rich Hill" coal of earlier reports
Mineral coal bed of Mineral Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Abernathy (1937) named the "Mineral cyclothem" for the town of West Mineral, northwestern Cherokee County, Kansas.

Abernathy (1937, p. 22) stated "The coal bed is locally known as the upper 'Weir-Pittsburg,' 'Lightning Creek' and 'Mineral'. It is designated as the Mineral coal bed in this report."

Mineral Ricer coal

Mineral Ricer coal (Pierce and Courtier, 1935) - in Kansas; = ***Fleming Coal Bed of Fleming Shale***
Pennsylvanian System (Desmoinesian Series)

Mineral Shale of Cabaniss Subgroup, Cherokee Group

Mineral cyclothem (**Abernathy, 1937**; Moore, et al., 1941) - in Kansas
Mineral formation (Searight, et al., 1953; Searight and Howe, 1961)
Mineral Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Abernathy (1937) named the "Mineral cyclothem" for the town of West Mineral, northwestern Cherokee County, Kansas.

Thompson (1995, p. 101) stated "Where the Mineral Formation is complete, it consists of (in ascending order): 1) a thin, dark-gray, finely crystalline, fossiliferous limestone; 2) a calcareous, gray shale; 3) a silty, light- to medium-gray shale; 4) a stigmarian sandstone; 5) an underclay; and 6) the **Mineral coal bed**...The Mineral coal bed at the top of the formation ranges from the thickness of a smut streak to as much as 7 ft..."
The Mineral Shale overlies the Scammon Shale, and is overlain by the Robinson Branch Shale.

Minnesotan series

Minnesotan series (**Keyes, 1912**, 1941b) = ***St. Peter Sandstone***
Minnesotan series (Keyes, 1914; 1915) = ***Everton - Decorah***
Ordovician System (Mohawkian Series)

"Minnesotan series" was term proposed by Keyes (1912, p. 147-151), which he later applied to Missouri (1915, p. 253). It overlies the Canadian series of Ulrich and underlies the Mohawkian series. Apparently it initially only included the **St. Peter Sandstone**.

Minnith zone

Minnith zone (Weller and St. Clair, 1928) = ***"Powell Dolomite"***
Ordovician System (Ibexian Series)

Weller and St. Clair (1928, p. 86-90) stated that the base of the upper "Powell Dolomite" is placed at the bottom of a zone of cellular ferruginous chert, which they termed the "Minnith zone", in which there is a prolific fauna in most places where it is found, the distinguishing fossils being Trochonemoid gastropods. The Minnith zone consists of intercalated beds of argillaceous dolomite, decomposed dolomite, and soft, ferruginous chert. At Minnith, the Minnith zone rests directly on the Cotter Dolomite. It was named for exposures at and near Minnith, Ste. Genevieve County.

Miocene Series

Tertiary System

The Miocene Series includes formations that form the next to last (youngest) series of the Tertiary System. It overlies strata of the Oligocene Series, and is overlain by the Pliocene Series.

Misener sand

Misener sand (Clair, 1943)
Misener Sandstone Member of Chattanooga Shale (Maples, 1994; Baars and Maples, 1998) - in Kansas
Devonian System (Late Devonian Series)

Clair (1943, p. 31) states, that there is a possibility that a sand in northwest Missouri drill holes is a representative of the Misener which is considered by some to be of Mississippian, but by others to be of Devonian age. Kansas defined this unit as the **Misener Sandstone Member of the Chattanooga Shale.** Maples (1994) stated that "'Misener sandstone' is the probable equivalent of Bachelor or Bushberg sand- stones." In this usage, it would be essentially synonymous with the **Sylamore Sandstone.**

Mission Creek shale

Mission Creek shale bed of Deer Creek limestone member of Shawnee formation (Condra, 1927) - in Kansas; = ***Larsh Shale Member of Deer Creek Formation***
Mission Creek shale member of Deer Creek limestone (Moore, 1932) = ***Larsh Shale Member of Deer Creek Formation***
Mission Creek shale member of Deer Creek limestone (Condra, et al., 1932) = ***Larsh Shale Member of Deer Creek Formation***
Larsh - Mission Creek shale member of Deer Creek limestone (Moore, 1936, 1937) - in Kansas; = ***Larsh-Burroak Shale Member of Deer Creek Formation***

Larsh-Mission Creek shale member of Deer Creek limestone (McQueen and Greene, 1938; Branson, 1944b)
= ***Larsh-Burroak Shale Member of Deer Creek Formation***
Pennsylvanian System (Virgilian Series)

Mississippian (Sub-System) System

Carboniferous or "Mountain limestone on the Mississippi" (Engleman, 1847) = ***Mississippian System***
Mississippi Limestone series, or "Mississippi group" (Winchell, 1869)
Mississippian series (Williams, 1891)
Mississippian system (Gordon, 1895)
Mississippian (Sub-Carboniferous) system (Buckley and Buehler, 1904)
Mississippic Period (Schuchert, 1910)
Mississippian series (Keyes, 1914, 1922, 1933) = ***Osagean and Meramecian Series***
Upper Mississippian series (Branson, 1944b) = ***Chesterian Series***
Middle Mississippian series (Branson, 1944b) = ***Osagean and Meramecian Series***
Upper Mississippian Series (Bradley, 1956) = ***Meramecian and Chesterian Series***
Mississippian system (Spreng, 1961)
Mississippian System (Thompson, 1986, 1995)
Mississippian Subsystem of Carboniferous System (Subcommission on Carboniferous Stratigraphy, 2000)
Mississippian System

The Mississippian System has been previously called Lower Carboniferous, Subcarboniferous, and in Missouri, the Mountain Limestone. It was named for its development in the Mississippi River Valley between Missouri and Illinois.

Missourian Series

Missouri terrane (**Keyes, 1893a**)
Missouri formation (Keyes, 1894a)
Missouri stage (Keyes, 1894a; Lonsdale, 1895)
Missourian series (Wheeler, 1896.; Prosser, 1897) - in Kansas; = ***Pleasanton to Permian***
Missourian formation (Bain, 1897; Marbut, 1898)
Missouri series (Keyes, 1898b)
Missourian series (Keyes, 1899; 1900b) = ***Kansas City Group to Permian***
Missourian stage (Calvin, 1901) - in Iowa
Missourian series (Prosser, 1902) - in Kansas; = ***Kansas City to base of Permian***
Missourian division (Bain, 1902) - in Kansas
Missouri group (Hinds, 1912; Moore and Haynes, 1917) = ***Kansas City to Permian***
Missouri series (Moore, 1932, 1936) = ***Pleasanton to Pedee Groups***
Missouri series (Condra, et al., 1932; Keyes, 1937b; Moore, et al., 1944) = ***Missourian and Virgilian Series***
Missourian series (Moore, et al., 1951) - in Kansas
Missourian Series (Searight and Howe, 1961; Gentile, 1976; Thompson, 1995)
Missourian Stage of Upper Pennsylvanian Series (Jewett, et al., 1968) - in Kansas
Missourian Series of Pennsylvanian System (Baars and Maples, 1998) - in Kansas
Pennsylvanian System

Type area: Keyes (1894a, p. 82) stated "The Missouri corresponds essentially with the 'upper' Coal Measures, representing the more strictly marine beds. It is the formation typically developed in the northwestern part of the State of Missouri. The Missouri river also winds its way for more than 100 miles through the beds of this stage, exposing numberless fine sections on both sides of the stream throughout the entire distance."

Moore (1932, p. 88) redefined the unit, stating, "..The Missouri series, as formerly defined, included all of the Pennsylvanian strata above the Des Moines. The writer proposes now to restrict this name to apply to the beds between the unconformity at the top of the Des Moines series and another important unconformity in what has previously been classed as the Douglas formation or group [top of Pedee Group]."

The Missourian Series comprises four groups. It overlies strata of the Desmoinesian Series, and is overlain by those of the Virgilian Series.

Moberly sandstone

Moberly sandstone (Marbut, 1898)
Moberly channel (Hinds, 1926)
Moberly channel sandstone (Bass, 1934)
Moberly sandstone of Pleasanton group (Branson, 1944b)
Moberly Sandstone Member (Thompson, 1979)
Pennsylvanian System (Missourian Series)

Howe (1982) reclassified the Warrensburg Sandstone Member and Moberly Sandstone Member together as the **Weldon River Sandstone Member of the Shale Hill Formation** of the Pleasanton Group. The Warrensburg is exposed in the area of Warrensburg, in west-central Missouri, whereas the Moberly is exposed north of the Missouri River primarily in Randolph and Monroe counties.

Moccasin Springs Member of Bainbridge Formation

Moccasin Springs formation of Bainbridge group (**Lowenstam, 1949**)
Moccasin Springs (Amsden, 1963) "= Henryhouse of Oklahoma"
Moccasin Springs Formation (North, 1968, Rogers, 1970, 1972) = ***lower part of Moccasin Springs Member***
Moccasin Springs Formation of Bainbridge Group (Berry and Boucot, 1970; Willman and Atherton, 1975; Ausich, 1987)
Moccasin Springs Member of Bainbridge Formation (Thompson, 1993, 1995)
Silurian System (Wenlockian and Ludlovian Series)

Type section: Lowenstam (1949, p. 16-18) proposed the Moccasin Springs formation for the upper formation of his Bainbridge group in Illinois. It was named for Moccasin Springs, in Trail of Tears State Park, Cape Girardeau County, Missouri. The type section is (Thompson, 1993, p. 55) "...the same as that of the [Bainbridge] formation..., in a small ravine or canyon in the west bluff of the Mississippi River Valley 1 mi south of Moccasin Springs (Trail of Tears State Park), about 2 mi north of the abandoned village of Bainbridge..." SE NW 24, 32N-14E.

The Moccasin Springs Member of the Bainbridge Formation includes all of the Silurian strata that overlie the St. Clair Limestone Member in the outcrop area in Cape Girardeau and Ste. Genevieve counties. It is considered to be transitional with the lower Devonian Bailey Formation that directly overlies it.

Mohawkian Series

Mohawkian (**Clark and Schuchert, 1899**)
Mohawkian series (Savage, 1909; Keyes, 1914, 1915) = ***Maquoketa and Kimmswick formations***
Mohawkian group (Folger, 1928) = ***Plattin - Kimmswick***
Mohawkian series (Kay, 1929a) = ***Kimmswick Limestone***
Mohawkian (Edson, 1929) = ***Plattin - Decorah***
Mohawkian series (Keyes, 1937a, 1941b) = ***Joachim - Kimmswick***
Mohawkian series (Grohskopf, et al., 1939) = ***Plattin - Kimmswick***
Mohawkian stage of Champlainian Series (Martin, et al., 1961a; Templeton and Willman, 1963) = ***Plattin - Kimmswick***
Mohawkian Series (Ross, et al., 1982; Thompson, 1991, 1995) = ***St. Peter - Kimmswick***
Ordovician System

The Mohawkian stage was originally proposed as the upper stage of the Champlainian Series (Middle Ordovician) of the Ordovician System in New York. Raised to series level, Middle Ordovician comprised the lower Whiterockian Series and younger Mohawkian Series, the latter further subdivided into (ascending) the Black Riveran, Rocklandian, Kirkfieldian, and Shermanian Stages. In eastern Missouri, the Mohawkian Series is represented by (ascending) the St. Peter Sandstone, Joachim Dolomite, Plattin Group, Decorah Group, and Kimmswick Limestone. Recent international correlations (Webby, 1998) have redefined the Ordovician standard sections such that today strata of the Mohawkian Series include the upper part of the Middle Ordovician (St. Peter in Missouri), and lower part of the Upper Ordovician (Joachim to Kimmswick).

Momence sandstone of Eminence Dolomite

Momence sandstone of Eminence Dolomite (Howe, et al., 1972) = ***Jordan Sandstone***

Cambrian System (Upper Cambrian Series)

Howe, et al. (1972, p. 1) stated "...the Momence Sandstone of northern Illinois is recognized in northeast Missouri where it underlies dolostone provisionally identified as upper Eminence. It is interpreted as the basal part of the Jordan-equivalent succession in Missouri."

Montesano limestone

Montesano (Monte Sano) limestone (Ulrich, 1911) = lower part of ***Ste. Genevieve Limestone***

Mississippian System (Chesterian Series)

These were Mississippian terms used by Ulrich (1911), named for exposures at Monte Sano, Madison County, Alabama. Ulrich (1911, pl. 29) used the term Monte Sano in his "General time scale" to include the Tribune, Cypress, and Ste. Genevieve. No definition was given. Apparently he also used "Montesano limestone" for the lower part of the Ste. Genevieve Formation in 1911. Usually, this name seems to correspond to the lower part of what now is the Chesterian series.

Montrose chert

Montrose chert (Keyes, 1895b) = ***Keokuk Limestone***

Mississippian System (Osagean Series)

Keyes (1895b, p. 445) used the term "Montrose chert" for a series of conspicuously cherty beds, with a poor fossil fauna, between the more abundantly fossiliferous portions of the Burlington and Keokuk Limestones. Keyes considered them as Burlington, beneath his Keokuk limestone. These beds, named for exposures at Montrose, Lee County, Iowa, are now included in the **Keokuk Limestone**.

Moreau sandstone

Moreau sandstone (Winslow, 1894) = ***Roubidoux Formation***

Moreau sandstone (Keyes, 1894a) = ***Gunter Sandstone Member of Gasconade Dolomite***

Moreau sandstone (Gallaher, 1900) = ***Roubidoux Formation and Jefferson City Dolomite***

Ordovician System (Ibexian Series)

Moreau was a name used in early Missouri reports for what is now known as the Roubidoux formation. Winslow (1894a, p. 331, 370-375) proposed the name, defining it as overlying the Osage (Gasconade) limestone and underlying the Jefferson City limestone in central Missouri. It was named for Moreau Creek, Cole County, Missouri. However, according to Weeks (1902), Keyes (1894a) identified the Gunter Sandstone the "Moreau sandstone."

Moredock Member

Moredock Member of Dunleith Formation of Kimmswick Subgroup (Templeton and Willman, 1963) - part of ***"lower Kimmswick Limestone"***

Ordovician System (Mohawkian Series)

Most members of the Dunleith Formation described by Templeton and Willman (1963) were named principally from exposures in the northern Illinois- southern Wisconsin area, but some were extended into Missouri as a subdivision of the Kimmswick Limestone. Named for Moredock Lake at Valmeyer, in Monroe County, Illinois Templeton and Willman (1963) stated the Moredock Member was equivalent to the Fairplay, Mortimer, and Rivoli Members of the Dunleith Formation in the "northern outcrop area."

Morgan School Shale

Morgan School Shale (Ravn, et al., 1984) - in Iowa; = ***lower part (Summit Coal Bed and below) of Little Osage Shale***

Pennsylvanian System (Desmoinesian Series)

Morrowan Series

Morrow group (Ulrich, 1904b) - in Arkansas, "Boston" was preoccupied
Morrow group (Adams and Ulrich, 1905, Henbest, 1953) - in Arkansas
Morrowan Series (Moore, 1951) - in Kansas
Morrowan Series (Searight and Howe, 1961; Thompson, 1970, 1995) - in Missouri

Pennsylvanian System

Type area: The basal series of the Pennsylvanian, Morrowan "group" was named from (Adams and Ulrich, 1905, p. 4) "...the post office of Morrow, in Washington County, Arkansas, just south of which a high hill affords a nearly complete section of the formation." Henbest (1962, p. 39) concluded that "This high hill can be no other than Hale Mountain." Moore, et al. (1951) raised the rank of the Morrow to that of a Series.

There is only one documented Morrowan-aged exposure in Missouri, that of a unit that correlates on conodonts with the **Prairie Grove Member of the Hale Formation** in Arkansas (Thompson, 1970). It has been called the **"Prairie Grove equivalent."**

Mound City Shale Member of Hertha Formation, Bronson Subgroup

Mound City shale member of Swope formation (**Jewett, 1932**) - in Kansas
Mound City shale member of Hertha formation (Greene and Searight, 1949)
Mound City shale member of Hertha limestone (Moore, et al., 1951) - in Kansas
Mound City member of Hertha formation (Searight and Howe, 1961)
Mound City Member of Hertha Formation (Payton, 1966)
Mound City Shale Member of Hertha Limestone (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Watney and Heckel, 1994; Baars and Maples, 1998) - in Kansas
Mound City Shale Member of Hertha Formation (Gentile, 1976; Thompson, 1995)
Mound City Shale Member of Coffeyville Formation (Watney, et al., 1989) - in southern Kansas

Pennsylvanian System (Missourian Series)

Type section: Named by Jewett (1932, p. 100), he stated "The name is proposed for the strata between the Critzer limestone below and the Sniabar limestone (called 'Hertha' at Kansas City) above. It is generally less than five feet thick, yellow, fossiliferous and contains local beds of limestone a few inches thick." It was named from exposures near Mound City, Linn County, Kansas.

Thompson (1995, p. 112) stated "The Mound City Shale Member...includes the **Ovid coal** and its associated underclay in its lower part. The upper part contains beds of dark- and light-gray shale and thin, argillaceous limestone. The thickness of the member ranges from less than 5 ft to more than 10 ft." The Mound City Shale Member overlies the Critzer Limestone Member, and is overlain by the Sniabar Limestone Member of the Hertha Formation.

Mounds Gravel

Tertiary System (Pliocene? Series)

Thompson (1995, p. 140-141) stated "Throughout the Mississippi Embayment area of southeastern Missouri and in the part of the Ozark region adjacent to the Embayment, there is a formation composed predominantly of gravel which caps most of the higher hills and divides. Northward in Ste. Genevieve, St. Francois, Washington, Franklin and St. Louis counties, high-level gravels similar in character to those present in the Embayment have been reported to be present...

"The names which have been proposed to designate this particular rock unit and similar-appearing rock units throughout the Mississippi Valley are almost as numerous as the number of men who have proposed them, but most general reports (up to 1961) referred to the gravel composing the unit or units as the **'Lafayette' Gravel** or as the 'Lafayette-type gravel.' In Missouri..., two formal names have been proposed. For those high-level gravels that are present in and adjacent to St. Louis County, the name **Grover Gravel** was proposed by William W. Rubey in 1952. For those gravels that are present in the extreme southeastern part of Missouri, in and adjacent to the Mississippi Embayment, the name **Piketon Gravel** was proposed by C.F. Marbut in 1902. Recent work in the region has referred to this unit as the **Mounds Gravel**. This name is used extensively in Illinois, and was adopted by the U.S. Geological Survey in their work in the Embayment region.

Mound Valley Limestone of Bronson Subgroup, Kansas City Group

Mound Valley limestone (Adams, 1896) = ***Swope and Dennis formations?***
Mound Valley limestone (Haworth, 1898) - in Kansas; = ***Bethany Falls limestone?***
Mound Valley limestone ("Dennis limestone") (Adams, 1904) - in Kansas
Mound Valley limestone lentil of Coffeyville formation (Schrader and Haworth, 1908; Schrader, 1908) - in Kansas
Mound Valley limestone (Haworth and Bennett, 1908) = ***limestone between Ladore Shale (revised) and Galesburg Shale***
Mound Valley Limestone (Watney, et al., 1989; Watney and Heckel, 1994) - in southern Kansas
Pennsylvanian System (Missourian Series)

The Mound Valley Limestone was proposed by Adams (1896), and rejuvenated by Watney, et al. (1989) for a thin limestone unit above the Ladore Shale (revised) and beneath the Galesburg Shale. It may be what was shown as a thin bed of limestone nodules in the lower Galesburg in Thompson (1995, p. 113, Fig. 34).

It is also very possible that here is no Mound Valley Limestone in Missouri, but that it is present primarily in south-central Kansas.

Mound Valley shales

Mound Valley shales (Haworth, 1898) - in Kansas; = ***Ladore? and Galesburg Shales***
Pennsylvanian System (Missourian Series)

Apparently this unit is the shales that are above and below the "Mound Valley limestone"

Moundville coal

Moundville coal (Greene and Pond, 1926) = ***Croweburg Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Mountain limestone

Mountain limestone (early geologists) = ***Mississippian System***
"Carboniferous or 'Mountain limestone on the Mississippi (Engleman, 1847)
Mountain limestone (Weeks, 1902) = ***Meramecian - lower Chesterian Series***
Mississippian System

This term in Missouri included most of the Mississippian formations. Engleman (1847) rephrased it as the **"Carboniferous or 'Mountain limestone on the Mississippi'"**, from which came the name "**Mississippian Limestone series,** or "**Mississippi group**" (Winchel, 1869).

Mountain Glen shale

Mountain Glen shale (Savage, 1920; Bassett, 1925) = ***Grassy Creek Shale***
Devonian System (Upper Devonian Series)

This Upper Devonian formation was named by Savage (1920, p. 169-178) for its occurrence near Mountain Glen, Union County, Illinois. This hard, black, laminated shale is equivalent of the Chattanooga. According to Savage (1925, p. 408), this shale "does not appear to be represented in Missouri." However, Bassett (1925, p. 362) stated that the Lingle limestone (St. Laurent Limestone) in eastern Missouri is overlain by the Mountain Glen shale.

Mt. Simon Sandstone

Lamotte-Mt. Simon Sandstone (Summerson and Swann, 1970)
Lamotte (Mt. Simon) Sandstone (Howe, et al., 1972; Houseknecht, 1989)
Mt. Simon Sandstone (Kurtz, 1989)
Cambrian System (Upper Cambrian Series)

The northern extension of the Lamotte Sandstone exposed in east-central and southern Missouri is called the **Mt. Simon Sandstone**, named from exposures on Mt. Simon, near Eau Claire, Wisconsin, by Ulrich (*in* Walcott, 1914). It was proposed for "235 feet of coarse sandstone and grits." Kurtz (1989) proposed using the name **Mt. Simon Sandstone** in Missouri, whereas previously Howe, et al. (1972) and Houseknecht (1989) had proposed **"Lamotte (Mt. Simon) Sandstone."**

Mud-rock

Mud-rock (Upper and Lower Mud-rock) (Gallaher, 1900) = ***Davis Formation***
Cambrian System (Upper Cambrian Series)

These were terms used by Gallaher (1900, p. 97-98) for argillaceous limestones, one about 20 feet above the other, separated by his "Upper Green shales".

Mulberry Coal Bed of Bandera Shale, Appanoose Subgroup, Marmaton Group

Mulberry coal (**Broadhead, 1874**)
Mulberry coal of Pleasanton shale (Hinds, 1912)
Mulberry coal of Pleasanton formation (Hinds and Greene, 1915)
Mulberry coal of Bandera shale member of Pleasanton formation (Greene and Pond, 1926)
Mulberry coal of Bandera shale (Jewett, 1941; Moore, et al., 1951) - in Kansas
Mulberry coal horizon of Bandera shale member of Altamont limestone (Clair, 1943)
Mulberry coal of Bandera shale (Branson, 1944b)
Mulberry coal of Bandera formation (Greene and Searight, 1949; Cline and Greene, 1950)
Mulberry coal (Wanless, 1955) "= No. 7 coal of Illinois"
Mulberry coal of Bandera Shale (Jewett, et al., 1968) - in Kansas
Mulberry coal of Bandera Formation (Gentile, 1976; Thompson, 1995)
Mulberry coal bed in Bandera Shale (Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Type section: Broadhead (1874, p. 58) stated "The Mulberry Coal of Bates county [Missouri] often 2½ to 3 feet thick, we find represented in the eastern part of Cass and the western part of Johnson by a 1-foot seam, and at Lexington by a thin band of shaly Coal." Baars and Maples (1998, p. 166) stated it was "Named from Mulberry Creek in Bates County, Missouri."

Thompson (1995, p. 107) noted, that "Although it is of mineable thickness in Bates County, the Mulberry diminished to the thickness of a smut north of the Missouri River."

Mulky Coal Bed of Mulky Shale, Cabaniss Subgroup, Cherokee Group

Mulky Creek coal (**Broadhead, 1874**)
Mulky coal of Cherokee shale (Hinds, 1912)
Mulky (Macon City) coal (of Cherokee shale) (Hinds and Greene, 1915)

Mulky coal (Wanless, and Weller, 1932) "= #4 coal of Illinois"
Fort Scott or Mulky coal of Cherokee formation (Greene, 1933)
Mulky coal of Lagonda shale and sandstone of Cherokee formation (McQueen and Greene, 1938)
"beds immediately above the Mulky coal" (Miller and Owan, 1939) = ***Excello Shale***
Mulky coal of Lagonda formation (Branson, 1944b; Unklesbay, 1952a; Howe and Searight, 1953)
Mulky coal of Henrietta group (Moore, 1948)
Mulky coal of Blackjack Creek cyclothem (Moore, 1949; Moore, et al., 1951) - in Kansas
Mulky coal of Mulky formation (Searight, et al., 1953; Searight and Howe, 1961)
Mulky coal of Mulky formation (Searight, 1959) "= Summum (No. 4) coal in Illinois"
"near the horizon of the Mulky coal" (Furnish, et al., 1962)
"immediately above the Mulky Coal" (Furnish, et al., 1962) = ***Excello Shale***
Mulky coal (Wanless, et al., 1963) "= #4 coal of Illinois; #IV coal of Indiana; #8B coal of Kentucky"
Mulky coal bed of Cabaniss Formation (Jewett, et al., 1968) - in Kansas
Mulky coal of Mulky Formation (Gentile, 1976)
"Cherokee Group above Mulky Coal" (Frest, et al., 1981) = ***Excello Shale***
Mulky Coal Member (of Swede Hollow Formation) (Ravn, et al., 1984) - in Iowa
Mulky Coal Member (in Banzet formation) (Brenner, 1989) - in Kansas
Mulky coal bed of Mulky Formation (Thompson, 1995)
Mulky coal bed (in Cabaniss Formation) (Baars and Maples, 1998) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Type section: Broadhead (1873, p. 45) stated "On the land of Ennis and Cundiff, at the Railroad near Mulky Creek, coal crops out at the surface from 16 to 20 inches thick..." No type section was specifically designated by Broadhead, but it appears to be either SE sec. 34 or SW sec. 35, 49N-25W, Lafayette County, Missouri, near Mulky Creek. Searight (1955, p. 38) stated "The coal was named from Mulky Creek, Johnson County, Missouri."

Robertson (1971, p. 20) stated "The Mulky coal bed constitutes an important coal resource in east-central Missouri...in Audrain, Montgomery, and Ralls Counties where it averages about 28 inches in thickness. The Mulky thins eastward into Monroe, Randolph, and Macon Counties, where it ranges from 14 to 24 inches in thickness...it has been mined on a minor scale in Lafayette, Saline and Vernon Counties..."

Mulky Shale of Cabaniss Subgroup, Cherokee Group

Mulky cyclothem (Abernathy, 1937)
Mulky formation (1 member) (Searight, et al., 1953; Unklesbay, 1955; Searight and Howe, 1961)
Mulky Formation (1 member) (Neal, 1969; Gentile, 1976; Thompson, 1995)
"Mulky member" (1 member) of Banzet formation (Brenner, 1989) - in Kansas
Pennsylvanian System (Desmoinesian Series)

Type section: Broadhead (1873, p. 45) stated "On the land of Ennis and Cundiff, at the Railroad near Mulky Creek, coal crops out at the surface from 16 to 20 inches thick..." No type section was specifically designated by Broadhead, but it appears to be either SE sec. 34 or SW sec. 35, 49N-25W, Lafayette County, Missouri, near Mulky Creek. Searight (1955, p. 38) stated "The coal was named from Mulky Creek, Johnson County, Missouri."

The Mulky Shale overlies the Lagonda Formation and is overlain by the Excello Shale. It is (Thompson, 1995, p. 103) ...a persistent unit which extends across the state from Vernon County to the Iowa line in Schuyler County. It is also persistent in northeastern Missouri near the Lincoln Fold." Comprised usually of the Mulky Coal Bed and its underclay, it may also contain a limestone beneath the underclay (Breezy Hill Limestone Member), either as a single bed or as discontinuous lenses interbedded with thin coal beds, the lowest of which marks the top of the underlying Lagonda Formation.

Muncie Creek Shale Member of Iola Formation, Linn Subgroup, Kansas City Group

Muncie Creek shale member of Iola limestone (**Newell, *in* Moore, 1932**; Moore, 1936; Moore, et al., 1951) - in Kansas
Muncie Creek shale member of Chanute shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)

Muncie Creek shale of Iola formation (Condra and Scherer, 1939) - in Nebraska
Muncie Creek shale of Iola limestone (Ellison, 1941)
Muncie Creek shale of Iola limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Muncie Creek shale member of Iola formation (Moore, 1948)
Muncie Creek member of Iola formation (Searight and Howe, 1961)
Muncie Creek Shale Member of Iola Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Muncie Creek Shale Member of Iola Formation (Kidder, 1985; Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 114) located the type section along "Muncie Creek, Wyandotte county, Kansas. Typically exposed in the bluffs between Muncie and City Park, Kansas City, Kansas."

McQueen and Greene (1938) and Branson (1944b) placed the Iola members within the "Chanute shale." Thompson (1995, p. 116) noted, "The Muncie Creek Shale Member...consists of a fissile shale, which contains phosphatic concretions and is uniformly dark-gray to black in the lower part and light- to medium-gray in the upper part. Thickness of the member ranges from a few inches to about 2 ft." The Muncie Creek Shale Member overlies the Paola Limestone Member, and is overlain by the Raytown Limestone Member of the Iola Formation.

Munger Granite Porphyry of St. Francois Mountains Intrusive Suite, Hypabyssal Rocks
Precambrian Erathem

Type section: Robertson (*in* Thompson, 1995, p. 14) stated "The Munger crops out extensively in northeastern Reynolds County where it occurs as a sill in secs. 4, 6, 21, and 27, T. 33 N.l, R. 2 E."

Tolman and Robertson (1969, p. 38-39) added "It is very similar to the Buford granite porphyry in composition, but is generally coarser grained with orthoclase phenocrysts up to 8 mm in length and quartz up to 4 mm in diameter."

Murfreesboro limestone
Murfreesboro limestone (Ulrich, 1939) = ***"Pecatonica Formation"***
Ordovician System (Mohawkian Series)

A member of the Stones River group, Safford and Killebrew (1900, p. 105, 125) named the basal formation of the Stones River group in Tennessee the Murfreesboro limestone, the name derived from Murfreesboro, Rutherford County, Tennessee. The term was applied in Missouri by Ulrich (1939, p. 105-109), after recognizing it in 1937. It previously had been assigned to the Plattin formation, but Ulrich determined that strata in southeastern Missouri equivalent to the Murfreesboro were above the Joachim Dolomite and below the typical Plattin. These beds were later named the **Rock Levee formation** by Grohskopf (1948), and are now identified as the **"Pecatonica Formation."**

Myrick Station Limestone Member of Pawnee Formation, Appanoose Subgroup, Marmaton Group
Myrick Station limestone member of Pawnee limestone ("Lexington cap rock") (**Cline, 1941**)
Myrick Station limestone member of Pawnee limestone (Jewett, 1941; Moore, et al., 1951) - in Kansas
Myrick Station limestone member of Pawnee formation (Clair, 1943; Greene and Searight,. 1949)
Myrick Station member of Pawnee formation (Cline and Greene, 1950; Searight and Howe, 1961)
Myrick Station limestone (Wanless, 1955) "= Brereton or Herrin limestone of Illinois"
Myrick Station Limestone Member of Pawnee Limestone (Jewett, et al., 1968; Heckel, 1979; Baars and Maples, 1998) - in Kansas
Myrick Station Limestone Member of Pawnee Formation (Gentile, 1976; Thompson, 1995)
Myrick Station Limestone Member of Pawnee Limestone (Price, 1981)
Myrick Station Limestone Member of Pawnee Limestone (Price, 1981) - in Iowa
Pennsylvanian System (Desmoinesian Series)

Type section: Cline (1941) named the Myrick Station, and stated (p. 37) "...the type section, outcrops in ravines in the south bluff of the Missouri River near Myrick Station, just west of Lexington, Lafayette county, Missouri."

Thompson (1995, p. 107) added "In western Missouri, the Myrick Station Limestone Member... is composed of a dense, bluish-gray limestone, which is thinly, but irregularly bedded. In northern Missouri, gray shale is intercalated with the limestone. Toward the Iowa state line, the unit is increasingly shaly and becomes a succession of beds of calcareous, fossiliferous shale...The member is 2 to 10 ft thick." It overlies the dark shales of the Anna Shale Member, and is overlain by the Mine Creek Shale Member.

Mystic coal bed

Lexington coal (Mystic coal) (Hinds and Greene, 1915)
Lexington (Mystic) coal of Labette shale (Cline, 1941)
Mystic coal of Labette Formation (Landis and Van Eck, 1965) - in Iowa; = ***Lexington Coal Bed of Labette Shale***
Pennsylvanian System (Desmoinesian Series)

N

N, O, P, and Q Beds

N, O, P, and Q Beds (Fowler and Lyden, 1931) = ***Grand Falls Chert***
Mississippian System (Osagean Series)

Nachusa Formation

Nachusa Formation of Plattin Subgroup of Platteville Group (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***middle part of Macy Limestone of Plattin Group***
Nachusa of Plattin Sub-Group (Shourd and Levin, 1978)
Ordovician System (Mohawkian Series)

The Nachusa Formation was proposed for Platteville strata of the Illinois Basin, and was extended into Missouri by Templeton and Willman (1963). However, the nomenclature proposed in 1951 by Larson was found by Thompson (1991) to more adequately represent Plattin strata in Missouri, and Nachusa was not used.

Nebraskan

Nebraskan stage (age)
Nebraska drift
Quaternary System (Pleistocene Series)

These names were applied to the oldest Pleistocene drift of the western or Keewatin part of the Laurentide ice sheet and the time during which this drift was deposited. The drift was named by Shimek (1909, p. 408) for its occurrence in Nebraska; where, however, it is poorly exposed. The name Kansan was first applied to this drift, then to a younger drift. This drift has also been called sub-Aftonian (from the fact that it underlies the Aftonian interglacial deposits) and pre-Kansan (from the fact that it is an older drift than the Kansan).

Nehawka Limestone Member

Nehawka Limestone of Andrew (Lawrence) shales (Condra and Bengston, 1915) - in Nebraska; = ***Iatan Limestone***
Nehawka Limestone Member of Plattford Formation (Burchett and Reed, 1967) - in Nebraska; = ***Iatan Limestone***
"Nehawka" Limestone Member of Plattford Formation (Burchett, 1970) - in Nebraska; = ***Iatan Limestone***
Nehawka Limestone Member of Plattford Formation (Burchett, 1971) - in Nebraska; = ***Iatan Limestone***
Pennsylvanian System (Missourian Series)

Nellie Bly

Nellie Bly Shale Member of Dewey Limestone (Watney, et al., 1989) - in southern Kansas; = ***a shale between the Westerville Limestone Member of the Cherryvale Formation and below the Quivira Shale***

Nellie Bly Formation (Watney and Heckel, 1994; Baars and Maples, 1998) - in southern Kansas; between the Cherryvale (restricted) and Dewey formations

Pennsylvanian System (Missourian Series)

Nemaha Subgroup of Wabaunsee Group

Nemaha formation (Condra and Bengston, 1915) - in Nebraska; = ***Rulo and Silver Lake Members of Scranton Formation to top of Willard Shale***

"XVII. Shale" of Nemaha formation (Condra and Bengston, 19156) - in Nebraska; = ***Willard Shale***

"XV. Shale" of Nemaha formation (Condra and Bengston, 1915) - in Nebraska; = ***Soldier Creek Shale Member of Bern Formation***

"XIV. Shale" of Nemaha formation (Condra and Bengston, 1915) - in Nebraska; = ***Silver Lake Shale Member of Scranton Formation***

Nemaha limestone (Condra, et al., 1932) = ***Burlingame to Willard Shale***

Nemaha subgroup (Condra, 1935) = ***Burlingame to Tarkio***

Nemaha subgroup (Condra and Reed, 1943, 1959) - in Nebraska; = ***Burlingame to Willard Shale***

Nemaha subgroup (Greene, and Searight, 1949; Searight and Howe, 1961)

Nemaha subgroup (Moore, 1949; Moore, et al., 1951) - in Kansas

Nemaha Subgroup (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas

Namaha Subgroup (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Condra and Bengston (1915, p. 8) proposed the **Namaha formation** for a unit that "...includes five limestones and four shale members. It is best developed in the Big Nemaha valley with exposures between Tecumseh and Humbolt and between Falls City and Rulo. There are exposures between Union and Nebraska City, north of Rulo and at the mouth of the Big Nemaha. The name Nemaha is here proposed for this formation of limestones and shales, it being recognized that Tarkio and Burlingame are names for members only. The limestone ledge names and numbers of the Nemaha formation are: Rulo (14), Burlingame (15), Fargo (16), Preston (17), and Tarkio (18)."

The middle of three subgroups proposed by Searight and Howe (1961) for the uppermost Group of Pennsylvanian strata in Missouri, the Nemaha Subgroup includes the Bern, Auburn, Emporia, and Willard formations.

Neogene

Neogene

Neogenic (Ulrich, 1911)

Late Tertiary and Quaternary Systems

This is a term used by Ulrich to include the Recent, Pleistocene, Pliocene and Miocene.

Neopaleozoic (Ulrich, 1911)

This is a term used by Ulrich for the upper part of the Paleozoic, including his Tennessean, Waverlyan, Devonian, and Silurian.

Neutral Coal Bed of Warner Sandstone, Krebs Subgroup, Cherokee Group

Neutral coal of Neutral cyclothem (Abernathy, 1937) - in Kansas

Neutral coal of Warner formation (Searight, et al., 1953; Branson, 1957; Searight and Howe, 1961)

Neutral coal bed of Krebs Formation (Baars and Maples, 1998) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Named originally by Abernathy (1937), Baars and Maples (1998, p. 170) stated "Typical exposure along Brush Creek in the NE SW sec. 10, T. 34 S., R. 24 E., a short distance east of the town of Neutral, Cherokee County, Kansas."

It is not certain of this is the same coal bed called "Warner Coal Bed" by some geologist (Gentile (1976).

New Bloomfield

New Bloomfield Member of Snyder Creek Formation (Waring, 1971)
New Bloomfield lithofacies of Snyder Creek Shale (Schumacher, 1972)
Devonian System (Upper Devonian Series)

New Design group

New Design group of Chester series (Weller, 1939) = ***lower "third" of Chesterian Series*** (Renault to Beech Creek)
New Design group of Chesterian series (Weller, et al., 1948)
Mississippian System (Chesterian Series)

The term New Design seems to originate from Weller (1939) as the lowest of three groups of his Chester series (Thompson, 1986, p. 124-127). The New Design was later replaced (Swann, 1963) by the **Gasperian Stage**, which included strata from the Renault Limestone to the Beech Creek Limestone Member of the Golconda Formation.

New London Member

New London Member of Dunleith Formation of Kimmswick Subgroup (Templeton and Willman, 1963)
Ordovician System (Mohawkian Series)

This was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone. The New London Member is equivalent to the Sherwood, Wall, and Wyota Members of the Dunleith Formation of "the northern outcrop area."

New Scotland

New Scotland limestone (Savage, 1908) = ***Bailey Formation***
"New Scotland Helderbergian" (Ulrich, 1904a) = ***Bailey Formation of Lower Devonian Series***
Devonian System (Lower Devonian Series)

This name was used in the east for a Lower Devonian limestone. Savage (1908, p. 112) adopted the term for beds in southeastern Missouri which Dake (1917, p. 173) later called Bailey.

Newton

Newton or Calico (sandstone) (Ulrich, 1939) - in Arkansas; = ***lower sandstone of Everton Formation***
Ordovician System (Whiterockian Series)

See also **"Kings River sandstone member"** of Everton Formation

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Niagara

Niagara limestone (Willis, 1912) = ***Noix Oolite?, Bryant Knob Formation, and Bowling Green Formation***, northeastern Missouri
Niagara group (Shumard, 1873) = ***Bainbridge Formation***, southeastern Missouri
Niagaran Series = ***Wenlockian Series***, Silurian System
Silurian System (Wenlockian Series)

Terms adapted from usage in the New York, early Missouri geologists used the term Niagara or Niagara group for the Bainbridge in Missouri, and Broadhead (1874, p. 28) included the Cape Girardeau limestone in his Niagara group. The Bainbridge Formation is now considered to represent the Niagaran and Cayugan Series (Wenlockian Ludlovian, and Pridolian), essentially all of the middle and upper Silurian.

Nishnabotna sandstone

Nishnabotna sandstone (Keyes, 1915)

Cretaceous System

This is a term used by Keyes (1915, p. 252) as a representative of his Dakotan series in Missouri. It overlies the Missourian series and underlies his Egypt sand. The term (Nishnabotna) was originally defined by White (1867, p. 27, 31) for a sandstone in southwestern Iowa of supposed Cretaceous age, suspected to be part of the Dakota group. It was named for the East Nishnabotna River.

Nodaway Coal Bed of Aarde Shale Member, Howard Formation, Sacfox Subgroup, Wabaunsee Group

Nodaway coal of Aarde shale member of Howard limestone (**Moore, 1936**; Schoewe, 1946) - in Kansas
Nodaway coal bed of Aarde member of Howard formation (Searight and Howe, 1961)
Nodaway coal bed of Aarde Shale Member of Howard Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Nodaway coal of Aarde Shale Member of Howard Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Not known. Apparently this coal bed was named by Moore (1936) from Nodaway County, Missouri, where it had extensively been mined.

The Nodaway Coal Bed is in the lower part of the Aarde Shale Member of the Howard Formation. It can be over 1 ft thick in some areas.

Nodaway limestone

Nodaway limestone (Gallaher, 1898) = ***Deer Creek Formation***
Nodaway limestone (Weeks, 1902) = ***Howard formation?***

Pennsylvanian System (Virgilian Series)

Noel shale

Noel shale (Ulrich, 1904b) - southwestern Missouri, "Eureka" was preoccupied; = ***Chattanooga Shale***
Noel shale (Grabau, 1906; Mehl, 1960, 1961) = ***Chattanooga Shale***
"Noel" shale (Giles, 1935) -also used Chattanooga and "Hannibal shale"
Noel shale (Kindle and Miller, 1939) - also used Chattanooga shale and James River shale

Devonian System (Upper Devonian Series)

The black shale outcropping in southwestern Missouri and northwestern Arkansas had been called "Eureka shale" in Arkansas, and this term was also applied to this shale in Missouri. However, the name "Eureka" was preoccupied. Therefore, Ulrich (1904b, p. 90-113) proposed the name "Noel shale", taken from the town of Noel, in McDonald County, Missouri; but as later work indicated the Noel shale was the direct equivalent of the Chattanooga shale exposed in Tennessee, the name Chattanooga was adopted and Noel shale abandoned.

Noix Limestone **of Edgewood Group**

Noix formation (Keyes, 1898c) = ***Noix Limestone and Bryant Knob Formation***
Noix oolite (Keyes, 1898c; Thompson and Satterfield, 1971)
Noix oolite member of Edgewood limestone (Savage, 1913; Bassler, 1950)

Noix limestone (Keyes, 1914) - rejected "Edgewood"; = ***Noix Limestone and Bryant Knob Formation***
Noix oolite (Rowley, 1916) = ***Noix Limestone and Bryant Knob Formation***
Noix oolite of Cyrene member of Edgewood formation (Krey, 1924; Martin, et al., 1961b)
Noix oolite member of Edgewood formation (Keyes, 1941b; Branson, 1944b) = ***Noix Limestone and Bryant Knob Formation***
Noix oolite of Edgewood formation (Martin, et al., 1961a)
Noix Oolite Member of Edgewood Dolomite (Craig, 1969) - Silurian in age
Noix Limestone of Edgewood Group (Amsden, 1974) - from ms. of Thompson and Satterfield
Noix Limestone of Edgewood Group (Thompson and Satterfield, 1975; McCracken and Barnes, 1982; Amsden, 1986; Thompson, 1991, 1993, 1995)
Noix Limestone (Ross, et al., 1982; Ausich, 1987)
Ordovician System (Cincinnatian Series)

Type section: The term was first used by Keyes (1898c, p. 59, 62) for exposures along Noix Creek at the south edge of Louisiana, Pike County, Missouri. The type section is at a small roadside park (Clinton Springs) on the west side of Highway 79 at the south edge of Louisiana.

The Noix Limestone is an oolitic facies of the Late Ordovician Cyrene Limestone exposed to the west of Louisiana, Missouri. It is overlain by the Bowling Green Dolomite and/or Bryant Knob Formation (both of lower Silurian age) and underlain by the Maquoketa Shale. It has been regarded as both Silurian or Ordovician in age, but Thompson and Satterfield (1975) determined it is correlative with the Leemon Formation of southeastern Missouri, and is Late Ordovician, post-Maquoketa, in age. In northeastern Missouri it is included in the Edgewood Group, which includes (ascending) the Noix - Cyrene Limestones, Bryant Knob Formation, and Bowling Green Dolomite.

Norfleet Limestone Member of Lenapah Shale, Appanoose Subgroup, Marmaton Group

Norfleet limestone member of Lenapah limestone (**Jewett, 1941**; Moore, et al., 1951) - in Kansas
Norfleet limestone member of Lenapah formation (Greene and Searight, 1949; Cline and Greene, 1950)
Norfleet member of Lenapah formation (Searight and Howe, 1961)
Norfleet Limestone Member of Lenapah Limestone (Jewett, et al., 1968; Baars and Maples, 1998) - In Kansas
Norfleet Limestone Member of Lenapah Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Jewett (1941, p. 338) named the Norfleet, and stated "The type exposure of the Norfleet limestone member is on the Norfleet farm along Pumpkin creek north of the lower-water bridge in the SE¼ sec. 35, T. 32 S., R. 18 E., northeast of Mound Valley, Labette County, Kansas."

Thompson (1995, p. 108) added "The Norfleet Limestone Member...is represented by a single, thin bed of greenish-gray, medium- to coarsely-crystalline, crinoidal limestone. The bed thins to a featheredge in northern Missouri, but it has been identified in many places in the western part of the state. In western Missouri the Norfleet ranges from a featheredge to 10 in. in thickness." The Norfleet Limestone Member overlies the shales of the Nowata Shale, and is overlain by the Perry Farm Member of the Lenapah Shale.

Northview Formation of Chouteau Group

"Vermicular sandstone at Northview" (Weller, 1899) = ***Northview Formation***
Northview sandstone and shale (**Weller, 1901**)
Northview sandstone (Weller, 1905)
Northview member of Chouteau formation (Branson, 1944b)
Northview formation of Chouteau group (Beveridge and Clark (1952) - central and west-central Missouri
Northview formation of St. Joe group (Beveridge and Clark, 1952) - southwestern Missouri
Northview formation of Chouteau group (Spreng, 1961)
Northview Shale ("Vermicular Sandstone at Northview") (Yochelson and Saunders, 1967)
Northview Formation (Thompson and Fellows, 1970; Thompson and Robertson, 1993)
Northview Formation of Chouteau Group (Thompson, 1986)
Mississippian System (Kinderhookian Series)

Type section: The Northview Formation was named by Weller (1901, p. 140-144) from exposures in the vicinity of Northview, in Webster County, southwestern Missouri. The type section consisted of sections along old Highway 66 and the east bound lane of (present) Interstate 44. The upper part of these exposures (on I-44) have since been covered by new construction (Thompson and Fellows, 1970).

The uppermost formation of the Chouteau Group of the Kinderhookian Series, the Northview Formation overlies the Sedalia Formation or Compton Limestone (where the Sedalia is absent) and is overlain by the basal Osagean formations Pierson Limestone or Burlington Limestone (the latter if the Pierson is absent). It ranges from over 80 feet of shale, siltstone, and dolomitic siltstone north of Springfield, Greene County, Missouri, to less than 2 ft of argillaceous limestone at the Arkansas-Missouri border. The Northview cannot be traced into northeastern Missouri; its stratigraphic position is somewhere within the Hannibal Shale.

Nowata Shale of Appanoose Subgroup. Marmaton Group

Nowata shale (**Ohern, 1910**) **-** in Oklahoma
Nowata shale member <u>of Marmaton formation</u> (Moore, 1920) **-** in Kansas
Nowata shale member <u>of Pleasanton formation</u> (Condra, 1927) **-** in Nebraska
Nowata shale <u>of Marmaton group</u> (Moore, 1932; Jewett, 1941; Moore, et al., 1951) **-** in Kansas
Nowata shale <u>of Henrietta group</u> (Cline, 1941)
Nowata formation <u>of Marmaton group</u> (Greene and Searight, 1949; Cline and Greene, 1950; Searight and Howe, 1961)
Nowata Shale <u>of Marmaton Group</u> (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Nowata Formation <u>of Marmaton Group</u> (Gentile, 1976; Thompson, 1995)
Nowata Shale (Ravn, et al., 1984) **-** in Iowa

Pennsylvanian System (Desmoinesian Series)

Type section: The Nowata Shale was named from the town of Nowata, in Nowata County, Oklahoma, the type section (Baars and Maples, 1998, p. 175) "...measured on south bank of Verdigris River.".

Thompson (1995, p. 108) stated "The lower part of the Nowata Formation consists of an underclay, the thin **Laredo coal bed**, and a thin limestone. The beds above the limestone are commonly composed of gray or red shale. The **Walter Johnson Sandstone Member**, which is a sandstone and siltstone, locally occupies the position of the upper Nowata and possibly cuts down into the Altamont Formation below...The thickness of the Nowata averages between 10 and 15 ft." The Nowata Shale overlies the Worland Limestone of the Altamont Formation, and is overlain by the Norfleet Limestone member of the Lenapah Formation.

<u>Noxie Sandstone Member</u>

Noxie sandstone member <u>of Chanute shale</u> (Moore, et al., 1951) **-** in Kansas
Noxie Sandstone Member <u>of Chanute Shale</u> (Baars and Maples, 1998) in Kansas

Pennsylvanian System (Missourian Series)

In Kansas (Baars and Maples, 1998, p. 175), the Noxie Sandstone is a channel sandstone developed at the base of the Chanute Shale that cuts down into beds as low as the Stark Shale Member of the Dennis Formation.

<u>Nuyaka Creek Shale</u>

Nuyaka Creek black shale bed (Bennison, 1981) = ***part of Holdenville Shale?***
Nuyaka Creek Shale (Watney, et al., 1989)
Nuyaka Creek Shale Member <u>of Lost Branch Formation</u> (Watney, et al., 1989)
Nuyaka Creek Shale Member <u>of Coffeyville Formation</u> (Watney, et al., 1989) **-** in southern Kansas
Nuyaka Creek black shale bed <u>of Lost Branch Formation</u> (Heckel, 1991)

Pennsylvanian System (Desmoinesian Series)

This unit has been proposed in part to replace Holdenville, and in part to represent a possible lateral facies of the Holdenville.

Nyman coal bed

Nyman coal bed of Table Creek shale (Moore, 1936) - in Kansas; = ***Nyman coal of Pillsbury Shale***
Nyman coal of Table Creek shale (Branson, 1944b) = ***Nyman coal of Pillsbury Shale***
Nyman coal of Wamego member of Zeandale formation (Searight and Howe, 1961)
Nyman coal bed of Wamego Shale Member of Zeandale Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

O

O, P, and Q beds

O, P, and Q beds (Fowler and Lyden, 1931) = ***Elsey Formation***
Mississippian System (Osagean Series)

These letters were used to designate certain zones in the Mississippian succession in the the lead-zinc mining district (Tri-State region, or Joplin District) of Kansas, Oklahoma, and Missouri, that were correlatable within the mines, and important in the search for galena and/or sphalerite mineralization.

Oakley Shale Member

Oakley Shale Member of Swede Hollow Formation (Ravn, et al., 1984) - in Iowa; = ***pre Ardmore Limestone Member Verdigris Formation***
Oakley Shale Member of Verdigris Formation (Brenner, 1989) - in Kansas; = ***pre Ardmore Limestone Member Verdigris Formation***
Pennsylvanian System (Desmoinesian Series)

Oglesby Member of "Pecatonica Formation"

Oglesby Member of Pecatonica Formation (Templeton and Willman, 1963)
Oglesby Member of "upper Pecatonica" of "Pecatonica Formation" (Thompson, 1991)
Ordovician System (Mohawkian Series)

The **Oglesby Member** is the uppermost member of the "Pecatonica Formation," and strongly resembles the limestone of the overlying Plattin Group. It is reported to be present in the southeastern Missouri region around Cape Girardeau, exposed in quarry walls in the southeastern part of the town. It can be very difficult to distinguish from the overlying Blomeyer Member of the Bloomfield Limestone of the Plattin Group.

Okaw

Okaw formation (Weller, 1914) = ***Golconda -Tar Springs***
Okaw limestone (Keyes, 1933) = ***Glen Dean Limestone***
Mississippian System (Chesterian Series)

Weller (1913, p. 127) proposed the name Okaw formation in western Illinois for part of the Chesterian series, typical exposures being in Randolph County, Illinois, where the formation is exposed in the valley of the Kaskaskia or Okaw River, and in the Mississippi River bluffs both above and below the mouth of the Okaw. Later investigations noted that this unit is made of two calcareous formations separated by a sandstone; the lower and upper limestone units have been named respectively Golconda and Glen Dean, and the sandstone the Hardinsburg. The greater part of the original Okaw limestone is now known to be the equivalent of the Golconda. According to Weller and St. Clair (1928, p. 242) the limestones overlying the Paint Creek in the Missouri section are all a part of the lower division of the Okaw formation as originally described by Weller, and consequently represent the Golconda formation.

<u>**Oklahoman series**</u>

Oklahoman series <u>of Carboniferous system</u> (Keyes, 1896c, 1910) = **Virgilian Series of Pennsylvanian System**

Pennsylvanian System (Virgilian Series)

<u>**Olathe limestone member**</u>

Olathe limestone member <u>of Stanton formation</u> (**Newell, 1936**; Moore, 1936) - in Kansas; = ***Stoner Limestone Member***

Stoner or Olathe limestone member <u>of Stanton limestone</u> (McQueen and Greene, 1938)

Stoner ("Olathe") limestone <u>of Stanton limestone formation</u> (Condra and Reed, 1943, 1959) - in Nebraska

Olathe limestone member <u>of Stanton limestone</u> (Clair, 1943; Branson, 1944b) = ***Stoner Limestone Member***

Pennsylvanian System (Missourian Series)

Newell (1936) proposed the "Olathe limestone" for a member in the Stanton formation. This name was used several times by Missouri geologists, including Clair (1943) and Branson (1944b). McQueen and Greene (1938) called this the **"Stoner or Olathe limestone member of the Stanton limestone."** Apparently Moore (1948) abandoned the name Olathe, because it doesn't appear to show up again in published reports on Missouri stratigraphy. Moore (1936) indicated that the Olathe overlay the Eudora Shale Member, and was overlain by the Victory Junction (now Rock Lake) Shale Member of the Stanton Formation.

<u>**Old Red sandstone**</u>

Old Red sandstone (Broadhead, 1873) = ***Bushberg Sandstone***

Devonian System (Upper Devonian Series)

According to Wilmarth (1938), "Old Red sandstone" was a name applied in early geological reports to the Devonian system of present terminology. In Missouri it was used by Broadhead (1873, p. 46) for what is now called the **Bushberg Sandstone**.

<u>**Olpe shale**</u>

Olpe shale (Adams, 1903) - in Kansas; = ***Auburn Shale and to Willard Shale***

Pennsylvanian System (Virgilian Series)

<u>**One-foot coal**</u>

One-foot coal (Greene and Pond, 1926) = ***Croweburg Coal Bed***

"just above the One-Foot coal" (Miller and Owen, 1939) = ***Verdigris Formation***

Pennsylvanian System (Desmoinesian Series)

<u>**Onesquethaw stage**</u>

Onesquethaw stage <u>of Ulsterian Series</u> (Cooper, et al., 1942) = ***upper part of Lower Devonian Series***

Devonian System (Lower Devonian Series)

<u>**Onondaga**</u>

Onondaga limestone (early geologists) = ***Clear Creek through Grand Tower formations***

Onondaga Limestone (Swallow, 1955; Shumard, 1855) = ***Clear Creek through Cedar Valley formations?***

Onondaga (Broadhead, 1874) = ***Clear Creek Chert?***

Devonian System (Lower and Middle Devonian Series)

Onondaga was a Devonian term from New York used in Missouri by various early geologists for the Cooper (Cedar Valley) and Grand Tower Limestones. It has also been used more recently in a time sense (Weller, 1939; Onondaga Stage).

<u>oolite</u>

"oolite of Lincoln county" (Potter, 1873) = ***Noix Limestone***
oolitic bed in Cyrene limestone member of Edgewood formation **(Noix oolite)** (Laswell, 1957)
Ordovician System (Cincinnatian Series)

<u>Orange sand</u>

Orange sand (Safford, 1856)
"Orange sand" or "Lagrange group" (Safford, 1869)
Tertiary System (Eocene Series)

This was a descriptive term used by Safford (1856, p. 148-162) in Tennessee for the beds now known as the Wilcox Group. In 1869, Safford (p. 424) revised his earlier description and used the name "Orange sand" or "Lagrange group".

Orchard Creek Shale of Maquoketa Group

Orchard Creek shale (Savage, 1909, 1926; Dott, 1941)
Orchard Creek (Ball, 1941, 1942) = "Alexandrian" in age
"Orchard Creek formation (Silurian)" (Herold, et al., 1958)
Orchard Creek shale (Gudstadt, 1958) **-** may include Maquoketa Shale of east-central Missouri
Orchard Creek shale (Pulse and Sweet, 1960) = ***Maquoketa Group below Girardeau Limestone***
Orchard Creek(?) formation (Martin, et al., 1961)
Orchard Creek Shale Member <u>of Scales Formation</u> (Templeton and Willman, 1963)
Orchard Creek Shale (Satterfield, 1971; Thompson and Satterfield, 1975; Thompson, 1982; Amsden, 1986)
Orchard Creek Shale <u>of Maquoketa Group</u> (Kolata and Guensburg, 1979; Thompson, 1991, 1995)
Ordovician System (Cincinnatian Series)

Type section: The formation was named by Savage (1909, p. 515) from Orchard Creek, two miles south of Thebes, Alexander County, Illinois, for the shale underlying the Girardeau Limestone and overlying the Thebes Sandstone.

The occurrence of the Orchard Creek shale in Missouri was reported by McManamy and Stewart as cited by J.R. Ball (1939, p. 113). Gealy (1955, p. 94) considered the Orchard Creek Shale a member of the Maquoketa Shale. Thompson (1991, p. 221), following the original proposal by Gudstadt (1958), raised the Maquoketa to a group, including, from bottom up, the Cape La Croix Shale (formerly called simply Maquoketa shale), Thebes Sandstone, Orchard Creek Shale, and Girardeau Limestone. If the Thebes Sandstone is not present, the Orchard Creek and Cape La Croix Shales cannot be distinguished separately.

Ordovician System

Ordovician system (Tarr, 1918) "Canadian and upper Ozarkian of Ulrich"; **=** ***Potosi to Gasconade formations?***
Ordovician system (Branson, 1918; Weller and St. Clair, 1928) = Canadian of Ulrich; **=** ***Roubidoux to Powell only***
Lower Ordovician (Branson and Mehl, 1933a) = ***Roubidoux to Powell***
Lower Ordovician (Ireland, 1936; Miller, et al., 1947) = ***Gasconade to Powell***
Ordovician series (of Ulrich) (Grohskopf and Hundhausen, 1937) = ***Everton - Kimmswick***
Ordovician or Canadian system (Greene, 1945) = ***Everton- Kimmswick?***
Ordovician System (Martin, et al., 1961a; Thompson, 1991, 1995)
Paleozoic Era

The Ordovician System comprises rocks of the next to the oldest period of the Paleozoic era, succeeding the Cambrian and preceding the Silurian. In early reports it was called "Lower Silurian", until Lapworth (1879) defined the Ordovician as separate from the Silurian, and renamed the "Lower Silurian" the Ordovician. Ordovician rocks in Missouri are divided into four series (in ascending order): the **Ibexian Series** (formerly **Canadian Series**), **Whiterockian Series**, **Mohawkian Series**, and **Cincinnatian Series**. Previous classifications (Martin, et al., 1961) used the term **Champlainian Series**, which has now been replaced by the Whiterockian and Mohawkian Series.

<u>**Ordovicic**</u>

Ordovicic (Keyes, 1914)

This is a variant on **Ordovician** proposed by Keyes.

Oread Formation of Shawnee Group

Oread limestone (Haworth, 1894) - in Kansas; = ***Toronto Limestone Member only***
Oread limestone (**Haworth, 1895**; Adams, 1903) - in Kansas; = ***Toronto to Kereford Members***
Oread limestone (Hall, 1896)
Oread limestone member <u>of Plattsmouth limestone</u> (Keyes, 1899)
Oread limestone member (7 beds) <u>of Douglas formation</u> (Condra, 1927)
unnamed shale member <u>of Oread limestone</u> (Condra, et al., 1932) = ***Heumader Shale Member***
Oread limestone formation (7 members) (Condra, 1935)
Oread limestone (7 members) (Moore, 1936; Moore, et al., 1951) - in Kansas
Oread limestone (7 members) (McQueen and Greene, 1938; Branson, 1944b)
Oread formation (5 members) (Condra and Scherer, 1939) - in Nebraska
Oread formation (7 members) (Searight and Howe, 1961)
Oread Formation (7 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Oread Limestone (7 members) (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Oread Formation (7 members) (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Haworth (1894, 1895) named the Oread limestone from exposures on Mt. Oread, in Lawrence, Douglas County, Kansas; T. 12 S., R. 19 E.

Thompson (1995, p. 122-123) stated "The Oread Formation is composed an alternating succession of four limestone and three shale members...The complete succession is well-exposed at several places in Buchanan and Andrew counties [Missouri]. The total thickness of the Oread in Missouri is about 50 ft." The Oread Formation overlies the "upper unnamed shale member" of the Lawrence Formation, and is overlain by the Jackson Park Shale Member of the Kanwaka Formation. It comprises seven members.

<u>**Oread limestone**</u>

Oread limestone (Haworth, 1894) = ***Toronto Limestone Member of Oread Formation***

Pennsylvanian System (Virgilian Series)

When originally named, Haworth (1894) applied the name "Oread limestone" only to the unit now called the **Toronto Limestone Member of the Oread Formation**. He emended his definition in 1895 to include the other members within the Oread.

<u>**Oriskany (Oriskanian)**</u>

Oriskany (early geologists) = ***Clear Creek Chert***
Oriskany sandstone (Meek and Worthen, 1866) = ***Beauvais Sandstone*** in part
Oriskany lower beds, or Clear Creek group (Meek and Worthan, 1866)
Oriskanian Series <u>of Earl Devonic Sub-Period</u> (Keyes, 1914) = ***upper part of Lower Devonian Series***
Oriskinian Series <u>of Lower Devonian</u> (Savage, 1920a) = ***upper part of Lower Devonian Series***
Oriskinian Group of Lower Devonian Series (Weller, 1944) = ***upper part of Lower Devonian Series***

Devonian System (Lower and Middle Devonian Series)

"Oriskany" is a term used in New York for a Lower Devonian sandstone or group. The term was applied in Missouri by early geologists to what is now called the Clear Creek Formation.

Osage City

Osage City limestone (Hall, 1896) - in Kansas; = ***Howard Formation***
Osage City shales (Hall, 1896) - in Kansas; = ***Severy Formation***
Pennsylvanian System (Virgilian Series)

Osage limestone

Osage limestone (**Winslow, 1894**) = ***Gasconade Dolomite***
Ordovician System (Ibexian Series)

A term used by Winslow (1894, p. 331, 366, 375) for a part of his Gasconade limestone, the "Osage limestone" was overlain by the **Moreau (Roubidoux) sandstone** and underlain by the **Cole Camp (Gunter) sandstone**. It was named for Osage Bluff, Cole County, Missouri.

Osagean Series

Osage group (Williams, 1891; Weller, 1898a, 1898b) = ***Keokuk and Burlington Limestones***
Osage age (Williams, 1891)
Osage epoch (Weller, 1898a, 1898b) = ***Osagean Series and Warsaw Formation***
Osage group of Iowa Series (Weller and Sutton, 1940) - included Warsaw
"unassigned Osagean limestone" (Kissling, 1960) = ***"lower Burlington limestone"***
Osagean series (Spreng, 1961)
Osagean Series (Thompson and Fellows, 1970; Thompson, 1979a, 1979b, 1986)
Mississippian System

Type area: The Osage group was proposed by H.S. Williams (1891, p. 169) to include the Keokuk and Burlington Limestones. The name was derived from the Osage River, west-central, Missouri, along which both the Keokuk and Burlington are exposed in the vicinity of Osceola, St. Clair County.

The Osagean Series of the Mississippian System succeeds the Kinderhookian Series and precedes the Meramecian Series. It includes primarily the Burlington and Keokuk formations, but also includes the Fern Glen Formation in eastern Missouri, and its equivalents, the Pierson Limestone, Reeds Spring and Elsey Formations in western and southwestern Missouri. The boundaries have changed many times. Some authors have included the Warsaw Formation, which overlies the Keokuk. However, the Warsaw is currently considered the base of the Meramecian Series. This unit has also been called the "Augusta group," "Keokuk group," "Osage group," and the "Ozark group." The Osage group became the Osagean Series. In Illinois, Osagean strata comprise the lower part of the **Valmeyeran Series**.

Osage shales

Osage shales (Haworth, 1898) - in Kansas; = ***Scranton Formation***
Pennsylvanian System (Virgilian Series)

Osgood member

Osgood member of Bainbridge formation (Ball, 1942) = ***St. Clair Limestone Member of Bainbridge Formation***
Silurian System (Wenlockian and Ludlovian Series)

See also **Laurel member** of the Bainbridge Formation.

Oshawanan series

Oshawanan series (Keyes, 1933) = ***Chesterian Series***
Oshwanan (*sic.*) series (Keyes, 1940a)
Oshawanan series of late Leeic period (Keyes, 1941b)
Mississippian System (Chesterian Series)

This was a term used by Keyes (1941b, p. 156) for a series of Late Leeic age, including (ascending) Aux Vases sandstone, Kaskaskia limestone, and Jackfork shale (Pennsylvanian in age). The first two are strata now in the Chesterian Series of the Mississippian System.

Oskaloosa Shale Member of Deer Creek Formation, Shawnee Group

Oskaloosa shale member of Deer Creek limestone (**Condra, 1935**; Moore, 1936; Moore, et al., 1951) **-** in Kansas
Oskaloosa member of Deer Creek formation (Searight and Howe, 1961)
Oskaloosa Shale Member of Deer Creek Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Oskaloosa Shale Member of Deer Creek Limestone (Jewett, et al., 1968; Heckel, et al., 1979; French, et al., 1988; Baars and Maples, 1998) **-** in Kansas
Oskaloosa Shale Member of Deer Creek Formation (Thompson, 1995)
Pennsylvanian system (Virgilian Series)

Type section: Named by Condra (1935), Moore (1936, p. 180) located the type section in the "vicinity of Oskaloosa, Jefferson county, Kansas."

Thompson (1995, p. 125) stated "The Oskaloosa Shale Member...consists of shale, which is nonsilty and calcareous in the lower part and silty in the upper part. The average thickness of the unit is about 10 ft." The Oskaloosa Shale Member overlies the Ozawkie Limestone Member, and is overlain by the Rock Bluff Limestone Member of the Deer Creek Formation.

Ost Limestone Member of Tecumseh Shale, Shawnee Group

Ost limestone of Tecumseh shale member of Shawnee formation (**Condra, 1930**) **-** in Nebraska
Ost limestone member of Tecumseh shale (Moore, 1932)
Ost limestone of Tecumseh shale (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Ost member of Tecumseh formation (Searight and Howe, 1961)
Ost Limestone Member of Tecumseh Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Ost Limestone Member of Tecumseh Formation (Howe, 1968)
Ost Limestone of Tecumseh Shale (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1930), Moore (1936, p. 179) located the type locality at "Ost farm on south fork of Weeping Water Creek, about 3.5 miles east of Avoca, Otoe county, Neb."

Howe (1968, p. 35) described the Ost Limestone Member as "Limestone, medium-gray, extremely argillaceous, tough; crinoidal...0 ft 10-12 in." The Ost Limestone Member overlies the Kanosha Shale Member, and is overlain by the Rakes Creek Shale Member of the Tecumseh Shale. It has been described in Missouri from one locality (Howe, 1968), in the C NE NW sec. 15, 59N-36W, Andrew County, in a roadcut on Interstate Highway 29.

Oswegan series

Oswegan series (Wilson, 1922) = ***Alexandrian (Llandoverian) Series***
Silurian System (Llandoverian Series)

This term, previously used in New York, was applied in Missouri by Wilson (1922, p. 31) for what was later called the Alexandrian Series (Lower Silurian).

Oswego limestone

Oswego limestone (Haworth and Kirk, 1894; Adams, 1896; Haworth, 1898) **-** in Kansas; **=** ***Fort Scott Subgroup of Marmaton Group***
Oswego or Fort Scott limestone (Bennett, 1896) = ***Fort Scott Subgroup of Marmaton Group***
Fort Scott ("Oswego") limestone (Greene, 1918) = ***Fort Scott Subgroup of Marmaton Group***
Pennsylvanian System (Desmoinesian Series)

The Oswego limestone was used by Haworth and Kirk (1894) for the Blackjack Creek through Higginsville succession, later called the Fort Scott limestone (Fort Scott Subgroup today). Adams (1902-1903) rejected Oswego for Fort Scott, and Greene (1918) called the succession "Fort Scott ('Oswego') limestone".

Ottawa limestone

Ottawa limestone (Haworth, 1894) - in Kansas; = ***Stanton Formation***

Pennsylvanian System (Missourian Series)

Ovid Coal Bed of Mound City Shale Member, Hertha Formation, Bronson Subgroup, Kansas City Group

Ovid coal (Bergstrom, 1956) "= No. 8 coal of Illinois"

Ovid coal of Mound City Member of Hertha Formation (Payton, 1966)

Pennsylvanian System (Missourian Series)

Thompson (1995, p. 112) stated "The Mound City Shale Member...includes the **Ovid coal** and its associated underclay in its lower part..."

Owl Creek Formation

Owl Creek tongue of Ripley formation (Farrar, 1935)

Owl Creek formation (Grohskopf and Howe, 1961)

Owl Creek Formation (Thompson, 1995)

Cretaceous System (Gulfian Series)

Type section: For a Cretaceous formation overlying the Ripley (McNairy) Formation and underlying the lower Tertiary Clayton Formation, Hilgard (1860, p. 79, 84-91, 102) used the term Owl Creek marl. The name was derived from exposures on Owl Creek, near Ripley, Tippah County, Mississippi.

The Owl Creek marl was originally included in the Ripley group with the underlying McNairy, but in 1937 the name was changed to the Owl Creek Formation, and the name "Ripley" was restricted to underlying deposits. Later the Paleocene was differentiated at the base of what was the Eocene, making the formation overlain by Paleocene deposits. The Owl Creek was first recognized in Missouri by Stephenson (personal communication to Farrar, 1935, p. 15) in exposures near the village of Ardeola, Stoddard County.

Thompson (1995, p. 135) added "The Owl Creek Formation consists of a massive, sandy, micaceous, fossiliferous, marine clay, which is commonly glauconitic...The Owl Creek is exposed along Crowley's Ridge in Scott and Stoddard counties and dips southeastward into the subsurface of the embayment, where it consists of brown, calcareous, sandy clay with pyritized fossils and glauconite. The thickness...is variable, ranging from a few inches to 11 ft in the outcrop area, to as much as 100 ft in the subsurface. The Owl Creek is unconformably overlain by Tertiary rocks."

Ozan

Ozan formation (Dane, 1926, 1929) - in Arkansas

Ozan and Marlbrook-Saratoga units (Grohskopf, 1955) - in subsurface of Missouri embayment

Cretaceous System

Dane (1926) used the term Ozan formation for a Cretaceous marl in southwest Arkansas. Grohskopf (1955, p. 20) stated that wells in the deeper portion of the embayment of Missouri encounter Cretaceous below the McNairy that does not crop out at the surface. These beds are of both marine and nonmarine origin, and the stated they roughly correlate with the Ozan and Marlbrook-Saratoga units of the Arkansas section. The formation was named for exposures along the middle fork of the Ozan Creek and for the town of Ozan, Hempstead County, Arkansas, which is located on its outcrop.

Ozark group

Ozark group (Williams, 1922) = ***Osagean Series***

Mississippian System (Osagean Series)

The "Ozark group" was proposed by H.S. Williams (1922, p. 36-40) for what was later called the Osage group - then the **Osagean Series** of current usage. It was named "for prominent development of the formations constituting the group on the southern and western margins of the Ozark uplift."

Ozark marble

Ozark marble (Broadhead, 1889; Wilmarth, 1938?) = ***"Taum Sauk limestone" of Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Broadhead (1889, p.7-8) used this term for marble underlying the "Fourth Magnesian limestone" (Bonneterre Formation) and overlying sandstone and conglomerate (Lamotte Sandstone) resting on Archean granites and porphyries, in Madison County, Missouri. Bridge (1930, in personal communication to Wilmarth, 1938) stated that this marble consists of lenses in the lower part of the Bonneterre limestone. It was named for the Ozark uplift.

Ozark series - Ozarkian system

Ozark series (**Broadhead, 1874**) = ***Ibexian Series±***
Ozark series (Broadhead, 1891) = ***Potosi Dolomite to Gasconade Dolomite***
Ozark stage of lower Silurian system (Winslow, 1894) = ***Potosi Dolomite to Gasconade Dolomite***
Ozark or Cambric Period (Schuchert, 1910)
Ozarkian system (**Ulrich, 1911**; Tarr, 1918; Dake, 1921; Grohskopf and Hundhausen, 1937; McQueen and Greene, 1938) = ***Potosi to Jefferson City***
Ozarkian or late Cambrian system (Wilson, 1922)
Ozarkian system (Ulrich, 1929) = ***Potosi to Gasconade***
Ozarkian system of Ulrich (McQueen, 1931a, 1931b; Grohskopf, et al., 1939)
Ozarkian (Shimer, 1934)
Ozarkian Period (Ulrich and Cooper, 1938)
Ozarkian series of Cambric Period (Keyes, 1941b)

Cambrian and Ordovician Systems (Upper Cambrian and Ibexian Series)

"Ozark" was first used by Broadhead (1874, 1891, p. 33) for what was also called the Magnesian limestone series; (descending) First Magnesian limestone, First or Saccharoidal sandstone, Second Magnesian limestone, Second sandstone, Third magnesian limestone, Third sandstone, Fourth magnesian limestone, Ozark marble, basal sandstone and conglomerate. This definition was used often in Missouri reports until 1898, but there were also many other definitions of Ozark. The series was named for development of the rocks in the Ozarks.

This term was formally proposed by Ulrich (1911), as "Ozarkian system," to include rocks now classified as late Upper Cambrian and early Lower Ordovician. It initially included the Jefferson City at the top and the Potosi dolomite at the bottom; later (1929) he made the top of the Gasconade the top of his Ozarkian system, beneath the "Canadian system" (Roubidoux - Everton formations), and overlying the "Cambrian system" (Lamotte - Derby-Doerun formations). The Ozarkian system was derived from Broadhead's Ozark series.

The term **Ozark** or **Ozarkian** was used until the middle 1950's for strata of late Cambrian (Eminence and Potosi Dolomites) through early Ordovician (Gasconade Dolomite) ages. It wasn't until Twenhofel, et al. (1954) that the Canadian was redefined to be synonymous with "lower Ordovician". Prior to then, Ozarkian included the Gasconade Dolomite, the rest of the Lower Ordovician was the Canadian System (also proposed by Ulrich in 1911).

Ozawkie Limestone Member of Deer Creek Formation, Shawnee Group

Ozawkie limestone member of Deer Creek limestone (**Condra, 1935**)
Ozawkie limestone member of Deer Creek limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Ozawkie member of Deer Creek formation (Searight and Howe, 1961)
Ozawkie Limestone Member of Deer Creek Limestone (Jewett, et al., 1968; Heckel, et al., 1979; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Ozawkie Limestone Member of Deer Creek Formation (Burchett, 1970) - in Nebraska
Ozawkie Limestone Member of Deer Creek Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1935), Moore (1936, p. 182) located the type locality "In road cut, NE¼ sec. 31, T. 9 S., R. 18 E., Jefferson county, Kansas."

Thompson (1995, p. 125) stated "The Ozawkie Limestone Member...is composed of several uneven beds of argillaceous, buff limestone that are separated by shaly partings. The thickness of the...[member]... ranges from 5 to 7 ft." The Ozawkie Limestone Member overlies the Tecumseh Shale, and is overlain by the Oskaloosa Shale Member of the Deer Creek Formation.

Ozora Limestone

Ozora Limestone (Rogers, 1970) = ***Little Saline Limestone***

Devonian System (Lower Devonian Series)

P

Pacific sandstone

Pacific sandstone (Ball and Smith, 1903) = ***St. Peter Sandstone***

Ordovician System (Mohawkian Series)

Initially called "First or Saccharoidal sandstone" by Swallow, the name "Pacific sandstone" was proposed by Ball and Smith (1903, p. 79-81) for the thick sandstone mined for glass sand in the vicinity of the town of Pacific, Franklin County, Missouri. This name, along with "Crystal City sandstone," a name proposed for another area in Missouri where the same sandstone formation was mined, was discarded several years later in favor of **St. Peter Sandstone**

Paint limestone

Paint limestone (Keyes, 1923b) = ***Paint Creek Formation***

Mississippian System (Chesterian Series)

This was a shortened name for the Paint Creek Formation employed by Keyes (1923b, p. 320).

Paint Creek Formation

Paint Creek formation (**Weller, 1913**) - in Illinois
Renault-Paint Creek Formation (Flint, 1925) = ***Renault and Paint Creek formations***
Paint Creek formation (Weller and St. Clair, 1928) - includes Cypress Formation at top
Paint Creek formation (Branson, 1944b; Spreng, 1961)
upper limestone of Paint Creek formation (Spreng, 1961) - in Missouri, = ***Ridenhower Limestone of Illinois***
middle part of Paint Creek formation (Spreng, 1961) - in Missouri, = ***Bethel Sandstone of Illinois***
lower limestone of Paint Creek formation (Spreng, 1961) - in Missouri, = ***Downeys Bluff Limestone of Illinois***
Paint Creek Group of Gasperian Stage (Swann, 1963) - in Illinois
Paint Creek Formation (Thompson, 1979a, 1986, 1995)

Mississippian System (Chesterian Series)

Type section: S. Weller (1913, p. 120-125) named the formation for Paint Creek, Monroe County, Illinois, where it overlies the Yankeetown chert and underlies the Ruma (Cypress) formation.

Weller (1920, p. 281-290, 395-416) redefined the Paint Creek, including the lower part of the Ruma formation at the top, the upper part of the Ruma being placed in the overlying Cypress sandstone, which now limits the Paint Creek formation at the top. Thompson (1986, p. 133) noted that "Spreng (1961, p. 75) described a three-part lithologic division of the Paint Creek in Missouri." Thompson regarded these as members of the Paint Creek, "...corresponding to the three parts of the Paint Creek Group in Illinois...", in ascending order, the Downeys Bluff Limestone, Bethel Sandstone, and Ridenhower Limestone.

Paleocene Series

Tertiary System

The name applied to the basal series of the Tertiary System, the Paleocene over lies the upper part of the Cretaceous System (Gulfian Series) and is overlain by the Eocene Series of the Tertiary System. Thompson (1995, p. 138), stated "The Paleocene Series of southeastern Missouri is represented by the Midway Group, which, within the state, is composed of the Clayton and Porters Creek Formations..."

Paleozoic Era

A major time term, meaning old or ancient life, the Paleozoic Era includes (in ascending order), the Cambrian, Ordovician Silurian, Devonian, Carboniferous (or Mississippian and Pennsylvanian), and Permian Systems. The Paleozoic Era lies on rocks of the Precambrian Erathem, and are overlain by those of the Cenozoic Era, the oldest in Missouri being of the Cretaceous System. Rocks of the Permian System have not been identified in Missouri, but the other Paleozoic systems are all represented.

Paola Limestone Member **of Iola Formation, Linn Subgroup, Kansas City Group**

Paola limestone member of Iola limestone (**Newell, *in* Moore, 1932**; Moore, 1936; Moore, et al., 1951) - in Kansas
Paola limestone member of Chanute shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Paola limestone of Iola formation (Condra and Scherer, 1939) - in Nebraska
Paola limestone of Iola limestone formation (Condra and Reed, 1943, 1959)
Paola limestone member of Iola formation (Moore, 1948)
Paola member of Iola formation (Searight and Howe, 1961)
Paola Limestone Member of Iola Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Paola Limestone Member of Iola Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 114) located the type section as "North edge of Paola, Kansas [Miami County]."

McQueen and Greene (1938) and Branson (1944b) both included the Paola limestone in the "Chanute shale." Thompson (1995, p. 116) stated "The Paola Limestone Member...is characteristically a single bed of dark-gray, fossiliferous limestone, which has an average thickness of about 1 ft." Howe (1986, p. 21) noted that "In southern Platte County, the Paola is a single massive ledge of dense dark limestone containing *'Osagia'* pisolites, *'Ottonosia,'* and *Archaeolithophyllum*, in addition to an invertebrate fauna..." The basal member of the Iola Formation, the Paola Limestone Member is overlain by the Muncie Creek Shale Member, and overlies the Chanute Shale.

Parkville limestone

Parkville limestone (Gallaher, 1898, 1900) = ***Cement City Limestone Member of Drum Formation***

Pennsylvanian System (Missourian Series)

Parkville shale

Lane shale of Parkville shales (Keyes, 1889) = ***Bonner Springs Shale***
Parkville shales (Keyes, 1899) = ***Lane (Liberty Memorial) Shale to Bonner Springs Shale;*** = "Carlyle limestone" in Kansas
Parkville shale (Keyes, 1900b, 1901b) = ***Lane (Liberty Memorial) Shale to Bonner Springs Shale***

Pennsylvanian System (Missourian Series)

Parsons limestone

Parsons limestone (Adams and Taff, 1900; Adams, 1903; Schrader, 1908) = ***Altamont and Lenapah Formations***

Pennsylvanian System (Desmoinesian Series)

Pawhuska

Pawhuska limestone (Smith, 1894) - in Oklahoma?; = ***Deer Creek Formation***

Plummer limestone member of Pawhuska formation (Heald, 1918) - in Oklahoma; = ***Rock Bluff Limestone Member of Deer Creek Formation?***

Pennsylvanian System (Virgilian Series)

Pawnee Formation of Appanoose Subgroup, Marmaton Group

Pawnee limestone series (Swallow, 1866) = ***Labette and Pawnee formations***

Pawnee limestone of Pawnee limestone series (**Swallow, 1866**)

Pawnee limestone (Haworth, 1895)

Pawnee limestone (Drake, 1897) = ***Foraker Formation of Wabaunsee Group in Kansas***

Pawnee limestone member of Henrietta formation (Hinds and Greene, 1915)

Pawnee limestone member of Marmaton formation (Moore and Haynes, 1917) - in Kansas

Pawnee limestone (Moore, 1936) - in Kansas

Pawnee formation (Keyes, 1941f) = ***Fort Scott Subgroup - Pawnee Formation***

Pawnee limestone (3 members) (Cline, 1941)

upper limestone member of Pawnee limestone (Cline, 1941) = ***Coal City Limestone Member of Pawnee Formation***

middle shale of Pawnee limestone (Cline, 1941) = ***Mine Creek Shale Member of Pawnee Formation***

Pawnee limestone (4 members) (Jewett, 1941; Moore, et al., 1951) - in Kansas

Pawnee formation (Moore, 1949) - included Lexington Coal Bed

Pawnee formation (2 members) (Clair, 1943)

Pawnee formation (4 members) (Greene and Searight, 1949; Cline and Greene, 1950; Searight and Howe, 1961)

Pawnee limestone (5 members) (Branson, 1954a) - in Oklahoma

Pawnee Limestone (4 members) (Jewett, et al., 1968; Heckel, et al., 1979) - in Kansas

Pawnee Formation (4 members) (Gentile, 1976; Thompson, 1995)

Pawnee Limestone (Price, 1981) - in Kansas, Missouri, and Iowa; = **Oologah Limestone in Oklahoma**

Pennsylvanian System (Desmoinesian Series)

Type section: Named originally by Swallow (1866, p. 24), Moore (1936, p. 62) stated the Pawnee was named from exposures "On Pawnee Creek near the Village of Pawnee southwest of Fort Scott, Kansas." This village is now called Anna. Jewett (1941, p. 315) added "Because it is desirable that the type exposure show units that are regionally significant, I have selected as the type the exposure along [Kansas] State Highway 7, slightly north of the center of sec. 7, T. 27 S., R. 24 E., Bourbon County. The upper 20 to 25 feet is not well exposed there, but can be seen fairly well at the middle of the east line of sec. 2, T. 27 S., R. 24 E. " (the latter section is the type section for the Anna Shale Member).

The Pawnee Formation, overlying the Labette Shale and overlain by the Bandera Shale, (Thompson, 1995, p. 107) "...consists of four members...The average thickness of the formation is approximately 20 ft. It is thickest (more than 40 ft) near the Kansas border, but is thinner north of the Missouri River, particularly near the Iowa state line and in northeastern Missouri."

"Pecatonica Formation"

Pecatonica Formation (Templeton and Willman, 1973; Thacker and Satterfield, 1977, 1997)

"Pecatonica Formation" (Thompson (1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 73) stated "As Hershey [1894] designated no type section, a section in the quarries and roadcut on the East Branch of the Pecatonica River, just north of Woodford, Lafayette County, Wisconsin...is proposed."

Thompson (1991, p. 106) stated "In southeastern Missouri, there is a sequence of limestone and limestone and dolomite between the Plattin Group and Joachim Dolomite, between the basal members of the Bloomsdale Limestone (Brickeys and/or Blomeyer Members) and the uppermost beds of the Joachim Dolomite...these strata were identified as part of the **Rock Levee Formation** by Grohskopf (1948)...These same strata were designated the "Pecatonica Formation" by Templeton and Willman (1963). The top of the Rock Levee coincides with that of the "Pecatonica," but the base of the former was marked by a particular chert horizon about 270 ft below the top, now determined to be in the 'middle Joachim Dolomite'; hence, north of approximately central Perry County, where the 'Pecatonica Formation' pinches out, the 'Rock Levee' comprises only the upper part of the Joachim Dolomite, and is wholly a synonym of Joachim."

The upper beds of the "Pecatonica Formation" strongly resemble those of the overlying Plattin Group, and were called **"upper Pecatonica"** by Thompson (1991). Likewise, the **"lower Pecatonica"** is very similar to the underlying Joachim Dolomite.

Pedee Group

Pedee group (**Moore, 1932**; Newell, 1936; Moore, et al., 1951) - in Kansas
Pedee Group (Condra, 1935) - in Nebraska
Pedee group (Searight and Howe, 1961)
Pedee Group (Thompson, 1979, 1995; Howe, 1986)

Pennsylvanian System (Missourian Series)

Type area: According to Moore (1936, p. 137) the type section of the Pedee Group is along "Pedee Branch in the vicinity of Weston, Mo. [Platte County]". No specific type section has been identified, and the location of a "Pedee Branch" cannot be verified as it does not appear on recent 7.5' quadrangles of the region.

Moore (1932, p. 93) named the Pedee, and stated "Shale and thin limestone, up to 100 feet or more in thickness locally, that overlie the Stanton limestone and underlie the pre-Virgil unconformity are differentiated as constituting the Pedee group." In Missouri, the Pedee Group comprises two formations, the **Weston Shale** and **Iatan Limestone**, both of which have been cut out by pre-Virgilian erosion in some areas, particularly in Clay and Platte counties, replaced by the Tonganoxie Sandstone Member of the basal Virgilian Stranger Formation.

Use of the name Pedee has been abandoned in Kansas, the units of the Pedee formation placed as basal members in the Stranger Formation. In Missouri, the Pedee Group is overlain by formations of the Douglas Group, and overlies formations of the Lansing Group.

Peerless Park Member of Keokuk Limestone

Peerless Park Member <u>of Keokuk Limestone</u> (**Brenkle and Carter, 1991;** Thompson, 1995)

Mississippian System (Osagean Series)

Type section: The Peerless Park Member, named by Brenkle and Carter (1991, p. 427) was "...named for exposures...located near Peerless Park, southern St. Louis County, Missouri." The type section is a railroad cut on the southeastern side of the St. and San Francisco Railroad spur, just north of Highway I-44.

Thompson (1995, p. 61) stated "The Peerless Park Member of the Keokuk Limestone is a single, thick bed of cross-stratified grainstone (or calcarenite) containing scattered oolites and fossil fragments. It has been identified only in St. Louis County and while it is not as oolitic as the Short Creek Oolite of western Missouri, it had a similar depositional environment, and is essentially in the same stratigraphic position."

<u>Pella Formation</u>

Pella Formation (Johnson and Vondra, 1969) - northeastern Missouri; = ***Ste. Genevieve Limestone***
Pella Formation (Thompson, 1986)
Pella beds (Thompson, 1986) - in Iowa

Mississippian System (Chesterian Series)

Keyes (1941b, p. 156) used the term "Pella shale" for the top formation of his Chartresan series of Leeic age, underlain by Genevieve limestone and overlain by Aux Vases sandstone. It was originally named from exposures in Iowa that are equivalent in age to Ste. Genevieve strata in Missouri.

Pennsylvanian (Sub-System) System

Pennsylvania series (Adams, 1904)
Pennsylvanian system (Moore, 1928)
Upper Pennsylvanian series (Branson, 1944b) = ***Virgilian Series***
Middle Pennsylvanian series (Branson, 1944b) = ***Missourian and Virgilian Series***
Pennsylvanian System (Searight and Howe, 1961; Thompson, 1995)
Pennsylvanian Subsystem of Carboniferous System (Subcommission on Carboniferous Stratigraphy, 2000)
Pennsylvanian System

Pennsylvanian rocks in Missouri are the youngest Paleozoic units in the state. They are underlain by Mississippian carbonates, and generally overlain by Quaternary-age glacial deposits. Named for extensive coal development in the state of Pennsylvania, this system has also been known as the "Coal measures" and Upper Carboniferous.

Pentremital limestone

Pentremital limestone (early geologists) = ***Chesterian Series***
Mississippian System (Chesterian Series)

Peoria Loess

Peoria loess (Grohskopf, 1955; Heim, 1961; Thompson, 1995)
Quaternary System (Pleistocene Series, Wisconsinan Stage)

Type section: Leverett (1898c, p. 244-249) proposed the term Peorian soil and weathered zone and Peorian interglacial stage to the interval between the Iowan loess and the Shelbyville till sheet, a till sheet which appears to be the earliest of the Wisconsin series. It was named for exposures near Peoria, Tazewell County, Illinois.

Subsequently the loess was included in the Peorian interglacial stage. Leighton (1933, p. 168) included the Peorian loess and preceding Iowan glacial stage in the Wisconsin stage, and somewhat modified the definition of Peorian. Several authors have used the term Peoria loess rather than Peorian. Its presence in Missouri was suggested by Clark in a personal communication to Grohskopf (1955, p. 24-25). Davis, et al. (1960) identified the Peoria loess in Platte County, Missouri.

Whitfield (*in* Thompson, 1995, p. 148) stated "The grain size, calcium carbonate content, and color of the Peoria loess varies with the distance from the river bluffs. Near the bluffs, the Peoria is a well-sorted, medium to coarse silt, which contains some very fine- to fine-grained sand. It is light yellowish-brown and is vertically jointed. Secondary carbonate nodules (loess Kindchen), manganese nodules, and limonite tubes are present. Pulmonate gastropod shells are common near the bluffs where the loess is thick and unleached."

Perry Farm Member of Lenapah Shale, Appanoose Subgroup, Marmaton Group

Perry Farm shale member of Lenapah limestone (**Jewett, 1941**; Moore, et al., 1951) **-** in Kansas
Perry Farm shale member of Lenapah formation (Greene and Searight, 1949; Cline and Greene, 1950)
Perry Farm member of Lenapah formation (Searight and Howe, 1961)
Perry Farm ("Warrensburg") sandstone and shale of Lenapah Formation (Anderson and Wells, 1968)
Perry Farm Sandstone of Lenapah Formation (**"Warrensburg" sandstone"**) (Wells and Anderson, 1968)
Perry Farm Shale Member of Lenapah Limestone (Jewett, et al., 1968; Heckel, 1991; Baars and Maples, 1998) - in Kansas
Perry Farm Member of Mound Valley Formation (Greenberg, 1986) - unpublished, in Kansas and Missouri
Perry Farm Shale Member of Lenapah Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Jewett (1941, p. 339) named the Perry Farm member of the Lenapah, and stated "The exposure selected as the type exposure of the Perry Farm shale is along the south side of the east-west road and along a private road to the southeast, east of a bridge over Pumpkin creek, in the NW NE sec. 7, T. 34 S., R. 18 E. This exposure is about 1.5 miles west of Argola, Labette County, Kansas. The name is taken from the Perry Farm, which is on the south side of the east-west road."

Thompson (1995, p. 109) added "The Perry Farm Member is mostly a gray shale, which is characteristically calcareous below and green and red above....A thin underclay or stigmarian sandstone near the top of the member is locally overlain by either a thin coal or coal smut. The member ranges in thickness from 1 foot in Bates County to 20 ft in Ray County." The Perry Farm is overlain by the Sni Mills Limestone Member and overlies the Norfleet Limestone Member of the Lenapah Formation.

Perry limestone

Perry limestone (Keyes, 1896a) of Silurian age; = ***Clear Creek Chert***
Perry limestone (Kindle and Miller, 1939) - Silurian and Middle and Lower Devonian in south-eastern Missouri
Devonian System (Lower and Middle Devonian Series)

Keyes (1896a, p. 41) proposed "Perry limestone" for a limestone exposed in eastern Missouri along the Mississippi River, named for Perry County, Missouri. It underlies the Grand Tower Limestone (Middle Devonian) and overlies the Girardeau Limestone (Upper Ordovician). He stated that it is essentially equivalent to Worthen's Clear Creek, but that he prefers term Perry. Wilmarth (1938, p. 1640-1641) stated that the name Perry is preoccupied, and that the Perry limestone of Keyes "Includes several fms."

Peru sandstone

Peru sandstone (Moore, 1949) - in Kansas; = ***Englevale Sandstone Member of Labette Shale***
"Peru sand" of subsurface (Moore, et al., 1951) - in Kansas; = ***Englevale Sandstone Member***
"Peru" sandstone of Labette shale (Branson, 1954a) - in Oklahoma?
Bandera Quarry ("Peru", "Polo") sandstone (Anderson and Wells, 1968) = ***Bandera Quarry Sandstone Member of Bandera Shale***
Pennsylvanian System (Desmoinesian Series)

Peter sandstone

Peter sandstone (Keyes, 1922) = ***St. Peter Sandstone***
Ordovician System (Mohawkian Series)

This is an abbreviation of **St. Peter Sandstone** introduced by Keyes (1922). It has not been generally accepted.

Phelps Sandstone

Phelps Sandstone of Hamilton Stage (Shepard, 1898) = ***Bachelor Formation***
Phelps Sandstone ("resembles Sylamore of Arkansas") (Weller, 1901) = ***Bachelor Formation***
Phelps sandstone (Kindle and Miller, 1939) = ***Bachelor Formation***
Mississippian system (Kinderhookian Series)

Shepard (1898, p. 49, 77-82) applied the term "Phelps sandstone" to a sandstone others called "Sylamore sandstone", named for the Phelps mines, in Greene County, Missouri. It was first considered Late Devonian in age, but later was proven to be Kinderhookian (Mehl, 1961, Thompson & Fellows, 1970), and renamed **Bachelor Formation** by Mehl (1960, 1961) to distinguish it from the Late Devonian Sylamore Sandstone of Arkansas.

Piasa Limestone

Piasa Limestone (Yochelson and Saunders, 1967) = ***St. Louis Limestone*** in St. Louis County
Mississippian System (Meramecian Series)

Pierson Limestone

Pierson [sic.] limestone (Weller, 1901, 1905) - named for **Pearson** Creek, Greene County, Mo.
Pierson formation (Moore, 1928) - restricted to area of type section
Fern Glen (Pierson) (Fowler and Lyden, 1931) = ***Pierson Limestone***
Pierson member of Chouteau formation (Branson, 1944b)
Pierson formation of St. Joe group (Beveridge and Clark, 1952)
Pierson formation (Spreng, 1961)
Pierson Formation (Robertson, 1967; Thompson, 1967, 1979a, 1979b; Thompson and Fellows, 1970)
Pierson Limestone of St. Joe Group (Sable, 1979)
Pierson Limestone (Thompson, 1986, 1995)
Mississippian System (Osagean Series)

Type section: The Pierson Limestone was named by Weller (1901, p. 144-147) from exposures along Pearson Creek in Greene County, east of Springfield. Thompson (1986, p. 76) stated "Beveridge and Clark (1952, p. 76) designated the type section as the '...cut on the north side of County Road D in the NE¼ SW¼ SW¼ sec. 29, T. 29 N., R. 20 W., near Turner Station, in Greene County...'" County Road D has been rebuilt, but the type section is still preserved on a side road (old Highway D) to Turner Station from new Highway D.

The basal formation of the Osagean Series in southwestern Missouri, the Pierson Limestone is overlain by strata from the Reeds Spring - Elsey formations at Springfield and south, to the base of the Burlington-Keokuk Limestone to the north of Springfield. It is everywhere underlain by the Northview Formation. Kaiser (1950, p. 2157, 2160) proposed that the name Pierson be dropped, assigning the more dolomitic lower beds to the Sedalia and the upper beds to the St. Joe. Clark and Beveridge (1952, p. 76-77) accepted the Pierson of Weller, and placed the base of the Osagean at the Pierson-Northview contact. They also extended the Pierson northward to include the silty dolomitic limestone unit which lies between the Northview and the Burlington in west-central Missouri, the "Sedalia" of Kaiser.

Pierson Point shale

Pierson Point shale of McKissick Grove shale member of Wabaunsee formation (Condra, 1927) = ***Wamego Shale Member of Zeandale Formation***
Pierson Point shale of McKissick Grove shale member of Wabaunsee formation (Condra, 1927) = ***Wamego Shale Member and Pillsbury Shale*** (where Maple Hill limestone is absent)
Pierson Point shale member of McKissick Grove shale (Moore, 1932) = ***Wamego Shale Member of Zeandale Formation***
Pierson Point shale member of McKissick shale (Condra, et al., 1932) - in Nebraska; = ***Wamego Shale Member***
Pierson Point shale member of McKissick shale formation (Condra, 1935) = ***Wamego Shale Member***
Pierson Point shale (Moore, 1936; Jewett, 1941; Moore, et al., 1951) - in Kansas; = ***Wamego Shale Member***
Pierson Point shale (McQueen and Greene, 1938; Branson, 1944b; Moore, 1948) = ***Wamego Shale Member***
Pierson Point formation (Condra, 1949) = ***Wamego Shale Member***
Pennsylvanian System (Virgilian Series)

The Pierson Point shale was used for the unit now called the **Wamego Shale Member of the Zeandale Formation** in Nebraska and Kansas before Wamego was proposed by Condra and Reed (1943). Branson (1944b) continued to use **Pierson Point shale** for this unit in Missouri.

Piketon gravel

Piketon gravel (Marbut, 1902) = ***Mounds Gravel***
Tertiary System (Pliocene Series)

Marbut (1902, p. 27) used the term "Piketon gravel" for gravels exposed in southeastern Missouri later called the "Lafayette" Gravel, and now called the **Mounds Gravel**. The name was derived from exposures at the former trading post of Piketon in Stoddard County, Missouri.

Pillsbury Shale of Richardson Subgroup, Wabaunsee Group

Pillsbury shale (**Moore and Mudge, 1956**)
Pillsbury formation (Searight and Howe, 1961)
Pillsbury Shale (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Pillsbury Formation (Burchett, 1970) - in Nebraska
Pillsbury Shale (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Moore and Mudge (1956, p. 2275) named the Pillsbury shale, and stated "The formation is named from Pillsbury Crossing, a ford across Deep Creek in the NE.¼ NW.¼ of Sec. 5, T. 11 S., R. 9 E., Riley County, Kansas. The type exposure is in a road cut in the SE.¼ NE.¼ NE.¼ of Sec. 28, T. 10 S., R. 9 E..."

In Missouri, McQueen and Greene (1938) and Branson (1944b) called the shale between the Zeandale and Stotler Formations the **Table Creek shale**. Greene and Searight (1949) called it the **Langdon shale formation**. Thompson (1995, p. 130) stated "The lower and middle parts of the Pillsbury Shale consist of gray silty shale. Clay-ironstone concretions are present in the lower part of this division, and the shale becomes increasingly sandy near the top. Beds of massive sandstone, several feet thick, are present above the sandy shale at most localities, and silty, gray or maroon clay occurs above it and below the overlying Dover Member of the Stotler Formation....The average thickness of the Pillsbury in Missouri is about 28 ft." The Pillsbury Shale overlies the Maple Hill Limestone Member of the Zeandale Formation, and is overlain by the Dover Limestone Member of the Stotler Formation.

Pilot coal

Pilot coal bed (Pierce and Courtier, 1938) - in Kansas; = ***Tebo Coal Bed***
"Pilot" coal of Pilot cyclothem (Moore, 1949) - in Kansas; = ***Tebo Coal Bed***
Pilot coal of Pilot cyclothem (Moore, et al., 1951) - In Kansas; = ***Tebo Coal Bed***
Pilot coal (Branson, 1954a; Schleicher and Hambleton, 1954) - in Kansas; = ***Tebo Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Pilot cyclothem

Pilot cyclothem (Abernathy, 1937; Moore, 1949; Moore, et al., 1951) - in Kansas; = ***Tebo Shale***
Pennsylvanian System (Desmoinesian Series)

Pilot Knob conglomerate

Pilot Knob conglomerate (Keyes, 1894) = ***Lamotte Sandstone***
Cambrian System (Upper Cambrian Series)

Keyes (1894b) used the name "Pilot Knob conglomerate" for a conglomerate known to occur only on Pilot Knob, in Iron County, Missouri, underlying the Fourth Magnesian limestone (Bonneterre Formation) and younger than the Iron Mountain porphyry. Keyes considered it to be Upper Cambrian. It is today regarded as the basal conglomerate in the **Lamotte Sandstone**.

Pilot Knob Felsite of Butler Hill Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Sides (1976), no type section was given.

Robertson (*in* Thompson, 1995, p. 11) stated "This formation...[is]...a sequence of rhyolitic flows with an abundance of lithophysae, local autobreccias, and flow lineation. Fresh rocks are porphyritic with reddish feldspar and a few small quartz phenocrysts in a dark red to maroon matrix...Outcrops...are restricted to the northwestern part of the Lake Killarney Quadrangle...the pilot Knob is between 500 and 1,000 ft thick."

<u>**Pilot Knob formation**</u>

Pilot Knob formation (Buckley, 1907)

Late Precambrian Erathem or Early Upper Cambrian System

Buckley (1907, p. 286; 1909, p. 15-17) used the term "Pilot Knob formation" for slate and conglomerate below the Lamotte and above Laurentian diabase, granite, and rhyolite. Dr. Hayes says this consists of breccias and agglomerates underlying the Ironton slates of Keyes. It was named from Pilot Knob, Iron County, Missouri.

<u>**Pinicon Ridge Formation**</u>

Pinicon Ridge Formation <u>of Wapsipinicon Group</u> (Woodruff, 1990) - northeastern Missouri

Devonian System (Middle Devonian Series)

<u>**Pipe clay deposit**</u> (Swallow, 1855)

<u>**Piqua limestone**</u>

Piqua limestone (Adams, 1904) - in Kansas; = ***Stanton Formation***

Piqua limestone member <u>of Wilson formation</u> (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas; = ***Stanton Formation***

Pennsylvanian System (Missourian Series)

<u>**Pitted Dolomite member**</u>

Pitted Dolomite member (Lee, 1913) = ***part of Jefferson city Dolomite***

Ordovician System (Ibexian Series)

This is a descriptive term used by Lee (1913, p. 35) for the lower 80 feet of the Jefferson City Dolomite. It could have been referring to the "Quarry Ledge", but this is not certain.

<u>**Platteville Group**</u>

"Platteville Group" = ***"Pecatonica" and Plattin formations***

Platteville Group (Templeton and Willman, 1963)

"Platteville Group" (Thompson, 1991)

Ordovician System (Mohawkian Series)

The Platteville Group of Illinois comprises the Pecatonica Formation and the Plattin Subgroup (Templeton and Willman, 1963). In Missouri, "Pecatonica" strata are present only in a small area of southeastern Missouri, leaving only the Plattin Group (or Limestone) to represent the "Platteville" over the rest of the state. Except for this small area near Cape Girardeau, "Platteville" as a stratigraphic name is not necessary.

<u>**Plattford formation**</u>

Weston (Plattford) shale formation (Condra, 1935) - in Nebraska; = ***Weston Shale***

Unnamed Shale Member <u>of Plattford Formation</u> (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska; = ***Weston Shale***

Plattford Shale (Heckel, et al., 1979) - in Nebraska; = ***Weston Shale***

Pennsylvanian System (Missourian Series)

Plattin Group, Plattin Limestone

Plattin limestone (Gallaher, 1900) = ***Plattin and Decorah formations***
Plattin limestone (**Ulrich, 1904a**; Willis, 1912; Foerste, 1920; Dake, 1921; Bradley, 1925) - may include Decorah Formation at top
Plattin limestone (Weller and St. Clair, 1928; Ulrich, 1939) - restricted to present definition, named overlying strata the Decorah Formation
Plattin formation of Black River group (McQueen, 1939)
Plattin group (Larson, 1951; Twenhofel, et al., 1954)
Plattin formation (Martin, et al., 1961a)
Plattin Subgroup of Platteville Group (Templeton and Willman, 1963; Willman and Kolata, 1978; McCart, 1986)
Plattin Limestone (Echols and Levin, 1966; Thompson, 1982)
Plattin Sub-Group (Shourd and Levin, 1976) = ***"Pecatonica" and Plattin formations***
Plattin Formation (Thacker and Satterfield, 1977; Thompson, 1987) = ***Plattin and basal Decorah Castlewood Limestone Member***
Plattin Group (Thompson, 1991, 1995) - east-central and southeastern Missouri
Plattin Limestone (Thompson, 1991, 1995) - northeastern outcrop and subsurface in Missouri
Ordovician System (Mohawkian Series)

Type section: As stated by Thompson (1991, p. 110) "The Plattin Limestone was named [by Ulrich (1904a, p. 111)] from exposures near the mouth of Plattin Creek, Jefferson County, Missouri...No specific section has been designated as the type."

The Plattin overlies the Joachim Dolomite and is overlain by basal units of the Decorah Group (Diecke K-bentonite, and the Castlewood Limestone Member of the Spechts Ferry Formation). It had been commonly known as the "Trenton," "Black River," and "Birds-Eye" limestones in the early report of the Missouri Geological Survey. As originally defined, it included all strata between the Joachim limestone below and the Kimmswick limestone above. Weller (1928, p. 109) recognized the Decorah formation at the top of the Plattin, and this became the limiting formation at the top. McQueen (1939) redefined the formation in the Cape Girardeau area by placing the base of the Plattin at the top of beds called "Stones River," later defined by Grohskopf as the upper part of the "Rock Levee," now the "Pecatonica" Formation. Larson (1951) published a detailed report on the Plattin limestone of southeastern Missouri, and raised the formation to a group with four formations and several members. Larson's nomenclature is used today for the **Plattin Group**.

Plattsburg Formation of Lansing Group

Plattsburg limestone (**Broadhead, 1866**, 1872; Weeks, 1902)
Plattsburg limestone (Haworth and Kirk, 1894) - in Kansas
Plattsburg limestone (Keyes, 1899) = ***Plattsburg - Stanton formations (Lansing Group)***
Plattsburg limestone member of Lansing formation (Hinds and Greene, 1915; McCourt, 1917; Condra, et al., 1927)
Plattsburg limestone member of Lansing formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Pennsylvanian System (Missourian Series)
Plattsburg limestone (3 members) (**Newell, *in* Moore, 1932**)
Plattsburg limestone (3 members) (Moore, 1936; Moore, et al., 1951) - in Kansas
Plattsburg limestone (3 members) (McQueen and Greene, 1938)
Plattsburg formation (3 members) (Condra and Scherer, 1939) - in Nebraska
unnamed shale in Plattsburg limestone (Branson, 1944b) = ***Hickory Creek Shale Member***
Plattsburg formation (3 members) (Searight and Howe, 1961)
Plattsburg Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Plattsburg Limestone (3 members) (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Plattsburg Formation (Kidder, 1985)
Plattsburg Formation (3 members) (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Broadhead (1866), Hinds and Greene (1915) located the type section of the Plattsburg Formation as"...the locality which Broadhead took as the type of the Plattsburg limestone...SECTION SOUTHEAST OF PLATTSBURG." Moore (1936, p. 127) located this section as being at "Plattsburg, Clinton County Missouri, T. 55 N., R. 35 W. "(actual location is in sec. 24, T. 55 N., R. 32 W.).

From 1915 to 1932 the Plattsburg limestone was considered a member of the Lansing formation. In 1932, the Lansing was raised by Newell to a group, and the Plattsburg a formation. Thompson (1995, p. 117) stated "The Plattsburg Formation contains a lower and an upper limestone member and an intervening shale member...The lithologic characteristics of each are apparently consistent within the state, and the thickness variation of each is not great. The principal areas of exposure of the formation are in Platte, Clay, Clinton, DeKalb, and Gentry counties." The Plattsburg Formation overlies the Bonner Springs Shale (or Member of the Lane Shale), and is overlain by the Vilas Shale.

Platt shales

Platt shales (Keyes, 1899, 1901b, 1937g, 1941f) = ***Kanwaka to Tecumseh formations***

shale (VI) of Platt shales (Condra and Bengston, 1915) - in Nebraska; = ***King Hill Shale Member of Lecompton Formation***

shale (VII) of Platt shales (Condra and Bengston, 1915) - in Nebraska; = ***Rakes Creek Shale Member of Tecumseh Shale***

Pennsylvanian System (Virgilian Series)

Plattsmouth Limestone Member of Oread Formation, Shawnee Group

Plattsmouth beds (Meek, 1872) - in Kansas; = ***Oread Formation***

Plattsmouth limestone (**Keyes, 1898a**, 1900b, 1902, 1937g, 1941b; Weeks, 1902) = ***Oread Formation***

Plattsmouth limestone (Condra and Bengston, 1915) - in Nebraska; = ***Leavenworth to Kereford Members of Oread Formation***

Plattsmouth limestone of Oread limestone member of Douglas formation (Condra, 1927) - in Nebraska

Plattsmouth limestone member of Oread limestone (Moore, 1932)

Plattsmouth limestone member of Oread limestone (Moore, 1936; Moore, et al., 1951) - in Kansas

Kereford-Plattsmouth limestone of Oread formation (Condra and Scherer, 1939) - in Nebraska; = ***Plattsmouth through Kereford Members of Oread Formation***

Plattsmouth member of Oread formation (Searight and Howe, 1961)

Plattsmouth Limestone Member of Oread Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska

Plattsmouth Limestone Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas

Plattsmouth Limestone Member of Oread Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Meek and Hayden (1871), and defined by Keyes (1898a) to comprise the whole Oread Formation, Condra (1927, p. 37) restricted and redefined the Plattsmouth limestone from the original broad unit of Keyes to "1. Plattsmouth Limestone, for the 'top' and thickest unit of the member, from Plattsmouth, Nebraska."

Thompson (1995, p. 123) stated "The Plattsmouth Limestone Member...is composed of a scarp-forming, wavy-bedded, somewhat cherty limestone. It is extensively quarried, especially in Andrew and Nodaway counties, for road surfacing material. The member is commonly 20 ft thick." The Plattsmouth Limestone Member overlies the Heebner Shale Member, and is overlain by the Heumader Shale Member of the Oread Formation.

Pleasanton Group

Pleasanton shales (Haworth, 1895; Haworth and Bennett, 1895; Adams, 1896) = ***Labette or Bandera Shale - Pleasanton Group***

Pleasanton formation (Keyes, 1898b)

Lower Pleasanton shales (Haworth 1898) = ***Bandera Shale***

Pleasanton formation (Hinds and Green, 1915; Bartle, 1933) = ***Labette Shale? - Pleasanton Group***

Pleasanton formation (McCourt, 1917; Hinds, 1926)
Pleasanton group (McQueen and Green, 1938; Searight and Howe, 1961)
pre-Exline Pleasanton group (Cline and Greene, 1950) = ***Seminole Formation***
Pleasanton group (Moore, et al., 1951) - in Kansas
Lower unnamed formation of Pleasanton group (Searight and Howe, 1961) = ***Seminole Formation***
Pleasanton Group (Jewett, et al., 1968) - in Kansas
Pleasanton Group (Burchett, 1970) - in Nebraska
Pleasanton Group (Gentile, 1976; Thompson, 1995)
Pleasanton Shale (Pabian and Diffendal, 1989) - in Kansas
Pennsylvanian System (Missourian Series)

Type area: Haworth (1895, p. 44) stated "Above the Pawnee limestone lies a heavy bed of shale which is of great stratigraphic importance. It contains within it one or more small limestone systems of little importance...On account of the heavy development of these shales at and around Pleasanton [Linn County, Kansas] it is proposed to call them the Pleasanton shales."

Thompson (1995, p. 109) stated "The Pleasanton Group comprises all the strata which lie below the Kansas City Group and above the regional disconformity which separates the Desmoinesian from the Missourian Series. Pleasanton strata are dominantly clastic...The group is also represented by channel-fill deposits in the Warrensburg and Moberly channels in western and central Missouri and by others in St. Louis County."

Originally called the **Bourbon formation** (Moore, 1936), the Pleasanton was subdivided into three unnamed formations in 1995. There are several alternative proposals in print to subdivide the Pleasanton (Jewett, et al., 1968; Howe, 1982; Watney and Heckel, 1994; Heckel and Watney, in press, 2000), but no consensus has yet been reached on the final formal subdivisions of the Pleasanton.

Pleistocene Series
Quaternary System

The Pleistocene Series includes the rocks and time involved for all of the Quaternary Period. It is commonly called the Glacial Epoch and popularly known as the Great Ice Age. The Recent Stage (Age) has not and is not always included in the Pleistocene, but the Missouri Geological Survey considers it part of the Pleistocene Series at the present time (Whitfield, *in* Thompson, 1995). The Pleistocene Series consists of (in ascending order): the pre-Illinoian Stage, Yarmouthian interglacial Stage, Illinoian glacial Stage, Sangamonian Stage. Wisconsinan glacial Stage, and Recent Stage.

Pliocene(?) Series
Pliocene (?) Series (Farrar, 1935)
Tertiary System

The Pliocene Series is the youngest series of the Tertiary System. It is overlain by sediments of the Pleistocene Series, and underlain by rocks of the Eocene Series. It is believed to be represented in Missouri by the Mounds Gravel ("Lafayette gravel" of older publications).

Plummer limestone member
Plummer limestone member of Pawhuska formation (Heald, 1918) - in Oklahoma; = ***Rock Bluff Limestone Member of Deer Creek Formation?***
Pennsylvanian System (Virgilian Series)

Pocket Hollow oolite bed
Pocket Hollow oolite bed (Cullison, 1944) = ***Cotter Dolomite***
Ordovician System (Ibexian Series)

Cullison (1944, p. 31) used the name "Pocket Hollow oolite bed" for a medium to coarse grained oolitic chert present over an extensive area of the southern portion of the Missouri. It occurs at or near the top of Cullison's Theodosia Formation. It was first distinguished in the field by Cullison in the fall of 1938, and was named for its occurrence at South Pocket Hollow in the Thornfield quadrangle, Ozark County, Missouri.

Poinsettan series

Poinsettan series (Keyes, 1915) = ***Mounds Gravel***

Tertiary System (Pliocene Series)

Keyes (1915, p. 252) named the "Poinsettan series" to cover the late Tertiary Pliocene gravels of Missouri, represented by the Mounds ("Lafayette") Gravel. It overlies his "Crowleyan series" (Wilcox Group) and underlies the Pleistocene Series. The derivation of the name is unknown.

"Polo" sandstone

Bandera Quarry ("Peru", "Polo") sandstone (Anderson and Wells, 1968) = ***Bandera Quarry Sandstone Member of Bandera Shale***

Pennsylvanian System (Desmoinesian Series)

Pond Ridge Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the NE¼ NW¼ sec. 3, T. 33 N., R. 3 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The presence of many large, reddish flamme is a distinguishing characteristic of the Pond Ridge Rhyolite. It is a dark maroon to gray ash-flow tuff containing up to 20 percent white to pinkish feldspar phenocrysts and a few quartz phenocrysts in addition to flamme. It is approximately 400 ft thick." Anderson (1962) had included these rocks in the upper part of his "Cedar Bluff felsite".

Pony Creek shale

Pony Creek shale of McKissick Grove shale member of Wabaunsee formation (Condra, 1927) - in Nebraska; = ***Dry Shale Member of Stotler Formation***

Pony Creek shale member of McKissick Grove shale (Moore, 1932) = ***Dry Shale Member of Stotler Formation***

Pony Creek shale of McKissick shale formation (Ver Wiebe and Vickery, 1932) = ***Dry Shale Member of Stotler Formation***

Pony Creek shale member of McKissick shale (Condra, et al., 1932) = ***Dry Shale Member of Stotler Formation***

Friedrich-Dry shale member of Pony Creek shale formation (Condra, 1935) - in Nebraska; = ***Dry Shale Member of Stotler Formation***

Pennsylvanian System (Virgilian Series)

Porters Creek Clay of Midway Group

Porters clay (Keyes, 1915)

Porters Creek clay (Matthes, 1933; Farrar, 1935; Koenig, 1961)

Porters Creek Clay (Thompson, 1995)

Tertiary System (Paleocene Series)

Type section: This formation was known for many years as the "Flatwoods clay" at the base of the so-called "Northern Lignitic formation." It was renamed by Safford (1864, p. 361-368) from the type locality on Porters Creek near Middleton, Hardeman County, Tennessee.

A formation of the Midway Group of Paleocene age, in Missouri the Porters Creek overlies the Ackerman Formation of the Wilcox Group and is underlain by the Clayton Formation. It was first recognized in Missouri by Matthes (1933, p. 1005), although its presence had been previously suggested by Lamar and Sutton (1930, p. 845-866) near the towns of Bloomfield and Idalia, Stoddard County, and also by Shepard (1907, p. 24-29).

Thompson (1995, p. 138-139) stated "The Porters Creek Clay is a massive, homogeneous, dark-gray clay, that is almost black when wet. When dry, it spalls with a characteristic conchoidal fracture and is white to very light-gray. The formation is remarkably uniform in lithologic character and maintains its diagnostic features throughout its extent....Petrographic studies indicate that the clays of the Porters Creek are bentonite and are commercially valuable as a bleaching clay. The Porters Creek varies in thickness in the outcrop area and is more than 200 ft thick in some places. Southeastward, in the subsurface, it thickens to 650 ft or more...lacks sand, and its lower 50 ft commonly contains foraminifera and small pelecypods."

Potosi Dolomite

Potosi dolomite (**Winslow, 1894**) = ***Bonneterre to pre-St. Peter formations***
Potosi limestone (Nason, 1901) = ***Derby-Doerun and Potosi Dolomites***
Potosi limestone (Weeks, 1902)
Potosi group (Bain and Ulrich, 1905) = ***Potosi to Jefferson City Dolomite***
Potosi formation (Buckley, 1908) = ***Potosi and Eminence Dolomites***
"Potosi limestone of Missouri" (O'Connell, 1913)
Potosi formation (Weller and St. Clair, 1928; McQueen and Greene, 1938; Clair, 1943; Branson, 1944b; Hayes and Knight, 1961)
Potosi (Dake and Bridge, 1932)
Potosi dolomite (Bridge, 1940; Kidwell, 1947
Potosi Dolomite (Calvert, 1964; Kurtz, et al., 1975; Palmer, 1989; Clendenin, 1989; Thompson, 1995)
Potosi Formation (Stinchcomb, 1980)
Cambrian System (Upper Cambrian Series)

Type section: The term Potosi was first used by Winslow (1894, p. 331, 351, 355) who applied it to the series of beds which are well-exposed near the town of Potosi in Washington County, Missouri.

The Potosi Dolomite is overlain by the Eminence Dolomite, and overlies the Derby-Doerun Dolomite. Winslow (1894) originally defined the "Potosi dolomite" as "all strata between St. Joseph limestone [Bonneterre Formation] and St. Peter sandstone." Bain and Ulrich (1905) defined the "Potosi group" as lying between the Elvins (Derby-Doerun and Davis formations) below and the St. Peter above. They also called it the **"Yellville group**." That term was discarded in favor of the more restricted Potosi Dolomite.

Local usage soon restricted the term Potosi to the drusy and cherty beds above the non-drusy and non-cherty Elvins. Buckley (1909, p. 51-58) limited the use of the term to those beds, which contain the abundant "mineral blossom" of the local miners. It was previously called the "Lesueur" and "Potosi Residuary" (in part).

<u>Potosi Residuary</u>

Potosi Residuary (Nason, 1901b) = ***Potosi and Eminence Dolomites***
Cambrian System (Upper Cambrian Series)

This was a term used by Nason (1901b, p. 358-361) for residual Potosi clay with drusy quartz overlying the Potosi Dolomite in St. Francois County. Bridge (1930, personal communication to Wilmarth, 1938) stated that it corresponds to part of the Eminence and part of the Potosi of present nomenclature.

<u>Potosi slates and conglomerates</u>

Potosi slates and conglomerates (Nason, 1901b) = ***Davis Formation***
Cambrian System (Upper Cambrian Series)

Nason (1901b, p. 358-361) used this term for fossiliferous slates, interbedded with conglomerates, with a basal limestone "edgewise" conglomerate. It overlies the Bonneterre Formation ("St. Joseph limestone") and is overlain by the Potosi Dolomite in St. Francois County. It is the same as the lower part of the Elvins Group.

Potsdam

Potsdam (Broadhead, 1874) = ***Lamotte Sandstone***
Potsdam (Broadhead, 1874) = ***Lamotte Sandstone to Gasconade Dolomite***, some sections
Cambrian System (Upper Cambrian Series)

An upper Cambrian sandstone in New York, "Potsdam" was used in Missouri by Broadhead (1874, p. 352-357) for the **Lamotte Sandstone**. Broadhead (1874, p. 18) also used Potsdam as a group term to include (ascending) Potsdam (Lamotte), Fourth Magnesian limestone (Bonneterre), Third sandstone (Gunter Sandstone Member), and Third Magnesian limestone (Gasconade Dolomite).

Pottawatomie

Pottawatomie formation (Haworth, 1898) **-** in Kansas; **=** ***Kansas City and Lansing Groups***
Pottawatomie stage (Haworth and Bennett, 1908) **-** in Kansas; **=** ***Kansas City and Lansing Groups***
Pennsylvanian System (Missourian Series)

Powell Dolomite

Powell limestone (Ulrich, *in* Ulrich and Bassler, 1915; Purdue and Miser, 1916)
Powell limestone of Jefferson City group (Dake, 1921)
Powell member of Jefferson City formation (Bretz, 1950)
Powell formation (Martin, et al., 1961a)
Powell Dolomite (Thacker and Satterfield, 1977; Thompson, 1982, 1991, 1995)
Ordovician System (Ibexian Series)

Type section: Ulrich named the Powell formation in 1915. The beds had previously been included in his restricted Yellville formation. The name was recorded in 1915 by Ulrich and Bassler (unpublished ms.), and first published by Purdue and Miser (1916). Thompson (1991, p. 52) stated "Purdue and Miser (1916, p. 5) stated that 'The formation was named by E.O. Ulrich from Powell station, on the White River branch of the St. Louis, Iron Mountain & Southern Railway, where it is well exposed.' Powell station, originally located about 2 mi down Crooked Creek from the present village of Pyatt, Marian County, Arkansas, is abandoned, and the railroad is now the Missouri-Pacific Railway."

In Arkansas, the Powell is underlain by the Cotter Dolomite and overlain by the Smithville Dolomite or Everton or locally the St. Peter. Weller (1928, p. 84) stated that Ulrich had confirmed the existence of the Powell and the Cotter in Ste. Genevieve County, Missouri. McKnight (1935) redefined the Cotter-Powell boundary. Thompson (1995, p. 26) stated "The Powell Dolomite has been identified in several areas in Missouri. However, some doubt exists as the whether this is truly Powell, or upper Cotter strata."

"Prairie Grove equivalent"
Pennsylvanian System (Morrowan Series)

This unit is a calcareous siltstone exposed in a graben (Pineville Fault) in extreme southwestern Missouri. Conodonts recovered from this unit (Thompson, 1970) show a direct correlation with the Prairie Grove Member of the Hale Formation of Arkansas, and younger Pennsylvanian rocks (Desmoinesian Series), including a coal bed that was mined at one time, are also preserved in this structure.

Precambrian Erathem

This represents all time preceding the Cambrian and the rocks formed during this time.

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pre-Illinoian glacial Stage

Quaternary System (Pleistocene Series)

Whitfield (*in* Thompson, 1995, p. 144) stated "Quaternary investigations in adjoining states support an interpretation that the Kansan and Nebraskan glacial stages had a more complex history of multiple glaciation and interglacial periods than previously described. Better dating techniques also show that past age correlations were underestimated. Until the stratigraphy of the Pleistocene is resolved, the age and correlation of Kansan and Nebraskan glacial deposits in Missouri are identified as '**pre-Illinoian**.'"

(p. 146) "The first recognizable sign of the glacial approach in Missouri is outwash layers of silt and sand, containing round to subangular chert and limestone pebbles, lying directly on Pennsylvanian deposits...At some locations, the presence of dense, compact silty layers interbedded with varved silt implies ice-marginal ponds and lakes formed in front of the ice mass.

"The base of the till varies in lithology. In places it consists of sand and gravel beds several feet thick; in other places it is an unleached and unoxidized till (blue clay)..."

"Probably the most distinctive erratic in western Missouri is pink Sioux Quartzite.

"Materials overlying the leached and oxidized pre-Illinoian till vary from loess, Yarmouth-Sangamon soil, Ferrelview clayey silt, to lacustrine silty clay."

"Pre-McNairy" Cretaceous beds

Pre-McNairy Cretaceous beds (Grohskopf and Howe, 1961; Thompson, 1995)

Cretaceous System (Gulfian Series)

Thompson (1995, p. 135) stated "Wells in the deeper part of the Missouri portion of the Embayment encounter (below the McNairy Formation) Cretaceous beds, which are not exposed within the state. These beds are both marine and nonmarine in origin and consist of unconsolidated or partially consolidated sand, chalk or marl, clay, and limestone. The succession is overlapped by the McNairy Formation and is provisionally regarded as equivalent in part to the Coffee (sandstone) and overlying Selma (marl and chalk) Formations of Tennessee. The combined thickness of the succession in Missouri is more than 100 ft."

Preston limestone

Preston limestone member of Nemaha formation (Condra and Bengston, 1915) - in Nebraska; = ***Emporia Formation***

Preston ("Emporia") limestone formation (3 members) (Condra, 1935)

Pennsylvanian System (Virgilian Series)

Primordial

Primordial (Gallaher, 1900) = ***Precambrian***

Precambrian Erathem

This is a term applied in early geologic reports, and used by Gallaher (1900, p. 29) in Missouri for what had also been called Archean, *i.e.*, Precambrian. He seems to have included all of the igneous rocks in Missouri as Primordial.

Proctor

Proctor limestone (**Winslow, 1894**; Ball and Smith, 1903; Ball, 1904; Marbut, 1907) = ***Eminence Dolomite***

Proctor limestone (Ulrich, 1911; Tarr, 1918; McQueen, 1930) = ***upper part of Eminence Dolomite***

Proctor dolomite (Keyes, 1914; Tarr, 1917; Shimer, 1934) = ***Eminence Dolomite***

Eminence-Proctor dolomite (Dake and Bridge, 1927) = ***Eminence Dolomite***

Proctor dolomite (Ireland, 1936; Bartram, et al., 1950) = ***upper part of Eminence Dolomite***

Proctor-Eminence (Jonas and Stose, 1936)

Cambrian System (Upper Cambrian Series)

Winslow (1894, p. 331, 366) used the term "Proctor" for the oldest formation exposed in central Missouri, overlain by the "Cole Camp sandstone." It was named for exposures on Proctor Creek, Morgan County, Missouri. At one time the Proctor was correlated with the Fourth Magnesian limestone of Swallow. The Proctor has been proven to be equivalent to the Eminence, and the name is no longer used.

Proffit Mountain Formation **of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup**

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SW¼ sec. 16, T. 33 N., R. 2 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "The Proffit Mountain Formation consists of interbedded red to gray air-fall tuffs and maroon to gray ash-flow tuffs. The ash-flow tuffs contain abundant (20-30 percent) quartz and feldspar phenocrysts. The lower 50 ft of the formation is vividly lineated. The formation is more than 450 ft thick."

Prosser limestone

Prosser limestone (Taylor, 1947) - in Iowa; = ***Kimmswick Limestone***

Prosser Limestone of Galena Group (Kay, 1970) = ***lower half of Kimmswick Limestone***

Ordovician System (Mohawkian Series)

Ulrich (1911, p. 27, p. 368, 369, 524, 525) proposed the name "Prosser" for a formation comprising certain fossil beds of Minnesota. The name is taken from a small gulch, Prosser Ravine, west of Wykoff, Fillmore County, Minnesota, where it is fully developed. His chart shows Upper Prosser as overlying Kimmswick and underlying McCune dolomite (upper Kimmswick) in eastern Missouri. Kay (1970) identified Prosser Limestone beneath the Stewartville Dolomite and Dubuque Formation of the upper part of the Galena Group.

Proterozoic

Proterozoic (U.S. Geological Survey) = ***Precambrian Erathem***

Proterozoic (other geologists) = ***post Archaeozoic Precambrian***

Precambrian Erathem

This was a term used by the U.S. Geological Survey and other geologists for all Precambrian time represented by rocks visible for study. It has been restricted by others to what was previously called "Algonkian" (immediately preceding the Cambrian) preceded by Archeozoic.

Providence limestone

Providence limestone (Bassler, 1950) ***"= upper Chouteau limestone"***

Mississippian system (Kinderhookian Series)

"Prue" sandstone"

Squirrel" sand (Prue) of Lagonda formation (Bailey, 1935; Bartle, 1938)

"Squirrel" ("true"[*sic.*]) sandstone (Anderson and Wells, 1968)

"Prue" sandstone (Wells and Anderson, 1968) = ***Squirrel Sandstone Member of Lagonda Formation***

Pennsylvanian System (Desmoinesian Series)

Q

"Quarry ledge" of Jefferson City Dolomite

Quarry ledge of Jefferson City formation (Lee, 1913)
"Quarry Ledge" of Jefferson City formation (Martin, et al., 1961)
"Quarry Ledge" of Jefferson City Dolomite (Thompson, 1991, 1995)
Ordovician System (Ibexian Series)

Lee (1913, p. 37) proposed the term "Quarry ledge" for a persistent and frequently exposed 5 to 7 foot bed of dolomite about 25 feet above the bottom of the Jefferson City Dolomite. It is dense, very finely crystalline, and strikingly mottled by irregular pockets of fine, white sugary, crystalline quartz disseminated through it. It splits into slabs 8 to 14 inches thick, and the quartz weathers out on exposure. The "Quarry ledge" is a very useful marker zone for mapping Jefferson City and related units, and can even be identified in well cuttings. It was called the "School Mine ledge" by Cullison (1944, p. 18-19).

Quaternaric - A variant of Quaternary proposed by Keyes.

Quaternary System

The Quaternary System includes all unconsolidated post-Tertiary deposits, and consists of clay, silt, sand, and gravel. It is divided into the **Pleistocene Series** and the **Recent (Holocene) Series**, the latter beginning 10,000 years bp. Most of the Quaternary is Pleistocene.

Queen Hill Shale Member of Lecompton Formation, Shawnee Group

Queen Hill Shale of Lecompton member of Shawnee formation (**Condra, 1927**) **-** in Nebraska
Queen Hill shale member of Lecompton limestone (Moore, 1932)
Queen Hill shale member of Lecompton limestone (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Queen Hill member of Lecompton formation (Searight and Howe, 1961)
Queen Hill Shale Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Queen Hill Shale Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) **-** in Kansas
Queen Hill Shale Member of Lecompton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927) from Queen Hill, northeast of Rock Bluff, Nebraska, Moore (1936, p. 175) located it in "...T. 11 S., R. 14 E..."

Thompson (1995, p. 124) stated "The Queen Hill Shale Member...is composed of a shale, which is dark-gray to black and fissile in the lower part and light-gray, calcareous, and fossiliferous in the upper part. The average thickness of the member is about 3 ft." The Queen Hill Shale Member overlies the Big Springs Limestone Member, and is overlain by the Beil Limestone Member of the Lecompton Formation.

Quimbys Mill Formation

Quimbys Mill Formation of Plattin Subgroup of Platteville Group (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***upper part of Macy Limestone of Plattin Group***
Quimbys Mill of Plattin Sub-Group (Shourd and Levin, 1976)
Ordovician System (Mohawkian Series)

The Quimbys Mill Formation was proposed for Platteville strata of the Illinois Basin, and was extended into Missouri by Templeton and Willman (1963). However, the nomenclature proposed in 1951 by Larson was found by Thompson (1991) to more adequately represent Plattin strata in Missouri, and Quimbys Mill was not used.

Quindaro Shale Member of Wyandotte Formation, Zarah Subgroup, Kansas City Group

Quindaro shale member of Wyandotte limestone (**Newell, *in* Moore, 1932**)
Quindaro shale member of Wyandotte limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Quindaro shale member of Iola limestone (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Quindaro shale of Wyandotte limestone (Ellison, 1941)
Quindaro-Frisbie of Wyandotte limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Quindaro shale member of Wyandotte formation (Moore, 1948)
Quindaro member of Wyandotte formation (Searight and Howe, 1961)
Quindaro Member of Wyandotte Formation (Burchett, 1965) - in Nebraska
Quindaro Shale Member of Wyandotte Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Quindaro Shale Member of Wyandotte Limestone (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Quindaro Shale Member of Wyandotte Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 120) stated that the Quindaro was "Named from Quindaro township in northeastern Wyandotte County, Kansas. Typically exposed at Boyn's quarry, NW cor. sec. 30, T. 10 S., R. 25 E., northeast of Welborn, Kan."

Thompson (1995, p. 116) stated "The Quindaro Shale Member... is a dark- to medium-gray, calcareous shale. Locally, it contains calcareous, fossiliferous siltstone in the upper part. The thickness...varies from less than 1 ft to about 3 ft." The Quindaro Shale Member overlies the Frisbie Limestone Member, and is overlain by the Argentine Limestone Member of the Wyandotte Formation.

Quitman limestone

Quitman limestone (Gallaher, 1898) = ***Howard Formation***
Pennsylvanian System (Virgilian Series)

This term was used by Gallaher (1898) for the units now in the Howard Formation.

Quivira Shale Member of Cherryvale Formation, Linn Subgroup, Kansas City Group

Quivira shale member of Drum limestone (**Newell, *in* Moore, 1932**) - in Kansas
Quivira shale (Condra, et al., 1932) - in Nebraska
Chanute shale (Quivira) (Gunnell, 1933)
Quivira shale (Moore, 1936; Newell and Jewett, 1936) - in Kansas
Quivira shale member of Chanute shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Quivira formation (Condra and Scherer, 1939; Condra, 1949) - in Nebraska
Quivira shale (Ellison, 1941)
Quivira shale member of Cherryvale formation (**Moore, 1948**)
Quivira shale member of Cherryvale formation (Moore, et al., 1951) - in Kansas
Quivira member of Cherryvale formation (Searight and Howe, 1961)
Quivira Formation (Landis and Van Eck, 1965) - in Iowa
Quivira Formation (Burchett, 1965, 1970, 1971; Burchett and Reed, 1967) - in Nebraska
Quivira Shale Member of Cherryvale Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Quivira Shale Member of Dewey Formation (Kidder, 1985)
Quivira Shale Member of Cherryvale Formation (Howe, 1986; Thompson, 1995)
Quivera (*sic.*) Shale Member of Dewey Limestone (Watney, et al., 1989; Watney and Heckel, 1994) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Jewett, 1932), Moore (1936, p. 102) described the type section as being at "Quivira Lake, east of Holiday, in sec. 32, T. 11 S., T. 24 E., Johnson County, Kansas. Also well exposed behind school building at east edge of Holiday."

Early geologists included this unit in the lower part of the "Chanute shale member of Kansas City formation" (Hinds and Greene, 1915). Newell named it the "Quivira shale member of Drum Limestone," and McQueen and Greene (1938) and Branson (1944b) called it the "Quivira shale member of Chanute shale." Moore (1948) stabilized the nomenclature by placing the Quivira in the Cherryvale formation. Recently (Watney, et al., 1989, Heckel and Watney, in press) the Quivira Shale Member has been moved up into the basal part of the Dewey Formation in Kansas. This has not as of yet been universally accepted.

Thompson (1995, p. 115) stated, "The Quivira Shale Member... comprises a number of distinct beds. At most exposures, it includes gray shale in the lower and middle parts, and in the upper part a thin clay and overlying slightly fissile, dark-gray shale...Its thickness varies greatly in the Kansas City area, where it ranges from an average of about 1 ft to a maximum of about 15 ft. This thickness variation is associated with an essentially equivalent variation in the underlying Westerville. The average thickness of the Quivira in its outcrop area is about 10 ft." The Quivira Shale Member overlies the Westerville Limestone Member of the Cherryvale Formation, and is overlain by the Cement City Limestone Member of the Drum Limestone.

R

Rakes Creek Shale Member of Tecumseh Shale, Shawnee Group

Rakes Creek shale of Tecumseh shale member of Shawnee formation (**Condra, 1930**) **-** in Nebraska
Rakes Creek shale member of Tecumseh shale (Moore, 1932)
Rakes Creek shale member of Tecumseh shale (Moore, 1936) **-** in Kansas
Rakes Creek Shale Member of Tecumseh Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Rakes Creek Shale Member of Tecumseh Formation (Howe, 1968)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1930), Moore (1936, p. 180) located the type section "...on Rakes Creek, in the northwest quarter, sec. 5, T. 10 N., R. 14 E., Cass county, Neb."

Howe (1968, p. 35) described the Rakes Creek Shale Member as "Shale, medium gray, weathering tan to grayish-brown; approximate thickness exposed...40 ft." The Rakes Creek Shale Member overlies the Ost Limestone Member of the Tecumseh Shale, and is overlain by the Ozawkie Limestone Member of the Deer Creek Formation. It has been described in Missouri from one locality (Howe, 1968), in the C NE NW sec. 15, 59N-36W, Andrew County, in a roadcut on Interstate Highway 29.

Ralls Oolitic Limestone Conglomerate Physiofacies

Ralls Oolitic Limestone Conglomerate Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***part of Cedar Valley Limestone***
Devonian System (Middle Devonian Series)

Randol Shale

Randol Shale (North, 1968; Rogers, 1970, 1972) = ***upper shale of Moccasin Springs Member of Bainbridge Formation***
Silurian System (Wenlockian and Ludlovian Series)

Randol shale member

Randol shale member of Maquoketa formation (Gealy, 1955) = ***Cape La Croix Shale***
Ordovician System (Cincinnatian Series)

The name Randol shale member of the Maquoketa formation was proposed in an unpublished ms. by Gealy (1955, p. 95). It underlies the Thebes Sandstone. It was named from Randol School which is about 1 1/2 miles from the type exposure on the east fork of Cape La Croix Creek. This name has been suppressed, replaced by **Cape La Croix Shale** (Thompson, 1991).

Raytown Limestone Member of Iola Formation, Linn Subgroup, Kansas City Group

Raytown limestone bed of Chanute shale member of Kansas City formation (**Hinds and Greene, 1915**)
Raytown limestone member of Iola limestone (**Newell, *in* Moore, 1932**)
Raytown limestone member of Iola limestone (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Raytown limestone member of Chanute shale (McQueen and Greene, 1938; Clair, 1943; Branson, 1944b)
Raytown limestone of Iola formation (Condra and Scherer, 1939) **-** in Nebraska
Raytown limestone of Iola limestone formation (Condra and Reed, 1943, 1959) **-** in Nebraska
Raytown limestone (Moore, et al., 1944)
Raytown limestone member of Iola formation (Moore, 1948)
Raytown (Avant) limestone member of Iola limestone (Moore, 1949) **-** in Kansas
Raytown member of Iola formation (Searight and Howe, 1961)
Raytown Member of Iola Formation (Burchett, 1965) **-** in Nebraska
Raytown Limestone Member of Iola Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Raytown Limestone Member of Iola Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas
Raytown Limestone Member of Iola Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Hinds and Greene (1915) named the Raytown limestone. Moore (1936, p. 155) located the type section at "Raytown, Jackson county, Missouri. Well exposed in railroad cut just west of the town." Gentile (personal communication, 1999) located this as an exposure along the Chicago-Rock Island & Pacific Railroad to the water tank on the top of the hill along 63rd St., at Raytown, SE SE NE 5, 48N-32W.

Hinds & Greene (1915) originally proposed this unit as the **"Raytown limestone bed of the Chanute shale member of the Kansas City formation."** Newell (*in* Moore, 1932) placed it in the Iola formation. However, in Missouri McQueen and Greene (1938), Clair (1943) and Branson (1944b) retained the Raytown as a **member of the Chanute shale.**

Thompson (1995, p. 116) stated "The Raytown Limestone member...is generally a massive unit, which is composed of several thick beds of fossiliferous, gray and brown limestone, but in some areas the limestone beds alternate with beds of calcareous, gray shale. The thickness...ranges from 5 to 8 ft." The Raytown Limestone Member overlies the Muncie Creek Member, and is overlain by the Liberty Memorial (formerly Lane) Shale.

Reading Limestone Member of Emporia Formation, Nemaha Subgroup, Wabaunsee Group

Reading blue limestone (**Smith, 1905**) **-** in Kansas
Reading limestone member of Preston ("Emporia") limestone (Condra, 1935)
Reading limestone (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Reading limestone (McQueen and Greene, 1938; Moore, 1948)
Reading limestone member of Willard shale (Branson, 1944b)
Reading limestone member of Emporia limestone (Moore and Mudge, 1956)
Reading member of Emporia formation (Searight and Howe, 1961)
Reading Limestone Member of Emporia Limestone (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Reading Limestone Member of Emporia Formation (Burchett, 1970; Pabian and Diffendal, 1989) **-** in Nebraska
Reading Limestone Member of Emporia Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named the **"Reading blue limestone"** by Smith (1905), Moore (1936, p. 224) located the type section as "In the vicinity of Reading, Lyon county, Kansas. Excellent exposures in roadcut near NW cor. sec. 33, T. 17 S., R. 13 E., one mile east and one mile north of Reading."

In Missouri, Branson (1944b) placed the Reading limestone as the uppermost member of his **Willard shale**. McQueen and Greene (1938) called it the **Reading limestone**, and Searight and Howe (1961) the **Reading member of the Emporia formation**. Thompson (1995, p. 1430) stated "The Reading Limestone Member...typically occurs as a single bed of dense limestone that contains few fossils. It is commonly dark-bluish-gray, and locally it is dolomitic. The member is 2 to 3 ft thick." The Reading Limestone Member overlies the Auburn Shale, and is overlain by the Harveyville Shale Member of the Emporia Formation.

Reagan Sandstone

Reagan Sandstone (Kurtz, et al., 1975; Thompson, 1995)
Cambrian System (Upper Cambrian Series)

Type section: Named by Taff (1902) from the town of Reagan (although spelled "Regan"), Johnson County, Oklahoma, the type section for the Reagan Sandstone is (Baars and Maples, 1998, p. 198) "About 5 mi (8 km) southwest of village of Mill Creek, Johnson County, Oklahoma." The town of Reagan is "...about 10 mi (16 km) south of the type locality, in the Tisahomingo quadrangle."

Kurtz, et al. (1975, p. 15) stated "This unit is a nearshore facies of the Bonneterre and Davis Formations and is also known to be the nearshore equivalent of formations as young as the Roubidoux Formation, of Early Ordovician age in Tulsa County, Oklahoma..."

"The Lamotte/Bonneterre - Reagan Sandstone facies change represents a highly diachronous basal Upper Cambrian clastic unit that became progressively younger westward as it lapped onto the Precambrian surface."

Recent (Holocene) Stage

Quaternary System (Pleistocene Series)

The Recent (Holocene) is the youngest stage of the Pleistocene Series, made up of alluvium and landslide debris. "Recent" has been generally used to designate the post-glacial interval (10,000 ybp), predominantly a time free of important effects of continental glaciation. Some classifications have the Pleistocene and Recent (or Holocene) as series of the Quaternary, instead of the Recent as a stage of the Pleistocene.

Whitfield (*in* Thompson, 1995, p. 149) stated "Recent deposits comprise the alluvium that is associated with the present streams and rivers in the state as well as minor amounts of landslide debris. The alluvial material, which is associated with the Missouri and Mississippi rivers, has sand and gravel at the base and from 10 to 20 ft or more of silt at the top. The total thickness of this material is commonly more than 100 ft. Soils are developing on this and on all exposed material in the state."

Receptaculite limestone

Receptaculite limestone of Trenton Limestone (Shumard, 1855; Shumard, 1873) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

Shumard (1873, p. 265) referred to the Kimmswick Limestone by the name of the large, characteristic fossil found in that unit, *Receptaculites* (recently changed to *Fisherites*). It had previously known as the "Cape Girardeau marble" and as part of the Trenton limestone.

Reeds Spring Formation

Reeds Spring limestone member of Boone formation (**Moore, 1928**)
Reeds Spring (R Bed) (Fowler and Lyden, 1931)
Reeds Spring formation (Cline, 1934) - suppressed "Boone" as a synonym of "Osagean"
Reeds Spring member of Chouteau formation (Branson, 1944b)
Reeds Spring limestone (Weller, et al., 1948)
Reeds Spring formation (Kaiser, 1950) = ***Reeds Spring and Elsey Formations*** at some sections
Reeds Spring Formation of Boone Group (Barney, 1959) = ***Reeds Spring and Elsey formations***

Reeds Spring formation (Spreng, 1961)
Reeds Spring Limestone Member of Boone Formation (Hessler, 1965)
Reeds Spring Formation (Robertson, 1967; Thompson, 1967, 1986; Thompson and Fellows, 1970)
Mississippian System (Osagean Series)

Type section: Thompson (1986, p. 82) stated "Named by Moore (1928) from exposures in the vicinity of Reeds Spring, Stone County, Missouri, the type section [of the Reeds Spring Formation] is along the Missouri-Pacific Railroad south of the tunnel south of the town, N½ NW¼ SW¼ sec. 31, T. 24 N., R. 22 W..."

Moore (1928) applied the name Reeds Spring to a cherty limestone which Branson (1944b) interpreted as the top member of the Chouteau in southwest Missouri, but which is known today to be Osagean in age (Thompson and Fellows, 1970). The Reeds Spring overlies the Pierson Limestone, and in turn is overlain by the Elsey Formation. Moore considered it a member of the Boone formation, and in fact the Reeds Spring, coupled with the overlying, equally cherty Elsey, are called "Boone chert" in Arkansas. In the region of Springfield, Greene County, Missouri, and to the north, the differences between Reeds Spring and Elsey become blurred, and the two together constitute a single, highly cherty unit between the Pierson and Burlington Limestones usually referred to as "Reeds Spring - Elsey."

Reelfoot arkose

Reelfoot arkose (**Houseknecht, 1989**) = ***basal Lamotte Sandstone***?
Cambrian System (Upper Cambrian Series)

This term was proposed by Houseknecht (1989) for arkosic sediments penetrated by four wells in the Reelfoot basin. Househnecht (1989, p. 31) stated "The predominance of red, conglomeratic arkosic sandstone restricted to graben basins strongly suggests non-marine deposition of sediment locally derived the Precambrian basement....it is likely that sedimentation occurred on alluvial fans and in associated braided fluvial environments..."

Renault Formation

Renault limestone (Weller, 1914) = ***Aux Vases and Renault formations***
Renault-Paint Creek Formation (Flint, 1925) = ***Renault and Paint Creek formations***
Renault limestone (Weller and St. Clair, 1928)
Renault formation (Branson, 1944b; Spreng, 1961)
Renault Limestone (Swann, 1963) - Gasperian Stage, in Illinois
Renault Limestone (Sable, 1979) "= Levias Member of Ste. Genevieve Limestone of Kentucky and Indiana"
Renault Formation (Thompson, 1979a, 1986, 1995)
Mississippian System (Chesterian Series)

Type section: The Renault Formation was originally described by Weller (1914, p. 118-129) from exposures in Renault Township, Monroe County, Illinois.

The Renault Formation is overlain by Yankeetown Sandstone and overlies the Aux Vases Sandstone. Weller and St. Clair (1928, p. 230) stated that the formation extends into Randolph County, Illinois, and the Ste. Genevieve County exposures are a direct continuation of the Illinois beds. Weller noted (1914, p. 24) that "The formation is exceedingly variable in its lithologic characters, and includes sandstone, shale, and limestone members."

Reno Sandstone Member of Franconia Formation

Reno Sandstone Member of Franconia Formation (Howe, et al., 1972)
Reno Member of Franconia Formation (Kurtz, 1989)
Cambrian System (Upper Cambrian Series)

In a discussion of Cambrian strata in the Upper Mississippi Valley region that were considered to be also present in the subsurface of parts of northern Missouri, Kurtz (1989, p. 78) stated "The Reno is a glauconitic and mostly burrowed dolomitic sandstone, siltstone and shale. Laminations and crossbeds are present when not burrowed. The lower part of the formation contains more shale interbeds than does the upper part."

Rhomboidal limestone

Rhomboidal limestone (**Broadhead, 1874**) = ***Houx Limestone Member of Little Osage Shale***
"Rhomboidal limestone" and Summit coal (Greene, 1933) = ***Little Osage Shale***; **-** Houx Limestone Member and Summit Coal Bed
"Rhomboidal limestone" (Greene, 1933) = ***Houx Limestone Member***
shale including Rhomboidal limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Little Osage*** ` ***Shale***, with Houx Limestone Member
Rhomboidal limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Houx Limestone Member***
Houx limestone (= Rhomboidal limestone) bed of Little Osage shale member of Fort Scott formation (Unklesbay, 1952a) = ***Houx Limestone Member***

Pennsylvanian System (Desmoinesian Series)

This was an early name (Broadhead, 1874) given the to Houx limestone because of its tendency to fracture into rhombohedral blocks.

Richardson Subgroup of Wabaunsee Group

Richardson subgroup of Wabaunsee group (**Condra, 1935**) = ***Wamego Shale Member of Zeandale Formation to top of Pennsylvanian***
Richardson subgroup of Wabaunsee group (Condra and Reed, 1943, 1959) **-** in Nebraska; = ***Wamego to Dry shale***
Richardson subgroup of Wabaunsee group (Greene and Searight, 1949) = ***Maple Hill Limestone Member of Zeandale Formation to "French Creek"***
Richardson subgroup of Wabaunsee group (Moore, 1949; Jewett, 1949; Moore, et al., 1951) **-** in Kansas; = ***Wamego Shale Member of Zeandale Formation to Dry shale***
Richardson subgroup of Wabaunsee Group (Moore and Mudge, 1956; Searight and Howe, 1961) = ***base of Zeandale Formation to Dry Shale Member***
Richardson Subgroup of Wabaunsee Group (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas
Richardson Subgroup of Wabaunsee Group (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Condra (1935), p. 4-5) stated "The Wabaunsee group, as now defined is subdivided as three subgroups; Richardson, hereby named from Richardson county, Nebraska..." He added (p. 5) "...Richardson subgroup, the Big Nemaha Valley of southern Richardson County, between points south of Humbolt and southwest of Falls City [Nebraska]..."

The topmost of three subgroups for the uppermost Group of Pennsylvanian strata in Missouri, the Richardson Subgroup includes the Zeandale, Pillsbury, and Stotler formations.

Rich Fountain formation

Rich Fountain formation of Jefferson City group (C**ullison, 1944**) = ***Jefferson City Dolomite***
Rich Fountain formation (Cloud, 1945)
Rich Fountain Formation (Kay, 1951)
Rich Fountain of Jefferson City (Flower, 1957)

Ordovician System (Ibexian Series)

Cullison (1944, p. 17) proposed the "Rich Fountain formation" for the lower formation of his "Jefferson City group"; the upper formation, the Theodosia, is equivalent to the Cotter Dolomite. Rich Fountain is underlain by the Roubidoux Formation and overlain by the Theodosia formation. It is named for exposures near Rich Fountain in Osage County, Missouri.

<u>Rich Hill coal</u>

Rich Hill coal <u>of "shale and coal members of Cherokee formation"</u> (Greene and Pond, 1926) = ***Mineral Coal Bed***
"upper Rich Hill coal" (Furnish, et al., 1962) = ***Mineral Coal Bed***
"immediately above the upper Rich Hill coal" (Furnish, et al., 1962) = ***Robinson Branch Shale***
Pennsylvanian System (Desmoinesian Series)

<u>Rich Hill limestone</u>

Rich Hill limestone (**Greene and Pond, 1926**) = ***Ardmore Limestone Member of Verdigris Formation***
Rich Hill, Ardmore, or Verdigris limestone (Greene, 1933) = ***Ardmore Limestone Member***
Ardmore (Rich Hill) (Verdigris of Oklahoma) (McQueen and Greene, 1938) = ***Ardmore Limestone Member***
Pennsylvanian System (Desmoinesian Series)

Greene and Pond (1926) proposed this name for the limestone in Vernon County, Missouri, that had been called "Ardmore limestone" by Gordon (1896), and was later called "Verdigris limestone" by Smith (1928).

<u>Richland</u>

Richland (well logs) = ***"upper" Gasconade Dolomite***
Ordovician System (Ibexian Series)

The name **Richland** has been used for the relatively chert-free upper Gasconade on some logs on file at the Missouri Division of Geology and Land Survey offices. It is a useful unit for field mapping, but is now called **"upper" Gasconade Dolomite**.

<u>Richmond</u>

Richmond limestone (Weller, 1907) = ***Cape Limestone***
Richmond - Maquoketa beds (Savage, 1908)
Ordovician System (Cincinnatian Series)

Weller and Savage were referring to stratigraphic units that contained fossils of the Richmondian Stage of the Cincinnatian Series in southeastern Missouri.

<u>Richmondian Stage</u>

Richmondian Stage
Ordovician System (Cincinnatian Series, Richmondian Stage)

The Richmondian Stage is the uppermost stage of the Cincinnatian Series of the Ordovician System. It was named by Winchell and Ulrich (1897, p. 103) for Richmond, Indiana. In Missouri it includes the upper part of the Maquoketa Group (Orchard Creek Shale and Girardeau Limestone), and the Leemon Formation.

Ridenhower Limestone Member of Paint Creek Formation

Ridenhower Formation <u>of Paint Creek Group</u> (Swann, 1963) - in Illinois
Ridenhower Limestone Member <u>of Paint Creek Formation</u> (Thompson, 1986, 1995) - in southeastern Missouri
Mississippian System (Chesterian Series)

Type section: Named by Butts (1917), Atherton, et al. (1975, p. 153) stated the Ridenhower was "...named for Ridenhower School, Johnson County [Illinois], and the type section is at Indian Point, 5 miles south of Vienna (SE SW 32, 13S-13E.), where the formation is 60 feet thick and consists of shale with beds of fossiliferous limestone."

For Missouri, Thompson (1995, p. 89) added "The Ridenhower Limestone Member of the Paint Creek Formation contains light-buff, oolitic, cross-bedded limestone and some shale, with numerous crinoid (*Pterotocrinus*) and blastoid debris; in all 40 to 70 ft thick." The uppermost of three members of the paint Creek, the Ridenhower Member overlies the Bethel Member of the Paint Creek Formation, and is overlain by the Cypress Formation. Although Spreng (1961) recognized the three-part division of the Paint Creek in Missouri, he did not apply the member names used in Illinois to these units in Missouri,

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<u>Ridley limestone</u>

Ridley limestone (Grohskopf, 1955) = ***Pecatonica Formation?***

Ordovician System (Mohawkian Series)

The Ridley limestone was proposed by Safford (1869, p. 258-267) for a limestone underlying the Glade (Lebanon) limestone and overlying the Pierce limestone, limestones of the Stones River group in Tennessee. It was named for Judge Ridley's mill (now Davis' mill), near Old Jefferson, Rutherford County, Tennessee. Grohskopf (1955, p. 62) states that Dr. J. Bridge stated orally on September 5, 1941, to H.S. McQueen that certain fossils from a locality in Cape Girardeau County obtained by McQueen were also found in the Ridley formation. He also stated that the beds overlying the Ridley at Cape Girardeau (the Plattin Group) were correlative with the Lebanon of Tennessee, and that the Stones River was really Black River. The beds in the "Ridley limestone" are included in the present **Pecatonica Formation**. See Lebanon limestone.

<u>Ripley formation</u>

Ripley formation (Farrar, 1935) = ***McNairy Formation***
Riplyan series (Keyes, 1915) = ***McNairy Formation***

Cretaceous System (Gulfian Series)

Hilgard (1860, p. 3, 62, 83-95) used Ripley group for the uppermost Cretaceous formation, underlying the Northern Lignitic group (Wilcox), in Mississippi. It was named for Ripley, Tippah County, Mississippi.
Later the Owl Creek deposits, which overlie the McNairy sand member of the Ripley in western Tennessee and northeast Mississippi, were treated as a tongue of the Ripley formation. In 1937 the Owl Creek was raised (by the U.S. Geological Survey) to the rank of a formation, and the Ripley formation restricted to beds beneath the Owl Creek.

In southeastern Missouri rocks equivalent to the Ripley are called **McNairy Formation**. It is overlain by the Owl Creek Formation, and is the oldest Cretaceous occurring at the surface. It was first recognized in Missouri by Matthes (1933, p. 1003-1009) on the eastern face of Crowley's Ridge between Ardeola station and Ardeola schoolhouse. When the formation is quartzitic the term "McNairy quartzite" is sometimes used. This is also the Commerce quartzite of McQueen (1939, p. 72).

Keyes (1915, p. 252) used the term **"Riplyan series"** for his "Egypt sands," which are overlain by Porter (Porters Creek) clay and underlain by his Dakotan series. It is equivalent to the Ripley formation discussed above.

Riverton Formation

Riverton coal bed <u>of Cherokee shale</u> (Pierce and Courtier, 1937) **-** in Kansas
Riverton cyclothem (**Abernathy, 1937**) **-** in Kansas
Riverton cyclothem (Riverton coal) (Moore, 1949) **-** in Kansas
Riverton formation (Riverton coal) (Searight, et al., 1953) **- in Missouri**
Hartshorne formation (Riverton coal bed) (Branson, 1954a; 1957) **-** in Oklahoma
Riverton member <u>of Krebs formation</u> (Wanless, 1955)
Riverton formation (Riverton coal) (Branson, 1957) **-** in Kansas
Riverton formation (Searight and Howe, 1961)
Riverton Formation <u>of Krebs Subgroup</u> (Hayes, 1963)
Riverton Formation (Gentile, 1976; Thompson, 1979, 1995)
"Ladden Branch" limestone of Riverton Formation (Lambert and Thompson, 1990)

Pennsylvanian System (Atokan Series)

Type section: The type section for the Riverton Formation is located beneath the concrete bridge over Brush Creek (formerly U.S. Highway 66), 2 miles west of the town of Riverton, Center W line, NW NW 24, 34S-24E, Cherokee County, Kansas.

The Riverton Formation in Missouri (Thompson, 1995, p. 96) "...is composed of dark-gray to black, fine-grained, relatively brittle shale and contains as many as three coal beds, each of which is underlain by underclay." It also contains relatively thick sandstone beds in the west-central region, as well as at least one well-developed calcarenitic limestone at or near the base, the **"Ladden Branch" limestone** of Lambert and Thompson (1990). The Riverton Formation is overlain by the Warner Sandstone, and unconformably overlies Mississippian strata.

Roaring River sandstone

Roaring River sandstone member of Noel shale (Mehl, 1960) = ***Sylamore Sandstone***
Roaring River sandstone (Mehl, 1961) = ***Sylamore Sandstone***

Devonian System (Upper Devonian Series)

Mehl (1960) rejected the name "Sylamore" as ambiguous; it could be either Devonian or Mississippian in age.

Robbins shale member

Robbins shale member of Stranger formation (Moore, 1936; Moore, et al., 1951; O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas; = ***"lower unnamed shale member" of Lawrence Formation***

Pennsylvanian System (Virgilian Series)

Robinson Branch Coal Bed of Robinson Branch Shale, Cabaniss Subgroup, Cherokee Group

Robinson Branch coal of Robinson Branch formation (**Searight, et al., 1953**; Searight and Howe, 1961)
Robinson Branch coal (Searight, 1959)
"Robinson Branch coal bed" of Cabaniss Formation (Jewett, et al., 1968) - in Kansas
Robinson Branch coal of Robinson Branch Formation (Gentile, 1976) = upper "Rich Hill" coal
Robinson Branch coal bed of Robinson Branch Formation (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Searight, et al. (1953), Searight (1955, p. 39) stated "The type locality is in the coal strip pit in the SW-¼ sec. 2, T. 35 N., R. 30 W., near Robinson Branch southeast of Walker, Vernon County, Missouri...the coal bed was covered with water."

Howe (1956, p. 66) stated "The only area in which this coal is known to have been of minable thickness is near Walker, Vernon County, Missouri, where there was only local development of coal thick enough to mine."

Robinson Branch Shale of Cabaniss Subgroup, Cherokee Group

Robinson Branch formation (**Searight, et al., 1953**; Searight and Howe, 1961; Hoare, 1961a)
"Robinson Branch shale and limestone" (Hoare, 1960)
"Robinson Branch shale" (Hoare, 1961a)
"Robinson Branch limestone" (Hoare, 1961a)
Robinson Branch Formation (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Searight, et al. (1953), Searight (1955, p. 39) stated "The type locality is in the coal strip pit in the SW-¼ sec. 2, T. 35 N., R. 30 W., near Robinson Branch southeast of Walker, Vernon County, Missouri...the coal bed was covered with water."

Overlying the Mineral Formation and overlain by the Fleming Formation, the Robinson Branch Formation is 0 to 10 ft thick. It has not been identified in the Forest City Basin

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Rockaway conglomerate

Rockaway conglomerate of Jefferson City group (**Cullison, 1944**) = ***upper part of Jefferson City Dolomite***

Ordovician System (Ibexian Series)

Cullison (1944, p. 25) used this term for chert conglomerate beds occurring at the base of his Theodosia formation (Cotter Dolomite). These beds are not one continuous thickness of conglomerate but are commonly separated by "cotton rock" or crystalline dolomite. The name is derived from the locality of Rockaway Beach, Lake Taneycomo, Taney County, Missouri. This horizon, if properly identified, has been used by mappers to determine the top of the Jefferson City Dolomite in the southwestern Missouri (Taney Country) area.

Rock Bluff Limestone Member of Deer Creek Formation, Shawnee Group

Rock Bluff limestone of Deer Creek limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska

Rock Bluff limestone member of Deer Creek limestone (Moore, 1932) = ***Ozawkie Limestone member of Deer Creek Formation***

Rock Bluff limestone member of Deer Creek limestone formation (Ver Wiebe and Vickery, 1932) = ***Ozawkie Limestone member of Deer Creek Formation***

Rock Bluff limestone member of Deer Creek limestone (Condra, et al., 1932)

Rock Bluff limestone member of Deer Creek limestone (Condra, 1935) - in Nebraska

Rock Bluff limestone member of Deer Creek limestone (Moore, 1936; Moore, et al., 1951) - in Kansas

Rock Bluff member of Deer Creek formation (Searight and Howe, 1961)

Rock Bluff Limestone Member of Deer Creek Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska

Rock Bluff Limestone Member of Deer Creek Limestone (Jewett, et al., 1968; Heckel, et al., 1979; French, et al., 1988; Baars and Maples, 1998) - in Kansas

Rock Bluff Limestone Member of Deer Creek Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Moore (1936, p. 185) located the type locality at "Rock Bluff, Neb." However, several reports missidentified the Ozawkie Limestone Member as "Rock Bluff," which was not straightened out until Condra (1935)

Thompson (1995, p. 125) stated "The Rock Bluff Limestone Member...is a single, massive bed of dense, medium-gray limestone, which has pronounced vertical joints. It has an average thickness of approximately 2 ft." The Rock Bluff Limestone Member overlies the Oskaloosa Shale Member, and is overlain by the Larsh-Burroak Shale Member of the Deer Creek Formation.

Rockford shales

Rockford shales (Keyes, 1938a, 1941b) = ***Snyder Creek Shale***

Devonian System (Upper Devonian Series)

This is a term proposed by Keyes (1941b, p. 156) for the top formation of his Linnian series of Late Yorkic age. It is overlain by "Grassy shale" (Grassy Creek Shale) and underlain by his "Coralville limestone" (Cedar Valley Limestone). This may be equivalent to the Snyder Creek Shale.

Rock Fort sandstone

Rock Fort sandstone (King, 1851) = ***St. Peter Sandstone***

Ordovician System (Mohawkian Series)

Rock Fort is a nongeographic name used by King (1851, p. 189) for the St. Peter sandstone. He said it underlies the Blue limestone regarded by Hall as equivalent to the Trenton limestone of New York, and overlies 500 feet of light-yellow or buff magnesian limestone (Ibexian Series). It frequently appears in the top of hills between Ste. Genevieve and the Meramec River, presenting a bold wall-like escarpment or bluff. In these cases it has received the common name Rock Fort.

Rock Lake Shale Member of Stanton Formation, Lansing Group

Rock Lake shale bed of Stanton limestone member of Lansing formation (**Condra, 1927**) - in Nebraska
Rock Lake shale member of Stanton formation (Newell, 1932) - in Kansas
Rock Lake shale member of Stanton limestone (Moore, 1937; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Rock Lake or Victory Junction shale member of Stanton limestone (McQueen and Greene, 1938)
Rock Lake shale of Stanton formation (Condra and Scherer, 1939) - in Nebraska
Rock Lake ("Victory Junction") shale of Stanton limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Rock Lake shale member of Stanton limestone (Branson, 1944b)
Rock Lake member of Stanton formation (Searight and Howe, 1961)
Rock Lake Shale Member of Stanton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Rock Lake Shale Member of Stanton Limestone (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Rock Lake Shale Member of Stanton Formation (Howe, 1986; Thompson, 1995)
Rock Lake Shale Member of Stanton Limestone (Goebel, et al., 1989) - in Iowa and Nebraska

Pennsylvanian System (Missourian Series)

Type section: Condra (1927, p. 59) named the Rock Lake Shale. He stated "The name Rock Lake is given from an outcrop at Rock Lake, in Section 3, Township 12 North, Range 10 East, Sarpy County, Nebraska."

Originally called the **"Rock Lake shale bed of Stanton limestone member of Lansing formation,"** (Condra, 1927), this unit has also been called the **"Victory Junction shale member of the Stanton limestone"** (Newell, 1936, Moore, 1936). McQueen and Greene (1938) called it **"Rock Lake or Victory Junction shale member of Stanton limestone."**

Thompson (1995, p. 119) stated "The Rock Lake Shale Member..consists of greenish shale and is sandy in the upper part. Locally, the upper part consists of thin-bedded, calcareous sandstone. The thickness...ranges from 1 to 16 ft, but averages less than 10 ft." The Rock Lake Shale Member overlies the Stoner Limestone Member, and is overlain by the South Bend Limestone Member of the Stanton Formation.

Rock Levee formation

Rock Levee formation (**Grohskopf, 1948**; Larson, 1951; Martin, et al., 1961a) = ***"Pecatonica Formation" and/or upper Joachim Dolomite***

Ordovician System (Mohawkian Series)

Grohskopf (1948, p. 360-362) set up several zones in the Plattin and Joachim. One of these included the top of what had been the Joachim and the lower part of what had been the Plattin, and was made a new formation, the Rock Levee formation, named for Rock Levee, a siding on the St. Louis-San Francisco Railroad in Cape Girardeau County, Missouri. Ulrich (1939, p. 109) correlated these beds with the Murfreesboro formation of the Stones River group of central Tennessee. Bridge (1941, oral communication to McQueen) correlated them with the Ridley formation of the same group, considering this group correlative with the Black River rather than the Chazyan as Ulrich had done. The upper boundary of this unit has been relocated several times, and miscorrelations to the north of the Cape Girardeau area resulted in the upper half of the Joachim Dolomite being missidentified as "Rock Levee." Templeton and Willman (1963) identified "Rock Levee" strata at Rock Levee as equivalent to the Pecatonica Formation of Illinois, and proposed to call this unit Pecatonica, instead of Rock Levee. Rock Levee is no longer a valid stratigraphic unit in Missouri.

Roubidoux Formation

Roubidoux sandstone (Nason, 1892) - included St. Peter Sandstone at some sections
Roubidoux or Saccharoidal sandstone (Winslow, 1894) = ***St. Peter and possibly Everton sandstones***
Roubidoux sandstone (Gallaher, 1900) = ***Gunter Sandstone Member (of Gasconade Formation)***
Roubidoux sandstone (Weeks, 1902)

Roubidoux (Buckley and Buehler, 1904)
Roubidoux formation (Bain and Ulrich, 1905a,b; Heller, 1954; Martin, et al., 1961)
Roubidoux Sandstone (Sloss, 1963)
Roubidoux Formation (Thompson, 1982, 1991, 1995)
Ordovician System (Ibexian Series)

Type section: Nason (1892, p. 114-115) was the first to apply the name Roubidoux to the complex of chert, dolomite and sandstone "...overspreading the Ozark region from Cabool to Gasconade City and from Salem to Doniphan." No type section was initially specified, but the name was taken from Roubidoux Creek in Pulaski and Texas counties, Missouri. Thompson (1991, p. 31) noted that Heller (1954, p. 17) stated "The Roubidoux Creek Section, which is here designated the type area section for the Roubidoux formation is exposed along a southeast-facing hillside above Roubidoux Creek in the SE¼ NW¼ SW¼ sec. 10, T. 33 N., R. 12 W., Texas County, Missouri."

The Roubidoux Formation is overlain by the Jefferson City Dolomite and overlies the Gasconade Dolomite. Nason correlated it with the Second sandstone of earlier geologists, and erroneously implied a correlation with the First (St. Peter) sandstone. Winslow (1894, p. 31) in his correlation table, uses the term "Moreau" for what is now known as the Roubidoux, beneath the Jefferson City, and restricts the term Roubidoux to beds above the Jefferson City, equivalent to the Crystal City (St. Peter). Ball and Smith (1903) ignored Nason's term Roubidoux and introduced the name "St. Elizabeth" for the Second sandstone of Miller County, although accepting Nason's term Gasconade for the underlying beds. Bain and Ulrich (1905) reintroduced Nason's term Roubidoux, with a clear understanding of the fact that it does not include the First or St. Peter sandstone, thus for the first time formulated essentially the present definition of the formation. Gallaher (1900, p. 113) applied the term Roubidoux to the Gunter sandstone and used the terms "St. Thomas" and "Moreau" for the true Roubidoux. Lee (1913, p. 21-30) divided the Roubidoux Formation in the Rolla quadrangle, Phelps County, Missouri, area into four sandstones and three dolomite members.

Rowe Coal Bed of Rowe Shale, Krebs Subgroup, Cherokee Group

Rowe coal bed of Cherokee shale (**Pierce and Courtier, 1938**)
Rowe coal bed of Rowe formation (Searight and Howe, 1961)
Rowe (Jordan) coal bed of Krebs Subgroup (Robertson, 1971)
Rowe coal bed of Rowe Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

The Rowe Coal Bed is at the top of the Rowe Shale, the type section being a coal strip pit near the Rowe school in the NW¼ 34, 30S-25E, Crawford County, Kansas.

Rowe Shale of Krebs Subgroup, Cherokee Group

Rowe coal bed of Cherokee shale (**Pierce and Courtier, 1938**) - in Kansas
Rowe formation (Searight, et al., 1953; Branson, 1957; Searight and Howe, 1961; Hoare, 1961a)
"cap rock of Rowe coal" (Hoare, 1961a) = ***Drywood Shale*** (lower part)
Rowe-Drywood Formations (Gentile, 1976) = ***Rowe and Drywood Shales***
Rowe Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Pierce and Courtier (1938, p.65), the Rowe Coal Bed (and thus the Rowe Formation) was named from a coal strip pit near the Rowe school in the NW¼ (NE ¼ according to Baars and Maples, 1998, p. 206) 34, 30S-25E, Crawford County, Kansas.

Thompson (1995, p. 97-98) stated "From the base upward, the Rowe Formation includes sandstone, siltstone, underclay, and the **Rowe coal bed**. Locally the formation appears to be mostly sandstone. The Rowe coal bed is persistent but is noticeably lenticular. It has been mined in many places from Barton County to eastern Henry County and also in Clark County. The formation ranges in thickness between 10 and 25 ft." The Rowe is overlain by the Drywood Shale, and overlies the Warner Sandstone.

Royal Gorge Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the SE¼ SE¼ sec. 3, T. 33 N., R. 3 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "The Royal Gorge Rhyolite is a red to maroon to gray lava flow containing 5 percent or more quartz and alkali feldspar phenocrysts. It is vividly banded red and white in many localities but may be massive. It is as much as 2,000 or more ft thick in some localities but may be much thinner or even absent in others."

Rulo Limestone Member of Scranton Formation, Wabaunsee Group, Sacfox Subgroup

Rulo limestone of Nemaha formation (**Condra and Bengston, 1915**) - in Nebraska
Rulo limestone of Scranton limestone member of Shawnee formation (Condra, 1927) - in Nebraska
Rulo limestone member of Scranton shale (Moore, 1932; Condra, et al., 1932; Condra, 1935)
Rulo limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Rulo limestone (McQueen and Greene, 1938; Moore, 1948)
Rulo limestone member of Scranton shale (Branson, 1944b; Moore and Mudge, 1956)
Rulo member of Scranton formation (Searight and Howe, 1961)
Rulo Limestone (Landis and Van Eck, 1965) - in Iowa
Rulo Limestone Member of Scranton Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Rulo Limestone Member of Scranton Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Rulo Limestone Member of Scranton Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Originally proposed by Condra and Bengston (1915, p. 4) as the **Rulo limestone of Nemaha formation**, they stated "This is exposed at the base of the bluff south of Rulo, two miles north of Rulo and between that point and Winnebago Creek. The type locality is 2 ½ miles north of Rulo [Richardson County, Nebraska]."

In Missouri this unit was called the **Rulo limestone** by McQueen and Greene (1938), and the **Rulo member of the Scranton formation** by Searight and Howe (1961). Thompson (1995, p. 129) stated "The Rulo Limestone Member...consists of dark-gray, earthy, fossiliferous limestone, which grades laterally to calcareous shale. The member commonly contains carbonaceous material and ranges in thickness from less than 1 ft to about 2 ft." The Rulo Limestone Member overlies the Cedar Vale Shale Member and is overlain by the Silver Lake Shale Member of the Scranton Formation.

Ruma

Ruma formation (Weller, 1914) - in Illinois; = ***upper Paint Creek and Cypress formations***
Ruma sandstone (Ulrich, 1917; Weller and Weller, 1939) = ***upper Paint Creek and Cypress formations***

Mississippian System (Chesterian Series)

Weller (1913) proposed the name "Ruma" for a series of shales and sandstones overlying the Paint Creek formation and underlying the Okaw formation, named for Ruma, in Randolph County, Illinois. Later, Weller (1920) revealed that the upper part of the Ruma consisted of the Cypress sandstone and that the lower part "properly belongs with the Paint Creek formation." Therefore, the name Ruma formation was abandoned.

Russell Creek limestone

Russell Creek limestone (Branson, 1954a) - in Oklahoma; = ***Robinson Branch Shale***
Russell Creek Limestone Member of Senora Formation (Branson, et al., 1965) - in Oklahoma; = ***Robinson Branch Shale***

Pennsylvanian System (Desmoinesian Series)

Russell Mountain Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Russell Mountain Rhyolite (**Berry, 1976**; Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the NE¼ SW¼ sec. 2, T. 33 N., R. 3 E, Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The Russell Mountain Rhyolite is a brick-red to dark maroon ash-flow tuff with abundant large flamme and 2-5 percent white feldspar phenocrysts. It is widely exposed in the Taum Sauk area where it is nearly 1,000 ft thick." This is not the same unit Anderson (1962) called the "Russell Mountain rhyolite" (see next entry). Anderson (1962) identified this unit as the "Shut-ins ash flow", and in 1970 as "Unit C, tuff of Stouts Creek".

Russell Mountain rhyolite

Russell Mountain rhyolite (**Anderson, 1962**) = ***Royal Gorge Rhyolite, Taum Sauk Group, St. Francois Mountains Volcanic Supergroup***
Precambrian Erathem

Anderson (1962) used the term "Russell Mountain rhyolite" for the banded rhyolite Berry (1976) named the **Royal Gorge Rhyolite**.

S

Saccharoidal sandstone

Saccharoidal sandstone (Shumard, 1855) = ***St. Peter Sandstone***
Saccharoidal sandstone (Swallow, 1855) = ***St. Peter Sandstone*** (in northwestern Missouri)
Saccharoidal sandstone (Swallow, 1855; Pumpelly, 1873) = ***St. Peter and lower Everton sandstones*** (in southeastern Missouri)
Saccharoidal or Roubidoux sandstone (Keyes, 1898c; Marbut, 1898) = ***St. Peter and Everton sandstones***
Ordovician System (Whiterockian and/or Mohawkian Series)

A descriptive term applied, in a titular sense, in early Missouri reports to the sandstone now called St. Peter Sandstone and the lower sandstone of the underlying Everton Formation. It is so-called because when struck with a hammer it crumbles into fine white sand resembling granulated sugar.

Sacfox Subgroup of Wabaunsee Group

Sac-Fox subgroup (**Condra, 1935**; Moore and Mudge, 1956) = ***Severy, Howard, and Scranton Formations***
Sacfox subgroup (Greene and Searight, 1949; Searight and Howe, 1961)
Sacfox subgroup (Jewett, 1949; Moore, et al., 1951) - in Kansas
Sacfox Subgroup (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Sacfox Subgroup (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1935, p. 5) stated "...Sac-Fox subgroup, in the Missouri River blufflands, between the mouth of the Big Nemaha and Iowa Point, Kansas." The name was chosen from the Iowa-Sac-Fox Indian Reservation in southwestern Nebraska and northeastern Kansas.

The lower of three subgroups proposed by Condra (1935) for the uppermost Group of Pennsylvanian strata in Missouri, the Sacfox Subgroup includes the Severy, Howard, and Scranton Formations.

<u>Sac limestone</u>

Sac limestone (Shepard, 1898) = ***Compton Limestone (or Powell Dolomite?)***
Sac limestone (Weller, 1901; Keyes, 1902) = ***Compton Limestone***
Sac limestone (Yochelson and Saunders, 1967) = ***Cotter Dolomite***
Ordovician (Ibexian Series) or Mississippian (Kinderhookian Series) Systems

Shepard (1898) proposed the name "Sac limestone" for a unit overlying the "Phelps sandstone and underlying the King limestone." He regarded it to be Devonian in age. Later reports assigned it to the Kinderhook group. Bridge (1937, personal communication to Wilmarth, 1938) stated that the Sac limestone belongs to the Powell limestone of Ordovician age. It was named from typical outcrops at various points along the Sac River and its branches in Greene County, Missouri, where the Compton is unusually dolomitic, and does resemble rocks of Ordovician age in this area.

St. Clair Limestone Member of Bainbridge Formation

St. Clair limestone (Penrose, 1891) - in Arkansas, may include some middle Ordovician strata
St. Clair limestone (Niagaran) (Keyes, 1902) = ***Bainbridge Formation***
St. Clair formation <u>of Bainbridge Group</u> (Lowenstam, 1949)
St. Clair (Amsden, 1963) "= Clarita of Oklahoma"
St. Clair Limestone <u>of Bainbridge Group</u> (Berry and Boucot, 1970; Willman and Atherton, 1975)
St. Clair Limestone Member <u>of Bainbridge Formation</u> (Thompson, 1993, 1995)
Silurian System (Wenlockian and Ludlovian Series)

Type section: Penrose (1891, p. 102-174) named the St. Clair limestone for St. Clair Springs, 8 miles northeast of Batesville, in Independence County, Arkansas.

Lowenstam (1949, p. 13-16) applied the name "St. Clair" to the lower limestone formation of his Bainbridge group in Illinois, and then applied the name regionally to the pink crinoidal limestone of early Niagaran age throughout its distribution in the midwestern states, which includes the lower Bainbridge in southeastern Missouri. In Missouri the St. Clair is the lower limestone member of the Bainbridge Formation, whereas in Illinois it is still called the lower limestone formation of the Bainbridge Group.

<u>St. Croix (Croixian) series</u>

St. Croix series (Schuchert, 1897)
St. Croixian or Upper Cambrian (Buckley, 1908)
Croixian Series (Keyes, 1914)
Croixian Epoch (Chenoweth, 1968)
Upper Cambrian (Croixian) Series (Howe, 1968)
Croixian Series (Buschbach, 1975) - in Illinois
Croixian Series (Upper Cambrian) (Kurtz, 1981)
Cambrian System (Upper Cambrian Series)

This geographic name for the Upper Cambrian Series was proposed by Walcott (1912, p. 306-307) and used in Missouri by several authors (Ulrich, 1911; Keyes, 1914) although it is not generally used today. The name originated from sections exposed in the vicinity of the St. Croix River in Minnesota. Bridge used "Upper Cambrian" instead of Croixian, and Keyes (1941b) formally rejected Ulrich's term "Ozarkian" in favor of **Upper Cambrian Series**.

<u>St. Francis formation</u>

St. Francis formation (Houseknecht, 1989)
Cambrian System (Upper Cambrian Series)

The St. Francis formation was proposed by Houseknecht (1989, p. 32) for carbonates that were a southern facies of sandstone (Lamotte Sandstone) to the north. He stated "The presence of oolite-bearing carbonates restricted to the Reelfoot basin suggests that shallow marine water invaded the basin from the south as Cambrian sea level rose. Alternatively, the oolites could have been derived from the shelf and deposited as turbidites..."

Ste. Genevieve Limestone

Ste. Genevieve marble (Swallow, 1855) = ***St. Louis Limestone*** (according to Shumard, 1859)
Ste. Genevieve limestone (Shumard, 1859) - removed from "St. Louis limestone"
Ste. Genevieve limestone (Shumard, 1873; Keyes, 1894a; Gallaher, 1898, 1900)
Genevieve group (Williams, 1891) = ***Meramecian and Chesterian***, excluded Warsaw
Ste. Genevieve epoch (Weller, 1898a, 1898b) = ***Meramecian and Chesterian Series***
Ste. Genevieve sandstone (Gallaher, 1900) = ***Aux Vases Sandstone***
Ste. Genevieve limestone (Weller, 1907) - excluded from "Chester group"
Ste. Genevieve group (Williams, 1922) = ***Meramecian and Chesterian Series***
Ste. Genevieve formation (Branson, 1944b; Spreng, 1961)
Ste. Genevieve Limestone of Meramecian Series (Swann, 1963; Thompson, 1966, 1979a, 1986),
Ste. Genevieve Limestone of Chesterian Series (Maples and Waters, 1987; Thompson, 1995)
Mississippian System (Chesterian Series)

Type section: Thompson (1986, p. 117) stated "This formation was named from exposures near Ste. Genevieve, Ste. Genevieve County, Missouri. Weller and St. Clair (1928, p. 217) considered the outcrops along the bluffs of the Mississippi River, mentioned by Shumard, as '... the typical expression of the formation.'...An excellent exposure at a small roadside park on U.S. Highway 61, 0.5 mile south of Ste. Genevieve, in the NE¼ sec. 35, T. 38 N., R. 9 E...may be regarded as the type for the Ste Genevieve Limestone..."

The basal formation of the Chesterian Series, the Ste. Genevieve Limestone overlies the St. Louis Limestone and is overlain by the Aux Vases Sandstone. The formation was named by Shumard (1859, p. 406). He did not adequately describe it, but it was said to be exhibited in the bluffs of the Mississippi, commencing a mile or two below Ste. Genevieve, and from thence extending almost uninterruptedly to the mouth of the River Aux Vases. In subsequent reports the beds were usually not specifically named, but were included in the St. Louis limestone or St. Louis group. Gallaher (1898, 1900) treated the Ste. Genevieve as a formation distinct from the St. Louis and from the overlying rocks of Chesterian age. Ulrich (1904a) revived the Ste. Genevieve limestone as a formation in the Mississippi section, in connection with his studies in Kentucky. S. Weller (1907) excluded the Ste. Genevieve from the Chester group, but did not put it definitely in the Meramec group until 1920 (1920a). It has also been called the Second Archimedes limestone in early reports.

Initially included as the uppermost formation of the Meramecian Series, Maples and Waters (1987) redefined the series boundaries, and placed the Ste. Genevieve Limestone as the basal formation of the Chesterian Series.

Ste. Genevieve marble

Ste. Genevieve marble (Swallow, 1855) = ***St. Louis Limestone*** (Schumard, 1859)
Mississippian System (Meramecian Series)

This was a name used by Swallow (1855, p. 96) for a building stone quarried at Ste. Genevieve. According to Shumard (1859, p. 407) this is the basal member of the St. Louis limestone and older than the formation near Ste. Genevieve to which he applied the name Ste. Genevieve limestone.

Ste. Genevieve sandstone

Ste. Genevieve sandstone (Gallaher, 1900) = ***Aux Vases Sandstone***
Mississippian System (Chesterian Series)

Gallaher (1900, p. 168) used this term for a yellow-brown sandstone quarried four miles below Ste. Genevieve, named for Ste. Genevieve, in Ste. Genevieve County, Missouri. It is now called the **Aux Vases Sandstone**, which overlies the Ste. Genevieve Limestone.

St. Elizabeth formation

St. Elizabeth formation (Ball and Smith, 1903) = ***Roubidoux Formation***
Ordovician System (Ibexian Series)

Ball and Smith (1903, p. 50-68) proposed the name "St. Elizabeth" for the complex of sandstone, chert, and dolomite lying between the Gasconade formation below and the Jefferson City formation above. They applied the term "Bolin Creek sandstone member" to the prominent sandstones within that interval. It is the same as the Roubidoux Formation, which name was previously introduced by Nason (1892, p. 114), and is the name used at present. It was named for St. Elizabeth, Miller County, Missouri.

St. Francois limestone

St. Francois limestone (Winslow, 1894) = ***Bonneterre Formation - Potosi Dolomite***

Cambrian System (Upper Cambrian Series)

Winslow (1894, p. 331, 346, 349-354) proposed "St. Francois limestone" for the great body of dolomitic limestone lying between the LaMotte Sandstone below and the Crystal City (St. Peter) sandstone above in southeast Missouri. It included the Potosi limestone and the "St. Joseph limestone". Although he said it extended to the St. Peter Sandstone, in actual usage it extended from the top of the Lamotte to the top of the Potosi.

St. Francois Mountains Intrusive Suite

Precambrian Erathem

This is a "Supergroup" comprising hypabyssal and plutonic intrusives of the St. Francois Mountains of eastern Missouri, most of which were proposed by Tolman and Robertson (1969). They were extensively reviewed by Robertson (*in* Thompson, 1995).

St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Presented in a table as the head of a series of volcanic units, the **St. Francois Mountains Volcanic Supergroup** apparently was first presented by Kisvarsanyi, et al. (1981, p. 3, Table 1). This table was later reproduced with some modifications by Robertson (*in* Thompson, 1995, p. 8, Table 1).

St. Francois terrane

Precambrian Erathem

Robertson (*in* Thompson, 1995, p. 5) stated "The St. Francois terrane consists of an 1.4 to 1.5 Ga anorogenic granite-rhyolite terrane which crops out in southeast Missouri forming the St. Francois Mountains. It extends southwestward to approximately the Bolivar Mansfield Tectonic Zone."

St. James Member

St. James Member of Dunleith Member of Kimmswick Subgroup (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***lower part of "lower Kimmswick Limestone"***

Ordovician System (Mohawkian Series)

This unit was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

St. Joe

St. Joe marble (Keyes, 1902) = ***Compton, Northview, and Pierson formations***

St. Joe limestone (Keyes, 1902) "= Pennsylvanian limestone of Gallaher, 1898"

St. Joe Limestone (Purdue, 1907) = ***Compton, Northview, and Pierson formations***

Fern Glen (St. Joe) (Girty, 1915b) = ***Compton, Northview, and Pierson formations***

St. Joe limestone member of Boone formation (Girty, 1915b; Moore, 1928) "= Fern Glen limestone member of Kinderhook formation" = ***Compton, Northview, and Pierson formations***
St. Joe limestone member of Boone formation (Moore, 1928) - included Pierson Limestone in areas other than type area of Pierson in Greene County; = ***Compton, Northview and Pierson formations***
Saint Joe member of Boone formation (Moore, 1933) = ***Compton Limestone?***
St. Joe limestone member of St. Joe limestone (Giles, 1933) = ***Compton, Northview and Pierson formations***
St. Joe limestone (Weller, et al., 1948) = ***Compton, Northview and Pierson formations***
St. Joe formation (Laudon and Bowsher, 1949) = ***Compton, Northview, and Pierson formations***
"Fern Glen zone" of St. Joe limestone (Bassler, 1950) = ***Pierson Limestone***
St. Joe Group (Beveridge and Clark, 1952) = ***Compton, Northview, and Pierson formations***
St. Joe Limestone (Freeman and Schumacher, 1969) = ***Compton, Northview, and Pierson formations***
St. Joe Group (Sable, 1979) = ***Compton, Northview and Pierson formations***
St. Joe Limestone Member of Boone Formation (Dutro, et al., 1979) = ***Compton, Northview, and Pierson formations***

Mississippian System (Kinderhookian and Osagean Series)

Branner (*in* Hopkins, 1893, p. 253) proposed the name "St. Joe" for a prominent bed of red limestone, which is widely distributed in northern Arkansas and occurs in southwest Missouri, from the town of St. Joe, in Searcy County, north central Arkansas. It had various ranks until Cline (1935, p. 1132-1141) designated it as a formation. Giles (1935, p.1815-1878) and McKnight (1935, p. 63-75) considered the St. Joe to be the basal member of the Boone formation, although Cline had abandoned the use of Boone when he gave the St. Joe formational rank. Clark and Beveridge (1952, p. 75-77) proposed that the St. Joe be raised to the rank of a group in Missouri, comprising, from bottom to top, the **Compton, Northview, and Pierson formations**. It has never been consistently used in Missouri, although it has been used in Arkansas and Oklahoma as **St. Joe Limestone Member of the Boone Formation** where the unit is too thin to further subdivide into units. St. Joe Group is essentially synonymous with Chouteau Group in southwestern Missouri.

St. Joseph limestone

St. Joseph limestone (**Winslow, 1894**) = ***Bonneterre Formation to Derby-Doerun Dolomite***

Cambrian System (Upper Cambrian Series)

This term was proposed by Winslow (1894, p. 331, 347) to include everything from the top of the Lamotte to the base of the Potosi, as now defined. It formed the lower part of his "St. Francois limestone" in southeast Missouri. It is equivalent to the Elvins Group and Bonneterre Formation of present nomenclature. It is also equivalent to the "Fredericktown limestone" of Keyes (1896d). It was named for the mines of the St. Joseph Lead Company near Fredericktown, Madison County, Missouri.

St. Laurent Limestone

St. Lorenz (*sic.*) limestone (Dake, 1918) - from unpublished ms. of Weller, misspelled
St. Laurent limestone (Wilson, 1922) - from unpublished ms. of Weller
St. Laurent formation (Weller and St. Clair, 1928; Branson, 1944a; Croneis, 1944; Koenig, 1961a)
St. Laurent limestone (Cooper and Warthin, 1942)
St. Laurent Limestone (Collinson, et al., 1967) "= Lingle and Alto Formations of Illinois"
St. Laurent Limestone (Fraunfelter, 1970, 1986; Thompson, 1993, 1995)
St. Laurent Formation (Fraunfelter, 1984)

Devonian System (Middle Devonian Series)

Type section: Thompson (1993, p. 103) stated "The name, taken from an unpublished manuscript of Weller's, was proposed by Wilson [1922, p. 51-52], who stated, 'Overlying the Beauvais is about 100 feet of the St. Laurent, dominantly limestone, but with some highly arenaceous layers and some thin seams of pure sandstone, the highest Middle Devonian in this area." It is named from St. Laurent Creek, along the course of which a good exhibition of the formation may be seen about three miles south of St. Marys in Ste. Genevieve County, Missouri.

Dake (1918, p. 175), apparently misquoting a manuscript by Weller, called this formation the "St. Lorenz limestone", underlying the Chattanooga Shale(?) and overlying the Beauvais Sandstone. Wilson (1922, p. 51-52) first used the name

St. Laurent and credited it to the unpublished manuscript of S. Weller. Weller and St. Clair (1928, p. 151) stated that the St. Laurent succeeded the Beauvais Sandstone in the section along Little Saline Creek, dominantly limestone with some notable arenaceous beds included. The formation occurs in Perry and Ste. Genevieve counties.

St. Lawrence Formation

St. Lawrence Formation (Howe, et al., 1972)

Cambrian System (Upper Cambrian System)

In a discussion of Cambrian strata in the Upper Mississippi Valley, Kurtz (1989, p. 78) stated "The St,. Lawrence is a shaly, silty, and variably glauconitic dolomitic unit that stands in contrast to the sandstones above and below." It may occur in the subsurface of northern Missouri, equivalent to Potosi and/or Eminence strata exposed in the east-central part of Missouri.

St. Lorenz limestone

St. Lorenz limestone (Dake, 1918) = ***St. Laurent Limestone***

Devonian System (Middle Devonian Series)

The same as **St. Laurent Limestone**, misspelled by Dake (1918) when first proposed.

St. Louis Limestone

St. Louis limestone (Englemann, 1847, 1863; Shumard, 1873) = ***Meramecian Series*** (Warsaw to Ste. Genevieve formations)
"Bedded limestone of St. Louis" (Owen, 1852)
St. Louis limestone (Swallow, 1855; Weller, 1898) = ***Salem to Ste. Genevieve formations***
St. Louis limestone (Shumard, 1859) = ***Salem and St. Louis formations***
St. Louis group (Worthen, 1866; Girty, 1915b) = ***Meramecian Series***
St. Louis limestone of Mountain limestone (Newberry, 1889) ***- may = Meramecian Series?***
St. Louis stage of Genevievian age (Williams, 1891) = ***Salem to Ste. Genevieve formations***
St. Louis group (Keyes, 1892) = ***Meramecian Series***, excluding Warsaw
St. Louis limestone (Keyes, 1892) = ***St. Louis and Ste. Genevieve formations***; rejected named "Ste. Genevieve"
St. Louis limestone (Ulrich, 1904a; Weller, 1914) **- restricted to present definition**
St. Louis limestone member of St. Louis group (Buehler, 1907) **-** included Salem and/or Ste. Genevieve formations
St. Louis limestone (Fenneman, 1911) **-** included Ste. Genevieve beds
St. Louis formation (Branson, 1944b; Spreng, 1961)
St. Louis Limestone (Thompson, 1966, 1979a, 1986, 1995; Lane and Brenckle, 1977)

Mississippian System (Meramecian Series)

Type section: Englemann (1847, p. 119-120) named the St. Louis formation, the typical exposures being in the city of St. Louis. No specific type section has ever been proposed.

The uppermost formation of the Meramecian Series, the St. Louis Limestone is overlain by the Ste. Genevieve Limestone (basal Chesterian Series) and overlies the Salem Formation. Swallow (1855, p.93, 174) defined it as underlying the Ferruginous sandstone (Aux Vases) and overlying the Archimedes limestone (Warsaw). Shumard (1859, p. 406) restricted the St. Louis limestone by defining the Ste. Genevieve as the upper part of Swallow's St. Louis. Ulrich (1904a) further restricted the St. Louis by defining the Spergen limestone (Salem) as the lower part of Swallow's St. Louis.

Prior to being defined as it is today, the "St. Louis group" was proposed by Worthen (1866, p. 83) for what is now the Meramecian Series. It included the Ste. Genevieve limestone and the St. Louis limestone (which included the Salem). The Warsaw limestone was also included although not recognized as a distinct formation. It was named for St. Louis, Missouri.

St. Peter Sandstone

"the geological formation St. Peters" (**Nicollet, 1843**) **-** in Minnesota
St. Peters formation (Owen, 1847) **-** in Minnesota
St. Peter sandstone (Gallaher, 1900; Buckley, 1908; Branson, 1918) = ***St. Peter and Everton sandstones***
St. Peter or Pacific sandstone (Buckley and Buehler, 1904) = ***St. Peter and Everton sandstones***
St. Peters (Pacific) sandstone (Van Horn and Buckley, 1905)
St. Peter ("Crystal City") sandstone (Bain and Ulrich, 1905a,b)
St. Peter sandstone (Ulrich, 1911)
St. Peter formation (Martin, et al., 1961a)
St. Peter Sandstone (Templeton and Willman, 1963; Thompson, 1982, 1991, 1995)
St. Peter Sandstone (Nunn, 1986) = ***Tonti Member of St. Peter Sandstone only***

Ordovician System (Mohawkian Series)

Type section: The St. Peter sandstone was first named by Nicollet in 1843. The name was applied to a sandstone and an overlying limestone exposed at the mouth of St. Peter's River (now called Minnesota River) at Ft. Snelling, Minnesota.

Owen (1847, p. 160-173) restricted the term to the sandstone and mentioned its presence along the St. Peter's River near Lake St. Croix, Minnesota. It was later recognized that this sandstone was a widespread unit which was called the First or ?Saccharoidal sandstone by Shumard (1855) and others, Crystal City sandstone by Winslow (1894), the Cap-au-Gres by Keyes (1898c), and Pacific by Ball and Smith (1903). Gallaher (1898, p. 21) was the first to apply the term St. Peter to this sandstone in Missouri. In Missouri the St. Peter overlies the Everton Formation or lies on the eroded surface of the Ibexian Series, and is overlain by the Dutchtown Formation or Joachim Dolomite.

St. Peter group

St. Peter group (Dake, 1918,1921) = ***Everton and St. Peter formations***

Ordovician System (Whiterockian and Mohawkian Series)

Dake (1918, 1921) proposed using the term "St. Peter group" for the St. Peter sandstone and the sandstone of the underlying Everton Formation where the intervening upper Everton limestone is absent, and the two formations cannot readily be distinguished.

St. Thomas sandstone

St. Thomas sandstone (**Gallaher, 1900**) = ***Roubidoux Formation***

Ordovician System (Ibexian Series)

Gallaher (1900, p. 124-126) proposed the name "St. Thomas sandstone" for what is now the Roubidoux Formation. It was named for the town of St. Thomas in the south part of Cole County, "in which locality it has reached its greatest development." The name may have been applied only to a specific sandstone unit within what is now Roubidoux. He also proposed the "Moreau sandstone" in the same paper for possibly another sandstone in the Roubidoux, or the same sandstone in an other area.

Salem Formation

Salem (Spergen) limestone (Willis, 1912)
Salem limestone (Weller, 1914; Weller and Sutton, 1940)
Spergen (Salem) limestone (Weller and St. Clair, 1928)
Salem limestone (Spergen limestone) (Branson, 1944b)
Salem ("Spergen") formation (Spreng, 1961)
Salem Formation (Thompson, 1966, 1979a, 1986, 1995; Lane and Brenckle, 1977)

Mississippian System (Meramecian Series)

Type section: According to Thompson (1986, p. 106), Cumings (1901, p. 232-233) stated "Since the term Bedford as the name of a formation is preoccupied, having been applied to the 'Bedford shale' of northeastern Ohio in 1870, the writer proposed the name *Salem limestone* for the rocks called Bedford limestone by Hopkins and Siebenthal...'" It was named for Salem, Washington County, Indiana.

In older reports these beds were included in the "Archimedes limestone." Shumard (1873, p. 294) in his report on Ste. Genevieve County, has referred a part of the formation to the Third Archimedes limestone, and a part he has included in the St. Louis limestone. Other writers have referred the formation to the Warsaw, or to the St. Louis group. Hopkins and Siebenthal (1896, p. 289-427) were the first to designate the formation by a distinctive name, the Bedford limestone. But the name Bedford was preoccupied. Cumings (1901, p. 232) proposed the name Salem. Ulrich (1904a, p. 110; 1904b, table opposite p. 90) proposed the name Spergen Hill for the formation.

Ulrich (1904a, p. 110) was the first to extend usage of the formation name (Spergen Hill), first applied to the exposures in Indiana, to the stratigraphy along the Mississippi River. The name was later shortened to Spergen. Both names, Spergen and Salem, were used by geologists for many years. The Salem Formation is overlain by the St. Louis Limestone and overlies the Warsaw Formation.

Sanborn

Sanborn formation (**Elias, 1931**) **-** in Kansas
Sanborn group (Davis, et al., 1960)

Quaternary System (Pleistocene Series)

This is a group term derived from the Sanborn formation as proposed by Elias (1931, p. 163) for the loess, with some gravel and sand at the base, which is widely distributed on the divides in western Kansas. It was further defined by Frye and Leonard (1952). Davis, et al .(1960) (p. 125) raised the formation to a group rank, giving eolian silt members of the Sanborn formation formational rank and the alluvial sediments informal stratigraphic names. The loess bodies were grouped together under the name Sanborn group, in a restricted sense to include the Loveland loess, Peorian loess, and Bignell loess in Platte County, Missouri. The name is from Sanborn, Nebraska, which is the nearest town to a locality of the formation in the northwestern corner of Cheyenne County, Kansas.

Sandy Hook Dolomite and Dolomitic Limestone Physiofacies

Sandy Hook Dolomite and Dolomitic Limestone Physiofacies of Callaway Limestone Physiofacies of Cedar City Formation (Fraunfelter, 1967a) = ***Callaway facies of Cedar Valley Limestone***

Devonian System (Middle Devonian Series)

Sangamonian Stage

Quaternary System (Pleistocene Series)

This name was applied to the interglacial stage during which the Sangamon soil and gumbotil, vegetal and other deposits were formed. The name for the interval was proposed by Leverett (1898a, p. 171-181) from exposures of the soil in Sangamon County, Illinois. The name was originally based on a buried soil, the **Sangamon Paleosol**, which was first reported by Worthen (1873, p. 306-319). The Sangamonian interglacial Stage was preceded by the Illinoian Stage of glaciation and succeeded by the Wisconsinan Stage of glaciation.

Sangamon Paleosol

Quaternary System (Pleistocene Series, Sangamonian Stage)

Whitfield (*in* Thompson, 1995, p. 148) stated "Soil developed in the Sangamonian interglacial age is one of the most distinctive Pleistocene stratigraphic markers in western Missouri. The soil developed on all materials that were exposed during this time, and the B-horizon usually does not exceed 3 ft in thickness."

Saratoga - See Marlbrook-Saratoga.

Sarpy formation

Sarpy formation (Condra, 1949; Burchett, 1970, 1971) - in Nebraska; = ***Block, Wea, and Westerville Members of Cherryvale Formation***

Pennsylvanian System (Missourian Series)

"Sarpy" is a name used in Nebraska for the lower three members of the formation called **"Cherryvale"** in most other Midcontinent states. Only the Quivira Shale Member was placed in the Cherryvale.

Savanna formation

Savanna cyclothem (Condra, 1949) = ***Rowe and Drywood Shales?***

Savanna formation (Branson, 1954a, 1957) - in Oklahoma; = ***Rowe and Drywood Shales***

Pennsylvanian System (Desmoinesian Series)

Saverton Shale

Saverton (blue) shales (Keyes, 1913)

Saverton shale (Moore, 1928) - Mississippian in age

Saverton (Laudon, 1930) "= Maple Mill of Iowa"

Saverton shale (Weller, 1935) = ***Grassy Creek and Saverton Shales***

Saverton shale of Fabius group (Weller, et al., 1948) - Mississippian in age

Saverton Shale (Scott and Collinson, 1959) - in Illinois

Saverton shale (Mehl, 1960, 1961)

Saverton formation (Koenig, 1961a; Koenig, et al., 1961)

Saverton Shale (Spreng and Work, 1977; Thompson, 1979, 1993, 1995; Ziegler and Sandberg, 1984;Woodruff, 1990)

Saverton Shale (Carter, 1988) = ***"unnamed lower shale" of Sulphur Springs Group***

Devonian System (Upper Devonian Series)

Type section: Keyes (1913, p. 160) proposed the Saverton Shale from exposures in the vicinity of Saverton, Ralls County, about seven miles south of Hannibal, Missouri.

Keyes (1913 p. 160) proposed the Saverton Shale when he divided the original Grassy Creek shale into two units. He retained the name "Grassy" for the lower black shale and applied the name Saverton to the upper green shales. Weller (1935, p. 191-192) proposed expanding the Saverton formation to include certain of the underlying black shales previously called Grassy Creek shale. However, today we retain two units, the lower black shale (Grassy Creek Shale), and the overlying green to blue clay shale (Saverton Shale). The Saverton is in turn overlain by the Louisiana Limestone.

Sawkillian Stage

Sawkillian Stage of Lower Devonian Series (Amsden, 1988) = ***upper part of Lower Devonian Series***

Devonian System (Lower Devonian Series)

Scammon Coal Bed **of Scammon Formation, Cabaniss Subgroup, Cherokee Group**

Scammon coal of Scammon cyclothem (Abernathy, 1937; Moore, et al., 1951) - in Kansas

Scammon coal of Scammon formation (Searight, et al., 1953; Searight and Howe, 1961)

Scammon coal bed of Scammon formation (Searight, 1955)

Scammon coal bed of Cabaniss Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas

Scammon coal (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

This coal bed is very thin in Missouri and is not minable. It occurs at the top of the Scammon Shale, and is overlain by the Mineral Shale.

Scammon Shale of Cabaniss Subgroup, Cherokee Group

Scammon cyclothem (Abernathy, 1937; Moore, et al., 1951) - in Kansas
Scammon formation (Searight, et al., 1953; Searight and Howe, 1961)
Scammon-Fleming formations (Unklesbay, 1955) = ***Scammon, Mineral, and Fleming Shales udifferentiated***
Scammon Formation (Hoare, 1961a; Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Abernathy (1937) named the "Scammon cyclothem" from exposures along Cherry Creek, northwest of Scammon, Cherokee County, Kansas.

Thompson (1995, p. 100-101) stated "From the base upward, the Scammon Formation consists of: 1) a black fissile shale, which contains flattened and spherical phosphatic concretions, and which grades upward into a calcareous gray shale; 2) the **Tiawah Limestone Member**; 3) a black, hard, blocky shale which contains siderite concretions and which grades upward into a dark-gray mudstone; 4) the **Chelsea Sandstone Member**; 5) a thin underclay; and 6) the thin **Scammon coal**...The maximum thickness of the formation is probably not more than 30 ft." The Scammon Shale is overlain by the Mineral Shale, and overlies the Tebo Shale.

<u>School Mine ledge</u>

School Mine ledge (Cullison, 1944) = ***"Quarry ledge" of Jefferson City Dolomite***

Ordovician System (Ibexian Series)

Cullison (1944, p. 18-19) used this term for certain beds within his Rich Fountain (Jefferson City) formation. It is the same as the "Quarry ledge" of Lee (1913, p. 37).

Scranton Formation of Sacfox Subgroup, Wabaunsee Group

Scranton shales (**Haworth and Bennett, 1908**) - in Kansas
Scranton shale member <u>of Shawnee formation</u> (Hinds and Greene, 1915)
Scranton shale member <u>of Shawnee formation</u> (Moore, 1920) - in Kansas
Scranton shale member <u>of Shawnee formation</u> (Condra, 1927) - in Nebraska
Scranton shale (Condra, 1930; Condra, 1935) - in Nebraska
Scranton shale (Moore, 1932)
Scranton shale (5 members) (Condra, et al., 1932; Moore and Mudge, 1956)
Scranton shale (6 members) (Branson, 1944b)
Scranton formation (5 members) (Searight and Howe, 1961)
Scranton Shale (5 members) (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Scranton Formation (5 members) (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Scranton Formation (5 members) (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Haworth and Bennett (1908), the type section is at Scranton, Osage County, Kansas, T. 15 S., R. 15 E.

Named the "Scranton shales" by Haworth and Bennett (1908), Hinds and Greene (1915) called it the "Scranton shale member of the Shawnee formation." Thompson (1995, p. 128) added "The Scranton Formation is composed of a succession of beds that lies above the...Utopia Limestone Member of the Howard Formation and ...below the Burlingame Limestone Member of the Bern Formation. The formation is divided into five members...The average thickness...is about 130 ft."

<u>Seahorne limestone</u>

Seahorne limestone (Wanless, 1931) - in Illinois; = ***Tiawah Limestone Member of Scammon Shale***
Seahorne Limestone (Landis and Van Eck, 1965) - in Iowa; = ***Tiawah Limestone Member of Scammon Shale***

Pennsylvanian System (Desmoinesian Series)

<u>Second Archimedes limestone</u>

Second Archimedes limestone (Owen, 1852) = ***Ste. Genevieve Limestone***

Mississippian System (Chesterian Series)

<u>2nd Calciferous limestone</u>

2nd Calciferous limestone (Gallaher, 1900) = ***Cotter and Jefferson City Dolomites***

Ordovician System (Ibexian Series)

Gallaher (1900, p. 126-127) used this term for a part of his Calciferous group. Essentially it is the unrestricted Jefferson City formation, now comprising the Cotter and Jefferson City Dolomites.

<u>Second limestone</u>

Second limestone (Gallaher, 1900) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Gallaher (1900, p. 91-92) used this term for the third member of his Cambrian section. It is the middle part of the **Bonneterre Formation**, overlain by his "Black Lead" and underlain by his "White Lead".

<u>2nd Magnesian Limestone</u>

2nd Magnesian Limestone (Swallow, 1855; Shepard, 1898) = ***Powell, Jefferson City, and Cotter Dolomites***

2nd Magnesian limestone (Pumpelly, 1973) = ***Cotter Dolomite and Roubidoux Formation***

Ordovician System (Ibexian Series)

Swallow and other early geologists used this term in Missouri for what is essentially the unrestricted Jefferson City (Cotter and Jefferson City Dolomites). It is part of Swallow's "Calciferous sandrock", Broadhead's "Ozark series", and others' "Magnesian Limestone series".

<u>2nd sandstone</u>

2nd sandstone (Swallow, 1855; Broadhead, 1874; Keyes, 1898c) = ***Roubidoux Formation***

Ordovician System (Ibexian Series)

The term "Second sandstone" (or "2nd sandstone") was used by the early Missouri geologists for the formation later known as the Roubidoux. It was also called the "St. Elizabeth".

Sedalia Formation **of Chouteau Group**

Sedalia limestones (Vogdes, 1892; Weeks, 1902) = ***Compton Limestone***

Sedalia-Compton transition beds (Clark and Beveridge, 1952) = ***"unnamed limestone" of Chouteau Group***

Sedalia limestone (Moore, 1928, 1933) = ***Sedalia and Pierson formations*** in central Missouri

Sedalia limestone (formation?) (Laudon, 1937) - "Sedalia" of Illinois = ***Fern Glen Formation***, or ***Meppen Limestone Member of Fern Glen Formation***

Sedalia formation (McQueen and Greene, 1938) - "Osagean in age", = ***either Sedalia, Pierson, or both***

Sedalia member of Chouteau formation (Branson, 1944b)

Sedalia dolomite (Kaiser, 1950)

Sedalia formation of Chouteau group (Beveridge and Clark, 1952) - defined Sedalia as upper carbonate of the Kinderhookian-aged Chouteau Group

Sedalia formation (Spreng, 1961)

"Sedalia" Formation (Collinson, et al., 1962) - in Illinois, Osagean in age, = ***Meppen Limestone Member of Fern Glen Formation***

Sedalia Formation <u>of Chouteau Group</u> (Thompson, 1979a, 1986)

"alternating beds of Sedalia Formation and Chouteau Limestone" (Thompson, 1979) = ***"unnamed limestone" of Chouteau Group***
Mississippian System (Kinderhookian Series)

Type section: The name "Sedalia limestone" was proposed by Moore (1928, p. 61) for the upper part of the Chouteau limestone of Swallow (1855, p. 101-103). The name is from exposures in the vicinity of Sedalia, Pettis County, Missouri, although the type section is at the Missouri, Kansas, and Topeka railroad Sweeney quarry in Cooper County, SW¼ SW¼ SE¼, sec. 4, 46N-19W.

The Sedalia Formation is overlain by the Northview Formation and overlies either the Compton Limestone or a series of transition beds between the Sedalia and Compton ("unnamed limestone" of Thompson, 1995). It is the uppermost carbonate unit of the Chouteau Group. Moore considered the Sedalia to be the basal formation of the Osagean Series, but Beveridge and Clark (1952) determined that "Moore's Sedalia" unit was the Pierson Limestone, and redefined the Sedalia (which is characterized in most places by containing bluish-black chert nodules with light-gray to white "rinds," thus differing from the Pierson which usually is sparsely cherty or only has chert in the uppermost beds) to be the upper Chouteau carbonate beneath the Pierson and Northview (if present).

Selkirkic period

Selkirkic period (Keyes, 1914)
Precambrian Erathem

Keyes (1914, p. 23) used this term to cover the time of the Selkirk series of Canadian geologists, and later expanded it to include more than that series. In regard to Missouri, he (Keyes, 1915, p. 253) used it in a chart as part of the Proterozoic era, preceding the Superioric period. It has not been used by other geologists.

Selma formation

Selma formation (Wilson, 1922)
Cretaceous System (Gulfian Series)

The Selma formation is an Upper Cretaceous formation occurring in Alabama, Mississippi, and Tennessee, and which Wilson (1922, p. 262) said was probably present under the Missouri portion of the embayment area. The formation was named by Smith, Johnson, and Langdon (1894) as the "Selma chalk" or "Rotten limestone," underlying the Ripley group McNairy and overlying the Coffee (or Eutaw) group. It was named for Selma, Dallas County, Alabama.

Semi-crystalline limestone

Semi-crystalline limestone Meek, 1873) = ***Cedar Valley Limestone?***
Devonian System? (Middle Devonian Series?)

Meek (1873, p. 176-178) used this term for a limestone overlying the Trenton limestone(?) (Kimmswick?) and underlying the Cooper marble (facies of the Cedar Valley Limestone) in Saline County. He classed it as Hamilton group(?).

Seminole Formation of Pleasanton Group - of Howe (1982)

Seminole formation (Taff, 1901; Moore, et al., 1937) - in Oklahoma
Seminole formation (Branson, 1957) - in Kansas
Seminole Formation (Jewett, et al., 1968) - in Kansas
Seminole Formation (Howe, 1982)
Pennsylvanian System (Missourian Series)

Jewett, et al. (1968) and Howe (1982) have proposed the Seminole Formation, originally applied to a conglomerate in Seminole County, Oklahoma, to the succession of strata formerly called "lower unnamed formation" of the Pleasanton

Group in Kansas and Missouri. This would probably be equivalent to the **Hepler Formation** of Watney and Heckel (1994) and Heckel and Watney (in press). After the proposals of Watney and Heckel, (1994) Heckel and Watney (in press) are reviewed, the final subdivisions of the Pleasanton Group can be determined.

Seneca chert

Seneca chert (Jenney, 1894) = ***Grand Falls chert?***

Mississippian System (Osagean Series)

Jenney (1894, p. 178) stated that ore occurs in the upper beds of the Subcarboniferous (Mississippian) of southwest Missouri, units he designated as "Cherokee limestone" and "Seneca chert". Siebenthal (*in* Smith and Siebenthal, 1907, p. 4) stated that Jenney, in applying the name Seneca chert, presumably meant the chert Siebenthal called "Grand Falls chert member of the Boone limestone", but his (Jenney's) reference is too indefinite to satisfy the demand of geologic terminology. He (Siebenthal) said the chert at Seneca (Newton County) is not to be correlated with the Grand Falls, and the name Seneca is preoccupied. This may be the chert exposed with carbonate in the Seneca Graben, believed to be Chesterian in age.

Senecan Series

Senecan Series (Keyes, 1915; Cooper, et al., 1942) = ***upper part of Upper Devonian Series***

Senecan Series (Savage, 1920a) = ***upper part of Middle Devonian Series***

Devonian System (Middle and/or Upper Devonian Series)

This is a term derived from the Devonian succession in New York used in reference to Missouri by Keyes (1915, p. 253) for a Late Devonic series (actually Middle Devonian) represented by the Callaway (Cedar Valley) limestone. It overlies the Erian series (Wittenberg shale) and underlies the Chemungan series (Snyder Creek Shale). It was also used by Savage (1920) for the upper part of the Middle Devonian Series in Illinois.

Senora formation

Senora formation (Branson, 1954a) - in Oklahoma; = ***Tebo Shale to Scammon Shale***

Pennsylvanian System (Desmoinesian Series)

Seventy-four limestone

Seventy-four limestone (Bain, 1895) in Iowa; = ***Coal City Limestone Member of Pawnee Formation***

Pennsylvanian System (Desmoinesian Series)

Seventy-Six Shale Member of Bainbridge Formation

Seventy-Six Shale Member of Bainbridge Formation (Satterfield and Thompson, 1975; Thompson, 1993, 1995)

Silurian System (Wenlockian and Ludlovian Series)

Type section: Named by Satterfield and Thompson (1975), Thompson (1993, p. 50) stated "The type section of the Seventy-Six Shale Member of the Bainbridge Formation is in a stream bank of Clines Branch on the east side of Perry Country Road D, SE¼ corner SE¼ SW¼ sec. 29, T. 35 N., R. 13 E..."

Satterfield and Thompson (1975, p. 115) stated "...the Seventy Six is a green and brick-red, calcareous, partly fissile shale that is extremely glauconitic and contains hematitic 'buttons' that may have been algal in origin. At the type section, the shale is 9 inches thick, the lower 2 inches green, the upper 7 inches brick-red....The thickness...ranges from a few inches near McClure, Illinois, to near one foot at the type section and up to 2 to 4 feet in the subsurface." The Seventy Six Shale overlies the Sexton Creek Limestone of Early Silurian (Llandoverian) age, and is overlain by the middle Silurian (Wenlockian) St. Clair Limestone Member of the Bainbridge Formation.

Severy Formation of Sacfox Subgroup, Wabaunsee Group

Severy shales (**Haworth, 1898**; Adams, 1903) - in Kansas
Severy shale (Beede, 1902; Haworth and Bennett, 1908; Moore, 1936; Moore, et al., 1951) - in Kansas
Severy shale member of Shawnee formation (Hinds and Greene, 1915)
Severy shale member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Severy shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Severy and Howard formations to Nodaway Coal Bed***
Severy shale (Moore, 1932; Condra, et al., 1932; McQueen and Greene, 1938; Branson, 1944b)
Severy shale formation (Condra, 1935; Condra and Reed, 1943, 1959)
Severy shale (Moore, 1948) = ***Severy Formation and Bachelor Creek and Aarde Members of Howard Formation***
Severy formation (Searight and Howe, 1961)
Severy Shale (Landis and Van Eck, 1965) - in Iowa
Severy Shale (Jewett, et al., 1968; French, et al., 1988; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Severy Formation (Burchett, 1970) - in Nebraska
Severy Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Haworth (1898), Ver Wiebe and Vickery (1932, p. 111) stated the Severy Formation was named from "Severy, Greenwood county, Kansas, T. 28s., R. 11e." Haworth (1898, p. 66) also noted, "The town of Severy lies within it and therefore it may be called the Severy shales."

Thompson (1995, p. 127) stated "The Severy Formation is composed of silty, micaceous gray shale in the lower part and thin-bedded to massive sandstone in the upper part. The average thickness of the formation is about 25 ft." The Severy Formation overlies the Coal Creek Limestone Member of the Topeka Formation of the Shawnee Group, and is overlain by the Bachelor Creek Shale Member of the Howard Formation of the Wabaunsee Group.

Seville Formation of Krebs Subgroup, Cherokee Group

Seville cyclical formation (Wanless, 1931) - in Illinois
Seville limestone (Searight, et al., 1953)
Seville limestone member of Krebs formation (Wanless, 1955)
Seville formation (Branson, 1957) - in Kansas
Seville formation (Searight and Howe, 1961)
Seville limestone ("Seville formation") (Hoare, 1961a)
Seville (?) Limestone Member of Krebs Formation (Jewett, et al., 1968) - in Kansas
Seville Limestone Member of Bluejacket Formation (Wanless, 1975)
Seville Formation (Gentile, 1976; Thompson, 1995)
Seville limestone of Seville Formation (Gentile, 1976)
Seville Limestone Member of Krebs Formation (Baars and Maples, 1998) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Baars and Maples (1998, p. 218) located the type section "Southwest bank of Spoon River, SW SW sec. 23, T. 6 N., R. 1 E., Vermont quadrangle, Fulton County, Illinois."

Thompson (1995, p. 98-99) stated "The Seville Formation is a thin, widespread, patchy marine succession at the top of the Krebs Subgroup in Missouri. The most widely identified part of the unit is a pinkish-gray or dark gray to black, finely crystalline, brachiopodal limestone which is commonly a foot or less thick but in some places is as much as 2 ft thick. Locally, as much as 3 ft of calcareous shale below the limestone and as much as 2 ft or more of calcareous fossiliferous shale above the limestone are included in the formation." The thin, pinkish to gray limestone in this unit (**Seville limestone of Seville Formation**) is very widespread. It is not the same unit as the Seville of Illinois, and needs to be renamed. The Seville Formation overlies the Bluejacket Sandstone of the Krebs Subgroup and is overlain by the Weir Shale of the Cabaniss Subgroup

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Sexton Creek Limestone

Sexton Creek limestone (Savage, 1909)
Sexton Creek (Brassfield) limestone (Savage, 1913)
Sexton Creek ("Kankakee of Illinois") (Scobey, 1938)
Sexton Creek limestone (Branson, 1944b) = ***"Joliet Limestone" in northeastern Missouri***
Sexton Creek formation (Martin, et al., 1961a) = ***"Joliet Limestone" in northeastern Missouri***, Sexton Creek in southeastern Missouri
Sexton Creek Limestone (Amsden, 1963) "= Cochrane of Oklahoma"
Sexton Creek Limestone (Thompson and Satterfield, 1975) = ***"Joliett Limestone" in northeastern Missouri***, Sexton Creek in southeastern Missouri
Sexton Creek Formation (Amsden, 1986)
Sexton Creek Limestone (Thompson, 1991, 1993, 1995)
Silurian System (Llandoverian Series)

Type section: The name was proposed by Savage (1909, p. 518) to include all strata in this part of the Mississippi Valley (southwest Illinois) that belonged to the Clinton group. The formation was named for exposures on Sexton Creek, Alexander County, Illinois. Thompson (1993, p. 33) added "The best exposure in this region is along a gravel road that parallels a canal just southwest of the mouth of Sexton Creek, in the E½ NW¼ SW¼ sec. 27, T. 14S., R. 3 W., McClure 7½' Quadrangle."

The Sexton Creek Limestone (Alexandrian, or Llandoverian Series) is overlies the Upper Ordovician Girardeau Limestone or Leemon Formation, and is overlain by the Seventy-Six Shale Member of the Middle and Upper Silurian Bainbridge Formation. Savage (1913a) stated that the Sexton Creek limestone of Illinois and Missouri is equivalent to the Brassfield Limestone of Ohio.

Sexton limestone - An abbreviated form of **Sexton Creek Limestone** employed by Keyes.

Shale Hill Formation of Pleasanton Group - of Howe, (1982)

upper (unnamed) formation of Pleasanton Group (Searight and Howe, 1961)
Shale Hill Formation (Howe, 1982)
"upper unnamed formation" of Pleasanton Group (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Howe (1982) proposed Shale Hill Formation for the unit previously called **"upper unnamed formation"** of the Pleasanton Group. He included three members, the lower Weldon River Sandstone Member (formerly Warrensburg Sandstone), middle Knobtown Limestone Member, and upper Blue Mound Shale Member. This unit is the upper part of the Shale Hill Formation as modified by Watney and Heckel, 1994) and Heckel and Watney (in press)

Shale Hill Formation of Pleasanton Group - of Watney and Heckel (1994) and Heckel and Watney (in press)

Shale Hill Formation (Watney and Heckel, 1994; Heckel and Watney, in press) = ***Lees Summit and Shale Hill formations*** of Howe (1982)
Pennsylvanian System (Missourian Series)

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shale member
"shale member of Orchard Creek ('Maquoketa') Formation" (Sweet, et al., 1959)
Ordovician system (Cincinnatian Series)

Sharpsboro Member
Sharpsboro Member of Dutchtown Limestone (Templeton and Willman, 1963)
Ordovician System (Mohawkian Series)

McQueen (1937) subdivided the Dutchtown Formation at its type section (the Geiser Quarry) into three members, the "upper unnamed member," "Geiser Quarry member," and "lower unnamed member", the units identified from a study of insoluble residues. In 1963, Templeton and Willman (p. 53-54) recognized two members, combining the Geiser Quarry and "upper unnamed member" into the **Sharpsboro Member**, overlying the Gordonville Member below.

Shawnee Group

Shawnee formation (**Haworth, 1898**; Beede, 1902; Moore and Haynes, 1917; Moore, 1920) - in Kansas; ***= Kanwaka - Topeka formations***
Shawnee stage (Haworth and Bennett, 1908) - in Kansas; = ***Kanwaka to Topeka formations***
Shawnee formation (Hinds, 1912; Hinds and Greene, 1915) = ***Kanwaka to Scranton formations***
Shawnee group (Fath, 1921) - in Kansas; = ***Kanwaka to Topeka formations***
Shawnee formation (Condra, 1927) - in Nebraska; = ***Kanwaka to Scranton formations***
Shawnee group (Moore, 1932, 1936; Moore, et al., 1951) - in Kansas; = ***Oread to Topeka formations***
Shawnee group (Condra, et al., 1932) = ***Kanwaka to Scranton formations***
Shawnee formation (Shimer, 1934; Bassler, 1950)
Shawnee group (McQueen and Greene, 1938) = ***Oread to Willard formations***
Shawnee group (Ellison, 1941) = ***Oread to Topeka formations***
Shawnee group (Moore, et al., 1944) = ***Lecompton Formation to Reading Limestone Member of Emporia formation***
Shawnee group (Branson, 1944b) = ***Kanwaka to Emporia formations***
Shawnee group (Moore, 1948) = ***Oread to Topeka formations***
Shawnee group (Searight and Howe, 1961)
Shawnee Group (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Shawnee Group (Jewett, et al., 1968; Heckel, et al., 1979; Baars and maples, 1998) - in Kansas
Shawnee Group (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type area: The name was taken from Shawnee County, Kansas.

Thompson (1995, p. 122) stated "..The group is especially characterized by the relative abundance and greater thicknesses of the limestone beds that are included in it, as compared to the underlying Douglas Group and overlying Wabaunsee Group...The repetition of the sequence and lithology of the component units of the successive formations is striking...Many of these limestones are characterized by the exceptional persistence of their identifying features over very wide areas...The thickness of the Shawnee Group in Missouri ranges from 230 to 250 ft."

Sheffield Formation

Sheffield Formation (Dorheim, et al., 1969) - in Iowa, = ***Grassy Creek and Saverton Shales of Missouri***
Devonian System (Upper Devonian Series)

Sheldon Limestone Member of Topeka Formation, Shawnee Group

Sheldon limestone of Calhoun shale member of Shawnee formation (**Condra, 1930**) - in Nebraska
Sheldon limestone member of Calhoun shale (Moore, 1932, 1936; Condra, et al., 1932; Condra, 1935) = ***Hartford Limestone Member of Topeka Formation***
Sheldon limestone member of Deer Creek limestone (Condra, 1933) - in Nebraska
Sheldon limestone member of Calhoun shale (McQueen and Greene, 1938; Branson, 1944b) = ***Hartford Limestone Member of Topeka Formation***
Sheldon limestone of Topeka limestone formation (Condra and Reed, 1937, 1943, 1959) - in Nebraska
Sheldon limestone member of Topeka formation (Moore, 1948)
Sheldon limestone member of Topeka limestone (Moore, et al., 1951) - in Kansas
Sheldon member of Topeka formation (Searight and Howe, 1961)
Sheldon Limestone Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples) - in Kansas
Sheldon Limestone Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska

Sheldon Limestone Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1930) as the **"Sheldon limestone of Calhoun shale member of Shawnee formation,"** Condra (1949, p. 21) stated the Sheldon was "...named for Sheldon farm and quarry; type locality, one mile + east of Nehawka, Otoe County, Nebraska." It is the fifth member up from the base of the Topeka Formation

Like all of the members of the Topeka Formation, there were several miss-fires in attempts to correlate the various members in Nebraska, resulting in the Sheldon being called "Meadow limestone member," "Curzen limestone member," "Hartfort (Curzon) limestone member," and "Hartford limestone member," before finally stabilizing in Moore, et al. (1951).

Thompson (1995, p. 126) noted, "The Sheldon Limestone Member... consists of a single bed of light-gray limestone, which is composed almost entirely of algal material and shell debris. The member is 1 to 2 ft thick." The Sheldon Limestone Member overlies the Jones Point Shale Member, and is overlain by the Turner Creek Shale Member of the Topeka Formation.

Shepard Mountain Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in sec. 31, T. 34 N., R. 4 E., Iron County, Missouri.

Robertson (*in* Thompson, 1995, p. 10) stated "The Shepard Mountain Rhyolite is a brick-red to dark maroon ash-flow tuff containing white to slightly pink plagioclase phenocrysts and many flamme. It is well exposed on Shepard Mountain. It is approximately 2,000 ft thick."

Sheppards Point Limestone Member

Sheppards Point Limestone Member of Moccasin Springs Formation (Rogers, 1972) = ***upper part of lower carbonate of Moccasin Springs Member of Bainbridge Formation***
Silurian System (Wenlockian and Ludlovian Series)

Rogers (1972) named this member and the overlying **Randol Shale Member** of his Moccasin Springs Formation.

Shiel Clay Physiofacies

Shiel Clay Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter, 1967a) = ***part of Cedar Valley Limestone***
Devonian System (Middle Devonian Series)

Shoemaker Limestone Member

Shoemaker Limestone Member of Cass Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska; = ***Westphalia Limestone Member of Stranger Formation***
Pennsylvanian System (Virgilian Series)

Short Creek Member of Keokuk Limestone

Short Creek oolite member of Boone formation (**Smith and Siebenthal, 1907**)
Short Creek oolite (Bridge, 1917; Branson, 1944b)
Short Creek oolite of Warsaw Formation (Wilson, 1922)
Short Creek oolite of Keokuk formation (Clark, 1941)
Short Creek member of Keokuk formation (Spreng, 1961)
Short Creek Oolite Member of Boone Formation (Gordon, 1966) - in Arkansas?
Short Creek Oolite Member of Keokuk Limestone (Thompson and Fellows, 1970; Thompson, 1986; Thompson and Robertson, 1993)

Short Creek Member of Keokuk Limestone (Thompson, 1995)

Mississippian System (Osagean Series)

Type section: The Short Creek Oolite was named by Smith and Siebenthal (1907) for a thin but persistent bed of oolitic limestone in the upper part of the Keokuk Limestone. They stated (p. 5) "The member is named from Short Creek, a stream flowing westward between the cities of Galena and Empire, [Cherokee County] Kansas, and the type locality is the north bluff of the creek half a mile south of west of the Empire depot and a hundred yards north of the crossing of the Missouri, Kansas, and Texas and Frisco railways." Thompson (1986, p. 95) added "This is just north of the center of the line separating secs. 14 and 15, T. 34 S., R. 25 E...Baxter Springs 7½' Quadrangle."

Smith and Siebenthal regarded the Short Creek to be a member of the Boone formation. Stratigraphically it lies about 100 feet above the Elsey Formation ("Grand Falls chert member"). The term was first used in Missouri by Wilson (1922, p. 58), as the basal unit in the Warsaw Formation. Today the Short Creek Member is defined to mark the top of the Keokuk Limestone. Strata above the Short Creek are by definition part of the Warsaw Formation, although lithologically they are no different than those below the Short Creek. The top of the Short Creek is also the boundary between the Osagean and Meramecian Series in the west and west-central part of Missouri.

Shunganunga shale

Shunganunga shale (Beede, 1898) - in Kansas; = ***Severy Formation?;*** may be = ***to Wabaunsee Group***

Pennsylvanian System (Virgilian Series)

Shut-ins banded ash flow

Shut-ins banded ash flow (Anderson, 1962) = ***Russell Mountain Rhyolite***

Precambrian Erathem

Anderson (1962) used this term for the unit Berry (1976) named the **Russell Mountain Rhyolite**.

Shut-ins fragmental ash flow

Shut-ins fragmental ash flow (Anderson, 1962) = ***Wildcat Mountain Rhyolite***

Precambrian Erathem

Anderson (1962) used this term for the unit Berry (1976) named the **Wildcat Mountain Rhyolite**.

Sibley Coal Bed of Stranger Formation, Douglas Group

Pennsylvanian System (Virgilian Series)

Thompson (1995, p. 121) stated "The coal bed which is tentatively considered to be equivalent to the **"upper Sibley Coal"** of Kansas is present in northwestern Platte County, where it is locally nearly 1 ft thick. Commonly, it is represented only by a thin, carbonaceous streak, or it is identified simply as a coal horizon on the basis of the presence of other members of the immediate succession. An underclay of varying thickness is associated with the coal, or its horizon, at most localities." This underclay (and coal, if present) lie above the base of the Stranger, but below the Westphalia Limestone Member.

Siliceous Cap-rock

Siliceous Cap-rock (Gallaher, 1900)

Cambrian System (Upper Cambrian Series)

This is a term used by Gallaher (1900, p. 98-105) for the fifth and last member of his Upper Cambrian, because it is “the only siliceous limestone in the whole Cambrian Division.”

"silty dolomite zone in upper Bonneterre formation"

"silty dolomite zone in upper Bonneterre formation" (Howe, 1961) = ***Sullivan Siltstone Member of Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Howe (1961) used this term for the unit that was named the Sullivan siltstone Member of the Bonneterre Formation by Kurtz, et al. (1973).

Silurian System

Paleozoic Era

Representing the time and the rocks deposited during of one of the Paleozoic periods, the Silurian System followed the Ordovician System and preceded the Devonian System. In early geologic reports it was called "Upper Silurian." In 1879, Lapworth renamed the "Lower Silurian" the Ordovician System, and thereafter, the Silurian System replaced the "Upper Silurian". Thompson (1995, p. 42) indicated that the Silurian is divided into Lower (Llandoverian Series) and Upper (Wenlockian - Ludlovian Series) Silurian, replacing the earlier North American series, the Alexandrian, Niagaran, and Cayugan Series.

Siluric - A variant of Silurian proposed by Keyes.

Silver Lake Shale Member of Scranton Formation, Sacfox Subgroup, Wabaunsee Group

Silver Lake shale (**Beede, 1898**, 1902) - in Kansas; = ***White Cloud Shale Member through Silver Lake Shale Member of Scranton Formation***

Silver Lake shale of Scranton shale member of Shawnee formation (Condra, 1927) - in Nebraska

Silver Lake shale member of Scranton shale (Moore, 1932; Condra, et al., 1932; Condra, 1935)

Silver Lake shale (Moore, 1936; Moore, et al., 1951) - in Kansas

Silver Lake shale (McQueen and Greene, 1938)

Silver Lake shale member of Scranton shale (Branson, 1944b; Moore and Mudge, 1956)

Silver Lake shale formation (Greene and Searight, 1949)

Silver Lake member of Scranton formation (Searight and Howe, 1961)

Silver Lake Shale (Landis and Van Eck, 1965) - in Iowa

Silver Lake Shale Member of Scranton Shale (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas

Silver Lake Shale Member of Scranton Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska

Silver Lake Shale Member of Scranton Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Originally named by Beede (1898), Moore (1936, p. 214) located the type section in "...the vicinity of Silver Lake, Shawnee county, Kansas."

When originally named (Beede (1898), the Silver Lake shale extended from the middle White Cloud Shale Member of the Scranton Formation to the base of the Bern Formation (the top of the present Silver Lake - all of the Scranton except for the lower White Cloud). Condra (1927) restricted Silver Lake to its present definition.

In Missouri, McQueen and Greene (1938) and Greene and Searight (1949) regarded the Silver Lake as a formation (**Silver Lake shale**), whereas Branson (1944b) and Searight and Howe (1961) saw it as a member of the Scranton Formation. Thompson (1995, p. 129) stated "The Silver Lake Shale Member...consists of gray shale. It is thin in Nodaway County and thickens westward. Where it is exposed, the member is 5 to 10 ft thick." The Silver Lake Shale Member overlies the Rulo Limestone Member of the Scranton Formation, and is overlain by the Burlingame Limestone Member of the Bern Formation.

Silver Mine granite

Silver Mine granite (Graves, 1938)

Precambrian Erathem

This is a term proposed by Graves (1938, p. 119), who stated that there are three types of granite in Ste. Genevieve County on Jonca and Pickle creeks. Along the southern border of the main mass there is a medium-grained, red granite which is distinguished from the rest of the granite by its heavy mineral assemblage. The name **Silver Mine granite** was used for this rock. Presumably the name was derived from the locality of Silver Mine.

Silvermine Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Precambrian Erathem

Type section: Tolman and Robertson (1969) named this unit for the area called Silvermine, where it is extensively exposed along the St. Francis River, Madison County, Missouri.

Robertson (*in* Thompson, 1995, p. 12) noted " The Silvermine Granite together with the Knoblick and Slabtown Granites comprise a complex ring structure...The Silvermine is widely exposed along the St. Francis River from Silvermines to a point several mines [*sic.*] northwest."

Sinsinawa Member

Sinsinawa Member of Wise Lake Formation of Kimmswick Subgroup (Templeton and Willman, 1963) = ***upper Kimmswick Limestone***

Ordovician System (Mohawkian Series)

This unit was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Skiatook group

Skiatook group (Moore, 1949) - in Kansas and Oklahoma; = ***Bronson Subgroup of Kansas City Group?***

Pennsylvanian System (Missourian Series)

Skrainka diabase

Skrainka diabase (Keyes, 1915)

Precambrian Erathem

This term was used by Keyes (1915, p. 254) for diabases he regarded as being younger than the Iron Mountain porphyry and older than the Pilot Knob conglomerate. It was named for the old post office at Skrainka, southwest of Mine LaMotte Station, Madison County, Missouri.

Slabtown Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Slabtown granite (Tolman and Robertson, 1969)

Slabtown Granite (Robertson, *in* Thompson, 1995)

Precambrian Erathem

Type section: The Slabtown Granite was named by Tolman and Robertson (1969, p. 34) "...from exposures southwest and east of Slabtown, 33N-6E: [sec.] 1d, about 2½ miles northwest of Fredericktown in St. Francois County.

Tolman and Robertson (1969, p. 34) added "Most exposures of Slabtown granite are limited to the southeast part of 34N-6E except for an area on Buckner Mountain and Mt. Devon, 33N-6E; 14 and 23."

Sloan Valley formation

Sloan Valley formation (Brokaw, 1916) - in Illinois; = ***Glen Dean Limestone***,

Mississippian System (Chesterian Series)

Smithton Dense Limestone Physiofacies

Smithton Dense Limestone Physiofacies of Cooper Lithofacies of Cedar City Formation (Fraunfelter,1967a)

= part of Cedar Valley Limestone

Devonian System (Middle Devonian Series)

Smithville Dolomite

Smithville formation (**Branner, 1929**; Martin, et al., 1961a)
Smithville-Black Rock formations (McQueen, 1931b) = lower part
Smithville Formation (Stinchcomb, 1986)
Smithville Dolomite (Thompson, 1991, 1995)

Ordovician System (Ibexian Series)

Type section: The formation was differentiated by Ulrich and the name first published by G.C. Branner (1929) on the geologic map of Arkansas. The name is derived from Smithville, Lawrence County, Arkansas.

The Smithville Dolomite overlies the Powell Dolomite and underlies the Black Rock Formation. McQueen (1931), in his work on insoluble residues in Missouri, published a columnar section including the Smithville Dolomite. It is uncertain if true Smithville exists in Missouri.

Sniabar Limestone Member of Hertha Formation, Bronson Subgroup

Sniabar limestone member of Swope formation (**Jewett, 1932**) - in Kansas
Sniabar (Hertha) limestone formation (Condra, 1935) = ***Hertha Formation***
upper limestone of Sniabar (Hertha) limestone formation (Condra, 1935) = ***Sniabar Limestone Member***
lower limestone of Sniabar (Hertha) limestone formation (Condra, 1935) = ***Critzer Limestone Member***
Sniabar of Hertha limestone (Moore, 1936) - in Kansas
Sniabar limestone member of Hertha formation (Greene and Searight, 1949)
Sniabar limestone member of Hertha limestone (Moore, et al., 1951) - in Kansas
Sniabar member of Hertha formation (Searight and Howe, 1961)
Sniabar Member of Hertha Formation (Payton, 1966)
Sniabar Limestone Member of Hertha Limestone (Jewett, et al., 1968; Watney, et al., 1989; Pabian and Diffendal, 1989; Watney and Heckel, 1994; Baars and Maples, 1998) - in Kansas
Sniabar Limestone Member of Hertha Formation (Gentile, 1976; Thompson, 1995)
Sniabar Limestone Member of Coffeyville Formation (Watney, et al., 1989) - in southern Kansas

Pennsylvanian System (Missourian Series)

Type section: Jewett (1932, p. 101) named the Sniabar ..."to replace the term "Hertha" as has been used for the limestone at the base of the Kansas City formation at Kansas City..." It was named for Sni-A-Bar Creek just east of Kansas City in Johnson County, Missouri.

Thompson (1995, p. 112) stated "The Sniabar Limestone Member...is the most conspicuous unit of the Hertha. It is composed of a succession of limestone beds, the lowest of which is particularly massive and brown-weathering. Locally, as in parts of Jackson County, bioherms in the upper part of the Sniabar increase its thickness...The Sniabar member is about 10 ft thick." The Sniabar limestone overlies the Mound City Shale Member of the Hertha Formation and is overlain by the Elm Branch (Ladore) Shale.

Sni Mills Limestone Member of Lenapah Shale (Lost Branch Formation), Appanoose Subgroup, Marmaton Group

Sni Mills limestone (**Greene, 1936**; Clair, 1943)
Sni Mills limestone (Cline, 1941) "= Cooper Creek limestone of Iowa"
Sni Mills limestone member of Lenapah formation (Greene and Searight, 1949; Cline and Greene, 1950)
Sni Mills limestone member of Lenapah formation (Howe, 1953) = ***Idenbro Limestone Member of Lenapah Formation***
Sni Mills member of Lenapah formation (Searight and Howe, 1961)
Sni Mills Limestone Member of Lenapah Formation (Gentile, 1976; Thompson, 1995) = ***Idenbro Limestone Member of Lenapah Formation***
Sni Mills Limestone Member of "Lost Branch" Formation (Ravn, et al., 1984) - in Iowa
Sni Mills Limestone Member of "Lost Branch" Formation (Heckel, 1984) - in Kansas
Sni Mills Limestone Member of Lost Branch Formation (Heckel, 1991)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Greene (1936), Howe (1953, p. 21) stated the type section is "In NW¼ sec. 28, T. 48 N., R. 29 W., in drainage just east of town of Sni Mills, in southeastern Jackson County, Missouri."

Thompson (1995, p. 109) added "The Sni Mills Limestone member...is typically a light- to medium-gray, medium- to finely crystalline limestone, which contains dark-gray calcite veinlets...Cone-in-cone structure is commonly associated with it. The unit is absent in many places south of the Missouri River...The Sni Mills varies in thickness from a featheredge to 2.5 ft; it probably averages 8 in or less." The Sni Mills overlies the Perry Farm Member of the Lenapah Shale, and is overlain by the Holdenville Shale.

Snyder Creek Shale

Snyder Creek Shales (**Gallaher, 1900**)
Snyder shales (Keyes, 1902)
Snyder Creek shale (Branson, 1922; Kindle and Miller, 1939; Branson, 1944a; Unklesbay, 1952b; McAlester, 1963)
Snyder Creek formation (Branson, 1941; Koenig, 1961a)
Snyder Creek Formation (Unklesbay, 1952a; Waring, 1971)
Snyder Creek Shale (Schumacher, 1972; Pitrat, 1977; Huddle and Repetski, 1981; Thompson, 1993, 1995)

Devonian System (Upper Devonian Series)

Type section: Thompson (1993, p. 145) stated "The Snyder Creek Shale was named [by Gallaher, 1900] from exposures on Snyder Creek in sections 17, 18, and 20, T. 46 N., R. 9 W., Callaway County, Missouri..."

A lower Upper Devonian formation, the Snyder Creek Shale overlies the Cedar Valley Limestone in central Missouri. Swallow (1860, p. 635-660) described several species of fossils from the Snyder Creek shale of Callaway County, but called the shales "Hamilton." Gallaher (1900, p. 153) first called attention to the formation and named it the Snyder Creek shale. Greger (1909, p. 375) called this shale the "Craghead Creek shale." Snyder Creek strata unconformably underlie Mississippian strata, and conformably overly the Middle Devonian Cedar Valley Limestone. The uppermost beds in some areas are a cherty, dark-brown limestone.

Snyder shale - An abbreviated form of ***Snyder Creek Shale*** employed by Keyes.

Snyderville Shale Member of Oread Formation, Shawnee Group

Snyderville shale of Oread limestone member of Douglas formation (**Condra, 1927**) - in Nebraska
Synderville shale member of Oread limestone (Moore, 1932)
Snyderville shale member of Oread limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Snyderville shale of Oread formation (Condra and Scherer, 1939) - in Nebraska

Snyderville member of Oread formation (Searight and Howe, 1961)
Snyderville Shale Member of Oread Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Snyderville Shale Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Snyderville Shale Member of Oread Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 38) named the Snyderville Shale "...from exposures in Heebner Creek east of the Snyderville Quarry located between 3 and 4 miles west of Nehawka, Nebraska..."

Thompson (1995, p. 123) stated "The Snyderville Shale Member is a gray shale. It is reported to include a maroon zone at or near the base in Buchanan and Andrew counties. The member has an average thickness of about 10 ft." The Snyderville Shale Member overlies the Toronto Limestone Member and is overlain by the Leavenworth Limestone Member of the Oread Formation.

Soapstone coal
Soapstone coal (Greene and Pond, 1926) = ***Croweburg Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Soldier Creek Shale Member of Bern Formation, Nemaha Subgroup, Wabaunsee Group

Soldier Creek shale (**Beede, 1898**) - in Kansas
Soldier Creek shale member of Willard shale (Branson, 1944b)
Soldier Creek shale of Humphrey shale member of Wabaunsee formation (Condra, 1927) - in Nebraska
Soldier Creek shale member of Humphrey Creek shale (Moore, 1932)
Soldier Creek shale member of Nemaha limestone (Condra, et al., 1932) - in Nebraska
Soldier Creek shale formation (Condra, 1935) - in Nebraska
Soldier Creek shale (Moore, 1936; Moore, et al., 1951)
Soldier Creek shale (McQueen and Greene, 1938; Moore, 1948)
Soldier Creek shale member of Bern limestone (Moore and Mudge, 1956)
Soldier Creek member of Bern formation (Searight and Howe, 1961)
Soldier Creek Shale (Landis and Van Eck, 1965) - in Iowa
Soldier Creek Shale Member of Bern Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Soldier Creek Shale (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Soldier Creek Shale Member of Bern Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Originally named by Beede (1898), Moore (1936, p. 218) stated the type section was "Not designated, but presumably it is on 'Big and Little Soldier creeks about 3 miles from Silver Lake,' Shawnee county, Kansas."

In Missouri, McQueen and Greene (1938) called this unit the **Soldier Creek shale,** Branson (1944b) the **Soldier Creek shale member of the Willard shale,** and Searight and Howe (1961) the **Soldier Creek member of the Bern formation.**

Thompson (1995, p. 129) added "The Soldier Creek Shale Member... contains gray shale in the lower part and calcareous claystone in the upper part. The member is 3 to 4 ft thick." The Soldier Creek Shale Member overlies the Burlingame Limestone Member, and is overlain by the Wakarusa Limestone Member of the Bern Formation.

Solon Member
Solen (*sic.*) limestone (Keyes, 1940b, 1941b, 1941f)
Solon Member of Cedar Valley Formation (Bunker, et al., 1985) - in Iowa
Solon Member of Little Cedar Formation of Cedar Valley Group (Bunker and Witzke, 1992) - in Iowa
Devonian System (Middle Devonian Series)

The term Solon limestone was used in Iowa originally by Norton (1897, p. 148) and was named for Solon, Johnson County, Iowa. Keyes (1941b, p. 156) proposed the name "Solen" for the lowermost formation in his Linnian series of Late Yorkic age. The Solon has been regarded as the lowest member of the Cedar Valley Formation in Iowa (Bunker, et al., 1985), and most recently (Bunker and Witzke, 1992) as the Solon Member of the Little Cedar Formation of the Cedar Valley Group.

South Bend Limestone Member of Stanton Formation, Lansing Group

South Bend limestone member of Braddyville formation (Condra and Bengston, 1915) - in Nebraska
South bend limestone member of Scranton shale (Condra, 1927) - in Nebraska)
South Bend limestone member of Stanton limestone (Condra, 1930) - in Nebraska
South Bend limestone member of Stanton limestone (Moore, 1932; Moore, 1937; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
South Bend or Little Kaw limestone member of Stanton limestone (McQueen and Greene, 1938)
South Bend limestone of Stanton formation (Condra and Scherer, 1939) - in Nebraska
South Bend ("Little Kaw") limestone of Stanton limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
South Bend limestone member of Stanton limestone (Branson, 1944b)
South Bend member of Stanton formation (Searight and Howe, 1961)
South Bend Limestone Member of Stanton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
South Bend Limestone Member of Stanton Limestone (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
South Bend Limestone Member of Stanton Formation (Kidder, 1985; Howe, 1986; Thompson, 1995)
South Bend Limestone Member of Stanton Limestone (Goebel, et al., 1989) - in Iowa and Nebraska

Pennsylvanian System (Missourian Series)

Type section: Condra and Bengston (1915) named the South Bend as a member of the "Braddyville formation." The type section was a (p. 23) "Limestone 8 to 9 feet thick exposed near South Bend and other localities in the Platte Valley, Neb. Classed as a member of the Braddyville (Calhoun-Topeka) formation."

Named originally as a member of the Braddyville formation in Nebraska, Condra (1930) later placed the South Bend in the Stanton limestone. Newell (1936) and Moore (1936) called this unit the **"Little Kaw limestone Member of the Stanton formation"** in Kansas. McQueen and Greene (1938) called it the **"South Bend or Little Kaw limestone member of the Stanton limestone."** Thompson (1995, p. 119) stated "The South Bend Limestone Member...comprises from one to three thin limestone layers and interbedded shale. The lower part of the basal limestone bed typically is arenaceous In southern Clay and Platte counties, the member locally is absent owing to pre-Virgilian erosion, and its position is occupied by the Tonganoxie Sandstone Member of the Stranger Formation. Elsewhere in northwestern Missouri the South Bend Member is persistent and is from 3 to 5 ft thick." The South Bend overlies the Rock Lake Shale Member of the Stanton Formation, and is overlain by the basal beds of the Pedee Group, the Weston Shale.

South Fork Limestone Member

South Fork Limestone Member of Burlingame Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska

Pennsylvanian System (Virgilian Series)

South Mound Shale Member of Hepler Formation, Pleasanton Group - of Watney and Heckel (1994) and Heckel and Watney (in press)

South Mound Shale Member of Seminole Formation, Pleasanton Group - of Howe (1982)

South Mound Shale Member of Seminole Formation (Emery, 1962) - unpublished, in Kansas
South Mound Shale Member of Seminole Formation (Jewett, et al., 1965, 1968; Baars and Maples, 1998) - in Kansas

South Mound Shale Member of Seminole Formation (Howe, 1982)
South Mound Shale (Heckel, 1991)
Pennsylvanian System (Missourian Series)

The **South Mound Shale Member of the Seminole Formation** was proposed by Emery (1962) from sections near the town of South Mound in Neosho County, Kansas. Jewett, et al. (1965, p. 6) stated "The new name 'South Mound Shale Member' (Emery, 1962) is applied to strata in the Seminole Formation that lie above the Hepler Sandstone Member and below the Checkerboard Limestone [Exline Limestone?]." Watney and Heckel (1994) defined the South Mound as the upper member of the Hepler Formation.

Spavinaw granite-rhyolite terrane

Precambrian Erathem

Robertson (*in* Thompson, 1995, p. 5) stated "The 1.35 to 1.4 Ga old anorogenic **Spavinaw granite-rhyolite terrane** abuts against the St. Francois terrane at the Bolivar-Mansfield Tectonic Zone although the contact is somewhat transitional. It underlies southwest Missouri and extends only into the adjacent states of Kansas, Oklahoma, and Arkansas. It is known only in the subsurface in Missouri, but crops out at Spavinaw, Oklahoma. The rocks of this terrane are very similar to those of the St. Francois terrane."

Spechts Ferry Formation of Decorah Group

Spechts Ferry formation ("Decorah" of Missouri) (Kay, 1929a) = ***Glencoe Shale Member of Spechts Ferry Formation***
Spechts Ferry member of Decorah formation (Herbert, 1949; Larson, 1951)
Spechts Ferry member of Platteville formation (Kay, 1954)
Spechts Ferry Formation of Decorah Subgroup (Templeton and Willman, 1963; Willman and Kolata, 1978; Kolata, et al., 1984; Kolata, et al., 1986) - in Illinois and Missouri
Spechts Ferry Formation of Decorah Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: The Spechts Ferry Formation was named by Kay (1929). Templeton and Willman (1963, p. 105-106) located the type section as "...along a ravine just southwest of the Chicago, Milwaukee, St. Paul, and Pacific Railroad station... Dubuque, County, Iowa.

Other than Larson (1951), Templeton and Willman (1963), and then Thompson (1991) first identified the Spechts Ferry Formation in Missouri. Thompson (1995, p. 34) stated "The shale of the Spechts Ferry (Glencoe) is the unit that has previously been regarded as 'Decorah.' The Kings Lake and Guttenberg Limestones were first used formally in Missouri by Templeton and Willman (1963), who regarded the Decorah as a 'subgroup.' Thompson (1991) followed this concept, but defined the Decorah as a 'group.'"

The Spechts Ferry has two members, the lower Castlewood Limestone and upper Glencoe Shale. The base of the formation, and the group, is defined by the **Deicke K-bentonite bed**. The Spechts Ferry Formation overlies the Macy Limestone of the Plattin Group, and is overlain by the Kings Lake Limestone of the Decorah Group.

Spencer chert

Spencer chert (Scherer, 1905) = ***Ordovician System***
Ordovician System

This was a term used by Scherer (1905, p.59) for a local outcrop just north of the Decaturville Hotel, on the road from Decaturville, Camden County to Lebanon, of chert and limestone differing from any in the district. Ulrich, from certain fossils discovered, designated it as a chert from of the Maquoketa which Shepard has named Spencer chert. Shepard (letter dated Jan. 29, 1916) stated that he never published this name but used it provisionally in carbon prints given to his students for field work.

Spergen (Spergen Hill) limestone

Spergen Hill limestone (Ulrich, 1904a) = ***Salem Formation***
Spergen limestone (Buehler, 1907; Keyes, 1938b) = ***Salem Formation***
Salem (Spergen) limestone (Willis, 1912)
Spergen (Salem) limestone (Weller and St. Clair, 1928)
Salem limestone (Spergen limestone) (Branson, 1944b)
Salem ("Spergen") formation (Spreng, 1961)
Mississippian System (Meramecian Series)

Ulrich (1904a) proposed the name "Spergen Hill" for the formation previously called the "Bedford limestone" (proposed by Hopkins and Siebenthal, 1896, in Indiana, but preoccupied) and now called Salem Formation (proposed by Cumings in 1901, for the same formation in Indiana). The term was later shortened to Spergen limestone, and that term and the term Salem have both been used by many authors. The name was derived from a famous fossil locality, Spergen Hill, Washington County, Indiana.

Spring Branch Limestone Member of Lecompton Formation, Shawnee Group

Spring Branch Limestone of Lecompton limestone member of Shawnee formation (**Condra, 1927**) **-** in Kansas
Spring Branch limestone member of Lecompton limestone (Moore, 1932)
Spring Branch limestone member of Lecompton limestone (Moore, 1936; Moore, et al., 1951) **-** in Kansas
Spring Branch member of Lecompton formation (Searight and Howe, 1961)
Spring Branch Limestone Member of Lecompton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Spring Branch Limestone Member of Lecompton Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) **-** in Kansas
Spring Branch Limestone Member of Lecompton Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Spring Branch Member was named by Condra (1927), who noted (p. 47) "The *Spring Branch Limestone* or basal unit of the Lecompton...[is] not found exposed in Nebraska..." Moore (1936, p. 173) stated the type section was named from "Spring Branch, north of Big Springs, Douglas County, Kansas. Typically exposed in bluff at west edge of Lecompton, near NW cor. sec. 35, T. 11 S., R. 18 E., and in road cut near center S. line sec. 36, T. 11 S., R. 17 E."

Thompson (1995, p. 124) stated "The Spring Branch Limestone Member...is a dark-gray, massive, argillaceous limestone that weathers to a dark-buff. The member is 5 to 7 ft thick." The Spring Branch Limestone Member overlies the Stull Shale Member of the Kanwaka Formation, and is overlain by the Doniphan Shale Member of the Lecompton Formation.

Springfield (No. 5) coal

Springfield (No. 5) coal (Searight, 1959) - in Illinois; = ***Summit Coal Bed of Little Osage Shale***
Pennsylvanian System (Desmoinesian Series)

Spring Hill Limestone Member of Plattsburg Formation, Lansing Group

Spring Hill limestone member of Plattsburg limestone (**Newell, *in* Moore, 1932**; Moore, et al., 1951) **-** in Kansas
Spring Hill limestone of Plattsburg formation (Condra and Scherer, 1939) **-** in Nebraska
Spring Hill member of Plattsburg formation (Searight and Howe, 1961)
Spring Hill Limestone Member of Plattsburg Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska
Spring Hill Limestone Member of Plattsburg Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas
Spring Hill Limestone Member of Plattsburg Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 129) located the type section at "Spring Hill, railroad cut near center E. side sec. 14, T. 15 S., R. 23 E., southern Johnson county, Kansas."

Thompson (1995, p. 117) stated "Where it is typically developed, the Spring Hill Limestone member...contains a thin, basal, sponge-bearing limestone bed, which is overlain by thicker limestone beds that are commonly extremely fossiliferous and separated by pronounced shale partings. The uppermost part...is siliceous, hard, and slabby in many areas. The member commonly contains dark-gray chert and is 10 to 20 ft thick. It has been quarried at a number of localities in the state for riprap and road surfacing material." The Spring Hill Limestone Member overlies the Hickory Creek Shale Member of the Plattsburg Formation, and is overlain by the Vilas Shale.

Spring River sandstone

Spring River sandstone (White, 1899) = ***Aux Vases Sandstone***

Mississippian System (Chesterian Series)

Spring Rock limestone

Spring Rock limestone (Swallow, 1866; Beede, 1898) = ***Howard Formation?***

Pennsylvanian System (Virgilian Series)

Squirrel Sandstone Member of Lagonda Formation, Cabaniss Subgroup, Cherokee Group

Squirrel sand zone of Cherokee formation (**Greene, 1933**) - in Oklahoma
"Squirrel" sand (Prue) (Bailey, 1935; Bartle, 1938)
Squirrel sandstone of Henrietta group (McQueen, 1943; Moore, 1948)
Squirrel sand zone of Upper Cherokee formation (Clair, 1943)
"Squirrel" sandstone of Breezy Hill cyclothem (Moore, et al., 1951) - in Kansas
"Squirrel" sandstone member of Lagonda formation (Unklesbay, 1952a)
Squirrel sandstone of Lagonda formation (Searight, 1955)
"Squirrel" ("true") sandstone (Anderson and Wells, 1968)
"Squirrel" sandstone (Wells and Anderson, 1968)
"Squirrel" sandstone of Lagonda Formation (Gentile, 1976)

Pennsylvanian System (Desmoinesian Series)

Type section; No type section was ever designated, the unit was named from subsurface strata in Oklahoma by Greene (1933).

Pierce and Courtier (1938, p. 32) stated "Drillers have applied the name ' Squirrel sand' to the sandstone near the top of the Cherokee shale, because of the manner in which it 'jumps around', that is, varies in distance below the limestone markers above it."

Stanton Formation of Lansing Group

Stanton limestone (Swallow, 1865, 1867) = ***Plattsburg Formation***
Stanton limestone (Beede, 1898) = ***Bern Formation of Wabaunsee Group***
Stanton limestone (Keyes, 1900b, 1901b, 1941f; Adams, 1903 = ***Plattsburg to Stanton formations (Lansing Group)***
Stanton limestone (**Haworth and Bennett, 1908**) - in Kansas; = ***Stanton Formation***
Stanton limestone member of Wann formation (Ohern, 1910) - in Oklahoma
Stanton limestone member of Lansing formation (Hinds and Greene, 1915)
Stanton limestone member of Lansing formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Stanton limestone member of Lansing formation (Condra, 1927) - in Nebraska
Stanton limestone (5 members) (Moore, 1932)
Stanton limestone (5 members) (Condra, et al., 1932; McQueen and Greene, 1938; Branson, 1944b)
Stanton limestone (5 members) (Moore, 1936; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Stanton formation (5 members) (Condra and Scherer, 1939) - in Nebraska

Stanton limestone (3 members) (Clair, 1943)
Stanton formation (5 members) (Searight and Howe, 1961)
Stanton Formation (5 members) (Burchett and Reed, 1957; Burchett, 1970, 1971) - in Nebraska
Stanton Limestone (5 members) (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998)
Stanton Formation (Kidder, 1985)
Stanton Formation (5 members) (Howe, 1986; Thompson, 1995)
Stanton Limestone (3 members studied) (Goebel, et al., 1989) - in Iowa and Nebraska
Stanton Limestone (7 members) (Watney and Heckel, 1994; Heckel and Watney, in press) - in Kansas
Pennsylvanian System (Missourian Series)

Type section: Swallow (1865) originally proposed the name Stanton limestone for what turned out to be the Plattsburg formation. Haworth and Bennett (1908) redefined the name Stanton to the current definition of those limestone and shale beds between the Vilas Shale and Weston Shale. Moore (1936, p. 112) located the type section at "Stanton, Miami county, Kansas, but name has been shifted by usage to limestone next above that exposed at Swallow's type locality. Typically exposed in roadcuts near SE cor. sec. 3, T. 13 S., R. 21 E., and adjacent area along Captain Creek."

Thompson (1995, p. 118) stated "The Stanton Formation contains the following members (from the base upward): the Captain Creek, Eudora, Stoner, Rock Lake, and South Bend. Parts or all of the formation have been removed by pre-Virgilian erosion in some places, and the basal sandstone unit of the Virgilian Series, the Tonganoxie Sandstone Member, lies upon the eroded surface. The average thickness of the Stanton is about 35 ft." The Stanton Formation overlies the Vilas Shale, and is overlain by the Tonganoxie Sandstone Member, or the Weston Shale.

Watney and Heckel (1994) and Heckel and Watney (in press) have proposed that the Weston Shale and Iatan Limestone (Pedee Group) be placed within the Stanton Formation, eliminating the Pedee Group from their nomenclature.

Stark Shale Member of Dennis Formation, Bronson Subgroup, Kansas City Group

Stark shale member of Dennis formation (**Jewett, 1932**) - in Kansas
Stark shale member of Galesburg shale (McQueen and Greene, 1938; Branson, 1944b)
Stark shale of Dennis Formation (Condra and Scherer, 1939) - in Nebraska
Stark shale of Dennis limestone (Ellison, 1941)
Stark shale member of Dennis limestone (Clair, 1943)
Stark shale member of Dennis limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Stark shale of Dennis formation (Searight and Howe, 1961)
Stark Member of Dennis Formation (Payton, 1966)
Stark Shale Member of Dennis Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Stark Shale Member of Dennis Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Stark Shale Member of Dennis Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Named by Jewett (1932), Moore (1936, p. 92) described the type section as "Near Stark, Neosho county, Kansas. Typical exposures found in SE¼ sec. 18, T. 27 S., R. 21 E., and NW¼ sec. 28, T. 27 S., R. 20 E."

Thompson (1995, p. 114) stated "The Stark Shale Member ...is a dark-gray to black, fissile shale that grades upward into medium-gray shale. It is about 4 ft thick." The middle member of the Dennis Formation, the Stark Shale Member overlies the Canville Limestone Member, and is overlain by the Winterset Limestone Member.

Starved Rock Member of St. Peter Sandstone

Starved Rock Sandstone Member of St. Peter Sandstone (Templeton and Willman, 1963) - in Illinois
Starved Rock Sandstone (Okhravi and Carozzi, 1983; Nunn, 1986)
Starved Rock Member of St. Peter Sandstone (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 46) named the Starved Rock Member from Starved Rock State Park, north-central Illinois. They located the type section (p. 226) as "Exposures at Starved Rock, Lovers' Leap and French Canyon, in Starved Rock State Park, LaSalle County, Illinois..."

Templeton and Willman (1963, p. 47) stated "The Starved Rock Member consists of sandstone that closely resembles the underlying sandstone in the Tonti Member, but is consistently coarser grained." Thompson (1991, p. 77-78) noted that although "Not present in outcrop in Missouri, except possibly for a few small isolated exposures near Dutchtown in southern Cape Girardeau County, the Starved Rock Member...is an elongate sand body that extends through the subsurface of northern Missouri..., [and is] a continuation of the Starved Rock of northern Illinois."

Stephens Forest Formation

Stephens Forest Formation (Ravn, et al., 1984) - in Iowa; = ***post-Summit Coal Bed Little Osage Shale and Higginsville Limestone of Fort Scott Subgroup***

Pennsylvanian System (Desmoinesian Series)

Stephensport

Stephensport (Cumings, 1922) = ***middle units of the Chesterian Series***

Mississippian System (Chesterian Series)

This term was proposed by Cumings (1922, p. 514, footnote), although initially suggested to Prof. Weller, for the middle Chester, including all rocks between the top of the Glen Dean limestone and the base of the Cypress sandstone; however, Weller preferred to use "middle Chester". Derivation of the name was not stated, but it probably was named from Stephensport, Breckinridge County, Kentucky.

Stewartville

Stewartville Member of Wise Lake Formation of Kimmswick Subgroup (Templeton and Willman, 1963) = ***upper part of Kimmswick Limestone***

Stewartville Dolomite of Galena Group (Kay, 1970)

Ordovician System (Mohawkian Series)

This unit was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois- southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Stice coal

"Stice" coal (Pierce and Courtier, 1938) - in Kansas; = ***Bevier Coal Bed***

Stice coal of Stice cyclothem (Moore, 1949) - in Kansas; = ***Bevier Coal Bed***

Pennsylvanian System (Desmoinesian Series)

Stillman Member

Stillman Member of Grand Detour Formation (Templeton and Willman, 1963; Willman and Kolata, 1978) ***= upper part of Beckett Limestone of Plattin Group***

Ordovician System (Mohawkian Series)

Stoner Limestone Member of Stanton Formation, Lansing Group

Stoner limestone of Howard limestone member of Shawnee formation (**Condra, 1930**) - in Nebraska

Stoner limestone member of Stanton limestone (Condra, et al., 1932)

Stoner or Olathe limestone member of Stanton limestone (McQueen and Greene, 1938)

Stoner limestone of Stanton formation (Condra and Scherer, 1939) - in Nebraska

Stoner ("Olathe") limestone of Stanton limestone formation (Condra and Reed, 1943, 1959) - in Nebraska

Stoner limestone member of Stanton formation (Moore, 1948)

Stoner limestone member of Stanton limestone (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Stoner limestone (Sohn, 1960)
Stoner member of Stanton formation (Searight and Howe, 1961)
Stoner Limestone (Sohn, 1962)
Stoner Limestone Member of Stanton Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Stoner Limestone Member of Stanton Limestone (Jewett, et al., 1968; Heckel, 1975; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Stoner Limestone Member of Stanton Formation (Howe, 1986; Thompson, 1995)
Stoner Limestone Member of Stanton Limestone (Goebel, et al., 1989) - in Iowa and Nebraska
Pennsylvanian System (Missourian Series)

Type section: The name Stoner was proposed by Condra (1930, p. 11), "...the type locality being on the Stoner farm located northwest of South Bend [Nebraska]."

Thompson (1995, p. 119) stated "Most of the limestone beds of the Stoner Limestone Member...are light-gray and thin-bedded, but the topmost bed of the member is massive to rubbly, drab or buff limestone, 1 to 2 ft thick. The middle part of the member contains an abundance of fusuline foraminifera at most localities, and other fossils are commonly present. A small amount of gray chert is present in the member at some localities. The Stoner is extensively quarried in northwestern Missouri for concrete aggregate and road surfacing material. The average thickness of the member is about 15 ft." The Stoner Limestone Member, called the **Olathe Limestone Member** by several authors in Kansas (Moore, 1936), overlies the Eudora Shale Member, and is overlain by the Rock Lake Shale Member of the Stanton Formation.

Stones River limestone
Stones River limestone (Weller and McQueen, 1939) = ***"Pecatonica Formation"***
Ordovician System (Mohawkian Series)

The **Stones River group** was used by Safford (1851, p. 353-356) for fossiliferous limestones of Chazyan age which he divided for convenience into three members, named (ascending) Stones River beds, Lower Lebanon limestone, and upper Lebanon limestone. It was named for exposures on Stones River, in the vicinity of Nashville, Tennessee.
The term "Stones River" was used in Missouri by McQueen (1939, p. 63-64) for beds which Ulrich (1939, p. 105-109) correlated with the Murfreesboro limestone of the Stones River group in Tennessee. Bridge (oral communication to McQueen, September 5, 1941) correlated these beds with the Ridley formation of the Stones River group. These beds are now included in the "Pecatonica Formation" of eastern Missouri (Thompson, 1991, p. 105).

Stono Granite of St. Francois Mountains Intrusive Suite, Plutonic Rocks

Stono granite (Tolman and Robertson, 1969)
Stono Granite (Robertson, *in* Thompson, 1995)
Precambrian Erathem

Type section: Tolman and Robertson (1969, p. 36) stated "The Stono granite is named from exposures on Stono Mountain, 36N-4E; [sec.] 25b, St. Francois County."

They added "The Stono and Slabtown granites are very similar. The Stono granite is typically a fine grained, mottled, dull reddish-brown and green granite, in places porphyritic."

Stotler Formation of Richardson Subgroup, Wabaunsee Group

Stotler limestone (Moore and Mudge, 1956)
Stotler formation (2 members) (Searight and Howe, 1961)
Stotler Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970) - in Nebraska
Unnamed Member of Stotler Formation (Burchett and Reed, 1967) - in Nebraska; = ***Dry Shale Member of Stotler Formation***

Stotler Limestone (3 members) (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Stotler Formation (2 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: The Stotler Formation was named by Moore and Mudge (1956, p. 2275) who stated "The formation is named from the old Stotler Post Office which was in the SW.¼ of Sec. 10, T. 16 S., R. 13 E., Lyon County, Kansas...The type section is in the spillway and along the south side of a pond in the SE.¼ of Sec. 13, T. 16 S., R. 12 E. It is north of U.S. Highway 50 North and about 2 miles west of Miller."

Until 1956, members of the Stotler Formation were assigned to the upper part of the **McKissick Grove shale**. Thompson (1995, p. 130-131) stated "Where the Stotler Formation is complete, it consists of three members (from the base upward): the Dover, Dry, and Grandhaven. The uppermost member [Grandhaven] is a limestone where it is typically developed outside the state, but in Missouri the presence of the limestone has not been established. Instead, a red clay, which lies at the top of the Dry Member in Atchison County, is considered to be at the approximate stratigraphic position of the Grandhaven Member." The Stotler Formation overlies the Pillsbury Shale, and other than the Indian Cave Sandstone, is the uppermost Pennsylvanian unit in the state.

<u>Stouts Creek</u>
Stouts Creek rhyolite (Tolman and Robertson, 1969)
Unit A, tuff of Stouts Creek (Anderson, 1970) = ***Buck Mountain Shut-ins Formation***
Unit B, tuff of Stouts Creek (Anderson, 1970) = ***Lindsey Mountain Rhyolite***
Precambrian Erathem

Tolman and Robertson (1969, p. 20) stated "The Stouts Creek rhyolite is the most extensive unit that has been mapped with outcrops extending 26 miles north and south and 25 miles east and west...Good exposures are present in a great many localities...Exposures at Stouts Creek shut-ins...in the NW corner, Lot 2, 33N-4E: [sec.] 2b, have been designated as the type locality."

Stranger Formation of Douglas Group

Stranger formation (**Newell, *in* Moore, 1932**; Newell, 1936) - in Kansas
Stranger formation (5 members) (Moore, 1936; Moore, et al., 1944) - in Kansas; = ***Stranger members and basal Lawrence Shale ("Robbins Shale")***
Stranger formation (2 members) (McQueen and Greene, 1938)
Stranger formation (3 members) (Condra and Scherer, 1939; Condra and Reed, 1943, 1959) - in Nebraska
basal shale of Stranger formation (Condra and Scherer, 1939) - in Nebraska; = ***Vinland Shale Member***
Stranger shale (Ellison, 1941)
Stranger formation (2 members) (Branson, 1944b) = ***Westphalia and Vineland members only***
Stranger formation (5 members) (Condra, 1949) - in Nebraska; = ***Pedee Group and Stranger Formation***
Stranger formation (3 members) (Greene and Searight, 1949)
Stranger formation (Searight and Howe, 1961) - no members formally recognized in Missouri
Stranger formation (5 members) (Moore, et al., 1951) - in Kansas; = ***Pedee Group and Stranger Formation***
Stranger Formation (5 members) (O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas; = ***Pedee Group and Stranger Formation***
Stranger Formation (3 members) (Howe, 1986; Thompson, 1995)
Stranger Shale (Goebel, et al., 1989)
Pennsylvanian System (Virgilian Series)

Type section: Named by Newell (*in* Moore (1932), Moore (1936, p. 147) described the type section of the Stranger Formation as along "Stranger Creek, in bluffs on east side sec. 3, T. 12 N., R. 21 E., southern Leavenworth county, east of Tonganoxie, Kan."

Thompson (1995, p. 120-121) stated "In Missouri, the Stranger Formation comprises lower Douglas beds which lie above the Pedee Group and includes at the top a thin, crinoidal limestone which generally has been identified as the Haskell Limestone Member..."

"In Missouri, the channel-fill sandstone is prominently developed only in southern Platte and Clay counties where it occupies channels which have been cut down into Pedee and upper Lansing strata..."

"The coal bed which is tentatively considered to be equivalent to the upper Sibley of Kansas is present in northwestern Platte County, where it is locally nearly 1 ft thick. Commonly, it is represented only by a thin, carbonaceous streak..."

Comprising three members in Missouri, the Stranger Formation (which includes the Weston and Iatan "Members" in Kansas) overlies the Iatan Limestone, except where the Tonganoxie Sandstone channel has cut through underlying units, and is overlain by the Lawrence Shale.

Strawn limestone

Strawn limestone (Haworth and Kirk, 1894) - in Kansas; = ***Lecompton and Deer Creek Formations***

Pennsylvanian System (Virgilian Series)

Stull Shale Member of Kanwaka Formation, Shawnee Group

Stull shale member of Kanwaka shale (**Moore, 1932**)
Stull shale member of Kanawha (*sic.*) shale (Branson, 1944b)
Stull shale member of Kanwaka shale (Moore, 1936; Moore, et al., 1951) - in Kansas
Stull member of Kanwaka formation (Searight and Howe, 1961)
Stull Shale Member of Kanwaka Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Stull Shale Member of Kanwaka Formation (Burchett, 1970) - in Nebraska
Stull Shale Member of Kanwaka Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 171) located the type section in the "SE cor. sec. 26, T. 12 S., R. 18 E., near village of Stull, Douglas county, Kansas."

Thompson (1995, p. 124) stated "The Stull Shale Member...is a gray, silty shale, which locally contains lenticular sandstone in the upper part. The member also contains plant remains and one or more thin, non-persistent beds of coal in the upper part. The thickness of the member ranges from 25 to 30 ft." The Stull Shale Member overlies the Clay Creek Limestone Member of the Kanwaka Formation, and is overlain by the Spring Branch Limestone Member of the Lecompton Formation.

Subcarboniferous = ***Mississippian System***

This name was applied in many early reports to the Mississippian System. As first used by D.D. Owen, who included beds extending to the base of the Silurian limestones.

Sugar Creek shale member

Sugar Creek shale member of Bethany Falls limestone (Condra, et al., 1932) = ***Hushpuckney Shale Member of Swope Formation***

Pennsylvanian System (Missourian Series)

Sullivan Siltstone Member of Bonneterre Formation

Sullivan Siltstone Member of Bonneterre Formation (**Kurtz, et al., 1975**; Thompson, 1995)
(Sullivan?) Siltstone Member (Clendenin, 1989)

Cambrian System (Upper Cambrian Series)

Type section: Kurtz, et al. (1975, p. 6) stated "Although the Sullivan Siltstone is widespread in the subsurface, the only surface exposure is found in the Crooked Creek cryptoexplosive (cryptovolcanic) structure...in C, E½ NW¼ sec. 17, T. 36 N., R. 4 W., Crawford County, Missouri, and this is designated as the type section."

Kurtz, et al. (1975, p. 6) continued "The name now formally given to this unit has been applied informally by mining company geologists working in southeastern Missouri and the Viburnam Trend for many years and comes from the town of Sullivan, just north of the Franklin-Crawford County line, Missouri." Clendenin (1989) referred to this unit as the **"(Sullivan?) Siltstone Member."** The Sullivan Siltstone Member overlies the main carbonate portion of the Bonneterre Formation, and is overlain by the Whetstone Creek Member of the Bonneterre Formation.

Sulphur Springs Group

Sulphur Springs formation (**Ulrich, 1904a**; Weller and St. Clair, 1928; Weller and Sutton, 1940)
Sulphur Springs Group (Branson, 1934; Thompson, 1993, 1995)
Sulphur Springs group (Koenig, 1961a)
Sulphur Springs Formation (Chauff and Dombrowski, 1977; Chauff, 1981)

Devonian System (Upper Devonian Series)

Type section: Ulrich (1904a) proposed the name Sulphur Springs for a formation with three members exposed (p. 110) "...in the area about Glen Park and Sulphur Springs..." According to Thompson (1993, p. 193) "The section Ulrich utilized was in a small east-facing quarry above the north-south oriented railroad tracks on the west bank of the Mississippi River..., in the SE¼ NW¼ sec. 5, T. 41 N., R. 6 E., Jefferson County, Missouri..." The name was derived from the town of Sulphur Springs, Jefferson County, Missouri.

The Sulphur Springs Group includes three Late Devonian formations, a basal unnamed black shale, the Glen Park Limestone, and the Bushberg Sandstone. When Ulrich (1904a, p. 110) proposed the Sulphur Springs formation, he divided it into these three members. Branson (1933, p. 174) raised the rank of the Sulphur Springs to a group, and that of the Bushberg and Glen Park to formations. The uppermost sandstone bed on the Bushberg (1± ft thick) which was initially included in the Bushberg, has since been found to be the early Mississippian Bachelor Formation. The Bachelor is not included within the Bushberg Sandstone, or the Sulphur Springs Group.

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Summit Coal Bed of Little Osage Shale, Fort Scott Subgroup, Marmaton Group

Summit coal (**McGee, 1888**)
Summit coal (Hinds, 1912) = ***Wheeler Coal Bed of Verdigris Formation***
Summit coal (Knight, 1930, 1931) = ***Mulky Coal Bed***
"Rhomboidal limestone" and Summit coal (Greene, 1933)
shale (with Summit coal) of Fort Scott limestone (McQueen and Greene, 1938) = ***Little Osage Shale***
Summit coal of shale in Fort Scott limestone (McQueen and Greene, 1938)
Summit coal horizon in Fort Scott limestone (Cline, 1941)
"Summit" coal of Little Osage shale member of Fort Scott limestone (Jewett, 1941) - in Kansas
Summit coal horizon in Fort Scott formation (Clair, 1943)
Summit coal of Little Osage member of Fort Scott formation (Greene and Searight, 1949)
Summit coal of Little Osage shale member of Fort Scott formation (Moore, et al., 1951) - in Kansas
Summit coal (Wanless, 1955) "= No. 5 coal of Illinois"
Summit coal of Little Osage shale member of Fort Scott formation (Searight, 1959)
Summit coal bed of Little Osage Shale Member of Fort Scott Limestone (Jewett, et al., 1968) - in Kansas
Summit coal of Little Osage Formation of Fort Scott Subgroup (Neal, 1969; Gentile, 1976)
Summit Coal Member of Morgan School Shale (Ravn, et al., 1984) - in Iowa
Summit coal bed of Little Osage Shale of Fort Scott Subgroup (Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: McGee (1888) named a local coal in Macon County, Missouri, the Summit coal. Jewett (1941, p. 306) noted that the name was preoccupied in geologic literature "...by a Pennsylvanian limestone in Pennsylvania. It is not expedient, however, to replace the name."

Robertson (1971, p. 21) stated that "The Summit is important only in Howard County and northeastern Boone County where it has been recovered primarily through drifts and shallow shafts. It has been stripped in northeastern Boone County in tandem with the Bevier and also as a single seam." It occurs several feet below the Houx Limestone Member of the Little Osage, and several feet above the Blackjack Creek Limestone.

Superioric period

Superioric period (Keyes, 1914)

Precambrian Erathem

Although initially used by Keyes (1914, p. 201) for the latest period of the Proterozoic era in the Lake Superior region, Keyes also used this term in Missouri (1915, p. 253) for rocks following his Selkirkic period.

Swallow limestone

Swallow limestone (Haworth and Kirk, 1894) - in Kansas?; = ***Ardmore Limestone Member of Verdigris Formation***

Pennsylvanian System (Desmoinesian Series)

"Swan Creek sandstone" **of Cotter Dolomite**

"Swan Creek sandstone" of Cotter formation (Martin, et al.., 1961a)
Swan Creek Sandstone of Cotter Dolomite (Fellows, et al., 1971)
"Swan Creek sandstone" of Cotter Dolomite (Thompson, 1991, 1995)

Ordovician System (Ibexian Series)

This is an informally-used marker unit in the lower part of the Cotter Dolomite in southwestern Missouri, named from Swan Creek in Christian County, Missouri. It is quite variable in thickness, but has been identified from the areas around Northview (western Webster County) and Ava (western Douglas County) as a 10± ft thick sandstone, to a sandstone 1-3 ft thick in the region of Branson, in Taney County. Cullison (1944, p. 29) named this sandstone the "Hercules Tower sandstone."

Swede Hollow Formation

Swede Hollow Formation (Ravn, et al., 1984) - in Iowa; = ***Verdigris to Mulky formations***

Pennsylvanian System (Desmoinesian Series)

Sweetland Creek Shale

Sweetland Creek (Grassy Creek) shales (Krey, 1924) = ***Grassy Creek and Saverton Shales***
Sweetland Creek Shale (Woodruff, 1990; Thompson, 1993) - in subsurface of northeastern Missouri

Devonian System (Upper Devonian Series)

Swope Formation **of Bronson Subgroup, Kansas City Group**

Swope limestone (9 members) (**Moore, 1932**; Jewett, 1932) - in Kansas; = ***Hertha and Swope formations***
Swope limestone member (3 members) (Condra, 1935)
Swope limestone (3 members) (Moore and Newell, *in* Newell 1936; Newell and Jewett, 1936; Moore, 1936; Moore, et al., 1951) - in Kansas
Swope formation (Condra and Scherer, 1939) - in Nebraska
Swope limestone (Ellison, 1941) = ***Bethany Falls Limestone Member?***
Swope limestone (3 members) (Clair, 1943)
Swope formation (3 members) (Greene and Searight, 1949; Searight and Howe, 1961)
Swope Formation (3 members) (Payton, 1966; Gentile, 1976; Thompson, 1995)
Swope Formation (Burchett and Reed, 1967; Burchett, 1971) - in Nebraska
Swope Formation (2 members) (Burchett, 1970) - in Nebraska
Swope Limestone (3 members) (Jewett, et al., 1968; Mossler, 1973; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Swope Formation (3 members) (Mossler, 1971) - in Kansas
Swope Limestone Formation (3 members) (Mossler, 1973) - in Kansas
Swope Limestone (4 members) (Watney, et al., 1989)

Pennsylvanian System (Missourian Series)

Type section: Moore (1932) is credited with naming the Swope Formation. Moore (1936, p. 83) stated the Swope Formation was named from "Swope Park, Kansas City, Mo. Typically shown in quarry at 49th Street and Swope Parkway in Kansas City, Missouri, also in road cut on U.S. 50, one-half mile northwest of Knobtown, Jackson County, Missouri."

Thompson (1995, p. 114) stated "The Swope consists of a lower limestone (Middle Creek), a middle shale (Hushpuckney), and an upper limestone (Bethany Falls). Thickness of the Swope ranges from 20 to 25 ft." Prior to Moore (1932), the Swope was included in the broad usage of the "Bethany limestone", or "Bethany Falls limestone member of the Kansas City formation", which basically was synonymous with "Bronson Subgroup." The Swope Formation overlies the Elm Branch (Ladore) Shale, and is overlain by the Galesburg Shale.

Sylamore Sandstone

Sylamore sandstone (Penrose, 1891) - in Arkansas
Sylamore sandstone (Purdue, 1907; Moore, 1928; Branson and Mehl, 1933d; Branson, 1934; Beveridge and Clark, 1952; Muilenberg and Beveridge, 1954; Sohn, 1960, 1961; Koenig, 1961a, 1961b; Spreng, 1961) = ***Bachelor Formation*** of Mississippian age
Sylamore sandstone (Branson, 1923) = ***Bachelor Formation*** (lower Mississippian) at some localities, ***Sylamore Sandstone*** at others
"so-called Sylamore sandstone" (Keyes, 1937h) = ***Bachelor Formation*** of Mississippian age
Sycamore (sic.) sandstone member of Chattanooga shale (Kindle and Miller, 1939)
Sylamore sandstone (Branson, 1944a) = ***Bushberg Sandstone and/or Bachelor Formation*** - Devonian and/or Mississippian
Sylamore sandstone (Kaiser, 1950) = ***Bachelor Formation***, except for extreme southwestern Missouri where it is ***Sylamore Sandstone***
Sylamore sandstone (Collinson, et al., 1959; Collinson, et al., 1967a) = ***Turpin Sandstone***, northeastern Missouri
Sylamore sandstone (Collinson, 1961) = ***Turpin Sandstone***, northeastern Missouri; rejected name "Turpin"
Sylamore Sandstone (Collinson, et al., 1962) = ***Turpin Sandstone*** of northeastern Missouri
Sylamore Sandstone (Freeman and Schumacher, 1969) = ***Sylamore Sandstone*** at some sections, ***Bachelor Formation*** of Mississippian age at others
Sylamore Sandstone (Thompson and Fellows, 1970; Thompson, 1986, 1993, 1995)
Sylamore Sandstone Member of Chattanooga Shale (Sable, 1979) = ***Bachelor Formation*** of Mississippian age
Sylamore Sandstone Member of Chattanooga Shale (Manger, et al., 1988) - in Arkansas

Devonian System (Upper Devonian Series)

Type section: Manger, et al. (1988, p. 224) stated "The name is derived from Sylamore Creek, Stone County, Arkansas, but no type section was designated..." Thompson (1993, p. 184) added "Mehl (1960, p. 68) designated the type area of the Sylamore Sandstone as exposures on Sylamore Creek, SE¼ NW¼ sec. 31, T. 51 N., R. 11 W..."

According to Penrose (1891, p. 113-114), the Sylamore was named by J.C. Branner in an unpublished report, named from exposures on Sylamore Creek. He stated that it underlies the Boone chert (Mississippian, Osagean Series) and overlies the St. Clair limestone (Silurian). It occurs in northern Arkansas and southwestern Missouri, where it underlies the Compton Limestone. However, over most of this area, the sandstone called "Sylamore" is actually the **Bachelor Formation,** of early Mississippian age. The true Sylamore Sandstone is a facies of the Chattanooga Shale, and may be considered a member of the Chattanooga.

Sylvan shale

Sylvan shale (Taff, 1902) - in Oklahoma
Maquoketa (Sylvan) (Clair (1943) = ***Maquoketa Shale***
Maquoketa ("Sylvan" of the Mid-Continent region) (Grohskopf, et al., 1939) = ***Maquoketa Shale***

Ordovician System (Cincinnatian Series)

Taff (1902) proposed this name for shale exposures near the former village of Sylvan, Johnson County, Oklahoma. Clair (1943, p. 32) used the term "Maquoketa (Sylvan)" in the Forest City basin. Grohskopf, Hinchey, and Greene (1939, p. 11) used the "Maquoketa ("Sylvan" of the Mid-Continent region)".

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Table Creek shale

Table Creek shale of McKissick Grove shale member of Wabaunsee formation (Condra, 1927) - in Nebraska; ***= Pillsbury Shale***

Table Creek shale member of McKissick Grove shale (Moore, 1932) = ***Pillsbury Shale***

Table Creek shale and coal of McKissick shale formation (Ver Wiebe and Vickery, 1932; Condra, 1935) ***= Pillsbury Shale***

Table Creek shale member of McKissick shale (Condra, et al., 1932) = ***Pillsbury Shale***

Table Creek shale (Moore, 1936) - in Kansas; = ***Pillsbury Shale***

Table Creek shale (McQueen and Greene, 1938; Branson, 1944b) = ***Pillsbury Shale***

Table Creek (Langdon) shale (Moore, 1948) = ***Pillsbury Shale***

Pennsylvanian System (Virgilian Series)

The **Table Creek shale** (formerly a member of the **McKissick Grove shale**) was the name used before Moore and Mudge (1956) proposed the name **Pillsbury Shale** for the shale between the Zeandale and Stotler Formations of the Wabaunsee Group. In Missouri, McQueen (1938) and Branson (1944b) used "Table Creek shale" for what is now Pillsbury.

Tacket Formation

Tacket Formation (Emery, 1962, Jewett, et al., 1965) - in Kansas; = ***upper part of Pleasanton Group***

Pennsylvanian System (Missourian Series)

Emery (1962) and Jewett, et al. (1965) proposed the Tacket Formation for all Pleasanton strata above the Exline (Checkerboard?) limestone, and therefore, included the **"middle unnamed formation"** and **"upper unnamed formation"** of the Pleasanton Group of Thompson (1995).

Taconic

Taconic (Crane, 1912) = ***Lamotte and Bonneterre formations***

Cambrian System (Upper Cambrian Series)

A term used in the east for the Cambrian or part of the Cambrian, Crane (1912, p. 37) used the term in Missouri as an equivalent for the Cambrian (restricted) of Ulrich, the Bonneterre and the Lamotte formations.

Tamms group

Tamms group (Rogers, 1972) = ***Lower Devonian Series***

Devonian System (Lower Devonian Series)

Tarkio Limestone Member of Zeandale Formation, Richardson Subgroup, Wabaunsee Group

Tarkio limestone (**Calvin, 1901**) - in Iowa; = ***Emporia and Willard formations and Tarkio Limestone Member of Zeandale Formation***

Tarkio limestone member of Nemaha formation (Condra and Bengston, 1915; Condra, et al., 1932) - in Nebraska

Tarkio limestone member of Wabaunsee formation (Condra and Bengston, 1915) - in Nebraska; = ***Emporia Formation***

Tarkio limestone member of Wabaunsee formation (Hinds and Greene, 1915) = ***Burlingame Limestone Member of Bern Formation?***, or ***Emporia Formation?***

Tarkio limestone (Hinds and Greene, 1915; Moore, 1932)

Tarkio limestone member of Wabaunsee formation (Condra, 1927)

Tarkio limestone (Condra, 1935, **revised**; McQueen and Greene, 1938)

Tarkio limestone (Moore, 1936) - in Kansas

Tarkio limestone of Nemaha subgroup (Moore, et al., 1951) - in Kansas
Tarkio limestone member of Zeandale limestone (Moore and Mudge, 1956)
Tarkio member of Zeandale formation (Searight and Howe, 1961)
Tarkio Limestone Member of Zeandale Limestone (Jewett, et al., 1968; Pabian and Diffendal, 1898; Baars and Maples, 1998) - in Kansas
Tarkio Limestone Member of Zeandale Formation (Burchett, 1970) - in Nebraska
Tarkio Limestone Member of Zeandale Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Originally proposed by Calvin (1901) for a succession of strata from the Reading Limestone Member of the Emporia Formation to the Tarkio Limestone Member of the Zeandale Formation, Condra and Bengston (1915) located the "typical" section of the **Tarkio limestone member of the Nemaha formation** "...3 3/4 miles northeast of Fargo [Nebraska]."

Ver Wiebe and Vickery (1932, p. 110) located the type section of the Tarkio limestone on "Tarkio Creek, north of Coin, Page County, Iowa, T. 68n, R. 38w."

Moore (1936, p. 230) stated "Since it appears that usage of the past 20 years has led to designation by the name Tarkio of a limestone that is not recognized at the locality on Tarkio Creek, north of Coin, Iowa, and since it is desirable to continue to use Tarkio in its currently understood sense, the exposures of the Tarkio on Mill Creek, southwest of Maplehill, Kansas, which are noted by Swallow in 1867 under the designation of 'Chocolate limestone' may appropriately be chosen as a new 'type locality." This procedure may at first seem anomalous, but it is theoretically and practically in accord with principals of good stratigraphy."

Condra (1949, p. 16) added "...Condra in 1935 designated a type locality for the revised Tarkio, in the Missouri River bluff west of Tarkio Valley in Missouri, which is north of Corning, Missouri....Moore, 1936, selected a cotype locality for the Tarkio on Mill Creek, near Maple Hill, Kansas where the formation is thickest."

Thus, **three type sections** for the Tarkio Limestone Member have been proposed, one each in Iowa, Kansas, and Missouri.

Thompson (1995, p. 130) stated "The Tarkio Limestone Member of the Zeandale Formation is composed of a lower, massive, brown-weathering bed of limestone, which is separated from an upper, thin bed of algal limestone by a gray or maroon clay, which contains rough-textured limestone concretions. Large fusuline foraminifera, which are commonly encrusted with algae, are present in the lower, 3 to 4-ft-thick bed. The total thickness of the Tarkio Member ranges from 4 to 5 ft." The Tarkio Limestone Member overlies the Willard Shale, and is overlain by the Wamego Shale Member of the Zeandale Formation.

Tar Springs Sandstone

Tar Springs sandstone (**Owen, 1856**, 1857) - in Kentucky
Tar Springs sandstone (Brokaw, 1916) - first use in Illinois
Tar Springs sandstone (Flint, 1925) - unpublished, first use in Missouri
Tar Springs Member of Upper Okaw Formation (Sutton, 1934) - in Illinois
Tar Springs sandstone (McQueen, 1939; Weller, 1939)
Tar Springs formation (Spreng, 1961)
Tar Springs Sandstone of Elviran Stage (Swann, 1963) - in Illinois
Tar Springs Sandstone (Thompson, 1979a, 1986,1995)
Mississippian System (Chesterian Series)

Type section: Owen (1856, p. 174; 1857, p. 85-88) used the term Tar Spring and Shot Pouch sandstone for a Mississippian sandstone forming a cliff at the Tar Spring, three miles south of Cloverport, Breckinridge County, Kentucky.

The Tar Springs Sandstone overlies the Glen Dean Formation and is overlain by the Vienna Limestone. Flint (1925, p. 174) first recognized the Tar Springs formation in Missouri near Wittenberg in Perry County, in an unpublished manuscript. McQueen (1939, p. 170) published the first reference to it in Missouri.

Taum Sauk Group of St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

The **Taum Sauk Group** was proposed by Berry (1976) for a series of 14 volcanic units in the vicinity of Taum Sauk Mountain, in Iron County, Missouri. The classification was reviewed by Robertson (*in* Thompson, 1995, p. 9-10).

"Taum Sauk Limestone" of Bonneterre Formation

Taum Sauk limestone member of Bonneterre formation (Brightman, 1938)
"Taum Sauk marble" (Hays and Knight, 1961)
"Taum Sauk member of Bonneterre formation**"** (Howe, 1968)
Taum Sauk Limestone (Frank, 1979)
"Taum Sauk Limestone" of Bonneterre Formation (Palmer, 1989)

Cambrian System (Upper Cambrian Series)

This unit is a brick-red, lithographic, but very muddy, limestone unit in the Bonneterre Formation that has been quarried by Georgia Marble Co. for Terrazzo chips. It is very near or at the base of the Bonneterre. Brightman (1938) named this unit the "Taum Sauk member of the Bonneterre formation" from exposures along Little Taum Sauk Creek near the Iron-Reynolds County line, in the W½ SW¼ 30, 33N-3E, Iron County. Missouri."

Taum Sauk Mountain

Taum Sauk Mountain ash flows (Anderson, 1962, 1970) = ***Taum Sauk Rhyolite*** of Taum Sauk Group
tuff of Taum Sauk Mountain (Anderson, 1962, 1970) = ***Taum Sauk Rhyolite*** of Taum Sauk Group

Precambrian Erathem

This name was used by Anderson (1962, 1970) for the unit named **Taum Sauk Rhyolite** by Berry (1976).

Taum Sauk Rhylolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Taum Sauk Mountain ash flows (Anderson, 1962, 1970) = ***Taum Sauk Rhyolite*** of Taum Sauk Group
tuff of Taum Sauk Mountain (Anderson, 1962, 1970) = ***Taum Sauk Rhyolite*** of Taum Sauk Group
Taum Sauk Rhyolite (Berry, 1976; Robertson, *in* Thompson, 1995)

Precambrian Erathem

Type section: Named by Berry (1976), the type section of the Taum Sauk Rhyolite is in sec. 15, T. 33 N., R. 2 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9) stated "The Taum Sauk Rhyolite [sic.] is a red to dark maroon ash-flow tuff containing up to 30 percent phenocrysts of alkali feldspar and quartz; flamme may or may not be present. The formation is widely exposed in the Proffit-Wildcat-Taum Sauk mountain area. Although its maximum thickness has not been established, it is greater than 3,000 ft thick."

Taylor Branch Limestone Member

Taylor Branch Limestone Member of Burlingame Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska

Pennsylvanian System (Virgilian Series)

Tebo Coal Bed of Tebo Shale, Cabaniss Subgroup, Cherokee Group

Tebo coal (Marbut, 1898)
?Tebo coal bed of Cherokee shale (Hinds, 1912) - may be Croweburg Coal Bed
Tebo (lower Ardmore) coal of Cherokee shale (Hinds and Greene, 1915)

Tebo coal of Croweburg cyclothem (Abernathy, 1937) - in Kansas; = ***Croweburg Coal Bed***
Tebo coal (Miller and Owen, 1939) = ***Croweburg Coal Bed***
"just above the Tebo coal" (Miller and Owen, 1939) = ***Verdigris Formation***
Tebo coal of Tebo formation (McQueen, 1943)
Tebo coal of Tebo formation (Branson, 1957) - in Kansas
Tebo coal of Senora formation (Branson, 1957) - in Oklahoma
Tebo coal (Searight, 1959) "= Seahorne coal in Illinois"
"Shale over Tebo coal" (Hoare, 1960) = ***Scammon Shale***
Tebo coal bed of Tebo formation (Searight and Howe, 1961)
"immediately above the Tebo coal" (Furnish, et al., 1962) = ***Scammon Shale***
Tebo coal of Boggy Formation (Branson, et al., 1965) - in Oklahoma
Tebo coal bed of Cabaniss Formation (Jewett, et al., 1968) - in Kansas
Tebo coal of Tebo Formation (Gentile, 1976)
"Little Tebo" coal (Robertson and Smith, 1981) - Henry Co., Mo.; = ***Fleming Coal Bed of Fleming Shale***
Tebo coal bed of Tebo Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

The type section is the same as that for the **Tebo Shale.**

Tebo Shale of Cabaniss Subgroup, Cherokee Group

Tebo coal (**Marbut, 1898**)
Tebo formation (McQueen, 1943; Searight and Howe, 1961; Hoare, 1961a)
Tebo formation (Moore, 1948; Branson, 1957) - in Kansas
"Tebo" formation (Unklesbay, 1952a)
Tebo Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: McQueen (1943, p. 78-79) stated "The name Tebo was originally given by Marbut to a coal seam, the type locality of which is on Tebo Creek, Henry County." Marbut (1898) described several mines located about the Tebo Creek area, in T. 42 N., R. 25 W. These mines appear to fall within the "Lewis station" region described by Hinds (1912, p. 190-191) from the region around Lewis..."

Thompson (1995, p. 100) stated "From the base upward, the Tebo Formation consists of: 1) a more or less black, carbonaceous shale, which contains a few fossiliferous limestone nodules near the base; 2) a gray mudstone with siderite concretions; 3) a micaceous siltstone or sandstone; 4) an underclay; and 5) the **Tebo coal bed**...In the Tebo district, which extends from northwestern St. Clair County across Henry to south- eastern Johnson County, the Tebo coal is from 28 to 36 in thick. It is too thin to be mined elsewhere." The Tebo Shale overlies the Weir Shale, and is overlain by the Scammon Shale.

Tecumseh Shale of Shawnee Group

Tecumseh shales (**Beede, 1898**) - in Kansas
Tecumseh shale (Beede, 1902; Adams, 1903; Hayworth and Bennett, 1908; Moore, et al., 1951) - in Kansas
Tecumseh shale member of Shawnee formation (Hinds and Greene, 1915)
Tecumseh shale member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Tecumseh shale member of Shawnee formation (Condra, 1927) - in Nebraska
upper shale of Tecumseh shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Rakes Creek Shale Member***
lower shale of Tecumseh shale member of Shawnee formation (Condra, 1927) - in Nebraska; = ***Kenosha Shale Member***
Tecumseh shale (Condra, 1930) - in Nebraska
Tecumseh shale (3 members) (Moore, 1932, 1936)
Tecumseh shale (McQueen and Greene, 1938; Ellison, 1941; Branson, 1944b)
Tecumseh shale formation (3 members) (Condra and Reed, 1943, 1959) - in Nebraska
Tecumseh formation (1 member) (Searight and Howe, 1961)

Tecumseh Formation (3 members) (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Tecumseh Shale (Jewett, 1968; Heckel, 1979; Baars and Maples, 1998) - in Kansas
Tecumseh Formation (3 members) (Howe, 1968)
Tecumseh Shale (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Beede (1898), Moore (1936, p. 178) located the type section "Near village of Tecumseh, sec. 15, T. 11 S., R. 16 E., Shawnee county, Kansas. Well exposed in SE¼ sec. 35, T. 11 S., R. 17 E." Moore (1932) subdivided the Tecumseh Shale into three members in Kansas, the Kenosha Shale, Ost Limestone, and Rakes Creek Shale.

Howe (1968) described a section in Andrew County, Missouri where three members, the Kenosha Shale Member, Ost Limestone Member, and Rakes Creek Shale Member of the Tecumseh Shale, could be identified. Previously (Searight and Howe, 1961) only one of the three members had been identified in Missouri.

Thompson (1995, p. 125) stated "The Tecumseh Shale is arenaceous in the upper part. The **Ost Limestone** of Nebraska is possibly represented in Missouri by a lenticular limestone which is less than 1 ft thick near the base of the formation in a locality near Savannah in Andrew County. The thickness of the Tecumseh ranges from 40 to 50 ft." The Tecumseh Shale overlies the Avoca Limestone Member of the Lecompton Formation, and is overlain by the Ozawkie Limestone Member of the Deer Creek Formation.

Ten-inch coal

Ten-inch coal (Greene and Pond, 1926) = ***Croweburg Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Tennessean (Tenneseeic)

Tennessean series (Ulrich and Smith, 1905; Keyes, 1914) = ***Meramecian and Chesterian Series***
Tennessean system (Ulrich, 1911) = ***Meramecian and Chesterian Series***
Tennesseeic Period (Schuchert, 1910) = ***Meramecian and Chesterian Series***
Mississippian System (Meramecian and Chesterian Series)

This was a term used by Ulrich (*in* Ulrich and Smith, 1905, p. 24) for the upper part of the Mississippian rocks. This use was without rank. In 1911 (p. 581-582) he used "Tennessean system" and explained why he regarded the assemblages as systems. The terms include the Chesterian Series and Meramecian Series of present nomenclature.

Thayer shale

Thayer shale (Haworth, 1895; Adams, 1896; Kirk, 1896; Haworth, 1896) - in Kansas; = ***Cherryvale, Drum, and Chanute formations***
Thayer shales (Keyes, 1899, 1900b, 1901b) = ***Cherryvale to Chanute formations***
Pennsylvanian System (Missourian Series)

Thebes Sandstone of Maquoketa Group

Thebes sandstone and shale (Worthen, 1866)
Thebes formation (Ulrich, 1904a) = ***Maquoketa Group below Girardeau Limestone***
"Thebes sandstone and shale" (Savage, 1908) = ***Cape La Croix Shale and Thebes Sandstone***
Thebes sandstone (Savage, 1909; Dake, 1921) = ***Cape La Croix Shale and Thebes Sandstone***
"Thebes facies of Maquoketa shale" (Ulrich, 1911)
Thebes sandstone (Savage, 1913)
Thebes - Maquoketa formation (Weller and St. Clair, 1928) = ***Maquoketa Group below Girardeau***
Thebes (McQueen, 1939)
Thebes sandstone facies of Maquoketa formation (Branson, 1944b) - rejected Thebes as a formation
Thebes-Maquoketa formation (Grohskopf, 1955) = ***Cape La Croix Shale and Thebes Sandstone***
Thebes sandstone member of Orchard Creek formation - "Maquoketa" (Sweet, et al., 1959; Pulse and Sweet, 1960)

Thebes formation (Martin, et al., 1961a)
Thebes Sandstone Member of Scales Formation (Templeton and Willman, 1963)
Thebes Sandstone (Thompson and Satterfield, 1975)
Thebes Sandstone of Orchard Creek Shale - or Maquoketa (Sweet and Bergstrom, 1976)
Thebes Sandstone of Maquoketa Group (Thompson, 1991, 1995)
Ordovician System (Cincinnatian Series)

Type section: The name Thebes was proposed by Worthen (1866, p. 139) for a sandstone well exposed in the bluffs at the town of Thebes, Alexander County, Illinois, across the Mississippi River and slightly south from the town of Cape Girardeau, Missouri.

The Thebes Sandstone overlies the Cape La Croix Shale and is overlain by the Orchard Creek Shale. This sandstone was called the "Cape Girardeau sandstone" by Shumard (1873, p. 264) and was described as having a very limited area of exposure in and about the city of Cape Girardeau. Ulrich (1904a) extended Worthen's name Thebes into Missouri where it comprised two shales and a sandstone between. This was the Hudson River-Cincinnati group of earlier authors. In 1908 Savage divided the Thebes sandstone into two units, a lower one consisting of a sandstone and underlying sandy shale, and an upper one of bluish-gray shale. He restricted the name Thebes to the lower unit and left the upper one unnamed, which he later (1909, p. 515) called it the Orchard Creek shale. Dake (1921) correlated the basal shale of Savage's Thebes sandstone with the Maquoketa shale. Gealy (1955, p. 94) in an unpublished manuscript, considered the Thebes and the Orchard Creek to be members of the Maquoketa shale. Thompson (1991) raised the Maquoketa to group level, which includes, in ascending order, the Cape La Croix Shale, Thebes Sandstone, Orchard Creek Shale, and Girardeau Limestone.

Thebes-Maquoketa formation

Thebes-Maquoketa formation (Weller and St. Clair, 1928) = ***Maquoketa Group***
Ordovician System (Cincinnatian Series)

Weller and St. Clair (1928, p. 120) used the term "Thebes-Maquoketa formation" as a compound term because they considered them to be two distinct facies of contemporaneous sedimentation, both of which were represented in some places. Others also used this term, sometimes including the Orchard Creek with it.

Theodosia Formation

Theodosia Formation of Jefferson City Group (**Cullison, 1944**) = ***lower Cotter Dolomite***
Theodosia formation (Cloud, 1945) = ***Cotter Dolomite?***
Theodosia of Jefferson City (Flower, 1957) = Jefferson City Dolomite?
Theodosia Formation (Kay, 1970) = ***Cotter Dolomite***
Ordovician System (Ibexian Series)

Cullison (1944) elevated the Jefferson City to group status, dividing it into the Rich Fountain and Theodosia formations. The Theodosia formation is underlain by the Rich Fountain and overlain by the Cotter. However, he included in the Theodosia at least the lower half of what Weller and St. Clair (1928) called Cotter. The Theodosia formation consists of the Blackjack Knob member underlain by the Lutie member. There are two type sections exposing the two separate members of the formation. Cullison did not state the derivation of the name but presumably it is the former post office of Theodosia in west Ozark County, near which one of the type sections is located.

3rd Calciferous limestone

3rd Calciferous limestone (Gallaher, 1900) = ***Cotter and/or Powell Dolomite***
Ordovician System (Ibexian Series)

This is a term used by Gallaher (1900, p. 130-131) as part of his Calciferous group. Essentially it is the Cotter and/or Powell Dolomites.

Third limestone

Third limestone (Gallaher, 1900) = ***Bonneterre Formation?***

Cambrian System (Upper Cambrian Series)

This term was used by Gallaher (1900, p. 92-93) for the fourth member of his Cambrian section, the "second ore-bearing, or country rock, in the Magnesian Lens." It is overlain by his "Fourth Limestone" and underlain by "Dead Rock".

3rd Magnesian

3rd Magnesian Limestone (Swallow, 1855) = ***Gasconade Dolomite***

3rd Magnesian Sandstone (Swallow, 1855)

3rd Magnesian limestone (3rd sandstone) (Pumpelly, 1873; Keyes, 1898c)

Ordovician System (Ibexian Series)

This term was used by early Missouri geologists (Swallow, 1855; Pumpelly, 1873; Keyes, 1898c) for what is essentially the Gasconade, although it could also include the Eminence and/or Potosi Dolomites. It was part of Swallow's "Calciferous Sandrock", Broadhead's "Ozark series", and others' "Magnesian Limestone series".

3rd sandstone

3rd sandstone (Swallow, 1855; Winslow, 1894) = ***Gunter Sandstone Member of Gasconade Dolomite***

3rd sandstone (Walcott, 1891) = ***St. Peter Sandstone***

Ordovician System (Ibexian or Mohawkian Series)

This is a term used by early Missouri geologists for the **Gunter Sandstone**. It was part of Swallow's "Calciferous Sandrock", Broadhead's "Ozark series", and others' "Magnesian Limestone series". However, Walcott (1891) used it for the **St. Peter Sandstone**.

Tiawah Limestone Member of Scammon Shale, Cabaniss Subgroup, Cherokee Group

Tiawah limestone (**Lowman, 1932**) - in Oklahoma

Tiawah limestone member of Tebo formation (Searight, et al., 1953)

Tiawah limestone member of Senora formation (Branson, 1954b) - in Oklahoma

Tiawah limestone of Scammon formation (Searight, 1955; Hoare, 1961a)

Tiawah limestone member of Scammon formation (Searight, 1959) "= Seahorne limestone in Illinois"

"underlying black shale" (of Tiawah Limestone) (Hoare, 1960, 1961a) = ***Scammon Shale***

Tiawah member of Scammon formation (Searight and Howe, 1961)

Tiawah limestone (Hoare, 1961a)

Tiawah Limestone Member of Boggy Formation (Branson, et al., 1965) - in Oklahoma

"Tiawah Limestone of Missouri" (Murphey, 1966)

Tiawah limestone bed in Cabaniss Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas

Tiawah Limestone Member of Scammon Formation (Gentile, 1976; Thompson, 1995)

Tiawah Limestone Member of Senora Formation (Hemish, 1990) - in Oklahoma

Pennsylvanian System (Desmoinesian Series)

Type section: Lowman (1932) named the Tiawah Limestone Member from exposures in Rogers County, Oklahoma. Branson (1954b, p. 192) located this section "...as that in the north road cut on Oklahoma Highway 20 on the west side of the hill in the SW¼ sec. 12, T. 21 N., R. 16 E."

Searight (1955, p. 40) stated that the Tiawah limestone was "The persistent 'caprock limestone' of the Tebo coal...It is distinguished in Missouri, Kansas, and Oklahoma by very abundant platy algal remains." Thompson (1995, p. 101) added "The Tiawah Limestone...is a dense, persistent, medium- to dark-gray limestone containing an abundance of tabular algae, *Archeolithophyllum missouriensum*, and which extends from northeastern Henry County southwestward to and beyond the Missouri-Kansas line. The limestone is nodular in northeastern Missouri."

Tina limestone member

Tina limestone member of Altamont limestone (Cline, 1941; Branson, 1944b) = ***Amoret Limestone Member of Altamont Formation***

Tina limestone member of Altamont limestone (Jewett, 1941) **-** in Kansas; = ***Amoret Limestone Member***

"Tina" limestone member of Altamont limestone (Moore, 1949) = ***Amoret Limestone Member***

Pennsylvanian System (Desmoinesian Series)

Cline (1941, p. 29) proposed the "Tina limestone member" for the lower limestone of the Altamont Formation, named from a section about 2 miles southeast of Tina, in Carroll County, Missouri "...in ravines in the west-central part of Sec. 7, T. 54 N., R. 22 W., where, together with the upper member of the Altamont, it is quarried on both sides of the east-west road." Greene and Searight (1949, p. 7) rejected the name "Tina" "...because the rocks for the type Tina have proven not to be Amoret." They proposed the unit be renamed the **Amoret limestone member** of the Altamont formation, the name taken from the town of Amoret, in Bates County, Missouri.

Tomah Member of Franconia Formation

Tomah Member of Franconia Formation (Howe, et al., 1972; Kurtz, 1989)

Cambrian System (Upper Cambrian Series)

In a discussion of Cambrian strata in the Upper Mississippi Valley region, Kurtz (1989, p. 78) stated "The Tomah is pink-tan-gray colored fine grained sandstone and shale unit grading into green where glauconitic (*sic.*) is present. K-feldspar grains can make up most of the sediment. Where not burrowed, the unit is laminated sand and shale. The upper part of the Tomah in northern Missouri contains carbonate, unlike surface exposures." The Franconia and Eau Claire Formations are equivalent to the Bonneterre Formation, and were recognized in northern Missouri only.

Tonganoxie Sandstone Member of Stranger Formation, Douglas Group

Tonganoxie sandstone member of Stranger formation (**Moore, 1934**, 1936; Newell, 1936; Moore, et al., 1951) - in Kansas

Tonganoxie Sandstone Member of Stranger Formation (Jewett, et al., 1968) **-** in Kansas

"equivalent to the Tonganoxie sandstone of Kansas" (Searight and Howe, 1961)

Tonganoxie Sandstone Member of Stranger Formation (Howe, 1986; Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1934), Moore (1936, p. 147) located the type section of the Tonganoxie sandstone in the "...area east of Tonganoxie, Leavenworth county, Kansas. Good exposures are found along U.S. Highway 40 in. secs. 26 and 35, T. 11 S., R. 21 E., about seven miles east of Tonganoxie and on Stranger Creek and its tributaries, north of Linwood."

Thompson (1995, p. 120-121) stated "In Missouri...The Stranger Formation also includes a thick, channel-fill sandstone, which is considered to be equivalent to the **Tonganoxie Sandstone Member** believed to have a maximum thickness of about 50 ft.

"In Missouri, the channel-fill sandstone is prominently developed only in southern Platte and Clay counties where it occupies channels which have been cut down into Pedee and upper Lansing strata..."

Tonti Member of St. Peter Sandstone

Tonti Sandstone Member of St. Peter Sandstone (**Templeton and Willman, 1963**)

Tonti Sandstone (Okhravi and Carozzi, 1983)

Tonti Member of St. Peter Sandstone (Thompson, 1991, 1995)

Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963, p. 45) stated "The Tonti Sandstone Member of the St. Peter Sandstone is here named for Tonti Canyon in Starved Rock State Park... (p. 225) "Exposures at Starved Rock, Lovers' Leap, and French Canyon in Starved Rock State Park, LaSalle County, Illinois..."

Thompson (1991, p. 76) stated "Characteristically finer grained than the overlying Starved Rock Member, the **Tonti Member of the St. Peter Sandstone** is the typical "St. Peter Sandstone" that covers much of the Midcontinent region. It lies disconformably on the Everton Formation in parts of east-central Missouri... and on older Canadian [Ibexian] strata [or residuum on top of the Ibexian] (Kress Member) in eastern and central Missouri...Where Starved Rock is present, the Tonti Member was often previously identified as 'Everton' and the overlying Starved Rock Member was considered 'classical' St. Peter Sandstone."

Topeka Formation of Shawnee Group

Topeka limestone (**Bennett, 1896**) - in Kansas; = ***Curzon to Coal Creek Members***
Topeka limestone (Beede, 1898; Haworth, 1898; Haworth and Bennett, 1908) - in Kansas
Topeka limestone member of Shawnee formation (Hinds and Greene, 1915)
Topeka limestone member of Shawnee formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Topeka limestone member of Shawnee formation (5 named beds) (Condra, 1927) - in Nebraska; = ***Curzon to Coal Creek Members***
Topeka limestone member of Shawnee formation (3 named beds) (Condra, 1930) - in Nebraska; = ***DuBois to Coal Creek Members***
Topeka limestone (5 members) (Moore, 1932; Condra, et al., 1932) = ***Curzon to Coal Creek Members***
Topeka formation (3 members) (Condra, 1933) - in Nebraska; = ***DuBois to Coal Creek Members***
Topeka-Calhoun shales (Condra, 1933) - in Nebraska; = ***Turner Creek Shale Member of Topeka Formation***
Topeka limestone formation (5 members) (Condra, 1935) = ***Curzon to Coal Creek Members***
Topeka limestone (5 members) (Moore, 1936, 1937) - in Kansas; = ***Curzon to Coal Creek Members***
Topeka limestone formation (9 members) (Condra and Reed, 1937, 1953,1959) - in Nebraska
Topeka limestone (5 members) (McQueen and Greene, 1938; Branson, 1944b) = ***Curzon to Coal Creek Members***
Topeka limestone (Moore, et al., 1944)
Topeka formation (9 members) (Moore, 1948; Searight and Howe, 1961)
Topeka limestone (9 members) (Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Topeka Formation (9 members) (Thompson, 1995)
Topeka Limestone (9 members) (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Topeka Formation (9 members) (Burchett, 1970, 1971) - in Nebraska
Pennsylvanian System (Virgilian Series)

Type section: Named by Bennett (1896), Ver Wiebe and Vickery (1932, p. 112) located the type section "One mile east and one mile south of Topeka, Kansas." Moore (1936, p. 194) added "Topeka , Kansas. All members of the Topeka limestone are well exposed in SE¼ sec. 5, T. 11 S., R. 16 E., and vicinity, northeast of Topeka [Shawnee County., Kansas]."

Condra (1927) named 5 "beds" that were later incorporated into the Topeka Formation as members by Moore, (1932). Several authors included two members in the upper part of their Calhoun Shale that were later moved upward into the lower part of the Topeka Formation. Today there are nine members in the Topeka Formation, all nine first included by Condra and Reed (1937).

Thompson (1995, p. 125-126) added "The Topeka Formation consists of nine alternating limestone and shale members...Except for a few scattered exposures where the Ervine Creek Member has been quarried along the One Hundred and Two River south of Maryville in Nodaway County, exposures of the Topeka in Missouri are restricted to southern Holt County and to a few places along the Nodaway River as far north as Skidmore. The formation is from 30 to 35 ft thick." The Topeka Formation overlies the Calhoun Shale, and is overlain by the Severy Formation of the Wabaunsee Group.

Toronto Limestone Member of Oread Formation, Shawnee Group

Toronto limestone (**Haworth and Piatt, 1894**) - in Kansas
Toronto limestone member of Oread limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Weeping Water (Toronto) limestone of Oread limestone formation (Condra and Reed, 1936)
Toronto or Weeping Water limestone member of Oread limestone (McQueen and Greene, 1938)
Toronto limestone member of Oread limestone (Branson, 1944b)

Toronto (Weeping Water) limestone member of Oread formation (Condra, 1949)
Toronto limestone member of Oread formation (Greene and Searight, 1949)
Toronto member of Oread formation (Searight and Howe, 1961)
Toronto Limestone Member of Oread Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Toronto Limestone Member of Oread Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas
Toronto Limestone Member of Oread Limestone (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Haworth and Piatt (1894), the name was taken from the town of Toronto, Woodson County, Kansas.

McQueen and Greene (1938) recognized that the **Weeping Water limestone member of the Oread limestone** in Nebraska (Moore, 1932, Condra, et al., 1932) was the same unit as the Toronto Limestone in Kansas. Thompson (1995, p. 123) stated "The Toronto Limestone Member...is a dense, gray limestone, which weathers gray and buff. The thickness of the member, which may occur in several distinct beds, is about 5 ft." The Toronto Limestone Member overlies the "upper unnamed shale member" of the Lawrence Formation, and is overlain by the Snyderville Shale Member of the Oread Formation.

"transition zone between St. Peter and Joachim"
"transition zone between St. Peter and Joachim" in St. Peter Group (Dake, 1921) = ***Dutchtown Formation***
Ordovician System (Mohawkian Series)

This term was used by Dake (1921) to define beds that later were named the **Dutchtown Formation.**

Trempealeauan Stage

Trempealeau formation (**Bridge, 1936**)
Trempealeauan Stage of Upper Cambrian (Croixian) Series (Howe, 1968; Howe, et al., 1972; Kurtz, et al., 1975)
Cambrian System (Upper Cambrian Series)

Originally proposed by Bridge (1936) as a formation, then raised to a stage by Howell and Lochman (1938), this unit is the uppermost of three stages of the Upper Cambrian Series.

Trenton
Trenton Limestone (Shumard, 1855; Swallow, 1855) = ***Kimmswick Limestone***
Trenton group (Worthen, 1866) = ***Joachim to Kimmswick formations***
Trenton limestone (Pumpelly, 1873; Broadhead, 1874; Rowley, 1891; Marbut, 1898) = ***uppermost Plattin and Kimmswick formations***
Trenton (Edson, 1927; Kay, 1929b) = ***Kimmswick Limestone***
Trentonian (Edson, 1929) = ***Kimmswick Limestone***
Trentonian Stage of Champlainian Series (Barnes, et al., 1973)
Ordovician System (Mohawkian Series)

Trenton was a term named in the east and imported to Missouri by many early geologists for what are now the Plattin and/or Kimmswick Limestones.

Tribune limestone
Tribune limestone (Ulrich, 1904a) = ***Renault to Tar Springs formations***
Tribune member of Kaskaskia formation (Schuchert, 1910)
Tribune limestone (Girty, 1915a) - in Arkansas
Mississippian System (Chesterian Series)

An abandoned term for the upper part of the Chesterian series, Tribune was used by Ulrich (1904a, p. 109) for the main limestone of the Chester group, underlying the Birdsville formation and overlying the (so-called) Cypress sandstone (not true Cypress, but Aux Vases). Ulrich abandoned the term in 1917. It was named for Tribune, Crittenden County, Kentucky, but the limestone on which the town of Tribune is built was later found to be the Menard limestone, in the middle of the Birdsville formation.

Triple limestone

Erie or Triple limestone (Haworth, 1985) - in Kansas; = ***Sniabar, Bethany Falls and Winterset limestones***
Triple limestone (Kirk, 1896) - in Kansas; = ***Sniabar, Bethany Falls, and Winterset limestones***
Pennsylvanian System (Missourian Series)

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tuff and lava flows of Lake Springs

tuff and lava flows of Lake Springs (Anderson, 1970) = ***Buck Mountain Shut-Ins Formation***
Precambrian Erathem

Anderson (1970) used this term, and also "tuff of Mill Creek" for units Berry (1976) named **Buck Mountain Shut-Ins Formation**.

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tuff of Mill Creek

tuff of Mill Creek (Anderson, 1970) = ***Buck Mountain Shut-Ins Formation***
Precambrian Erathem

Anderson (1970) used this term for the unit Berry (1976) named the **Buck Mountain Shut-Ins Formation**. He also used "tuff and lava flows of Lake Springs" for the same unit.

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tuff of Stouts Creek

tuff of Stouts Creek (Anderson, 1970) = ***Taum Sauk Group of St. Francois Mountains Volcanic Supergroup***
Precambrian Erathem

Anderson (1970) divided the "tuff of Stouts Creek" into four "units." Unit A is now called **Ironton Rhyolite** and **Buck Mountain Shut-Ins Formation** (Berry, 1976), Unit B the **Lindsey Mountain Rhyolite** (Berry, 1976), Unit C the **Russell Mountain Rhyolite** (Berry, 1976), and Unit D, all but the upper part the **Wildcat Hollow Mountain Rhyolite** (Berry, 1976), the upper part of Unit D the **Bell Mountain Rhyolite** (Berry, 1976).

Tullahoma

Tullahoma formation (Buckley and Buehler, 1904) = ***Kinderhookian and Osagean Series?***
Tullahoma limestone (Ulrich and Smith, 1905) = ***Kinderhookian and Osagean Series***
Mississippian System (Kinderhookian and Osagean Series)

Named for Tullahoma, in Coffee County, Tennessee, by Safford (1901), this was the southern equivalent of the Osage and Kinderhook groups (Osagean and Kinderhookian Series) of the Mississippi Valley region. Buckley and Buehler (1904, p. 110) felt it could be recognized as far north as Ste. Genevieve, Missouri.

Turner Creek Shale Member of Topeka Formation, Shawnee Group

Turner Creek shale of Topeka limestone member of Shawnee formation (**Condra, 1927**) - in Nebraska
Turner Creek shale member of Topeka limestone (Moore, 1932; Condra, et al., 1932; Condra, 1935)
Turner Creek shale member of Topeka limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Turner Creek member of Topeka formation (Searight and Howe, 1961)
Turner Creek Shale Member of Topeka Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas

Turner Creek Shale Member of Topeka Formation (Burchett, 1970, 1971) - in Nebraska
Turner Creek Shale Member of Topeka Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927), Condra (1949, p. 21) stated the Turner Creek was "...named for Turner Creek exposures about 4 miles southeast of Du Bois, Nebraska."

Thompson (1995, p. 126) stated "The Turner Creek Shale Member...comprises approximately 3 feet of calcareous claystone in its lower and middle parts, and interbedded, calcareous shale and argillaceous limestone in its upper part. The total thickness of the member is about 4 ft." The Turner Creek Shale Member overlies the Sheldon Limestone Member, and is overlain by the DuBois Limestone Member of the Topeka Formation.

Turpin Sandstone

Turpin sandstone member of Grassy Creek shale (Mehl, 1960) - rejected the use of "Sylamore sandstone" in northeastern Missouri
Turpin sandstone (Mehl, 1961) - rejected "Sylamore" for northeastern Missouri
Turpin Sandstone (Thompson and Satterfield, 1975; Thompson, 1993, 1995) - northeastern Missouri
Devonian System (Upper Devonian Series)

Type section: Mehl (1960, p. 84) stated "The name Turpin comes from a small crossroads community in the SW cor. sec. 5, T. 52 N., R. 1 E., Pike County, Missouri, and is applied to a sandstone at the base of the Grassy Creek shale.

The Type locality of the Turpin sandstone is at a spring near the roadside in NW [SW?] SW SE sec. 3, T. 52 N., R. 1 E. (approximate), almost 2 miles east, 0.5 mile north of Turpin..."

Thompson (1995, p. 55) stated "The Turpin Sandstone is a pale-buff, brown, to reddish-brown sandstone at the base of the Grassy Creek Shale in northeastern Missouri...

"...The Turpin rests unconformably on rocks ranging from Late Ordovician Maquoketa Shale to Early Silurian Bowling Green Dolomite...and is always overlain by the Late Devonian Grassy Creek Shale.

"The relationship of the Turpin Sandstone to the Grassy Creek Shale appears to be analogous to the Sylamore-Chattanooga relationship, the sandstone (Turpin-Sylamore) a near-shore facies of the deeper-water black, carbonaceous shale (Grassy Creek-Chattanooga)."

Twenty-foot lime

upper Fort Scott limestone, or "Twenty-foot lime (Greene and Pond, 1926) = ***Higginsville Limestone***
"20-foot lime" (Charles and Page, 1929) = ***Higginsville Limestone***
Pennsylvanian System (Desmoinesian Series)

Two-foot coal

"Middle coal" or two-foot coal" of "Shale and coal member of Cherokee formation" (Greene and Pond, 1926) ***= Fleming Coal Bed of Fleming Shale***
Pennsylvanian System (Desmoinesian Series)

Tyson Member of Kings Lake Limestone, Decorah Group

Tyson Member of Kings Lake Formation (Templeton and Willman, 1963)
Tyson Member of Kings Lake Limestone (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: The type section for the Tyson Member is the same as that for the Mincke Member, the exposure on the Burlington-Northern Railroad in St. Louis County, at Tyson Research Center, near Mincke Station. Thompson (1991, p. 186) stated "This section is an exposure in the south bluff of the Meramec River, along the Burlington-Northern Railroad, ¼ mi northeast of Mincke Siding, near the center of E½ SE¼ SE¼ sec. 21, T. 44 N., R. 4E., Manchester 7½' Quadrangle..."

The two members of the Kings Lake Limestone are quite similar. Thompson (1991, p. 191) stated "The lower, Mincke Member is more silty and argillaceous than the Tyson Member. In northeastern Missouri the latter..is more argillaceous and silty than the overlying Guttenberg Limestone. The Tyson is more or less transitional between the Mincke and the basal Guttenberg beds, but it is much thinner bedded than the latter and more like the former." The Tyson Member of the Kings lake Limestone overlies the Mincke Member of the Kings Lake, and is overlain either by the Guttenberg Limestone of the Decorah Group (northeastern Missouri), or the Kimmswick Limestone (east-central and southeastern Missouri).

U

Ulsterian Series

Ulsterian Series of Lower Devonian (Savage, 1920b) = ***upper part of Lower Devonian Series***
Ulsterian Series (Savage, 1920a) = ***upper Lower Devonian and basal Middle Devonian Series***
Ulsterian series of Middle Devonian "Sub-System" (Savage, 1925)
Ulster series (McQueen, 1939) = ***part of Lower Devonian Series***
Ulsterian Series (Cooper et al., 1942; Koenig, 1967) = ***Lower Devonian Series***
Devonian System (Lower and/or Middle? Devonian Series)

Ulster is an eastern term for part of the Middle Devonian, named for Ulster County, New York. McQueen (1939) referred to the "Ulster series", saying the Clear Creek limestone or chert belongs to it.

Union limestone

upper limestone of Union limestone member of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Coal Creek Limestone Member of Topeka Formation***
lowest shale of Union limestone of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***Holt Shale Member of Topeka Formation***
basal limestone of Union limestone of Braddyville formation (Condra and Bengston, 1915) - in Nebraska; = ***DuBois Limestone Member of Topeka Formation***
Pennsylvanian System (Virgilian Series)

Union Station shale

Union Station shale of Chanute formation (Clair, 1943) = ***Chanute Shale*** (Moore, 1949)
Pennsylvanian System (Missourian Series)

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unit number 100

unit number 100 (Broadhead, 1874) = ***Farley Limestone Member of Wyandotte Formation***
Pennsylvanian System (Missourian Series)

Unity Farm Shale Member **of Lees Summit Formation, Pleasanton Group - of Howe (1982)**

Unity Farm Shale Member of Lees Summit Formation (Howe, 1982)
Pennsylvanian System (Missourian Series)

Type section: Howe (1982, p. 17-18) stated "The name Unity Farm, from Unity Farms in sec. 25, T. 48 N., R. 32 W., Jackson County, Missouri, is here given the shale occurring between the Exline Limestone Member [of the Lees Summit Formation] below and the base of the Shale Hill Formation above. The exposure at the Acme Brick and Tile Company's plant in the NW¼ NE¼ sec. 27, T. 48 N., R. 32 W., Jackson County, has been selected as the type section because it offers permanency and best illustrates relationships of the member to overlying beds."

Howe (1982) named the Unity Farm Shale Member to replace the **"unnamed member" of the "middle unnamed formation"** of the Pleasanton Group.

Unity Farm Shale Member of Shale Hill Formation, Pleasanton Group - of Watney and Heckle (1994)

Unity Farm Shale Member of Shale Hill Formation (Watney and Heckel, 1994) = ***Unity Farm Shale Member of Lees Summit Formation and Shale Hill Formation*** of Howe (1982); = ***"unnamed member"*** *of "middle unnamed formation" of Pleasanton Group* of Thompson (1995)

Pennsylvanian System (Missourian Series)

Heckel and Watney (in press, 2001) had originally proposed the "Mantey Shale Member of the Shale Hill Formation" for this unit between the Exline Limestone Member and the Critzer Limestone Member of the Shale Hill Formation. However, on a range chart they proposed to call this unit the Unity Farm Shale Member of the Shale Hill Formation, the latter having been expanded from the use originally proposed by Howe (1982).

"unnamed member" of "lower unnamed formation", Pleasanton Group

unnamed member of lower (unnamed) formation of Pleasanton Group (Searight and Howe, 1961) = ***South Mound Shale Member of Seminole Formation***

"unnamed member" of "lower unnamed formation" of Pleasanton Group (Thompson, 1995) = ***South Mound Shale Member of Seminole Formation***

Pennsylvanian System (Missourian Series)

Thompson (1995, p. 110) stated "The 'unnamed member' above the Helper [sic.] is composed upward of underclay, a thin bed of coal, and shale. The coal is represented by a thin smut over much of western Missouri, and it can be readily traced across the northern part of the state. The combined thickness of the member is rarely more than 3 ft."

This unit may be equivalent to the **South Mound Shale Member of the Seminole Formation** proposed by Jewett, et al. (1968) and Howe (1982).

"unnamed member" of "upper unnamed formation", Pleasanton Group

unnamed member of upper (unnamed) formation of Pleasanton group (Searight and Howe, 1961)

"unnamed member" of "upper unnamed formation" of Pleasanton Group (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Thompson (1995, p. 111-112) stated "The strata above the Warrensburg Member and below the base of the overlying Hertha Formation of the Kansas City Group are assigned to an uppermost 'unnamed member' of the Pleasanton Group. In much of western Missouri, as in the Jackson County area, this member contains a gray shale and an overlying fine-grained, micaceous sandstone; the latter being the 'upper Knobtown sandstone' of many former reports." This is equivalent to the **Knobtown Limestone Member** and **Blue Mound Shale Member** of the Shale Hill Formation of Howe (1982).

"unnamed limestone" of Chouteau Group

"alternating beds of Sedalia Formation and Chouteau Limestone" (Thompson, 1979) = ***"unnamed limestone" of Chouteau Group***

"Unnamed limestone" of Chouteau Group (Thompson, 1986)

"unnamed limestone" of Chouteau Group (Thompson, 1995)

Mississippian System (Kinderhookian Series)

Thompson (1995, p. 72) stated "In the type region of the Chouteau Group (Cooper County, central Missouri), is a succession of interbedded lithographic limestone and dolomitic limestone. There is no chert in this zone, and it is identifiable as a separate unit between the Compton Limestone below and the cherty dolomitic limestone of the Sedalia Formation above. Clark and Beveridge (1952) called this unit the 'Sedalia-Compton transition beds.' This unit is about 10 ft thick in the vicinity of Sedalia, in Pettis County."

"unnamed lower shale" of Sulphur Springs Group

unnamed shale member of Sulphur Springs formation (Ulrich, 1904a)
unnamed shale of Sulphur Springs formation (Weller and Sutton, 1940)
unnamed basal shale member of Sulphur Springs Formation (Chauff and Dombrowski, 1977)
unnamed lower shale of Sulphur Springs Group (Thompson, 1993, 1995)

Devonian System (Upper Devonian Series)

According to Thompson (1995, p. 59) this shale "...is usually less than 5 ft thick, and is probably equivalent to the Grassy Creek Shale of northeastern Missouri. In the type region of eastern Jefferson County, this shale rests on the Kimmswick Limestone...or Maquoketa Shale..." Why it has never been named is unknown, other than perhaps it is so thin, only 5 ft maximum, that no one has deemed it significant enough to formally propose a name.

"unnamed shale member" of "middle unnamed formation", Pleasanton Group

unnamed member of middle (unnamed) formation of Pleasanton group (Searight and Howe, 1961) = ***Unity Farm Shale Member of Lees Summit Formation*** of Howe (1982)
"unnamed shale member" of "middle unnamed formation" of Pleasanton Group (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Thompson (1995, p. 111) stated "The gray, locally silty, micaceous shale above the Exline Member is bounded at its upper surface either by a channel-fill sandstone or by a more widespread, even-bedded, calcareous marine sandstone that is associated with the channel-fill sandstone." Howe (1982) named this unit the **Unity Farm Shale Member of the Lees Summit Formation**.

Upland formation

Upland formation (Lugn and Condra, 1932; Lugn, 1934) - in Nebraska

Quaternary System (Pleistocene Series)

This term was proposed by Lugn and Condra (1932, p. 190), named for outcrops along the East Branch of Thompson Creek, about 2 1/2 miles west of town of Upland, Franklin County, Nebraska. Lugn (1934, p. 319-351) stated it is of Yarmouth age, unconformably underlies the Loveland formation and overlies the Kansas gumbotil in places and in other places rests on the Grand Island formation.

Upper Cambrian Series

St. Croixian or Upper Cambrian (Buckley, 1908)
Upper Cambrian (Croixian) Series (Howe, 1968; Howe, et al., 1972; Kurtz, et al., 1975)
Croixian Series (Upper Cambrian) (Kurtz, 1981)

Cambrian System (Upper Cambrian Series)

This is the youngest group of Cambrian rocks. All of the Cambrian succession in Missouri, except possibly for the very basal Lamotte in some places, is Upper Cambrian in age. Upper Cambrian is used today instead of "Croixian" or "St. Croixian" for this series. Howe (1968) called this series "Upper Cambrian (Croixian) Series, and Kurtz (1981) called it "Croixian Series (Upper Cambrian)".

Three stages - (in ascending order): Dresbachian, Franconian, and Trempealeauan - have been used to subdivided Upper Cambrian succession on faunal basis (primarily on trilobites and/or brachiopods). Thompson (1995, p. 17) added "The combined thicknesses of the strata which form the upper Cambrian Series in Missouri...total approximately 2,000 ft. The Series contains six formations (in ascending older); the Lamotte Sandstone, Bonneterre Formation, Davis Formation, and the Derby-Doerun, Potosi, and Eminence Dolomites. The Davis and Derby-Doerun together constitute the Elvins Group."

Upper Devonian Series -

Upper Devonian "Sub-system" (Savage, 1925)
Upper Devonian Series (Koenig, 1961a) = ***Snyder Creek Shale only***
Upper Devonian Series (Schumacher, 1976; Thompson, 1993,1995)
Devonian System (Upper Devonian Series)

Upper Devonian rocks in Missouri are predominately Late Late Devonian shales, associated with the New Albany - Chattanooga Shale succession so widespread in the upper United States and Canada. One notable exception is the Snyder Creek Shale, which is Early Late Devonian. Little Carbonate deposition was preserved in Upper Devonian sections, only the Glen Park Limestone and Louisiana Limestone achieving any distribution in the state. Sandstones present are near-shore (beach) facies of the thick black shales.

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upper Fort Scott limestone

upper Fort Scott limestone (Haworth, 1898) = ***Higginsville Limestone***
upper Fort Scott limestone, or "Twenty-foot lime" (Greene and Pond, 1926) = ***Higginsville Limestone***
Upper Fort Scott limestone of Henrietta formation (Knight, 1928a, 1928b) = ***Higginsville Limestone***
Upper Fort Scott limestone of Henrietta formation (Knight, 1934b) = ***Higginsville Limestone***
upper Fort Scott limestone of Fort Scott limestone (McQueen and Greene, 1938) = ***Higginsville Limestone***
Pennsylvanian System (Desmoinesian Series)

This limestone was the upper limestone of the old Fort Scott formation (or limestone), the basal part being the Blackjack Creek Limestone, the two separated by the Little Osage Shale.

"upper" Gasconade Dolomite **of Gasconade Dolomite**

"upper Gasconade" (Thompson, 1991, 1995)
Ordovician System (Ibexian Series)

The upper part of the Gasconade Dolomite is dominantly medium-crystalline dolomite, and contains relatively small amounts of chert or sand. This interval came to be called **"Richland"** on some logs on file at the DNR/DGLS offices, and is now identified as **"upper" Gasconade Dolomite**, or simply **"upper Gasconade."** This unit is useful to identify in field mapping, as it allows the mapper to more closely identify the Gasconade-Roubidoux boundary at the top of the unit.

"upper Joachim Dolomite" **of Joachim Dolomite**

"upper Joachim Dolomite" (Thompson, 1991, 1995) = ***Matson and Metz Members of Joachim Dolomite***
Ordovician System (Mohawkian Series)

The "upper Joachim" comprises the massive "reef-like" algal Matson Member and much thinner overlying Metz Member. It is usually easily distinguished from the thin-bedded, shaly "middle Joachim Dolomite" it overlies, and the overlying basal units of the Plattin Group, the Brickeys Member of the Bloomsdale Limestone.

"upper Kimmswick Limestone" **of Kimmswick Limestone**

"upper Kimmswick Limestone" (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Thompson (1991) informally divided the Kimmswick succession into two units. (Thompson, 1995) stated "In northeastern Missouri, where the greatest percentage of original Kimmswick is preserved..." (p. 35) "...an **'upper Kimmswick Limestone,'** a heavily burrowed, bioclastic, fine to medium grainstone to mudstone... overlies the coarse-grained 'lower Kimmswick'...The boundary between the 'upper' and 'lower' Kimmswick is a thin K-bentonite bed (altered volcanic ash bed) exposed on U.S. Highway 61 in eastern Ralls and northern Pike counties."

"upper member in a bed of fossiliferous, bluish shale"

"upper member in a bed of fossiliferous, bluish shale" (Savage, 1908) = ***Orchard Creek Shale of Maquoketa Group***

Ordovician System (Cincinnatian Series)

"upper Pecatonica" of "Pecatonica Formation"

Ordovician System (Mohawkian Series)

This is an informal designation used by Thompson (1991) for the upper limestone beds of the "Pecatonica Formation" that are essentially identical to those of the overlying Plattin Group above the Establishment Shale Member of the Bloomsdale Limestone. The "upper Pecatonica" includes two members, the **Oglesby and Medusa Limestone Members**.

Upper series

Upper series of Mississippian system (Gordon, 1895) = ***Meramecian and Chesterian Series***

Mississippian System (Meramecian and Chesterian Series)

Upper Silurian

Upper Silurian = ***Silurian System***

Early geologic reports identified rocks of the present Silurian System as "Upper Silurian". This ended when the "Lower Silurian" was renamed Ordovician System by Lapworth (1879).

"upper unnamed formation" of Pleasanton Group

upper (unnamed) formation of Pleasanton group (Searight and Howe, 1961)

"upper unnamed formation" of Pleasanton Group (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Thompson (1995, p. 111) stated "In western Missouri the thick shale of the "middle unnamed formation" is overlain either by a calcareous, marine sandstone which contains an abundance of shell debris ["lower Knobtown", or "lower Knobtown sandstone"], or, as in the Pleasant Hill area of Cass County, by a channel-fill sandstone, which has been referred to as the Warrensburg." Howe (1982) named this unit the **Shale Hill Formation**, with three members (in ascending order, the Weldon River Sandstone Member, Knobtown Limestone Member, and Blue Mound Shale Member).

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upper unnamed member **of Dutchtown Formation**

upper unnamed member of Dutchtown formation (McQueen, 1937) = ***upper part of Sharpsboro Member of Dutchtown Formation***

Ordovician System (Mohawkian Series)

McQueen (1937) subdivided the Dutchtown Formation at its type section (the Geiser Quarry) into three members, an "upper unnamed member," the middle "Geiser Quarry member," and a "lower unnamed member," the units identified from a study of insoluble residues. In 1963, Templeton and Willman (p. 53-54) recognized two members, combining the Geiser Quarry and "upper unnamed member" into the "Sharpsboro Member", overlying the "Gordonville Member" below.

"upper unnamed shale member" of Lawrence Shale, Douglas Group

upper unnamed member of Lawrence formation (Searight and Howe, 1961)

"upper unnamed shale member" of Lawrence Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Thompson (1995, p. 122) stated "The "upper unnamed shale member"... is composed predominantly of gray shale, which is commonly red or maroon in the upper part. Sandy shale or sandstone is generally present near the middle of the unit. Coal of poor quality and of uneven thickness is locally present above the sandy strata..." This unit ranges from 20 to 50 ft in thickness "...Where it is thinnest, the unit is usually composed for the most part of red or maroon shale, and in the same localities it appears that the underlying Amazonia Limestone Member has its thickest development." This unit overlies the Amazonia Limestone Member of the Lawrence Shale, and is overlain by the basal beds of the Shawnee Group, the Toronto Limestone Member of the Oread Formation.

Upper Plattin

Upper Plattin ("so-called Decorah shale") (Branson, 1944b) = ***Glencoe Shale Member of Spechts Ferry Formation?***

Ordovician System (Mohawkian Series)

"upper Wisconsinan alluvium"

Quaternary System (Wisconsinan Series)

Whitfield (*in* Thompson, 1995, p. 148) stated "Alluvium composed of silt and clay and containing poorly sorted sand, granules, pebbles and cobbles was deposited along the streams in Missouri at the time of deposition of the Bignell loess. These deposits are more than 50 ft thick in terraces. Another younger terrace is very widespread. The exact age of the latter has not been determined, but possibly it is post-Thermal Maximum."

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upper Worland limestone

upper Worland limestone of Bandera shale member of Pleasanton Formation (Greene, 1933) = ***Worland Limestone Member of Altamont Formation***

Pennsylvanian System (Desmoinesian Series)

Greene (1933) called the two limestones of the present Altamont Formation the "upper Worland limestone" and "lower Worland limestone" of the "Bandera shale member of the Pleasanton formation". The "upper Worland" is the present **Worland Limestone Member of the Altamont Formation**, the "lower Worland" is the Amoret Limestone Member of the Altamont Formation.

Utopia Limestone Member of Howard Formation, Sacfox Subgroup, Wabaunsee Group

Utopia limestone member of Howard limestone (**Moore, 1932**)
Utopia limestone member of Howard limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Utopia member of Howard formation (Searight and Howe, 1961)
Utopia Limestone Member of Howard Limestone (Jewett, et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Utopia Limestone Member of Howard Limestone (Pabian and Diffendal, 1989) - in Nebraska
Utopia Limestone Member of Howard Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 209) located the type section "just east of the village of Utopia, sec. 5, T. 25 S., R. 11 E., Greenwood county, Kansas."

Thompson (1995, p. 128) stated "The Utopia Limestone Member...is composed of slabby, brownish-gray, clastic limestone, which contains crinoidal debris, fusuline foraminifera, pelecypods, and gastropods, as well as carbonized wood. The average thickness...is about 2 ft." The Utopia Limestone Member overlies the Winzeler Shale Member of the Howard Formation, and is overlain by the White Cloud Member of the Scranton Formation.

V

Valmeyeran Series

Valmeyer series (Weller and Sutton, 1933) = ***Osagean and Meramecian Series***

Valmeyeran Series (Swann, 1964; Collinson, et al., 1979) - in Illinois; = ***Osagean and Meramecian Series***

Mississippian System (Osagean and Meramecian Series)

According to Moore (1933, p. 261-264), J.M. Weller and A.H. Sutton proposed the Valmeyer series to include beds from the Osage group to the top of the Ste. Genevieve limestone and strata of equivalent age. The name is derived from the town of Valmeyer in west-central Illinois, where the rocks of this series are well exposed. This is essentially the Osagean and Meramecian Series of present use in Missouri. It is used in Illinois because of the difficulty in identifying the Osagean-Meramecian boundary on faunal basis. They prefer a three-part Mississippian subdivision, instead of the four part used in Missouri.

Van Buren Formation

Van Buren formation (1 member) (McQueen, 1931) = ***lower Gasconade Dolomite***

Van Buren (Branson and Mehl, 1933a) = ***lower Gasconade Dolomite***

Van Buren Formation (Kay, 1970) = ***lower Gasconade Dolomite***

Ordovician System (Ibexian Series)

The Van Buren was first distinguished and named by Ulrich (1922), but the name was not published until 1931 (McQueen). The name is taken from Van Buren, in Carter County, Missouri, near which the formation is exposed although the town is built on an outcrop of Eminence. It constitutes the lower part of the Gasconade Dolomite as it is now defined; the Gunter Sandstone was included at the base of the Van Buren. The term is not formally used today, although it can be used informally in subsurface studies as a chert-free lower Gasconade unit. The "Van Buren" is generally a low-chert, finely crystalline dolomite similar to the "upper" Gasconade.

Venteran Stage

Venteran Stage of Desmoinesian Series (Searight and Howe, 1961) = ***Krebs Subgroup of Cherokee Group***

Pennsylvanian System (Desmoinesian Series)

Type area: This stage was named by Searight and Howe (1961) from exposures at Venter Bluff in southern St. Clair County, and comprises the lower part of the Cherokee Group, the Krebs Subgroup.

Use of Venteran Stage has been very limited as it is essentially synonymous with Krebs Subgroup.

Verdigris Formation of Cabaniss Subgroup, Cherokee Group

Verdigris limestone (**Smith, 1928**) - in Oklahoma; = ***Ardmore Limestone Member***

Rich Hill, Ardmore, or Verdigris Limestone (Greene, 1933) = ***Ardmore Limestone Member***

Verdigris formation (Searight, et al., 1953; Howe and Searight, 1953; Searight and Howe, 1961)

Verdigris limestone member of Verdigris formation (Searight, et al., 1953; Howe, 1956) = ***Ardmore Limestone Member***

Verdigris limestone member of Senora formation (Branson, 1954a) - in Oklahoma; = ***Ardmore Limestone Member***

Verdigris Limestone Member of Cabaniss Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas; = ***Ardmore Limestone Member***

Verdigris Formation (Gentile, 1976; Thompson, 1995)

Verdigris - Mecca Quarry Limestone of Cherokee Group (Kidder, 1985)

Verdigris Formation (Brenner, 1989) - in Kansas

Verdigris Limestone Member of Cherokee Formation (Baars and Maples, 1998) - in Kansas; = ***Ardmore Limestone member***

Pennsylvanian System (Desmoinesian Series)

Type section: The Verdigris Formation was named by Smith (1928) from exposures along the Verdigris River in south-central Oklahoma.

Searight (1955, p. 41) stated "The Verdigris formation (Searight and others, 1953) lies between the Croweburg and Bevier formations. Near the top is the well known Verdigris limestone ('Ardmore') which is the 'sump rock' of the Wheeler coal. This coal bed constitutes the top bed of the formation."

Gordon (1893) named the **Ardmore limestone** from exposures in Macon County, Missouri. This limestone is laterally persistent, and extends into central or south-central Oklahoma, where it was named the **Verdigris limestone** by Smith (1928), and into western Missouri where it was named the **Rich Hill limestone** by Greene and Pond (1926). Abernathy (1937) redefined the Ardmore as the **"Ardmore cyclothem"** with the Ardmore limestone as one of the more characteristic units within this cyclothem. Searight, et al. (1953) formally proposed that Abernathy's "cyclothem" be called the **Verdigris formation**, identifying the prominent limestone member as the **Verdigris limestone member**. Finally, to better promote understanding of Missouri stratigraphy, and to alleviate the awkward situation of a formation and member of that formation bearing the same name, Searight and Howe (1961) proposed the present nomenclature, the **Ardmore Limestone Member of the Verdigris Formation**.

<u>Vermicular sandstone and/or shale</u>

Vermicular Sandstone and Shales (Swallow, 1855) = ***Northview Formation*** in southwestern Missouri, = ***Hannibal Formation*** in northeastern Missouri

Vermicular shale and sandstone (Williams, 1891) = ***Hannibal Shale***

"Vermicular sandstone at Northview" (Weller, 1899) = ***Northview Formation***

Mississippian System (Kinderhookian Series)

This name was used by Swallow and other early Missouri geologists for what is known as the **Hannibal Formation** (northeastern Missouri) and Northview Formation (southwestern Missouri) today. The name was derived from the supposition that the tortuous tube-like cavities that penetrate the sandstone of these beds were worm borings. However, they apparently are of vegetable origin. Weller (1899) used this term for exposures of **Northview Formation** in the vicinity of Northview, Webster County, Missouri.

Vienna Limestone

Vienna limestone (Weller, 1920)

Vienna limestone (Flint, 1925) - unpublished, first use in Missouri

Vienna Member <u>of Upper Okaw formation</u> (Sutton, 1934) - in Illinois

Vienna limestone (Weller, 1939) - first published reference in Missouri

Vienna formation (Weller, et, al., 1948; Spreng, 1961)

Vienna Limestone (Thompson, 1979a, 1986, 1995)

Mississippian System (Chesterian Series)

Type section: Weller (1920) proposed this name for a limestone present in Johnson and Pope counties, Illinois, resting on the Tar Springs sandstone, and underlying the Waltersburg sandstone.

The Vienna Limestone is the uppermost Mississippian formation occurring in Missouri, belonging to the Chesterian Series, and overlies the Tar Springs Sandstone. Flint (1925, p. 174), in an unpublished manuscript, recognized the formation in two localities in Perry County, Missouri, and Weller (1939, p. 136) also recognized it in Perry County. These are its only occurrences in Missouri, mainly represented by loose, residual fragments of dark-colored chert and spongy, siliceous, highly weathered limestone.

<u>Victory Junction shale</u>

Victory Junction shale member <u>of Stanton limestone</u> (Newell, 1936; Moore, 1936) - in Kansas; = ***Rock Lake Shale Member of Stanton Formation***

Rock Lake or Victory Junction shale member <u>of Stanton limestone</u> (McQueen and Greene, 1938)

Rock Lake ("Victory Junction") shale <u>of Stanton limestone formation</u> (Condra and Reed, 1943, 1959) - in Nebraska

Pennsylvanian System (Missourian Series)

Victory Member of Hager Limestone, Plattin Group

Victory Member of Grand Detour Formation of Plattin Subgroup (Templeton and Willman, 1963)
Victory Member of Hager Formation of Plattin Subgroup (McCart, 1986)
Victory Member of Hager Limestone of Plattin Group (Thompson and Spreng, 1988; Thompson 1991, 1995; Spreng and McCart, 1994)
Ordovician System (Mohawkian Series)

Type section: Templeton and Willman (1963) stated "The Victory Member...is here named for Mt. Victory school, Calhoun County, western Illinois, which is 4½ miles north of the type section, a quarry north of West Point Landing." This is in the east bluff of the Mississippi River Valley, and includes bluff exposures north of the quarry.

Thompson (1995, p. 34) stated "The Victory Member of the Hager Limestone is usually a single, thick bed of unburrowed, very light-gray, sublithographic limestone. The surface is rough due to the inclusion of small dolomite rhombs in the limestone...The Victory, the only member of the Hager present in east-central Missouri (along Interstate 44), is absent north of St. Charles County, and thickens from 1 ft to over 7 ft in southeastern Missouri." The Victory Member of the Hager Limestone overlies the Hely Member of the Hager Limestone, or the Beckett Limestone if the Hely and Glaize Creek Members are not present, and is overlain by the Hook Member of the Macy Limestone.

Vilas Shale of Lansing Group

Vilas shale (**Adams, 1898**) - in Kansas; "between Earlton [Plattsburg] and Iola [Stanton] limestones"
Vilas shales (Haworth, 1898) - in Kansas
Vilas shale (Adams, 1903; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Vilas shale (Adams, 1904) - in Kansas; "shale between Allen [Plattsburg] and Piqua [Stanton] limestones"
Vilas shale member of Wilson formation (Schrader and Haworth, 1906; Schrader, 1908) - in Kansas
Vilas shale (Haworth and Bennett, 1908) - in Kansas; "shale between Allen and Stanton limestones"
Vilas shale member of Lansing formation (Hinds and Greene, 1915)
Vilas shale member of Lansing formation (Moore, 1920) - in Kansas
Vilas shale (Moore, 1932; Clair, 1943)
Vilas formation (Condra and Scherer, 1939) - in Nebraska
Vilas formation (Searight and Howe, 1961)
Vilas Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Vilas Shale (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Vilas Formation (Howe, 1986)
Vilas Shale (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Originally named by Adams (1898), Moore (1936, p. 130) located the type section as at "Vilas, Wilson county, Kansas. Typically exposed in sec. 30, T. 27 S., R. 17 E., and surrounding area."

Called the "Vilas shale member of the Lansing formation" by Hinds and Greene (1915), Thompson (1995, p. 118) stated "The Vilas Shale consists of silty to sandy, gray shale and locally contains sandstone where the unit is thickest, but in northern Missouri, where the formation is thin, it is composed of dark-gray to black shale. In the westernmost part of Platte County, the Vilas is 20 ft thick; elsewhere, it is no more than 5 ft thick." The Vilas Shale overlies the Spring Hill Limestone Member of the Plattsburg Formation, and is overlain by the Captain Creek Limestone Member of the Stanton Formation.

Vinland Shale Member of Stranger Formation, Douglas Group

Vinland shale (Patterson, 1934; Moore, et al., 1934) - in Kansas
Vinland shale member of Stranger formation (Moore and Newell, *in* Moore, 1936; Moore, et al., 1951) - in Kansas
Vinland member? of Stranger formation (Searight and Howe, 1961)
Vinland Shale Member of Stranger Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas

Vinland-Haskell Members (undifferentiated) of Stranger Formation (Howe, 1986)
Vinland Shale Member of Stranger Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named **"Vinland shale"** by Patterson (1934) in an unpublished M.A. thesis, Moore (1936, p. 151) located the type section "...about 2 miles northeast of Vinland, Douglas county [Kansas], best exposures in NW sec. 12, T. 14 S., R. 29 E."

Thompson (1995, p. 121) stated "The Vinland Shale...is an extremely fossiliferous, calcareous shale and claystone. It contains an abundance of gastropods and pelecypods. The unit is from 5 to 10 ft thick in Missouri exposures." The Vinland Shale Member overlies the Westphalia Limestone Member, and is overlain by the Haskell Limestone Member of the Stranger Formation.

Vinland-Haskell Members

Vinland-Haskell Members (undifferentiated) of Stranger Formation (Howe, 1986)
Pennsylvanian System (Virgilian Series)

Howe (1986) used this term for strata exposed in parts of Platte County, Missouri, where he could not distinguish between the two members of the Stranger Formation.

Viola limestone

Viola limestone (of Kansas) (Taylor, 1947) = ***Kimmswick Limestone***
Ordovician System (Mohawkian Series)

Virgilian Series

Virgil series (**Moore, 1932**; Ver Wiebe and Vickery, 1932) - in Kansas
Virgil series (McQueen and Greene, 1938)
Virgilian series (Moore, 1948; Greene and Searight, 1949; Searight and Howe, 1961)
Virgil series (Condra, 1949) - in Nebraska
Virgilian Stage of Kawvian Series (Moore and Thompson, 1949)
Virgilian series (Moore, et al., 1951) - in Kansas
Virgilian Stage of Upper Pennsylvanian Series (Jewett, et al., 1968) - in Kansas
Virgil Series (Burchett, 1971) - in Nebraska
Virgilian Series (Thompson, 1979, 1995; Howe, 1986)
Virgilian Series (Baars and Maples, 1998) - in Kansas
Pennsylvanian System

Type area: Condra (1949, p. 11) stated the Virgil "...type locality on Verdigris River from west of Madison to Virgil [Greenwood County, Kansas] and southeastward to central Wilson County..."

Moore (1932, p. 88)) stated "The beds between the unconformity last noted [unconformity in Douglas formation or group] and the base of the Permian are defined as the Virgil series." Thompson (1995, p. 120) added "In Missouri these rocks are restricted to an area which lies north of the Missouri River and west of Caldwell, Daviess, and Harrison counties. The boundary separating the Virgilian from the Missourian Series is drawn at a pronounced unconformity, which is developed on various upper Lansing and Pedee strata, and which is overlain by a thick sandstone considered to be the equivalent of the Tonganoxie Sandstone Member of the Stranger Formation in Kansas. The boundary is not marked by pronounced faunal changes. The Virgilian comprises (in ascending order): the Douglas, Shawnee, and WabaunseeGroups..." Only the upper beds of the Wabaunsee Group are missing; those which lie above the Stotler Formation.

W

Wabaunsee Group

Wabaunsee formation (**Prosser, 1895**) - in Kansas = ***Nodaway Coal Bed to Cottonwood Formation***
Wabaunsee formation (Beede, 1898; 1902) - in Kansas; = ***Howard Formation and above***
Wabaunsee formation (Haworth, 1898) - in Kansas; = ***Bern Formation and above***
Wabaunsee formation (Hinds and Greene, 1915) = ***Bern Formation and above***
Wabaunsee group (Fath, 1921)
Wabaunsee formation (Condra, 1927) = ***Bern and above***
Wabaunsee group (Condra, et al., 1932) = ***Bern and above***
Wabaunsee group (Condra, 1935; Moore, 1936; Jewett, 1949; Moore, et al., 1951) - Kansas; = ***Severy and above***
Wabaunsee group (McQueen and Greene, 1938; Moore, et al., 1944; Branson, 1944b) = ***Tarkio (Zeandale) and above***
Wabaunsee group (Howe, 1958; Searight and Howe, 1961)
Wabaunsee Group (Jewett, et al., 1968, Heckel, et al., 1979; French, et al., 1988; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Wabaunsee Group (Thompson, 1979, 1995)
Pennsylvanian System (Virgilian Series)

Type area: Prosser (1895, p. 689) named the **Wabaunsee formation**, and stated "This series of limestones and shales is well exposed along the Neosho River below and above Emporia, and especially to the north, in the eastern and northern portions of Wabaunsee county [Kansas]."

Hinds and Greene (1915) called this the "Wabaunsee formation," whereas McQueen and Greene (1938) and Branson (1944b) called it the Wabaunsee group. Searight and Howe (1961) subdivided the Wabaunsee group into three subgroups - Sacfox, Nemaha, and Richardson. Thompson (1995, p. 126) stated "However, in late 1961 these units were deemed unnecessary by a coalition of Midcontinent geological surveys, and dropped from use."

Thompson (1995, p. 126) added "In the northern Midcontinent, the Wabaunsee Group is the uppermost group of the Pennsylvanian System. Its complete section, which is present in Kansas and Nebraska, includes all the rock units which lie between the top of the Topeka Formation of the Shawnee Group and the top of the Brownsville Limestone Member of the Wood Siding Formation. In Missouri the uppermost part of the group is absent, and within the state the succession of beds forming the Wabaunsee terminates at what is believed to be the top of the Dry Member of the Stotler Formation..."

"The formations of the Wabaunsee Group in Missouri are composed largely of shale, siltstone, and sandstone. Some of the formations contain a few, thin beds of limestone and a few beds of coal that are mineable in places..."

"Rocks of the Wabaunsee Group are present in Holt, Nodaway, and Atchison counties in the northwestern corner of the state. In this area the group is approximately 340 ft thick."

Wakarusa Limestone Member of Bern Formation, Nemaha Subgroup, Wabaunsee Group

Wakarusa limestone (Beede, 1898) - in Kansas; = ***Reading Limestone Member of Emporia Formation***
Wakarusa limestone of Humphrey shale member of Wabaunsee formation (**Condra, 1927**) - in Nebraska
Wakarusa limestone member of Humphrey Creek shale (Moore, 1932)
Wakarusa limestone member of Humphrey Creek shale formation (Ver Wiebe and Vickery, 1932)
Wakarusa limestone member of Nemaha limestone (Condra, et al., 1932) - in Nebraska
Wakarusa limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Wakarusa limestone (McQueen and Greene, 1938; Moore, 1948)
Wakarusa limestone member of Willard shale (Branson, 1944b)
Wakarusa limestone of Shawnee group (Moore, et al., 1944)
Wakarusa limestone member of Bern limestone (Moore and Mudge, 1956)
Wakarusa member of Bern formation (Searight and Howe, 1961)
Wakarusa Limestone (Landis and Van Eck, 1965) - in Iowa
Wakarusa Limestone Member of Bern Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Baars and Maples, 1998) - in Kansas

Wakarusa Limestone (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
Wakarusa Limestone Member of Bern Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Condra (1927) as the **Wakarusa limestone of Humphrey shale member of Wabaunsee formation**, Moore (1936, p. 220) stated "The Wakarusa limestone of Beede [1898, actually the Reading Limestone Member of the Emporia Formation] was 'named from the fine exposure of this rock on Wakarusa Creek immediately south of Auburn.' The beds called Wakarusa by Condra and here designated by the name are present along Wakarusa Creek south of Auburn, but much better exposures are to be found on Kansas highway 10 west of Topeka in sec. 35, T. 11 S., R. 13 E., and along the creek north of the highway near this place."

In Missouri, this unit has been referred to as the **Wakarusa limestone** (McQueen and Green, 1938), the **Wakarusa limestone member of the Willard shale** (Branson, 1944b), and **Wakarusa member of the Bern formation** (Searight and Howe, 1961), as well as the current unit. Thompson (1995, p. 129) stated "The Wakarusa Limestone Member...is composed of three units: the lower is medium-gray, argillaceous limestone, about 6 in. thick; the middle is a thin, dark-gray shale bed; and the upper is an irregular-bedded crinoidal limestone, about 2 ft thick. The total thickness of the member is about 3 ft." The Wakarusa Limestone Member overlies the Soldier Creek Shale Member of the Bern Formation, and is overlain by the Auburn Shale.

Walgreen Member

Walgreen Member of Grand Detour Formation (Templeton and Willman, 1963) = ***upper part of Beckett Limestone of Plattin Group***
Ordovician System (Mohawkian Series)

Walker coal

Walker coal of "shale and coal member of Cherokee formation" (Greene and Pond, 1926) = ***Tebo Coal Bed***
Pennsylvanian System (Desmoinesian Series)

Walnut shale

Walnut shale (Haworth and Bennett, 1908; Moore and Haynes, 1917) - in Kansas?; = ***Nowata Shale of Marmaton Group***
Walnut shale member of Pleasanton formation (McCourt, 1917)
Pennsylvanian System (Desmoinesian Series)

Walter Johnson Sandstone Member of Nowata Shale, Appanoose Subgroup, Marmaton Group

Walter Johnson sandstone member of Nowata shale (**Jewett, 1941**; Moore, et al., 1951) - in Kansas
Walter Johnson member of Nowata formation (Searight and Howe, 1961)
Walter Johnson Sandstone Member of Nowata Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Walter Johnson Sandstone Member of Nowata Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Named by Jewett (1941, p. 335), he stated the name was taken "...from the Walter Johnson school in sec. 10, T. 35 S., R. 17 E., Montgomery County, Kansas..."

Thompson (1995, p. 108) stated "..The Walter Johnson Sandstone member, which is a sandstone and siltstone, locally occupies the position of the upper Nowata and possibly cuts down into the Altamont Formation below."

Wamego Shale Member of Zeandale Formation, Richardson Subgroup, Wabaunsee Group

Wamego shale (**Condra and Reed, 1943**, 1959) - in Nebraska
Wamego shale formation (Greene and Searight, 1949)
Wamego shale (Moore, 1949; Jewett, 1949) - in Kansas
Wamego shale member <u>of Zeandale limestone</u> (Moore and Mudge, 1956)
Wamego member <u>of Zeandale formation</u> (Searight and Howe, 1961)
Wamego Shale Member <u>of Zeandale Limestone</u> (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) - in Kansas
Wamego Shale Member <u>of Zeandale Formation</u> (Burchett, 1970) - in Nebraska
Wamego Shale Member <u>of Zeandale Formation</u> (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Condra and Reed (1943, p. 42-43) renamed the Pierson Point shale of Condra (1927) the Wamego Shale, and states of the Wamego "...the type locality being in the bluffs north of Highway No. 40 about 4 miles west of Wamego, [Pottawatomie County] Kansas, where the thickness of the shale is 15 to 18 ft."

The **Pierson Point shale** as originally proposed includes strata from the Dover Limestone Member of the Stotler Formation to the Tarkio Limestone Member of the Zeandale, and not just the shale between the Maple Hill Limestone Member and Tarkio Limestone Member as originally supposed. Therefore, Condra and Reed (1943) renamed the latter interval the Wamego Shale. In Missouri, McQueen and Green (1938) and Branson (1944b) called this shale the **Pierson Point shale**. Greene and Searight (1949) called it the **Wamego shale formation**, and Searight and Howe (1961) the **Wamego member of the Zeandale formation**. Thompson (1995, p. 130) stated "The Wamego Shale Member of the Zeandale Formation is predominantly a gray shale, which grades upward to sandy shale and sandstone. The lower and middle parts of the member contain clay-ironstone concretions. The thin persistent **Nyman coal bed** is present near the top of the Member. The total thickness of the Wamego is about 20 ft." The Wamego Shale Member overlies the Tarkio Limestone Member, and is overlain by the Maple Hill Limestone Member of the Zeandale Formation.

<u>**Wappellan series**</u>

Wappellan series (Keyes, 1941b)

Quaternary System (Pleistocene Series)

This is a term used by Keyes (1941b, p. 156) for a series of mid Quaternic age, including the Illinois and Kansas tills. It is underlain by his Gravoisan series.

Wapsipinicon Formation

Wapsipinicon stage (**Norton, 1895**) - in Iowa
Wapsipinicon Formation (Stainbrook, 1935; Klapper and Barrick, 1983; Bunker, et al., 1985) - in Iowa
Wapsipinicon Group (Klapper and Barrick, 1983; Witzke, et al., 1988) - in Iowa
Wapsipinicon Group (Woodruff, 1990) - in northeastern Missouri
Wapsipinicon Formation (Kocken and Carozzi, 1991; Thompson, 1993, 1995)

Devonian System (Middle Devonian Series)

Type section: Thompson (1993, p. 107) stated "Witzke et al. (1988, p. 226) stated, 'The Wapsipinicon Formation was named by Norton (1895) for exposures along the Wapsipinicon River [between Troy Mills and Central City] in northeastern Linn County, [east-central] Iowa. It encompasses the Devonian rock sequence below the Cedar Valley Group...'"

Thompson (p. 51) continued "Wapsipinicon rocks are present in the subsurface of northwestern Missouri, as attested by a thick sequence of evaporites identified in the 'Silurian-Devonian' ('Hunton') section in several wells drilled north and east of Kansas City. Wapsipinicon is also present in northeastern Missouri (Woodruff, 1990). At this time, no exposures of the Wapsipinicon are known in Missouri."

"...All Wapsipinicon is older than the base of the Cedar Valley, the latter overstepping the depositional edge of the Wapsipinicon in northern Missouri."

<u>Warner coal bed</u>

Warner coal bed (Searight,. 1955) = ***Neutral Coal Bed of Warner Formation***

Warner coal (Searight, 1959) "= Babylon coal in Illinois"

Warner coal <u>of Warner Formation</u> (Gentile, 1976)

Pennsylvanian System (Desmoinesian Series)

Warner Formation (Sandstone) of Krebs Subgroup, Cherokee Group

Warner sandstone member <u>of McAlester shale</u> (Wilson, 1935) - in Oklahoma

Little Cabin (Warner) sandstone <u>of lower Cherokee cyclothem</u> (Moore, et al., 1951)

Warner formation (with Warner sandstone) (Searight, 1955) = ***lower part of "Graydon" of western Missouri***

Warner formation (Searight, 1959) "= Babylon sandstone of Illinois"

Warner formation (sandstone) (Searight and Howe, 1961)

Warner Sandstone Member <u>of Krebs Formation</u> (Jewett, et al., 1968) - in Kansas; = ***Rowe, Drywood and Warner formations***

Warner Formation (Gentile, 1976; Thompson, 1995)

Warner Sandstone Member <u>of Krebs Formation</u> (Baars and Maples, 1998) - in Kansas

Pennsylvanian System (Desmoinesian Series)

Type section: Wilson (1935, p. 508) stated the Warner sandstone was named from "...exposures 1 mile north of Warner...", Muskogee County, Oklahoma. Baars and Maples (1998, p. 256) located it as "About ¼ mi (0.l4 km) east of NW corner sec. 21, T. 21 N., R. 19 E., 1 mi (1.6 km) north of Warner, Oklahoma"

The Warner Sandstone is the lowest sandstone above the Riverton Formation in west-central Missouri, usually found just a few feet above the upper two coals of the Riverton Formation. It contains at least one coal - the Neutral Coal Bed.

Warrensburg Sandstone Member of "upper unnamed formation", Pleasanton Group

Warrensburg sandstone (**Winslow, 1891**)

Warrensburg channel sandstone <u>of Pleasanton formation</u> (Hinds and Greene, 1915)

Warrensburg channel (Hinds, 1926)

Warrensburg channel sandstone (Bass, 1934)

Warrensburg sandstone (?) (Greene, 1936) = ***Walter Johnson Sandstone Member of Nowata Shale***

"Big Lake" or Warrensburg sand member <u>of Bourbon formation</u> (Bartle, 1938)

Warrensburg sandstone (in Missouri) (Cline, 1941) = ***Walter Johnson Sandstone Member***

Warrensburg sandstone <u>of Pleasanton group</u> (Branson, 1944b)

Warrensburg sandstone (Howe, 1948) = ***Walter Johnson Sandstone Member of Nowata Shale***

Warrensburg sandstone member <u>of Nowata shale</u> (Greene and Searight, 1949) ***"= Walter Johnson sandstone of Jewett"***

Warrensburg member <u>of upper (unnamed) formation of Pleasanton group</u> (Searight and Howe, 1961)

Perry Farm ("Warrensburg") sandstone and shale <u>of Lenapah Formation</u> (Anderson and Wells, 1968) = ***Perry Farm Sandstone Member***

Perry Farm Sandstone <u>of Lenapah Formation</u> (**"Warrensburg" sandstone"**) (Wells and Anderson, 1968)

Warrensburg Sandstone (Emerson, 1975)

Warrensburg Sandstone Member <u>of Pleasanton Group</u> (Gentile, 1976)

Warrensburg Sandstone Member (Thompson, 1979)

Warrensburg Sandstone Member <u>of "upper unnamed formation" of Pleasanton Group</u> (Thompson, 1995)

Pennsylvanian System (Missourian Series)

Type section: Named by Winslow (1891), Hinds and Greene (1915, p. 95) stated "The Warrensburg sandstone is well exposed in the northwestern quarter of the Calhoun quadangle (secs. 28 and 29, T. 43 N., R. 25 W.), where over 106 feet of it outcrops [Johnson County, Missouri]"

Howe (1982) proposed the name **Weldon River Sandstone Member** for this and the Moberly channel sandstone, and defined it as the basal member of his Shale Hill Formation.

Warsaw Formation

Warsaw or second Archimedes limestone (Hall, 1857) = ***Warsaw to St. Louis formations***
Warsaw limestone (Englemann, 1863; Weeks, 1902; Buehler, 1907; Branson, 1944b)
Warsaw limestone of St. Louis group (Broadhead, 1874)
Warsaw stage of Genevievian age (Williams, 1891)
Warsaw shales (Keyes, 1894a)
Warsaw limestone (and shales) (Ulrich, 1904a)
Warsaw limestone member of Boone formation (Moore, 1928) - in western Missouri
Warsaw (Carthage) limestone (Giles, 1933)
Warsaw limestone of Boone group (Barney, 1959)
Warsaw formation (Spreng, 1961)
Warsaw Formation (Thompson, 1979a, 1986, 1995)
Warsaw Shale (Collinson, et al., 1979) - in northeastern Missouri
Mississippian System (Meramecian Series)

Type section: The name Warsaw was first applied by Hall (1857) to strata above the "geodiferous bed" at the top of the Keokuk limestone. It was named for exposures at Warsaw, Hancock County, Illinois.

Following Hall, Van Tuyl (1925) included the geode bed as part of the Warsaw. Worthen (1866) did not recognize the Warsaw as a distinct stratigraphic division but included these beds in the lower part of his St. Louis group. In Missouri, Shumard (1855) distinguished the "Third Archimedes" (Warsaw) limestone as a division distinct from the overlying St. Louis limestone, but Broadhead (1874) classified the Mississippian rocks essentially as Worthen had done. However, he did recognize the Warsaw limestone as a separate division correlative in rank with the St. Louis limestone of the St. Louis group. It has been classified in the Augusta, Osage, and Meramec groups at different times, as well as the Meramecian Series. The basal formation of the Meramecian Series, the Warsaw is overlain by the Salem Formation and underlain by the Keokuk Limestone. Recent biostratigraphic work by Kammer, et al. (1991) has indicated that the actual Osagean-Meramecian Series boundary is not at the base of the Warsaw, as previously defined, but is actually in the middle part of the Warsaw, at the break between the lower limestone and upper shale units of the formation in the St. Louis area.

Warsaw-Spergen formations

Warsaw-Spergen formations (Krey, 1924) = ***Warsaw and Salem Formations***
Mississippian System (Meramecian Series)

Krey (1924, p. 40-41) stated "The Warsaw and Spergen (Salem) are recognized as distinct formations over most of the area, but it is extremely difficult, if not impossible, at most localities to say where one begins and the other ends." Therefore, he proposed the combined term Warsaw-Spergen for the units when they could not be separated.

"Water rock"

"Water rock" (Cline, 1941) = ***Coal City Limestone Member of Pawnee Formation***
Pennsylvanian System (Desmoinesian Series)

Watson limestone

Watson limestone (Rowley, 1916) = ***Cyrene Limestone***
Ordovician System (Cincinnatian Series)

Rowley (1916) proposed the name Watson limestone for a brown limestone in Pike County, Missouri, from exposures half a mile southwest of Vera or Watson station, in the first cut along the C & A Railroad. He stated that it is coarser and heavier than the Cyrene limestone, and is either the very base of the Bowling Green limestone or should be regarded as another member of the Edgewood formation. The Cyrene beds are replaced by the Watson horizon, which rests on Ordovician Maquoketa Shales, and yields an abundance of fossils. This unit was regarded by Thompson and Satterfield (1975) as a facies of the **Cyrene Limestone**.

Waverly (Waverlyan) series

Waverly (Schuchert, 1897) = ***part of Mississippian System***

Waverlyan series (Ulrich, 1911) = ***Upper Devonian and Kinderhookian and Osagean Series of Mississippian***

Waverlyan series (Keyes, 1914) = ***Grassy Creek Shale***

Devonian System (Upper Devonian Series)

This is a term used by Ulrich (*in* Ulrich and Smith, 1905; 1911) for the lower part of the Mississippian System. It included the Osagean and Kinderhookian series of present terminology.

Waverly coal

Waverly coal (Robertson, 1973) **-** in Lafayette County, Missouri, **=** ***Weir-Pittsburg Coal Bed***

Pennsylvanian System (Desmoinesian Series)

"Waverly flagging"

"Waverly flagging" (early geologists) = ***Kereford Limestone Member of Oread Formation***

Pennsylvanian System (Virgilian Series)

This was an informal term given to the limestone at the top of the Oread Formation before it was named "Kereford" by Condra (1927). It is not known for certain if this name was used in Missouri, or not, but it was used in Kansas and Nebraska.

Wayside sandstone

Wayside sandstone member of Pleasanton formation (Greene, 1933) = ***Hepler Sandstone Member of Seminole Formation***

Wayside sandstone (Greene, 1936) = ***Hepler Sandstone of Pleasanton Group***

"Wayside sandstone" of Pleasanton formation (Cline, 1941) = ***Walter Johnson Sandstone Member of Nowata Shale, or Hepler Sandstone?***

Wayside sandstone (Clair, 1943) = ***Hepler sandstone?***

Hepler sandstone ("Wayside") (Cline and Greene, 1950) = ***Hepler Sandstone***

Hepler ("Wayside") sandstone of Pleasanton Group (Anderson and Wells, 1968)

Holdenville Formation ("Wayside" sandstone) (Wells and Anderson, 1968)

Pennsylvanian System (Desmoinesian and/or Missourian Series)

Wea Shale Member **of Cherryvale Formation, Linn Subgroup, Kansas City Group**

Wea shale member of Cherryvale shale (**Newell, *in* Moore, 1932**; Moore, et al., 1951) **-** in Kansas

Wea shale (Gunnell, 1933; Moore, 1936)

Wea shale member of Sarpy formation (Condra, 1949) **-** in Nebraska

Wea member of Cherryvale formation (Searight and Howe, 1961)

Wea Member of Sarpy Formation (Burchett, 1965) **-** in Nebraska

Wea Shale Member of Sarpy Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) **-** in Nebraska

Wea-Westerville Members of Cherryvale Formation (Gentile, 1976)

Wea Shale Member of Cherryvale Formation (Howe, 1986; Thompson, 1995)

Wea Shale Member of Cherryvale Shale (Watney, et al., 1989; Baars and Maples, 1998) **-** in Kansas

Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 99) located the type section on "Wea Creek in northeastern Miami County, Kansas. The best exposures occur near the SE cor. sec. 31, T. 16 S., T. 24 E., and near to center of the east side of sec. 12, T. 18 S., R. 22 E."

Thompson (1995, p. 115) stated "The Wea Shale Member...is represented by a bluish-gray, silty, micaceous shale in the Kansas City area, where it us from 20 to 25 ft thick. In northern Missouri the shale contains a number of thin, argillaceous, fossiliferous limestone beds, and is from 10 to 15 ft thick." The Wea Shale Member overlies the Block Limestone Member, and is overlain by the Westerville Limestone Member of the Cherryvale Formation.

Webster group

Webster group (Shepard, 1905) = ***Devonian System?***

Devonian System?

This term was used by Shepard (1905, p. 57) for Devonian cherts in Greene County, southwestern Missouri. He described them as very hard chert, passing from sandstone on one side into quartzite on the other, imperfectly banded and aggatized, rarely oolitic, in extremely irregular layers or masses. The derivation of the name and stratigraphic position of the cherts was not stated.

Wedington Sandstone Member of Fayetteville Shale

Wedington sandstone (Adams, 1904) - in Arkansas
Wedington sandstone member of Fayetteville formation (Adams and Ulrich. 1905) - in Arkansas
Wedington Sandstone Member of Fayetteville Formation (Thompson, 1986)
Wedington Sandstone Member of Fayetteville Shale (Thompson, 1995)

Mississippian System (Chesterian Series)

Type section: White (1936, p. 13) located the type section as "Wedington Mountain, in northern Washington County, Ark., in the southwest corner of the Fayetteville [30'] quadrangle."

Thompson (1995, p. 92) stated "In a few southwestern Missouri localities, particularly Oakleigh Mountain [Barry County], the Fayetteville Shale is capped by a thick, resistant, 30-ft sandstone.." Previously presumed to be part of the **Hale Formation** of Early Pennsylvanian age, Thompson (1986) identified the age of this sandstone as Late Mississippian, primarily on included plant fossils. He then identified the sand as northern outliers of the Wedington Sandstone of the Fayetteville Formation that is well exposed in northern Arkansas.

Weeping Water limestone

Weeping Water limestone of Andrew (Lawrence) shales (Condra and Bengston, 1915) - ?in Nebraska; = ***Toronto Limestone Member of Oread Formation***
Weeping Water (or "Weepingwater") limestone bed of Oread limestone member of Douglas formation (Condra, 1927) - in Nebraska; = ***Toronto Limestone Member***
Weeping Water limestone member of Oread limestone (Moore, 1932; Condra, et al., 1932) = ***Toronto Limestone Member***
Weeping Water (Toronto) limestone member of Oread limestone (Condra, 1935)
Toronto or Weeping Water limestone member of Oread limestone (McQueen and Greene, 1938)
Weeping Water limestone of Oread formation (Condra and Scherer, 1939) - in Nebraska
Weeping Water limestone of Oread limestone formation (Condra and Reed, 1943, 1959) - in Nebraska
Toronto (Weeping Water) limestone member of Oread formation (Condra, 1949)

Pennsylvanian System (Virgilian Series)

"Weeping Water" is a name that was used for the **Toronto Limestone Member of the Oread Formation**, primarily in Nebraska, until around 1950, when Toronto was adopted by Nebraska geologists to conform with the other Midcontinent states.

Weir Shale of Cabaniss Subgroup, Cherokee Group

Weir cyclothem (Abernathy, 1937; Moore, 1949; Moore, et al., 1951) - in Kansas
Weir formation (Searight, et al., 1953; Searight and Howe, 1961)
Weir formation (Branson, 1957) - in Kansas
Weir Formation (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Abernathy (1937, p. 22) as the "Weir cyclothem", Pierce and Courtier (1938, p. 31-32) stated "The Weir-Pittsburg coal is overlain by 10 to 30 feet of light-gray, finely laminated sandy shale...well exposed in the north wall of a pit at the center of the north line of the NE¼ sec. 19, T. 30 S., R. 25 E., and also in a pit in the NW¼ sec. 8, T. 32 S., R. 25 E. " (Cherokee County, Kansas).

Thompson (1995, p. 100) stated "Where completely represented, the Weir Formation is a composite of three cyclic successions (in ascending order): 1) shale and clay, up to 6 or more ft thick, that contains an abundance of clay-ironstone concretions; 2) a fine-grained sandstone 0-30 ft thick; 3) a micaceous siltstone up to 5 ft thick; 4) an underclay; 5) a coal; 6) a shale as much as 3 ft thick; 7) a sandstone 0-2 ft thick; 8) an underclay; 9) a coal; 10) an underclay; and 11) the **Weir-Pittsburg coal bed**." Therefore, as many as three coal beds can be found in the Weir Shale.

The Weir Shale is the basal formation of the Cabaniss Subgroup of the Cherokee Group. It overlies the Seville Formation, and is overlain by the Tebo Shale.

Weir-Pittsburg Coal Bed of Weir Shale, Cabaniss Subgroup, Cherokee Group

Weir City - Pittsburg coal beds (Haworth and Kirk, 1894) - in Kansas
Weir-Pittsburg coal (Haworth and Crane, 1898; Pierce and Courtier, 1938) - in Kansas
Weir-Pittsburg coal of Weir cyclothem (Moore, et al., 1951)
Weir-Pittsburg coal of Weir formation (Searight, et al., 1953; Branson, 1957; Searight and Howe, 1961)
Weir-Pittsburg coal of Boggy formation (Branson, 1957) - in Oklahoma
Weir-Pittsburg coal (Searight, 1959) "= DeLong coals in Illinois"
Weir-Pittsburg coal of Cabaniss Formation (Jewett, et al., 1968; Heckel, et al., 1979) - in Kansas
Weir-Pittsburg coal (Robertson, 1973) = ***Waverly coal*** in Lafayette County, ***Eureka coal*** in western Missouri
Weir-Pittsburg coal of Weir Formation (Gentile, 1976; Thompson, 1995)

Pennsylvanian System (Desmoinesian Series)

Type section: Named by Abernathy (1937), Pierce and Courtier (1938, p. 31-32) stated "The Weir-Pittsburg coal is overlain by 10 to 30 feet of light-gray, finely laminated sandy shale [Tebo Shale]...well exposed in the north wall of a pit at the center of the north line of the NE¼ sec. 19, T. 30 S., R. 25 E., and also in a pit in the NW¼ sec. 8, T. 32 S., R. 25 E. " (Cherokee County, Kansas).

Thompson (1995, p. 100) stated "The Weir-Pittsburg coal bed and its underclay are the moist widely-recognized units of the formation. The coal has been mined in many places southwestward along its strike from Henry County. Mining of this coal has been particularly active in Barton County."

***Weldon River Sandstone Member* of Shale Hill Formation, Pleasanton Group - of Howe (1982)**

Weldon River Sandstone Member of Shale Hill Formation (Howe, 1982)

Pennsylvanian System (Missourian Series)

Howe (1982) proposed the name **Weldon River Sandstone Member** for the unit formerly called Warrensburg Sandstone Member when he proposed the **Shale Hill Formation** to replace the name "upper unnamed formation" of the Pleasanton Group.

Welling Formation

Welling Formation (Amsden, 1979) - In Oklahoma, = ***Cape Limestone***

Ordovician System (Cincinnatian Series)

Well Rock series

Well Rock series (Swallow, 1866) = ***Hertha Formation***

Pennsylvanian System (Missourian Series)

West Baden formation

West Baden formation (Cumings, 1922) = ***Aux Vases to Paint Creek formations?***

Mississippian System (Chesterian Series)

"West Baden" was a term suggested to Prof. S. Weller in 1920 by Cumings (1922, p. 514, footnote) for the lower Chester, including all rocks between the top of the Beech Creek limestone above and the base of the Paoli limestone (restricted) below; however, Weller preferred to use lower Chester. According to J.M. Weller's 1948 correlation chart this included all the rocks from the base of the Aux Vases Sandstone to the top of the Paint Creek Formation. It was probably named for the village of West Baden, Orange County, Indiana.

Westerville Limestone Member of Cherryvale Formation, Linn Subgroup, Kansas City Group

Westerville limestone (**Bain, 1898**; Condra and Upp, 1933) - in Iowa
Westerville oolite (Knight, 1933b)
Westerville limestone (Dunbar and Condra, 1932) - in Nebraska; = ***Drum or Cement City Limestone***
Westerville limestone (McQueen and Green, 1938; Moore, et al., 1944)
Westerville limestone (Moore, 1936) - in Kansas
Westerville formation (Condra and Scherer, 1939) - in Nebraska
Westerville limestone member of Cherryvale shale (Clair, 1943)
Westerville (Drum) limestone (Branson, 1944b)
Westerville limestone member of Sarpy formation (Condra, 1949) - in Nebraska
Westerville limestone member of Cherryvale shale (Moore, et al., 1951) - in Kansas
Westerville member of Cherryvale formation (Searight and Howe, 1961)
Westerville Member of Sarpy Formation (Burchett, 1965) - in Nebraska
Westerville Limestone Member of Sarpy Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Westerville Limestone Member of Cherryvale Shale (Jewett, et al., 1968; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Wea-Westerville Members of Cherryvale Formation (Gentile, 1976)
Westerville ? Limestone Member of Cherryvale ? Shale (Heckel, et al., 1979) - in Kansas
Westerville Limestone Member of Cherryvale Formation (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: The Westerville was named by Bain (1898, p. 276-277), who stated "In Union county [Iowa] there is an important bed of limestone, which, from the fact that it is well shown on Sand Creek near Westerville, may be called the Westerville limestone. It lies some little distance above the DeKalb horizon."

Originally proposed simply as the "Westerville limestone" by Bain, this limestone was also known in Missouri as the "Drum limestone member of the Kansas City formation" (Hinds and Greene, 1915) and the "Westerville (Drum) limestone" (Branson, 1944b). McQueen and Greene (1938) proposed abandoning the name "Drum" and applied "Westerville limestone."

Thompson (1995, p. 115) stated "The Westerville Limestone Member... is composed of a lower, relatively uniform, even-bedded limestone and an upper oolitic limestone which varies greatly in thickness and in lithology. In the Kansas City area, the oolitic limestone locally attains a thickness of 18 or 20 ft, and the total thickness of the member may be as much as 25 ft. In northern Missouri the thickness of the entire member is less than 10 ft." The Westerville Limestone Member overlies the Wea Shale Member, and is overlain by the Quivira Shale Member of the Cherryvale (Dewey Formation in Kansas) Formation.

Weston limestone

Weston limestone (Gallaher, 1898, 1900; Weeks, 1902) = ***Iatan Limestone***
Pennsylvanian System (Missourian Series)

Weston Shale of Pedee Group

Weston shale member of Lawrence shale (**Keyes, 1899**) = ***Weston Shale and lower part of Lawrence Shale***
Weston shale member of Lawrence shale (Keyes, 1900b)
Weston shale member of Douglas formation (Hinds and Greene, 1915)
Weston shale member of Douglas formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas
Weston shale member of Douglas formation (Condra, 1927) - in Nebraska

Weston shale of Pedee group (**Moore, 1932**, 1936) - in Kansas
Weston shale (Ver Wiebe and Vickery, 1932; Moore, et al., 1951; Jewett and Muilenburg, 1957) - in Kansas
Weston (Plattford) shale formation (Condra, 1935; Condra and Reed, 1943, 1959) - in Nebraska
Weston shale (McQueen and Greene, 1938; Branson, 1944b)
Weston formation (Condra and Scherer, 1939) - in Nebraska
Weston formation of Pedee group (Searight and Howe, 1961)
Weston Shale Member of Stranger Formation of Douglas Group (O'Connor, 1963; Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Weston Formation (Howe, 1986)
Weston Shale (Goebel, et al., 1989) - in Iowa and Nebraska
Weston Shale (Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type section: Keyes (1899) named this unit the "Weston shale member of the Lawrence shale." Ver Wiebe and Vickery (1932, p. 114) located the type section at "Weston, Platte county, Missouri, T. 53n, R. 36w." A specific section has not been identified at the type section. Hinds and Greene (1915, p. 173) described a section "...measured one-half mile northwest of the Weston depot" This exposure is along the east bluffs of the Missouri River Valley in the SE¼ sec. 11, 53N-36W, in Platte County, Missouri.

Thompson (1995, p. 120) stated "The Weston Shale is a gray shale that generally contains a great many clay-ironstone concretions. It is sparsely fossiliferous and usually contains only a few pectenid pelecypods. The shale is presently being used for the manufacture of lightweight aggregate. The thickness...ranges from about 60 ft in Platte County, to approximately 100 ft in Buchanan County. North and west of Buchanan County, it thins to a thickness of only a few feet." The Weston Shale overlies the South Bend Limestone Member of the Stanton Formation, and is overlain by the Iatan Limestone.

Westphalia Limestone Member of Stranger Formation, Douglas Group

Westphalia limestone member of Stranger formation (**Moore and Newell, *in* Moore, 1936**; Moore, et al., 1951) - in Kansas
Westphalia member? of Stranger formation (Searight and Howe, 1961)
Westphalia Limestone Member of Stranger Formation (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
Westphalia Limestone Member of Stranger Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Named by Moore and Newell (*in* Moore, 1936), the type section of the Westphalia was (p. 150) "...named here from a village in western Anderson county, Kansas. Typical outcrops may be seen in roadside exposures along the north part of section 12, T. 21 S., R. 17 E., and at the NE cor. sec. 20, T. 21 S., R. 18 E."

Thompson (1995, p. 121) stated "The Westphalia Limestone Member...is a few inches of platy limestone, which contains carbonized plant material along the bedding planes." The Westphalia overlies either the Iatan Limestone of the Pedee Group, the Tonganoxie Sandstone Member, or the Silbey Coal Bed or its underclay. It is overlain by the Vinland Shale Member of the Stranger Formation.

Wheeler formation

Wheeler formation (Howe and Searight, 1953) = ***upper (post-Ardmore Limestone Member) part of Verdigris Formation***
Pennsylvanian System (Desmoinesian Series)

Wheeler Coal Bed of Verdigris Formation, Cabaniss Subgroup, Cherokee Group

Wheeler coal (**Weller, et al., 1942**) - in Iowa
Wheeler coal of Verdigris formation (Searight, et al., 1953; Searight and Howe, 1961)
Wheeler coal of Wheeler formation (Howe and Searight, 1953)
Wheeler coal (Robertson, 1971)

Bevier-Wheeler coal (Robertson, 1971) - where two coal beds are only separated by a thin shale seam, mined as one bed; = ***Bevier and Wheeler Coal Beds***
Wheeler coal of Verdigris Formation (Gentile, 1976)
Wheeler Coal Member of Sweed Hollow Formation (Ravn, et al., 1984) - in Iowa
Wheeler coal bed of Verdigris Formation (Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: St. John (*in* White, 1870, "Geology of Iowa") described a coal outcropping near Wheeler's Mill, Lucas County, Iowa. This coal later was placed in the Swede Hollow Formation by Ravn, et al. (1984, personal communication, Mary Howes, Iowa Geological Survey Bureau), the type section exposed along Whitebreast Creek in Lucas Co., Iowa.

Whetstone Creek Member of Bonneterre Formation

Whetstone Creek Member of Bonneterre Formation (Kurtz, et al., 1975; Thompson, 1995)
Cambrian System (Upper Cambrian Series)

Type section: Kurtz, et al. (1975, p. 8-9) stated "This widespread subsurface unit overlies the Sullivan Siltstone. The surface exposures of the Whetstone Creek are inadequate as a type section. The surface section described earlier along with the Sullivan Siltstone [type section] is simply designated as a reference section, and the type section is the 1,435.0-1,468.0-foot interval in the St. Joe Minerals Corporation Core #63W133 (WR-1), SE¼ SE¼ sec. 16, T. 29 N., R. 13 W., Wright County, Missouri...The name of the member comes from Whetstone Creek near which the Wright County core hole was drilled."

The Whetstone Creek Member of the Bonneterre Formation overlies the Sullivan Siltstone Member of the Bonneterre, and is overlain by the Davis Formation.

White Cloud Shale

White Cloud Shale (Condra, 1927) = ***Scranton Formation***
Pennsylvanian System (Virgilian Series)

This unit, proposed by Condra (1927), was equivalent to what later (Condra, 1930) became the Scranton Formation.

White Cloud Shale Member of Scranton Formation, Sacfox Subgroup, Wabaunsee Group

White Cloud shale of Scranton shale member of Shawnee formation (**Condra, 1927**) - in Kansas; = ***White Cloud, Happy Hollow, and Cedar Vale members of Scranton Formation***
White Cloud shale member of Scranton shale (Condra, 1930) - in Nebraska
White Cloud shale member of Scranton shale (Moore, 1932; Condra, et al., 1932; Condra, 1935)
White Cloud shale (Moore, 1936; Moore, et al., 1951) - in Kansas
White Cloud shale (McQueen and Greene, 1938; Moore, 1948)
White Cloud shale member of Scranton shale (Branson, 1944b; Moore and Mudge, 1956)
White Cloud member of Scranton formation (Searight and Howe, 1961)
White Cloud Shale (Landis and Van Eck, 1965) - in Iowa
White Cloud Shale Member of Scranton Shale (Jewett, et al., 1968; Baars and Maples, 1998) - in Kansas
White Cloud Shale Member of Scranton Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska
White Cloud Shale Member of Scranton Formation (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Condra (1927, p. 58) stated "the White Cloud Shale is here named from exposures west of White Cloud, [Doniphan County] Kansas, where its thickness is about 100 feet..."

Originally proposed as a formation that included several members, equal to what is now the Scranton Formation, Condra (1930) redefined the White Cloud to be the basal member of the Scranton Formation. Thompson (1995, p. 129) stated "The White Cloud Member...is composed predominantly of gray shale. The upper 20 to 25 ft...contains numerous, thin, silty and argillaceous beds of limestone and large, irregular-shaped, septarian concretions....The boundary between the White Cloud and the overlying Happy Hollow Member is arbitrarily placed at the position of a coal horizon, which lies above the septarian concretions and beds of silty limestone....The average thickness of the member is about 100 ft." The White Cloud Shale Member overlies the Utopia Limestone Member of the Howard Formation, and is overlain by the Happy Hollow Member of the Scranton Formation.

White lead

White lead (Gallaher, 1900) = ***Bonneterre Formation***

Cambrian System (Upper Cambrian Series)

Gallaher (1900, p. 90-91) used this term for the second member of his Cambrian section. It is underlain by his "Basal sandstone" (Lamotte) and overlain by his "Dead Rock" or "Second limestone". It is part of the Bonneterre.

"White Ledge"

"White Ledge" of Burlington Limestone (Carter, 1968) = ***"Burlington white chert"*** of Bridge, 1917

Mississippian System (Osagean Series)

This is the lower 20-30 ft of **Burlington Limestone** in northeastern Missouri that is sparsely cherty to chert-free. It is 95-99% calcium carbonate, and numerous agricultural limestone quarries have been established to quarry this zone.

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white oolite bed

white oolite bed near Louisiana, Mo. (Onondaga) (Swallow, 1855) = ***Noix Limestone***

Ordovician System (Cincinnatian Series)

White River limestone

White River limestone (Winslow, 1894) = ***Jefferson City to Powell Dolomites***

Ordovician System (Ibexian Series)

Winslow (1894, p. 331) used the term "White River limestone" for all of his "Ozark series" in southwest Missouri. It was named for the White River in southwest Missouri and includes the Jefferson City, Cotter, and Powell Dolomites of current usage.

Whiterockian Series

Whiterockian Stage of Champlainian Series (Barnes, et al., 1973) = ***Everton Formation***

Whiterockian Series (Ross, et al., 1982, Thompson, 1991, 1995)

Ordovician System

This series of lower Middle Ordovician strata was defined from sections in Nevada. It is overlain by rocks of the upper Middle and Upper Ordovician Mohawkian Series, and overlies the Lower Ordovician Ibexian Series. Only one formation in Missouri, the Everton, is considered to be Whiterockian in age.

Wilcox Group

Wilcox group (Farrar, 1935)

Tertiary System (Eocene Series)

Type area: The name **Wilcox** was first used in published reports by Crider (1906) who then considered this group as a single formation. But the term was originally used by E.A. Smith, prior to this, in unpublished work in Alabama. The name of the group is derived from extensive development in Wilcox County, Alabama. Later the U.S. Geological Survey (Wilmarth, 1938) raised the name to the rank of a group and included in it all formations above the Midway and below the Claiborne.

Safford (1856, p. 148-162) described these units in Tennessee under the term "Orange Sand". Hilgard (1860, p. 110-111) used the name "Northern Lignitic" in Mississippi. Safford (1869, p. 424) revised his earlier description and used the name "Orange Sand or Lagrange group". The term "Lagrange formation" became widely used in the northern part of the Mississippi embayment.

In Missouri, the Wilcox Group consists of the Ackerman and Holly Springs Formations. It overlies the Porters Creek Clay of the Midway Group (Paleocene Series), and is overlain by Mounds Gravel (Pliocene Series). Wilson (1922, p. 263-264) first used the term Wilcox in Missouri to include all strata between the Cretaceous below and the Pliocene(?) gravel above. In 1935 Farrar (p. 23-24) redefined the Missouri usage of the term to include only those beds of sand and clay that lie between the top of the Midway and the base of the Pliocene(?). This conforms with the usually accepted meaning of the Wilcox Group throughout the Coastal Plain region. McQueen (1939, p. 59-76) published subdivisions proposed by Stewart (unpublished manuscript, 1942) and introduced into Missouri the formational names **Ackerman** and **Holly Springs**, which had been previously proposed from sections in Mississippi as units within the Wilcox Group.

Thompson (1995, p. 139) added "In Missouri, the formations of the Wilcox Group are widely distributed along Crowley's Ridge in Stoddard County and are present in a limited area in Scott County southwest of Commerce...On the surface it is possible to distinguish both the Ackerman and Holly Springs Formations as the lower and upper components of the group, respectively, but these two units are difficult to differentiate in the subsurface. The Wilcox Group has a thickness in its outcrop area that varies from 0, to more than 300 ft because over much of the area...it forms the uppermost rock succession on Crowley's Ridge. It thickens southeastward; and in the subsurface in the extreme southeastern corner of the state, it is more that 1,300 ft thick..."

Wildcat Mountain Rhyolite of Taum Sauk Group, St. Francois Mountains Volcanic Supergroup

Precambrian Erathem

Type section: Named by Berry (1976), the type section is in the S½ NE¼ sec. 6, T. 33 N., R. 3 E., Reynolds County, Missouri.

Robertson (*in* Thompson, 1995, p. 9-10) stated "The Wildcat Mountain Rhyolite is a deep-maroon ash-flow tuff containing 5-10 percent quartz and feldspar phenocrysts and many white stringers of microcrystalline quartz and feldspar. It is widely exposed in the Taum Sauk area where it is nearly 300 ft thick." Anderson (1962) called this unit the "Shut-ins fragmental ash flow", and all but the upper part of the "Unit D, tuff of Stouts Creek" mentioned by Anderson (1970) is now in this unit.

Willard Shale of Nemaha Subgroup, Wabaunsee Group

Willard shale (**Beede, 1898**, 1902; Moore, 1936; Moore, et al., 1951) **-** in Kansas
Willard shale (Haworth and Bennett, 1908; Moore and Haynes, 1917; Moore, 1920) **-** in Kansas; **=** ***Auburn Shale and Emporia Formation***
Willard shale (Hinds and Greene, 1915) **=** ***Soldier Creek and Wakarusa members of Bern Formation and Auburn Shale***
Willard shale member of Wabaunsee formation (Condra, 1927) **-** in Nebraska
Willard shale (Moore, 1932, 1948; McQueen and Greene, 1938; Branson, 1944b, p. 293)
Willard shale member of Nemaha limestone (Condra, et al., 1932) **-** in Nebraska
Willard shale (Branson, 1944b, p. 288) **=** ***Bern Formation, Auburn Shale, and Reading Limestone Member of Emporia Formation***
Willard-Langdon shale (Moore, 1949; Moore, et al., 1951) **-** in southern Kansas; **=** ***Zeandale and Pillsbury Formations?***
Willard formation (Searight and Howe, 1961)
Willard-Langdon Formations (Burchett and Reed, 1967) **-** in Nebraska; **=** ***Zeandale and Pillsbury Formations***
Willard Shale (Jewett, et al., 1968; Baars and Maples, 1998) **-** in Kansas
Willard Formation (Burchett, 1970) **-** in Nebraska
Willard Shale (Pabian and Diffendal, 1989) **-** in Nebraska
Willard Shale (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: According to Condra (1927, p. 78-79), Beede (1898) named the Willard shale from "...exposures south of Willard, [Shawnee County] Kansas, but [it] has been wrongly correlated at places..."

Thompson (1995, p. 130) stated "The Willard Shale consists mostly of gray shale, but contains a sandstone bed of variable thickness in its upper part. Where it crops out along the Missouri River bluffs in Atchison County, the thickness of the formation ranges from 20 to 30 ft, but in the subsurface north of Rock Port in Atchison County, it is somewhat thicker." The Willard Shale overlies the Elmont Limestone Member of the Emporia Formation, and is overlain by the Tarkio Limestone Member of the Zeandale Formation.

Willard shales

Willard shales (Branson, 1944b) = ***Nemaha Subgroup of Wabaunsee Group***

Pennsylvanian System (Virgilian Series)

Branson (1944b) named the succession from the base of the Burlingame Limestone Member of the Bern Formation to the top of the Reading Limestone of the Emporia Formation the "**Willard shales.**" All of the members of this succession were members of the Willard shales (or shale). He also called the actual Willard Shale, the Willard shale, but also recognized the Emporia Formation for the Harveyville and Elmont Members, in between his two "Willard shales."

"Williams" coal

"Williams" coal of "Shale and coal member of Cherokee formation" (Greene and Pond, 1926) - in Vernon County, Missouri; = ***Wheeler Coal Bed***

Pennsylvanian System (Desmoinesian Series)

Wilson formation

Wilson formation (Schrader and Haworth, 1905) - in Kansas; = ***Linn Subgroup of Kansas City Group and Lansing Group***

Pennsylvanian System (Missourian Series)

Named from exposures in Wilson County, southern Kansas.

Winfield limestone

Winfield limestone (Keyes, 1898c) = ***Cotter and Powell Dolomites***

Ordovician System (Ibexian Series)

Keyes (1898c, p. 59-60) proposed this term for strata now called Cotter Dolomite. It was named for Winfield, in Lincoln County, Missouri. It may also include strata up into the Powell Dolomite.

Winnebago Shale Member

Winnebago Shale Member of Burlingame Formation (Burchett, 1970; Pabian and Diffendal, 1989) - in Nebraska

Pennsylvanian System (Virgilian Series)

Winoka gravel

Winoka gravel (Park, 1904; Hays, 1904; Shepard, 1904)

Tertiary System

The Winoka gravel was proposed in a special report that included papers by Park (1904, p. 14; Hays, 1904, p. 19; and Shepard, 1904, p. 41) for scattered deposits of orange-brown to grayish-yellow river gravel occurring for the most part on hill tops and hillsides far above present stream beds in southwest Missouri. It rests on upper Burlington Limestone except in one area, where it rests on Compton Limestone. It was assigned to the Tertiary. In a later reports, Shepard (1905) assigned this gravel to the Pliocene and stated that it is the same as the Lafayette gravel. It was named for exposures at Winoka, in Greene or Christian County, Missouri.

Winterset Limestone Member of Dennis Formation, Bronson Subgroup, Kansas City Group

Winterset limestone (**Tilton and Bain, 1897**) - in Iowa
Winterset limestone member of Kansas City formation (Hinds and Greene, 1915; McCourt, 1917) = ***Dennis Formation***
Winterset limestone member of Kansas City formation (Moore and Haynes, 1917; Moore, 1920) - in Kansas; = ***Dennis Formation***
Winterset limestone member of Kansas City formation (Condra, 1927) - in Nebraska; = ***Dennis Formation***
Winterset limestone member of Dennis formation (Jewett, 1932; Moore, 1936) - in Kansas
Winterset limestone (Condra, et al., 1932; Gunnell, 1933)
Winterset limestone (McQueen and Greene, 1938) - old Drum limestone
Winterset limestone of Dennis formation (Condra and Scherer, 1939) - in Nebraska
Winterset limestone member of Dennis limestone (Clair, 1943)
Winterset limestone member of Dennis limestone (Moore, et al., 1951) - in Kansas
Winterset limestone (Wanless, 1955) "= Macoupin limestone of Illinois"
Winterset limestone member of Dennis limestone (Jewett and Muilenberg, 1957) "= Hogshooter limestone of Oklahoma"
Winterset member of Dennis formation (Searight and Howe, 1961)
Winterset Limestone Member of Dennis Formation (Payton, 1966; Gentile, 1976; Thompson, 1995)
Winterset Limestone Member of Dennis Formation (Burchett and Reed, 1967; Burchett, 1970, 1971) - in Nebraska
Winterset Limestone Member of Dennis Limestone (Jewett, et al., 1968; Heckel, et al., 1979; Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Winterset Limestone Member of Swope Limestone (Pabian and Diffendal, 1989) - in Kansas

Pennsylvanian System (Missourian Series)

Type section: The Winterset Limestone Member was named by Tilton and Bain (1897) from exposures in the vicinity of Winterset, Madison County, Iowa. Thompson, et al. (1956, p. 797) described the type section as "Winterset limestone...In old quarry on the south edge of Winterset, Madison county, Iowa in the west half sec. 6, T. 75N., R. 37W." However, in 1998, Baars and Maples (p. 266) located the type section of the Winterset as "Vicinity of Winterset, Madison County, Iowa (sec. 22, T. 57 N., R. 28 W.)."

Thompson (1995, p. 114) stated "The Winterset Limestone Member...is a thin- to thick-bedded limestone with many shale partings. The Winterset, like most thick Pennsylvanian limestones in this region, is composed principally of fossil debris...The rock is light- to medium-gray on freshly broken surfaces, but weathers to light-brown or drab. It commonly contains an abundance of dark-gray chert in its upper part. It has been quarried for riprap, road metal, and agricultural limestone in many localities in northern and western Missouri. The thickness of the Winterset ranges from 25 to 40 ft." The Winterset Limestone Member overlies the Stark Shale Member of the Dennis Formation, and is overlain by the Fontana Shale Member of the Cherryvale Formation

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Winzeler Shale Member of Howard Formation, Sacfox Subgroup, Wabaunsee Group

Winzeler shale member of Howard limestone (**Moore, 1932**)
Winzeler shale member of Howard limestone (Moore, 1936; Moore, et al., 1951) - in Kansas
Winzeler member of Howard formation (Searight and Howe, 1961)
Winzeler Shale Member of Howard Limestone (Jewett ,et al., 1968; French, et al., 1988; Baars and Maples, 1998) - in Kansas
Winzeler Shale Member of Howard Limestone (Pabian and Diffendal, 1989) - in Nebraska
Winzeler Shale Member of Howard Formation (Thompson, 1995)

Pennsylvanian System (Virgilian Series)

Type section: Named by Moore (1932), Moore (1936, p. 208) located the type section on the "Winzeler farm, sec. 4, T. 26 S., R. 11 E., Greenwood county, Kansas."

Thompson (1995, p. 128) stated "The Winzeler Shale Member...is composed of dark-gray shale, which is apparently unfossiliferous. The thickness of the member ranges from 2 to 4 ft." The Winzeler Shale Member overlies the Church Limestone Member, and is overlain by the Utopia Limestone Member of the Howard Formation.

Wisconsinan Stage

Quaternary System (Pleistocene Series)

Type area: The name was proposed by Chamberlin (1894, p. 754-775) in the form of "East Wisconsin stage" of glaciation for the time, and "East Wisconsin formation" for the deposits, because of their development in eastern Wisconsin.

The name Wisconsinan was applied to the fourth and last of first-rank subdivisions of the Pleistocene Series that is characterized by continental glaciation. It is usually divided into two substages, called Upper and Lower Wisconsinan. At the suggestion of Upham, Chamberlin (1895, p. 270-277) shortened the name to Wisconsin. Leighton (1931, p. 51-53) proposed to reclassify the Iowan and Wisconsin drifts by including in the Wisconsin the Peorian loess and the underlying Iowan drift. It has been subdivided by several authors, but these subdivision are not used in Missouri. Davis (*in* Davis, et al., 1960, p. 30) recognized deposits of Wisconsinan age in Platte County, Missouri, and used the top of the Brady soil as the division between Upper and Lower Wisconsinan.

Whitfield (*in* Thompson, 1995, p. 148) stated "The deposits of Wisconsinan age in Missouri are separated into upper and lower units. In this report the top of the Brady Geosol is recognized as the upper limit of the lower unit, which also includes the Peoria loess and the Farmdale loess. The upper unit includes the Bignell loess and alluvium. Other loesses of Wisconsinan age have been differentiated in Illinois, and some of them may possibly be present in Missouri. The loesses are thickest adjacent to the Missouri and Mississippi river valleys. The greatest thickness of loess reported in Missouri is 122 ft."

Wise Lake Formation

Wise Lake Formation of Kimmswick Subgroup of Galena Group (Templeton and Willman, 1963; Willman and Kolata, 1978) = ***upper Kimmswick Limestone***

Ordovician System (Mohawkian Series)

The Wise Lake was proposed by Templeton and Willman (1963), principally from exposures in northern Illinois-southern Wisconsin, but was extended into Missouri as a subdivision of the Kimmswick Limestone.

Wittenberg shale

Wittenberg shale (Keyes, 1915; Kindle and Miller, 1939) = ***upper part of the Grand Tower Limestone***
Wittenberg shales (Keyes, 1939e) = ***Beauvais Sandstone?***, at least in part
Wittenberg shales (Keyes, 1941c, 1941i) = ***upper Grand Tower Limestone***, "Lower Devonic"

Devonian System (Middle Devonian Series)

Keyes (1915, p. 253) proposed the term Wittenberg shale for shales he defined as underlying the Callaway limestone and overlying the Grand Tower limestone in southeastern Missouri, the unit named for Wittenberg, in Perry County, Missouri. Recent studies (Thompson (1993, p. 95-96, 103) concluded that the Wittenberg shale is part of the Grand Tower succession, and possibly at least part of the overlying Beauvais Sandstone; no Callaway (or Cedar Valley) limestone is identified southeastern Missouri.

Wolf River limestone

Wolf River limestone of Topeka limestone formation (Condra and Reed, 1937) - in Nebraska; = ***Hartford Limestone Member of Topeka Formation***
Wolf River limestone of Topeka formation (Condra and Reed, 1943, 1959) - in Nebraska; = ***Hartford Limestone Member of Topeka Formation***

Pennsylvanian System (Virgilian Series)

Worland Limestone Member of Altamont Formation, Appanoose Subgroup, Marmaton Group

upper Worland limestone of Bandera shale member of Pleasanton formation (Greene, 1933) = ***Worland Limestone Member***

intervening shale between upper and lower Worland limestone of Bandera shale member of Pleasanton formation (Greene, 1933) = ***Lake Neosho Shale Member of Altamont Formation***
lower Worland limestone of Bandera shale member of Pleasanton formation (Greene, 1933) = ***Amoret Limestone Member of Altamont Formation***
Worland limestone member of Bandera shale (Moore, 1936) - in Kansas; = ***unnamed limestone within Bandera Shale***
Worland limestone member of Altamont formation (Cline, 1941) - unit #7, p. 33 = ***Amoret Limestone Member of Altamont Formation***
Worland limestone member of Altamont limestone (Jewett, 1941; Moore, et al., 1951) - in Kansas
Worland limestone member of Altamont limestone (Clair, 1943)
upper "Worland limestone" of Bandera shale (Branson, 1944b) = ***Worland Limestone Member of Altamont Formation***
lower "Worland limestone" of Bandera shale (Branson, 1944b) = ***Amoret Limestone Member of Altamont Formation***
Worland limestone member of Altamont formation (Greene and Searight, 1949)
Worland member of Altamont formation (Cline and Greene, 1950; Searight and Howe, 1961)
Worland limestone (Wanless, 1955) **"= Piasa limestone of Illinois"**
Worland Limestone Member of Altamont Limestone (Jewett, et al, 1968; Baars and Maples, 1998)- in Kansas
Worland Limestone Member of Altamont Formation (Gentile, 1976; Thompson, 1995)
Pennsylvanian System (Desmoinesian Series)

Type section: Originally named by Greene (1933) for the succession now called Altamont Formation, Cline (1941) redefined the name Worland to include only the upper limestone member of the Altamont. Jewett (1941, p. 334) then stated "I am here designating as the type exposure of the Worland limestone the exposure along the Kansas City Southern railway just north of the grade crossing northeast of Worland, Missouri. At that place is exposed about 4.5 feet of gray-brown-weathering, massive limestone containing large fusulinids and overlying a few inches of dark, platy shale." This section is located in the SW SW sec. 5, 39N-33W, Bates County, Missouri.

Thompson (1995, p. 108) stated "This persistent member of the Altamont Formation...crops out from Bates and Jackson counties northeastward to the Missouri-Iowa state line in Putnam County. It is characteristically a massive bed of limestone which grades laterally into a lower light-bluish-gray limestone and upper lighter gray, algal limestone...The member varies in thickness from 1 to 4 ft." The Worland Limestone Member overlies the Lake Neosho Shale Member of the Altamont Formation, and is overlain by the Nowata Shale.

Wrather Limestone

Wrather Limestone (North, 1968) - in Illinois, = ***Little Saline Limestone***
Devonian System (Lower Devonian Series)

Wyandotte Formation of Zarah Subgroup, Kansas City Group

Wyandotte limestone (5 members) (**Newell, *in* Moore, 1932)**
Wyandotte limestone (5 members) (Moore, 1936; Moore, et al., 1951) - in Kansas
Wyandotte formation (4 members) (Condra and Scherer, 1939) - in Nebraska
Wyandotte limestone (Ellison, 1941) = ***Argentine Limestone Member only***
Wyandotte limestone formation (4 members) (Condra and Reed, 1943, 1959) - in Nebraska
Wyandotte formation (5 members) (Moore, 1948; Searight and Howe, 1961)
Wyandotte Formation (5 members) (Burchett, 1965, 1970, 1972; Burchett and Reed, 1967) - in Nebraska
Wyandotte Limestone (6 members) (Jewett, et al., 1968) - in Kansas
Wyandotte Limestone (5 members) (Watney, et al., 1989; Baars and Maples, 1998) - in Kansas
Wyandotte Formation (5 members) (Kidder, 1985; Howe, 1986; Thompson, 1995)
Wyandotte Limestone (3 members) (Pabian and Diffendal, 1989; Watney and Heckel, 1994) - in Kansas; restricted, ***Frisbie through Argentine Members only***
Pennsylvanian System (Missourian Series)

Type section: Named by Newell (*in* Moore, 1932), Moore (1936, p. 119) located the type section as "Along Kansas river in southern Wyandotte county, Kansas. Typical exposures in quarry of Lone Star Cement co., at east edge of Bonner Springs."

Moore (1932, p. 92) stated "The Wyandotte limestone includes the 'Iola' of Kansas City, which is named Argentine, a few feet of shale (Island Creek) which overlies this limestone, and the Farley limestone, as identified by Hinds and Greene..." Thompson (1995, p. 116) stated "The Wyandotte Formation is composed of five members (from the base upward): the Frisbie, Quindaro, Argentine, Island Creek, and Farley..." Currently the Wyandotte Formation overlies the Lane (or Liberty Memorial) Shale and is overlain by the Bonner Springs Shale (or the Island Creek Shale Member of the Lane Shale).

Watney and Heckel (1994) and Heckel and Watney (in press, 2001) are proposing to restrict the Wyandotte to the Frisbie, Quindaro and Argentine Members, and place the Island Creek and Farley Members into the overlying Lane Shale, along with the Bonner Springs Member.

Wyckoff limestone

Wyckoff limestone (Haworth and Kirk, 1894) - in Kansas (preoccupied); = ***Burlingame Limestone Member of Bern Formation***

Pennsylvanian System (Virgilian Series)

Y

Yankeetown Sandstone

Yankeetown sandstone (**Weller, 1914**)
Yankeetown chert (Weller, 1920; Flint, 1925)
Yankeetown formation (Weller and St. Clair, 1928; Branson, 1944b; Spreng, 1961)
Yankeetown Sandstone of Gasperian Stage (Swann, 1963) - in Illinois
Yankeetown Sandstone (Thompson, 1979a, 1986, 1995)

Mississippian System (Chesterian Series)

Type section: The formation was named by S. Weller (1914, p. 124) from exposures in Monroe and Randolph counties, Illinois, and the occurrence of the formation in Missouri is a continuation of the Illinois outcrop along the strike where the beds cross the Mississippi River (S. Weller, 1928, p. 236). It was named for typical development adjacent to Yankeetown School in the southeast corner of Monroe County, Illinois. Thompson (1986, p. 130) stated "Swann (1963, p. 86) described the type section as '...located on west side of the Ames-Waterloo Road a few hundred feet south of Prairie Branch Creek and a quarter of a mile north of the southeast corner of sec. 26, T. 4 S., R. 9 W.,...Monroe County, Illinois.'"

The Yankeetown Sandstone overlies the Renault Formation and underlies the Paint Creek Formation. Shumard (1855, p. 149) observed this bed but offered no interpretation of the age of this "hard siliceous limestone." But later (1859, p. 405; 1873, p. 292) he referred this bed with some of the underlying shale, to the "Coal Measures," or to what is now called the Pennsylvanian system. Atherton, et al. (1975, p. 152) stated "The Yankeetown is a sandstone-shale unit in western Illinois that grades into a limestone-shale unit in eastern Illinois...Red shale is extensively developed near the top of the Yankeetown, but other shales present are dark greenish-gray, and variegated." Spreng (1961, p. 75) noted that in Missouri "At many places, the formation contains gray or red shale"

Yarmouth Geosol

Quaternary System (Pleistocene Series, Yarmouthian Stage)

Whitfield (*in* Thompson, 1995, p. 146) stated "Remnants of a thick, gray soil developed on the pre-Illinoian till and preserved only on primary divides in northern Missouri have been tentatively classified as Yarmouthian age." These are classified under the name **Yarmouth Geosol**.

Yarmouthian Stage

Quaternary System (Pleistocene Series)

Type area: The name was proposed by Leverett (1898b, p. 238-243) for deposits of this interglacial stage that had been discovered in material thrown out of a well at Yarmouth, Des Moines County, Iowa.

The name is applied to the interglacial stage following the third, or "pre-Illinoian Stage of glaciation and preceding the second or Illinoisan Stage of glaciation. The deposits include soil, gumbotil, vegetal, and other interglacial deposits. Two formal units, the **Yarmouth Geosol** and **Ferrelview Formation** are part of the Yarmouthian Stage.

Yarmouth-Sangamon Soil

Quaternary System (Pleistocene Series, Illinoian Stage)

Whitefield (*in* Thompson, 1995, p. 147) stated "The Yarmouth-Sangamon soil is intensely weathered. Guccione (1982) describes this soil occurring on north-central Missouri uplands where weathering and development of the Sangamon Geosol has extended through a thin deposit of Loveland loess and welded to the underlying Yarmouth Geosol, which formed on the pre-Illinoian till. In places the Yarmouth-Sangamon soil has at least a 4.3 meter thick leached and gleyed solum."

Yellville

Yellville formation (Adams and Ulrich, 1905) in Arkansas; = ***Cotter, Powell, and Smithville Dolomites***
Yellville group (Ulrich, 1911)
Yellvillian series of Cambric Period (Keyes, 1941b) = ***Roubidoux to Powell formations***

Ordovician System (Ibexian Series)

Adams (1904, p. 18, 32, 90, 93) and Bain and Ulrich (1905, p. 12) proposed the terms Yellville formation or Yellville group for the magnesian limestones or dolomites of Ordovician age of northern Arkansas. In 1905, it was applied to all rocks between the top of the Elvins of Missouri and the base of the St. Peter (actually in the Everton limestone). Ulrich (1911, p. 667, pl. 27) restricted the term to rocks in northern Arkansas and southern Missouri between the top of the Jefferson City Dolomite and the base of the Everton limestone. Bassler (1915, p. 2) published a series of charts in which Ulrich had rearranged and reevaluated names. Yellville was raised to a series and included Powell limestone (the restricted Yellville of 1911), Cotter limestone (the upper part of what had been Jefferson City), Jefferson City limestone, and Roubidoux sandstone.

Yorkic period - A term used by Keyes (1941b, p. 157) apparently for the Devonian.

Z

Zadoc member

Zadoc member of McNairy Formation (McQueen, 1939)
"Zodoc (*sic.*) clay" (Thompson, 1995)

Cretaceous System (Gulfian Series)

This is a member of the McNairy Formation as used by McQueen (1939, p. 70). The name presumably is from the town of Zadoc (or Zadock) near the Ardeola Hill section, in Scott County, Missouri. "...a light-gray, to brownish-black, lignitic lay locally know as the **'Zodoc clay'** has been mined for ceramic clay" (Thompson (1995, p. 135).

Zarah Subgroup of Kansas City Group

Zarah subgroup of Kansas City group (**Moore, 1948**; Searight and Howe, 1961)
Zarah subgroup of Kansas City group (Moore, et al., 1951) **-** in Kansas
Zarah Subgroup of Kansas City Group (Jewett, et al., 1968) **-** in Kansas
Zarah Subgroup of Kansas City Group (Howe, 1986; Thompson, 1995)
Pennsylvanian System (Missourian Series)

Type area: Moore (1948), p. 2033) named the Zarah Subgroup, and stated that the Zarah was "...named from the village of Zarah on Kansas Highway 10 at the Sante Fe Railway crossing in western Johnson County [Kansas]."

Prior to Moore's naming the Subgroup, rocks of the Zarah were classed as the upper part of the Kansas City formation, Kansas City limestone, or Kansas City group. The Zarah Subgroup comprises three formations, under some controversy at the time this was written (2000-2001). The basal formation, the Lane Shale of previous classifications, has been renamed the **Liberty Memorial Shale** by Watney, et al. (1989), Watney and Heckel (1994), and Heckel and Watney (in press, 2001). Likewise, the shale succession from Island Creek through Bonner Springs Shale has been renamed the **Lane Shale**; the Island Creek, Farley and Bonner Springs becoming members of the Lane Shale. The Island Creek and Farley Members were previously members of the Wyandotte. While there is some justification for some of these changes, they must be considered on a regional basis, and historical usage must also be considered, before a complete change over of the Zarah Subgroup is contemplated.

Zeandale Formation of Richardson Subgroup, Wabaunsee Group

Zeandale limestone (3 members) (**Moore and Mudge, 1956**)
Zeandale formation (3 members) (Searight and Howe, 1961)
Zeandale Limestone (3 members) (Jewett, et al., 1968; Pabian and Diffendal, 1989; Baars and Maples, 1998) **-** in Kansas
Zeandale Formation (3 members) (Thompson, 1995)
Pennsylvanian System (Virgilian Series)

Type section: Moore and Mudge (1956, p. 2276) stated "The [Zeandale] formation is here named from the town of Zeandale on the south side of the Kansas River in Riley County, Kansas. The type section is the exposure in the SE.¼ NE.¼ NE.¼ Sec. 28, T. 10 S., R. 9 E., along a north-south farm access road south of Deep Creek, about one mile east and ¼ mile south of Zeandale."

Previously known as the lower part of the **McKissick Grove shale** or **McKissick shale** in Nebraska, and possibly Kansas, Moore and Mudge (1956) named this unit the Zeandale Formation. Thompson (1995, p. 130) added "The Zeandale Formation includes (from the base upward): the Tarkio, Wamego, and Maple Hill Members. The formation is well-exposed along the Missouri River bluffs south of Rock Port in Atchison County. The Zeandale Formation is about 25 ft thick." The Zeandale Formation overlies the Willard Shale, and is overlain by the Pillsbury Shale.

Zell Member of Macy Limestone, Plattin Group

Zell limestone member of Macy Limestone of Plattin Group (Larson, 1951) **=** ***Zell Member of Macy Limestone and Castlewood Member of Spechts Ferry Formation of Decorah Group***
Zell Member of Macy Limestone of Plattin Group (Thompson, 1991, 1995)
Ordovician System (Mohawkian Series)

Type section: Thompson (1991, p. 171) stated "The type section of the Zell Member of the Macy Limestone is the same as that for the underlying Hook Member and the Macy Limestone itself, a roadcut on U.S. Highway 61, SE¼ NE¼ SE¼ sec. 28, T. 38 N., R. 8 E., Ste. Genevieve County..." The name is from the town of Zell just south of the exposure, in Ste. Genevieve County, Missouri.

Larson (1951, p. 2061-2064) proposed the "Zell limestone member of the Macy formation" for a fine-textured, well bedded calcitite with green shale partings above the fucoidal Hook calcitite and below the Decorah formation. Thompson (1991) reproposed the classification originally defined by Larson for the Plattin Group, with the upper formation being the Macy Limestone. The Zell Member, the uppermost unit in the Plattin Group, overlies the Hook Member of the Macy Limestone, and is overlain by the Deicke K-bentonite bed and Castlewood Limestone Member of the Spechts Ferry Formation of the Decorah Group. Thompson (1995, p. 34) added "The Zell Member...is characterized by prominent horizontally oriented burrows, usually filled with a tan to brown finely crystalline carbonate. Upon weathering, the Zell appears more slabby-bedded than the Hook."

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