FIELD TRIPS GUIDEBOOK
Jerry Prewett, Editor

— Field Trip I (p. 1–12) —
Friday, September 28
Roadside Geology along U.S. 63 North of Rolla, Missouri

Devonian or Mississippian crinoidal limestone
at Northwye

Biothermal Mound in Jefferson City Dolomite

— Field Trip II (p. 13–30) —
Saturday, September 29
The Cambrian Succession in Western St. Francois County, Missouri

Davis Formation

Marble Boulder Bed

Missouri Route 32 east of Elvins

Large-Scale Ripple Bedding in Davis Formation
Missouri Route 32 east of Elvins

Prepared for the
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— Field Trip I —

Friday, September 28, 2012

Roadside Geology along U.S. 63
North of Rolla, Missouri

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Figure 1-1. Map showing field trip route and six stops along U.S. 63 north of Rolla, Missouri. Start point is at traffic signals on south side of Interstate 44 Exit 186 in Rolla, and end point (turn around point) is at Maries County Road 325, just west of the Gasconade River. County lines and the boundaries of 7½-minute topographic quadrangles are shown. The simplified geologic column shows the rock units and the lithologies that are observable along the route.
Introduction

This field trip follows the general route of an Association of Missouri Geologists field trip conducted by Spreng and Laudon (1990), with the exception that it does not include stretches of old U.S. 63 (Fig. 1-1). Some of the stops are the same and some are not. The field trip route is approximately 20 miles from start to end. The rocks observed along the way belong to the Lower Ordovician Series, the Devonian and Mississippian Systems, and the Pennsylvanian Subsystem (Fig. 1-1).

Road Log

Mileage

0.0  Traffic signals on south side of Interstate 44 Exit 186 at Rolla, Missouri. Proceed north across the overpass and continue north on U.S. 63.

1.0  **STOP 1.** Roadcut at Northwye, about which Spreng and Laudon (1990) stated, “This roadcut exposes the upper part of the [Lower Ordovician Ibexian] Jefferson City Dolomite…. These beds lie about 200 ft above the Quarry Ledge Member which occurs near the base of the formation. These dolomite layers weather to a brown color as do other higher Jefferson City beds in the field trip area. This is possibly due to more intense weathering of the beds at this locality. The darkest brown dolomite bands contain white cherts [sic] nodules and occur in several exposures along this field trip route; sometimes there are more than one such layers in an exposure. These layers show interesting sedimentological features; for example, the long axis of some chert nodules is not parallel to the bedding, the usual orientation. Faults of small displacements also occur in the chert nodules. Several sinks and solution structures cap the section. Maroon and [greenish] gray shales that fill the structures are presumed to be Pennsylvanian in age. Mississippian cherts occur in the sinks as well as in the intersink areas.”

The Jefferson City Dolomite, which is well exposed in the lower walls of this roadcut, contains pockets and slots of maroon and greenish gray shale that appear to represent filled solution conduits associated with the overlying Pennsylvanian sink structures that are exposed on the wooded upper slope of this roadcut. A normal fault exhibiting about one foot of vertical displacement is visible in the Jefferson City Dolomite.

Spreng and Proctor (2001) prepared a geologic map of the Rolla 7½-minute quadrangle that shows “unassigned Middle Devonian,” “unassigned Osagean-Meramecian Mississippian,” and “unassigned Pennsylvanian” strata occurring in the upper slope on the east side of this roadcut. The map also reveals that Devonian and Mississippian rocks are rarely encountered in the Rolla quadrangle.

The maroon and greenish gray shales that occur in the upper slope can probably be assigned to the Pennsylvanian Cheltenham Formation. Also occurring are pebble- to boulder-sized residual pieces of 1) crinoidal limestone, 2) wavy-laminated (algal?) to
nearly micritic limestones that contain conspicuous inclusions of orange calcite spar, 3) nonfossiliferous chert that appears not to be Lower Ordovician, 4) sedimentary quartzite and 5) silica-cemented quartz sandstone that may contain molds of crinoid ossicles, brachiopods and rugose corals (Fig. 1-2).
All of these lithologies are assignable to the Devonian or Mississippian or both. Also, they are jumbled together in a red clayey matrix that may represent the disrupted Cheltenham Formation or a terra rossa that resulted from the almost complete chemical erosion of the limestone that was originally present. Regarding the sedimentary quartzite, Bridge and Charles (1922) identified Devonian fossils in an isolated occurrence of similar quartzite located about two miles southwest of this roadcut. Also, Bridge (1917) studied the faunas of the residual Mississippian in this general area of the Ozarks.

1.5  **Quarry Ledge** of Jefferson City Dolomite at road level at 9 o’clock.

3.5  **STOP 2.** Biohermal mound in low cut on right (east) side of road (Fig. 1-3). Spreng and Laudon (1990) in describing this mound stated, “Rare (unique?) reef mound at the top of the Quarry Ledge Member of the Jefferson City Dolomite. The cherts in the upper part of the mound contain trilobite pygidia and cephalons and planispired gastropods. The mound is composed of fine-grained dolomite. It contains ostracods, small, straight cephalopods, and possible brachiopods. These fossils are associated with the mound and not with the adjacent Jefferson City beds.”

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**Figure 1-3.** Biohermal mound or reef in Jefferson City Dolomite at **STOP 2.** The mound is about seven feet across. Hammer for scale.
The dolomite strata overlying the mound are decidedly domed, indicating that the mound was a rigid framework of boundstone that stood slightly above the sediment substrate as it grew. The boundstone was probably created by cyanobacteria (blue-green algae). Smaller biohermal mounds will be seen in the Jefferson City Dolomite at Stop 3.

Two-hundred feet north of the mound, a mass of limonite that is pseudomorphic after iron pyrites occurs in a prominent recess in the Jefferson City Dolomite (Fig. 1-4). The recess is the result of preferential weathering of a soft and powdery material that separates the limonite from the much more competent dolomite country rock. The soft and powdery material probably represents country rock that was altered during the emplacement of the iron pyrites or during the oxidation of the iron pyrites or during both emplacement and oxidation of the iron pyrites. It is well known that the oxidation of iron pyrites produces sulfuric acid, which would readily leach calcium and magnesium from the dolomite country rock. This diminutive iron ore body may well represent a small-scale version of the much larger iron ore and pyrites deposits that were mined in the Ozarks from the mid-1800s to the mid-1900s (Grawe, 1930).

![Figure 1-4: Mass of limonite pseudomorphic after iron pyrites in recess in Jefferson City Dolomite at STOP 2. Close examination suggests that the iron pyrites grew radially outwards from more than one center of crystallization. The whitish efflorescence on the limonite is an iron sulfate mineral or a calcium sulfate mineral or both. Hammer for scale.](image)

3.6 Entrance road to Capital Quarries Co., Inc., Rolla Quarry at 3 o’clock. The east highwall of the quarry is visible. Jefferson City Dolomite is being mined.
3.8 Jefferson City Dolomite is exposed in both sides of roadcut.

4.6 Paleocollapse structure in Jefferson City Dolomite is exposed in roadcut at 3 o’clock.

5.7 Red-stained dolomite that appears to contain stratified sandstone and greenish shale. What is going on here? The authors cannot offer a good explanation.

10.9 Downtown Vichy, Missouri.

11.8 Here the road crosses a broad and shallow sink. Look very closely because this feature is so subtle that it is not revealed by contouring on topographic maps. Rolla National Airport is at 3 o’clock.

12.5 Missouri 28 intersection. Maintain straight course on U.S. 63.

13.7 Brown Jefferson City Dolomite in cuts on both sides of road. Spreng and Laudon (1990) noted “…an incipient sink structure in the middle of the roadcut.” The present authors find these exposures most confusing. There is some wavy folding involved. Stratigraphic correlation from exposure to exposure and from one side of the road to the other is challenging. Is it possible that erosional cutters and pinnacles are involved?

Figure 1-5. Large roadcut at STOP 3. (A) Zone of finer broken rock (possibly fault gouge or collapse fill) that strikes N60°E and dips 65°SE. Photographer is standing on the middle of this same zone on the other side of this roadcut. (B) Slice of intact Quarry Ledge-like lithology of Jefferson City Dolomite. (C) Hanging wall of intact rock on southeast side of zone of finer broken rock. (D) Localized exposure of coarsely broken rock. View is looking N60°E.
STOP 3. Highly deformed and broken Jefferson City Dolomite exposed in large roadcut (Fig. 1-5). This structural complex is a paleocollapse feature or a tectonic fault zone or a combination of both. Spreng and Laudon (1990) indicate a northwest-trending fault at this location. A conspicuous aspect of this complex is a light-colored 45-ft-wide zone of much finer broken rock that strikes N60°E and dips 65°SE (Fig. 1-6A). This zone is in sharp contact with unbroken Quarry Ledge-like dolomite on either side. What appear to be weathered slickensides on the Quarry Ledge-like dolomite walls suggest vertical displacement. But the slickensides are inconclusive as to whether the footwall is up or down with respect to the hanging wall. Additionally, an intact slice of Quarry Ledge-like dolomite parallels and abuts the north side of the zone of finer broken rock, and it exhibits negligible stratigraphic displacement with respect to the intact rock that flanks its north side (Fig. 1-6B). Megabreccia occurs in other parts of this roadcut. This entire structural complex is possibly the result of transtensional or transcompressional or both styles of faulting associated with an overall tectonic strike-slip fault. Paleokarsting may have left a secondary overprint on the porous and permeable tectonic fault zone.

Included with STOP 3. Walk 0.2 miles to the west of the large roadcut at 14.8-mile mark. View a much lower roadcut on the north side of the road. Small biohermal mounds of probable cyanobacterial origin are developed on top of a hard quartz sandstone layer in the Jefferson City Dolomite (Fig. 1-6).
The mounds appear to have grown both upwards and laterally (to the point of coalescing) during the latter phase of sandstone deposition. Did the mounds develop prior to a regressive shallowing from a subtidal environment to an intertidal environment? Or did they develop during a transgressive deepening from an intertidal environment to a subtidal environment? The upwards succession from quartz sandstone to boundstone to nonfossiliferous cotton rock-like lithology to nonfossiliferous greenish gray shaly rock appears to favor the regressive shallowing scenario. The greenish gray shaly rock may represent deposition in the uppermost intertidal environment, perhaps extending up into the lowermost supratidal environment.

15.6 STOP 4. Devonian limestone or Mississippian limestone or both is flanked by lower Jefferson City Dolomite in a low roadcut on south side of road (Fig. 1-7). Some of the limestone is fossiliferous. Some is nonfossiliferous and nearly micritic. The latter is similar to the near-micrite limestone observed at STOP 1 in that it contains prominent inclusions, but the inclusions here are limonite rather than orange calcite spar. Also, compared to STOP 1, this “exotic” material is much lower in the stratigraphic section. Did this material drop down primarily as the result of paleokarsting, or did it drop down primarily as the result of transtensional action along a strike-slip fault zone?

Figure 1-7. Devonian or Mississippian limestone or both at STOP 4.

15.8 Jefferson City Dolomite in roadcut.
16.3 Roubidoux Formation in deep roadcut.
16.7 Roubidoux Formation in roadcut.
16.8 Intersection with Missouri A. Proceed straight ahead.
16.9 Quartz sandstone beds on lower part of Roubidoux Formation.
STOP 5. Contact between Gasconade Dolomite and overlying basal quartz sandstone of Roubidoux Formation is exposed in roadcut on north side of road (Fig. 1-8). The Gasconade Dolomite shows characteristic pitting.

The top of the bench of this roadcut shows that the pre-Roubidoux depositional surface exhibits some relief. A conspicuous circular area of positive relief is composed of cherty Gasconade Dolomite (Fig. 1-9).
18.5 Middle of bridge over Gasconade River.

18.6 Gasconade Dolomite exposed on both sides of roadcut west of Gasconade River.

19.0 Jefferson City Dolomite exposed in roadcut.

19.1 **STOP 6.** This was the site of a large rockslide that occurred around noon on Sunday February 21, 2010 (Figs. 1-10 and 1-11). Pieces of rock ranging up to the size of huge boulders slid from the north side of the roadcut and completely blocked U.S. 63. The road was made passable at about 5 o’clock in the afternoon on the same day. Is the highly broken rock that occurs at this location the result of paleokarsting? Or is it the result of tectonic faulting?

![Figure 1-10](image.jpg)

*Figure 1-10.* U.S. 63 was completely blocked by this rockslide that occurred at **STOP 6** on Sunday, February 21, 2010. The rock slid from the north side (left side of photograph) of the roadcut. Some of the material had been removed at the time this photograph was taken. View is looking southeast, towards the Gasconade River. (Photograph courtesy of Missouri Department of Transportation, MoDOT.)

19.7 Maries County Road 325—END OF FIELD TRIP. Turn around and retrace route back to Rolla.
Figure 1-11. Another view (looking east) of the rockslide that occurred at STOP 6 on Sunday, February 21, 2010. The rock slid from the north side of the roadcut (left side of photograph). Note the extremely large boulder resting on smaller boulders. (Photograph courtesy of Missouri Department of Transportation, MoDOT.)

References Cited


— Field Trip II —

Saturday, September 29, 2012

The Cambrian Succession in Western St. Francois County, Missouri

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Rolla, Missouri
Figure 2-1. Map showing field trip route and six stops along Missouri Route 32 and Missouri Route B in western St. Francois County, Missouri. Part A road log is for Missouri 32, and Part B road log is for Missouri B. The simplified geologic column shows the Cambrian System rock units in Missouri. Units highlighted yellow are observed during this field trip.
The Cambrian Succession in Western St. Francois County, Missouri

Introduction

This field trip addresses the fundamental aspects of the Cambrian succession of sedimentary strata in the west-central portion of St. Francois County (Fig. 2-1). The trip is separated into two parts (A and B), which have separate road logs. The road log for Part A involves exposures of Lamotte Sandstone, Davis Formation and Derby-Doerun Dolomite in roadcuts along Missouri Route 32 to the southwest of Park Hills. The road log for Part B involves outstanding exposures of Bonneterre Formation, Davis Formation and Derby-Doerun Dolomite in deep roadcuts along Missouri Route 8 between the small town of Gumbo and westward to the Big River bridge. Both road logs are within the confines of the Flat River 7½-minute quadrangle.

The subject matter for these road logs has largely been borrowed from Thompson et al. (in preparation).

Part A — Road Log for Missouri Route 32

Mileage
0.0 Road log starts at the intersection of Davis Crossing Road and Missouri Route 32, about 6 miles southwest the town of Park Hills.

0.4 STOP 1. Gently flexed Lamotte Sandstone is exposed in both sides of roadcut (Fig 2-2). The Lamotte section is thickest (about 25 feet) on the south side of the road.

In regard to this roadcut, Gregg et al. (1989) stated, “Lamotte Sandstone with arkose, quartz arenite, conglomerate, and shale facies. Note the cross bedding and channel cuts in parts of the exposure….. The outcrop is cut by several faults…of the Simms Mountain fault system. The main trace of the fault system is to the immediate northeast of the outcrop along Dry Creek, where [there] is about 800 feet of throw, with the downthrown side to the northeast.”

Seeger and Palmer (1998) in describing this exposure stated, “The Lamotte Sandstone [in the regional context of southeastern Missouri] consists of basal, locally derived alluvial redbeds, middle quartzose-dominant fluviat sandstones, and upper marine sandstones. This exposure [at STOP 1] is comprised of arkose, quartz arenite, conglomerate, and shaly sandstones. Cross-bedding and channel cuts are notable in parts of the exposure. The majority of the roadcut is basal or near-basal Lamotte; the east end of the roadcut contains middle Lamotte that has been faulted downward relative to the lower Lamotte. The basal Lamotte rocks are dominated by rock fragment and polycrystalline quartz grains [see Figure 2-3 herein], while the middle and upper Lamotte are mostly monocrystalline quartz. The basal and middle sequences are interpreted as a variety of alluvial fan facies which grade upward, and laterally, into rocks interpreted as part of a fluvial plain sequence.”
Figure 2-2. Lamotte Sandstone exposed in roadcut on north side of road at STOP 1. View is towards the northeast. Dr. James F. Miller for scale.

Figure 2-3. Weathered igneous rock fragments ranging up to pebble-sized and polycrystalline quartz grains in basal Lamotte Sandstone on north side of road at STOP 1.
One of the faults in this roadcut is a normal fault that displays about 3 feet of down-to-the-northeast vertical displacement and which strikes N50°W and dips 74°NE (Fig. 2-4). The expression of this same fault on the north side of the road is probably hidden behind a clump of vegetation that is on strike with the fault. This fault is likely related to the Simms Mountain fault zone.

Figure 2-4. Normal fault (white line) in Lamotte Sandstone on north side of road at STOP 1. View is to the southeast and parallel to strike of fault.

0.6 Lamotte Sandstone exposed on south side of road. It shows an apparent dip of 3°NE.

0.7 Lamotte Sandstone exposed on south side of road. Down-to-the-northeast normal fault strikes N60°W and dips 65°NE and exhibits about one foot of vertical displacement. Slickensides indicate movement was vertical.

0.8 Barnes Road intersection. Lamotte Sandstone exposed at NW, SW and SE corners of intersection. Forthwith, the road crosses Dry Creek and the Simms Mountain fault zone.

0.9 Oakwood Road intersection. Exposure of Derby-Doerun Dolomite that is shaly-bedded in lower part and massively-bedded dolomite containing calcite spar in upper part.

1.2 Railroad crossing.

1.5 Ellis Road intersection.
1.6 Derby-Doerun Dolomite exposed on both sides of road.

1.8 Derby-Doerun Dolomite exposed on both sides of road.

2.1 Contact between Davis Formation and overlying Derby-Doerun Dolomite. The slightly recessed Davis beds comprise greenish-gray shale that is interbedded with slightly glauconitic dolomite. The Derby-Doerun Dolomite is thick-bedded dolomite.

2.2 Derby-Doerun Dolomite exposed on north side of road.

2.7 Derby-Doerun Dolomite largely hidden by vegetation on north side of road.

3.0 Derby-Doerun Dolomite exposed on north side of road.

3.2 Intersection with Missouri Business Route 32. Derby-Doerun Dolomite exposed on northwest corner.

3.4 Intersection with Missouri Route B, immediately followed by railroad crossing and then entrance road to St. Joe State Park.

3.5 Greenish-gray shale of uppermost Davis Formation exposed in fresh cuts on both sides of road. It is overlain by thick-bedded Derby-Doerun Dolomite. Successively younger layers of Derby-Doerun Dolomite are encountered as one ascends the uphill grade of the road.

3.9 Power lines overhead.

4.1 **STOP 2.** Crest of roadway. Contact between Davis Formation and overlying Derby-Doerun Dolomite is clearly visible on both sides of road along the downhill road grade ahead (Fig. 2-5). The first thick (17 feet) dolomite layer beneath the contact is the *Eoorthis* bed of the Davis Formation (Fig. 2-5). The orthid brachiopod *Eoorthis remnicha* occurs in this bed (Kurtz, 1960, 1975, 1989; Kurtz et al., 1975). The interval between the *Eoorthis* bed and the Derby-Doerun is 12 feet thick in this cut (Thompson et al., in preparation). A minor fault is visible in the west cut (Fig. 2-5).

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**Figure 2-5.** Roadcut on west side of Missouri Route 32 at **STOP 2** that shows contact (horizontal white line) between Davis Formation and overlying Derby-Doerun Dolomite. Minor normal fault is at interruption in white contact line. The *Eoorthis* bed is the first thick dolomite bed below the contact. View is towards the northwest.
The residuum that covers the south flank of the east cut contains drusy masses of rhombohedrally-terminated hexagonal prism quartz crystals and banded chalcedony (Fig. 2-6) that are similar to those that occur in the Potosi Dolomite in Washington County, which abuts the west side of St. Francois County. The remnant of a platy to slabby dolomite is exposed at the top of the east cut. Could it represent basal Potosi Dolomite?

Those who are able to do so should walk north to STOP 3, where coach will be waiting.

4.5 STOP 3. Davis Formation exposed on both sides of road. The most conspicuous feature is the “Marble Boulder bed” of Thompson et al. (in preparation) that serves as a reliable marker horizon in the middle part of the Davis Formation in the field trip area (Fig. 2-7). The “Marble Boulders” are thrombolite mounds that were probably formed by cyanobacteria (blue-green algae). The bed is 6 to 8 feet thick on both side of road.

Intraformational conglomerate (Fig. 2-8) occurs in dolomite layers below the “Marble Boulder bed.” Brown dolomite crystals occur on joint surfaces of dolomite beds. Masses of calcite spar occur within dolomite beds. A minor down-to-the-south normal fault having 2 to 3 feet of vertical displacement is visible on both sides of the roadcut. The fault strikes N70°W and dips 62°S.
Figure 2-7. Davis Formation exposed in west side of roadcut at STOP 3. The “Marble Boulder bed” is a reliable marker horizon for the middle part of the Davis formation in the field trip area.

Figure 2-8. Intraformational conglomerate in Davis Formation below “Marble Boulder bed” in west side of roadcut at STOP 3. Note the cobble-sized clast at upper left. Dime for scale is to the right of the cobble-sized clast.
Large-scale ripples occur on an exposed dolomite bedding surface atop the southeast side of the roadcut (Fig. 2-9). The ripples are on top of a 9-foot-thick sequence of blocky dolomite. The rippled surface is 17 feet above the top of the "Marble Boulder bed." An 8-foot-thick greenish-gray shale overlies the rippled surface, and the contact between the two is extremely sharp. The ripples are somewhat sinuous, display some bifurcation, and trend N10°W. Their wavelength is about 15 inches, and their amplitude is between 2 and 3 inches. Note that the crests of the ripples are slightly planed down by excavation equipment. The ripples are slightly asymmetrical to varying degrees. Troughs are rounded and wide. Were these ripples wave-generated? Or were they current-generated?

Figure 2-9. Large-scale ripples in Davis Formation on southeast side of road cut at STOP 3. Knapsack for scale. View towards the south.

END of PART A road log.
Part B — Road Log for Missouri Route 8

Mileage

0.0 Road log starts at the intersection of Missouri Route Z and Missouri Route 8 on the west side of town of Park Hills. Travel west on Missouri 8. Bonneterre Formation exposed in low cut on south side of road. Kurtz (1960) originally described the stratigraphy that will be seen during the course of this road log.

0.5 Bonneterre Formation exposed in low cut on south side of road.

0.7 Intersection with Missouri Route P. Bonneterre Formation exposed in low cut on south side of road.

0.8 Bonneterre Formation exposed in low cut on south side of road.

1.3 Intersection with Maple Street in small town of Gumbo. Top of Bonneterre Formation exposed below road level in northeast corner of intersection.

1.4 Top of Bonneterre Formation on north side of road.

1.5 Arenaceous beds in lower part of Davis Formation on both sides of road.

1.7 **STOP 4.** Intersection with Hulsey Road. Arenaceous beds in lower part of Davis formation exposed on both sides of road (Fig. 2-10).

![Arenaceous beds of lower part of Davis Formation exposed immediately west of intersection of Hulsey Road and Missouri 8 at the beginning of walk-to-the-west STOP 4. View is towards the west.](image-url)
Those who are capable of doing so should walk 0.6 miles west to road log mileage 2.3 and enjoy the spectacular roadcut exposures of Davis Formation along the way. Coach will be at mileage 2.3 when we get there. BE CAREFUL. THIS IS A BUSY ROAD.

1.8  Dolomite and shale of middle Davis Formation exposed on both sides of road. “Marble Boulder bed” is towards top of roadcut. Look for interesting edgewise lithoclast conglomerates in dolomites from here to mileage 2.3 (Fig. 2-11).

2.0  “Marble Boulder bed” of Davis Formation is exposed at road level (Fig. 2-12).

Figure 2-11. Example of edgewise lithoclast conglomerate in Davis Formation at STOP 2.

Figure 2-12. “Marble Boulder bed” of middle part of Davis Formation exposed at road level on north side of road at 2.0 mileage mark of road log.
2.2 Near crest of roadway. “Marble Boulder bed” is several feet below ground level. Top bedding surface of the thick dolomite interval at road level correlates with the ripple-bearing surface at STOP 3. The *Eoorthis* bed is exposed in the upper bench of the roadcut at about 30 feet above road level (Fig. 2-13).

2.3 West end of roadcut and intersection with access road to Big River Quarry. The “Marble Boulder bed” is exposed at road level (Fig. 2-14). Large-scale ripples are patchily exposed on top of the thick dolomite unit that overlies the “Marble Boulder bed” (Fig. 2-15). This ripple-marked horizon, which is overlain by greenish-gray shale, correlates with the ripple-bearing horizon at STOP 3. Do the ripples indicate current or oscillatory water movement? Apparently, the rippled horizon is present over an extensive area and may constitute a reliable stratigraphic marker.
Figure 2-15. Large-scale ripples on bedding surface that is marked by the red line in Figure 2-14. James R. Palmer for scale.

This is the END of STOP 4 — REBOARD the COACH

2.9 Intersection with Hunt Street on northeast side of town of Leadwood. Bonneterre Formation is exposed on the west corner of the intersection.

Figure 2-16. Bonneterre Formation in contact (red line) with overlying Davis Formation in cut on southwest side Missouri 8 on the northeast side of the town of Leadwood. STOP 5 of road log.
3.1 **STOP 5.** High, vertical roadcuts on both sides of road expose the upper 20 feet of Bonneterre Formation, which is overlain by lowermost beds of the Davis Formation. (Fig. 2-16). The exact line of contact is open to interpretation, as it appears to be gradational.

3.3 Bonneterre Formation in transitional contact with overlying Davis Formation is exposed in cut on south side of road.

3.5 Intersection with Huntsford Road.

3.8 Arenaceous beds in the lower part of the Davis Formation are exposed in low cut on south side of road.

4.1 Intersection with Marler Road. Shaly strata in upper part of Davis Formation are exposed in low cuts on both sides of road.

4.2 Contact between Davis Formation and overlying Derby-Doerun Dolomite is poorly exposed in low cuts alongside road.

4.3 Nearly vertical cuts form walls of thick- to massive-bedded Derby-Doerun Dolomite on both sides of road.

4.6 **STOP 6.** Contact between Davis Formation and overlying Derby-Doerun Dolomite (Fig. 2-17). The growth of eastern red cedars has obscured the large biohermal mounds (thrombolites) that were noted in the base of the Derby-Doerun Dolomite when this cut was fresh over twenty years ago (Thompson and Palmer, 1987). The top of the Davis Formation appears to have been a hardground onto which eocrinoids cemented their holdfasts prior to deposition of the Derby-Doerun Dolomite (Fig. 2-18). Small pockets of trilobite hash also occur.

Those who are capable of doing so should walk 0.3 miles west to road log mileage 4.9. Coach will be at mileage 4.9 when we get there. **BE CAREFUL. THIS IS A BUSY ROAD.**

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*Figure 2-17. North side of roadcut on Missouri 8 at STOP 6. Red line marks contact between Davis Formation and Derby-Doerun Dolomite.*
Figure 2-18. Eocrinoid holdfasts (white, button-like features) on top of Davis Formation hardground at STOP 6.

4.7 Minor folding in Davis Formation displayed in cut on south side of road.

4.8 *Eoothis* bed is exposed on both sides of road. It is about 10 feet thick and forms a prominent bench (Fig. 2-19). It is 7 feet thinner here than it is at STOP 2. The shale-dominant interval between the *Eoothis* bed and the Derby-Doerun Dolomite is about 20 feet thick, much thicker than it is (12 feet thick) at STOP 2 on Missouri Route 32. However, the combined thickness of the *Eoothis* bed and the overlying shale-dominant interval is nearly the same at both locations; that is, 29 to 30 feet.

Figure 2-19. North side of roadcut between mileage marks 4.8 and 4.9 at STOP 6. This photograph corresponds to the leftmost one-quarter of the photograph shown in Figure 2-17.

It has been observed (Thompson et al., in preparation) that the Davis Formation, by way of lithologic facies change, becomes less shaly and more dolomitic towards the southeast. For example, in southwestern Madison County (35 miles south-southwest of the present STOP 6), the Davis Formation is entirely a dolomite whose lithology cannot readily be distinguished from that of the underlying Bonneterre Formation or the overlying Derby-Doerun Dolomite. Kurtz (1975) and Kurtz et al. (1975) did detect the characteristic Davis Formation biostratigraphic zones in such cases, but biozones are of little practical importance—in fact, irrelevant—when it comes to field mapping rock-stratigraphic units. Thompson et al. (in preparation) recommend assigning such difficult-to-subdivide dolomite sequences to the Dug Hill Formation, which is a new
lithostratigraphic unit name. This would simplify and facilitate the field mapping of rock units.

4.9 The tops of “marbles” of the “Marble Boulder bed” of the Davis Formation are exposed in ditch on both sides of road at the west end of the roadcut.

This is the END of STOP 6 — REBOARD the COACH

5.0 Earthen bridge over the Hayden Creek valley.

5.2 Arenaceous beds of lower part of Davis Formation are exposed in low cuts on both sides of road.

5.4 Intersection with old Missouri Route 8 or Glore Road.

5.5 “Marble Boulder bed” of Davis Formation is exposed at about 20 feet above road level in north side of roadcut (Fig. 2-20).

5.6 Intersection with Harmon Road.

5.9 Arenaceous beds of lower part of Davis formation are exposed in roadcuts on both sides of road just before reaching intersection with old Missouri Route 8 and forthwith crossing the Big River bridge. Sandstone beds of lower Davis Formation are exposed beneath the east side of the bridge.

END of PART B road log.
Selected References


Kurtz, V.E., 1975, Measured sections and faunal lists from the Elvins Group (Upper Cambrian) of southeast Missouri. Southwest Missouri State University, Department of Geography and Geology, Springfield, Missouri, Geoscience Series No. 2, 11 p.


Plate 1. Outcrop map of Cambrian System and structure contour map on top of subsurface Cambrian System in Missouri. Red is outcrop area of Precambrian rocks, where the Cambrian System is absent. Yellow is outcrop area of Cambrian Lamotte Sandstone. Blue is outcrop area of combined Cambrian Bonnerterre Formation, Davis Formation and Derby-Doerun Dolomite. Orange is outcrop area of Cambrian Potosi Dolomite and Eminence Dolomite. Blue lines are 500-foot-interval structure contours. Prepared by Justin G. Davis (2012).