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Bronston and Burnside Members: Subdivision of the St. Louis Limestone in South-Central Kentucky

Garland R. Dever Jr.
University of Kentucky

Jack R. Moody
Kentucky Division of Water, Kentucky Natural Resources and Environmental Protection Cabinet

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Kentucky Geological Survey
James C. Cobb, State Geologist and Director
University of Kentucky, Lexington

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For further information contact:
Manager, Communications and Technology Transfer
Kentucky Geological Survey
228 Mining and Mineral Resources Building
University of Kentucky
Lexington, KY 40506-0107

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Bronston and Burnside Members: Subdivision of the St. Louis Limestone in South-Central Kentucky

Garland R. Dever Jr.[1] and Jack R. Moody[2]

Abstract

The St. Louis Limestone (Mississippian) of south-central Kentucky consists of two major lithologic units that herein are named, in ascending order, the Bronston Member and Burnside Member. Two other lithologic units occurring in the St. Louis Limestone and in correlative rocks of the Slade Formation (Mississippian), which extends from south-central into northeastern Kentucky, herein are named the Ringgold Bed and Big Sinking Bed.

The principal part of the St. Louis Member of the Slade Formation, which consists of Burnside lithologies, herein is renamed the Burnside Member of the Slade. This renaming addresses the problem associated with the previous use of the name "St. Louis" for both a formation and a member that is only partly correlative with the formation.

Introduction

The St. Louis Limestone (Mississippian) crops out across the Mississippian Plateau of western and south-central Kentucky. Correlative limestone and dolomite, assigned to the Slade Formation, extend northeast along the Cumberland Escarpment from south-central into northeastern Kentucky (Fig. 1).

In south-central Kentucky, the St. Louis Limestone consists of two major lithologic units. The upper unit is composed of cherty, fossiliferous limestone; the lower unit consists of dolomite with interbedded limestone.

New Nomenclature

The upper cherty, fossiliferous limestone unit of the St. Louis herein is named the Burnside Member of the St. Louis Limestone; the lower dolomite-dominated unit is name the Bronston Member of the St. Louis Limestone (Fig. 2). Two other distinct lithologic units occurring in the St. Louis Limetone and in correlative rocks of the Slade Formation herein are formally named the Ringgold Bed and Big Sinking Bed. These new names were used informally by Dever and others (1990) and Dever (1999).

Revised Nomenclature

The principal part of the St. Louis Member of the Slade Formation (Ettensohn and others, 1984), which is correlative with the Burnside Member of the St. Louis Limestone, herein is renamed the Burnside Member of the Slade Formation. This resolves the problem associated with previous use of the name "St. Louis" for a formation and also for a member that is correlative with only part of the formation (Fig. 2).

During the U.S. Geological Survey–Kentucky Geological Survey cooperative mapping program (1960–78), the upper cherty, fossiliferous limestone unit was designated as the St. Louis Limestone Member of the Newman Limestone (Hatch, 1964;

[1]Kentucky Geological Survey, University of Kentucky
[2]Kentucky Division of Water, Kentucky Natural Resources and Environmental Protection Cabinet

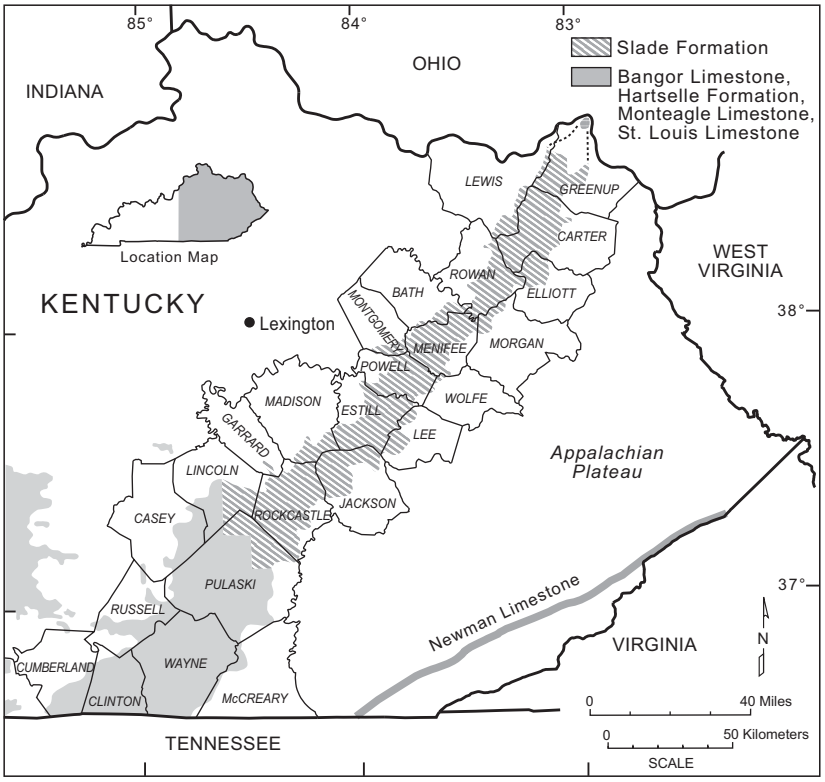

Figure 1. Outcrop of Mississippian carbonate rocks in central and eastern Kentucky.

Cohee and West, 1965). The St. Louis Limestone Member was mapped in parts of east-central Kentucky (see Rice, 1972, for example) included limestones herein assigned to the Big Sinking Bed. The lower dolomite-dominated unit was assigned to the Renfro Member of the Borden Formation (Weir and others, 1966). The Renfro as defined by Weir and others (1966) also includes rocks correlative with the Salem and Warsaw Formations and the Muldraugh Member of the Borden Formation of south-central Kentucky (Dever and others, 1979; Dever and Moody, 1979).

This division of St. Louis–correlative rocks was retained in the Slade Formation, established in east-central and northeastern Kentucky by Ettensohn and others (1984). The upper limestone was designated as the St. Louis Member of the Slade; the lower dolomite-dominated unit forms part of the Renfro Member of the Slade.

Renaming the St. Louis Member of the Slade as the Burnside Member should prevent any further confusion caused by using "St. Louis" for both a formation in south-central Kentucky and for a restricted interval of limestone in east-central and northeastern Kentucky that is correlative with only the upper part of the formation. The nomenclature for the dolomite-dominated Renfro Member of the Slade in east-central and northeastern Kentucky is retained, because in parts of the area, Bronston-correlative dolomites are not readily distinguished from dolomitic correlatives of the Muldraugh and Salem-Warsaw occurring in the lower Renfro.

Bronston Member

The Bronston Member of the St. Louis limestone is herein named for the community of Bronston in southern Pulaski County. The type section for the Bronston and Burnside Members of the St. Louis is in roadcuts and outcrops along and near the entrance road to General Burnside Island State Park, which are about 1¼ miles southeast of the community (Figs. 3–6; Appendix A).

The Bronston and correlative rocks in the Renfro Member of the Slade Formation thin northeastward from a thickness of 75 ft in south-central Kentucky to 2 ft in northeastern Kentucky. It is absent in parts of northeastern and northern east-central Kentucky as a result of intra-Mississippian erosion (Dever, 1980).

The member is mainly composed of very finely crystalline dolomite, commonly in alternating intervals of burrowed and finely laminated dolomite. The dolomite is silty, slightly argillaceous, generally unfossiliferous, partly brecciated, and thick to thin bedded. In fresh exposures, it is very light gray to olive gray and greenish gray, but weathers to yellowish gray, yellowish to grayish orange, and yellowish brown.

As many as six limestone units, from 2 in. to 13 ft thick, are present in the Bronston and correlative rocks of the Renfro. Most of the limestones apparently were relatively widespread, but dolo-

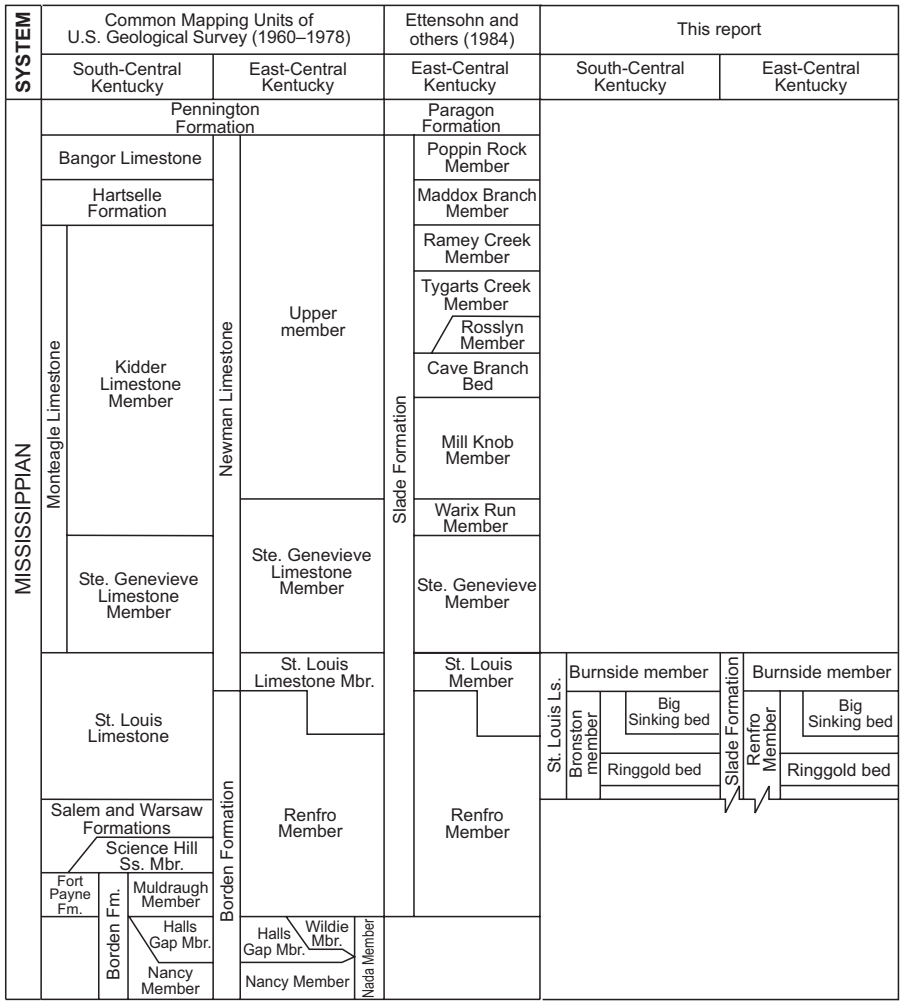

Figure 2. New stratigraphic nomenclature for the St. Louis Limestone and correlative rocks of the Slade Formation. Modified from Dever (1999).

mitization and dissolution have obscured their original thickness and areal extent in parts of the region. The Ringgold Bed, described in a following section, is the most widespread limestone unit.

Three thin limestone units, 2 in. to 1.5 ft thick, composed of dark-yellowish-brown and light-olive-gray to olive-gray sparsely fossiliferous calcilutite and bioclastic calcarenite, are present near the middle of the Bronston and in the correlative interval of the Renfro. The limestone beds commonly are scalloped and thinned by solution, resulting in local removal of the limestone units (Fig. 4). Each limestone is overlain by an interval of brecciated dolomite, from 1 in. to 3 ft thick, composed of dolomite clasts in a very finely crystalline, dolomitic matrix, with irregular and nodular bodies of quartz in the lower part of the brecciated intervals. The quartz bodies contain celestite, anhydrite laths, and rare gypsum ghosts. One to two additional intervals of dolomite breccia and quartz bodies, but without evidence of an underlying limestone, are present in this part of the Bronston and Renfro. Brecciated dolomite with quartz bodies occurs in the Renfro as far to the northeast as Estill County.

The breccias and quartz are considered to have formed during dissolution and replacement of evaporites (Dever and others, 1978). These vanished evaporites would be correlative with subsurface deposits of gypsum and anhydrite in the St. Louis of west-central and western Kentucky, southwestern indiana, and south-central Illinois (McGregor, 1954; Saxby and Lamar, 1957; McGrain and Helton, 1964). Limestones underlying the breccias may correspond to the limestones in cyclic evaporite deposits of the St. Louis in southwestern Indiana, described by Jorgensen and Carr (1973).

One to two limestones are present in the upper 6 to 20 ft of the Bronston and Renfro, from south-central Kentucky northeastward into Estill and Lee Counties. The limestones, 2 in. to 13 ft thick, are composed of light-olive-gray to olive-gray and light-gray calcilutite and bioclastic calcarenite (in part containing micrite-enveloped bioclastic grains and sparse ooids), locally with nodules and thin beds of chert. In contrast to the sparsely fossiliferous limestones that are associated with the dolomite breccias, the upper limestones commonly are fossiliferous, containing crinoid plates, brachiopods, bryozoans, and colonies of *Syringopora* sp. and *Acrocyathus proliferus.*

The lithologic contact between the Bronston and the overlying Burnside Member is sharp. Dolomite at the top of the Bronston is overlain by Burnside limestone.

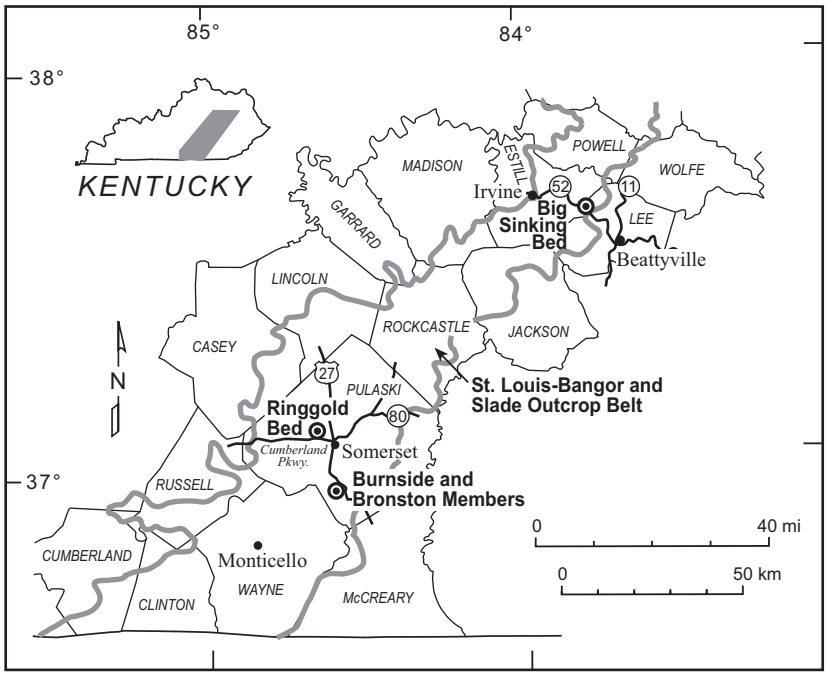

Figure 3. Location of type sections for stratigraphic units named in this report.

Burnside Member

The Burnside Member of the St. Louis Limestone and Slade Formation is herein named for the town of Burnside in southern Pulaski County. The type section for the Burnside and Bronston Members is in roadcuts and outcrops along and near the entrance road to General Burnside Island State Park, which are about ¼ mile southwest of the town (Figs. 3–6; Appendix A).

The member, which is as much as 30 ft thick in south-central Kentucky, commonly is 15 to 25 ft thick. Episodes of intra-Mississippian erosion have resulted in thinning and removal of the Burnside in parts of the region (Dever, 1980, 1999).

The Burnside consists of cherty, fossiliferous limestones. The lower part is composed of very light-olive-gray to medium-olive-gray, very fine- to very coarse-grained, bioclastic calcarenite, locally with interbeds and lenses of calcilutite. The upper part mainly consists of light-olive-gray to dark-olive-gray and dark-brownish-gray to dusky-yellowish-brown calcilutite and calcisiltite, with interbeds and lenses of bioclastic calcarenite. Burnside limestones are thin to thick bedded, with very thin to thin interbeds of greenish-gray shale, more commonly in the lower part. Discrete bodies of very finely crystaline dolomite, as much as 5 ft thick, occur locally in the member (Dever, 1980, 1999; Moody, 1982).

In northeastern and northern east-central Kentucky, a distinctive subunit, 1 to 6 ft thick, consisting of interbedded calcarenite, calcilutite, and greenish-gray argillaceous limestone, occurs near the middle of the Burnside. Limestone in the subunit is thin to medium bedded, with interbedded shale.

Broken and whole fossils are abundant in the Burnside and include corals, brachiopods, bryozoans, crinoids, echinoids, and gastropods. Colonies of acrocyathid and syringoporid corals (*Acrocyathus proliferus, A. floriformis,* and *Syringopora* sp.), partly in growth position, are the most prominent fossils. The corals occur concentrated in zones and as scattered, isolated colonies, both in the lower calcarenite and upper calcilutite. In earlier geologic reports, *A. proliferus* and *A. floriformis* commonly were identified, respectively, as *"Lithostrotion" proliferum* and *Lithostrotionella castelnaui* (see Sando, 1983).

Chert in the form of nodules, irregular bodies, and discontinuous beds and stringers is common to abundant, occurring both scattered through the member and concentrated in intervals as much as 3 ft thick. In south-central Kentucky, the chert is mainly dark colored (dark gray to grayish black and olive gray to olive black), but in east-central and northeastern Kentucky, it commonly is red, brown, light-colored, and green (moderate red, pale reddish brown to dark reddish brown, moderate reddish brown, light brown to moderate brown, very light gray to yellowish gray, and dark greenish gray). A limestone bed containing abundant nodules and irregular bodies of chert at the top of the Burnside on weathering yields a bedded chert, up to 1 ft thick, in parts of south-central Kentucky.

Northeast of Rockcastle County, pedogenic features (micritic calcrete, brecciated limestone, and melanization) cap the Burnside in the outcrop belt across east-central and northeastern Kentucky;

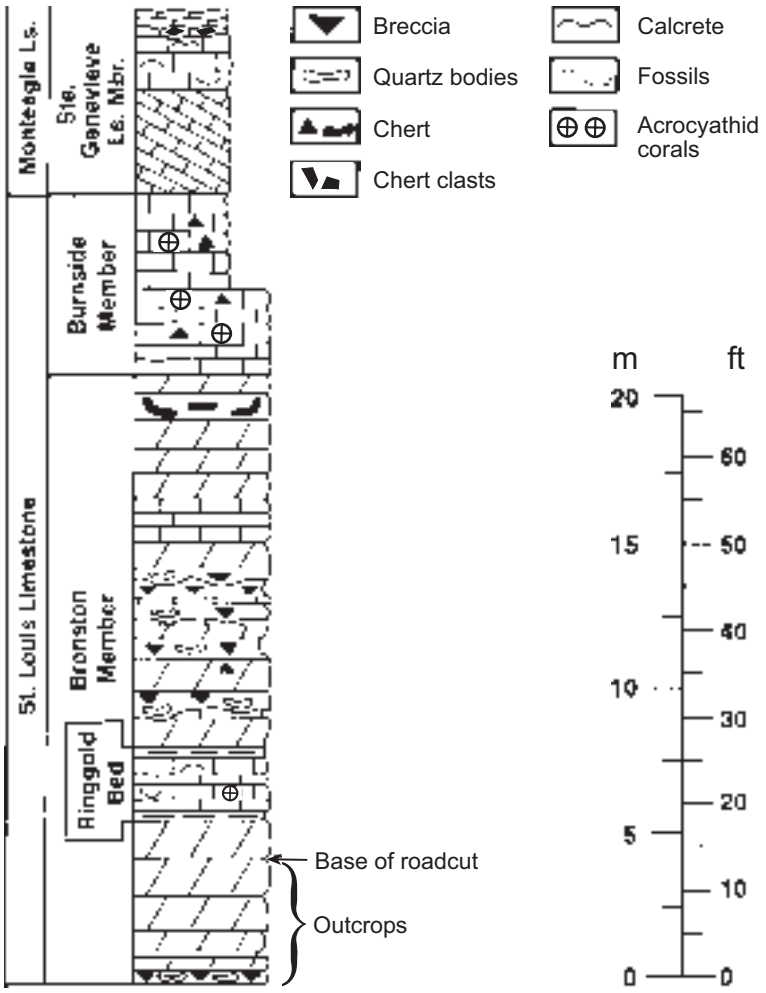

Figure 4. Generalized columnar section showing St. Louis Limestone and lower part of Monteagle Limestone at General Burnside Island State Park, Pulaski County (from Dever and others, 1990).

pedogenic features also occur locally at the top of the member in south-central Kentucky (Dever, 1980, 1999). These features are remnants of a caliche paleosol (Ettensohn and others, 1988).

Ringgold Bed

The Ringgold Bed of the St. Louis Limestone is herein named for the community of Ringgold in west-central Pulaski County. The type section is a roadcut along the north side of the Cumberland Parkway at milepost 85.8, which is about 9/10 mile southwest of the community (Figs. 3, 7a–b; Appendix B).

The Ringgold is the most widespread limestone unit in the Bronston Member of the St. Louis Limestone and Renfro Member of the Slade Formation, extending from south-central Kentucky northeastward into Menifee County of east-central Kentucky. In south-central Kentucky, where it is as much as 9 ft thick, the Ringgold is composed of medium-olive-gray to dark-olive-gray, very fine- to very coarse-grained, bioclastic calcarenite, with nodules and discontinuous stringers of chert. The unit is very thin to thick bedded, with interbedded greenish-gray shale and argillaceous partings.

Fossils are abundant in the Ringgold of south-central Kentucky, and include brachiopods, bryozoans, echinoids, solitary corals, colonial corals *(Acrocyathus proliferus* and *Syringopora),* gastropods, blastoids, and pelecypods. Horizontal burrows commonly cover bedding planes. The top limestone bed in western and southern Pulaski County contains abundant algal oncolites.

In east-central kentucky, where the Ringgold is as much as 4 ft thick, the limestone is lighter in color and varies from calcilutite with scattered bioclastic grains to bioclastic calcarenite. It is highly burrowed, sparsely fossiliferous, and very thin to medium bedded, with interbedded shale and argillaceous partings.

Big Sinking Bed

The Big Sinking Bed of the Slade Formation is herein named for Big Sinking Creek in western Lee County. The type section is in outcrops and roadcuts in Hatton Hollow along the northeast side of Ky. 52, which are about ¼ mile southeast of the creek (Figs. 3, 8; Appendix C).

The bed is a distinct limestone unit, as much as 10 ft thick, that is present at or near the top of the Renfro Member of the Slade in parts of east-central Kentucky. A Big Sinking equivalent, up to 6 ft thick, also occurs at or near the top of the Bronston Member of the St. Louis in parts of south-central Kentucky. Big Sinking limestone is mainly composed of well-sorted, finely laminated, very fine-grained, bioclastic, pelletal calcarenite. These characteristics distinguish it from the relatively

Figure 5. Type section for Bronston and Burnside Members of St. Louis Limestone, with position of Ringgold Bed noted. North end of roadcut at General Burnside Island State Park, Pulaski County.

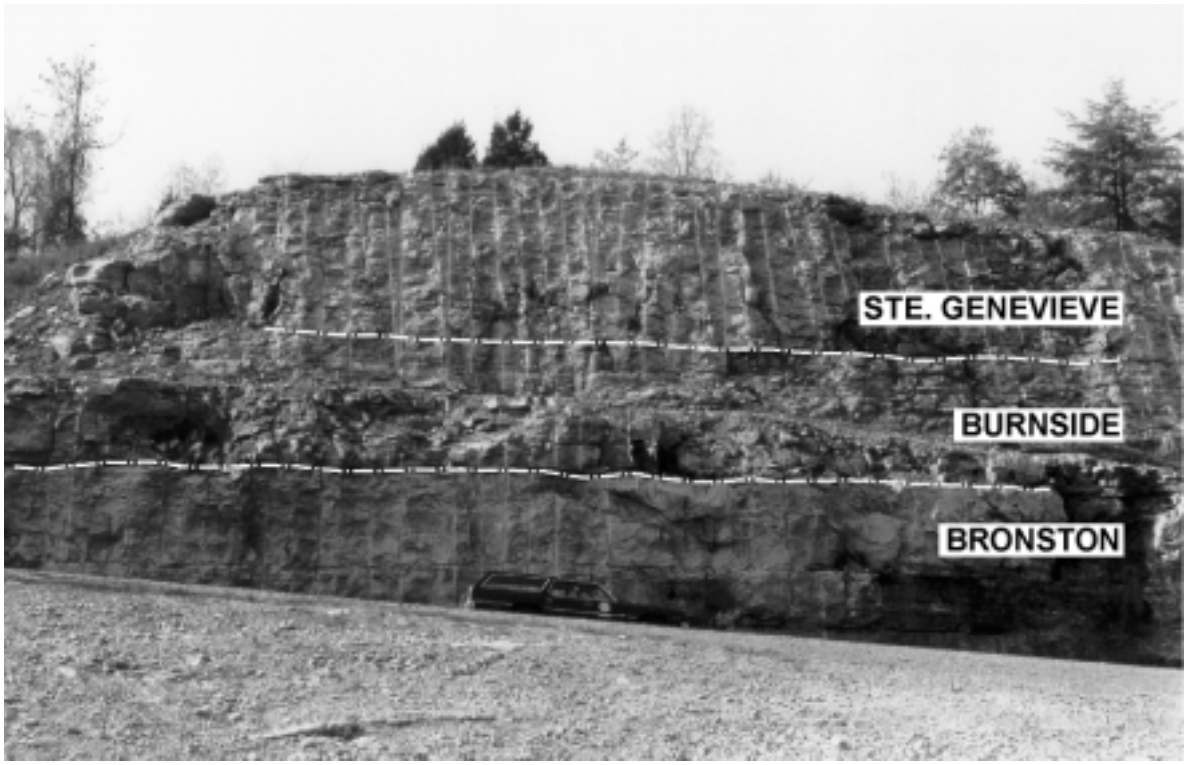

Figure 6. Type section for Bronston and Burnside Members of St. Louis Limestone, which is overlain by Ste. Genevieve Limestone Member of Monteagle Limestone. South end of roadcut at General Burnside Island State Park, Pulaski County.

Figure 7. (a) Type section for Ringgold Bed of St. Louis Limestone. Ringgold overlain and underlain by rocks of Bronston Member. Roadcut along north side of Cumberland Parkway at milepost 85.8, Pulaski County. (b) Closeup of bedding in type section for Ringgold Bed of St. Louis Limestone. Geologic hammer for scale.

poorly sorted, coarser grained, bioclastic calcarenite in the lower part of the overlying Burnside.

The Big Sinking and its equivalent principally consist of very light-olive-gray to light-olive-gray, very fine-grained, bioclastic, pelletal calcarenite, with calilutite occurring locally in the basal part of the unit. The calcarenite, commonly finely laminated, is mainly composed of micritic pellets (slightly elongate to round) with bioclasts, including fragmented and whole ostracodes and calcareous sponge spicules. Carbonate particles mainly range from coarse silt to very fine and fine sand. The unit contains detrital quartz silt and very fine- to fine-grained quartz sand.

It commonly is sparsely fossiliferous (brachiopods, bryozoans, gastropods, and crinoid plates), but orthotetid and productoid brachiopods are locally abundant. Light-brown to reddish-brown and light-gray to light-olive-gray chert occurs in discontinuous stringers (in part with relict laminae),

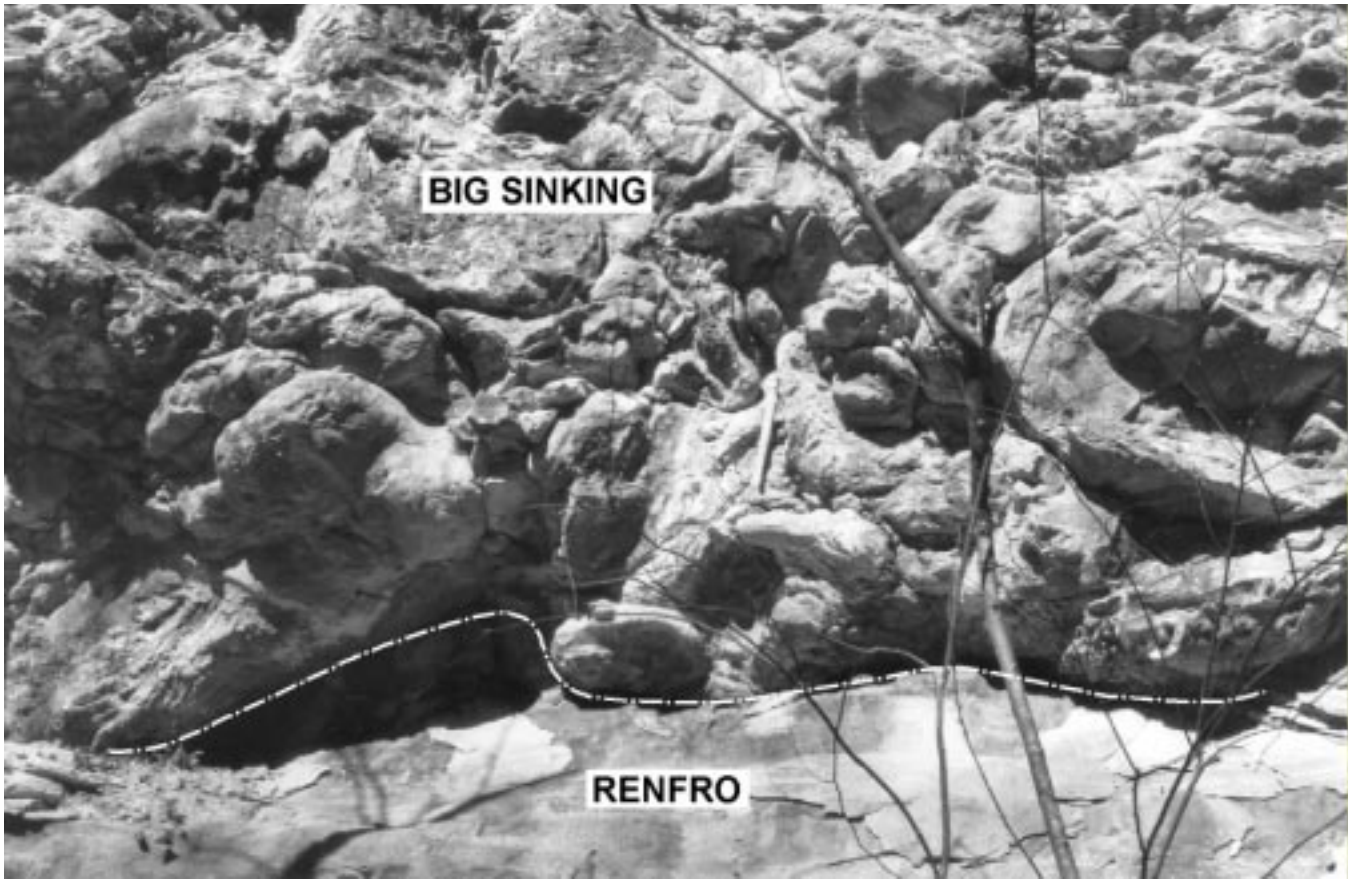

Figure 8. Type section for Big Sinking Bed of Slade Formation. Irregular contact with underlying Renfro Member of Slade. Outcrop in Hatton Hollow, adjacent to Ky. 52, Lee County. Geologic hammer for scale.

irregular bodies, nodules, and, locally, in beds as much as 1.2 ft thick. Discrete, elongate bodies of dolomite, as much as 1.7 ft thick, are present locally. The limestone is thin to thick bedded, with very thin to thin interbeds of greenish-gray shale, mainly in the lower part.

Contorted bedding is a prominent feature of the Big Sinking Bed in parts of east-central Kentucky (parts of Jackson, Estill, Lee, and Powell Counties) and in equivalent rocks to the south in Pulaski County (Dever, 1999) (Fig. 8). The contorted bedding had been noted by previous workers in the east-central counties, who mainly identified the rocks as St. Louis limestone (Butts, 1922; McFarlan and Walker, 1956; Rice, 1972; Haney, 1976; Black, 1977, 1978; Haney and Rice, 1978). Curvilinear patterns of deformed laminae and chert stringers outline bodies of rolled-up sediment. Original laminae in the calcarenite and chert, though highly contorted, commonly are preserved, an indication of deformation by plastic flow during subaqueous movement (Dott, 1963). Bedding in the Big Sinking ranges from totally deformed to wholly planar, but more commonly it is only partly deformed, the interval of contorted bedding being either underlain by, overlain by, or within undeformed planar-bedded Big Sinking limestone. The contorted bedding may be related to local fault movement (Dever, 1999; Greb and Dever, in press).

Partial to complete dolomitization of Big Sinking limestone is common. At several localities, relict chert stringers and curvilinear structures in the dolomite are the only evidence for the presence of the unit. The apparent absence of the Big Sinking in parts of the region may be the result of masking by dolomitization.

The contact between the Big Sinking Bed and overlying limestone or dolomite commonly is sharp. Locally in Powell, Pulaski, and Rockcastle Counties, Big Sinking and Burnside limestones

intertongue through intervals less than 3 ft thick. The Burnside is absent in parts of Estill, Jackson, and Lee Counties, and Ste. Genevieve calcarenite rests on the Big Sinking Bed (Dever, 1999). In the area where the Burnside is absent, pedogenic features (calcrete, brecciated limestone, and melanization) occur at the top of the Big Sinking Bed.

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Appendix A: Type Section for Burnside and Bronston Members of the St. Louis Limestone

Unit	Description	Thickness (ft)
Mississippian		
Monteagle Limestone (incomplete):		
Ste. Genevieve Limestone Member (incomplete):		
18.	Limestone, light-olive-gray, micrograined, with coarser bioclastic grains; conglomerate in basal 3 to 6 in. composed of clasts of black to olive-gray chert and brownish-gray limestone in very fine- to coarse-grained bioclastic matrix; nodular bedding with argillaceous partings	3.0
17.	Limestone, light-olive-gray to medium-light-olive-gray, very fine- to very coarse-grained, bioclastic (in part micrite-enveloped grains); fossiliferous (crinoids, brachiopods, and echinoids; in part silicified); irregular bodies of black chert in upper part; in part dusky yellowish-brown to dark-yellowish-brown, micrograined limestone in upper foot, with few stringers of micrograined calcrete; indistinctly to medium-bedded	6.5
16.	Limestone, medium-light-olive-gray, very fine- to coarse-grained, bioclastic (mainly micrite-enveloped grains), peloidal; discontinuous stringers of black chert in lower part; cross-laminated	12.0
Total thickness of Ste. Genevieve Limestone Member (incomplete)		21.5
Total thickness of Monteagle Limestone (incomplete)		21.5
St. Louis Limestone		
Burnside Member		
15.	Limestone, light-olive gray to olive-gray, micrograined to very fine-grained; in part very fine- to medium-grained; dark-greenish-gray, argillaceous at top; fossiliferous (colonial corals, *Acrocyathus proliferus, Syringopora* sp., *A. floriformis;* echinoids, brachiopods, gastropods, and bryozoans; in part silicified); spherical and irregular bodies, stringers, and nodules of medium-light-gray to black chert; thin- to medium-bedded, with argillaceous partings	6.5
14.	Limestone, olive-gray, very fine- to coarse-grained, bioclastic; in part micrograined; nodules and spherical bodies of black chert; thin- to medium-bedded, with argillaceous partings	2.0
13.	Limestone, light-olive-gray to olive-gray, micrograined, with coarser bioclastic grains; fossiliferous (colonial corals, *A. proliferus;* brachiopods, crinoids, echinoids, and bryozoans; in part silicified); irregular bodies and nodules of brownish-gray to grayish-black and yellowish-orange chert; thin- to medium-bedded, with argillaceous partings	2.0
12.	Limestone, light-olive-gray, very fine- to very coarse-grained, bioclastic; in part micrograined; fossiliferous (colonial corals, *A. proliferus;* brachiopods, crinoids, bryozoans, and echinoids; in part silicified); irregular bodies and nodules of medium-light-gray to grayish-black and brownish-gray chert; thin- to medium-bedded, with argillaceous partings	4.5
11.	Limestone, light-olive-gray to olive-gray, very fine- to very coarse-grained, bioclastic (few micrite-enveloped grains); fossiliferous (brachiopods,	

crinoids, and bryozoans; in part silicified); in part micrograined; in part greenish-gray, argillaceous in lower part; thin- to medium-bedded, with thin greenish-gray shales and argillaceous partings 5.0

Total thickness of Burnside Member 20.0

Bronston Member:

10. Dolomite, very light-gray to medium-light-greenish-gray, microcrystalline to very finely crystalline; commonly finley laminated; in part burrowed; in part micrograined limestone near base; stringers and irregular bodies of chert, in part finely laminated and in part contorted, in 4-ft interval, 2 to 6 ft below top (Big Sinking Bed equivalent); thick-bedded to massive; 4-in. greenish-gray shale at top 14.0
9. Limestone, light-olive-gray to olive-gray, dark-gray, and brownish-gray, very fine- to coarse-grained, bioclastic (in part micrite-enveloped; in part finely laminated; upper 1 to 1.5 ft of limestone apparently grades laterally into dolomite; few vertical stringers of black chert; thin- to medium-bedded with very thin shales 5.0
8. Dolomite, light-olive-gray to olive-gray and greenish-gray, microcrystalline; two breccias in lower 2 to 3 ft composed of dolomite clasts in very finely crystalline dolomitic matrix; greenish-gray shales within and capping lower breccia; quartz bodies in basal part of upper breccia; dolomite in upper 1 to 2.5 ft apparently grades laterally into limestone; thin- to thick-bedded; rubbly weathering in basal part 7.0
7. Dolomite, very light-gray, microcrystalline; in part burrowed; partly brecciated in lower part, with few quartz bodies; dark-yellowish-brown to medium-gray, micrograined limestone, up to 4 in. thick, at base, but pinches out locally; dark-yellowish-brown, microcrystalline dolomitic limestone and micrograined limestone in upper 2 in.; thick-bedded with thin beds at top and base 2.0
6. Dolomite, olive-gray to very light-greenish-gray, microcrystalline to very finely crystalline; mainly finely laminated, with very thin shaly partings; laminations partly wavy and contorted in upper part; dolomite partly burrowed in basal part; brecciated in basal foot and in 2-ft interval, 6 ft above base, with quartz and chert bodies; chert stringers and nodules in 3-ft interval, 2 ft above base; medium- to thick-bedded; thin-bedded with argillaceous partings in upper 2 ft 9.5
5. Dolomite, light-gray to light-olive-gray, microcrystalline to very finely crystalline; in part laminated and in part burrowed; few chert nodules in upper foot; micrograined limestone, up to 5 in. thick, locally at top; thick- to medium-bedded 4.5

Ringgold Bed:

4. Limestone, dark-olive-gray, micrograined to coarse-grained, bioclastic; fossiliferous (crinoids, bryozoans, brachiopods, and colonial corals, *Syringoporal* sp. and *Acrocyathus proliferus);* stringers and nodules of chert; slightly argillaceous; abundant oncolites in top bed; thin- to thick-bedded, with interbedded shales, up to 4 in. thick 8.5

Bronston Member:

3. Dolomite, very light-olive-gray to pale-yellowish-brown, microcrystalline to very finely crystalline; in part laminated and in part burrowed; scattered bioclastic grains in upper part; medium-olive-gray, microcrystalline to very

finely crystalline, dolomitic limestone, with scattered fossils (brachiopods), in basal part; thick- to very thin-bedded 18.5

2. Dolomite, light-greenish-gray, very finely crystalline, argillaceous; brownish-gray to dark-brownish-gray, microcrystalline to micrograined limestone in upper part; irregular bodies of moderately to coarsely crystalline calcite; scattered pyrite; indistinctly bedded 1.0

Total thickness of Bronston Member 70.0

Total thickness of St. Louis Limestone 90.0

Salem and Warsaw Formations (incomplete):

1. Limestone, pale-yellowish-brown, very fine- to very coarse-grained, bioclastic; commonly with very finely crystalline matrix; fossiliferous (crinoids, bryozoans, and brachiopods); crossbedded 7.0

Appendix B: Type Section for the Ringgold Bed of the St. Louis Limestone

Unit	Description	Thickness (ft)
Mississippian		
St. Louis Limestone (incomplete):		
Bronston Member (incomplete):		
24.	Dolomite, very light-olive-gray to light-olive-gray, microcrystalline to very finely crystalline; in part finely laminated; in part burrowed; rarely fossiliferous (brachiopods); interval of brecciated dolomite with quartz bodies at base; thick-bedded to massive	8.6
23.	Limestone, very dark-yellowish-brown, and medium-olive-gray to olive-gray, very fine- to very coarse-grained, bioclastic, in microcrystalline matrix; partly fossiliferous (crinoids); commonly one bed; locally medium- to thin-bedded; upper surface broadly scalloped	1.5
22.	Dolomite, very light-olive-gray to light-olive-gray, microcrystalline to very finely crystalline; in part burrowed; sparsely fossiliferous (corals); small calcite-filled vugs, mainly in upper part; one bed	1.2
21.	Dolomite, pale-greenish-gray, very finely crystalline, silty, argillaceous; finely laminated; thin-bedded, with very thin to thin, greenish-gray shales and argillaceous partings	0.8
20.	Dolomite, very light-olive-gray to light-olive-gray, and greenish-gray, microcrystalline to very finely crystalline, slightly argillaceous; one bed	0.7
19.	Shale, greenish-gray to medium-gray, clayey	0.2
Ringgold Bed:		
18.	Limestone, light-olive-gray to olive-gray, very fine- to coarse-grained, bioclastic; abundant oncolites in upper part; burrowed; very thin- to thin-bedded, with argillaceous partings	0.4
17.	Shale, greenish-gray	0.3
16.	Limestone, olive-gray to medium-olive-gray and greenish-gray, very fine- to coarse-grained, bioclastic, peloidal, argillaceous; fossiliferous (colonial corals, *Syringopora* sp., *Acrocyathus proliferus;* echinoids, gastropods, brachiopods, and solitary corals; in part silicified); zone of nodular chert at 6 in. above base; thin- to thick-bedded, with argillaceous partings; 1-in. shale, with argillaceous limestone, at base	2.2
15.	Limestone, olive-gray and medium-gray to medium-dark-gray, very fine- to coarse-grained, and very finely crystalline, bioclastic, argillaceous; fossiliferous (colonial corals, *Acrocyathus proliferus;* echinoids, brachiopods, crinoids, bryozoans, and foraminifera); burrowed; thin- to medium-bedded, with argillaceous partings	1.1
14.	Shale, greenish-gray, clayey; very thin-bedded, fossiliferous limestone at base	0.3
13.	Limestone, olive-gray, micrograined to coarse-grained, bioclastic, slightly argillaceous; fossiliferous (colonial corals, *Syringopora* sp. and *Acrocyathus proliferus;* echinoids, foraminifera, and brachiopods; in part silicified); burrowed; few chert bodies; one bed	0.8

12. Shale, interbedded with very thin, cherty, fossiliferous, argillaceous limestone 0.2
11. Limestone, olive-gray to dark-olive-gray, very fiine- to fine-grained, bioclastic, argillaceous; fossiliferous (colonial corals, *Acrocyathus proliferus* and *Syringpora* sp.; echinoids, brachiopods, and bryozoans); burrowed; stringers and nodules of chert; medium-bedded; very thin- to thin-bedded in upper part, with argillaceous partings; 1-in. shale, with nodular chert, at base 1.3
10. Limestone, medium-olive-gray to olive-gray, very fine- to medium-grained, bioclastic, argillaceous; in part very finely crystalline, dolomitic; sparsely fossiliferous (crinoids; in part silicified); in part burrowed; stringers and nodules of chert in upper 6 in.; thick- to medium-bedded; 1-in. shale at base 2.5

Total thickness of Ringgold Bed 9.1

Bronston Member:

9. Dolomite, light-olive-gray, microcrystalline to very finely crystalline; finely laminated; burrowed in upper 6 in.; thick-bedded; thin shale at base 5.6
8. Dolomite, light-olive-gray to medium-light-olive-gray, microcrystalline to very finely crystalline; partly burrowed in upper part; thick-bedded 4.1
7. Shale, greenish-gray to dark-greenish-gray, platy to clayey; 1-in. dolomite bed in upper part 0.3
6. Dolomite, light-gray to light-olive-gray, microcrystalline to very finely crystalline; burrowed; one bed 0.8
5. Shale, medium-olive-gray, platy 0.4
4. Dolomite, very light-olive-gray to medium-olive-gray, microcrystalline to very finely crystalline; in part burrowed; thin- to medium-bedded; thin shale at base 1.7
3. Dolomite, light-gray, microcrystalline to very finely crystalline; in part finely laminated; medium- to thick-bedded 4.5
2. Dolomite, very light-olive-gray, microcrystalline to very finely crystalline; scattered elongate bodies lined with crystalline quartz; very thin- to thin-bedded, with thin shales and argillaceous partings 1.0

Total thickness of Bronston Member (incomplete) 40.5

Total thickness of St. Louis Limestone (incomplete) 40.5

Salem and Warsaw Formations (incomplete):

1. Limestone, olive-black, very fine- to very coarse-grained, bioclastic; fossiliferous (brachiopods, bryozoans, and foraminifera); scattered quartz sand, crossbedded 10.0

Appendix C: Type Section for the Big Sinking Bed of the Slade Formation

Unit	Description	Thickness (ft)
Mississippian		
Slade Formation (incomplete):		
Tygarts Creek Member (incomplete):		
26.	Limestone, very light-olive-gray to medium-olive-gray, fine- to very coarse-grained, oolitic, bioclastic (mainly micrite-enveloped grains); fossiliferous (crinoids and brachiopods); intraclasts of calcilutite and shale in basal part; thin- to medium-bedded in lower part; massive in upper part of unit	2.0
Mill Knob Member:		
25.	Limestone, very light-olive-gray to light-olive-gray, micrograined, partly brecciated; in part grayish-orange to moderate-yellowish-brown, very finely crystalline dolomite; greenish-gray shale along fractures and in pockets; massive	1.6
24.	Limestone, light-olive-gray, micrograined, brecciated; in part moderate-yellowish-brown to grayish-orange, very finely crystalline to microcrystalline dolomite; one bed	0.5
23.	Calcrete, vry pale-yellowish-brown to dusky yellowish-brown, micrograined, with calcite blebs and stringers; rubbly weathering; irregular upper surface, overlain by greenish-gray shale	0.8
22.	Limestone, light-olive-gray to medium-light-olive-gray; pale-yellowish-brown in upper part; very fine- to fine-grained, bioclastic; commonly laminated; pale-yellowish-brown, micrograined calcrete in upper 6 in.; medium- to thick-bedded	4.1
21.	Limestone, very light-olive-gray to light-olive-gray, fine- to coarse-grained, bioclastic (mainly micrite-enveloped grains), oolitic; thin- to medium-bedded	2.1
20.	Limestone, very light-gray to light-olive-gray, very fine-grained; nodular to wavy bedded; 1-in. shale at base	0.7
19.	Limestone, very light-gray to light-olive-gray, very fiine- to medium-grained, bioclastic; in part micrograined; very thin- to medium-bedded, with very thin shales	2.0
18.	Limestone, very light-olive-gray to light-gray, micrograined, with calcite blebs in lower part; planar-bedded in lower part; nodular-bedded with greenish-gray shale in middle and upper parts	1.1
Total thickness of Mill Knob Member		12.9
Warix Run Member:		
17.	Shale, pale-olive, clayey	0.5
16.	Limestone, very light-olive-gray to medium-olive-gray; pale-yellowish-brown in upper part; very fine- to very coarse-grained, bioclastic (in part micrite-enveloped grains), peloidal, oolitic; clasts of limestone, calcrete, and chert; quartz sand, abundant in basal part; pale-yellowish-brown to dark-yellowish-brown, micrograined calcrete in upper part; laminated and crossbedded	15.5

Total thickness of Warix Run Member 16.0

Ste. Genevieve Member:

15. Limestone, medium-olive-gray, very fine- to very coarse-grained, bioclastic (in part micrite-enveloped grains), sparsely oolitic; pale-yellowish-brown to dusky yellowish-brown, micrograined calcrete in upper part; medium- to thick-bedded 1.2

Burnside Member:

14. Limestone, pale-yellowish-brown to dusky yellowish-brown, very fine-grained, with fine to very coarse bioclastic grains; stringers of micrograined calcrete 1.0
13. Limestone, medium-olive-gray, very fine-grained, with fine to very coarse bioclastic grains; fossiliferous; thin zone of *Acrocyathus proliferus* corallites at 1.4 ft above base of subunit; abundant small irregular bodies and nodules of light-brown to moderate-brown chert; thin- to medium-bedded 2.7
12. Limestone, very light-olive-gray to light-olive-gray, micrograined to very fine-grained; fossiliferous (crinoids, brachiopods, and bryozoans; in part silicified); in part fine- to very coarse-grained, bioclastic; very thin- to medium-bedded 0.8
11. Limestone, very light-gray to light-olive-gray, fine- to very coarse-grained, bioclastic, fossiliferous 9crinoids and brachiopods; in part silicified); one bed 0.7

Total thickness of Burnside Member 5.2

Big Sinking Bed:

10. Limestone, very light-olive-gray to light-olive-gray, very fine- to medium-grained (principally very fine calcarenite to coarse calcisiltite), pelletal, bioclastic; quartz silt and very fine sand, mainly in middle part; locally fossiliferous (sponges, brachiopods, bryozoans, and gastropods); irregular bodies and nodules of light-gray, reddish-brown, and greenish-gray chert; contorted bedding in lower to middle part; indistinctly bedded to massive in upper part; locally thin- to medium-bedded at top. thickness ranges from 6.7 to 9.7 ft; very irregular contact with underlying dolomite of Renfro Member 9.7

Renfro Member:

9. Dolomite, light-gray, very finely crystalline, earthy; glauconite-filled burrows; massive; thin greenish-gray shale at base. Thickness ranges from 1 to 5 ft; very irregular contact with overlying limestone of Big Sinking Bed 1.4
8. Dolomite, yellowish-gray, very finely crystalline; thick-bedded to massive 3.5
7. Dolomite, very pale-yellowish-brown to pale-yellowish-brown, very finely crystalline; one bed; irregular seams of greenish-gray shale in lower part 1.4
6. Dolomite, very pale-orange to pale-yellowish-brown and grayish-orange, very finely crystalline; brecciated in lower part; bioclastic grains in dolomitic matrix at top; one bed; irregular seams of greenish-gray shale at top 0.5
5. Shale, grayish-yellow-green, dolomitic 0.4
4. Dolomite, moderate-yellowish-brown to yellowish-gray, very finely crystalline; thick- to medium-bedded 2.5

Ringgold Bed:

3. Limestone, medium-gray to light-olive-gray, very fine- to coarse-grained, bioclastic, burrowed; scattered fossils (brachiopods); medium- to thin-bedded, interbedded with greenish-gray, clayey shale 4.1

Renfro Member:

2. Dolomite, dark-yellowish-orange to yellowish-brown, very finely crystalline, burrowed; scattered bioclastic grains; medium-bedded. At base of unit, 0 to 1 in. thick, limestone, bioclastic, argillaceous, very sandy, with scattered quartz granules and pebbles 1.2

Total thickness of Renfro Member 15.0

Total thickness of Slade Formation (incomplete) 62.0

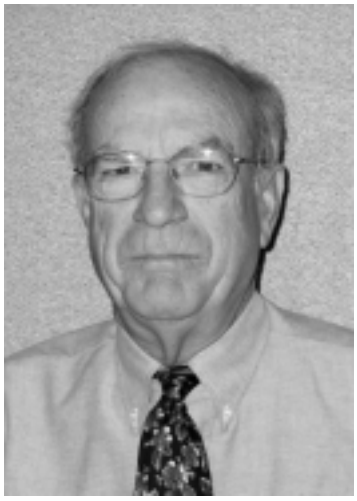
Borden Formation (incomplete):

Nada Member (incomplete):

1. Shale, greenish-gray, interlayered with grayish-red-purple to very dusky red-purple, clayey 5.0

About this publication

The St. Louis Limestone of Mississippian age is a widespread formation in Kentucky. Distinct rock units in the formation, which are identified in this study, will aid in establishing regional correlations and interpreting geologic history.



About the author

Garland R. Dever Jr. serves as an industrial minerals geologist in the Energy and Minerals Section of the Kentucky Geological Survey. His research concentrates on the investigation of limestone resources in the state and the geology of Mississippian rocks. He holds Ph.D. and M.S. degrees from the University of Kentucky and a B.S. degree from the University of Notre Dame.