

HIGH RESOLUTION STRATIGRAPHY OF THE ST.
JOE GROUP FROM SOUTHWEST MISSOURI TO
NORTHEAST OKLAHOMA

By

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NORTHEAST OKLAHOMA

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Abstract: Lower Mississippian strata in the tri-state region of Missouri, Arkansas, and Oklahoma include the Bachelor Formation, Compton Formation, and Northview Formation of Kinderhookian Stage, as well as the Pierson Formation, Reeds Spring Formation, and Bentonville Formation of Osagean Stage. Collectively, the Bachelor-Pierson formations make up the St. Joe Group and were deposited on a shallow marine carbonate ramp, known as the Burlington Shelf. These beds regionally thin in a southward direction off of the Ozark Uplift, as well as south-southwest from Jane, Missouri, towards Siloam Springs, Arkansas, and continue into northeast Oklahoma. Several workers have noted unique changes in thickness, facies variations, unconformities, and northward-dipping progradation of the St. Joe Group in this region. Some hypothesized that the southward regional thinning is possibly due to marine condensed sedimentation into a starved basin or alternatively thinning over a structural high.

Seven stratigraphic sections were chosen from southwestern Missouri to northeastern Oklahoma for detailed lithologic and petrographic analysis to gain a better understanding of the mechanism responsible for the thinning of these strata. A total of 164 samples were taken from beds spanning from the Bachelor Formation to the lowermost 2 beds of the Reeds Spring Formation. Conodont recovery and identification analyses were conducted for each sample to aid in determining formation boundaries. Additionally, 131 of the 164 samples were used for petrographic examination to determine carbonate textures and fossil content.

The petrographic data presented in this report provides evidence that these deposits contain moderate to high energy skeletal wackestones and packstones that indicate a shallow marine ramp depositional environment. Other lines of evidence that these deposits are of shallow marine origin include green calcareous shale, greenish-blue pisoids, peloids, and quartz silt commonly seen throughout the St. Joe Group. These characteristics favor the proposition that these strata are thinning over a fore-bulge high due to syndepositional tectonism associated with the Ouachita Orogeny. This orogeny created fore-bulge arches that overprinted lithostratigraphic and sequence stratigraphic architecture of the St. Joe Group.

TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION	1
Objectives	3
Previous Studies.....	4
II. GEOLOGIC FRAMEWORK	10
Depositional History	11
Bachelor Formation	14
Compton Formation	15
Northview Formation.....	17
Pierson Formation	18
Reeds Spring Formation	19
III. METHODOLOGY	21
Field Methods	21
Laboratory Methods.....	22
Acetate Peel Preparation	22
Acetate Peel Descriptions	22
Conodont Recovery	23

Chapter	Page
IV. FINDINGS AND DISCUSSION	24
Jane, Missouri	25
Bachelor Formation	27
Compton Formation	27
Petrographic Analysis	28
Bella Vista, Arkansas	32
Bachelor Formation	34
Compton Formation	34
Petrographic Analysis	35
Northview Formation	37
Petrographic Analysis	38
Pierson Formation	39
Petrographic Analysis	40
Reeds Spring Formation	44
Petrographic Analysis	45
Bentonville, Arkansas	46
Pierson Formation	48
Petrographic Analysis	50
Reeds Spring Formation	54
Petrographic Analysis	55
Siloam Springs, Arkansas	57
Bachelor Formation	59
Compton Formation	60
Petrographic Analysis	61
Northview Formation	63
Petrographic Analysis	64
Pierson Formation	64
Petrographic Analysis	65
Reeds Spring Formation	68
Petrographic Analysis	68
Kansas, Oklahoma	70
Bachelor Formation	72
Compton Formation	72
Petrographic Analysis	73
Northview Formation	76
Petrographic Analysis	77
Pierson Formation	79
Petrographic Analysis	81
Reeds Spring Formation	83
Petrographic Analysis	83
Baron Fork, Oklahoma	85
Bachelor Formation	86
Compton Formation	87

Petrographic Analysis	87
Northview Formation.....	89
Pierson Formation.....	89
Petrographic Analysis	90
Reeds Spring Formation	91
Petrographic Analysis	91
Tahlequah, Oklahoma.....	93
Bachelor Formation	95
Compton Formation.....	96
Petrographic Analysis	96
Northview Formation.....	97
Pierson Formation.....	97
Petrographic Analysis	99
Reeds Spring Formation	101
Petrographic Analysis	101
Discussion.....	103
V. CONCLUSIONS.....	105
REFERENCES	108
APPENDICES	112
Appendix A (Sample Descriptions).....	112
Appendix B (Petrographic Analysis).....	179

LIST OF FIGURES

Figure	Page
1.1 Stratigraphic Nomenclature of St. Joe Group	2
1.2 Map of study area.....	3
1.3a Conodont biozonation chart	6
1.3b Conodont biozonation chart continued	7
1.4 Cross-section from Jane, Missouri to Tahlequah, Oklahoma	8
1.5 Cross-section from Jane, Missouri to Baron Fork, Oklahoma.....	9
2.1 Paleogeographic map of the Early Mississippian	11
2.2 Late Tournasian paleogeographic map with depositional magnafacies	12
2.3 Paleogeographic model of Early Mississippian.....	14
3.1 Example of bed divisions.....	21
4.0 Lithologic symbology	24
4.1a Stratigraphic section of St. Joe Group at Jane (South), Missouri	26
4.1b Bachelor Formation	27
4.1c Compton Formation	28
4.1d Compton bed C1 at Jane (South)	29
4.1e Compton bed C2 at Jane (South)	30
4.1f Compton bed C6 at Jane (South).....	30
4.1g Compton bed C12 at Jane (South)	31
4.2a Stratigraphic section of St. Joe Group at Bella Vista, Arkansas	33
4.2b Bachelor Formation	34
4.2c Compton Formation	35
4.2d Compton bed C1 at Bella Vista	36
4.2e Compton bed C6 at Bella Vista.....	36
4.2f Northview Formation	37
4.2g Northview bed NV1 at Bella Vista	38
4.2h Northview bed NV2 at Bella Vista	39
4.2i Pierson Formation.....	40
4.2j Pierson bed P1 at Bella Vista.....	41
4.2k Pierson bed P2 at Bella Vista.....	42
4.2l Pierson bed P13 at Bella Vista.....	42
4.2m Pierson bed P14 at Bella Vista.....	43
4.2n Pierson bed P18 at Bella Vista.....	43
4.2o Reeds Spring Formation	44

4.2p Reeds Spring bed RS1 at Bella Vista.....	45
4.3a Stratigraphic section of St. Joe Group at Bentonville, Arkansas	47
4.3b Base of the Pierson Formation.....	48
4.3c Lower portion of the Pierson Formation.....	49
4.3d Middle portion of the Pierson Formation.....	49
4.3e Upper portion of the Pierson Formation	50
4.3f Pierson bed P1 at Bentonville.....	51
4.3g Pierson bed P5 at Bentonville.....	51
4.3h Pierson bed P14 at Bentonville	52
4.3i Pierson bed P22 at Bentonville.....	52
4.3j Pierson bed P28 at Bentonville.....	53
4.3k Pierson bed P32 at Bentonville	53
4.3l Pierson bed P36 at Bentonville.....	54
4.3m Reeds Spring Formation	55
4.3n Reeds Spring bed RS1 at Bentonville.....	56
4.4a Stratigraphic section of St. Joe Group at Siloam Springs (South), AR.....	58
4.4b Bachelor Formation	59
4.4c Compton Formation	60
4.4d Compton bed C1 at Siloam Springs (South).....	61
4.4e Compton bed C5 at Siloam Springs (South)	62
4.4f Compton bed C7 at Siloam Springs (South)	62
4.4g Northview Formation.....	63
4.4h Northview bed NV3 at Siloam Springs (South)	64
4.4i Pierson Formation.....	65
4.4j Pierson bed P1 at Siloam Springs (South).....	66
4.4k Pierson bed P3 at Siloam Springs (South)	67
4.4l Pierson bed P4 at Siloam Springs (South)	67
4.4m Reeds Spring bed RS1 at Siloam Springs (South).....	69
4.5a Stratigraphic section of St. Joe Group at Kansas, Oklahoma	71
4.5b Bachelor Formation	72
4.5c Compton Formation	73
4.5d Compton bed C1 at Kansas.....	74
4.5e Compton bed C4 at Kansas	75
4.5f Compton bed C9 at Kansas	75
4.5g Northview Formation.....	76
4.5h Northview bed NV2 at Kansas	77
4.5i Northview bed NV8 at Kansas	78
4.5j Northview bed NV12 at Kansas	78
4.5k Pisoids in bed P5 at Kansas	80
4.5l Pierson and lower portion of the Reeds Spring Formation at Kansas	80
4.5m Pierson bed P1 at Kansas	81
4.5n Pierson bed P5 at Kansas	82
4.5o Reeds Spring bed RS1 at Kansas	83
4.6a Stratigraphic section of St. Joe Group at Baron Fork, Oklahoma.....	85
4.6b Bed divisions of the St. Joe Group.....	86
4.6c Compton bed C2 at Baron Fork	88

4.6d Compton bed C4 at Baron Fork	88
4.6e Pierson bed P1 at Baron Fork.....	90
4.6f Pierson bed P4 at Baron Fork	91
4.6g Reeds Spring bed RS1 at Baron Fork	92
4.7a Stratigraphic section of St. Joe Group at Tahlequah, Oklahoma	94
4.7b Bed divisions of the St. Joe Group.....	95
4.7c Compton bed C1 at Tahlequah.....	97
4.7d Pisoids in bed P5 at Tahlequah	98
4.7e Pierson bed P1 at Tahlequah	99
4.7f Pierson bed P4 at Tahlequah	100
4.7g Pierson bed P5 at Tahlequah.....	100
4.7h Reeds Spring bed RS1 at Tahlequah.....	102
4.8 Distally steepened ramp model proposed for the St. Joe Group.....	104

CHAPTER I

INTRODUCTION

The Mississippian Subsystem in the Mid-continent region of the United States is of great interest to academia and industry as hydrocarbon exploration continues to expand in northeastern Oklahoma and southern Kansas. In order to gain a better understanding of Mississippian strata in the subsurface and develop an accurate depositional model, it is crucial to perform detailed studies of these units in outcrop. The following report presents a detailed lithologic and petrographic study of the Lower Mississippian, St. Joe Group (Figure 1.1), including the characterization of carbonate facies to provide a better understanding of their depositional history. Though there has been much indecision regarding the units that make up the St. Joe Group, this paper recognizes the Compton, Northview, and Pierson to be formations within the group, as proposed by Mazzullo and others (2013).

Seven outcrops were chosen along the southwestern flanks of the Ozark Uplift for detailed bed-by-bed petrographic, lithologic, and conodont biostratigraphic analysis of the St. Joe Group. These stratigraphic sections are located in northeastern Oklahoma, northwestern Arkansas, and southwestern Missouri as shown in Figure 1.2. The lithostratigraphic units of interest are, in ascending order, the Bachelor Formation,

Compton Formation, and Northview Formation of the Kinderhookian Stage, as well as the Pierson Formation and lower Reeds Spring Formation of the Osagean Stage.

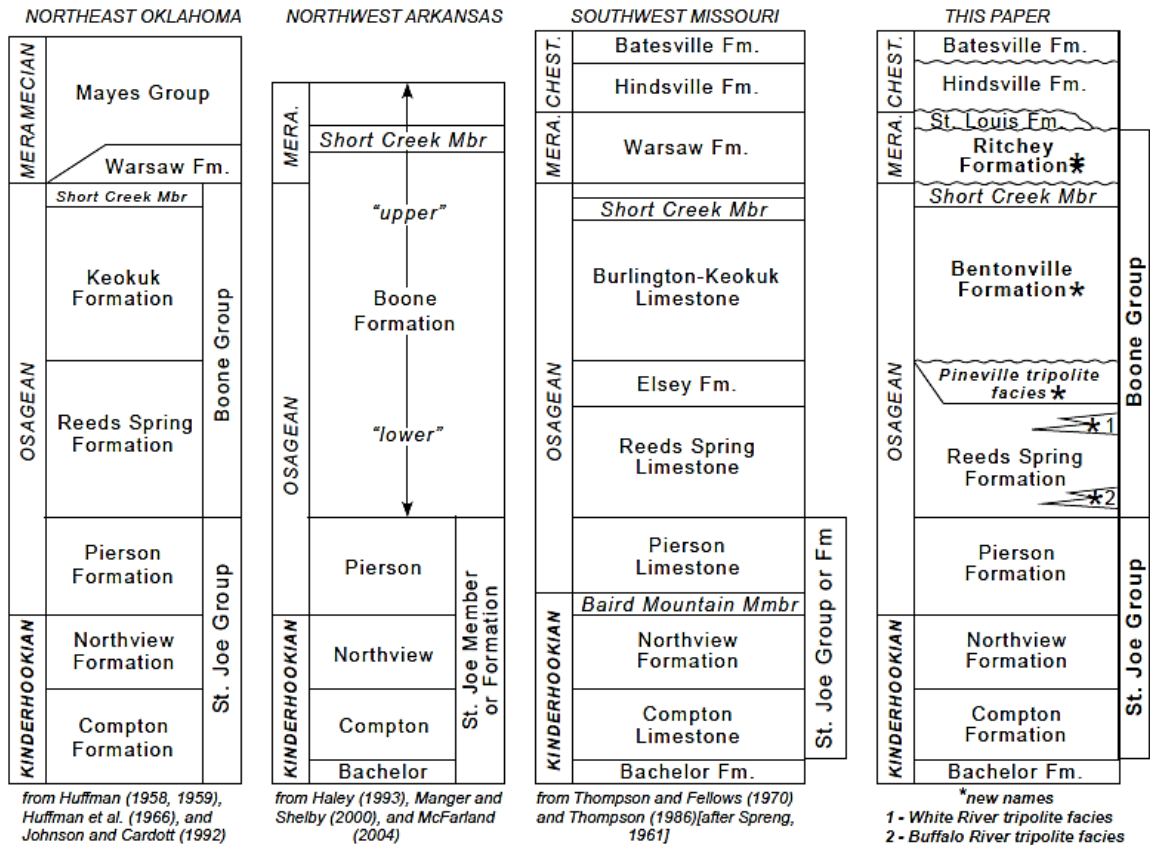


Figure 1.1. Stratigraphic nomenclature of Lower Mississippian units in northeast Oklahoma, northwest Arkansas, southwest Missouri, and the revised nomenclature from Mazzullo and others (2013) used in this paper.

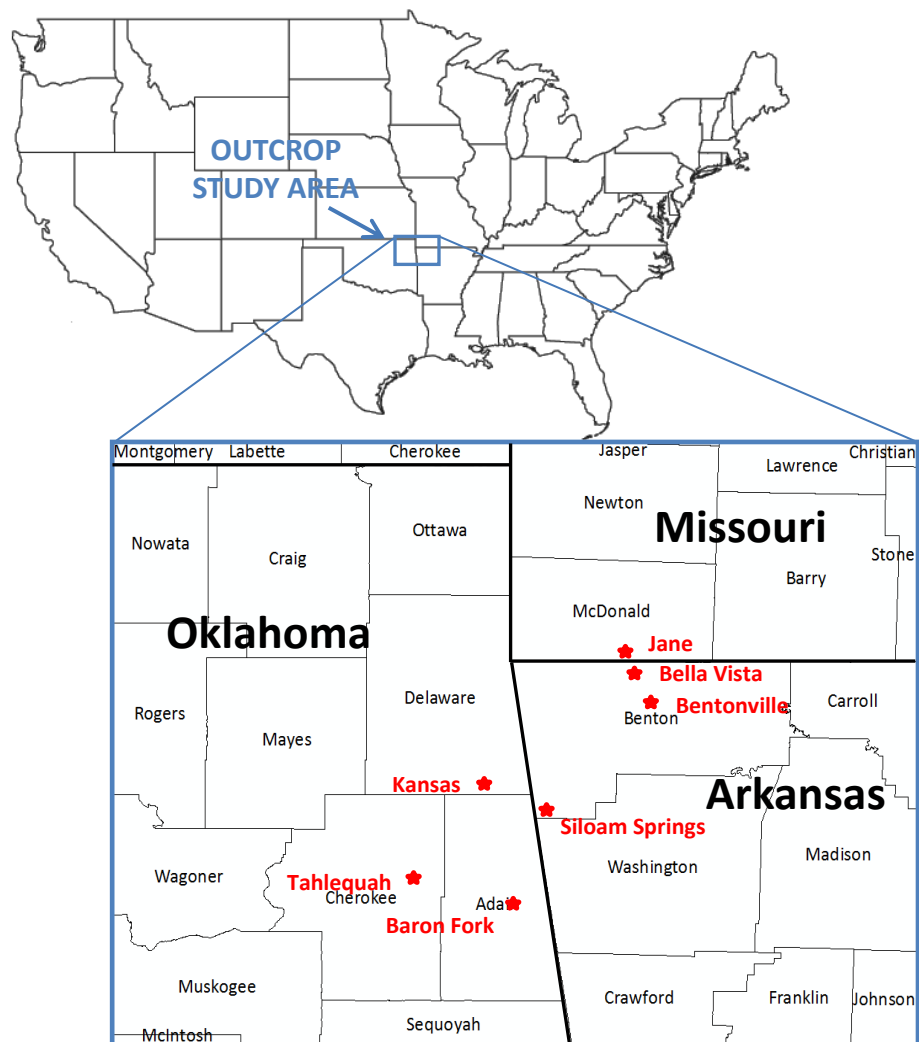


Figure 1.2. Map of study area. Red stars indicate approximate location of each outcrop in which a stratigraphic section was made.

Objectives

The objective of this study is to explain the mechanism responsible for the regional thinning of the St. Joe Group in the study area (Figures 1.4 and 1.5). To date, there has not been a detailed bed-by-bed petrographic, conodont biostratigraphic, and lithologic analysis of the St. Joe Group at the seven stratigraphic sections chosen for this study. This report provides descriptions of these units in order to better understand their depositional history and structural history. This is important due to unique changes in St.

Joe Group thickness, facies variations, multiple unconformities, and northward progradation southwest of the Ozark Uplift that is believed to be the result of fore-bulge vasillations in response to the Kinderhookian-Osagean Ouachita Orogeny (Mazzullo *et al.*, 2011). Determining the mechanism responsible for the thinning of these units will help build a foundation for an accurate depositional model and paleogeographic map that could be used for future hydrocarbon exploration.

Previous Studies

The Kinderhookian and Osagean units in this region have been studied to great extent since the late 1800's. However, little is known about the depositional history of the St. Joe Group along the southwestern flanks of the Ozark Uplift. The lack of detailed stratigraphic and biostratigraphic studies of the Lower Mississippian strata in northeast Oklahoma, northwest Arkansas, and southwest Missouri has made it difficult to determine the depositional environment in which the St. Joe Group formed.

The conodont fauna and stratigraphic succession of Kinderhookian and Osagean strata in this region are well documented by Thompson (1969) and Thompson and Fellows (1970). Thompson and Fellows (1970) conducted a comprehensive study that presented descriptions of the Lower Mississippian strata at 42 localities along the southwestern flank of the Ozark Uplift. Age relationships were determined from conodonts. In addition, the study provides the geographical distribution and historical nomenclature changes of the lower Mississippian units in the region.

Though there were several stratigraphic studies published regarding the St. Joe Group, the regional paleogeography was poorly understood before 1978. Lane (1978) developed the first paleoecologic model from conodont fauna of the early to middle

Osagean strata in the central United States. Through the use of conodont biostratigraphy and carbonate textural descriptions, Lane placed the current study area at the southern shelf margin of the widespread Burlington Shelf. Lane and DeKeyser (1980) formulated the first depositional model, as well as the first paleogeographic model of the early Mississippian strata of the southwestern United States. By mapping isopachs of these rock units and associated structures, as well as using conodont biostratigraphy, they were able to show the distribution of four primary late Tournasian depositional facies. These depositional facies are discussed in more detail in the following chapter.

A recent study by Boardman and others (2013) augmented Thompson and Fellows (1970) work with 54 new measured and sampled sections along the western and southern edge of the Ozark Uplift. Their study provided an up-to-date conodont range chart with zonation schemes for the Middle Tournaisian-lower Visean strata in the study area (Figures 1.3a-b). Not only is this important for biostratigraphic correlations, but also for determining the cause of the shelf-to-basin transition described by Lane and DeKeyser (1980). Boardman and others (2013) suggest that the thinning of the St. Joe Group to the south of Springfield, Missouri is not caused by condensed sedimentation into a starved basin as previously postulated by Lane (1978). Instead, evidence from petrographic data, conodont zonations, and unconformities seen within the St. Joe Group and Reeds Spring Formation led to an interpretation that favored thinning over a structural high, as hypothesized by Mazzullo et al. (2011).

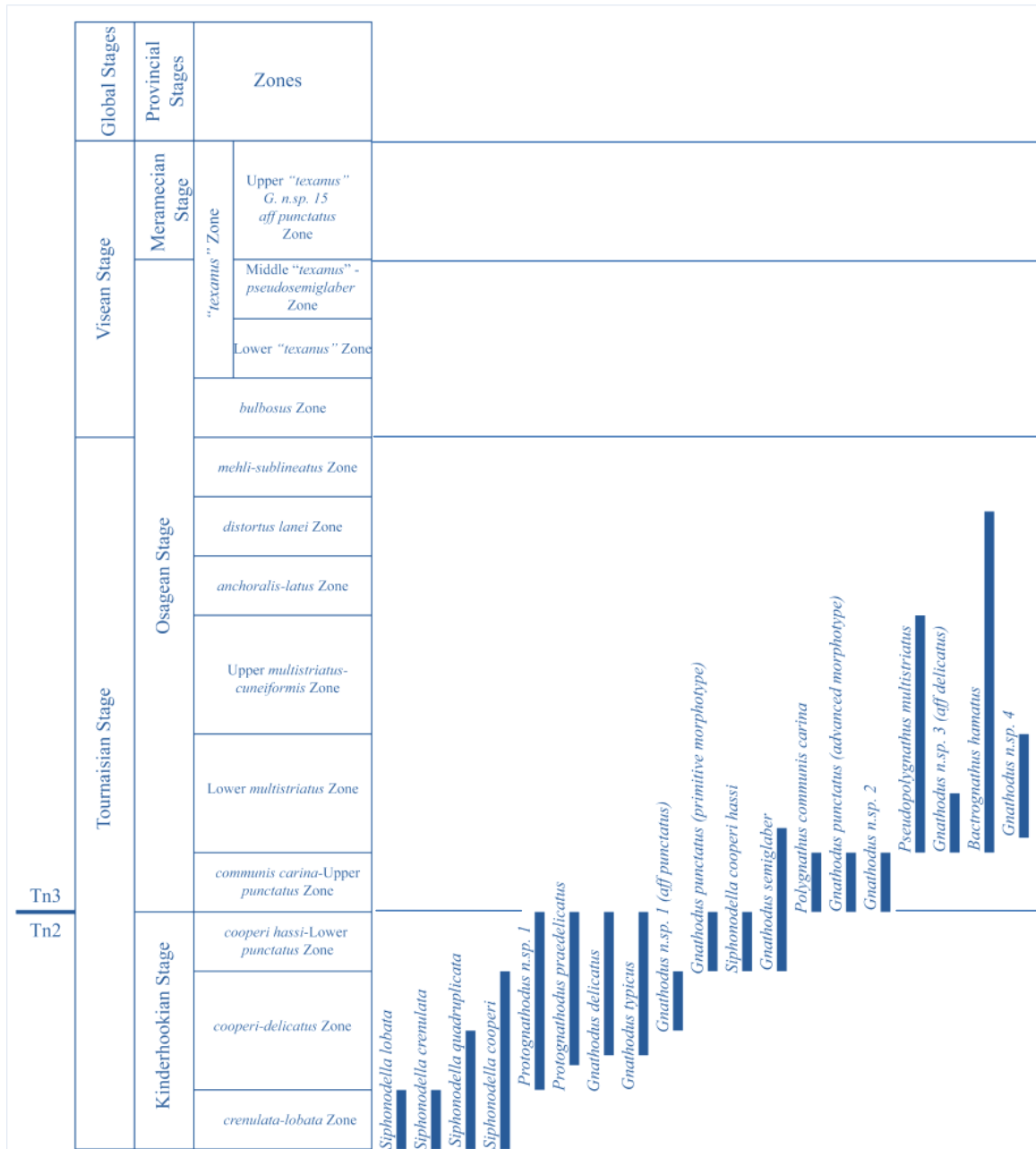


Figure 1.3a. Range chart for the biostratigraphically most significant taxa in the study area. Adapted from Mazzullo *et al.* (2013).

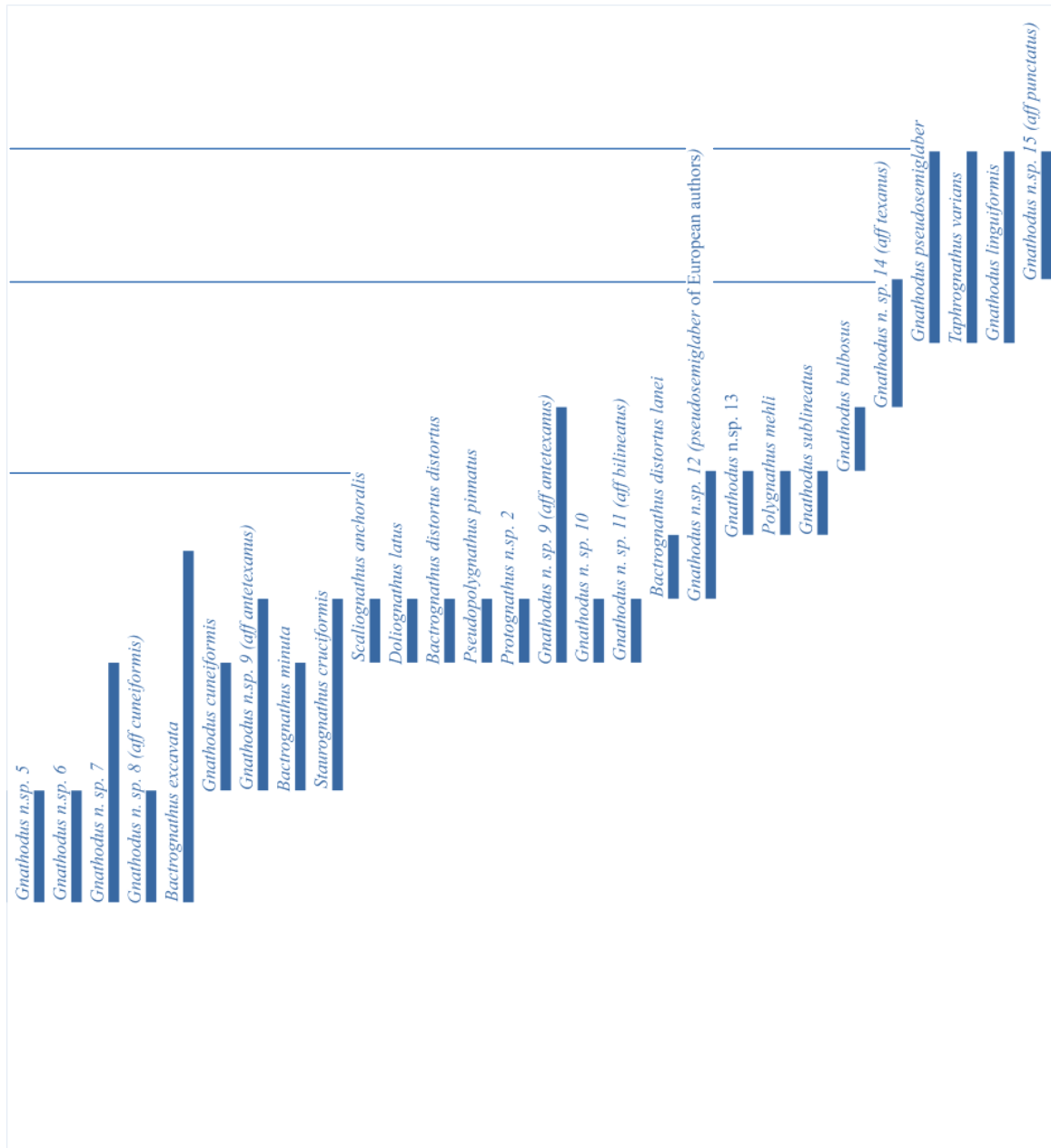
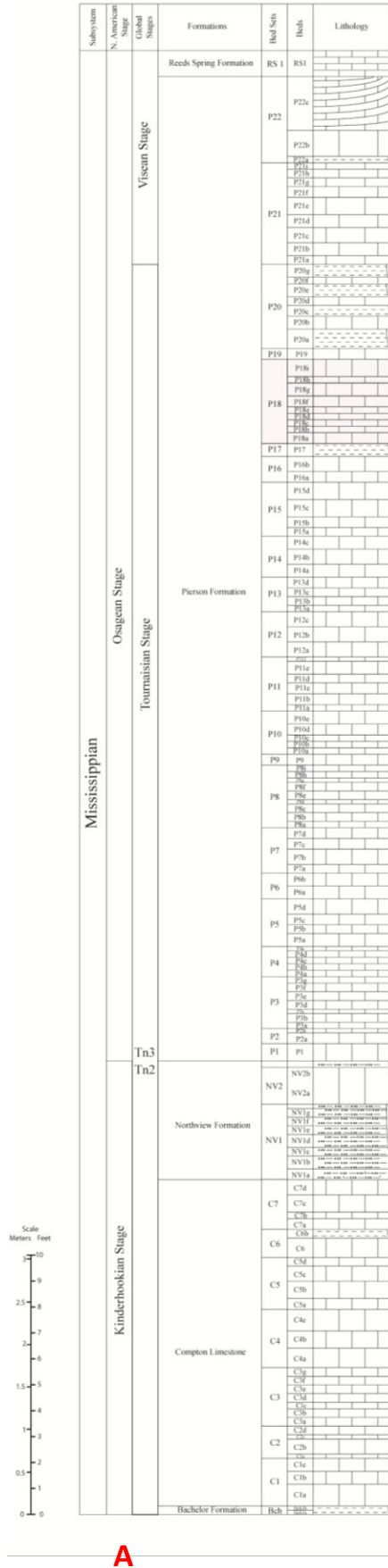


Figure 1.3b. Range chart for the biostratigraphically most significant taxa in the study area. Adapted from Mazzullo *et al.* (2013).

Jane (North), MO



A

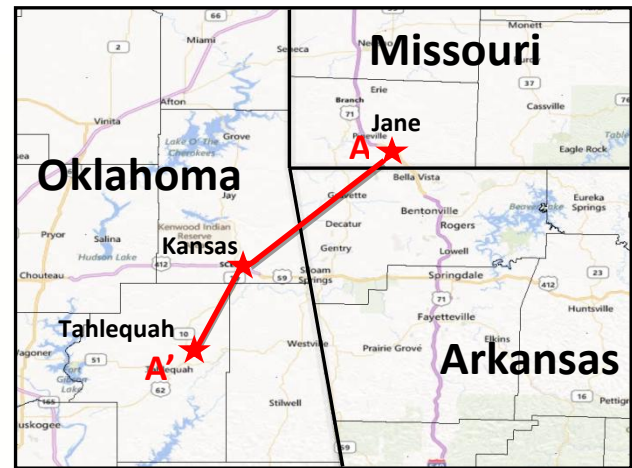
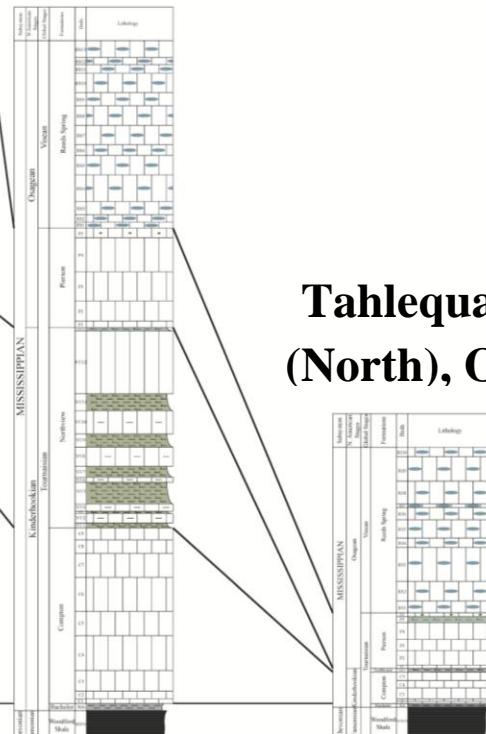


Figure 1.4. Stratigraphic cross-section from Jane (North), Missouri (A) (Adapted from Shoeia, 2012) to Tahlequah, Oklahoma (A') showing the change in the thickness of the St. Joe Group. The Jane (North) stratigraphic section is a reference locality in which it represents a completely conformable section with no evidence of unconformable surfaces.

Kansas,
OK

Tahlequah
(North), OK



A'

Jane (North), MO

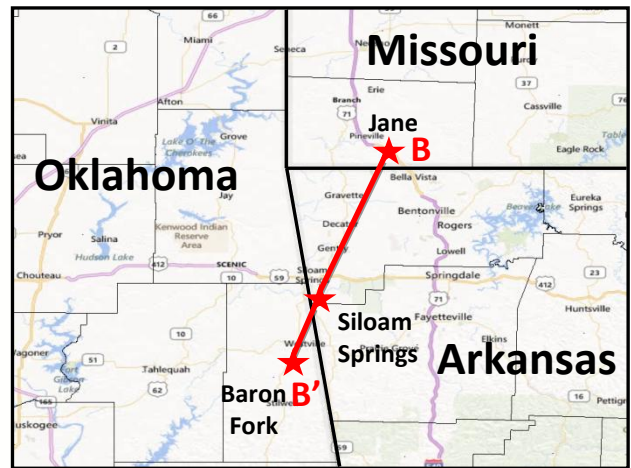
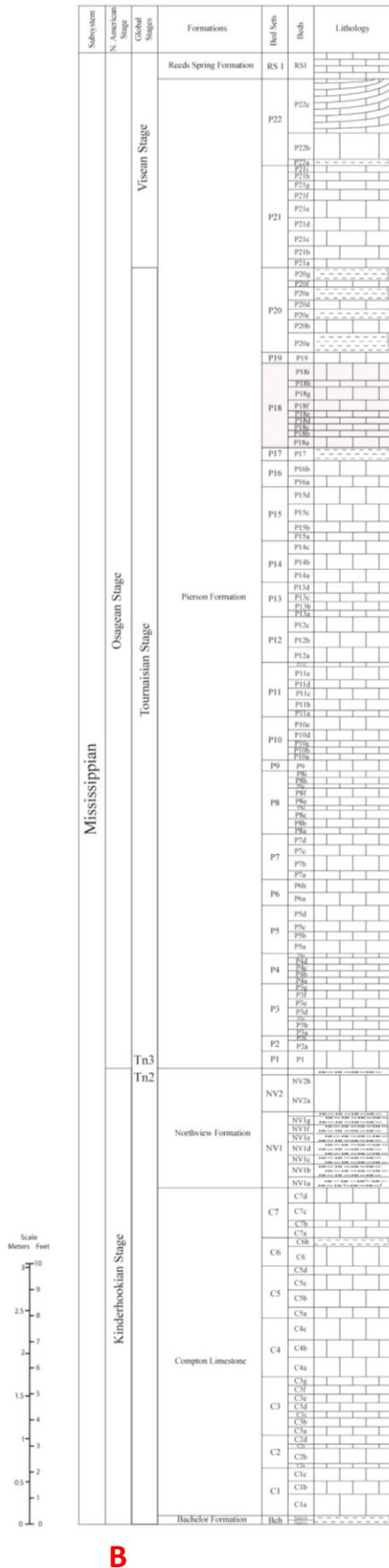
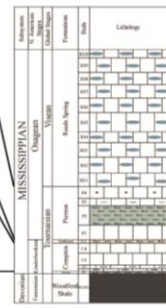


Figure 1.5. Stratigraphic cross-section from Jane (North), Missouri (B) (Adapted from Shoeia, 2012) to Baron Fork, Oklahoma (B') showing the change in the thickness of the St. Joe Group.

Siloam Springs (South), AR



Baron Fork, OK



B'

CHAPTER II

GEOLOGIC FRAMEWORK

This study focuses on lower Mississippian strata along the southwestern flank of the Paleozoic Ozark Uplift. This broad, asymmetrical dome stretches across southwestern Missouri, northwestern Arkansas and northeastern Oklahoma. It is bound to the west and northwest by the Prairie Plains Homocline, to the south by the Arkansas Valley and Ouachita Trough, and to the southeast by the Mississippi Lowlands (Huffman, 1955). These Mississippian rocks gently dip westward off the Ozark flanks under many oil-producing areas of the Mid-Continent area. Many northeast-trending faults and folds parallel the Ozark axis in this region, which form numerous structural traps for petroleum reservoirs.

During early Mississippian time this area was located between 10-15 degrees south of the equator as part of a broad, shallow-water carbonate platform, known as the Burlington Shelf (Gutschick and Sandberg, 1983). This carbonate platform covered a large portion of southern North America at this time (Figure 2.1). According to Lane and De Keyser (1980), the St. Joe Group units were deposited along the shelf margin during early Mississippian time. These shelf margin deposits formed within the Ouachita foreland basin during a time of syndepositional tectonic activity from the Ouachita thrust belts (Thomas, 2004).

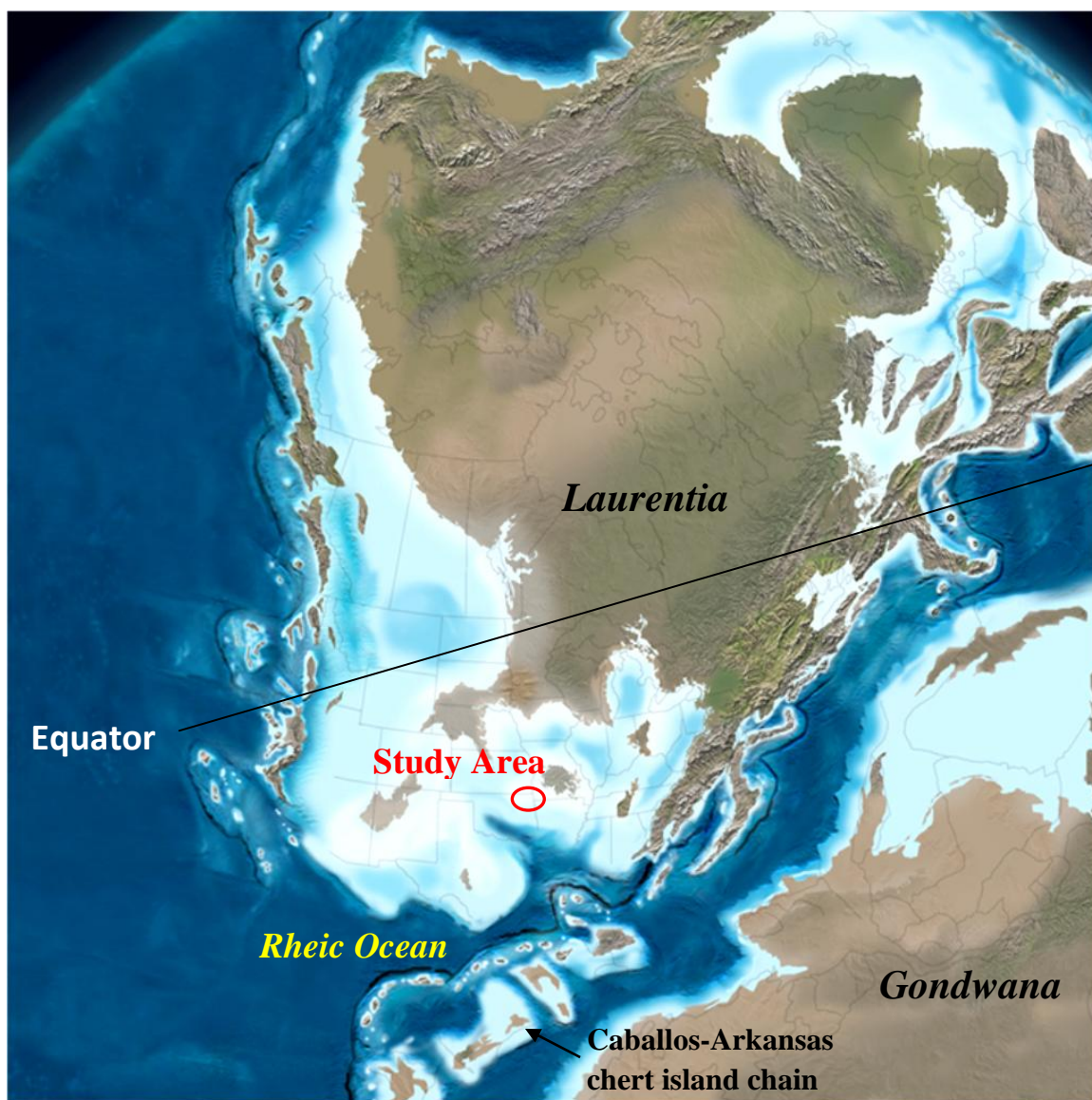


Figure 2.1. Paleogeographic map of Laurentia and northern Gondwana during the early Mississippian (Blakey, 2011). The red circle represents the location of the study area.

Depositional History

The St. Joe Group sediments of the tri-state region of Oklahoma, Arkansas, and Missouri, were deposited during Kinderhookian to lower Osagean time. These strata are predominantly limestone with minor amounts of chert occasionally found near the top of the Pierson Formation. In this study area, including all seven localities, the St. Joe Group

is unconformably underlain by the Middle to Upper Devonian Woodford Shale. In areas further north and to the east of the study region, this group is unconformably underlain by lower Ordovician and Silurian strata (Thompson, 1969), indicating that prior to St. Joe Group deposition, considerable amounts of erosion or nondeposition took place. The Osagean Reeds Spring Formation overlies the St. Joe Group at all localities in the study area.

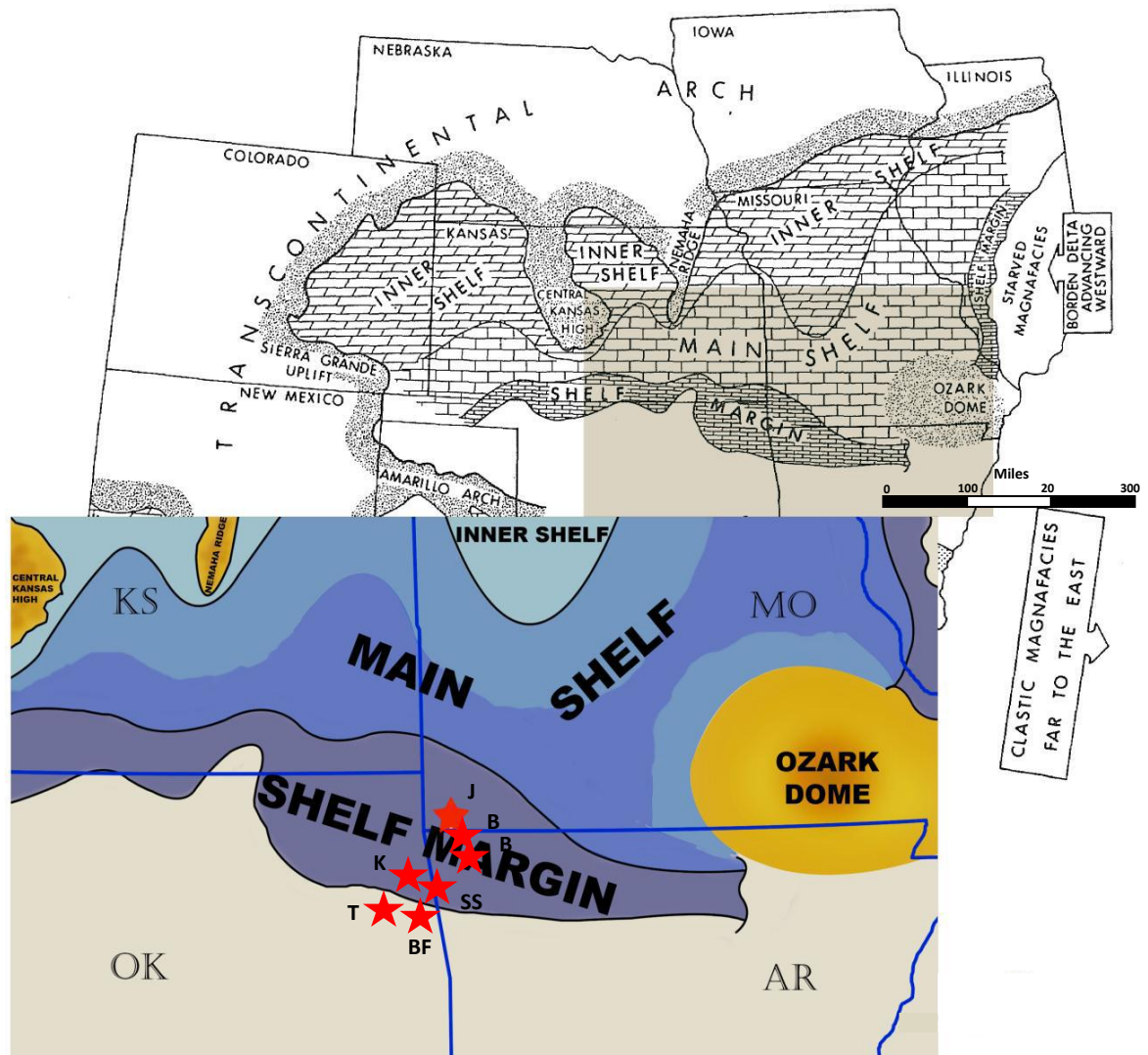


Figure 2.2. Late Tournasian paleogeographic map showing the study area in relation to the depositional magnafacies described by Lane and De Keyser (1980). Adapted from Shoeia (2012). Abbreviations for outcrop names are as followed; J (Jane), B (Bentonville), BV (Bella Vista), SS (Siloam Springs), K (Kansas), T (Tahlequah), BF (Baron Fork).

In more recent studies, Mazzullo and others (2011) provide evidence that the current study area was subject to syndepositional tectonism that played a crucial role in overprinting the original sequence stratigraphic architecture of the St. Joe Group. This evidence includes thick crinoidal sands, greenish-red shales and silty shales, multiple unconformities with vadose exposure, pisolites, peloids, and many other shallow-marine characteristics of the St. Joe Group in this region. In addition, northward progradation and dislodged buildups with these units indicate that the Ouachita Orogeny to the south must have had a significant influence on deposition. Mazzullo and others (2011) proposed a fore-bulge model that formed as a result of north-south compression associated with the collision between Laurentia and an impending island arch to the south during early Osagean time (Figure 2.3). Their work suggests a loading phase in the Earth's crust caused uplift and submarine erosion of the St. Joe Group, followed by a load-relaxation phase that may have led to further uplift and possible subaerial unconformities. These tectonic phases likely caused thinning of the St. Joe Group by erosion of the Pierson Formation.

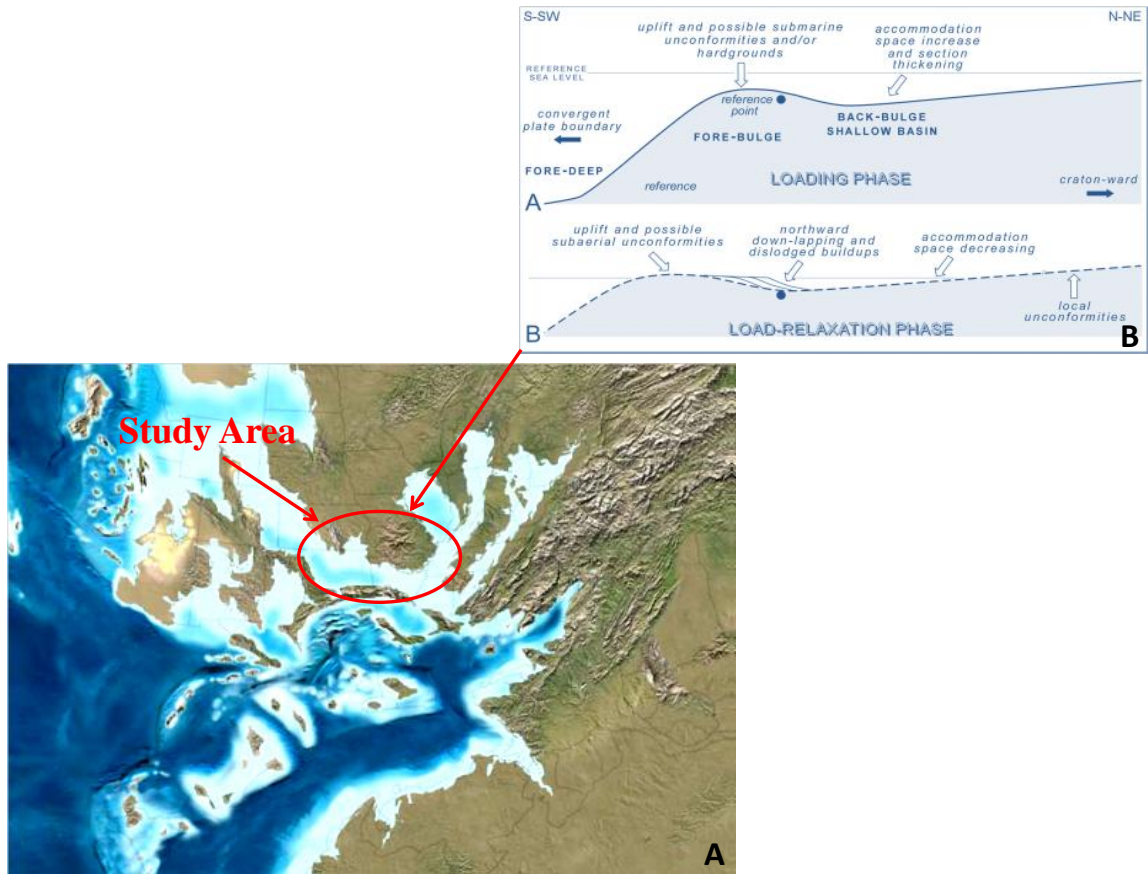


Figure 2.3. (A) Paleogeographic map and (B) structural model adapted from Wilhite and others (2011) showing the study area during early Mississippian time.

Bachelor Formation:

The Bachelor Formation represents the basal unit unit of the Lower Mississippian, Kinderhookian Series, in this region. This formation was originally proposed by Mehl (1960), as a thin quartzose sandstone in central Missouri. The name was given for its type locality located in Bachelor, Callaway County, Missouri, where it is well developed in outcrop. Along the southwestern edge of the Ozark Uplift, the Bachelor Formation is less than 30.5 cm (1.0 ft) and typically consists of two units; a basal sandstone and upper shale (Thompson and Fellows, 1970). However, the Bachelor Formation consists of only

the upper shale in the study area. This shale was also recognized in northeastern Oklahoma by Laudon (1939) and northwestern Arkansas by Purdue and Miser (1916).

This upper shale unit is predominantly a light-green to gray, silty shale, that directly overlies the upper Devonian Woodford Shale and is in turn overlain by the Compton Formation. Average thickness of the shale in the northern part of the study area is 2.5- 7.6 cm (1- 3 in) (Thompson and Fellows, 1970). Its fine lamination, abundant fractures, and loose compaction when weathered make it easily distinguishable from the bounding formations.

Age correlations of the Bachelor shale member can be determined by conodont species recovered. Lower Mississippian conodont zones in the tri-state area of Oklahoma, Arkansas, and Missouri have been well documented by several workers, such as Voges (1959) and Thompson and Fellows (1970). The basal sandstone member is characterized by the *Siphonodella duplicata* and *Pseudopolygnathus marginatus* species that are not found in the upper shale (Thompson and Fellows, 1970). The base of this shale member is marked by the absence of *S. duplicata* and the occurrence of *Siphonodella lobata* and *Siphonodella crenulata* (Thompson and Fellows, 1970). The source of the sandstone member is believed to be the Ozark highland of central Missouri, where it was restricted to local deposition around the uplift. The absence of *S. duplicata* zone species in the present study area indicate that the shale in the Bachelor Formation was deposited more distal to the source, in a position south of the sandstone unit.

Compton Formation:

The Compton Formation was proposed by Moore (1928), as a grayish-green, very finely crystalline limestone at the base of the Northview Formation in Webster County,

Missouri. The Compton Formation is not only chert-free at its type locality, but also in the present study area (Beveridge and Clark, 1952). It turns darker gray in color in Oklahoma, due to increased organic content. The Compton overlies the Bachelor Formation in the region and typically has an abrupt contact with the overlying silty Northview Formation.

The Compton often contains small crinoid fragments and numerous irregular shale partings throughout. Beds tend to be range from 15- 91 cm (6-36 in) thick at its type locality, but become thinner south of the Ozark Uplift. The average Compton Formation thickness averages between 1.5- 4.6 m (5.0-15.0 ft), with maximum thickness reaching 9.1 m (30.0 ft) in this region (Mazzullo *et al.*, 2011). This anomalous thickness is generally due to the presence of mud mounds. The formation pinches out to the southwest where it less than a foot thick in the southern part of Delaware and Adair Counties, Oklahoma. In northwestern Arkansas, the formation disappears to the southeast in the southern part of Independence County, Arkansas.

According to Lane and De Keyser's (1980) paleogeographic model, the Compton was deposited on a broad carbonate shelf at the southern edge of the Burlington Shelf at all study localities except near Tahlequah and Baron Fork, Oklahoma, where it was deposited just off the margin. However, Mazzullo and others (2011) describe the lithology as being a shallow water mudstone to packstone deposited aggradationally along a shallow-water ramp, with evidence of vadose exposure and micritic buildups. This supports the idea that the Compton Formation was being deposited in a much shallower environment than the 50-200 m proposed by Lane and DeKeyser (1980). Their

work suggests that the formation was deposited along a regional fore-bulge high (Fig. 2.3) (Mazzullo *et al.*, 2011).

Northview Formation:

The Northview Formation name was first proposed by Weller (1901) for the siltstones and shales found overlying the Compton Formation in Webster County, southwestern Missouri. Though some early geological reports suggested that these beds were equivalent to Swallow's (1855) Vermicular Sandstone and Keyes (1892) Hannibal Formation, later studies by Beveridge and Clark (1952) confirmed that the Northview Formation is not the lateral equivalent of these formations, but instead is a composite of the 2 type sections in Webster County.

In the study, area the Northview consists of many different lithologies from shale, silty shale, siltstones, limestone, and argillaceous limestone (Mazzullo *et al.*, 2011). The color of the siltstone and shale varies from greenish-brown to gray. North of the Arkansas-Missouri border, the contact with the Compton and Northview is abrupt. This is because the Northview is typically a siltstone or shale, where it is much more susceptible to erosion, making it easy to recognize. In such a case, the Northview is bound by noticeable ledges from the bounding Compton and Pierson formations. South of the Arkansas-Missouri border this contact is less-distinct and the Northview becomes more calcareous and often gradational with the Pierson Formation.

The average thickness of the Northview Formation in the northern portion of the study region is approximately 0.6- 2.4 m (2-8 ft), but thins rapidly to the south where it is less than 2.1 cm (2.0 in) thick near Tahlequah and Baron Fork, Oklahoma. However, this formation reaches nearly 24.4 m (80.0 ft) of grayish-green silty shale and siltstone just

north of Springfield, Missouri (Beveridge and Clark, 1952). The Northview Formation is predominantly a grayish-green dolomitic siltstone just north of the study area in Branson, Missouri, but becomes increasingly calcareous to the south where little to no dolomite is seen. This unit represents the final stage of Kinderhookian deposition during a time of local rapid accumulation of terrigenous material, probably close to the source. Following deposition of the Northview Formation, erosion occurred north of the Arkansas-Missouri state line, while deposition continued to the south (Thompson and Fellows, 1970).

Pierson Formation:

The Pierson Formation was also named by Weller (1901) for a fine-grained, gritty limestone characterized by Shepard (1898) as the Choteau Limestone. This lithostratigraphic unit was named for its numerous exposures along Pierson Creek, near Springfield, Missouri. Due to waste rock from abandoned zinc mines that covered many of these exposures in the area, Beveridge and Clark (1952) designated the type section of the formation near Turner Station, in Greene County, Missouri (Thompson and Fellows, 1970).

The Pierson Formation marks initial deposition of carbonate sediment spreading northward over the region at the beginning of the Osagean series. The Pierson Limestone is marked by the *Polygnathus communis carinus* Hass conodont zone recovered in the basal Pierson in this region by Thompson and Fellows (1970). The unit conformably overlies the Northview Formation and is unconformably to conformably overlain by the Reeds Spring Formation. At its type section just northeast of the study area, the formation is light brown with minor amounts of dolomite at the base (Thompson and Fellows,

1970). Here the Pierson Formation is very similar in lithology to the Compton Formation. In eastern Oklahoma and north-central Arkansas where the Northview pinches out, the Pierson and Compton are difficult to distinguish because of their similarities. The Pierson is predominantly a gray, finely crystalline, even and thin-bedded limestone that contains abundant crinoid ossicles and bryozoans.

The Pierson Formation is composed of relatively shallow-water mudstones-packstones and has an average thickness between 1.2- 5.5 m (4-18 ft) in the tri-state area (Mazzullo *et al.*, 2011). It reaches a maximum thickness of 22 m (73 ft) northeast of the study area in Taney County, southern Missouri (Thompson and Fellows, 1970). Numerous crinoidal bioherms are exposed along the Missouri-Arkansas border in an E-W trending belt, indicating possible shallow-marine deposition. Another indication of shallow-water deposition is that pisoids are common at many of the localities in the uppermost beds. In the northern part of the study region, chert is common in the upper portion of the Pierson Formation. Though the chert in the upper Pierson is similar to that in the Reeds Spring, it is typically found as smooth chert nodules, whereas the chert in the Reeds Spring commonly forms highly irregular beds and nodules. At most localities in northwestern Arkansas and northeastern Oklahoma, chert is uncommon in the upper Pierson Formation. The Pierson-Reeds Spring contact is somewhat abrupt with the boundary determined by the first occurrence of chert at the base of the Reeds Spring Formation. This abrupt contact could be the result of an erosional event of short duration.

Reeds Spring Formation:

The Reeds Spring name was given by Moore (1928) after its type locality along the Missouri-Pacific Railroad near Reeds Spring, in Stone County, Missouri. It was

originally a member of the Boone Formation until Cline (1934) elevated it to formation rank and described the fauna. Moore (1928) described this unit as being an extensive, highly cherty limestone that occurs between the Pierson and Burlington formations. As mentioned previously, the base of the Reeds Spring Limestone is marked by the first persistent chert bed. This Reeds Spring-Pierson boundary generally overlies a thin calcareous shale unit and is accompanied by a noticeable decrease in carbonate grain size (Manger and Shanks, 1976).

The limestone generally consists of nearly equal amounts of limestone and chert. This chert can vary in color from tan, blue, to dark gray and contains a finely crystalline fossiliferous texture (Kaiser, 1950). At most localities the Reeds Spring Formation maintains a consistent lithologic character from bottom to top. The formation has been found to range in fossil content depending on locality. Limestone beds are ordinarily about 15.2- 20.3 cm (6-8 in) thick with interbedded chert beds of roughly equal thickness. The thickness of the Reeds Spring Formation is not consistent in the tri-state region of Oklahoma, Arkansas, and Missouri. A detailed study by Mazzullo and others (2010) recorded a maximum thickness of 59 m (194 ft) near Jane, McDonald County, Missouri. In areas where the St. Joe Group is absent, the Reeds Spring Formation unconformably overlies the Devonian Woodford Shale. Conodonts recovered from Kinderhookian and Osagean rocks in extreme southwestern Missouri show that the Pierson-Reeds Spring sequence is a facies complex, as upper Pierson strata are the same age as the lower Reeds Spring (Thompson and Fellows, 1970).

CHAPTER III

METHODOLOGY

Field Methods:

Seven stratigraphic sections were measured with a tape measure. Each formation was measured from bottom to top and divided into beds. Beds were classified as either noticeable breaks in deposition or changes in lithologic character from the layers above and below (Figure 3.1). Each bed was measured to within 0.64 cm (.25 in.) to create an accurate representation of the entire outcrop. Samples were taken from each bed within the St. Joe Group, as well as the lower few feet of the Reeds Spring Formation to ensure the complete section was sampled. These samples were later used for petrographic and conodont study.

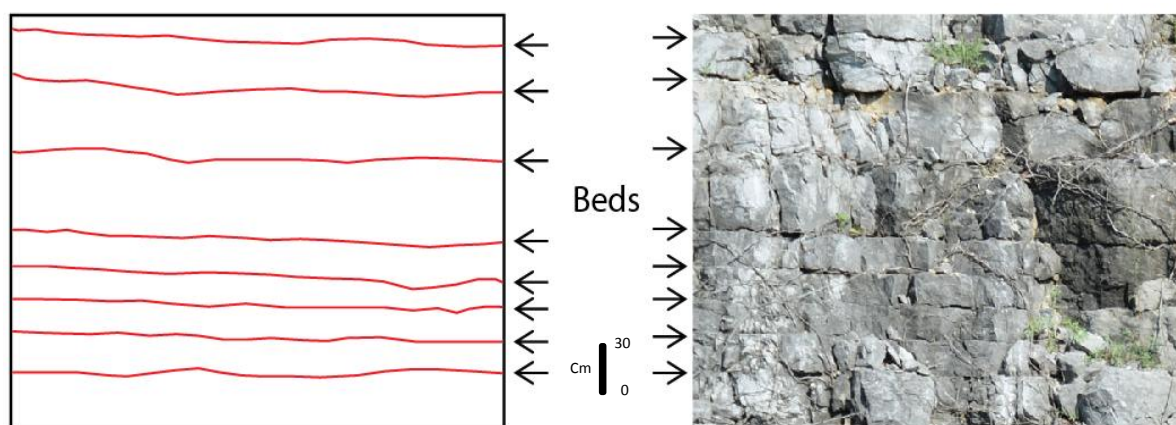


Figure 3.1. Example of bed breaks from the Pierson Formation at Bella Vista, Arkansas.

Laboratory Methods:

Acetate Peel Preparation:

A total of one hundred and thirty-six samples taken from the seven localities were used to make acetate peels. The tools and materials necessary to make the acetate peels include a rock saw, 200 and 600 grit silicon carbide powder, a polishing disc or glass plate, 10% dilute hydrochloric acid, acetone, acetate sheets, large format (2 in. by 3 in.) thin section glass, and clear tape.

Each sample was cut into approximately 10.16 cm by 7.62 cm (4 in by 3 in) rectangles when possible for maximum surface exposure. This ensured there was plenty of surface acquired to fill a large format thin section glass slides. Once two opposing sides were cut, the desired side was polished with 200 grit silicone powder to remove any saw marks. 600 grit silicon powder was then used to complete the final polished surface. The polished surface of each sample was then dipped into 10 % dilute hydrochloric acid for 10 seconds, rinsed with warm water, coated in acetone and covered with a pre-cut acetate sheet. After approximately 20 minutes of drying, the sheet was gently peeled from the sample. The peel was placed between two 5.1 cm by 7.6cm (2 in by 3 in) glass slides before being cut, taped, labeled and stored for petrographic analysis.

Acetate Peel Descriptions:

Each acetate peel was described based on overall texture using Dunham's 1962 carbonate classification system. Peels were also examined for fossil identification, including estimations of skeletal and non-skeletal grains, by using an Olympus BX51 Microscope and *A Color Guide to the Petrography of Carbonate Rocks: Grains*,

Textures, Porosity, Diagenesis book (Scholle and Ulmer-Scholle, 2003).

Photomicrographs were taken of each acetate peel using a ColorView II Soft Imaging System camera attachment. All photomicrographs were taken in plane-polarized light and include a 1 mm long scale bar in the lower right corner.

Conodont Recovery:

A total of 163 beds were sampled and processed for conodont recovery. Samples were broken up into small pieces, approximately 2 cm³ (.79 in³) with a 1.36 kg (3 lb) crackhammer. Two kilograms for each sample were properly weighed out and divided equally into two buckets, before adding 11 liters of water and 1100 milliliters of 10 % diluted formic acid. Samples were digested for a minimum of 24 hours before being wet sieved. Sieve mesh tray sizes of 35 (0.500 mm) and 120 (.125 mm) were used to retrieve the non-calcareous residue. For samples that contained high concentrations of organic matter, 32 % diluted hydrogen peroxide was used to dissolve any organics. All remaining residue was placed in low odor mineral spirits to break up any residual clay particles.

CHAPTER IV

FINDINGS AND DISCUSSION

Seven stratigraphic sections were measured, sampled, and described at each of the following localities. Each locality was selected to compare the relationships and lithological characteristics between each of the formations in the St. Joe Group as they regionally thin to the south. Stratigraphic columns are illustrated to show the lithology and thickness of the formations and beds within. Colors of lithologic units and non-skeletal grains exposed in outcrop are described using the *Geological Rock-Color Chart* by Geological Society of America (2009). Photomicrographs are shown to represent the general texture and skeletal components found within each bed, with additional photographs placed in the appendix. Lithologic symbols are shown in Figure 4.0.

Symbology

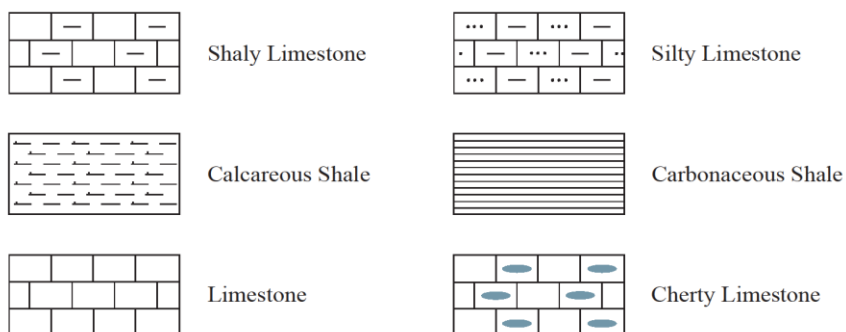


Figure 4.0. Lithologic symbology used in outcrop section descriptions shown by figures 4.1a – 4.7a.

Jane (South), Missouri:

The Lower Mississippian, St. Joe Group rocks are exposed along U.S. Highway 71 across southwest Missouri and northwest Arkansas. This outcrop was selected for detailed petrographic and stratigraphic analysis, as it contains the Bachelor Formation through the lower part of the Pierson Formation. These formations appear to represent a conformable succession of deposition with no signs of unconformable surfaces. This section is located at approximately 36° 30' 25.68" N Latitude, 94° 16' 50.24" W Longitude, on Hwy 71, 4.93 km (3.06 mi) southeast of Jane, in McDonald County, southwest Missouri. The Bachelor Formation, Compton Formation, Northview Formation, and the lower half of the Pierson Formation were measured and subdivided into bed thicknesses. However, due to sampling and measuring limitations along the outcrop, only the Bachelor and Compton formations were sampled and described.

The Bachelor Formation consists of a grayish-green shale member that overlies the gray-black Upper Devonian Woodford Shale. It contains abundant silt-size quartz grains which continue into the lower Compton Formation. The Compton Formation consists of 12 beds with wavy to irregular bed breaks. It contains grayish-brown limestone with sand-sized pyrite nodules that are scattered throughout the formation. The upper portion of the Compton Formation contains quartz silt clasts before transitioning into the Northview Formation. The Northview Formation is comprised of one lithologically similar unit of green, calcareous, silty shale. The Northview Formation transitions into the overlying Pierson Formation, which has fairly even, planar beds, that maintain similar thicknesses throughout the lower portion exposed at the outcrop. Figure 4.1a shows the stratigraphic column and a photograph of the outcrop.

Jane (South), MO

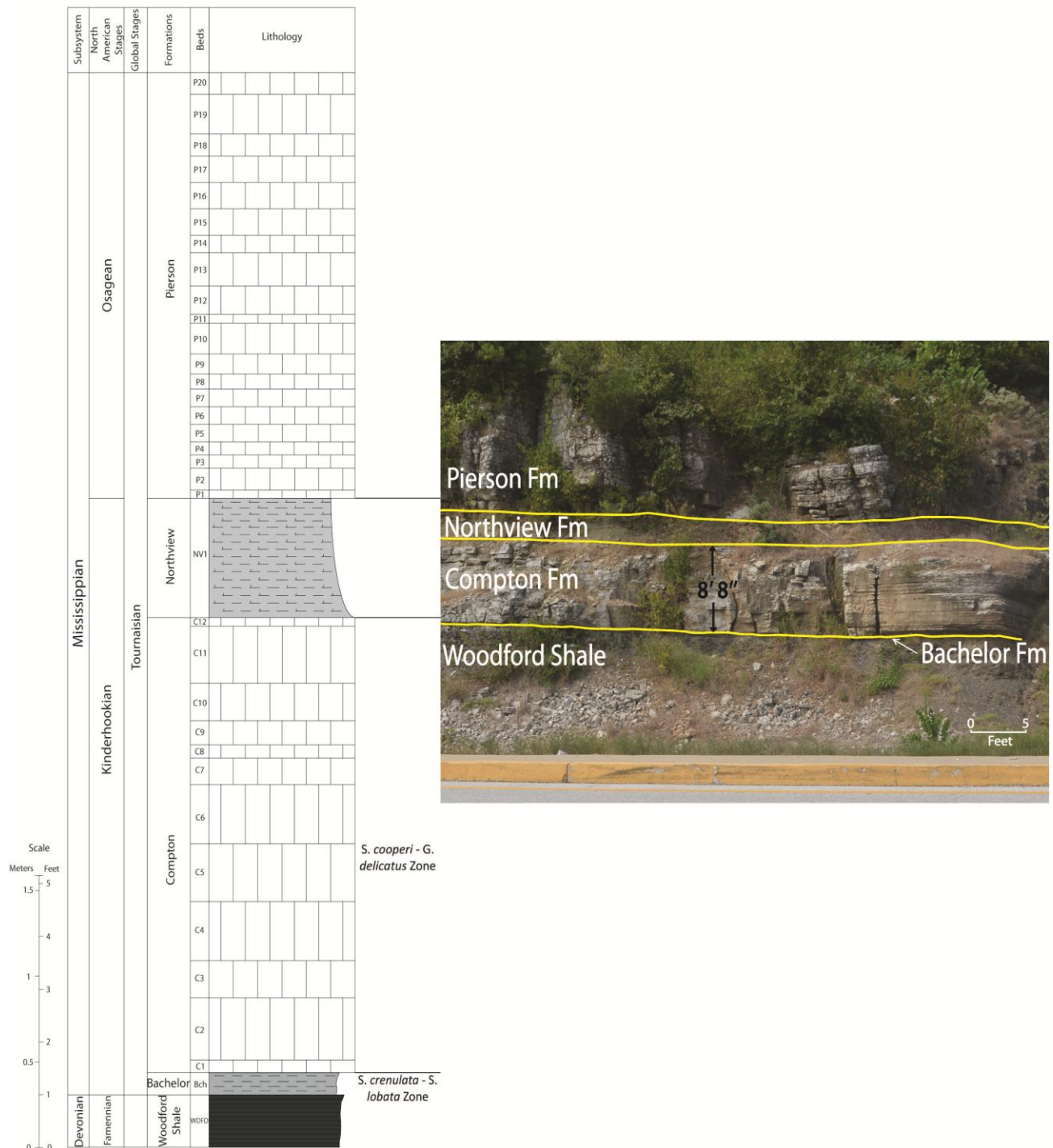


Figure 4.1a. Stratigraphic section of the upper part of the Woodford Shale, Bachelor Formation, and St. Joe Group at Jane (South), Missouri. Positions of formation contacts are shown by yellow lines on the outcrop photograph. Conodont biozones recovered are shown on the right side of the stratigraphic column.

Bachelor Formation

The Bachelor Formation (Fig. 4.1b) consists of only the upper carbonate shale member. This unit is greenish-gray in color, which makes it distinct and easily distinguished from the underlying Woodford Shale and overlying Compton Formation. The shale is approximately 12.7 cm (5.0 in.) thick of unconsolidated clay at this locality. It contains numerous amounts of well-preserved conodonts, as well as silt-sized quartz grains. Silt is also present in the lower beds of the Compton Formation.



Figure 4.1b. Closeup photograph of the Woodford Shale, Bachelor Formation, and Compton Formation at the Jane (South) locality. Formation contacts are marked by yellow lines. The pencil shown for scale is ~14.7 cm (5.8 in) long.

Compton Formation

The Compton Formation is about 2.6 m (~8.6 ft.) of grayish-brown, finely crystalline limestone. Silt-size quartz grains are seen throughout the entire formation. Brown clay wisps are scattered throughout each bed. Peloids are present in the lower

portion (C1-C4) and scarce in the upper portion (C8-C12). The formation is divided into 12 beds that are shown in figure 4.1c. The Compton Formation contains the *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.1a).

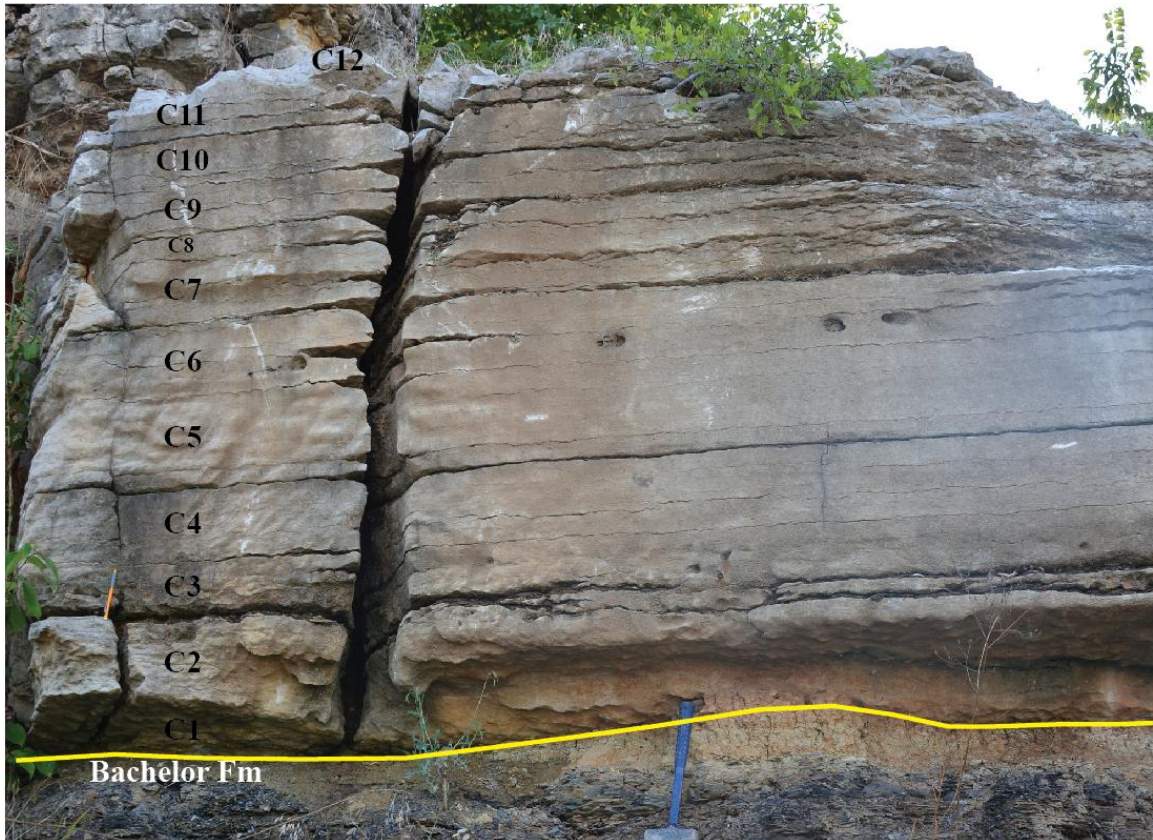


Figure 4.1c. The Compton Formation at Jane (South) has 12 bed divisions. The crackhammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The base of the Compton Formation is characterized as a crinoidal-rich wackestone-packstone. Crinoids are the dominate skeletal grain in bed C1 and represent ~ 40% of this bed. Silt-size quartz clasts represent < 5% of bed C1. Other nonskeletal grains found at the base of the Compton Formation are silt-size peloids, which are interpreted to indicate a low-energy, restricted marine environment (Tucker and Wright, 1990). Peloids present in bed C1 represent < 5% of this bed. The base transitions to a

finely crystalline skeletal wackestone with recrystallized micrite. Crinoids represent ~ 10% and bryozoans represent ~ 5% of this bed. From beds C4-C11 the Compton Formation becomes higher energy as evident by the presence of skeletal wackestone-packstones with lower amounts of mud and higher degree of disarticulation of fossil components than seen in the lowermost three beds. Between 30-40% of these beds are made up of crinoids and bryozoans distributed evenly. The top of the Compton Formation (C12) becomes a bryozoan-rich packstone before transitioning into the Northview Formation. Bryozoans make up ~ 55%, crinoids ~ 35%, and brachiopods and ostracodes represent ~ 5% of this bed.

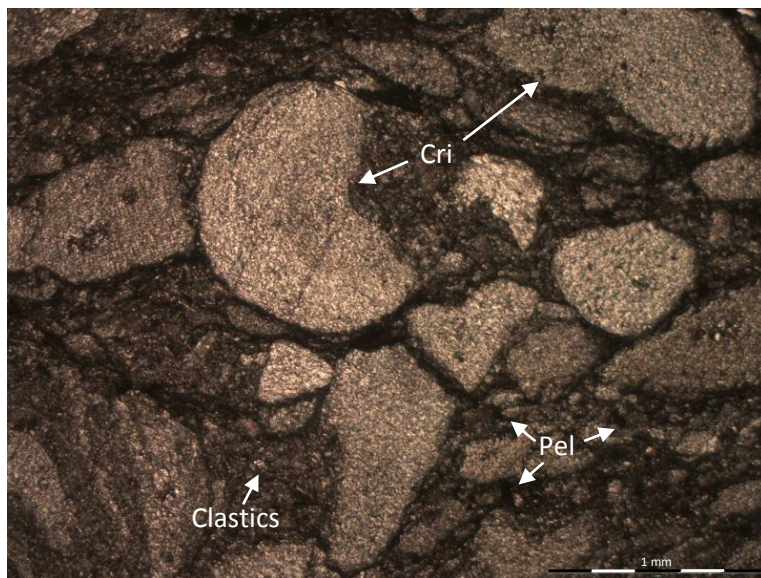


Figure 4.1d. Photomicrograph of Compton bed C1, a crinoidal (Cri) wackestone-packstone containing minor peloids (Pel). Crinoids dominate and make up ~ 40% of the bed, while peloids and quartz silt clasts represent ~ 5% of the bed. The composition and texture in this acetate peel is representative of most of the Compton Formation at the Jane (South) outcrop. All photomicrographs of acetate peels were taken using plane-polarized light (PPL). The scale bar in the lower right corner of the image is 1 mm long.

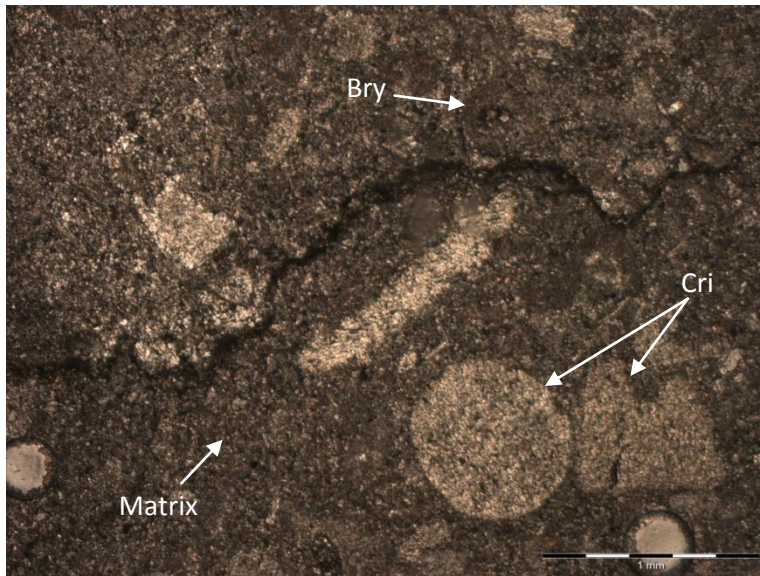


Figure 4.1e. Photomicrograph of Compton bed C2, a skeletal wackestone containing a neomorphosed mud matrix of finely crystalline calcite. Bioclasts include crinoids (Cri) and bryozoans (Bry). Crinoids represent ~ 10% and bryozoans represent ~ 5% of this bed. This acetate peel is representative of bed C2 at the Jane (South) outcrop. This image was taken using plane-polarized light (PPL). The scale bar in the lower right corner of the photograph is 1 mm long.

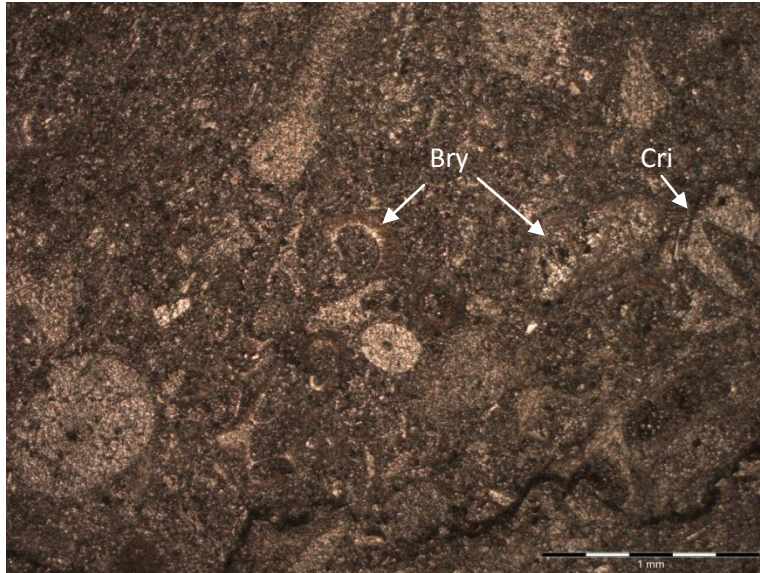


Figure 4.1f. Photomicrograph of Compton bed C6, a skeletal wackestone-packstone containing a neomorphosed mud matrix of finely crystalline calcite. Bioclasts include crinoids (Cri) and bryozoans (Bry). Crinoids represent ~ 15% and bryozoans represent ~ 25% of this bed. This acetate peel is representative of bed C6 at the Jane (South) outcrop. This image was taken using plane-polarized light (PPL). The scale bar in the lower right corner of the image is 1 mm long. Some of these fossils have been filled with micrite.

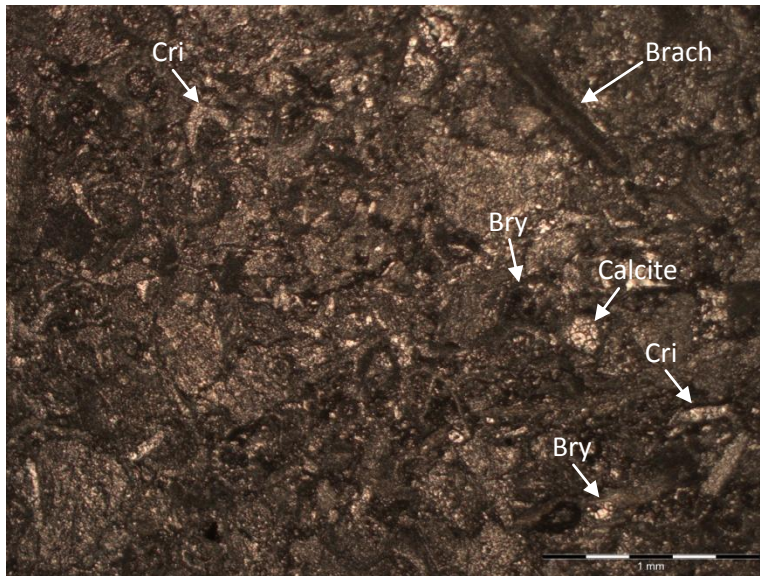


Figure 4.1g. Photomicrograph of Compton bed C12, a skeletal packstone containing predominantly bryozoans (Bry) and crinoids (Cri). Some brachiopods (Brach) and ostracodes (Ost) are found in small amounts. Intraparticle blocky calcite fills many of the skeletal grains. Bryozoans represent ~ 55%, crinoids ~ 35%, and brachiopods and ostracodes ~ 5% of this bed. This acetate peel is representative of bed P12 at the Jane (South) outcrop. A 1 mm long scale bar is displayed in the lower right corner of the image.

Bella Vista, Arkansas:

The St. Joe Group is exposed in many areas in northwest Arkansas and in several sections along U.S. Highway 71. The section Bella Vista, Arkansas was chosen for detailed stratigraphic and petrographic analysis because each formation within the St. Joe Group is thinner than the section measured at Jane (North), Missouri. Here, the St. Joe Group reaches a maximum thickness of ~ 7.9 m (26.0 ft), whereas the St. Joe Group is ~ 15.2 m (50.0 ft) in total thickness at the Jane (North), Missouri outcrop. The Bella Vista section (Fig. 4.2a) is located approximately 36° 27' 51.93" N Latitude, 94° 14' 33.6" W Longitude. It lies 3.3 km (2.0 mi) east of Bella Vista, in Benton County, northwest Arkansas. The entire St. Joe Group and the lower Reeds Spring Formation were measured, divided into bed thicknesses, sampled and described.

Bella Vista, AR

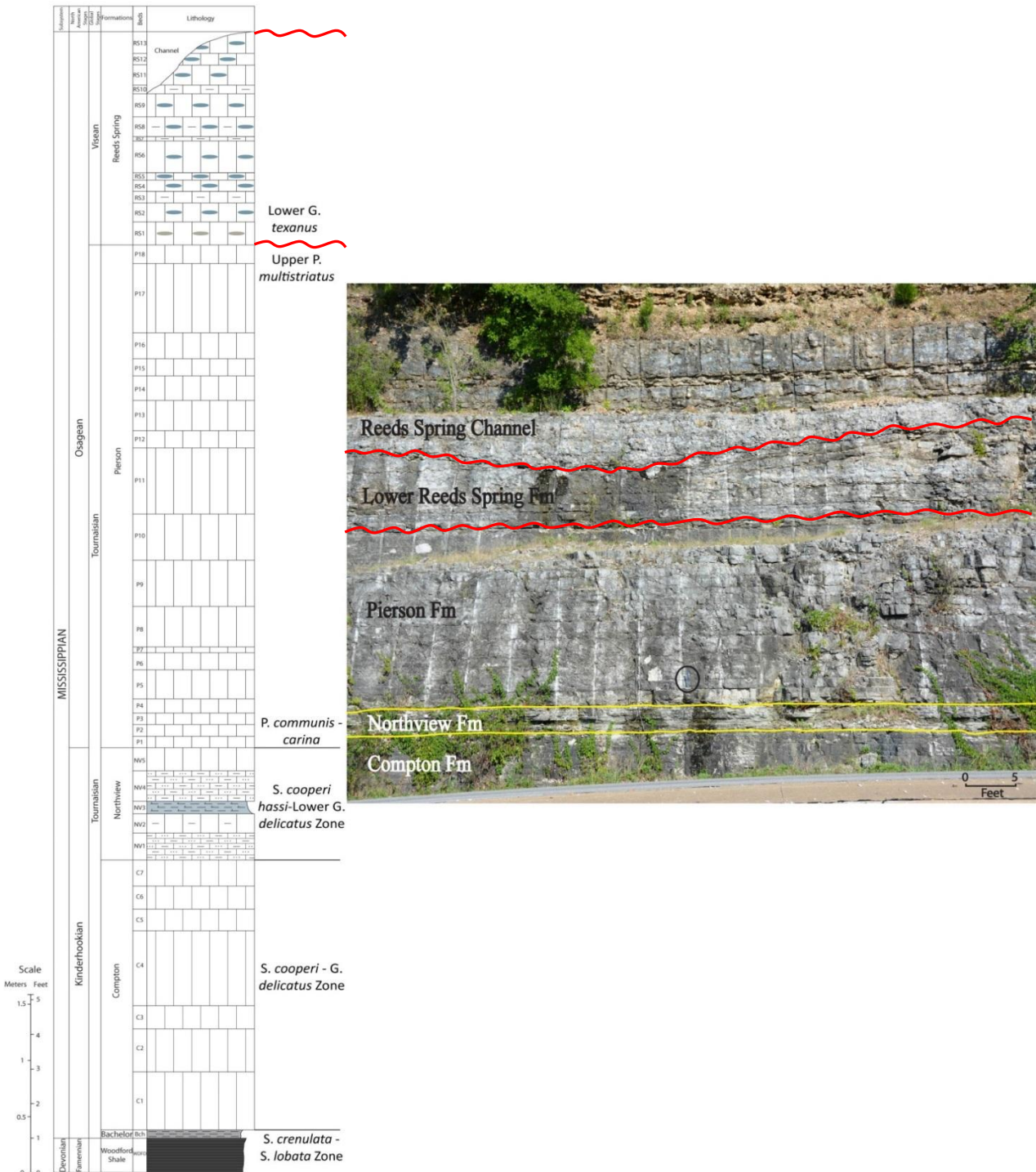


Figure 4.2a. Stratigraphy of the measured section from Bella Vista, Arkansas. The section includes the upper 1 foot of the Woodford Shale, Bachelor Formation, St. Joe Group, and lower part of the Reeds Spring Formation. Conformable formation contacts shown by yellow lines. Unconformities are marked by red lines. The crackhammer (black circle) shown for scale is ~ 40.6 cm (16.0 in) long. Conodont biozones recovered are shown to the right of the stratigraphic column.

Bachelor Formation

The Bachelor Formation consists of greenish-gray, easily weathered shale that is readily distinguishable from the underlying dark gray to black Devonian Woodford Shale. The Bachelor Formation contains silt-size quartz clasts throughout the shale. The total thickness of the Bachelor Formation is approximately 7.6 cm (3.0 in) thick. The formation forms the recess in outcrop profile seen in Figure 4.2b.

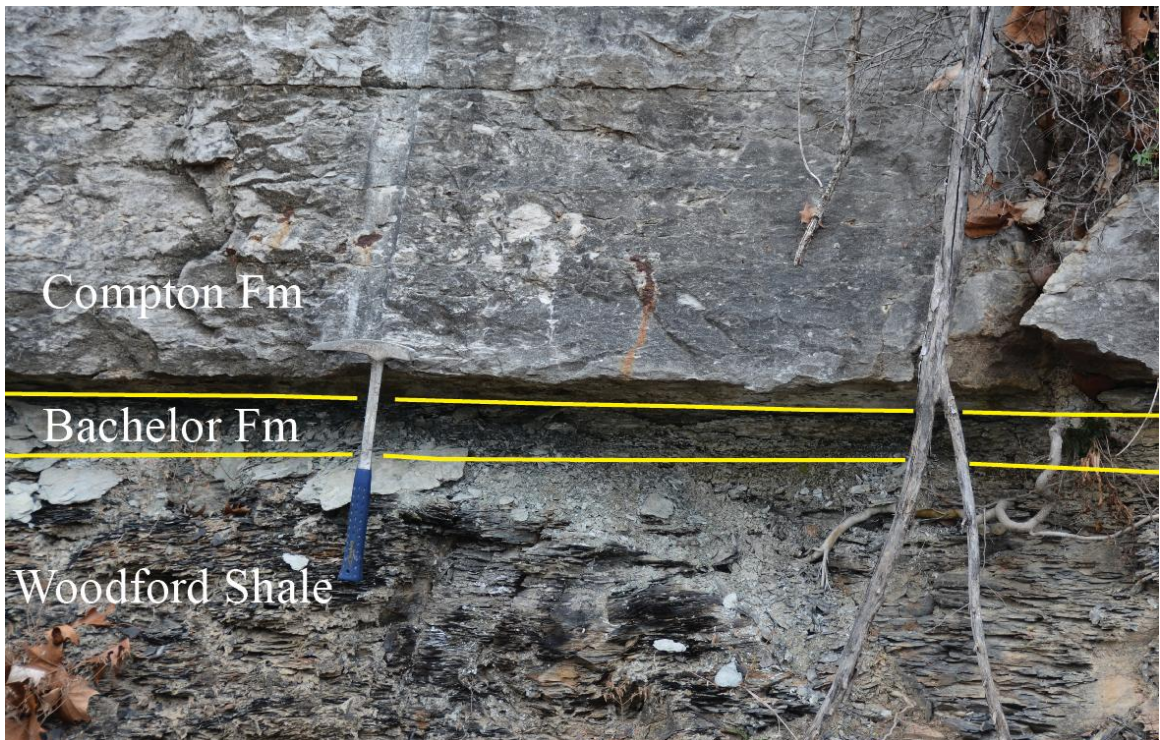


Figure 4.2b. Bachelor Formation in contact with subjacent Woodford Shale and overlying Compton Formation at Bella Vista. Contacts are identified by yellow lines. A rock hammer (~ 40.6 cm or 16.0 in) is shown for scale.

Compton Formation

The Compton Formation consists of 7 planar, massive beds (Figure 4.2c). These fossiliferous beds are light to medium gray in color. The primary skeletal grains are echinoderms and bryozoans. The Compton Formation at Bella Vista is about 2.4 m (~7.8 ft) thick. The beds range from 0.2 m (~7.5 in.) to 0.5 m (20.0 in.) in thickness. Quartz silt

(< 10%) occurs in beds near the base and top of the formation. The Compton Formation contains the entire *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.2a).

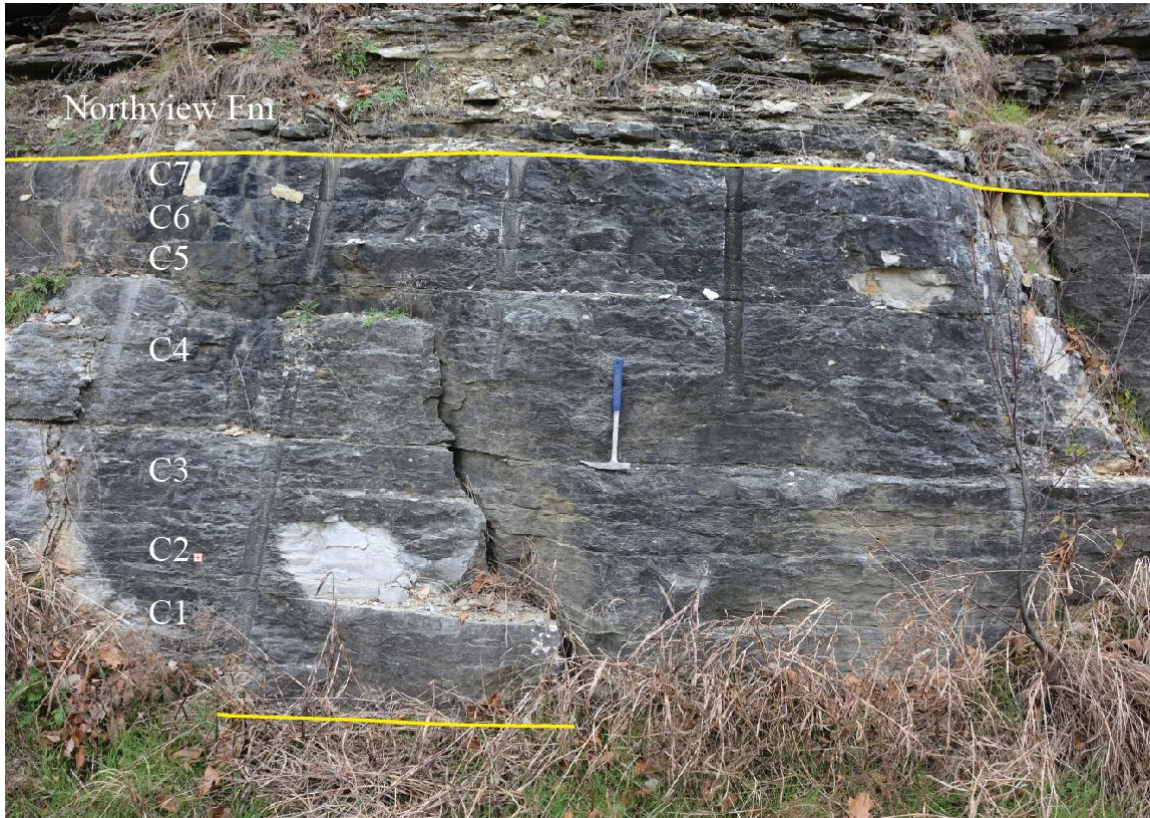


Figure 4.2c. Compton Formation at Bella Vista with the 7 bed divisions. Identified formation contacts are marked by yellow lines. The hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The basal bed (C1) of the Compton Formation at Bella Vista is characterized as an abraded, disarticulated skeletal packstone that contains several shale partings. The formation becomes a crinoidal wackestone-packstone in bed C2 and returns to a skeletal packstone at bed C3. Beds C4-C5 are skeletal packstone-wackestones and C6 is skeletal wackestone-packstone. Bed C7 of the Compton Formation at Bella Vista is skeletal

packstone. The overall texture of the Compton Formation at Bella Vista is skeletal packstone with lenses of skeletal wackestone-packstones.

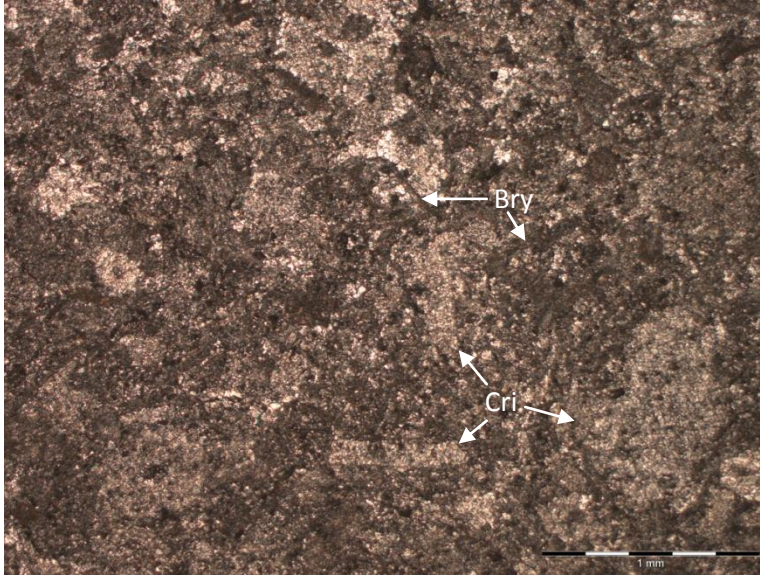


Figure 4.2d. Photomicrograph of Compton bed C1, a skeletal packstone with recrystallized calcite grains. The primary fossil grains are crinoids (Cri) and bryozoans (Bry). Crinoids represent ~ 60% and bryozoans ~ 30% of this bed. This acetate peel is representative of bed C1 at the Bella Vista outcrop. The image was taken in plane-polarized light (PPL). A 1 mm long scale bar is displayed in the lower right corner of the image.

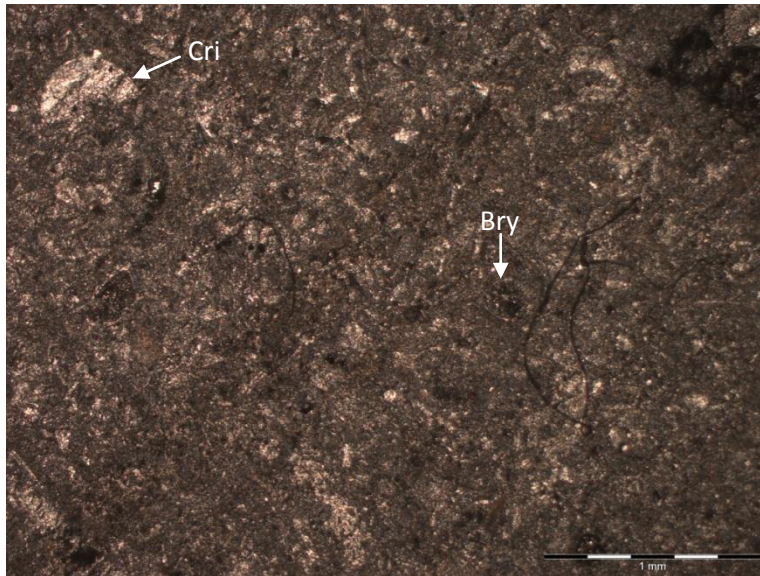


Figure 4.2e. Photomicrograph of Compton bed C6, a skeletal wackestone that contains crinoids (Cri) and bryozoans (Bry). Bryozoan fragments represent ~ 10% and crinoid fragments ~ 5% of this bed. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner of the image. This acetate peel represents bed C6 at the Bella Vista outcrop.

Northview Formation

The Northview Formation varies in lithology from calcareous shale, shaly limestone, and limestone. The fossiliferous carbonates are light gray with even, planar beds. The Northview Formation is nearly 1.0 m (~3.3 ft) thick and contains 5 distinct beds (Figure 4.2f). Beds NV1 and NV4, each made up of 5 thinly bedded limestones with subtle bedding breaks, were grouped into 1 bed. The calcareous shale (NV3) is a finely laminated, gray shale that is less resistant to weathering than the bounding beds. The uppermost bed contains ~ 5-10% quartz silt, a component that is evident in the lowest bed of the Pierson Formation, indicates that the contact is likely transitional. In addition, the Northview Formation contains the entire *S. cooperi hassi* - Lower *G. punctatus* conodont biozone with no signs of unconformable surfaces.

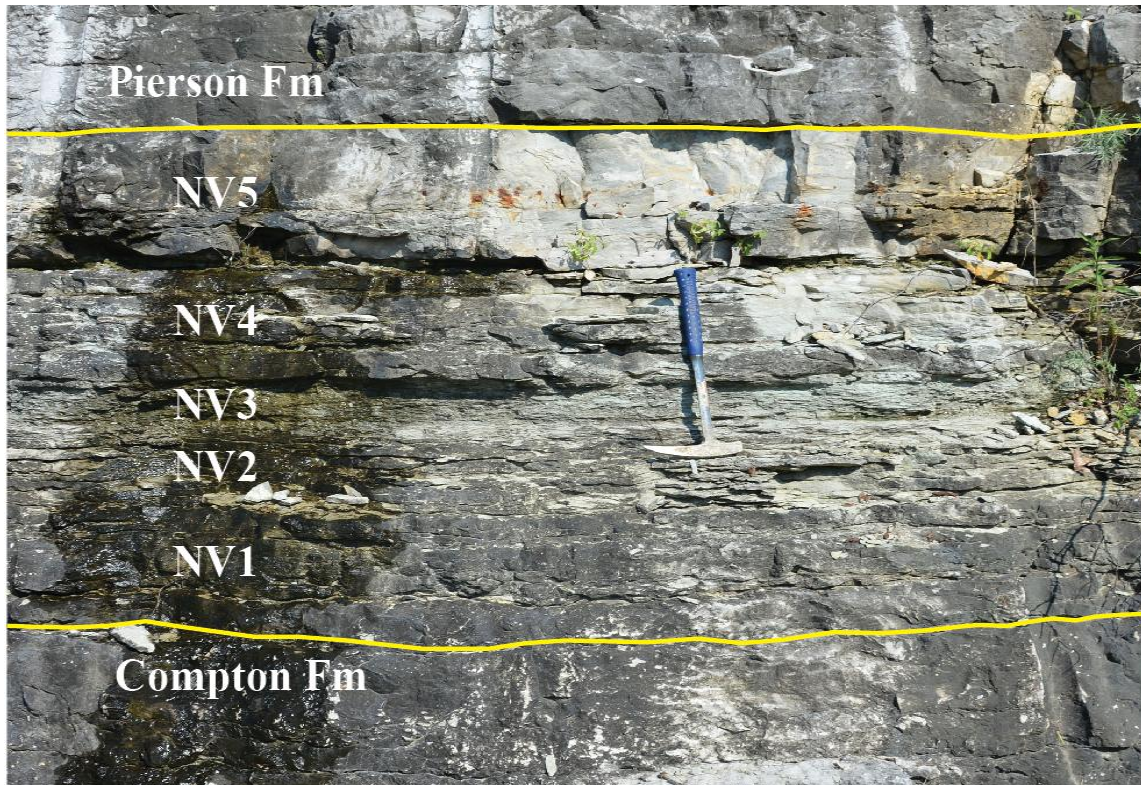


Figure 4.2f. Northview Formation at Bella Vista, Arkansas with 5 bed divisions. Contacts with the underlying Compton Formation and overlying Pierson Formation are marked by yellow lines. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The basal bed in the Northview Formation is skeletal packstone-wackestone that becomes a silty skeletal wackestone in bed NV2. Immediately above the shaley beds NV3 and NV4 the texture is briefly skeletal wackestone-packstone for bed NV4 before returning to a silty skeletal wackestone in bed NV5. The overall trend in texture for the Northview Formation is fining upward from a coarse skeletal packstone-wackestone at the base, to a silty skeletal wackestone at the top.

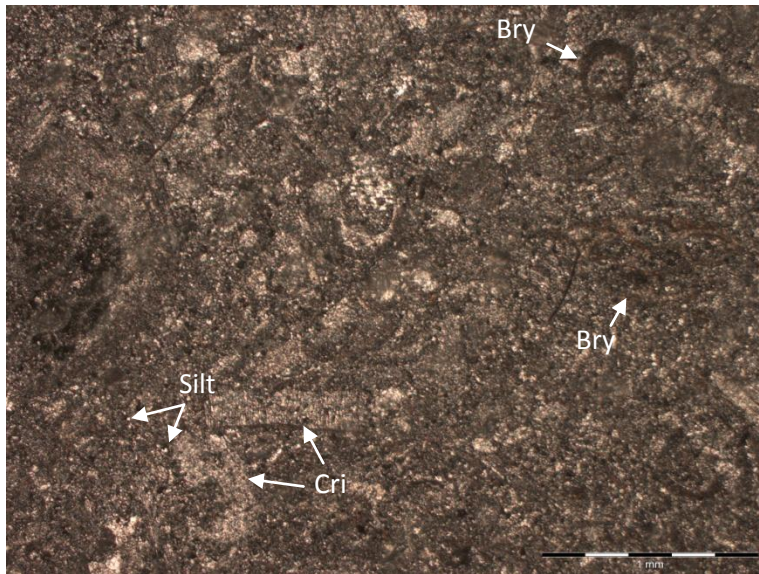


Figure 4.2g. Photomicrograph of Northview bed NV1, a skeletal packstone-wackestone that contains bryozoans (Bry), crinoids (Cri), and rare ostracodes (Ost). Bryozoan fragments represent ~ 30%, crinoid fragments ~ 20%, and ostracode fragments < 5% of this bed. NV1 contains less than 5% quartz silt. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner of the image. This acetate peel represents bed NV1 at the Bella Vista outcrop.

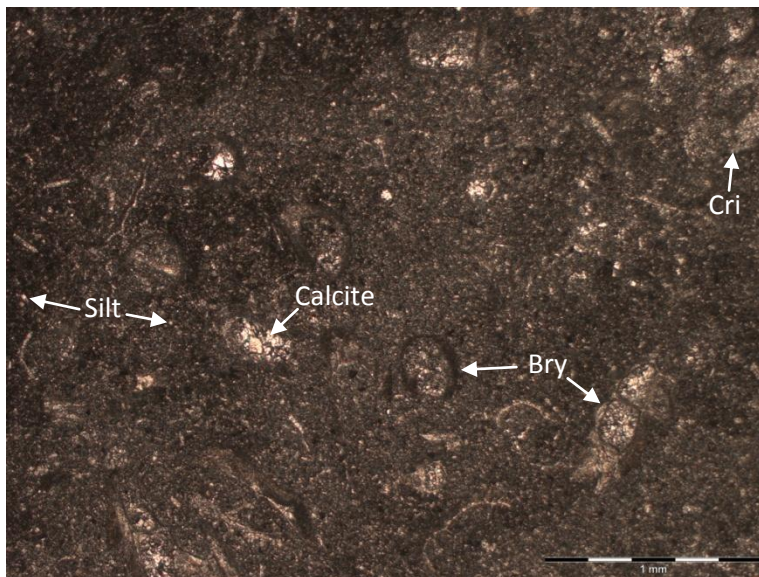


Figure 4.2h. Photomicrograph of Northview bed NV2, a silty skeletal wackestone with an increase in quartz silt from bed NV1. Blocky calcite fills some of the skeletal grains. The dominant skeletal components are bryozoans (Bri) and crinoids (Cri). Bryozoans are estimated to be ~ 20%, crinoids ~ 5%, and quartz silt < 5% of the total rock. This bed is very similar to bed NV5 at the top of the Northview Formation. This image was taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner.

Pierson Formation

The Pierson Formation is predominantly a light gray, fossiliferous, planar bedded limestone that is nearly 7 feet thicker than the Compton Formation. The total thickness of the Pierson Formation at Bella Vista is approximately 4.6 m (14.9 ft.). The Pierson is divided into 18 beds with bed thicknesses varying from less than 5.1cm (2.0 in) to nearly 61.0 cm (2.0 ft) (Figure 4.2i). The Pierson contains peloids (~ 5%) near the base of the formation and abraded, disarticulated skeletal fragments throughout. The upper Pierson Formation becomes more mud-supported, which is similar to lower beds in the Reeds Spring Formation. At this locality, the entire Pierson Formation is chert-free. The Pierson Formation contains the *P. communis-carina* through the Upper *P. multistriatus* conodont biozones with no significant increase in conodonts recovered within each bed sample. Missing biozones from *S. anchoralis* to *G. bulbosus* indicates significant erosion occurred prior to Reeds Spring deposition.

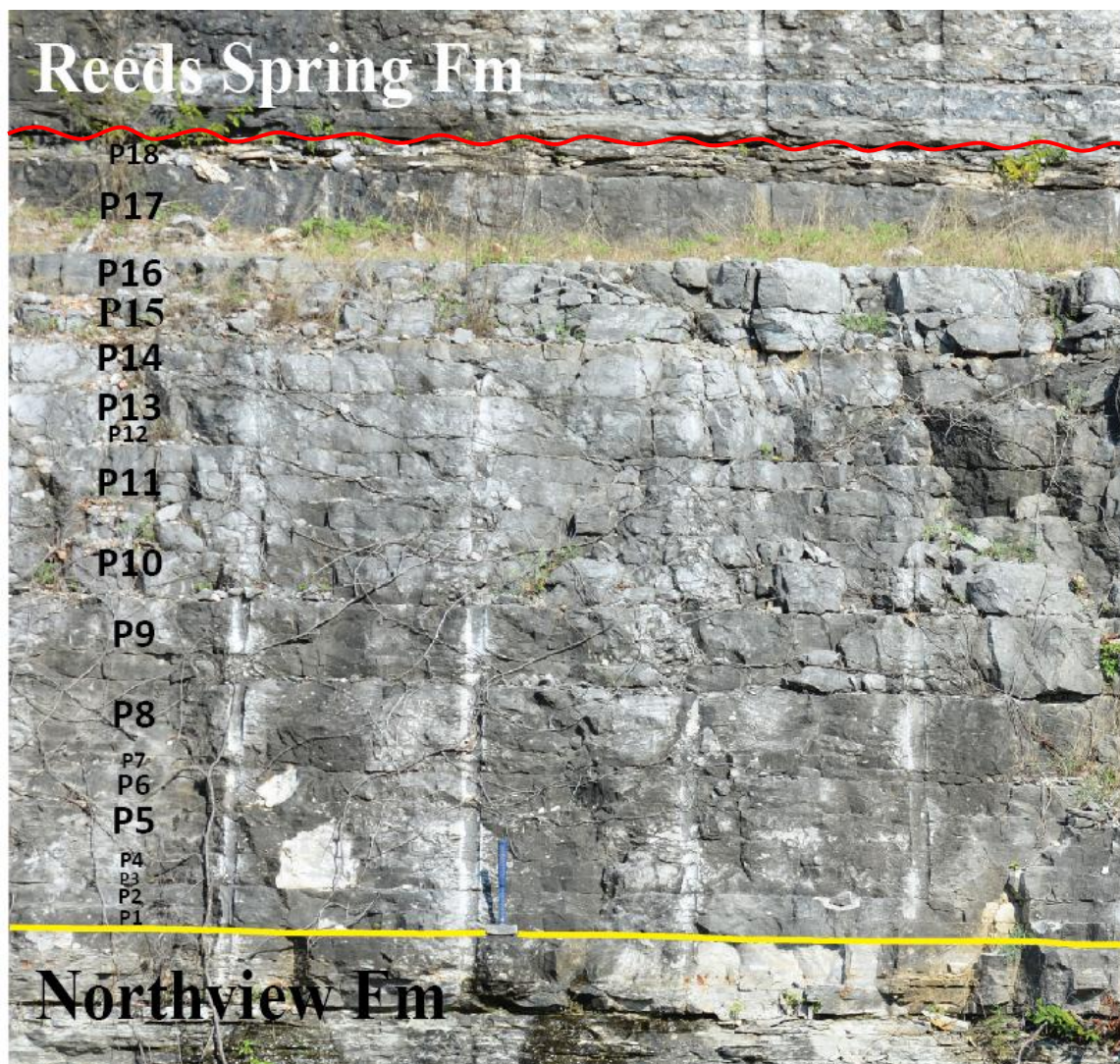


Figure 4.2i. Pierson Formation at Bella Vista with 18 beds. A conformable contact with the subjacent Northview Formation is shown by a yellow line. An unconformable contact with the superjacent Reeds Spring Formation is shown by a red line. The crackhammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The basal bed (P1) of the Pierson Formation at Bella Vista is silty skeletal wackestone. This is followed by an abraded skeletal packstone from P2-P5. Bed P6 of the Pierson Formation is skeletal packstone-wackestone, followed by skeletal packstone for beds P7-P10. Beds P11-P13 are mud-dominated skeletal wackestone-packstones and ultimately a skeletal wackestone. P14 is peloidal packstone-wackestone with silt-sized

pellets. The upper portion of the Pierson Formation alternates between packstone-wackestone and wackestone-packstone, which is a distinct contrast to the mudstone at the base of the Reeds Spring Formation. The overall texture is predominantly a skeletal packstone in the lower half of the Pierson, with alternating skeletal packstone-wackestones and wackestone-packstones in the upper half.

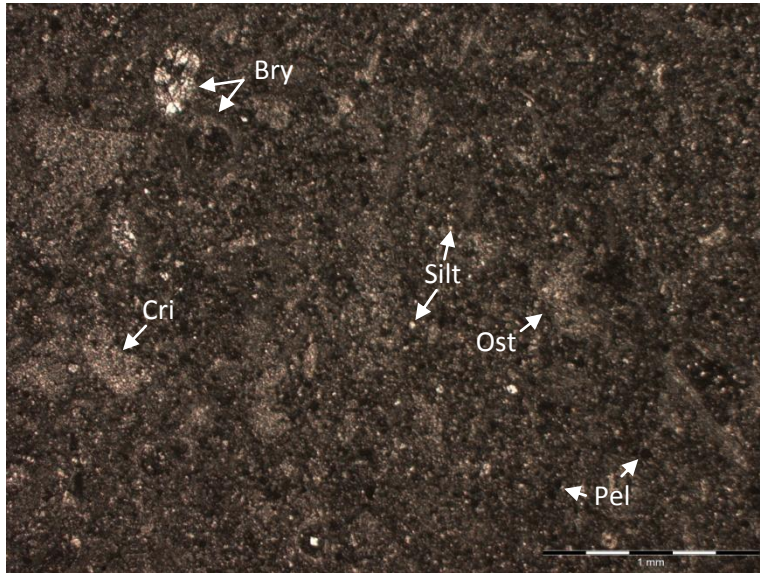


Figure 4.2j. Photomicrograph of Pierson bed P1, a skeletal wackestone that contains crinoids (Cri), bryozoans (Bry), and ostracodes. Bryozoan bioclasts are estimated to be ~ 10%, crinoids ~ 5%, and ostracodes < 5% of the total rock. Quartz silt and peloids (Pel) represent ~ 5% of the nonskeletal grains in this bed. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner. This acetate peel represents bed P1 at the Bella Vista outcrop.

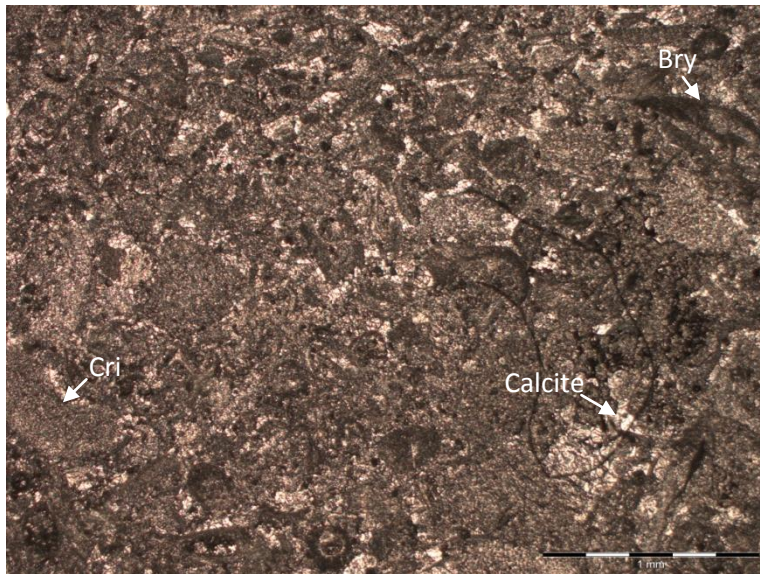


Figure 4.2k. Photomicrograph of Pierson bed P2, an abraded skeletal packstone that contains bryozoans (Bry), crinoids (Cri), and rare brachiopods (Brach) and ostracodes (Ost). Bryozoans are estimated to be ~ 40%, crinoids ~ 40%, and brachiopods and ostracodes < 5% of the total rock. Many of the skeletal grains are unidentifiable due to disarticulation caused by high-energy deposition. This texture represents most of the Pierson Formation at Bella Vista. Intraparticle blocky calcite is present in many of the skeletal grains. A 1 mm long scale bar is shown in the lower right corner of the image. Photomicrograph taken in plane-polarized light (PPL).

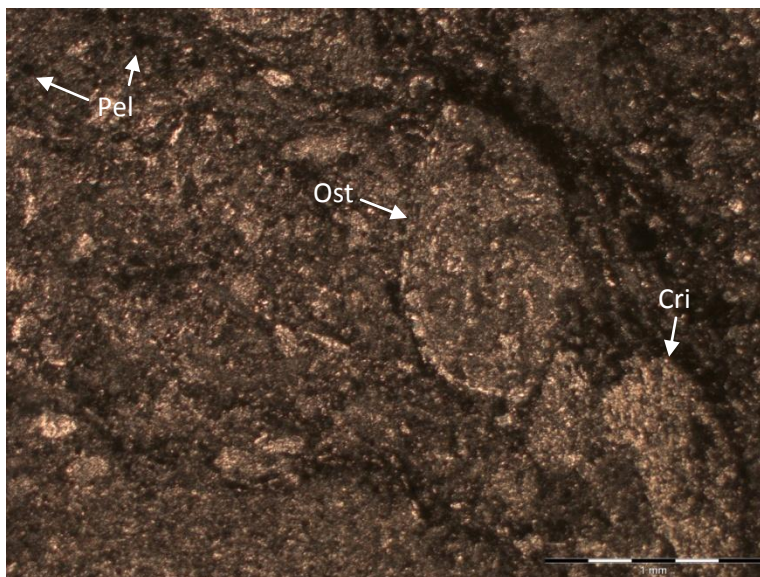


Figure 4.2l. Photomicrograph of Pierson bed P13, a sparsely skeletal wackestone containing peloids (Pel). The primary skeletal grains are crinoids (Cri) and ostracodes (Ost) with rare brachiopods (Brach). Crinoids are estimated to be ~ 5% and ostracodes ~ 5% of the total rock. Peloids represent < 5% of this bed. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner. This acetate peel is representative of bed P13 at Bella Vista.

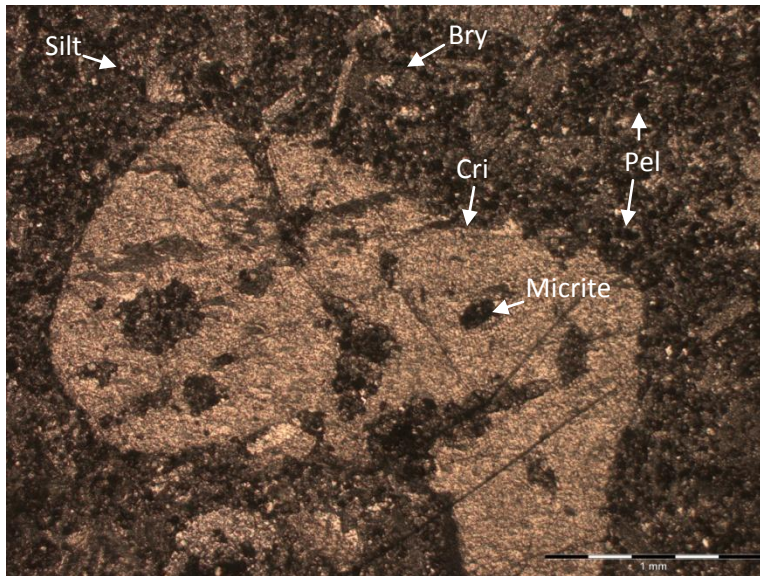


Figure 4.2m. Photomicrograph of Pierson bed P14, a silt-sized peloidal packstone-wackestone. Crinoids (Cri) and bryozoans (Bry) are the dominant skeletal grains. Intraparticle micrite fill many of the skeletal grains as shown above. Peloids are estimated to be ~ 40%, crinoids ~ 20%, bryozoans ~ 5%, and quartz silt < 5% of the total rock. This acetate peel is representative of bed P14 at Bella Vista. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner.

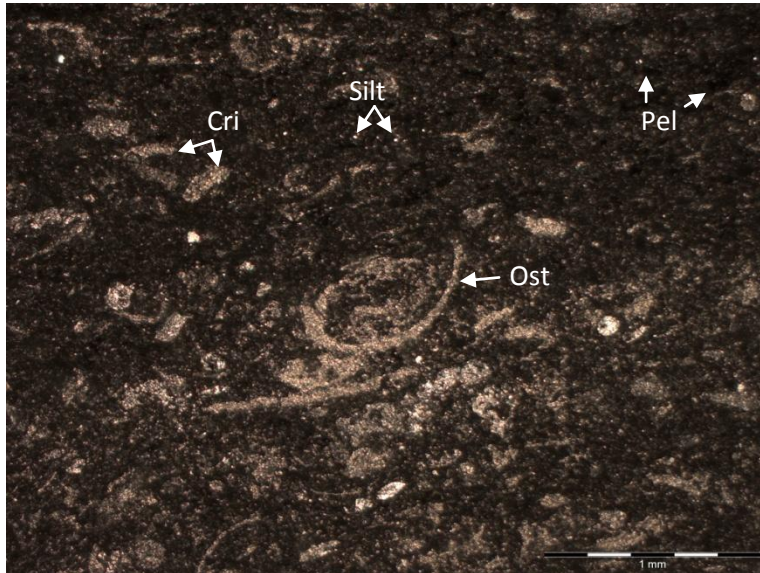


Figure 4.2n. Photomicrograph of Pierson bed P18 at Bella Vista. P18 is skeletal wackestone-packstone with crinoids (Cri), ostracodes (Ost), peloids (Pel) and quartz silt identified. Crinoids are estimated to be ~ 20% and ostracodes ~ 5% of this bed. Fine quartz silt and peloids are sparse and estimated to be ~ 5% combined of the total rock. Photomicrograph taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner. Texture representative of bed P18 at Bella Vista.

Reeds Spring Formation

The Reeds Spring Formation is the youngest and thickest unit described at Bella Vista. Due to the steepness of the upper part of the outcrop, only the lower part of the Reeds Spring and Reeds Spring "channel" (Fig. 4.2a) were measured and found to be approximately 2.8 m (9.2 ft.) in combined total thickness. The Reeds Spring Formation is primarily a thinly bedded, gray limestone with abundant grayish-tan chert nodules throughout (Fig. 4.2o). The lower Reeds Spring beds alternate between chert-free mudstone, shaly mudstone, and cherty mudstone throughout. The channel in the Reeds Spring Formation contains shaly limestones at the base, becoming predominantly mudstones with grayish-brown chert nodules. About halfway up in the Reeds Spring channel, the chert transitions from nodular to irregular beds of chert that is maintained to the top of the channel.

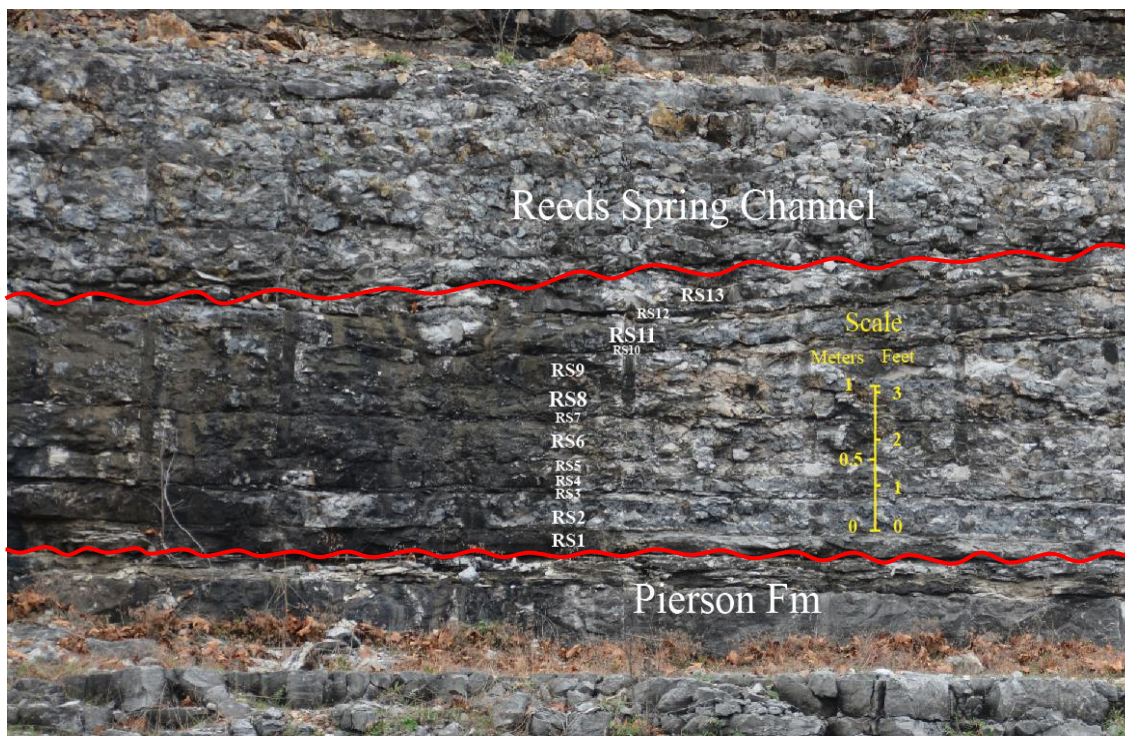


Figure 4.2o. The lower portion of the Reeds Spring Formation at Bella Vista with its 13 bed division. Identified unconformable formation contacts with the subjacent Pierson Formation and superjacent Reeds Spring Channel marked by red lines.

Petrographic Analysis:

Though bed thickness measurements were taken to the top of the Reeds Spring Channel, only the basal two beds were sampled for petrographic analysis. Two acetate peels were made to distinguish the boundary between the Pierson and Reeds Spring Formation, with the lowest bed shown in Figure 4.2p. Bed RS1 is a 4 inch bed of light gray, chert-free, mudstone with < 5% quartz silt grains. Rare skeletal grains include inarticulate brachiopods and ostracode fragments, which account for < 5% of the total rock.

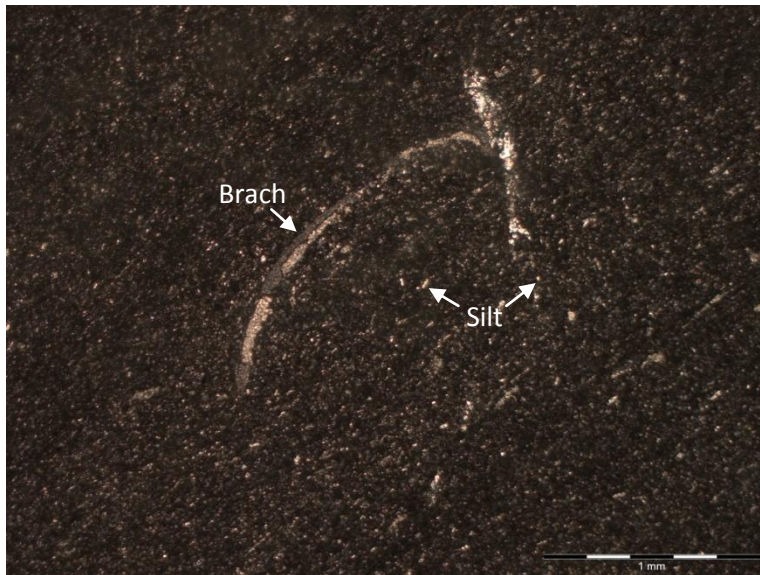


Figure 4.2p. Photomicrograph of Reeds Spring bed RS1, a mudstone with minor amounts (< 5%) of fine-silt size quartz grains. Rare skeletal grains include brachiopods (Brach) and bryozoan (Bry) fragments. Brachiopods and bryozoans are estimated to be < 5% of the total rock. Image taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner. This acetate peel is representative of bed RS1 at Bella Vista.

Bentonville, Arkansas:

Just south of Bella Vista on Hwy 71 is the Bentonville outcrop. It is located at approximately 36° 25' 12.03" N Latitude, 94° 13' 30.41" W Longitude. This section lies 5.44 km (3.37 mi) to the northwest of Bentonville, in Benton County, northwest Arkansas. Unlike the previous sections, only the upper portion of the Pierson Formation and lower portion of the Reeds Spring Formation are exposed at the outcrop. Detailed stratigraphic and petrographic analysis was performed on the Pierson Formation and lowermost bed of the Reeds Spring Formation. The Pierson Formation is anonymously thick compared to the Bella Vista section ~ 9.7 km (6.0 mi) to the northwest. Figure 4.3a shows the stratigraphic column for the Bentonville, Arkansas section.

Bentonville, AR

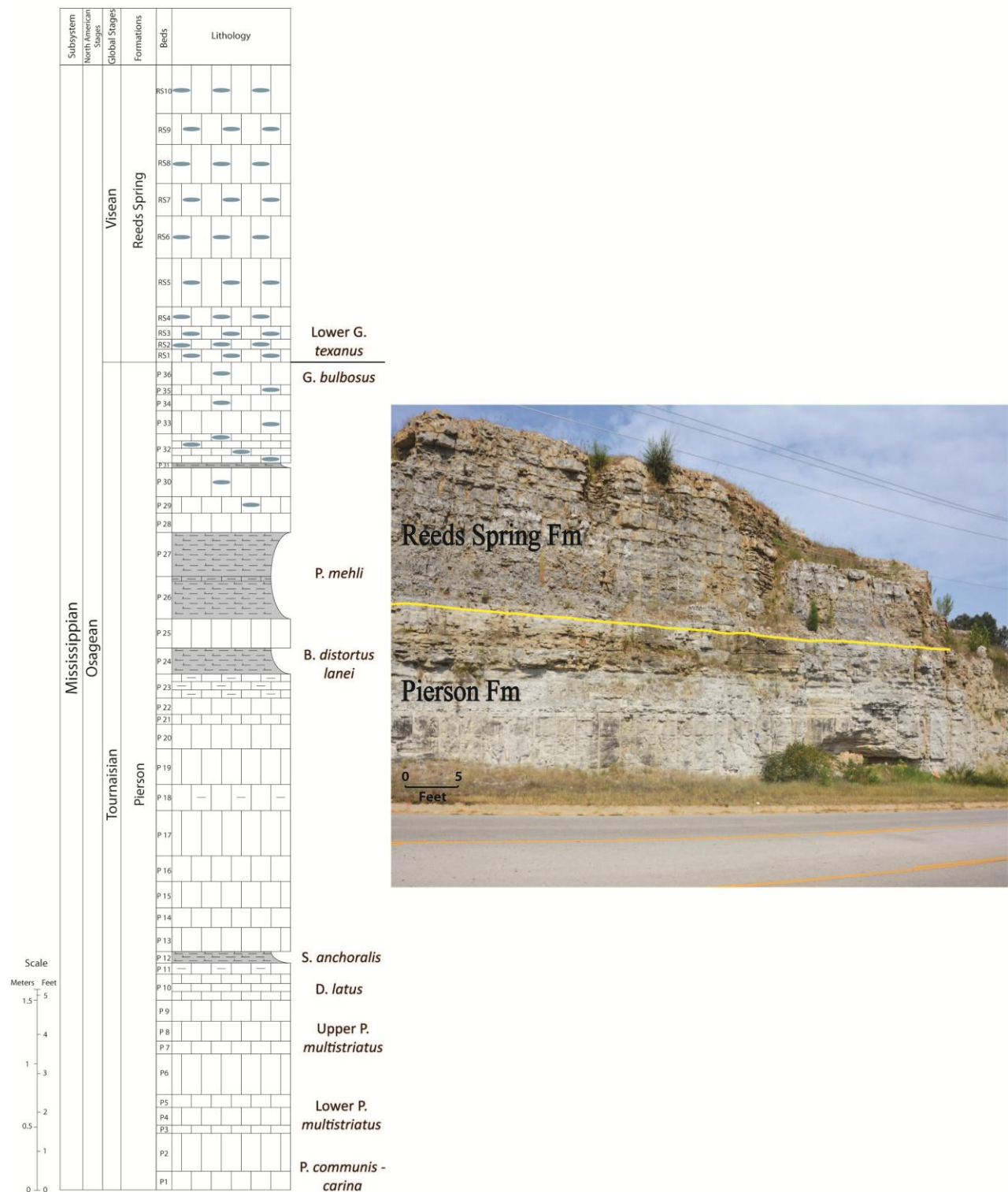


Figure 4.3a. Stratigraphic section of the Pierson and Reeds Spring formations at Bentonville, Arkansas. Formation contact marked by a yellow line. Conodont biozones recovered are shown to the right of stratigraphic section.

Pierson Formation

The Pierson Formation at Bentonville, Arkansas measures nearly 6.5 m (21.3 ft) is the thickest of all the St. Joe Group formations in this study. The Pierson Formation contains 36 beds with a wide range in textures from silty wackestone to skeletal packstone. Lithologies in the Pierson Formation vary from calcareous shale, shaly limestone, non-cherty limestone, to cherty limestone. The formation is predominantly light gray, fossiliferous limestone that contains two grayish-green shales near the middle. The Pierson Formation also contains a few finely crystalline chert nodules in the upper section, starting in bed P29, just above the *mehli* conodont zone, and extended to the top of bed P36. Unlike the Pierson Formation at Bella Vista, Arkansas, all conodont biozones are present within the formation at Bentonville (Fig. 4.3a).



Figure 4.3b. Base of the Pierson Formation exposed at Bentonville, Arkansas. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

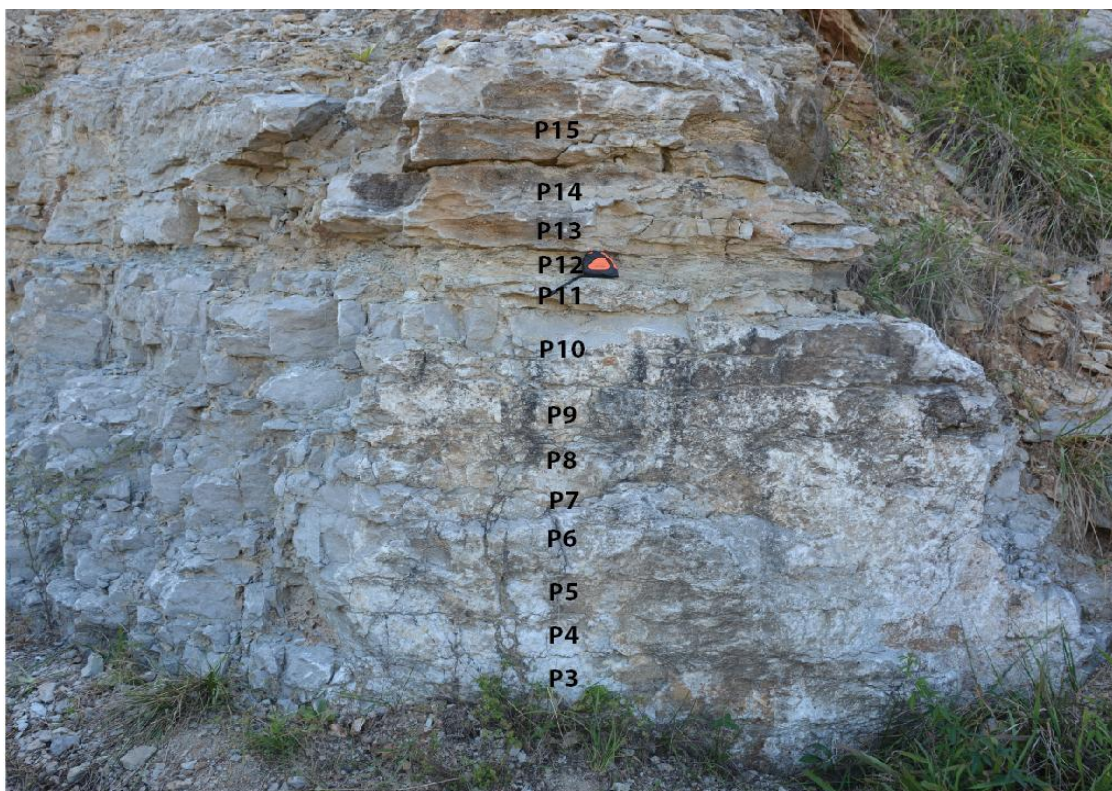


Figure 4.3c. Lower portion of the Pierson Formation at Bentonville, Arkansas. A tape measure shown for scale is ~ 7.6 cm (3.0 in) in height.



Figure 4.3d. Middle portion of the Pierson Formation at Bentonville, Arkansas. A field notebook shown for scale is ~ 12.7 cm (5.0 in) in height.



Figure 4.3e. Upper portion of the Pierson Formation exposed at Bentonville, Arkansas. A field notebook shown for scale is ~ 12.7 cm (5.0 in) in height.

Petrographic Analysis:

The lithology beginning at the base of the Pierson Formation varies from skeletal packstone to skeletal wackestone until becoming a silt-rich wackestone just below the *anchoralis* conodont zone (P12). The Pierson lithologically alternates between skeletal packstones and wackestones until becoming a silt-rich wackestone just below the base of the *mehli* conodont zone (P26-27). Above the *mehli* conodont zone the carbonate is mudstone to skeletal wackestone before becoming a skeletal packstone at P32. The top of the Pierson (P36) is a thin (< 6 in.) skeletal wackestone. The adjacent bed in the overlying Reeds Spring Formation is sparse skeletal wackestone-mudstone, evidence that the contact is likely transitional.

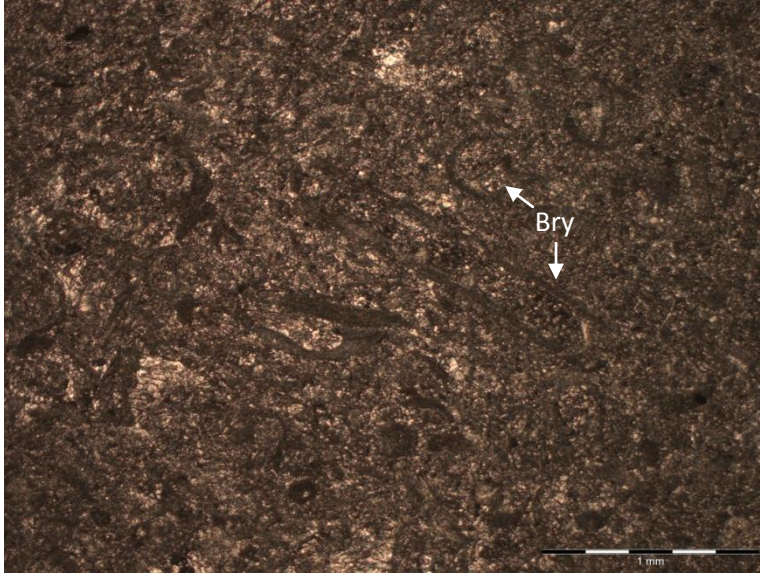


Figure 4.3f. Photomicrograph of Pierson bed P1, a bryozoan-rich packstone-wackestone. Bryozoans (Bry) represent ~ 70% of this bed. Brachiopods (Brach) are rare and make up < 5% of this bed. Photomicrograph taken in plane-polarized light and is representative of bed P1 at Bentonville. A 1 mm long scale bar is shown in the lower right corner of the image. The texture in this acetate peel is representative of bed P1 at the Bentonville section.

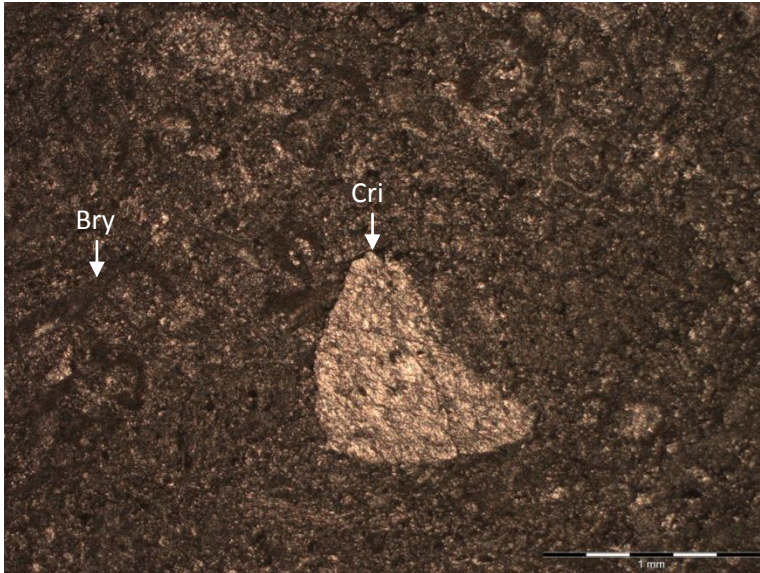


Figure 4.3g. Photomicrograph of Pierson bed P5 at the Bentonville section. Bed P5 is skeletal wackestone containing bryozoans (Bry) and crinoids (Cri). Bryozoans represent ~ 15% and crinoids ~ 5% of this bed. Image taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner. The texture in this acetate peel is representative of bed P5 at Bentonville.

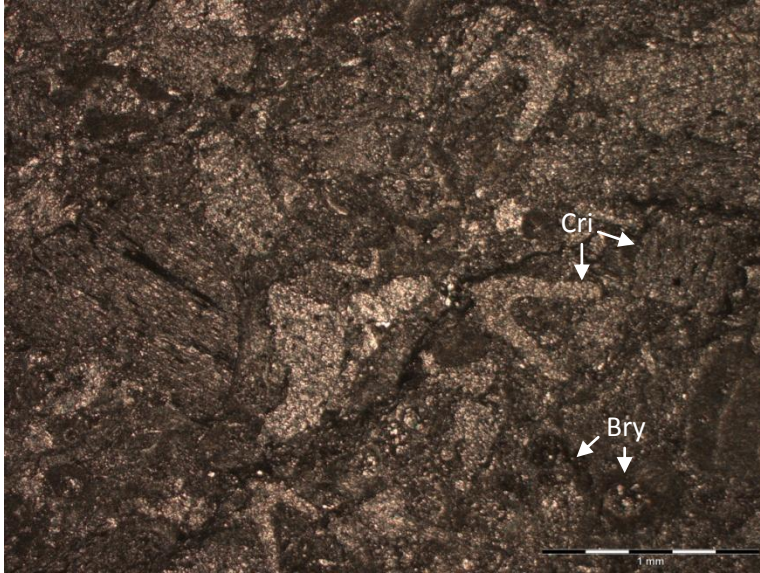


Figure 4.3h. Photomicrograph of Pierson bed P14, a skeletal packstone containing disarticulate bryozoans (Bry) and crinoids (Cri). Crinoids represent ~ 70% and bryozoans ~ 20% of this bed. Photomicrograph taken in plane-polarized light (PPL). A 1 mm long scale bar is shown in the lower right corner of the image. The texture in this acetate peel is representative of bed P14 at Bentonville.

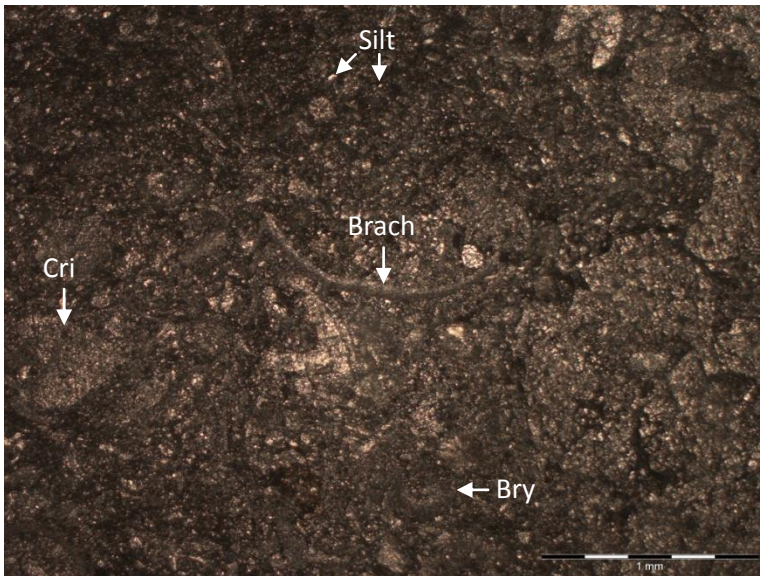


Figure 4.3i. Photomicrograph of Pierson bed P22, a silty sparsely skeletal wackestone. Fossils include bryozoans (Bry), crinoids (Cri) and rare brachiopods (Brach). Bryozoans represent ~ 5%, crinoids ~ 5%, brachiopods < 5%, and quartz silt ~ 5% of the total rock. This texture is representative of bed P22 at Bentonville. Photomicrograph taken in plane-polarized light and contains a 1 mm long scale bar in the lower right corner.

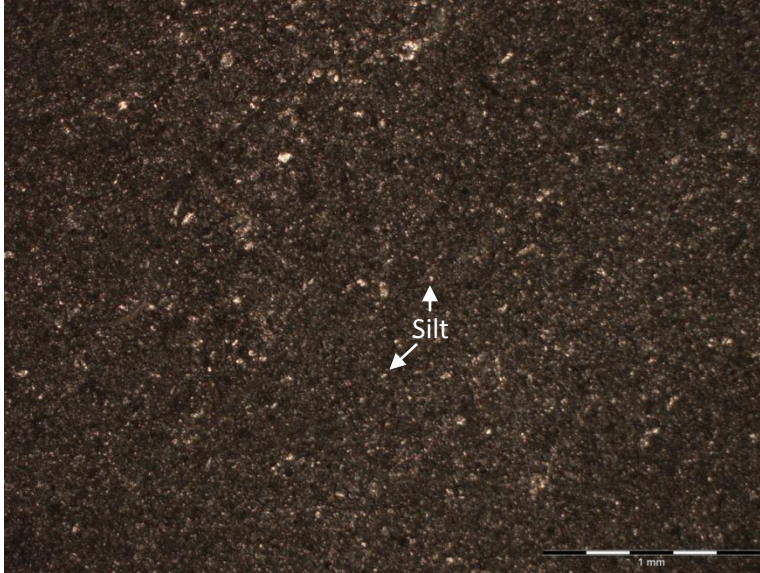


Figure 4.3j. Photomicrograph of Pierson bed P28, a mudstone containing quartz silt grains and rare crinoids (Cri). Crinoids and quartz silt represent < 5% of this bed. This texture is representative of bed P28 at Bentonville. Photomicrograph taken in plane-polarized light and contains a 1 mm long scale bar in the lower right corner.

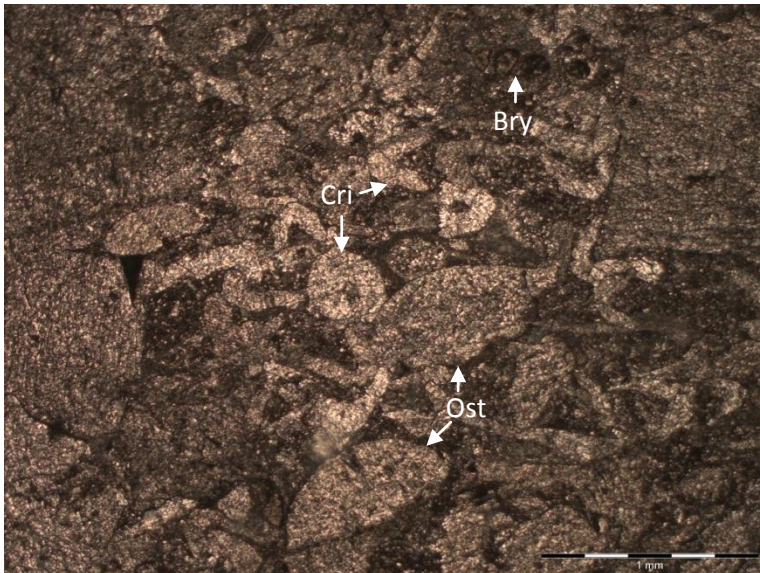


Figure 4.3k. Photomicrograph of Pierson bed P32, a coarse skeletal packstone. The primary fossils in this bed include bryozoans (Bry), ostracodes (Ost), and crinoids (Cri). Crinoids represent ~ 60%, ostracodes ~ 20%, and bryozoans ~ 10% of this bed. This texture is representative of bed P32 at Bentonville. Photomicrograph taken in plane-polarized light and contains a 1 mm long scale bar in the lower right corner.

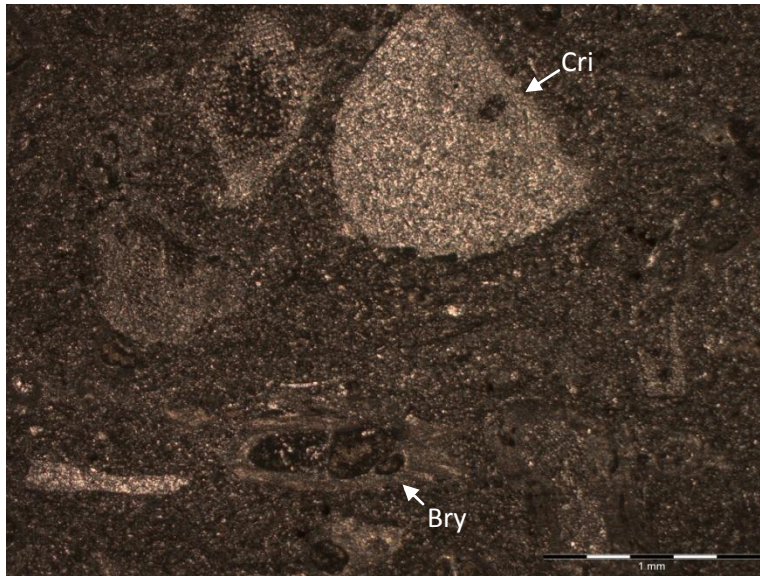


Figure 4.31. Photomicrograph of Pierson bed P36, a skeletal wackestone. The primary fossils in this bed include byozoans (Bry) and crinoids (Cri). Bryozoans are estimated to be ~ 10% and crinoids ~ 10% of the total rock. This texture is representative of bed P36 at the Bentonville section. Photomicrograph taken in plane-polarized light and contains a 1 mm long scale bar in the lower right corner.

Reeds Spring Formation

The Reeds Spring Formation is the youngest formation described at the Bentonville locality. The total thickness of the Reeds Spring Formation is nearly 5.1 m (16.8 ft), though only the lower 10 beds are included in the section's stratigraphic column (Fig. 4.3a.) for the purpose of illustrating the carbonate textures associated with the Pierson-Reeds Spring contact. The Reeds Spring Formation is primarily thinly bedded, gray limestone with abundant finely crystalline grayish-blue chert nodules throughout. The contact between the Pierson and Reeds Spring formations is subtle. The transition is marked by a decrease in energy from a silty sparsely skeletal wackestone at the top of the Pierson Formation, to a sparsely skeletal wackestone-mudstone at the base of the Reeds Spring Formation. There is also an increase in finely crystalline chert in the lowest bed of the Reeds Spring Formation.

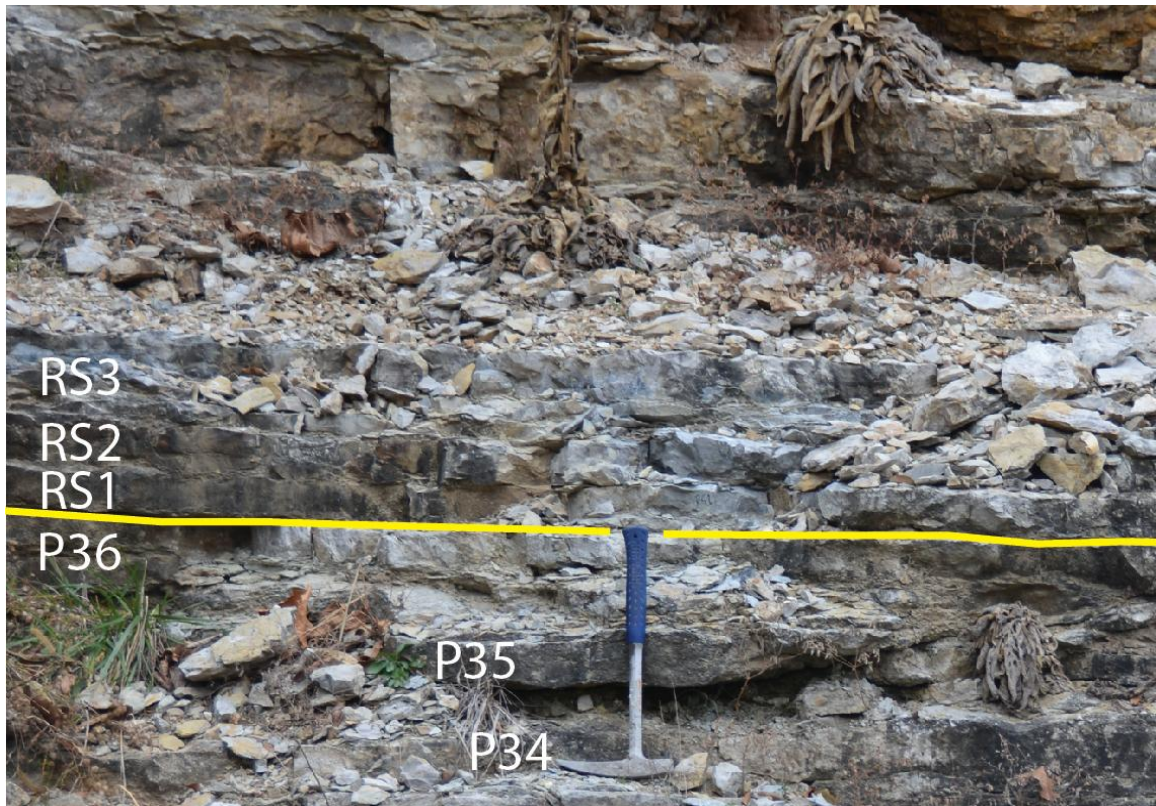


Figure 4.3m. Pierson-Reeds Spring contact at Bentonville marked by a yellow line. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The lower 2 beds of the Reeds Spring Formation were sampled, while the lowest bed (RS1) was selected for acetate peels. Bed RS1 is a 4 inch bed of medium gray, finely crystalline, chert bearing mudstone. Rare skeletal grains include fenestrate bryozoans, brachiopods, and crinoid fragments (Fig. 4.3n). Skeletal grains are likely derived from shallower, up-dip sediment in the Pierson Formation.

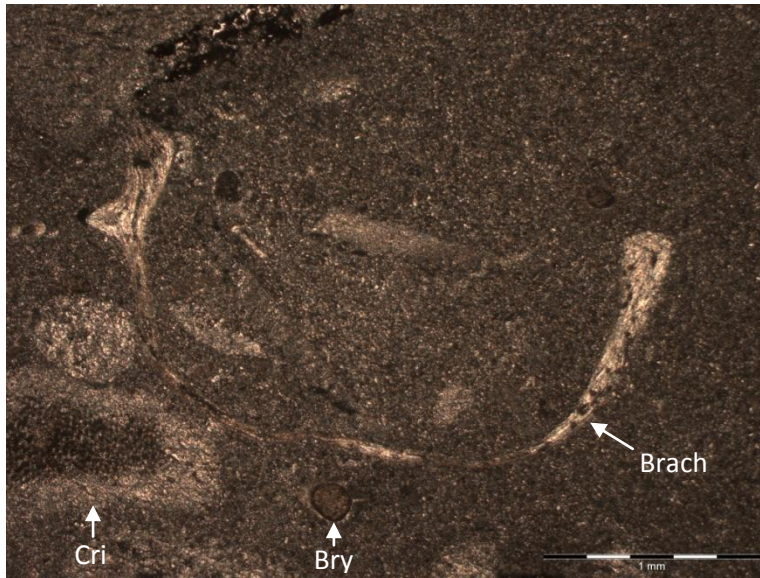


Figure 4.3n. Photomicrograph of Reeds Spring bed RS1, a skeletal wackestone-mudstone containing bryozoans (Bry), brachiopods (Brach), and crinoids (Cri). This image shows a grain rich area for fossil content. Crinoids make up ~5%, brachiopods and bryozoans < 5% of the total rock. This texture is representative of bed RS1 at Bentonville. Photomicrograph taken in plane-polarized light and contains a 1 mm long scale bar in the lower right corner.

Siloam Springs (South), Arkansas:

Lower Mississippian rocks are exposed along Hwy 59 South, approximately 8.37 km (5.19 mi) south of Siloam Springs, in southwest Benton County, Arkansas. This section was chosen for detailed petrographic and stratigraphic analysis as it is an example of continual thinning of the St. Joe Group to the south of Jane, Missouri. The section is located at approximately 36° 06' 45.21" N Latitude, 94° 31' 58.31" W Longitude. The maximum thickness of the St. Joe Group at Siloam Springs (South) is approximately 5.5 m (~ 18.2 ft.). Figure 4.4a shows the stratigraphic column of the section.

Siloam Springs (South), AR

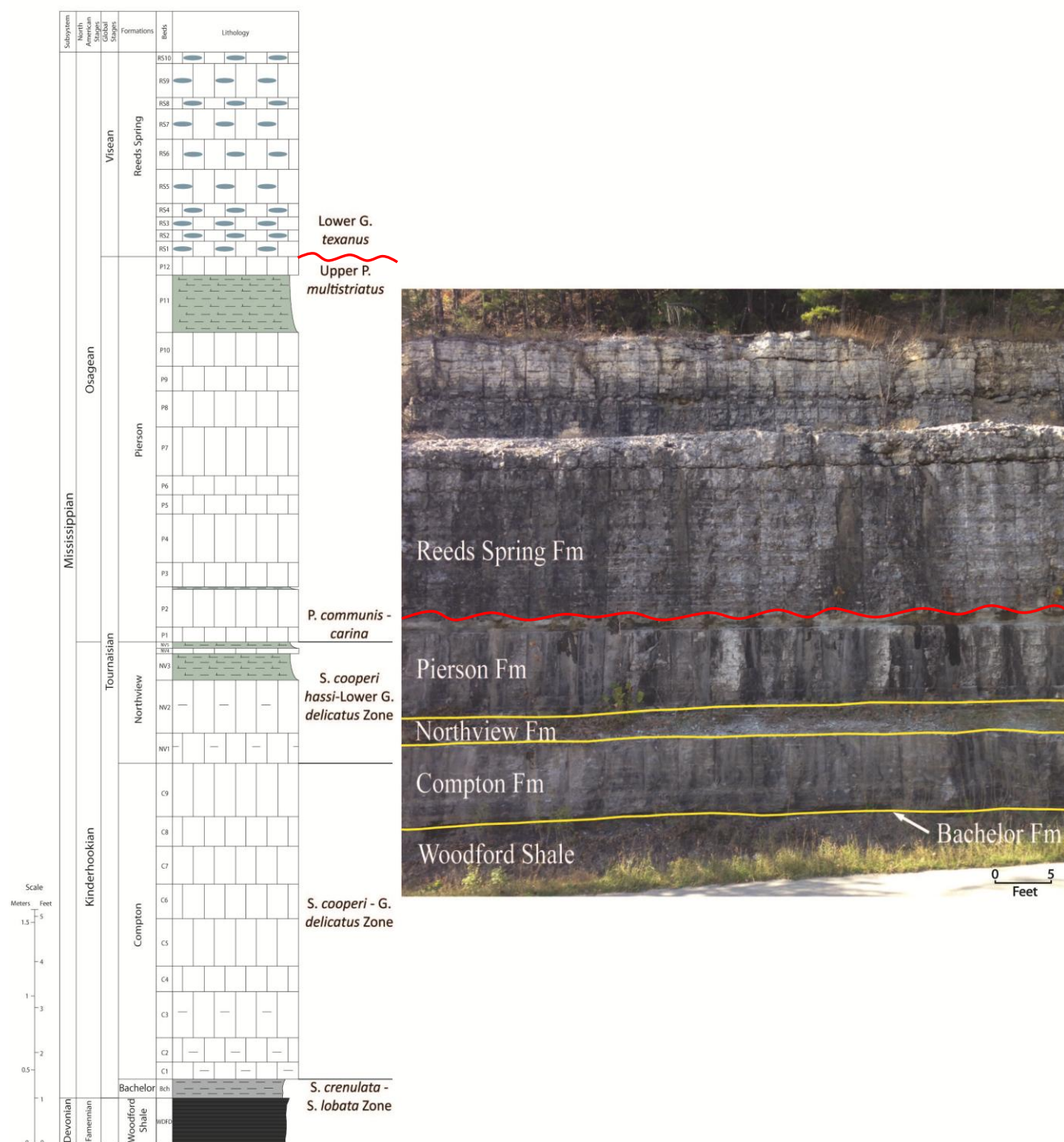


Figure 4.4a. Stratigraphic section of the upper part of the Woodford Shale, Bachelor Formation, St. Joe Group, and lower Reeds Spring Formation exposed at Siloam Springs (South), Arkansas. Positions of formation contacts in photograph are marked by yellow lines. Conodont biozones recovered are shown to the right of the stratigraphic section.

Bachelor Formation

The Bachelor Formation at Siloam Springs (South) is a grayish-tan, finely laminated, silty shale just above the black, fissile, Devonian Woodford Shale. The darker color of the Bachelor Formation may indicate that it contains a higher concentration of organic matter than the previously described sections. The Bachelor Formation contains quartz sand and silt that also occur throughout the overlying Compton Formation. The total thickness of the Bachelor Formation is approximately 12.7 cm (5.0 in). The Bachelor Formation is easily weathered and forms a recess in the outcrop profile (Figure 4.4b).

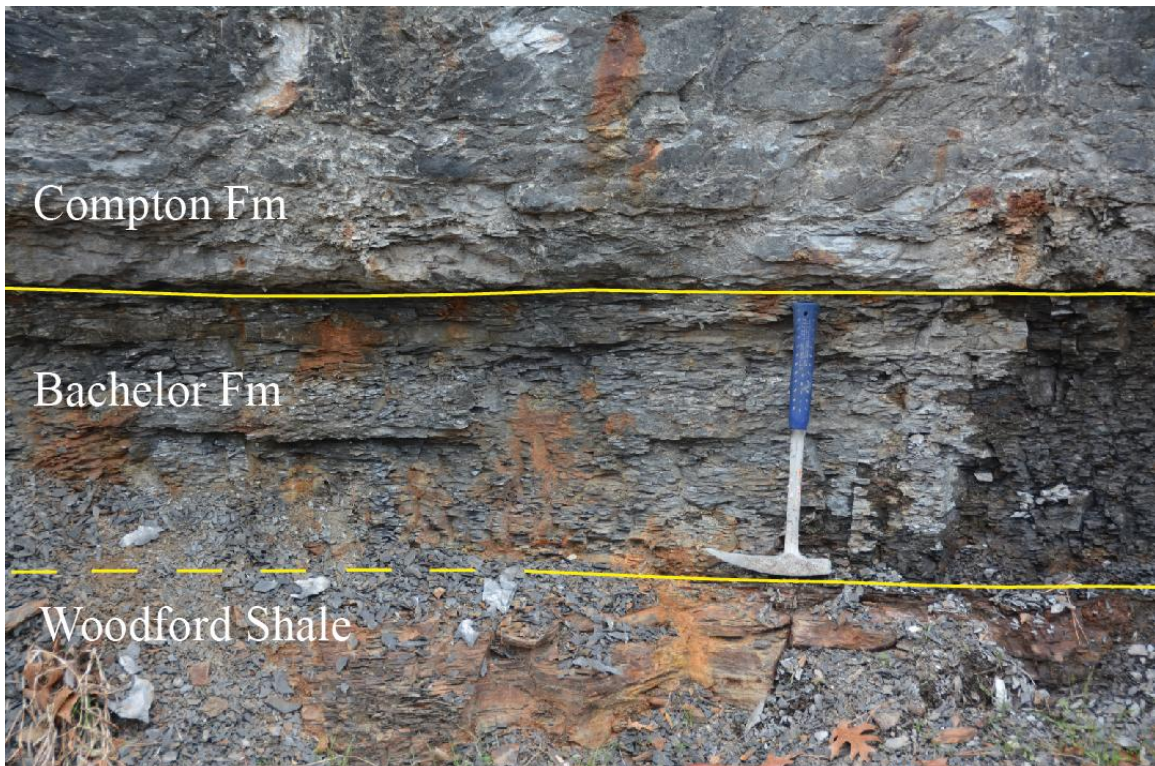


Figure 4.2b. Close-up photograph of the Woodford Shale, Bachelor Formation, and Compton Formation contacts (yellow lines) at Siloam Springs (South). The Bachelor Formation weathers to form a recess in the outcrop profile. The rock hammer shown for scale is ~ 40.6 cm (16.0 in).

Compton Formation

The Compton Formation is predominantly a silty, fossiliferous, gray limestone. This brittle limestone is finely crystalline and contains sand to pebble size pyrite concretions. Peloids are present throughout many of the beds in the Compton Formation. The lowermost 3 beds contain brown clay wisps throughout. The total thickness of the formation is about 2.1 m (~7.0 ft.). The Compton Formation contains the entire *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.4a). The formation is divided into 9 beds, ranging in thickness from 11.4 cm (4.5 in) to 35.6 cm (14.0 in) (Figure 4.4c).



Figure 4.4c. The Compton Formation at Siloam Springs (South) has 9 bed divisions. The formation forms a prominent ledge between the Bachelor Formation below and the Northview Formation above (yellow lines). The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The Compton Formation primarily contains bryozoans and echinoderms. The basal 2 beds are silty skeletal wackestones with peloids (< 5%), representative of a low energy, restricted marine environment. Beds C3-C4 reflect an increase in energy and transition into a silty skeletal wackestone-packstone. Beds C5 and C6 lack quartz silt and are much coarser-grained skeletal packstone-wackestones. The Compton Formation continues to coarsen and bed C7 is skeletal packstone. Toward the top of the formation, bed C8 is a skeletal wackestone-packstone followed by the skeletal packstone of bed C9. The general texture of the Compton Formation ranges from skeletal wackestone-packstone in the lower half to skeletal packstone-wackestone in the upper half.

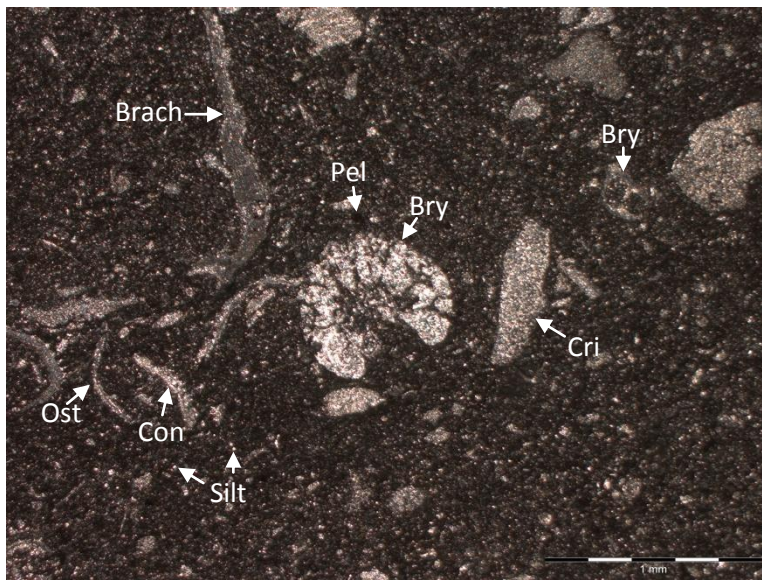


Figure 4.4d. Photomicrograph of Compton bed C1, a silty skeletal wackestone composed of fenestrate and ramose bryozoans (Bry), crinoids (Cri), and rare ostracodes (Ost), conodonts (Con), and brachiopods (Brach). Other nonskeletal grains include sparse peloids (Pel). Bryozoans are estimated to be ~ 5%, crinoids ~ 5%, ostracodes, conodonts, and brachiopods ~ 5% of the total rock. Quartz silt represents ~ 5 % of this bed. This acetate peel is representative of bed C1 at Siloam Springs (South). Image taken in plane-polarized light (PPL) and contains a 1 mm long scale bar in the lower right corner.

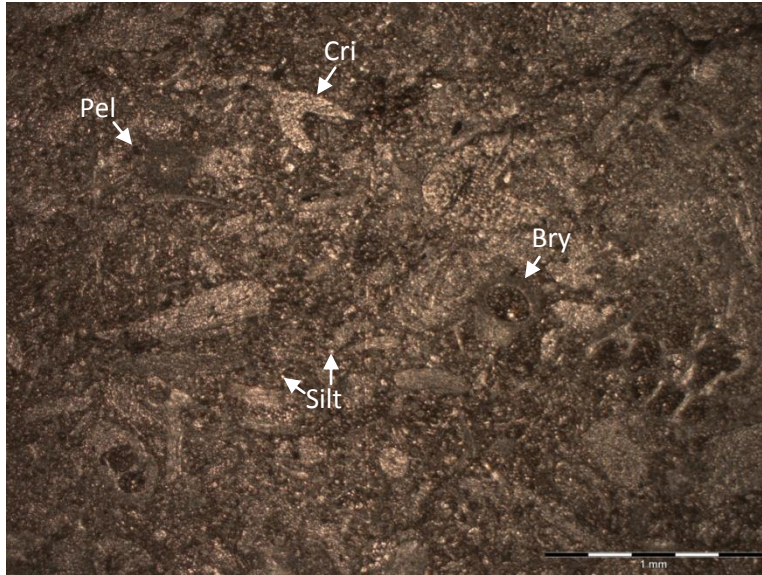


Figure 4.4e. Photomicrograph of Compton bed C5, a silty skeletal packstone composed of crinoids (Cri), fenestrate and ramose bryozoans (Bry), and rare ostracodes (Ost). C5 contains minor amounts ($< 5\%$) of quartz silt and peloids (Pel). Crinoids represent $\sim 60\%$, bryozoans $\sim 20\%$, and ostracodes $< 5\%$ of the total rock. This acetate peel is representative of bed C5 at Siloam Springs (South). Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

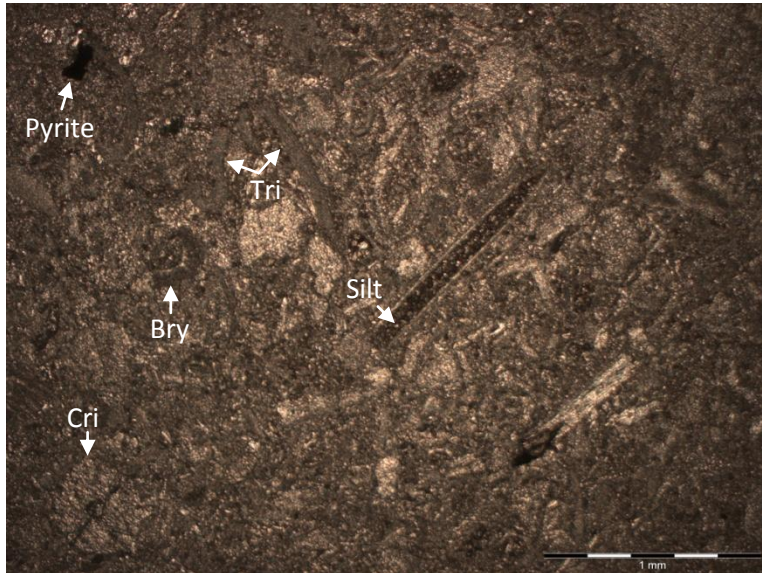


Figure 4.4f. Photomicrograph of Compton bed C7, a skeletal packstone containing crinoids (Cri), bryozoans (Bry), and rare trilobites (Tri). Quartz silt fill some of the skeletal grains. Crinoids are estimated to be $\sim 50\%$, bryozoans $\sim 25\%$, and trilobites $\sim 5\%$ of the total rock. Quartz silt represent $< 5\%$ of this bed. Pyrite occurs in trace amounts. This acetate peel is representative of bed C7 at Siloam Springs (South). Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Northview Formation

The Northview Formation has variable lithology including light-gray shaly limestone to light-green-gray calcareous shale. The Northview Formation is subdivided into 5 beds, which range in thickness from 3.8 cm (1.5 in) to 35.6 cm (14 in). The lower two thirds of the formation is characterized as shaly, brittle limestone, that fines upward into a poorly cemented, finely laminated, calcareous shale bed (NV3). Above this bed is an interbedded, quartz-silt-rich limestone. The top of the formation returns to a poorly cemented, finely laminated, calcareous shale bed. The total thickness of the Northview Formation is approximately 0.8 m (~2.7 ft.) (Figure 4.4g).

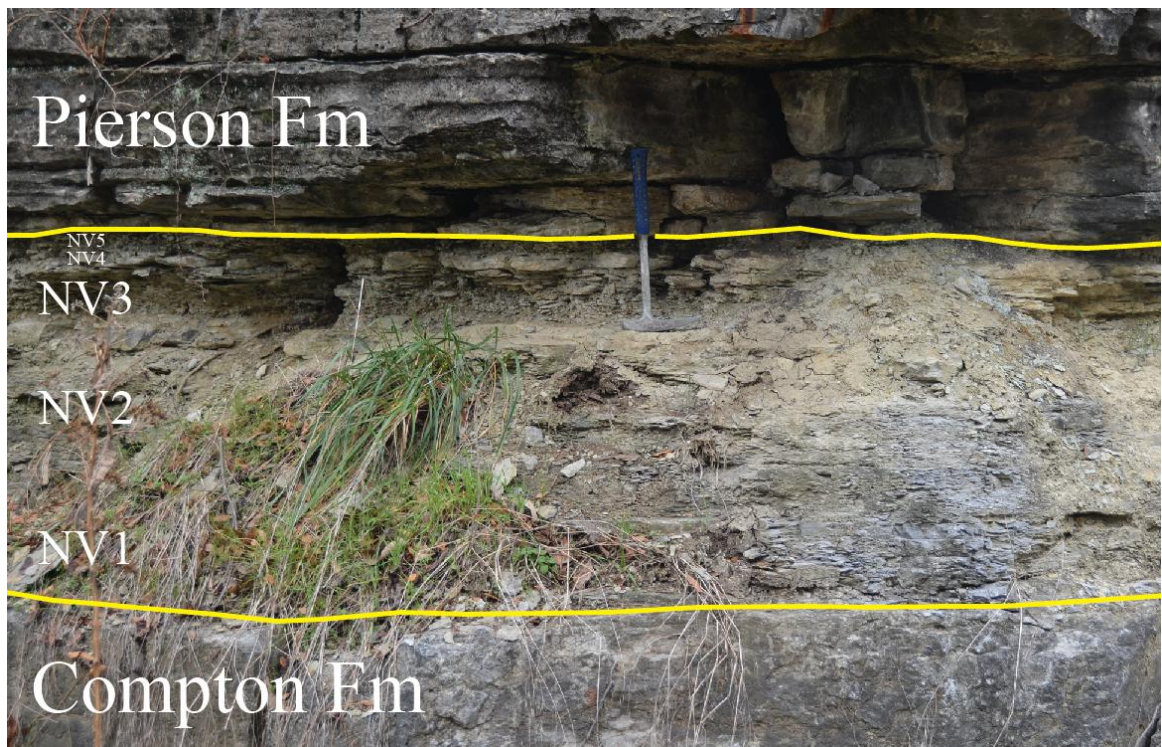


Figure 4.4g. Five poorly indurated beds of the Northview Formation at Siloam Springs (South) forming a recess above the Compton Formation and below the Pierson Formation. Formation contacts marked by yellow lines. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The Northview Formation is predominantly light green-gray silty shale and calcareous shale. However, near the top of the Northview Formation there is an interbedded silty, sparsely skeletal wackestone that is only 3.8 cm (~1.5 in) thick. This bed contains ~ 5-10% silt-size quartz grains and ~ 10% bryozoan, crinoid, and brachiopod grains sparsely distributed.

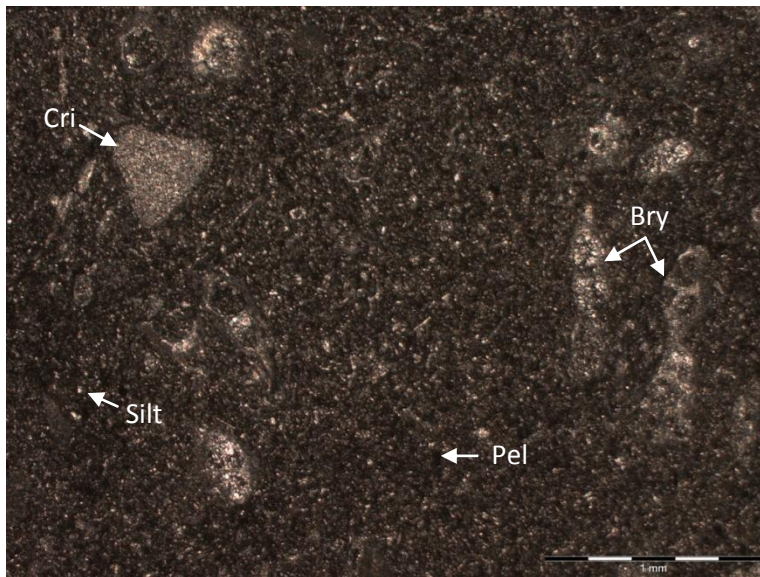


Figure 4.4h. Interbedded silty skeletal wackestone of Northview bed NV3 containing bryozoans (Bry), crinoids (Cri), peloids (Pel), and quartz silt. Bryozoans represent ~ 10%, crinoids < 5%, peloids and silt ~ 5% of the total rock. This photomicrograph is representative of NV3 at Siloam Springs (South) and was taken in plane-polarized light (PPL). A 1 mm long scale bar is shown in the lower right corner of the image.

Pierson Formation

The Pierson Formation has variable lithology and texture. It is predominantly a sparsely skeletal limestone at the base, coarsening upward into fossiliferous limestones. The top of the formation contains light-green-gray calcareous shale, capped with a loosely compacted limestone (Fig. 4.4a). Bed P12 transitions into mudstone with < 5% quartz silt. The total thickness of the Pierson Formation is nearly 2.5 m (~8.1 ft.), and it

was subdivided into 12 beds for petrographic analysis and conodont recovery. The Pierson Formation, which is similar in color to the light gray Compton Formation, is chert-free at this locality. The Pierson Formation contains the *P. communis-carina* through the Upper *P. multistriatus* conodont biozones with no significant increase in conodonts recovered within each bed sample. Missing conodont biozones from *S. anchoralis* to *G. bulbosus* indicate significant erosion occurred prior to Reeds Spring deposition.



Figure 4.i. The Pierson Formation at Siloam Springs (South) with its 12 bed subdivisions. Yellow lines mark the contacts with the Northview Formation below and Reeds Spring Formation above. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The base of the Pierson Formation (P1) is silty sparsely skeletal wackestone. Bed P2 transitions into a skeletal wackestone-packstone with fine-grained abraded skeletal

debris. The following bed (P3) is skeletal packstone-wackestone and grains increase upward to skeletal packstones in beds P4-P6. The texture reverts back into a skeletal packstone-wackestone for beds P7-P8. Beds P9-10 are predominately skeletal packstones. Bed P11 is an easily weathered calcareous shale bed that is overlain by a loosely compacted mudstone bed (P12). The overall generalized texture of the Pierson Formation ranges from skeletal wackestone-packstone at the base, to skeletal packstones in the mid-upper portion of the Pierson and finally a thin mudstone at the top.

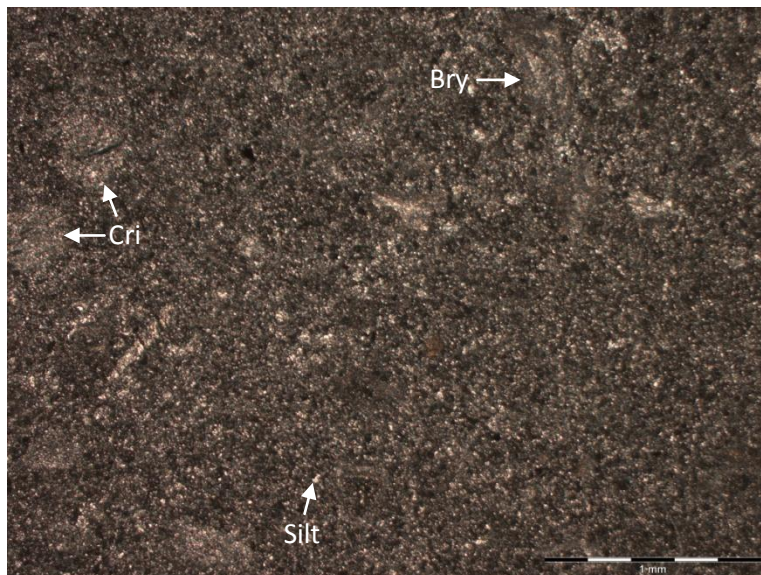


Figure 4.4j. Photomicrograph of Pierson bed P1, a sparse skeletal wackestone containing quartz silt, crinoids (Cri), and bryozoans (Bry). Quartz silt represents ~ 10%, crinoids ~ 5%, and bryozoans ~ 5% of the total rock. This acetate peel is representative of bed P1 at Siloam Springs (South). Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

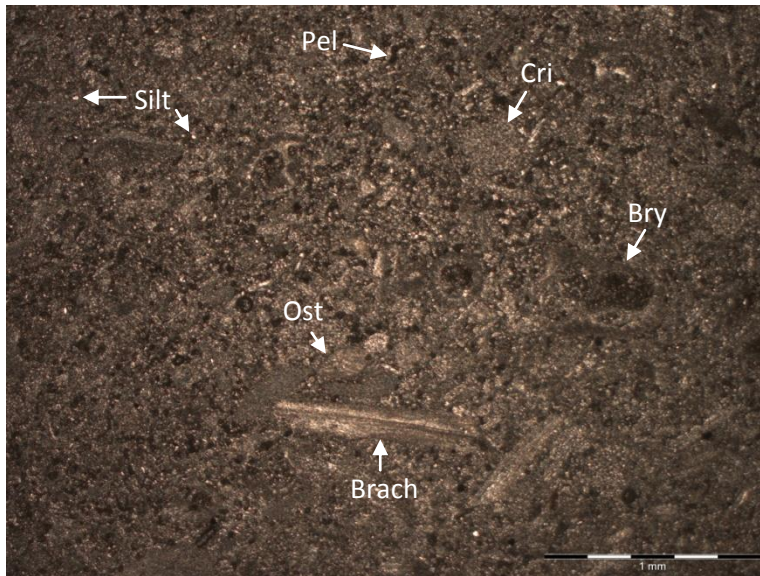


Figure 4.4k. Photomicrograph of Pierson bed P3, a skeletal packstone-wackestone containing crinoids, bryozoans, brachiopods, and minor ostracodes. Non-skeletal grains include peloids and quartz silt (~ 5%). Crinoids are estimated to be ~ 30%, bryozoans ~ 20%, brachiopods ~ 5%, and ostracodes < 5% of the total rock. This acetate peel is representative of bed P3 at Siloam Springs (South). Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

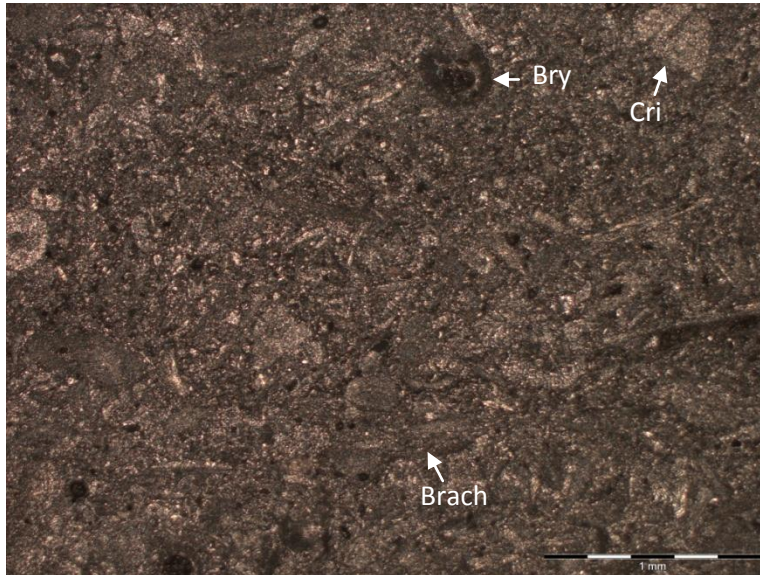


Figure 4.4l. Photomicrograph of Pierson bed P4, a skeletal packstone that contains bryozoans (Bry), and crinoids (Cri), and rare brachiopods (Brach). This texture is relatively consistent throughout the mid-upper Pierson Formation (P5-P10) at Siloam Springs (South). Crinoids represent ~ 55%, bryozoans ~ 25%, and brachiopods ~ 5% of the total rock. The photomicrograph was taken in plane-polarized light (PPL) and displays a 1 mm long scale bar in the lower right corner.

Reeds Spring Formation

The Reeds Spring Formation is the thickest unit exposed at Siloam Springs (South), with a total thickness of nearly 7.6 m (~25.0 ft). Only the lower 10 beds are represented in the section's stratigraphic column (Fig. 4.4a.) for the purpose of illustrating textural features associated with the Pierson-Reeds Spring contact. The Reeds Spring Formation is primarily a thinly bedded, tannish-blue limestone with abundant finely crystalline light blue colored chert beds throughout. The contact between the Pierson and Reeds Spring Formation is a subtle change. The transition is marked by a decrease in energy from a loosely compacted, non-cherty limestone at the top of the Pierson Formation, to a mudstone with < 5% quartz silt at the base of the Reeds Spring Formation. Finely crystalline chert occurs in the lowest bed of the Reeds Spring Formation. Thin alternating beds of limestone and chert characterize the rest of the Reeds Spring Formation section.

Petrographic Analysis:

The lower 2 beds of the Reeds Spring Formation at Siloam Springs were sampled, while the lowest bed (RS1) was selected for acetate peels. Bed RS1 is a ~ 12.7 cm (5.0 in) bed of light-gray-blue, finely crystalline mudstone with ~ 5-10% quartz silt grains. No skeletal grains were evident in the acetate peel of RS1.

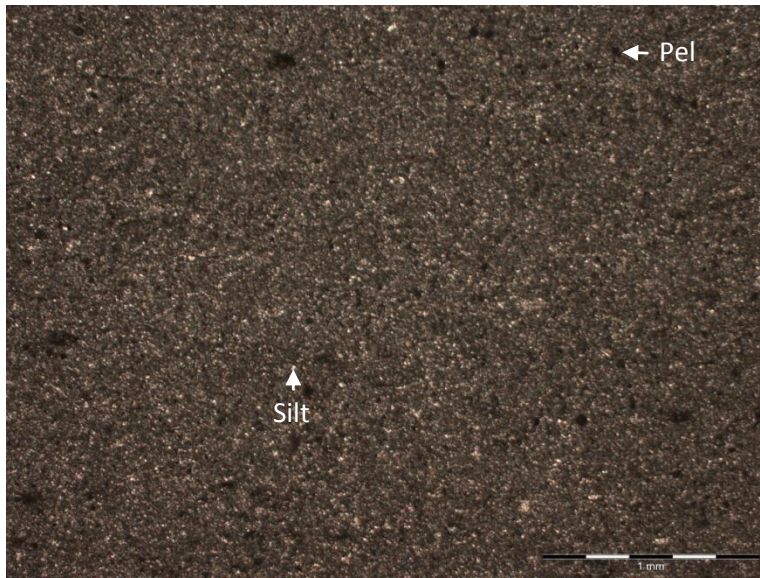


Figure 4.4m. Photomicrograph of Reeds Spring bed RS1, a mudstone containing minor amounts of peloids (Pel) and fine quartz silt. Silt and peloids represent ~ 5% of the total rock. This acetate peel is representative of bed RS1 at Siloam Springs (South). Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Kansas, Oklahoma:

Several outcrops along Hwy 412 in eastern Oklahoma expose Lower Mississippian rocks. At Kansas, Oklahoma the St. Joe Group is part of an eastward dipping anticline that exhibits a variety of lithologies and textures. This outcrop was selected for detailed petrographic and stratigraphic analysis, as it contains the entire St. Joe Group with an anomalous thickening of the Northview Formation. The total thickness of the St. Joe Group is nearly 5.0 m (~16.4 ft.). This section is found at the intersection of the Cherokee Turnpike W 412 and Hwy 59, at approximately 36° 12' 40.78" N Latitude, 94° 46' 17.44" W Longitude. It is located 2.45 km (1.55 mi) east of Kansas, in Delaware County, northeastern Oklahoma. A stratigraphic column and associated conodont biozones recovered for the measured section at Kansas, Oklahoma are shown in Figure 4.5a.

Kansas, OK

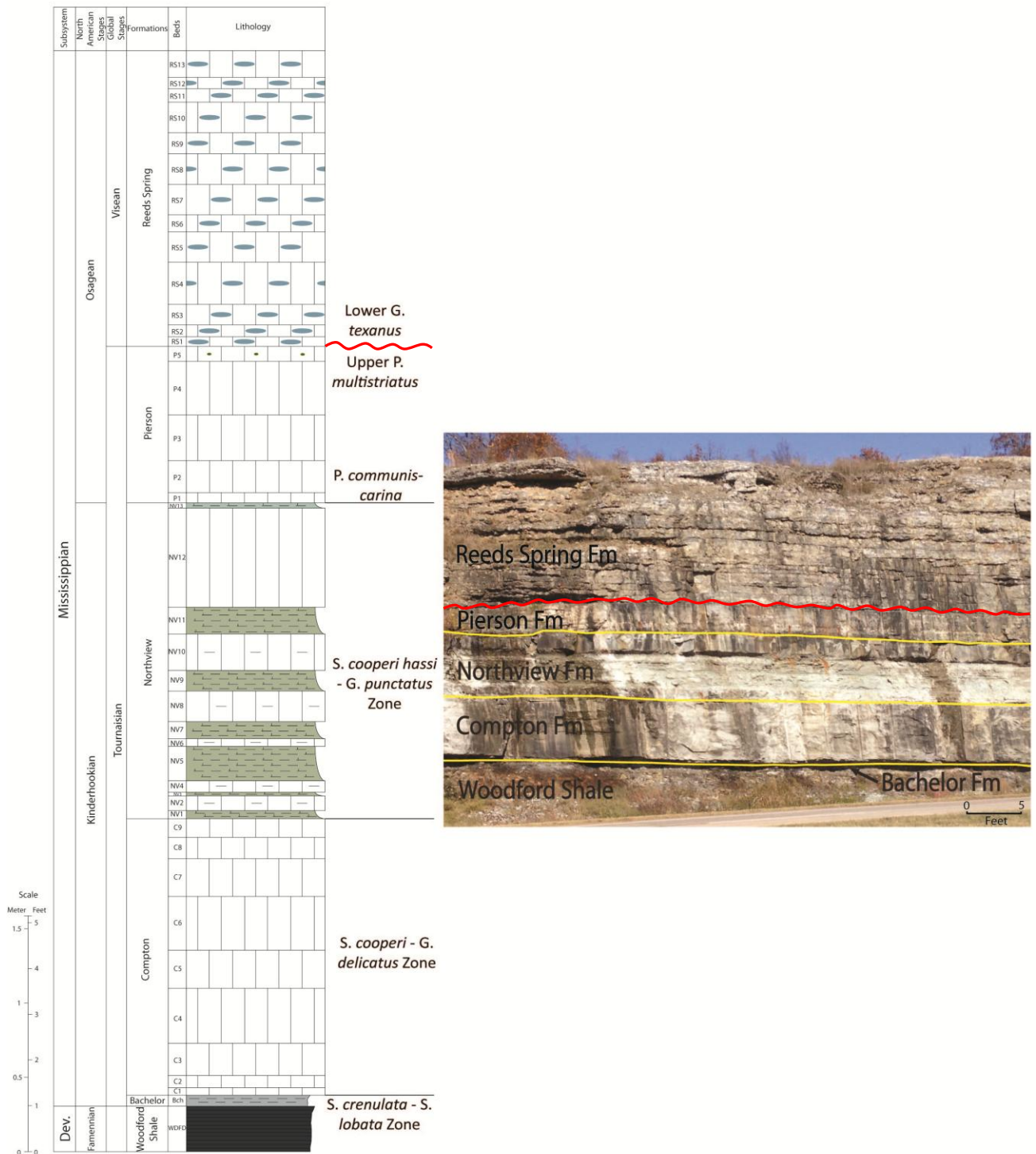


Figure 4.5a. Stratigraphic section of the upper part of the Woodford Shale, Bachelor Formation, St. Joe Group, and lower part of the Reeds Spring Formation exposed at Kansas, Oklahoma. Photograph shows positions of conformable contacts as yellow lines and unconformable contacts as red lines. Conodont biozones recovered are shown to the right of the stratigraphic section.

Bachelor Formation

The Bachelor Formation is gray, brittle, quartz-rich shale that overlies the dark gray to black, fissile, Devonian Woodford Shale. Because both shales weather relatively quickly, the contact is very subtle and must be exposed by digging (Fig. 4.5b). The total thickness of the Bachelor Formation is approximately 7.6 cm (3.0 in).



Figure 4.5b. The Bachelor Formation in contact with subjacent Woodford Shale and overlying Compton Formation. Contacts are identified by yellow lines. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Compton Formation

The Compton Formation at Kansas, Oklahoma is predominantly a light gray, mud-supported limestone with varying percentages of bioclasts across the unit. The unit contains massive, blocky beds that are not easily distinguished unless closely examined. Sparse peloids occur at the base and top of the formation. The primary skeletal components of the Compton Formation are fenestrate bryozoans, echinoderms, and

ostracodes; other grains include disarticulate brachiopods. The Compton Formation is subdivided into 9 beds separated by subtle bed breaks. The total thickness of the unit is about 1.8 m (~ 6.0 ft.) with beds ranging in thickness from 5.1 cm (2 in) to 36.8 cm (14.5 in) (Fig. 4.5c). The Compton Formation contains the entire *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.5a).



Figure 4.5c. The Compton Formation at Kansas, Oklahoma has 9 bed divisions. The Compton Formation forms a prominent ledge above the Bachelor Formation and is succeeded by the slope forming Northview Formation (yellow lines). A 12.7 cm (5.0 in) tall field notebook (white circle) is shown for scale.

Petrographic Analysis:

The lower 2 beds of the Compton Formation are sparse skeletal wackestones with minor peloids, evidence that it represents a shallow water, restricted environment. The Compton Formation is skeletal wackestone-packstone for beds C3-6 and becomes muddier as bed C7 is a silty skeletal wackestone. The limestone becomes grainier and is skeletal wackestone-packstone for bed C8. Mud increases as bed C9 is a skeletal

wackestone at the top of the Compton Formation. The dominant texture observed in the Compton Formation at Kansas is skeletal wackestone-packstone.

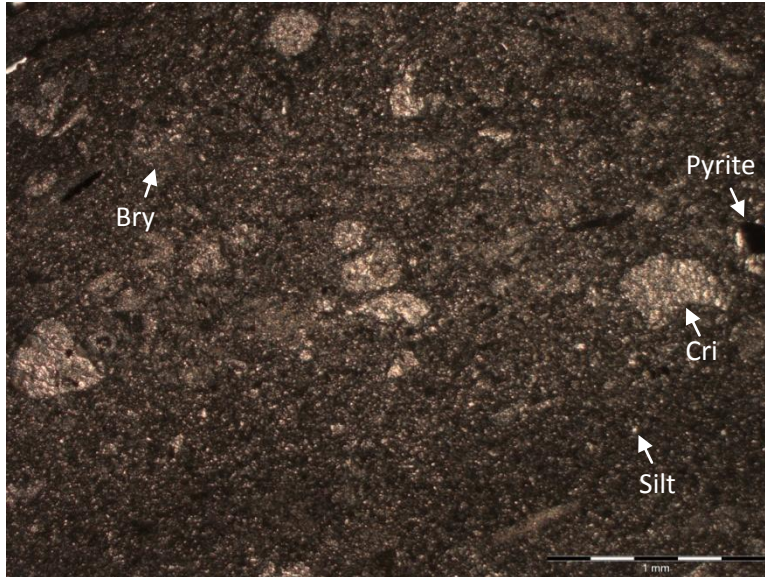


Figure 4.5d. Photomicrograph of Compton bed C1, a silty sparse skeletal wackestone containing crinoids (Cri), bryozoans (Bry), quartz silt, and traces of pyrite concretions. Crinoids represent ~ 10%, bryozoans ~ 5%, and fine quartz silt < 5% of this bed. This acetate peel is representative of bed C1 at the Kansas section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

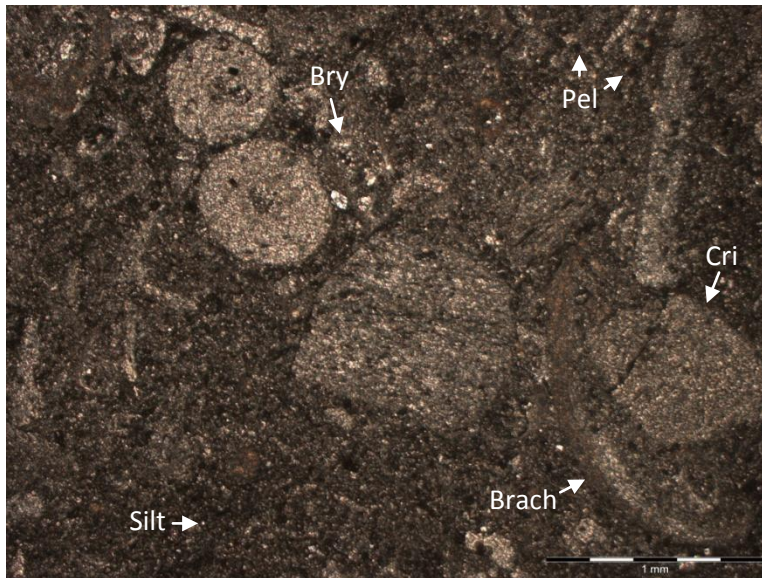


Figure 4.5e. Photomicrograph of Compton bed C4, a skeletal wackestone-packstone containing crinoids (Cri), bryozoans (Bry), brachiopods (Brach), quartz silt, and peloids (Pel). Crinoids are estimated to be ~ 30%, bryozoans ~ 10%, brachiopods < 5%, and quartz silt < 5% of this bed. Peloids occur in trace amounts. This acetate peel is representative of bed C4 at the Kansas section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

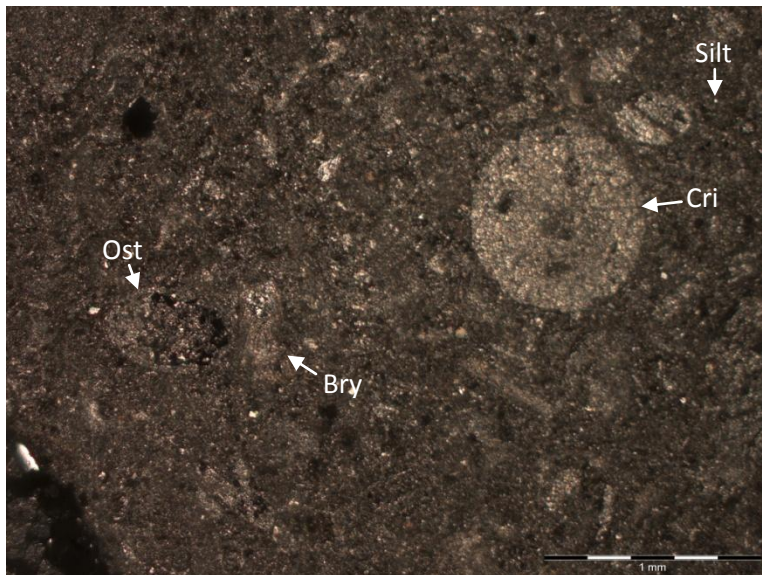


Figure 4.5f. Photomicrograph of bed C9, a skeletal wackestone with trace amounts of quartz silt. Intraparticle micrite is common in some of the skeletal grains. Primary fossils include crinoids (Cri), bryozoans (Bry), and ostracodes (Ost). Crinoids represent < 10%, bryozoans ~ 5%, and ostracodes < 5% of the total rock. This acetate peel is representative of bed C9 at the Kansas section. Image taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Northview Formation

The Northview Formation at Kansas varies in lithology and contains calcareous shale, shaly limestone, and silty limestone. The Northview Formation is dominated by light-gray, shale laminae that alternates with silty skeletal limestones. The top of the Northview Formation contains silty mudstone before its transitional contact with the Pierson. Here, the Northview Formation is thicker than at any of the other localities in the study area. It reaches nearly 2.1 m (~6.9 ft.) in total thickness and is subdivided into 13 beds with a wide range in thickness (Figure 4.5d). Individual bed thicknesses range from less than 3.8 cm (1.5 in) to 66 cm (26 in). The more common grain components are fenestrate bryozoans, echinoderms, disarticulate brachiopods, and quartz silt.



Figure 4.5g. Northview Formation at Kansas, Oklahoma with 13 bed divisions. Limestone beds increase and thicken toward the upper contact with the Pierson Formation. Yellow lines separate the underlying Compton Formation and overlying Pierson Formation. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The lowest bed (NV1) is characterized as a thin, 5 cm (2 in), tannish-gray shale that is succeeded by a 4 inch thick silty mudstone bed (NV2). This pattern is similar for beds NV3 and NV4 except NV4 is skeletal wackestone with peloids (~ 5-10%). Mud increases and NV5 is calcareous shale followed by silty sparse skeletal wackestone for NV6. Above the next thin calcareous shale (NV7) the carbonate texture is a skeletal wackestone with peloids (~ 5%) for beds NV8 and NV10. The top limestone in the Northview section is quartz silt-rich wackestone with sparse skeletal grains (NV12). The generalized overall texture of the Northview Formation is silty, peloidal, skeletal wackestone that is interbedded with gray-green calcareous shale.

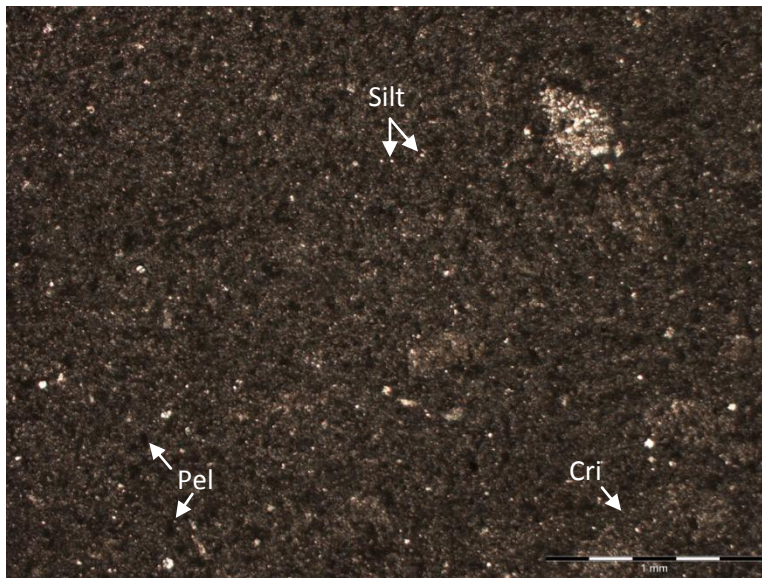


Figure 4.5h. Photomicrograph of Northview bed NV2, silty mudstone that contains quartz silt, peloids (Pel), and crinoids (Cri). Silt represents ~ 5%, peloids ~ 5%, and crinoids < 5% of the total rock. This acetate peel is representative of bed NV1 at the Kansas section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

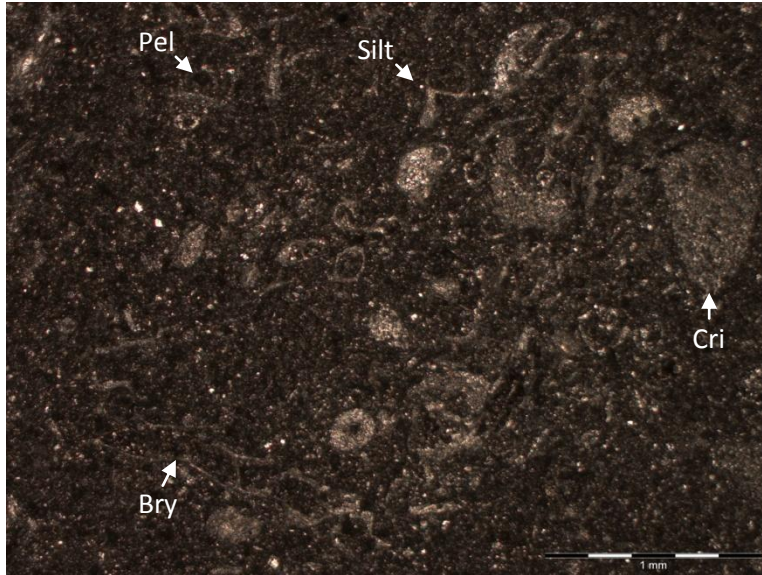


Figure 4.5i. Photomicrograph of Northview bed NV8, a skeletal wackestone containing quartz silt and peloids. The dominant skeletal grains include bryozoans (Bry) and crinoids (Cri) with trace amounts of ostracodes (Ost). Bryozoans are estimated to be ~ 15%, crinoids ~ 10%, and ostracodes < 5% of the total rock. Silt represents ~ 5% and peloids < 5% of this bed. This is the primary limestone texture of the Northview Formation at Kansas. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

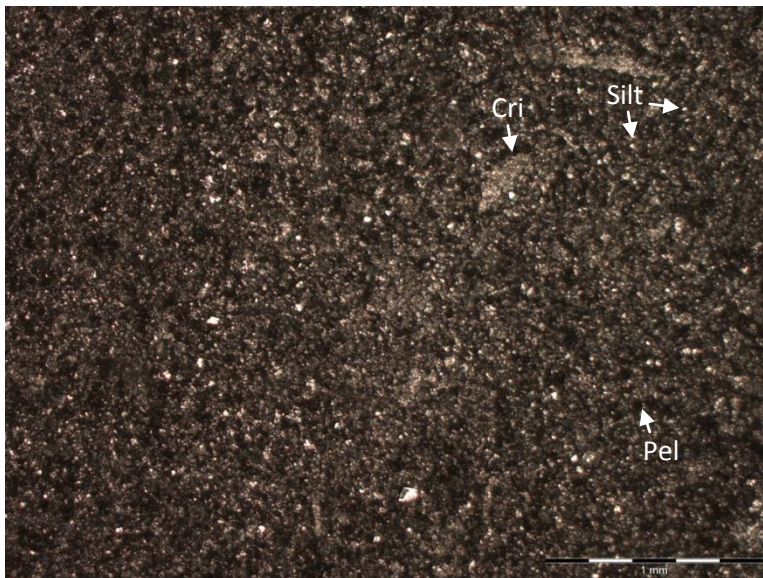


Figure 4.5j. Photomicrograph of Northview bed NV12, a silty wackestone with abundant quartz silt grains (~ 30%). Rare skeletal grains include bryozoans (Bry) and crinoids (Cri). Crinoids and bryozoans represent ~ 5% of this bed. Peloids are also present (~ 5%). This acetate peel is representative of bed NV12 at the Kansas section. Image taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Pierson Formation

The Pierson Formation at Kansas, Oklahoma (Fig. 4.5k) is subdivided into 5 beds that are mostly mud-supported limestones. The Pierson Formation is approximately 1.1 m (~ 3.5 ft) thick. This unit contains the *P. communis-carina* through the Upper *P. multistriatus* conodont biozones with no significant increase in conodonts recovered within each bed sample. Missing biozones from *S. anchoralis* to *G. bulbosus* indicates significant erosion occurred prior to Reeds Spring deposition. The entire Pierson Formation is chert-free and contains numerous circular, green-brown pisoids in the uppermost bed (P5) (Fig. k). These carbonate pisoids are approximately 2-8 mm in diameter and their origin is uncertain. Based on recent studies of ancient carbonate pisoids by Flugel (2010), such pisoids were likely formed in a marginal marine to shallow subtidal marine environment, primarily by chemical and biochemical precipitation. More in-depth analysis of these carbonate pisoids are needed for environmental implications.

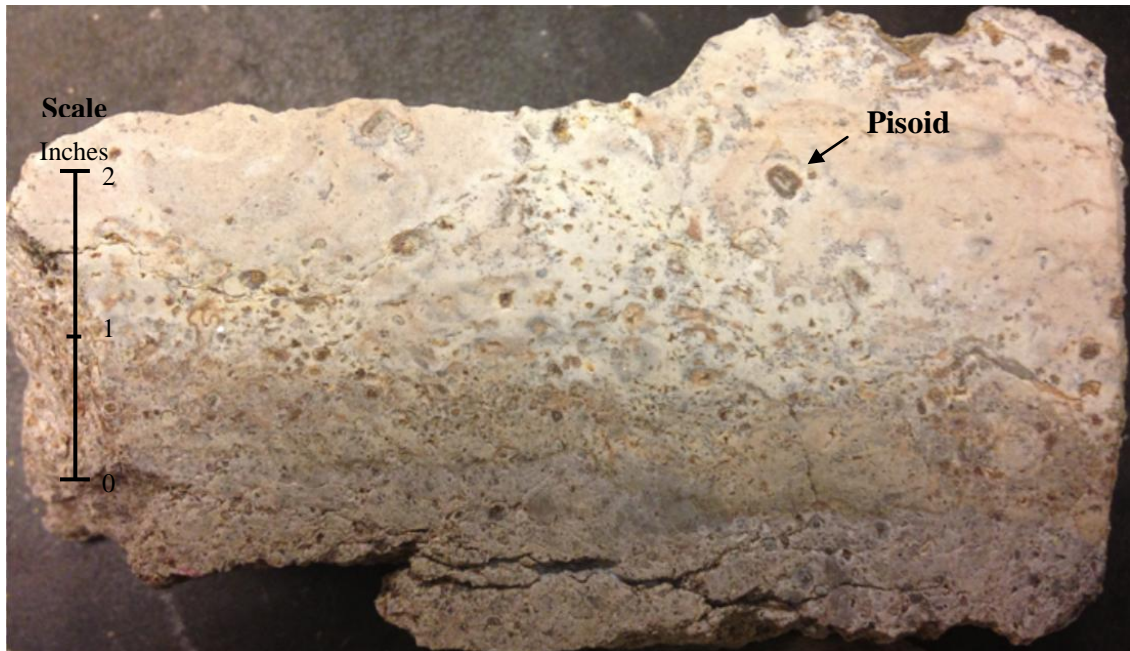


Figure 4.5k. Carbonate pisoids in the uppermost bed (P5) of the Pierson Formation, immediately below the contact with the overlying Reeds Spring Formation, exposed at Kansas, Oklahoma.



Figure 4.5l. The upper part of the Northview Formation, Pierson Formation, and lower part of the Reeds Spring Formation. The entire Pierson Formation at Kansas is 1.1 m (3.5 ft) thick. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Petrographic Analysis:

The base of the Pierson Formation at Kansas is sparse skeletal wackestone with peloids (P1). The following bed (P2) becomes grainier with skeletal wackestone-packstone and back into a sparsely skeletal wackestone for bed P3. Bed P4 is a higher energy skeletal wackestone. The top of the Pierson Formation contains a mudstone-sparse skeletal wackestone with carbonate pisoids (P5), representative of a low-energy depositional environment. The overall texture of the Pierson Formation at Kansas is skeletal wackestone, but the pisoid-bearing limestone is critical to interpreting the depositional history of the St. Joe Group.

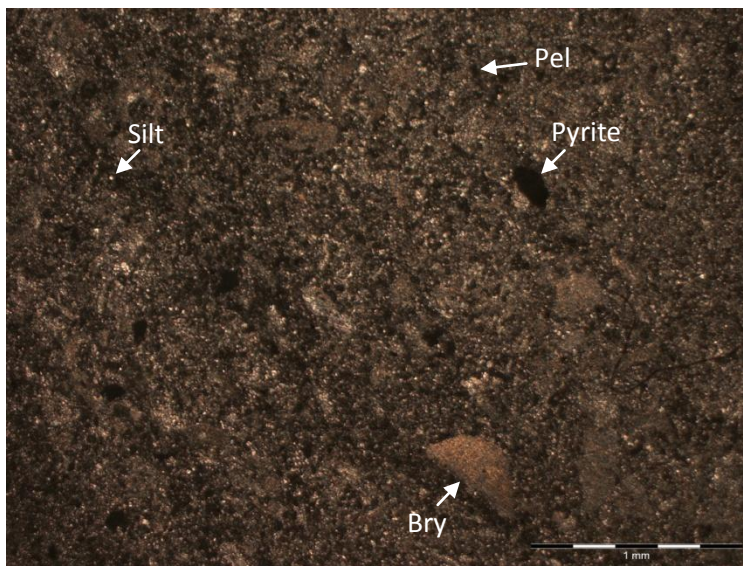


Figure 4.5m. Photomicrograph of Pierson bed P1, a skeletal wackestone with sparse peloids. Skeletal grains include bryozoans (Bry) and rare crinoids (Cri). Bryozoans are estimated to be ~ 20% and crinoids < 5% of the total rock. Quartz silt and peloids represent ~ 5-10% of this bed. Pyrite occurs in trace amounts. This texture is representative of the Pierson Formation at Kansas. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

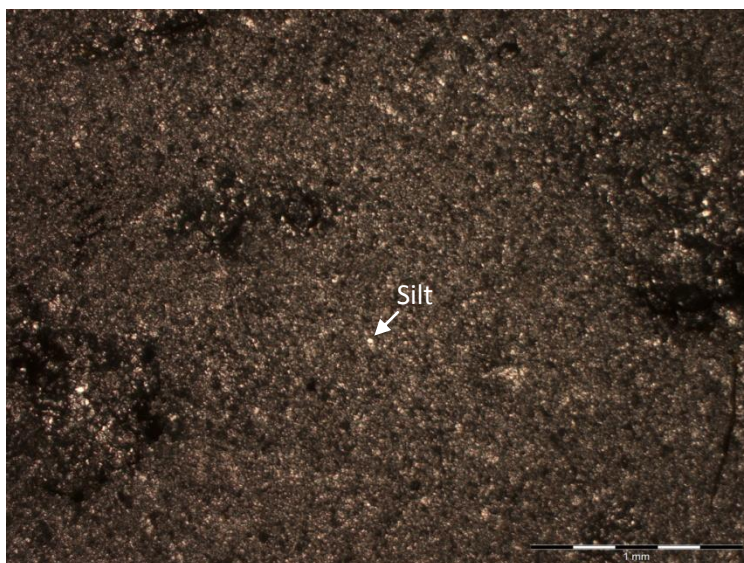


Figure 4.5n. Photomicrograph of Pierson bed P5, a mudstone-sparse skeletal wackestone. Rare fossils include ostracodes and crinoids. This image shows a mud rich area with minor quartz silt (~ 5%). Ostracodes and crinoids are estimated to be < 5% combined of the total rock. This acetate peel is representative of bed P5 at the Kansas section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Reeds Spring Formation

The Reeds Spring Formation (Fig. 4.5k) is tannish-gray, highly irregular, thin bedded limestone with alternating beds of limestone and chert. The chert is typically gray-blue in color and occurs as irregular beds and nodules. The Reeds Spring Formation exposed is nearly 4.3 m (~14 ft.) thick, but only the lower 10 beds are illustrated in the stratigraphic section (Figure 4.5a). The lower 2 beds were sampled to compare textures across the Pierson and Reeds Spring formations, while the lowest bed (RS1) was used for petrographic analysis. Bed RS1 is a 6.4 cm (2.5 in) bed of finely crystalline, gray-brown limestone with minor chert.

Petrographic Analysis:

Though bed thickness measurements were taken to the top of the exposed Reeds Spring Formation, only the basal bed (RS1) was sampled for petrographic analysis. Two

acetate peels were made to compare the textures across the boundary between the Pierson and Reeds Spring formations. Bed RS1 is dominantly mudstone-sparse skeletal wackestone (Fig. 4.5n). Rare skeletal grains include disarticulate brachiopods, fenestrate bryozoans, and echinoderms.

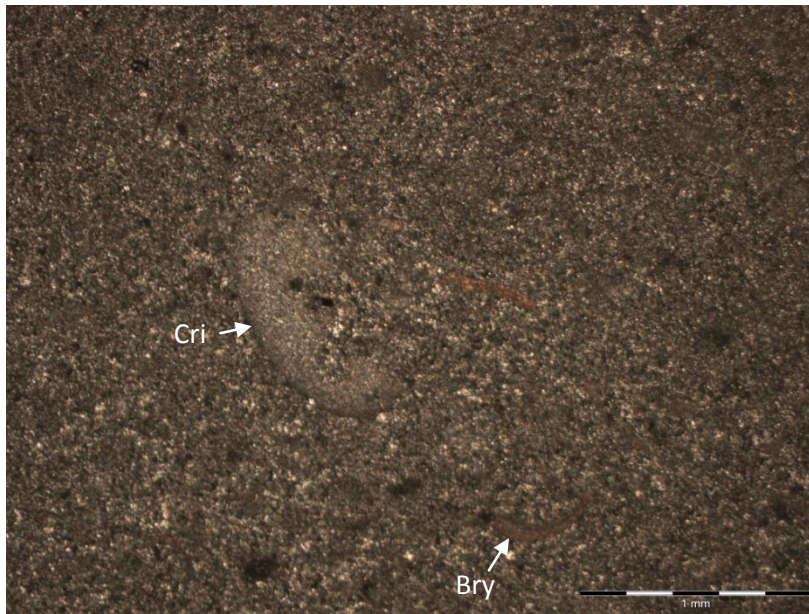


Figure 4.5o. Photomicrograph of Reeds Spring bed RS1, a mudstone-sparse skeletal wackestone. Fossils include bryozoans (Bry), crinoids (Cri), and brachiopods (Brach). Skeletal grains are estimated to be $< 5\%$ of the total rock. This acetate peel is representative of bed RS1 at the Kansas section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Baron Fork, Oklahoma:

The St. Joe Group is exposed along U.S. Hwy 59 South in northeastern Oklahoma, as it continues to thin off the southwestern flanks of the Ozark Uplift. The Baron Fork section is located at approximately 35° 54' 57.44" N Latitude, 94° 35' 49.71" W Longitude. It is 8.82 km (5.51 mi) southwest of Westville, in Adair County, Oklahoma. This section was chosen as it represents the thinnest section of the St. Joe Group rocks in this study, with a total thickness of 0.9 m (~2.9 ft.). Both stratigraphic and petrographic analysis was performed for each formation. A stratigraphic section for Baron Fork is shown in Figure 4.6a to represent the section.

Baron Fork, OK

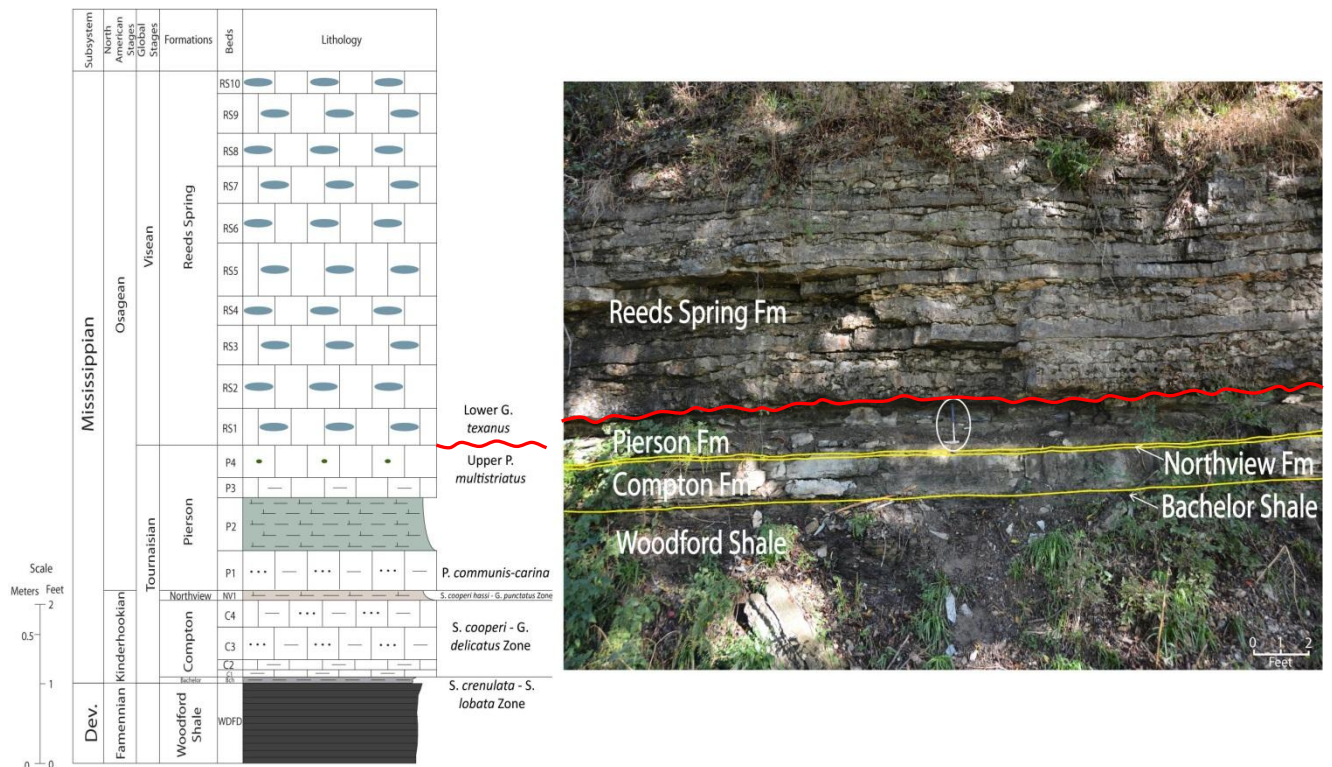


Figure 4.6a. Stratigraphic section showing the upper Woodford Shale, Bachelor Formation, St. Joe Group, and lower part of the Reeds Spring Formation exposed at Baron Fork, Oklahoma. Conformable formation contacts marked by yellow lines, while an unconformity contact is marked by a red line in the outcrop photograph. The rock hammer (white circle) shown for scale is ~ 40.6 cm (16.0 in) long.

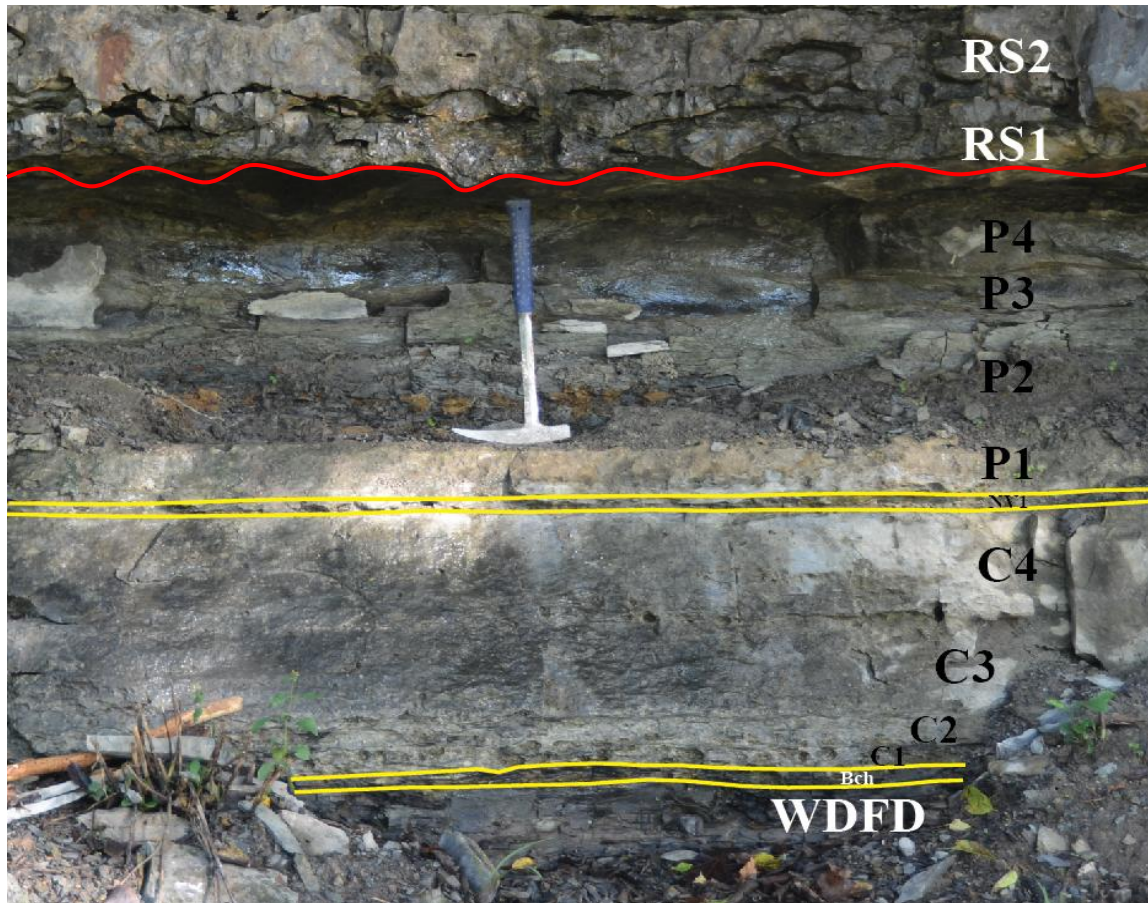


Figure 4.6b. Upper Woodford Shale (WDFD), Bachelor Formation (Bch), St. Joe Group and lower part of the Reeds Spring Formation with bed divisions. The more easily weathered Pierson Formation forms a recess below the cherty Reeds Spring Formation. Conformable formation contacts marked by yellow lines and an unconformity contact above the Pierson Formation marked by a red line. The rock hammer shown for scale is ~ 40.6 cm (16.0 in) long.

Bachelor Formation

The Bachelor Formation (Fig. 4.6b) is a brownish-gray shale unit that is less resistant than the underlying dark gray to black, fissile, Devonian Woodford Shale. It is difficult to distinguish the Bachelor Formation from the Woodford Shale at Baron Fork, as the Bachelor is very thin and dark colored. The total thickness of the Bachelor Formation is approximately 2.5 cm (1.0 in).

Compton Formation

The Compton Formation at Baron Fork is predominantly a grayish-tan, finely crystalline, mud-supported limestone with thin wavy bedding (Fig. 4.6b). Here, the Compton Formation is less fossiliferous than at previously described sections. The primary skeletal components identified are echinoderms, with varying amounts of fenestrate bryozoans and disarticulate brachiopods. Silt-size quartz occurs in each bed (< 5-10%). Sparse peloids (< 5%) occur only at the top of the formation. The Pierson Formation is subdivided into 4 beds that are separated by thin, brown shale partings. There are 2 discontinuous limestone beds at the base of the Compton Formation with brown shale partings ~ 0.6 cm (0.3 in), separating the beds. The total thickness of the Compton Formation is about 0.3 m (~11.5 in) with beds ranging in thickness from 2.5 cm (1 in) to 11.3 cm (4.5 in). Beds toward the base of the unit are shaly, whereas silty limestones occur toward the top. The Compton Formation contains the entire *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.6a).

Petrographic Analysis:

The Compton Formation at Baron Fork was subdivided into 4 beds, but the lowest bed (C1) was too poorly indurated for acetate peels. Therefore, the lowest bed used for petrographic analysis was bed C2. This bed is characterized as a mudstone with sparse crinoid and brachiopod fragments and < 5% quartz silt, and could represent shallow water deposition with siliciclastic input. Bed C3 is silty, sparsely skeletal wackestone with mostly crinoid and bryozoan bioclasts. The top of the Compton Formation is marked by a peloidal, crinoidal skeletal wackestone-packstone (C4).

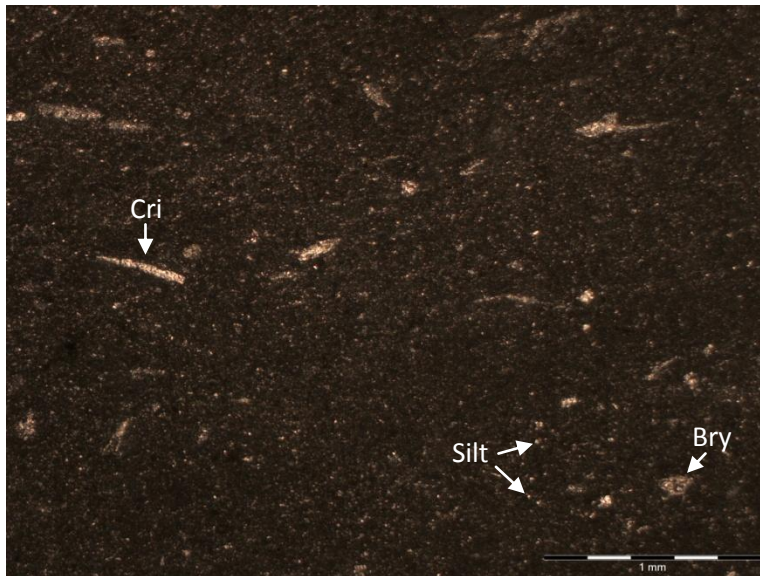


Figure 4.6c. Photomicrograph of Compton bed C2, a mudstone with sparse skeletal fragments including crinoids (Cri) and bryozoans (Bry). This bed contains minor amounts of fine-quartz silt (< 5%). Crinoids and bryozoans represent ~ 5% of the total rock. This acetate peel is representative of bed C2 at the Baron Fork section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner

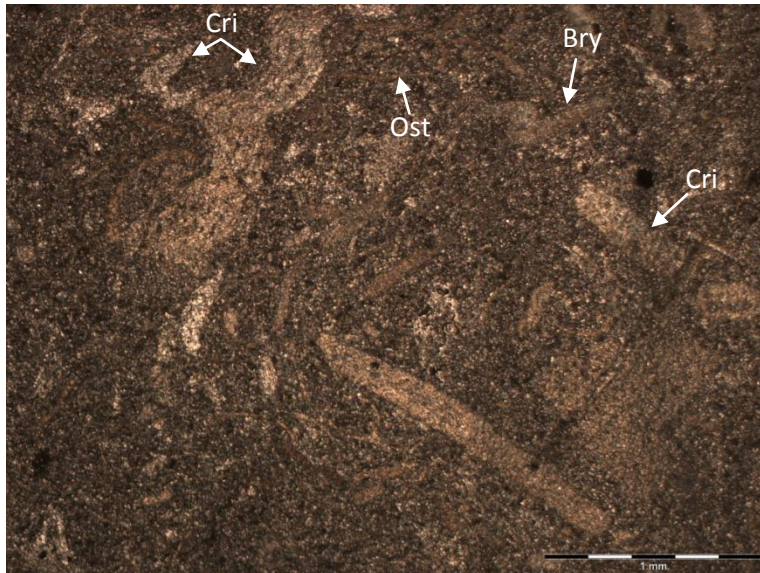


Figure 4.6d. Photomicrograph of Compton bed C4, a skeletal wackestone-packstone. Skeletal grains are crinoids (Cri), bryozoans (Bry) and sparse ostracodes (Ost). Crinoids are estimated to be ~ 25%, bryozoans ~ 10%, and ostracodes < 5% of the total rock. This acetate peel is representative of bed C4 at Baron Fork. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner

Northview Formation

The Northview Formation at Baron Fork is tan calcareous shale and silty limestone that is only 3.8 cm (~ 1.5 in) thick. Because the Northview Formation was poorly indurated, the unit was not sampled for petrographic analysis. This formation is shown in Figure 4.6b.

Pierson Formation

The Pierson Formation at Baron Fork is tannish-gray, silty, sparsely fossiliferous limestone and calcareous shale. The unit contains mud-supported, silty limestone at the base, transitions into a poorly resistant calcareous shale in the middle, and becomes a finely crystalline limestone at the top. The total thickness of the formation is nearly 0.6 m (~ 1.8 ft.) and it was divided into 4 beds (Figure 4.6b). The thickness of individual beds range from 7.6 cm (3.0 in) to 20.3 cm (8.0 in). The Pierson Formation is poorly indurated and is clearly seen in Figure 4.5a, as the majority of the unit is eroded to form an abrupt contact with the overlying resistant Reeds Spring cherty limestone. The uppermost limestone bed (P5) of the Pierson Formation contains green shale wisps, green-blue carbonate pisoids, and sparse gray chert nodules. The Pierson Formation contains the P. *communis-carina* through the Upper P. *multistriatus* conodont biozones with no significant increase in conodonts recovered within each bed sampled (Fig. 4.6a). Missing biozones from S. *anchoralis* to G. *bulbosus* indicates significant erosion occurred prior to Reeds Spring deposition.

Petrographic Analysis:

Though the Pierson Formation is not as fossiliferous at Baron Fork as it is at previously described sections, it is still composed of sparse crinoids, bryozoans, brachiopods, and minor ostracode fragments. The base of the Pierson (P1) is marked by a 12.5 cm (~5.0 in) silty, sparsely skeletal wackestone-mudstone. Bed P1 has an abrupt boundary with the above lying brittle, weakly indurated shaly P2. This shale coarsens upward to silty mudstone (P3). The uppermost Pierson Formation bed (P4) is finely crystalline, mudstone with minor silt, sparse crinoid and bryozoan fragments, and carbonate pisoids. The top of this bed contains greenish-brown shale partings before the abrupt contact with the overlying Reeds Spring Formation.

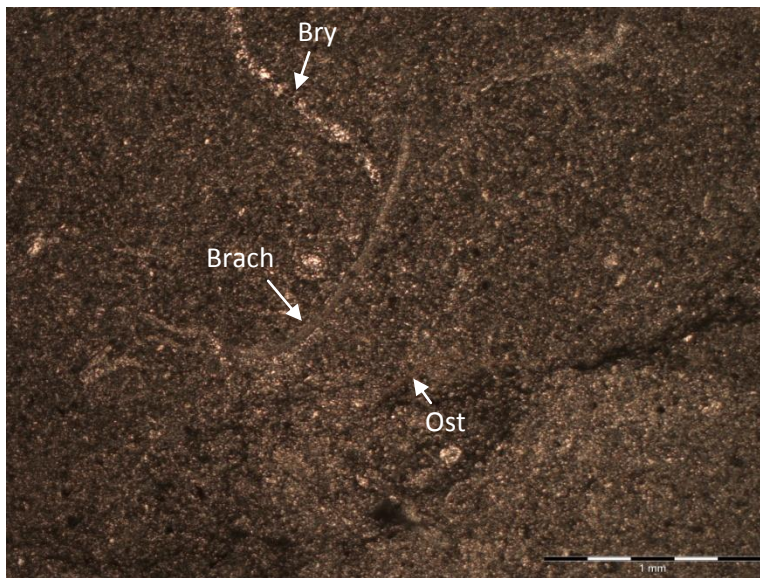


Figure 4.6e. Photomicrograph of Pierson bed P1, a sparse skeletal wackestone-mudstone. Bioclasts include brachiopods (Brach), bryozoans (Bry), and ostracodes (Ost). Collectively, bioclasts are estimated to be < 10% of the total rock. This acetate peel is representative of bed P1 at Baron Fork. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

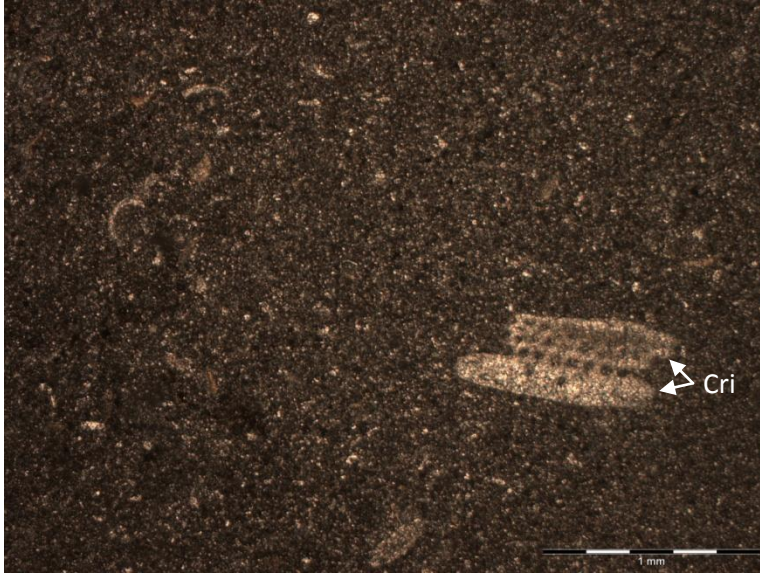


Figure 4.6f. Photomicrograph of Pierson bed P4, a mudstone with scarce skeletal grains, including crinoids (Cri) and ostracodes (Ost). Crinoids and ostracodes represent ~ 5% of the total rock. This acetate peel is representative of bed P4 at Baron Fork. Image taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Reeds Spring Formation

At Baron Fork, the base of the Reeds Spring Formation forms a ledge of resistive, nodular chert-bearing limestone just above the recessed Pierson Formation. The Reeds Spring Formation alternates between thin beds of blocky, light gray-tan limestone and irregular bluish-gray chert. The total thickness of the Reeds Spring Formation is 2.4 m (~ 8.0 ft), though only the lower 10 beds are illustrated in Figure 4.6a. The lower 2 beds were sampled to illustrate changes in composition and texture across the contact between the Pierson and Reeds Spring formations, while the lowest bed (RS1) was sampled for petrographic analysis.

Petrographic Analysis:

Though bed thickness measurements were taken to the top of the Reeds Spring outcrop, only the basal bed (RS1) was sampled for petrographic analysis. Bed RS1 is

dominantly a mudstone with sparse crinoids and chert. Rare skeletal grains include fenestrate bryozoans and echinoderms.



Figure 4.6g. Photomicrograph of Reeds Spring bed RS1, a mudstone with scarce crinoids. Crinoids are estimated to be $< 5\%$ of this bed. This acetate peel is representative of bed RS1 at Baron Fork. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Tahlequah (North), Oklahoma:

St. Joe Group rocks form prominent outcrops along the Illinois River north of Tahlequah, Oklahoma. The Tahlequah (North) outcrop is along the east side of Hwy 10, ~ 7.7 km (4.77 mi) from Tahlequah, in Cherokee County, Oklahoma. This outcrop is located at approximately 35° 57' 49.07" N Latitude, 94° 54' 32.07" W Longitude. The Tahlequah (North) outcrop was selected for detailed petrographic and stratigraphic analysis, as it contains the entire St. Joe Group. The total thickness of the St. Joe Group at this locality is about 0.9 m (~ 3.1 ft.). A stratigraphic section of the Tahlequah (North) outcrop and associated conodont biozones recovered in this section are shown in Figure 4.7a.

Tahlequah, OK

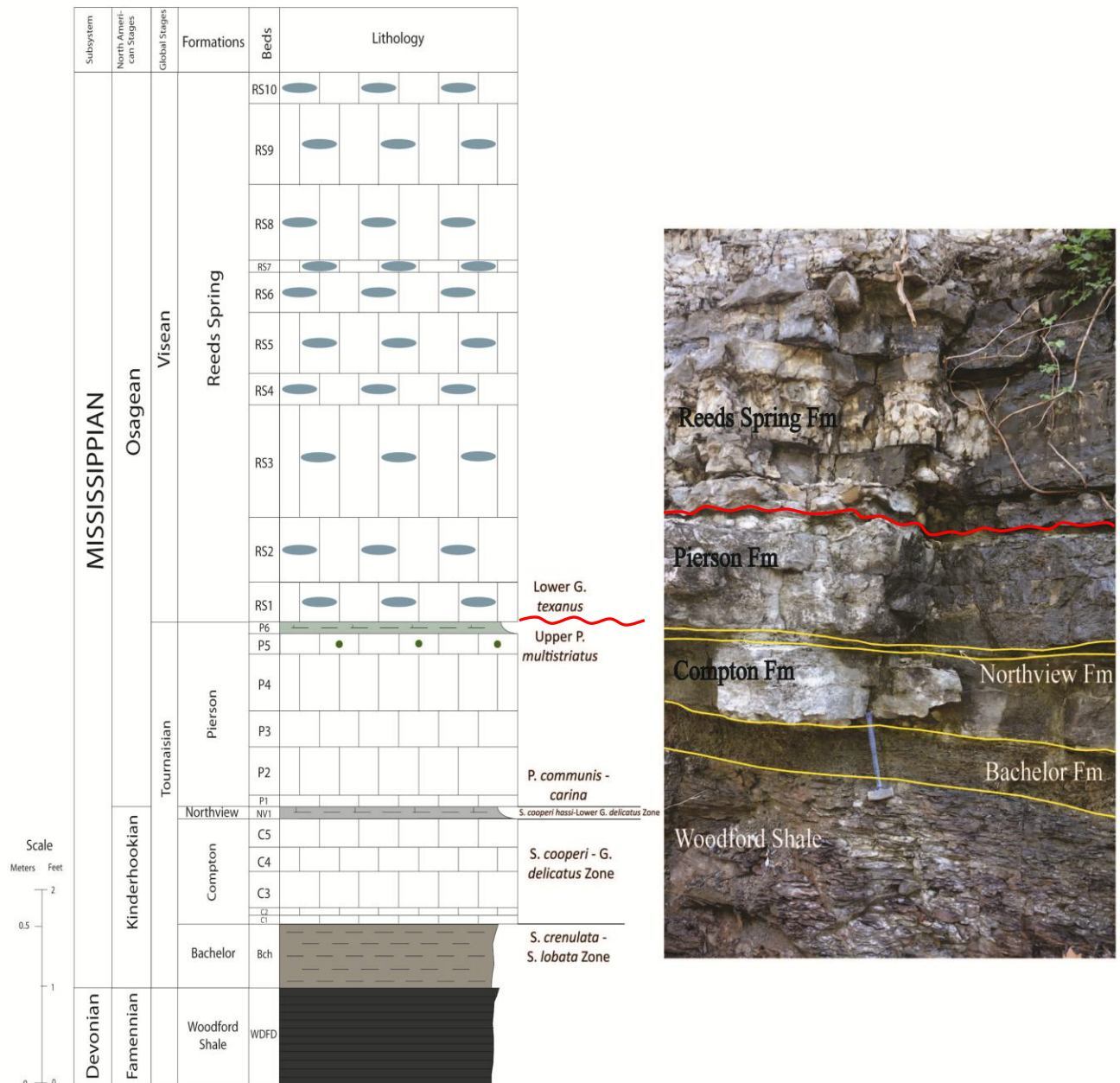


Figure 4.7a. Stratigraphic section of the upper Woodford Shale, Bachelor Formation, St. Joe Group and lower part of the Reeds Spring Formation exposed at Tahlequah (North), Oklahoma. Positions of conformable formation contacts are shown by yellow lines, whereas an unconformable contact above the Pierson Formation is marked by a red line. Conodont biozones recovered are shown to the right of the stratigraphic section. The crackhammer shown for scale is ~ 40.6 cm (16.0 in) long.

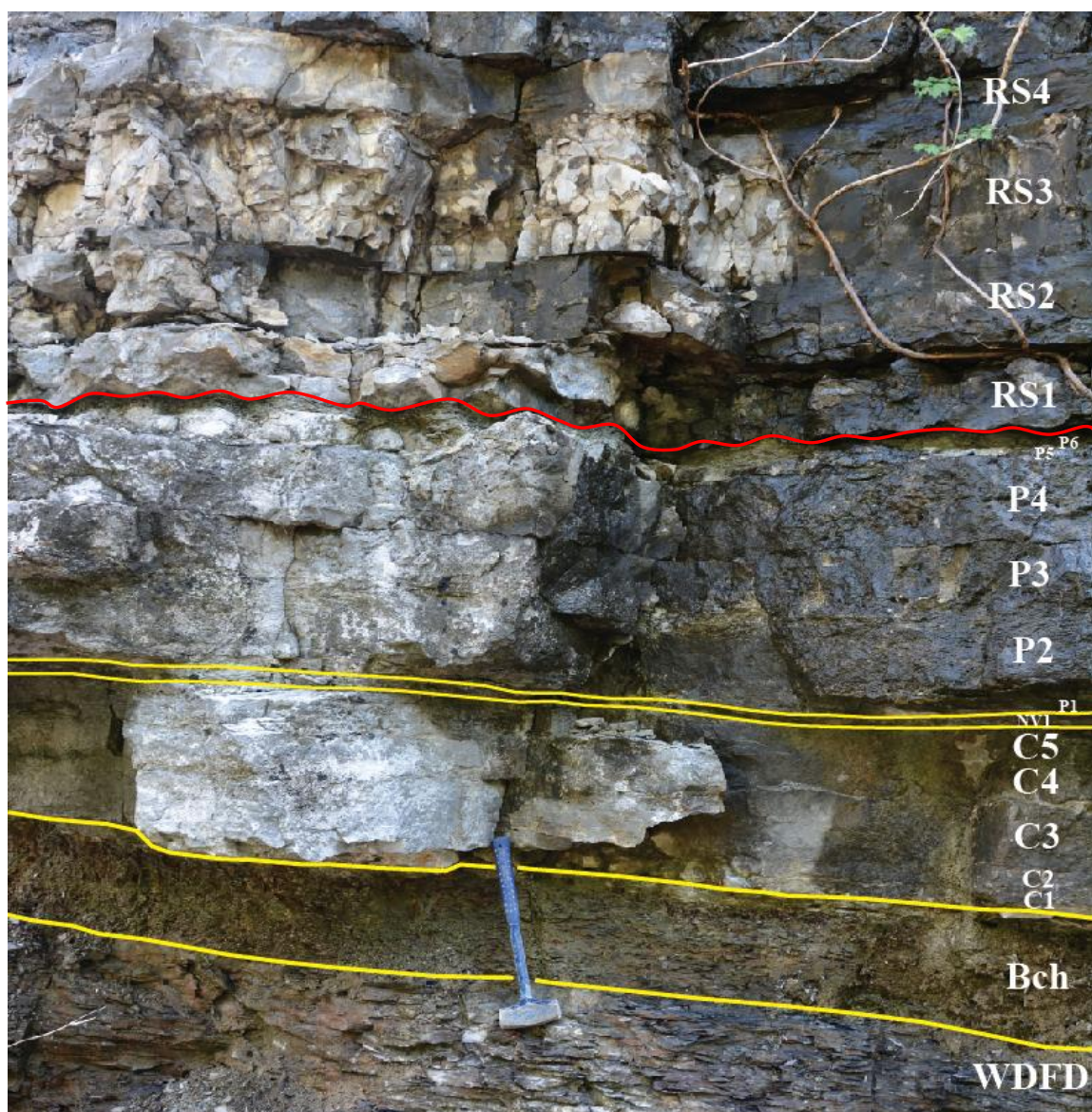


Figure 4.7b. Close-up photographic of the Woodford Shale (WDFD), Bachelor Formation (Bch), St. Joe Group, and lower part of the Reeds Spring Formation with bed divisions. The crackhammer shown for scale is ~ 40.6 cm (16.0 in) long.

Bachelor Formation

The Bachelor Formation is clayey brownish green shale, which distinguish it from the underlying dark gray to black Devonian Woodford Shale. The shale unit is thicker here than at any other locality in this study as it reaches nearly 20.0 cm (8.0 in) in

thickness and is much less resistant than the Woodford Shale (Fig. 4.7b). This slightly calcareous shale unit contains up to 50% quartz silt.

Compton Formation

The Compton Formation is thinly bedded, light gray, fine-grained skeletal wackestone. Peloids and quartz silt occur throughout the formation. The main skeletal grain components are echinoderms and bryozoans. The Compton Formation is about 0.3 m (~ 1.1 ft.) thick and divided into 5 beds that range from 2.5 cm (1.0 in) to 11.3 cm (4.5 in) in thickness. The Compton Formation contains the entire *S. cooperi* - *G. delicatus* conodont biozone, with no signs of unconformable surfaces (Fig. 4.7a). This unit forms a prominent ledge immediately above the Bachelor Formation that is shown in Figure 4.7b.

Petrographic Analysis:

The lowermost transitional bed (C1) in the Compton Formation is weakly indurated limestone that was too thin for petrographic analysis. The overlying bed (C2) is silty sparse skeletal wackestone with ~ 5% peloids at the base (Fig. 4.7c). This bed is succeeded by skeletal wackestone in bed C3, which in turn is overlain by mudstone-sparse skeletal wackestone in bed C4. Bed C5 is a skeletal wackestone containing ~ 5% peloids. At Tahlequah (North), the primary texture of the Compton Formation is a silty skeletal wackestone.

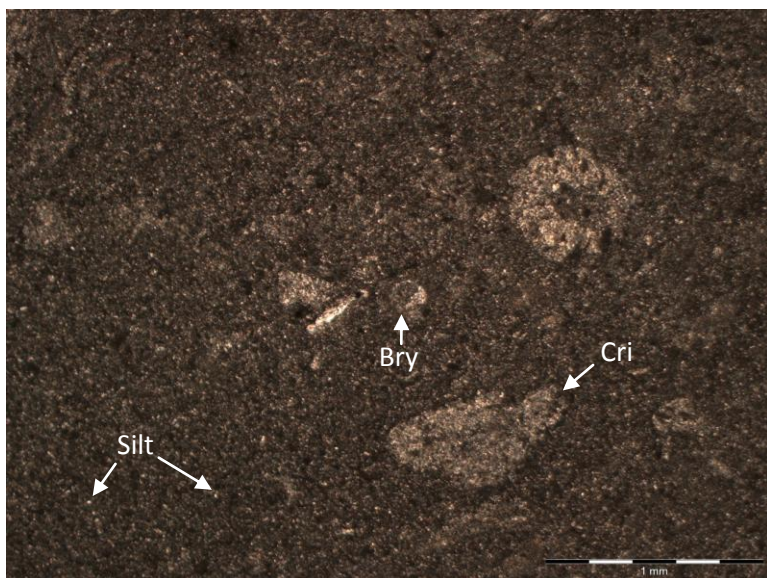


Figure 4.7c. Photomicrograph of Compton bed C2, a silty sparse skeletal wackestone that contains fine-quartz silt. Skeletal grains include crinoids (Cri) and bryozoans (Bry). Crinoids are estimated to be ~ 5% and bryozoans < 5% of the total rock. This bed represents the primary texture of the Compton Formation at the Tahlequah (North) section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Northview Formation

The Northview Formation at Tahlequah (North) (Fig. 4.7b) is represented by a single bed of light gray, calcareous, silty shale. This one bed is approximately 3.8 cm (~1.5 in) thick and changes lithology laterally across the outcrop from calcareous shale to silty limestone. Due to its crumbly nature, petrographic analysis on the Northview Formation was not performed.

Pierson Formation

The Pierson Formation at Tahlequah (North) is a light gray skeletal limestone that coarsens upward to bed P4. A single, mud-dominated limestone bed (P5) towards the top of the Pierson Formation contains ~ 10% green carbonate pisoids (Fig. 4.7d) that are up to ~ 1.3 cm (0.5 in) in diameter. The top bed (P6) in the Pierson Formation is a thin, ~ 3.8

cm (1.5 in), greenish-gray calcareous shale. The total thickness of the Pierson Formation is only ~ 0.6 m (1.9 ft) thick, but was divided into 5 beds, all of which are chert-free. The primary skeletal components that make up the Pierson Formation at Tahlequah (North) are echinoderms and fenestrate bryozoans. The Pierson Formation contains the P. *communis-carina* through the Upper P. *multistriatus* conodont biozones with no significant increase in conodonts recovered within each bed sampled (Fig. 4.7a). Missing conodont biozones from *S. anchoralis* to *G. bulbosus* is evident that significant erosion occurred prior to Reeds Spring deposition. This formation is shown in Figure 4.7b.

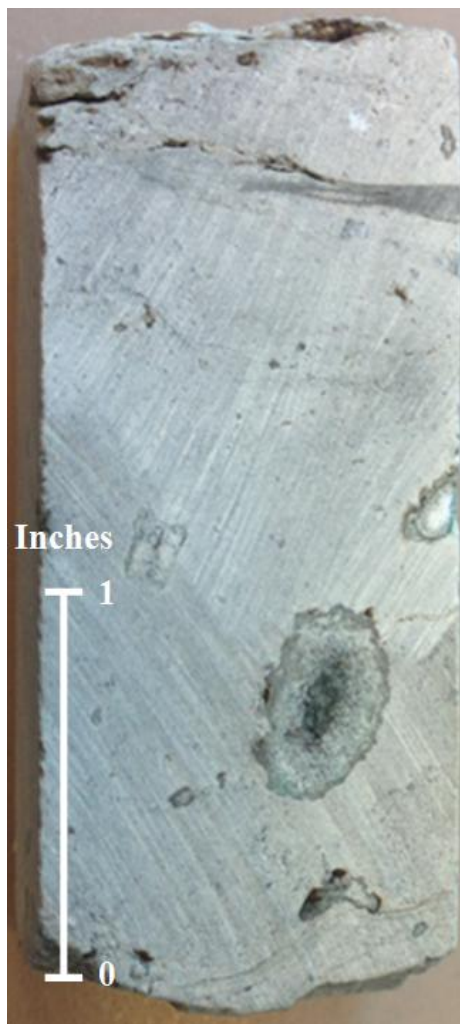


Figure 4.7d. Example of greenish-blue carbonate pisoids identified at the top of the Pierson Formation (bed P5) at Tahlequah (North), Oklahoma.

Petrographic Analysis:

The basal bed of the Pierson Formation (P1) is silty sparse bryozoan wackestone. This bed is overlain by higher energy skeletal wackestone-packstone (P2), which is succeeded by skeletal packstone-wackestone of bed P3. Bed P4 is a high energy skeletal packstone with abundant crinoids, bryozoans, and brachiopod bioclasts. This bed is followed by mudstone-sparse skeletal wackestone (P5) that is overlain by a thin green calcareous shale bed (P6) at the top of the formation.

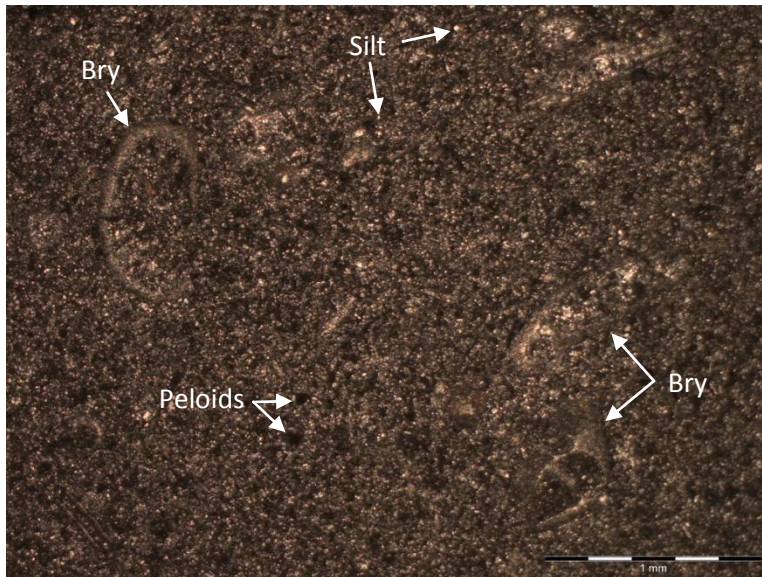


Figure 4.7e. Photomicrograph of Pierson bed P1, a silty sparse bryozoan (Bry) wackestone. Rare bioclasts include ostracodes (Ost) and crinoids (Cri). Bryozoans represent ~ 10%, ostracodes and crinoids < 5% of the total rock. Quartz silt represents ~ 15% of this bed. Peloids (Pel) are estimated to be < 5% of this bed. This acetate peel is representative of bed P1 at the Tahlequah section. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

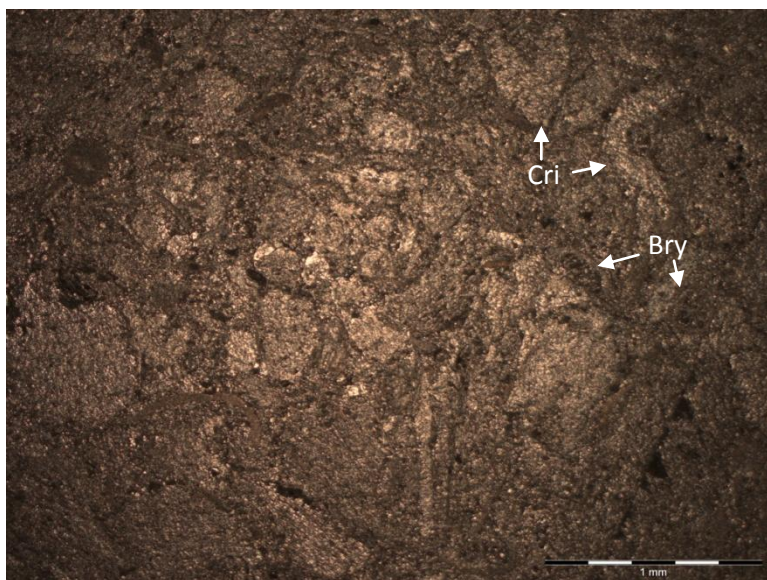


Figure 4.7f. Photomicrograph of Pierson bed P4, a skeletal packstone including abundant crinoids (Cri) and bryozoans (Bry). Crinoids are estimated to be ~ 60% and bryozoans ~ 30% of the total rock. This acetate peel is representative of bed P4 at Tahlequah. Image taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

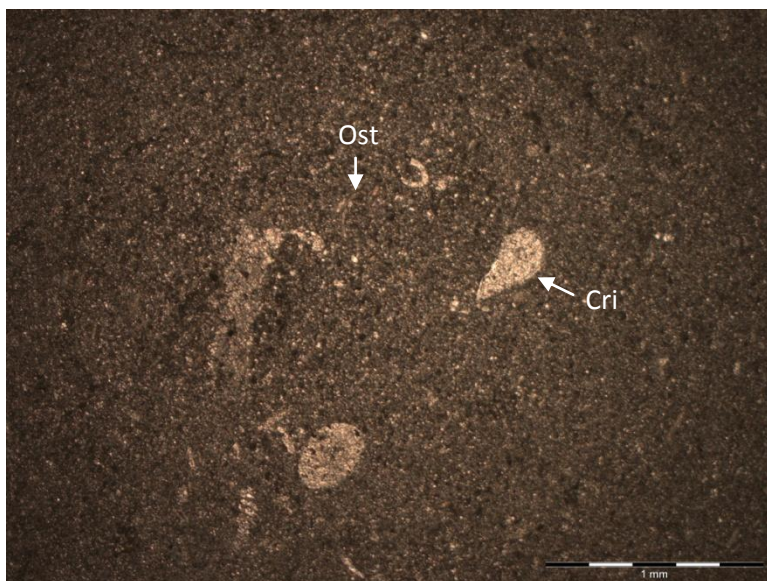


Figure 4.7g. Photomicrograph of Pierson bed P5, a mudstone- sparse skeletal wackestone that contains crinoids (Cri), and rare ostracodes (Ost) and bryozoans (Bry) bioclasts. Crinoids are estimated to be ~ 5% of the total rock. Collectively, ostracodes and bryozoans represent < 5% of this bed. This acetate peel is representative of bed P5 at the Tahlequah. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Reeds Spring Formation

The base of the Reeds Spring Formation at Tahlequah (North) forms a distinctive, tannish-white, nodular chert bed that is different from the underlying Pierson Formation (Fig. 4.7b). The Reeds Spring Formation contains alternating beds of thin, blocky, light gray limestone with oval chert nodules and irregular, tannish-white beds of chert. The lower 10 beds were measured and are illustrated in Figure 4.7a. The lower 2 beds were sampled to show changes in texture and composition between the Pierson and Reeds Spring formations. The lowest bed in the Reeds Spring Formation (RS1) was sampled for petrographic analysis.

Petrographic Analysis:

A photomicrograph of an acetate peel of the lowest bed of the Reeds Spring Formation is shown in Figure 4.7h. Bed RS1 is a 12.5 cm (5.0 in) bed of grayish-tan, mudstone with tan, oval chert nodules. Rare skeletal grains include bryozoan fragments.

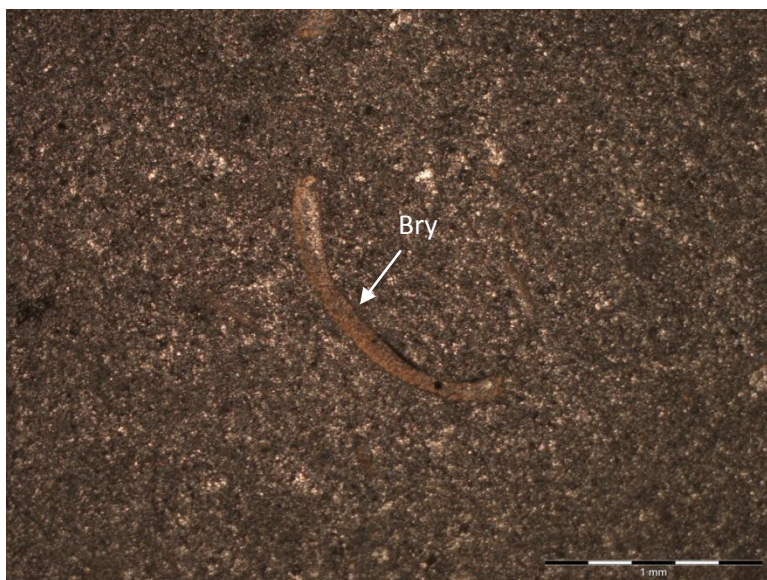


Figure 4.7h. Photomicrograph of Reeds Spring bed RS1, a mudstone including rare bryozoan fragments. Bryozoans are estimated to be $< 5\%$ of the total rock. This acetate peel is representative of bed RS1 at Tahlequah. Photomicrograph taken in plane-polarized light (PPL) and includes a 1 mm long scale bar in the lower right corner.

Discussion

Based on carbonate textures described here and the gradual migration of facies present in the study area, a middle ramp depositional environment is proposed for the St. Joe Group, as part of a distally steepened ramp (Fig. 4.8). A ramp model is favored over a shelf margin into basinal deposits because there is no evidence of a major break in slope, dark colored, pelagic foreslope limestones, or evidence of condensed sedimentation with biotic condensation. These moderate-high energy skeletal wackestones and skeletal packstones are interpreted as being deposited primarily between fair-weather and storm wave base. Nonskeletal grains such as quartz silt and large, > 1.3 cm (0.5 in) carbonate pisoids, are also representative of shallow marine deposits and not of deep shelf margin to basin deposits. The depositional model proposed here is based on Kaufman and Jameson's (2002) distally steepened ramp model applied to Lower Devonian carbonates in northeastern Timan-Pechora Basin, CIS (Fig. 4.8). Other lithofacies that can be found deposited on the middle ramp are shown in Figure 4.8.

Following deposition of the St. Joe Group, erosion of the middle to upper Pierson Formation and the subsequent loss of conodont biozones is likely related to irregular occurrences of syndepositional uplift and shallowing of facies along an east-west trending fore-bulge arch caused by Ouachita tectonism, as described by Mazzullo and others (2013). This tectonism overprinted the sequence stratigraphic framework of the St. Joe Group and is seen to have affected Mississippian rocks elsewhere in the Mid-continent region of the United States by Al-Tawil and others (2003). Further detailed carbonate petrography and conodont biostratigraphy of the St. Joe Group is needed to

establish an accurate paleogeographic map of this region and a Lower Mississippian outcrop map that can be tied with core and geophysical log data.

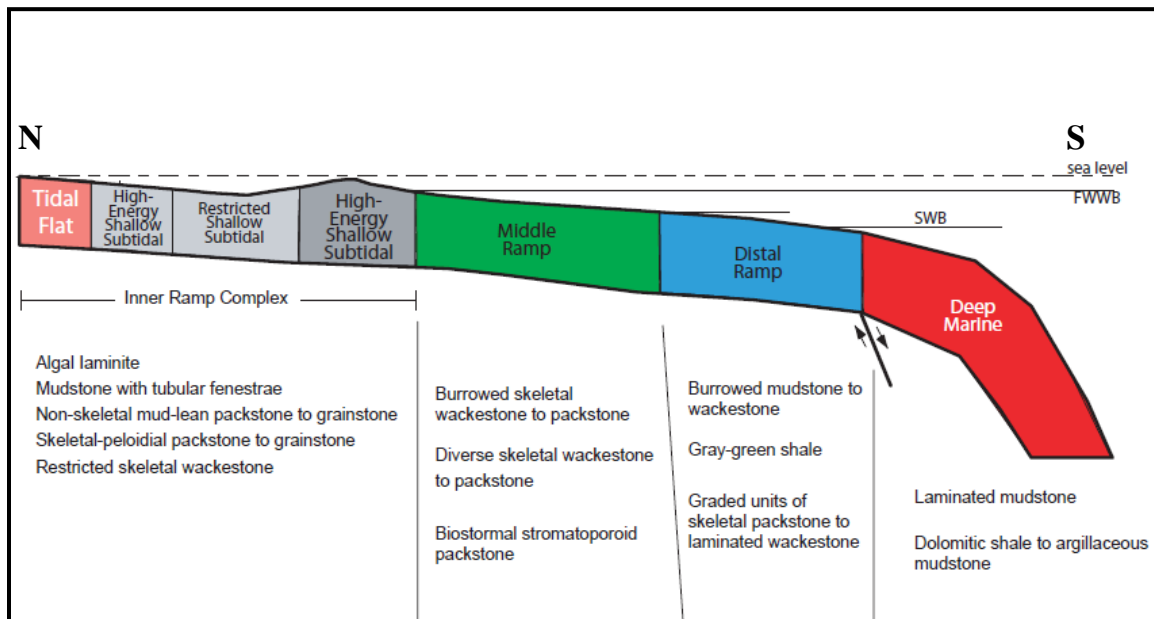


Figure 4.8. Distally steepened ramp model showing ideal environment conditions with associated facies, adapted from Kaufman and Jameson (2002). Petrographic analysis of the St. Joe Group in the study area primarily contain deposits from fair-weather wave base to storm wave base.

CHAPTER V

CONCLUSIONS

As discussed by several workers (e.g., Thompson, 1970 and 1986), the St. Joe Group regionally thins in a southerly to southwesterly direction off the Ozark Uplift. This is especially evident based on thicknesses measured in southwestern Missouri, northwestern Arkansas, and northeastern Oklahoma. Eventually the St. Joe Group pinches out ~ 4.8 km (3.0 mi) south of Tahlequah, Oklahoma. The St. Joe Group goes from being over 7.6 m (25.0 ft) thick at the Bella Vista, Arkansas section, to about 0.9 m (3.1 ft) thick at the Tahlequah (North), Oklahoma section. To the east, the group is measured to be less than 3 feet thick at the Baron Fork, Oklahoma section. It is proposed by some that this regional thinning is caused by facies deepening off a distally-steepened ramp (Mazzullo *et al.*, 2013).

Just north of the study area, approximately 2.5 km west of Jane, in McDonald County, Missouri, the Pierson Formation contains complete conodont biozonation up into the basal Reeds Spring Formation (Boardman and Thompson, 2010). However, at localities such as Kansas, Oklahoma, Siloam Springs and Bella Vista, Arkansas, most of the conodont biozones in the upper half of the Pierson Formation are not present. This absence of biozones is evident that thinning of the Pierson Formation was likely caused by erosion prior to deposition of the sediments of the Reeds Spring Formation and not by

biotic condensation.

Other lines of evidence are found to show that the St. Joe Group is not thinning by southward deepening of facies. Lithologies of the St. Joe Group in the study region predominantly show relatively moderate to high energy, shallow-marine carbonate skeletal packstones and skeletal wackestone-packstones. Also, quartz silt and sparse peloids are common in the Compton and lower Pierson formations where the St. Joe Group is less than 3.5 feet, which are characteristics of shallow-marine deposits. A greenish-gray calcareous shale bed overlies a mudstone-sparse skeletal wackestone with pisoids at the top of the Pierson Formation in Tahlequah (North), Oklahoma, which is another indication that these rocks are part of a shallow-water marine depositional environment. In addition, Mazzullo (2013) described dessication cracks in the upper Northview Formation at the Kansas, Oklahoma section, indicating tidal flat deposits.

Based on the evidence previously described, southward depositional thinning by biotic condensation and facies deepening of the St. Joe Group in the study area proposed by Lane (1978), Land and De Keyser (1980), Gutschick and Sandberg (1983), and Manger and Shelby (2000) is not supported by the results found in this study. The lithologies, textures, and conodont biota discussed here indicate that these carbonates were deposited in a much shallower marine environment than previously postulated. Missing biozones in the upper Pierson Formation, as well as the shallow-marine characteristics of the St. Joe Group carbonates in this region are likely the result of syndepositional uplift and shallowing of facies in response to Ouachita tectonism. Tectonism in this region during early Mississippian time involved crustal flexure in response to the Ouachita Orogeny. This tectonism formed an east-west trending fore-

bulge high that had a significant impact on overprinting sequence stratigraphic signatures in this area. The results of the study will help build a more accurate paleogeographic map and give further insight into the structural history of the Lower Mississippian carbonates that is necessary for future hydrocarbon exploration in the mid-continent region of the United States.

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APPENDICES

Appendix A

This appendix includes descriptions of all the samples analyzed for petrographic analysis from the study area.

Locality	Jane, Mo
Formation	Compton
Bed Number	1

Textural Classification (Dunham, 1962)					
	Mudstone				
	Mudstone-Wackestone				
	Wackestone				
X	Wackestone-Packstone				
	Packstone-Wackestone				
	Packstone				
	Packstone-Grainstone				
	Grainstone				

Non-Biotic		Biotic Constituents	
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Jane, Mo
Formation	Compton
Bed Number	2

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	3

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis: Neomorphosed micrite matrix		

Locality	Jane, Mo
Formation	Compton
Bed Number	4

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																			
	<input checked="" type="checkbox"/> Siliciclastics <input type="checkbox"/> Ooids <input type="checkbox"/> Pisoids <input type="checkbox"/> Grapestone <input checked="" type="checkbox"/> Peloids <input type="checkbox"/> Coated Grains <input type="checkbox"/> Oncolites <input type="checkbox"/> Fusulinids <input type="checkbox"/> Forams <input type="checkbox"/> Radiolarians <input type="checkbox"/> Spicules <input type="checkbox"/> Rugose Corals <input type="checkbox"/> Tabulate Corals <input type="checkbox"/> Fenestrate Bryozoans <input type="checkbox"/> Ramose Bryozoans <input type="checkbox"/> Inarticulate Brachiopods <input type="checkbox"/> Articulate Brachiopods <input type="checkbox"/> Gastropods <input type="checkbox"/> Bivalves <input type="checkbox"/> Scaphopods <input type="checkbox"/> Cephalopods <input type="checkbox"/> Annelids <input type="checkbox"/> Ostracodes <input type="checkbox"/> Trilobites <input checked="" type="checkbox"/> Crinoids <input type="checkbox"/> Echinoids <input type="checkbox"/> Holothurians <input type="checkbox"/> Vertebrate Debris <input type="checkbox"/> Other																			

Diagenesis		
<input type="checkbox"/> Cementation	<input type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	5

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																			
	<input checked="" type="checkbox"/> Siliciclastics <input type="checkbox"/> Ooids <input type="checkbox"/> Pisoids <input type="checkbox"/> Grapestone <input type="checkbox"/> Other <input type="checkbox"/> Coated Grains <input type="checkbox"/> Oncolites <input type="checkbox"/> Fusulinids <input type="checkbox"/> Forams <input type="checkbox"/> Radiolarians <input type="checkbox"/> Spicules <input type="checkbox"/> Rugose Corals <input type="checkbox"/> Tabulate Corals <input checked="" type="checkbox"/> Fenestrate Bryozoans <input type="checkbox"/> Ramose Bryozoans <input type="checkbox"/> Inarticulate Brachiopods <input type="checkbox"/> Articulate Brachiopods <input type="checkbox"/> Gastropods <input type="checkbox"/> Bivalves <input type="checkbox"/> Scaphopods <input type="checkbox"/> Cephalopods <input type="checkbox"/> Annelids <input type="checkbox"/> Ostracodes <input type="checkbox"/> Trilobites <input checked="" type="checkbox"/> Crinoids <input type="checkbox"/> Echinoids <input type="checkbox"/> Holothurians <input type="checkbox"/> Vertebrate Debris <input type="checkbox"/> Other																			

Diagenesis		
<input type="checkbox"/> Cementation	<input type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	6

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																							
	<div> <div>Siliciclastics</div> <div>Ooids</div> <div>Pisoids</div> <div>Grapestone</div> <div>Other</div> <div>Coated Grains</div> <div>Oncolites</div> <div>Fusulinids</div> <div>Forams</div> <div>Radiolarians</div> <div>Spicules</div> <div>Rugose Corals</div> <div>Tabulate Corals</div> <div>Fenestrate Bryozoans</div> <div>Ramose Bryozoans</div> <div>Inarticulate Brachiopods</div> <div>Articulate Brachiopods</div> <div>Gastropods</div> <div>Bivalves</div> <div>Scaphopods</div> <div>Cephalopods</div> <div>Annelids</div> <div>Ostracodes</div> <div>Trilobites</div> <div>Crinoids</div> <div>Echinoids</div> <div>Holothurians</div> <div>Vertebrate Debris</div> <div>Other</div> </div>																							
X																								

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	7

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
X Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																							
	<div> <div>Siliciclastics</div> <div>Ooids</div> <div>Pisoids</div> <div>Grapestone</div> <div>Other</div> <div>Coated Grains</div> <div>Oncolites</div> <div>Fusulinids</div> <div>Forams</div> <div>Radiolarians</div> <div>Spicules</div> <div>Rugose Corals</div> <div>Tabulate Corals</div> <div>Fenestrate Bryozoans</div> <div>Ramose Bryozoans</div> <div>Inarticulate Brachiopods</div> <div>Articulate Brachiopods</div> <div>Gastropods</div> <div>Bivalves</div> <div>Scaphopods</div> <div>Cephalopods</div> <div>Annelids</div> <div>Ostracodes</div> <div>Trilobites</div> <div>Crinoids</div> <div>Echinoids</div> <div>Holothurians</div> <div>Vertebrate Debris</div> <div>Other</div> </div>																							

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	8

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Jane, Mo
Formation	Compton
Bed Number	9

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
X	Ostracodes	
	Trilobites	
	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Jane, Mo
Formation	Compton
Bed Number	12

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis			
	Cementation	X	Blocky Calcite Cement
	Physical Compaction		Fibrous Calcite Cement
			Fracturing
Diagenesis:			

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	1

		Non-Biotic	Biotic Constituents
	Siliciclastics		
X	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis			
	Cementation	X	Blocky Calcite Cement
	Physical Compaction		Fibrous Calcite Cement
			Fracturing
Diagenesis:			

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	3

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
X	Pisoids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	4

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
X Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																																																												
	X	Siliciclastics		Ooids		Pisoids		Grapestone		Other		Coated Grains		Oncolites		Fusulinids		Forams		Radiolarians		Spicules		Rugose Corals		Tabulate Corals	X	Fenestrate Bryozoans		Ramose Bryozoans		Inarticulate Brachiopods		X	Articulate Brachiopods		Gastropods		Bivalves		Scaphopods		Cephalopods		Annelids		X	Ostracodes		Trilobites		X	Crinoids		Echinoids		Holothurians			Vertebrate Debris	

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	5

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
X Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	X Fenestrate Bryozoans	Ramose Bryozoans	X Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	X Ostracodes	Trilobites	X Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	6

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																												
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	X Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X									X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Compton
Bed Number	7

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
X Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic					Biotic Constituents																								
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	X Fenestrate Bryozoans	Ramose Bryozoans	X Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	X Ostracodes	Trilobites	X Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Northview
Bed Number	1

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Northview
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	X Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Northview
Bed Number	4

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Northview
Bed Number	5

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	1

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
	X													X									X		X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	2

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
														X		X							X		X					

Diagenesis		
Cementation	X Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	3

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	4

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	5

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X		X								X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	6

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X								X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
X	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	7

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	8

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	9

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
																	X							X						
																									X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	10

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
	Siliciclastics																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	11

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
X	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	12

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Peloids	
X	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	13

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	14

		Non-Biotic	Biotic Constituents
	Siliciclastics		
X	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	15

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																													
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
														X												X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	16

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X								X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	17

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X										X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Pierson
Bed Number	18

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
	Siliciclastics		Ooids		Pisoids		Grapestone		Peloids		Coated Grains		Oncolites		Fusulinids		Forams		Radiolarians		Spicules		Rugose Corals		Tabulate Corals		Fenestrate Bryozoans		Ramose Bryozoans		Inarticulate Brachiopods		Articulate Brachiopods		Gastropods		Bivalves		Scaphopods		Cephalopods		Annelids		Ostracodes		Trilobites		Crinoids		Echinoids		Holothurians		Vertebrate Debris		Other																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bella Vista, Ark
Formation	Reeds Spring
Bed Number	1

X	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X																								X						

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	1

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
X	Siliciclastics																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	2

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	3

		Non-Biotic	Biotic Constituents
	Siliciclastics		
X	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	4

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X										X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	5

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																													
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
														X												X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	6

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	7

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	8

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	X
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X												X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	9

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	X
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																												
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X												X			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	10

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	11

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis: Neomorphosed mud matrix		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	13

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis: Neomorphosed mud matrix		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	14

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	15

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	16

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Diagenesis					
	Cementation		Blocky Calcite Cement		Fibrous Calcite Cement
	Physical Compaction		Chemical Compaction		Fracturing

Diagenesis:

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	20

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic	Biotic Constituents																			
	Siiliclastics																			
	Ooids																			
	Pisoids																			
	Grapestone																			
	Other																			
	Coated Grains																			
	Oncolites																			
	Fusulinids																			
	Forams																			
	Radiolarians																			
	Spicules																			
	Rugose Corals																			
	Tabulate Corals																			
	Fenestrate Bryozoans	X																		
	Ramose Bryozoans																			
	Inarticulate Brachiopods	X																		
	Articulate Brachiopods																			
	Gastropods																			
	Bivalves																			
	Scaphopods																			
	Cephalopods																			
	Annelids																			
	Ostracodes																			
	Trilobites																			
	Crinoids	X																		
	Echinoids																			
	Holothurians																			
	Vertebrate Debris																			
	Other																			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	21

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic	Biotic Constituents																			
	Siiliclastics																			
	Ooids																			
	Pisoids																			
	Grapestone																			
	Other																			
	Coated Grains																			
	Oncolites																			
	Fusulinids																			
	Forams																			
	Radiolarians																			
	Spicules																			
	Rugose Corals																			
	Tabulate Corals																			
	Fenestrate Bryozoans	X																		
	Ramose Bryozoans																			
	Inarticulate Brachiopods																			
	Articulate Brachiopods																			
	Gastropods																			
	Bivalves																			
	Scaphopods																			
	Cephalopods																			
	Annelids																			
	Ostracodes	X																		
	Trilobites																			
	Crinoids	X																		
	Echinoids																			
	Holothurians																			
	Vertebrate Debris																			
	Other																			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	22

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
	X													X		X									X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	25

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
X														X												X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Mudstone	Textural Classification (Dunham, 1962)
<input checked="" type="checkbox"/> Mudstone-Wackestone	
<input type="checkbox"/> Wackestone	
<input type="checkbox"/> Wackestone-Packstone	
<input type="checkbox"/> Packstone-Wackestone	
<input type="checkbox"/> Packstone	
<input type="checkbox"/> Packstone-Grainstone	
<input type="checkbox"/> Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	28

Non-Biotic		Biotic Constituents	
<input checked="" type="checkbox"/>	Siliciclastics	<input type="checkbox"/>	
<input type="checkbox"/>	Ooids	<input type="checkbox"/>	
<input type="checkbox"/>	Pisoids	<input type="checkbox"/>	
<input type="checkbox"/>	Grapestone	<input type="checkbox"/>	
<input type="checkbox"/>	Other	<input type="checkbox"/>	
<input type="checkbox"/>	Coated Grains	<input type="checkbox"/>	
<input type="checkbox"/>	Oncolites	<input type="checkbox"/>	
<input type="checkbox"/>	Fusulinids	<input type="checkbox"/>	
<input type="checkbox"/>	Forams	<input type="checkbox"/>	
<input type="checkbox"/>	Radiolarians	<input type="checkbox"/>	
<input type="checkbox"/>	Spicules	<input type="checkbox"/>	
<input type="checkbox"/>	Rugose Corals	<input type="checkbox"/>	
<input type="checkbox"/>	Tabulate Corals	<input type="checkbox"/>	
<input type="checkbox"/>	Fenestrate Bryozoans	<input type="checkbox"/>	
<input type="checkbox"/>	Ramose Bryozoans	<input type="checkbox"/>	
<input type="checkbox"/>	Inarticulate Brachiopods	<input type="checkbox"/>	
<input type="checkbox"/>	Articulate Brachiopods	<input type="checkbox"/>	
<input type="checkbox"/>	Gastropods	<input type="checkbox"/>	
<input type="checkbox"/>	Bivalves	<input type="checkbox"/>	
<input type="checkbox"/>	Scaphopods	<input type="checkbox"/>	
<input type="checkbox"/>	Cephalopods	<input type="checkbox"/>	
<input type="checkbox"/>	Annelids	<input type="checkbox"/>	
<input type="checkbox"/>	Ostracodes	<input type="checkbox"/>	
<input type="checkbox"/>	Trilobites	<input checked="" type="checkbox"/>	
<input type="checkbox"/>	Crinoids	<input type="checkbox"/>	
<input type="checkbox"/>	Echinoids	<input type="checkbox"/>	
<input type="checkbox"/>	Holothurians	<input type="checkbox"/>	
<input type="checkbox"/>	Vertebrate Debris	<input type="checkbox"/>	
<input type="checkbox"/>	Other	<input type="checkbox"/>	

Diagenesis		
<input type="checkbox"/> Cementation	<input type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Mudstone	Textural Classification (Dunham, 1962)
<input type="checkbox"/> Mudstone-Wackestone	
<input checked="" type="checkbox"/> Wackestone	
<input type="checkbox"/> Wackestone-Packstone	
<input type="checkbox"/> Packstone-Wackestone	
<input type="checkbox"/> Packstone	
<input type="checkbox"/> Packstone-Grainstone	
<input type="checkbox"/> Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	29

Non-Biotic		Biotic Constituents	
<input checked="" type="checkbox"/>	Siliciclastics	<input type="checkbox"/>	
<input type="checkbox"/>	Ooids	<input type="checkbox"/>	
<input type="checkbox"/>	Pisoids	<input type="checkbox"/>	
<input type="checkbox"/>	Grapestone	<input type="checkbox"/>	
<input type="checkbox"/>	Other	<input type="checkbox"/>	
<input type="checkbox"/>	Coated Grains	<input type="checkbox"/>	
<input type="checkbox"/>	Oncolites	<input type="checkbox"/>	
<input type="checkbox"/>	Fusulinids	<input type="checkbox"/>	
<input type="checkbox"/>	Forams	<input type="checkbox"/>	
<input type="checkbox"/>	Radiolarians	<input type="checkbox"/>	
<input type="checkbox"/>	Spicules	<input type="checkbox"/>	
<input type="checkbox"/>	Rugose Corals	<input type="checkbox"/>	
<input type="checkbox"/>	Tabulate Corals	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	Fenestrate Bryozoans	<input type="checkbox"/>	
<input type="checkbox"/>	Ramose Bryozoans	<input type="checkbox"/>	
<input type="checkbox"/>	Inarticulate Brachiopods	<input type="checkbox"/>	
<input type="checkbox"/>	Articulate Brachiopods	<input type="checkbox"/>	
<input type="checkbox"/>	Gastropods	<input type="checkbox"/>	
<input type="checkbox"/>	Bivalves	<input type="checkbox"/>	
<input type="checkbox"/>	Scaphopods	<input type="checkbox"/>	
<input type="checkbox"/>	Cephalopods	<input type="checkbox"/>	
<input type="checkbox"/>	Annelids	<input type="checkbox"/>	
<input type="checkbox"/>	Ostracodes	<input type="checkbox"/>	
<input type="checkbox"/>	Trilobites	<input type="checkbox"/>	
<input checked="" type="checkbox"/>	Crinoids	<input type="checkbox"/>	
<input type="checkbox"/>	Echinoids	<input type="checkbox"/>	
<input type="checkbox"/>	Holothurians	<input type="checkbox"/>	
<input type="checkbox"/>	Vertebrate Debris	<input type="checkbox"/>	
<input type="checkbox"/>	Other	<input type="checkbox"/>	

Diagenesis		
<input type="checkbox"/> Cementation	<input type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	30

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X												X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	32

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																											
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris
														X										X		X			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	33

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	34

	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	35

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Bentonville, Ark
Formation	Pierson
Bed Number	36

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	2

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X										X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	3

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Peloids	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X									X			X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	4

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	5

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
X	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	6

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	X
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X														X		X							X		X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Compton
Bed Number	7

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	X
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
X											X			X										X	X					

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Northview
Bed Number	3

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																			
	<input checked="" type="checkbox"/> Siliciclastics <input type="checkbox"/> Ooids <input type="checkbox"/> Pisoids <input type="checkbox"/> Grapestone <input checked="" type="checkbox"/> Peloids <input type="checkbox"/> Coated Grains <input type="checkbox"/> Oncolites <input type="checkbox"/> Fusulinids <input type="checkbox"/> Forams <input type="checkbox"/> Radiolarians <input type="checkbox"/> Spicules <input type="checkbox"/> Rugose Corals <input type="checkbox"/> Tabulate Corals <input checked="" type="checkbox"/> Fenestrate Bryozoans <input checked="" type="checkbox"/> Ramose Bryozoans <input checked="" type="checkbox"/> Inarticulate Brachiopods <input type="checkbox"/> Articulate Brachiopods <input type="checkbox"/> Gastropods <input type="checkbox"/> Bivalves <input type="checkbox"/> Scaphopods <input type="checkbox"/> Cephalopods <input type="checkbox"/> Annelids <input type="checkbox"/> Ostracodes <input type="checkbox"/> Trilobites <input checked="" type="checkbox"/> Crinoids <input type="checkbox"/> Echinoids <input type="checkbox"/> Holothurians <input type="checkbox"/> Vertebrate Debris <input type="checkbox"/> Other																			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	1

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																			
	<input checked="" type="checkbox"/> Siliciclastics <input type="checkbox"/> Ooids <input type="checkbox"/> Pisoids <input type="checkbox"/> Grapestone <input type="checkbox"/> Other <input type="checkbox"/> Coated Grains <input type="checkbox"/> Oncolites <input type="checkbox"/> Fusulinids <input type="checkbox"/> Forams <input type="checkbox"/> Radiolarians <input type="checkbox"/> Spicules <input type="checkbox"/> Rugose Corals <input type="checkbox"/> Tabulate Corals <input checked="" type="checkbox"/> Fenestrate Bryozoans <input type="checkbox"/> Ramose Bryozoans <input type="checkbox"/> Inarticulate Brachiopods <input type="checkbox"/> Articulate Brachiopods <input type="checkbox"/> Gastropods <input type="checkbox"/> Bivalves <input type="checkbox"/> Scaphopods <input type="checkbox"/> Cephalopods <input type="checkbox"/> Annelids <input type="checkbox"/> Ostracodes <input type="checkbox"/> Trilobites <input checked="" type="checkbox"/> Crinoids <input type="checkbox"/> Echinoids <input type="checkbox"/> Holothurians <input type="checkbox"/> Vertebrate Debris <input type="checkbox"/> Other																			

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
X		
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	3

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
X		
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
X	Peloids	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
X	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	4

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	X
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X								X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	5

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	X
Grainstone	

Non-Biotic					Biotic Constituents																																																			
	Siliciclastics					Coated Grains		Oncolites		Fusulinids		Forams		Radiolarians		Spicules		Rugose Corals		Tabulate Corals		X	Fenestrate Bryozoans		Ramose Bryozoans		X	Inarticulate Brachiopods		Articulate Brachiopods		Gastropods		Bivalves		Scaphopods		Cephalopods		Annelids		X	Ostracodes		Trilobites		X	Crinoids		Echinoids		Holothurians		Vertebrate Debris		Other

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	6

Non-Biotic		Biotic Constituents																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	7

Non-Biotic		Biotic Constituents																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	8

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	9

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis: Recrystallized micrite		

Locality	Siloam Springs South, Ark
Formation	Pierson
Bed Number	10

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
X	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents																												
			Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
																	X										X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Siloam Springs South, Ark
Formation	Reeds Spring
Bed Number	1

X	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Peloids	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Others
X						X																								

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Compton
Bed Number	1

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Compton
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Compton
Bed Number	3

	Non-Biotic	Biotic Constituents																			
	Siliciclastics																				
	Ooids																				
	Pisoids																				
	Grapestone																				
X	Peloids																				
	Coated Grains																				
	Oncolites																				
	Fusulinids																				
	Forams																				
	Radiolarians																				
	Spicules																				
	Rugose Corals																				
	Tabulate Corals																				
X	Fenestrate Bryozoans																				
	Ramose Bryozoans																				
X	Inarticulate Brachiopods																				
	Articulate Brachiopods																				
	Gastropods																				
	Bivalves																				
	Scaphopods																				
	Cephalopods																				
	Annelids																				
	Ostracodes																				
	Trilobites																				
X	Crinoids																				
	Echinoids																				
	Holothurians																				
	Vertebrate Debris																				
	Other																				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Compton
Bed Number	4

	Non-Biotic	Biotic Constituents																			
	Siliciclastics																				
	Ooids																				
	Pisoids																				
	Grapestone																				
X	Peloids																				
	Coated Grains																				
	Oncolites																				
	Fusulinids																				
	Forams																				
	Radiolarians																				
	Spicules																				
	Rugose Corals																				
	Tabulate Corals																				
X	Fenestrate Bryozoans																				
	Ramose Bryozoans																				
X	Inarticulate Brachiopods																				
	Articulate Brachiopods																				
	Gastropods																				
	Bivalves																				
	Scaphopods																				
	Cephalopods																				
	Annelids																				
	Ostracodes																				
	Trilobites																				
X	Crinoids																				
	Echinoids																				
	Holothurians																				
	Vertebrate Debris																				
	Other																				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Compton
Bed Number	5

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Compton
Bed Number	6

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Compton
Bed Number	7

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X		Siliciclastics	
		Ooids	
		Pisoids	
		Grapestone	
		Other	
		Coated Grains	
		Oncolites	
		Fusulinids	
		Forams	
		Radiolarians	
		Spicules	
		Rugose Corals	
		Tabulate Corals	
X		Fenestrate Bryozoans	
		Ramose Bryozoans	
X		Inarticulate Brachiopods	
		Articulate Brachiopods	
		Gastropods	
		Bivalves	
		Scaphopods	
		Cephalopods	
		Annelids	
		Ostracodes	
		Trilobites	
X		Crinoids	
		Echinoids	
		Holothurians	
		Vertebrate Debris	
		Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Compton
Bed Number	8

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X		Siliciclastics	
		Ooids	
		Pisoids	
		Grapestone	
X		Peloids	
		Coated Grains	
		Oncolites	
		Fusulinids	
		Forams	
		Radiolarians	
		Spicules	
		Rugose Corals	
		Tabulate Corals	
X		Fenestrate Bryozoans	
		Ramose Bryozoans	
		Inarticulate Brachiopods	
		Articulate Brachiopods	
		Gastropods	
		Bivalves	
		Scaphopods	
		Cephalopods	
		Annelids	
X		Ostracodes	
		Trilobites	
X		Crinoids	
		Echinoids	
		Holothurians	
		Vertebrate Debris	
		Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
X	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Compton
Bed Number	9

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Northview
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Northview
Bed Number	4

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing

Diagenesis:

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Northview
Bed Number	6

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing

Diagenesis:

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Northview
Bed Number	8

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Northview
Bed Number	10

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Northview
Bed Number	12

X	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Kansas, Ok
Formation	Pierson
Bed Number	1

	Siliciclastics	Non-Biotic	Biotic Constituents
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Pierson
Bed Number	2

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
X Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic	Biotic Constituents																												
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
														X		X									X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Kansas, Ok
Formation	Pierson
Bed Number	3

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
X Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	X Fenestrate Bryozoans	Ramose Bryozoans	X Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis: Neomorphosed mud matrix		

	Siliciclastics	Non-Biotic
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	Biotic Constituents
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

		Siliciclastics	Non-Biotic
		Ooids	
X		Pisoids	
		Grapestone	
X		Peloids	
		Coated Grains	Biotic Constituents
		Oncolites	
		Fusulinids	
		Forams	
		Radiolarians	
		Spicules	
		Rugose Corals	
		Tabulate Corals	
		Fenestrate Bryozoans	
		Ramose Bryozoans	
		Inarticulate Brachiopods	
		Articulate Brachiopods	
		Gastropods	
		Bivalves	
		Scapopods	
		Cephalopods	
		Amelids	
X		Ostracodes	
		Trilobites	
X		Crinoids	
		Echinoids	
		Holothurians	
		Vertebrate Debris	
		Other	

169

Locality	Kansas, Ok
Formation	Reeds Spring
Bed Number	1

Mudstone	Textural Classification (Dunham, 1962)
<input checked="" type="checkbox"/> Mudstone-Wackestone	
<input type="checkbox"/> Wackestone	
<input type="checkbox"/> Wackestone-Packstone	
<input type="checkbox"/> Packstone-Wackestone	
<input type="checkbox"/> Packstone	
<input type="checkbox"/> Packstone-Grainstone	
<input type="checkbox"/> Grainstone	

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
	X		X											X		X									X					

Diagenesis		
<input type="checkbox"/> Cementation	<input checked="" type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Locality	Baron Fork, Ok
Formation	Compton
Bed Number	2

Mudstone	Textural Classification (Dunham, 1962)
<input checked="" type="checkbox"/> Mudstone-Wackestone	
<input type="checkbox"/> Wackestone	
<input type="checkbox"/> Wackestone-Packstone	
<input type="checkbox"/> Packstone-Wackestone	
<input type="checkbox"/> Packstone	
<input type="checkbox"/> Packstone-Grainstone	
<input type="checkbox"/> Grainstone	

Non-Biotic	Biotic Constituents																																
	X	Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	X	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	X	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	

Diagenesis		
<input type="checkbox"/> Cementation	<input checked="" type="checkbox"/> Blocky Calcite Cement	<input type="checkbox"/> Fibrous Calcite Cement
<input type="checkbox"/> Physical Compaction	<input type="checkbox"/> Chemical Compaction	<input type="checkbox"/> Fracturing
Diagenesis:		

Locality	Baron Fork, Ok
Formation	Compton
Bed Number	3

Textural Classification (Dunham, 1962)					
	Mudstone				
	Mudstone-Wackestone				
X	Wackestone				
	Wackestone-Packstone				
	Packstone-Wackestone				
	Packstone				
	Packstone-Grainstone				
	Grainstone				

Non-Biotic		Biotic Constituents	
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
X	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Baron Fork, Ok
Formation	Compton
Bed Number	4

Textural Classification (Dunham, 1962)					
	Mudstone				
	Mudstone-Wackestone				
	Wackestone				
X	Wackestone-Packstone				
	Packstone-Wackestone				
	Packstone				
	Packstone-Grainstone				
	Grainstone				

Non-Biotic		Biotic Constituents	
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
X	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Baron Fork, Ok
Formation	Pierson
Bed Number	1

	Non-Biotic	Biotic Constituents
X		
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
X	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
X	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Baron Fork, Ok
Formation	Pierson
Bed Number	3

	Non-Biotic	Biotic Constituents
X		
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
X	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

X	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Baron Fork, Ok
Formation	Pierson
Bed Number	4

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other
																								X		X				

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Baron Fork, Ok
Formation	Reeds Spring
Bed Number	1

X	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Non-Biotic		Biotic Constituents																											
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Compton
Bed Number	2

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic		Biotic Constituents	
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
X	Peloids		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
X	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Compton
Bed Number	3

Mudstone	Textural Classification (Dunham, 1962)
Mudstone-Wackestone	
Wackestone	
Wackestone-Packstone	
Packstone-Wackestone	
Packstone	
Packstone-Grainstone	
Grainstone	

Non-Biotic		Biotic Constituents	
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

X	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Tahlequah, Ok
Formation	Compton
Bed Number	4

Non-Biotic	Biotic Constituents																													
	Siliciclastics	Ooids	Pisoids	Grapestone	Peloids	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other	
X					X									X																

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

Locality	Tahlequah, Ok
Formation	Compton
Bed Number	5

	Non-Biotic	Biotic Constituents																												
		Siliciclastics	Ooids	Pisoids	Grapestone	Other	Coated Grains	Oncolites	Fusulinids	Forams	Radiolarians	Spicules	Rugose Corals	Tabulate Corals	X Fenestrate Bryozoans	Ramose Bryozoans	Inarticulate Brachiopods	Articulate Brachiopods	Gastropods	Bivalves	Scaphopods	Cephalopods	Annelids	X Ostracodes	Trilobites	Crinoids	Echinoids	Holothurians	Vertebrate Debris	Other

Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Pierson
Bed Number	1

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Pierson
Bed Number	2

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
X	Wackestone	
	Wackestone-Packstone	
	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

		Non-Biotic	Biotic Constituents
X	Siliciclastics		
	Ooids		
	Pisoids		
	Grapestone		
	Other		
	Coated Grains		
	Oncolites		
	Fusulinids		
	Forams		
	Radiolarians		
	Spicules		
	Rugose Corals		
	Tabulate Corals		
X	Fenestrate Bryozoans		
	Ramose Bryozoans		
	Inarticulate Brachiopods		
	Articulate Brachiopods		
	Gastropods		
	Bivalves		
	Scaphopods		
	Cephalopods		
	Annelids		
	Ostracodes		
	Trilobites		
X	Crinoids		
	Echinoids		
	Holothurians		
	Vertebrate Debris		
	Other		

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Chemical Compaction
		Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Pierson
Bed Number	3

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Fibrous Calcite Cement
		Fracturing
Diagenesis:		

Locality	Tahlequah, Ok
Formation	Pierson
Bed Number	4

	Mudstone	Textural Classification (Dunham, 1962)
	Mudstone-Wackestone	
	Wackestone	
	Wackestone-Packstone	
X	Packstone-Wackestone	
	Packstone	
	Packstone-Grainstone	
	Grainstone	

	Non-Biotic	Biotic Constituents
	Siliciclastics	
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Forams	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
X	Fenestrate Bryozoans	
	Ramose Bryozoans	
X	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
X	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

Diagenesis		
	Cementation	Blocky Calcite Cement
	Physical Compaction	Fibrous Calcite Cement
		Fracturing
Diagenesis:		

		Siliciclastics	Non-Biotic
		Ooids	
X		Pisoids	
		Grapestone	
		Other	
		Coated Grains	Biotic Constituents
		Oncolites	
		Fusulinids	
		Forams	
		Radiolarians	
		Spicules	
		Rugose Corals	
		Tabulate Corals	
X		Fenestrate Bryozoans	
		Ramose Bryozoans	
		Inarticulate Brachiopods	
		Articulate Brachiopods	
		Gastropods	
		Bivalves	
		Scaphopods	
		Cephalopods	
		Amnelids	
X		Ostracodes	
		Trilobites	
X		Crinoids	
		Echinoids	
		Holothurians	
		Vertebrate Debris	
		Other	

Diagenesis					
	Cementation		Blocky Calcite Cement		Fibrous Calcite Cement
	Physical Compaction		Chemical Compaction		Fracturing

Diagenesis:

	Siliciclastics	Non-Biotic
	Ooids	
	Pisoids	
	Grapestone	
	Other	
	Coated Grains	
	Oncolites	
	Fusulinids	
	Fossils	
	Radiolarians	
	Spicules	
	Rugose Corals	
	Tabulate Corals	
K	Fenestrate Bryozoans	Biotic Constituents
	Ramosse Bryozoans	
	Inarticulate Brachiopods	
	Articulate Brachiopods	
	Gastropods	
	Bivalves	
	Scaphopods	
	Cephalopods	
	Annelids	
	Ostracodes	
	Trilobites	
	Crinoids	
	Echinoids	
	Holothurians	
	Vertebrate Debris	
	Other	

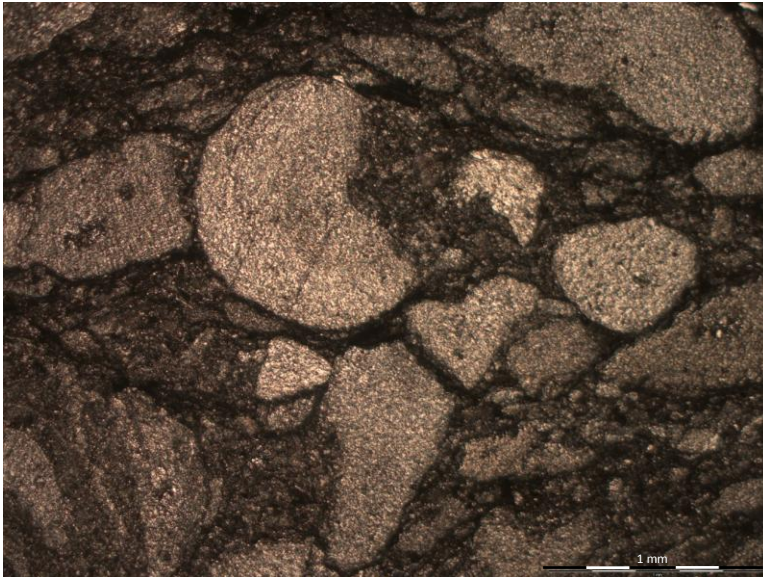
Diagenesis		
Cementation	Blocky Calcite Cement	Fibrous Calcite Cement
Physical Compaction	Chemical Compaction	Fracturing

Diagenesis:

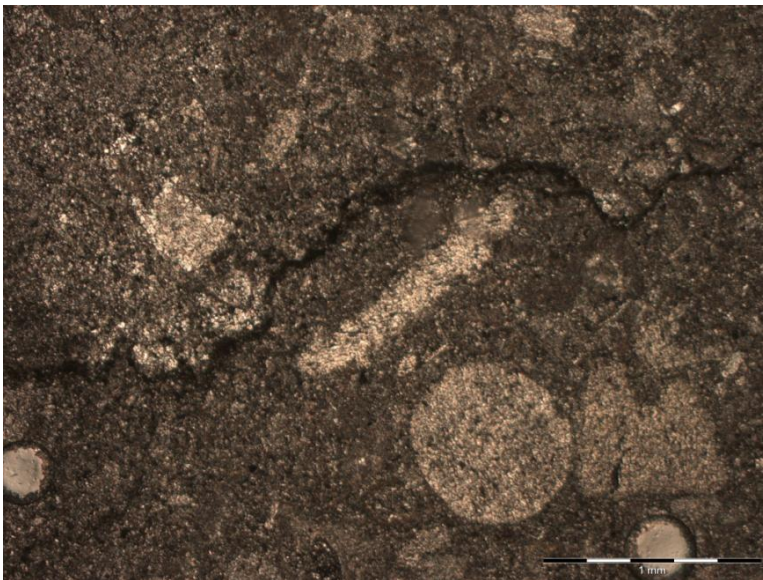
Appendix B

Appendix B includes petrographic photos of all the samples selected for petrographic analysis. All photomicrographs were taken in PPL (Plane-Polarized Light) and contain a 1 mm long scale bar in the lower right corner.

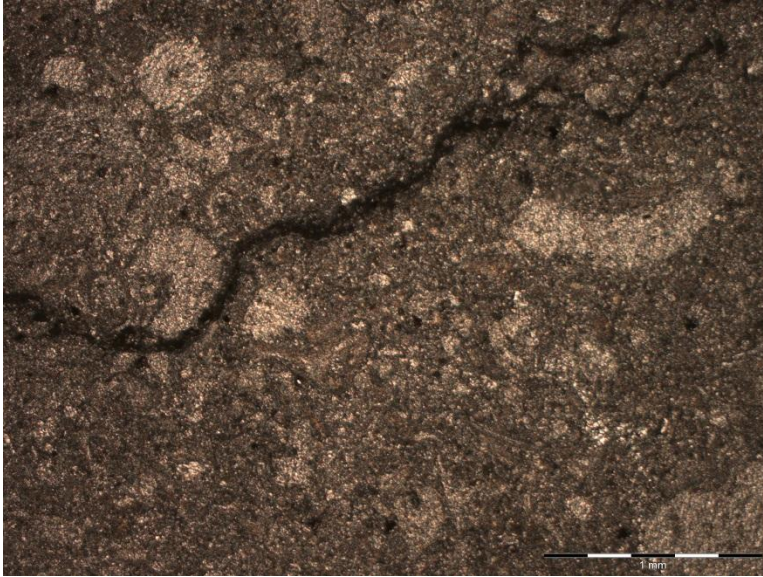
Jane, Missouri:



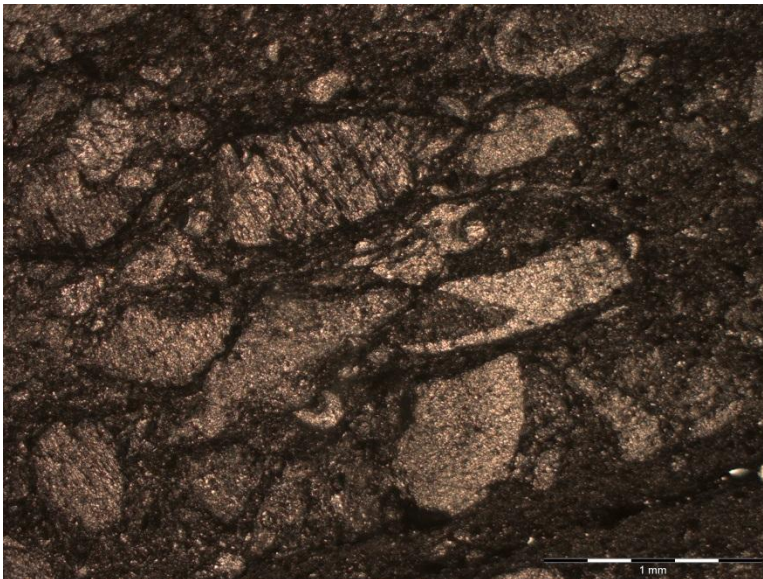
Sample C1. Photomicrograph of Compton bed C1, a crinoidal wackestone-packstone. This acetate peel is representative of bed C1 at Jane (South). Dominant skeletal grains are crinoids. Non-skeletal grains include peloids and quartz silt.



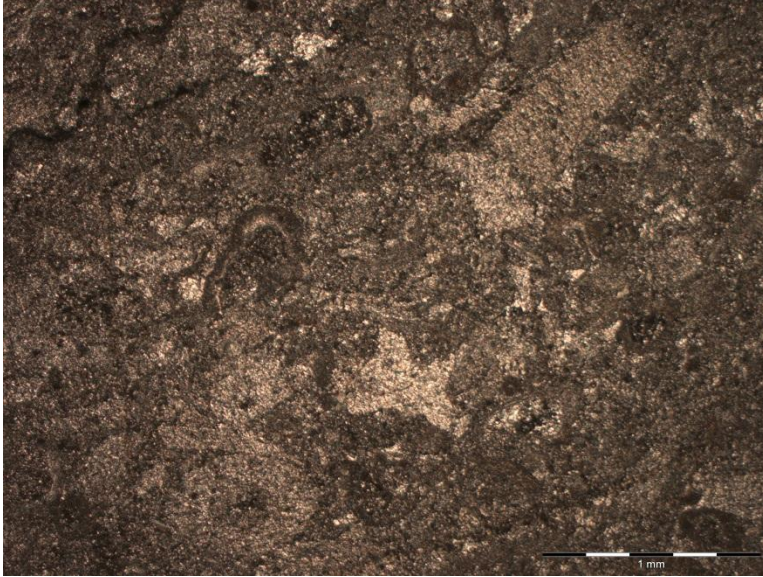
Sample C2. Photomicrograph of Compton bed C2, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of Compton bed C2 at Jane (South). Dominant skeletal grains include crinoids and bryozoans. Peloids occur in trace amounts.



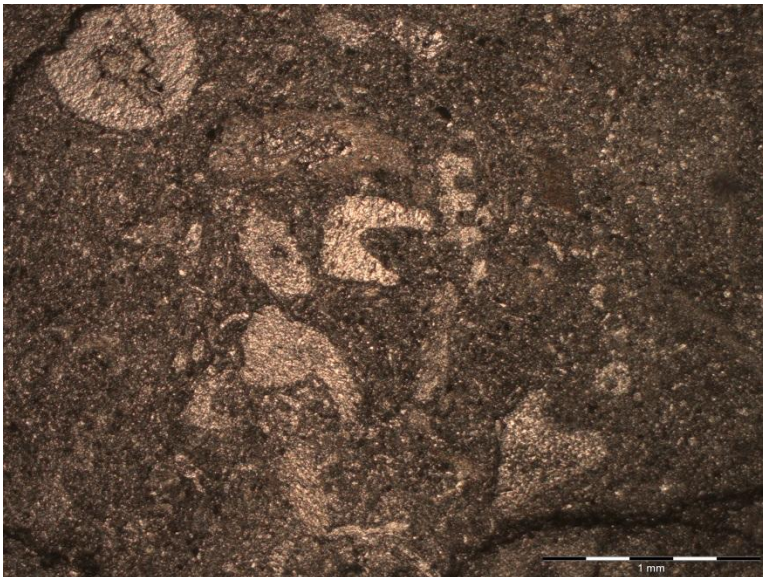
Sample C3. Photomicrograph of Compton bed C3, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of Compton bed C3 at Jane (South). Primary bioclasts of this bed are crinoids and bryozoans.



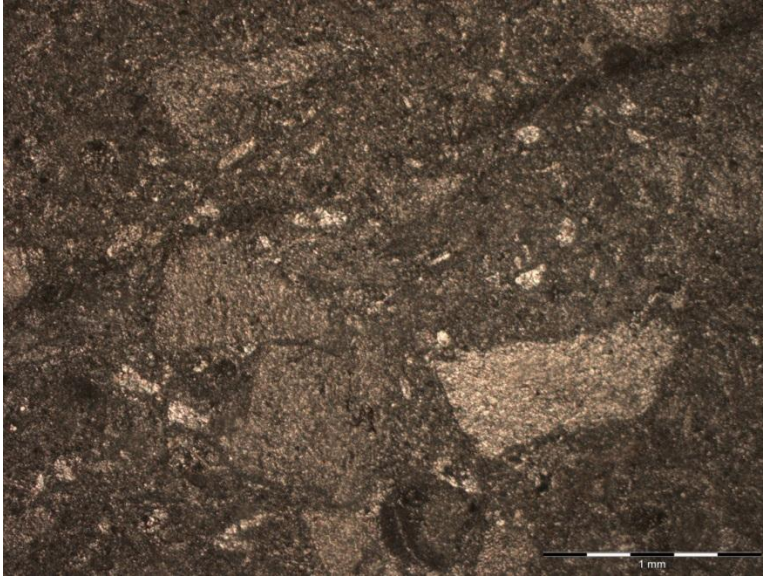
Sample C4. Photomicrograph of Compton bed C4, a crinoidal wackestone-packstone. This acetate peel is representative of Compton bed C4 at Jane (South). Dominant skeletal grains are crinoids. Primary non-skeletal grains are peloids.



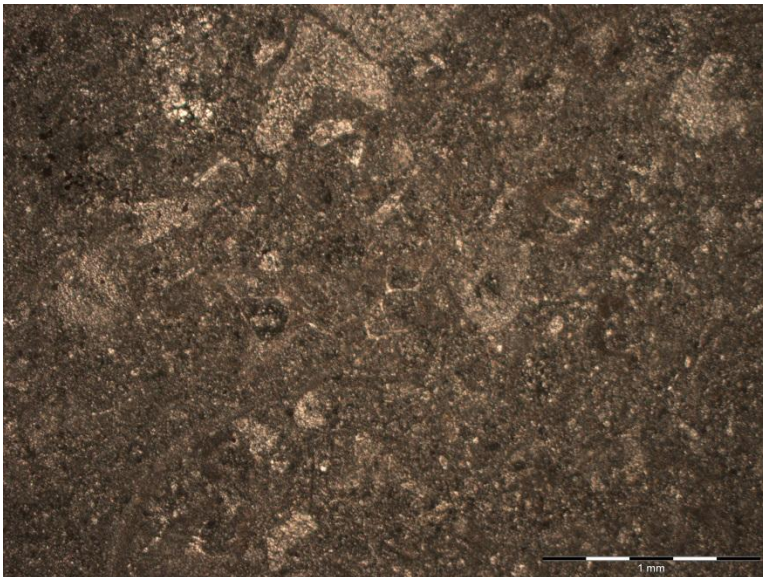
Sample C5. Photomicrograph of Compton bed C5, a skeletal packstone-wackestone. This acetate peel is representative of Compton bed C5 at Jane (South). Dominant skeletal grains are crinoids and bryozoans. Non-skeletal grains include fine-quartz silt.



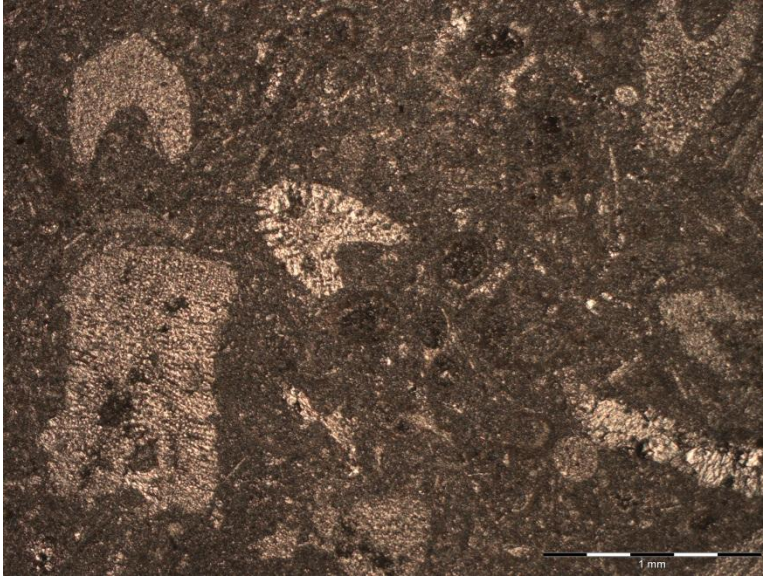
Sample C6. Photomicrograph of Compton bed C6, a skeletal wackestone-packstone. This acetate peel is representative of Compton bed C6 at Jane (South). Dominant skeletal grains are crinoids with lesser amounts of bryozoans. Non-skeletal grains include fine-quartz silt.



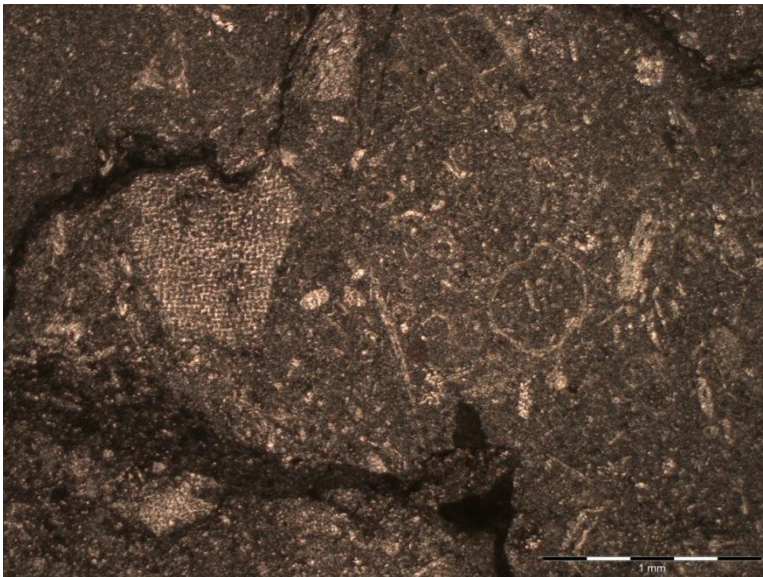
Sample C7. Photomicrograph of Compton bed C7, a skeletal wackestone. This acetate peel is representative of Compton bed C7 at Jane (South). Dominant skeletal grains are crinoids.



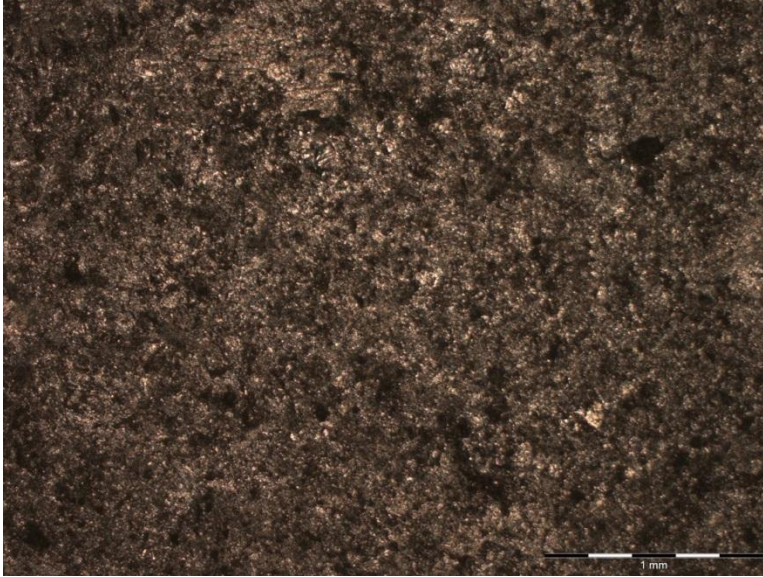
Sample C8. Photomicrograph of Compton bed C8, a skeletal wackestone-packstone. This acetate peel is representative of Compton bed C8 at Jane (South). Dominant skeletal grains are bryozoans and crinoids. Non-skeletal grains include fine-quartz silt.



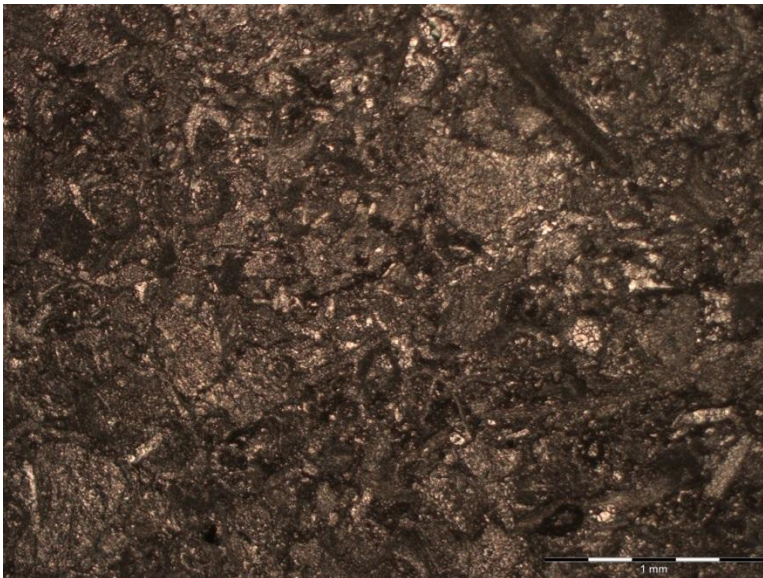
Sample C9. Photomicrograph of Compton bed C9, a skeletal packstone-wackestone. This acetate peel is representative of Compton bed C9 at Jane (South). Dominant skeletal grains are crinoids and bryozoans.



Sample C10. Photomicrograph of Compton bed C10, a silty skeletal wackestone-packstone. This acetate peel is representative of Compton bed C10 at Jane (South). Dominant skeletal grains are crinoids and bryozoans. Non-skeletal grains include quartz silt.

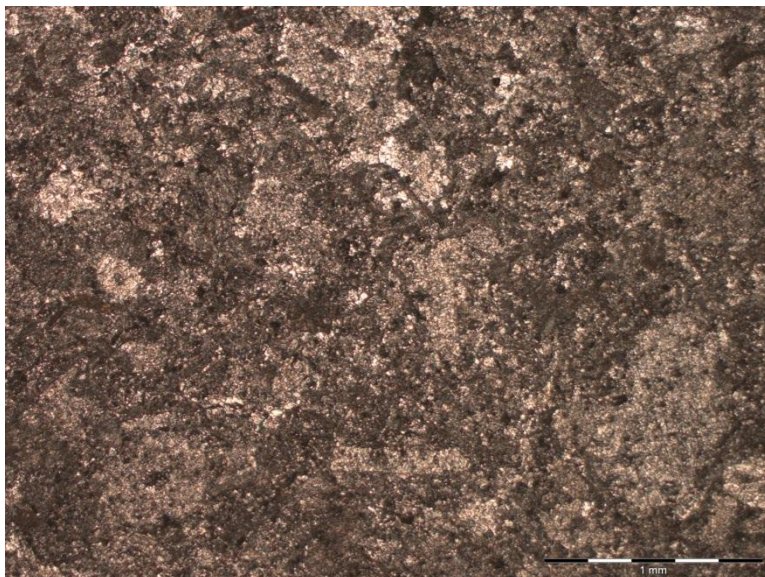


Sample C11. Photomicrograph of Compton bed C11, a skeletal wackestone. This acetate peel is representative of Compton bed C11 at Jane (South). Primary bioclasts are bryozoans. Non-skeletal grains include fine-quartz silt, peloids, and pyrite. Photomicrograph shows mud-rich area.

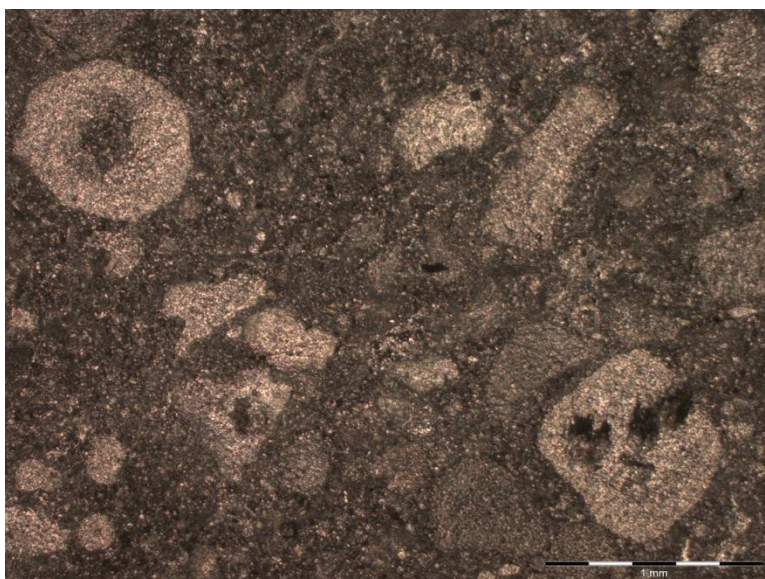


Sample C12. Photomicrograph of Compton bed C12, a skeletal packstone. This acetate peel is representative of Compton bed C12 at Jane (South). Dominant skeletal grains are bryozoans and crinoids, with lesser amounts of brachiopods.

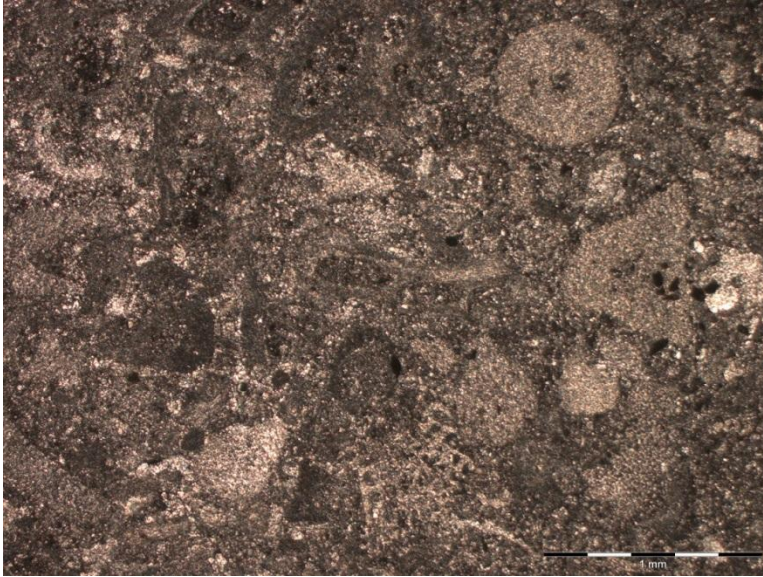
Bella Vista, Arkansas



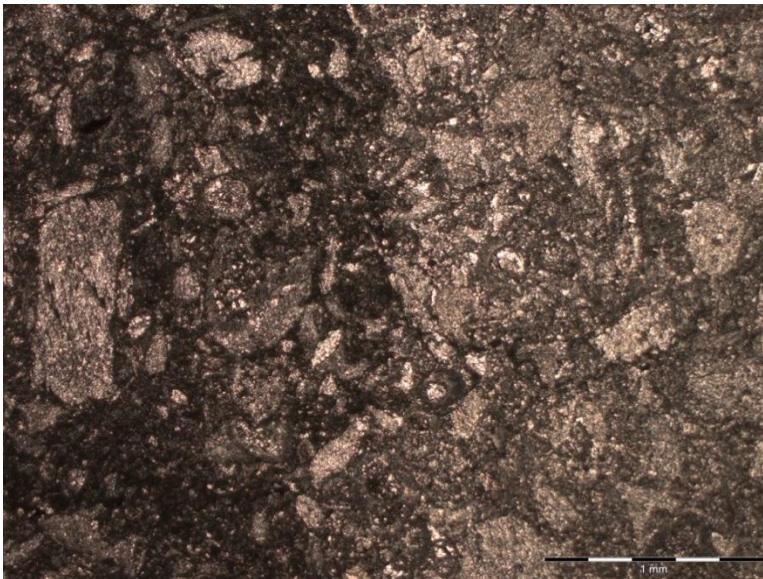
Sample C1. Photomicrograph of Compton bed C1, a skeletal packstone. This acetate peel is representative of bed C1 at Bella Vista. Primary bioclasts include crinoids and bryozoans.



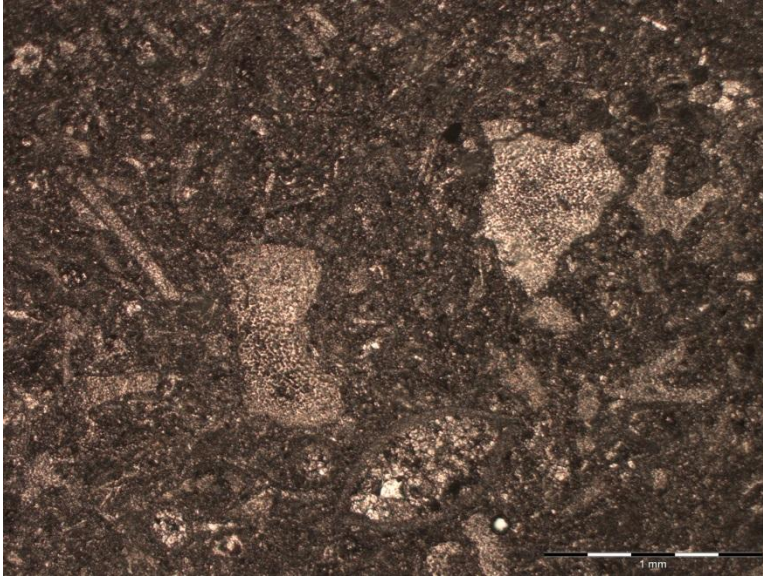
Sample C2. Photomicrograph of Compton bed C2, a skeletal wackestone-packstone. This acetate peel is representative of bed C2 at Bella Vista. Primary skeletal fragments are crinoids.



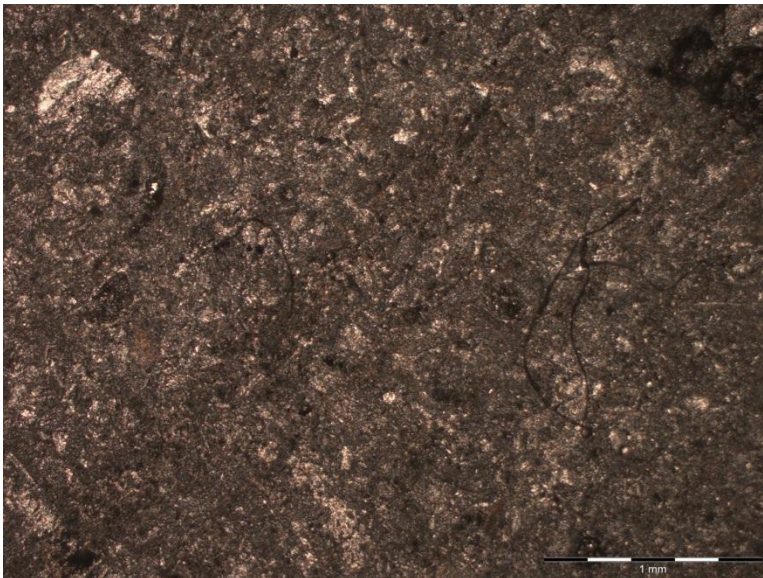
Sample C3. Photomicrograph of Compton bed C3, a skeletal packstone. This acetate peel is representative of bed C3 at Bella Vista. Dominant bioclasts are bryozoans and crinoids. Non-skeletal grains include quartz silt and pyrite concretions.



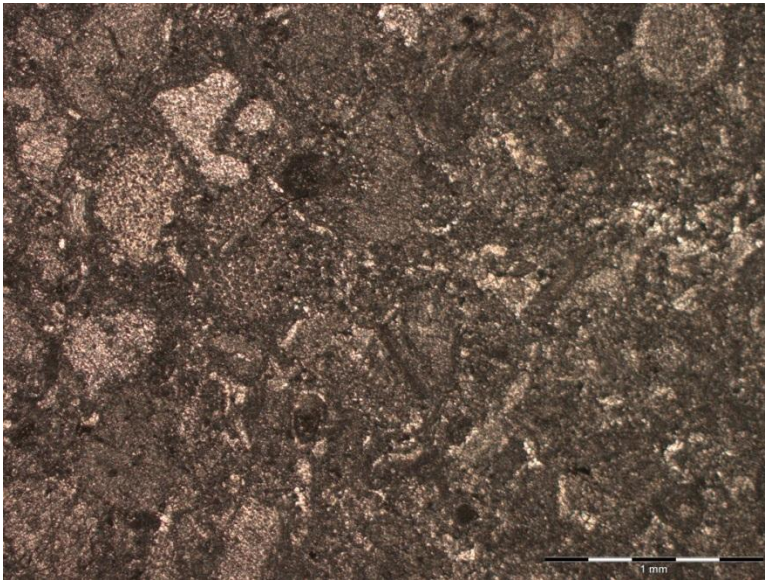
Sample C4. Photomicrograph of Compton bed C4, a skeletal packstone-wackestone. This acetate peel is representative of bed C4 at Bella Vista. Dominant bioclasts are crinoids and bryozoans.



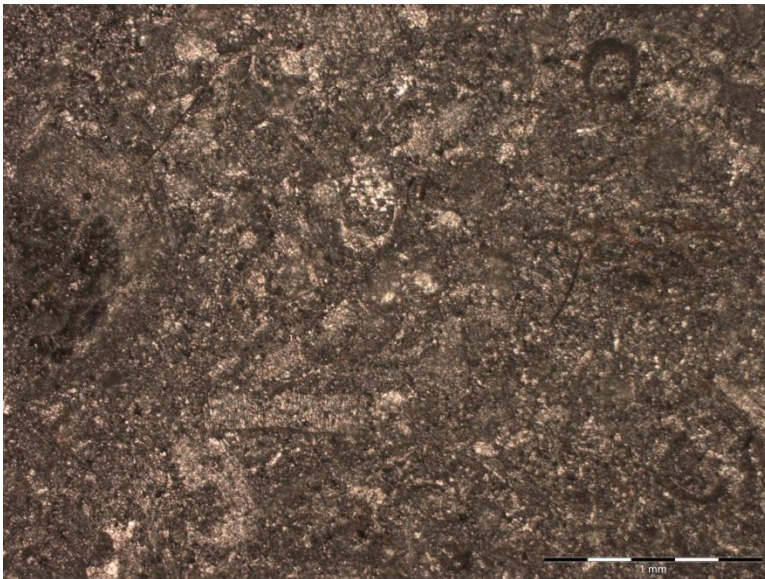
Sample C5. Photomicrograph of Compton bed C5, a skeletal packstone. This acetate peel is representative of bed C5 at Bella Vista. Primary skeletal fragments include crinoids and bryozoans. Pyrite concretions occur in trace amounts. Intraparticle blocky calcite occurs in some skeletal grains.



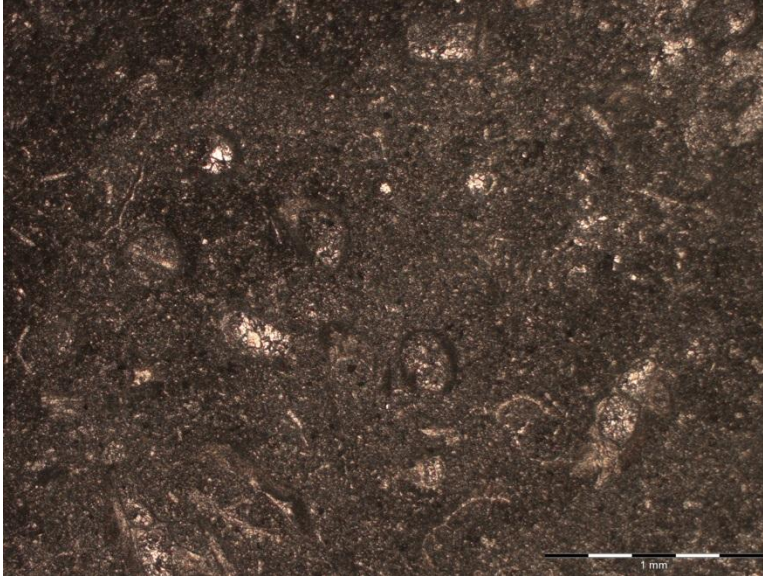
Sample C6. Photomicrograph of Compton bed C6, a skeletal wackestone-packstone. This acetate peel is representative of bed C6 at Bella Vista. Primary skeletal fragments include crinoids and bryozoans.



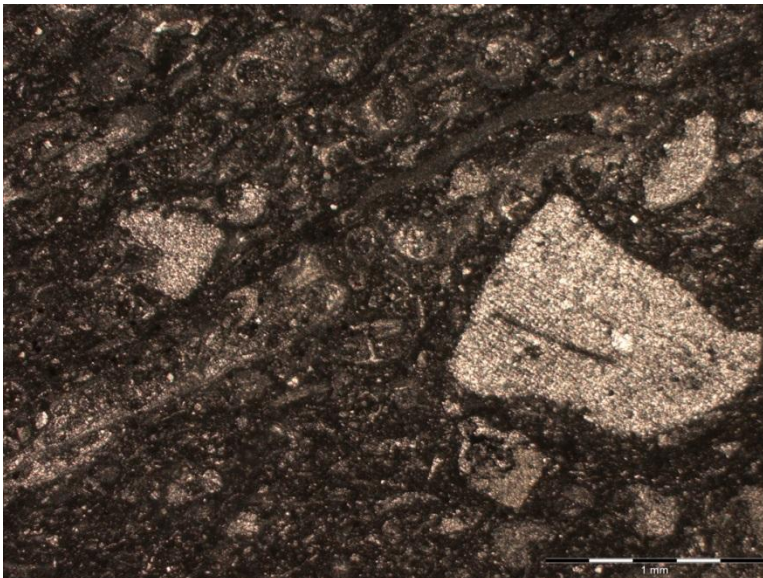
Sample C7. Photomicrograph of Compton bed C7, a skeletal packstone. This acetate peel is representative of bed C7 at Bella Vista. Dominant bioclasts are crinoids and bryozoans.



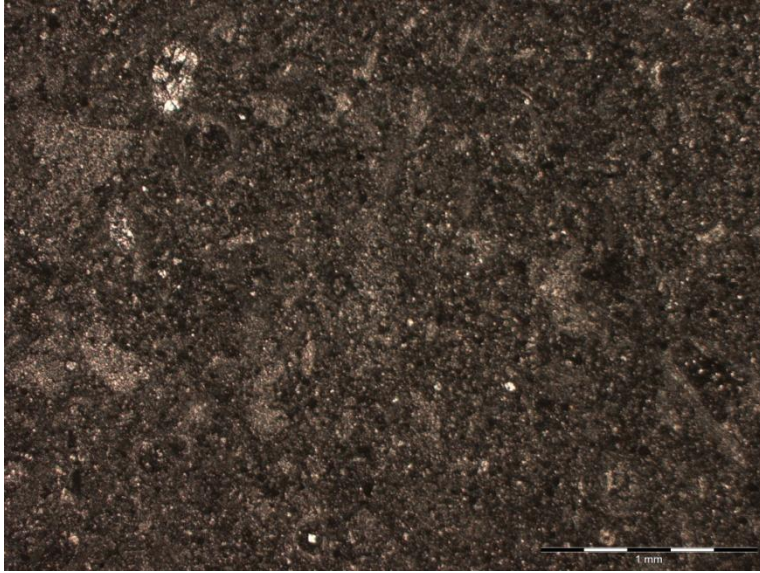
Sample NV1. Photomicrograph of Northview bed NV1, a skeletal packstone-wackestone. This acetate peel is representative of bed NV1 at Bella Vista. Primary skeletal fragments are bryozoans and crinoids. Non-skeletal grains include fine-quartz silt.



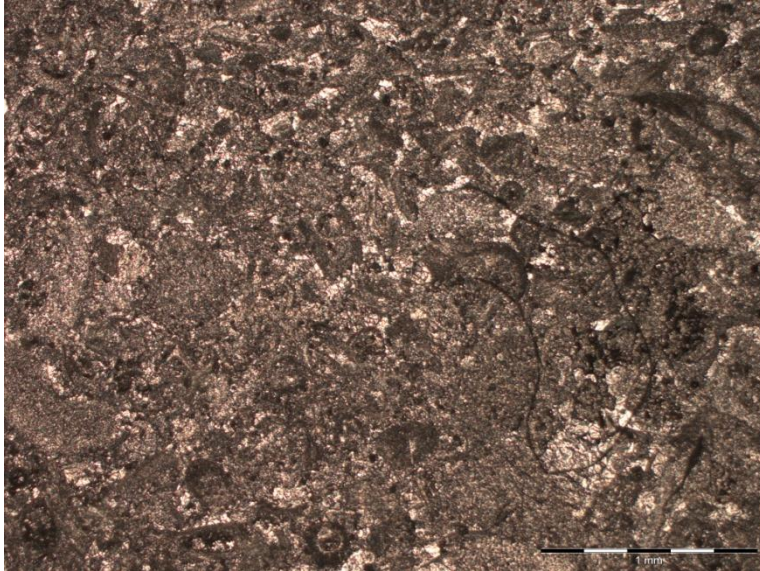
Sample NV2. Photomicrograph of Northview bed NV2, a skeletal wackestone. This acetate peel is representative of bed NV2 at Bella Vista. Bryozoans are the dominant bioclasts present, with lesser amounts of crinoids. Non-skeletal grains include fine-quartz silt. Intraparticle blocky calcite occurs in some skeletal grains.



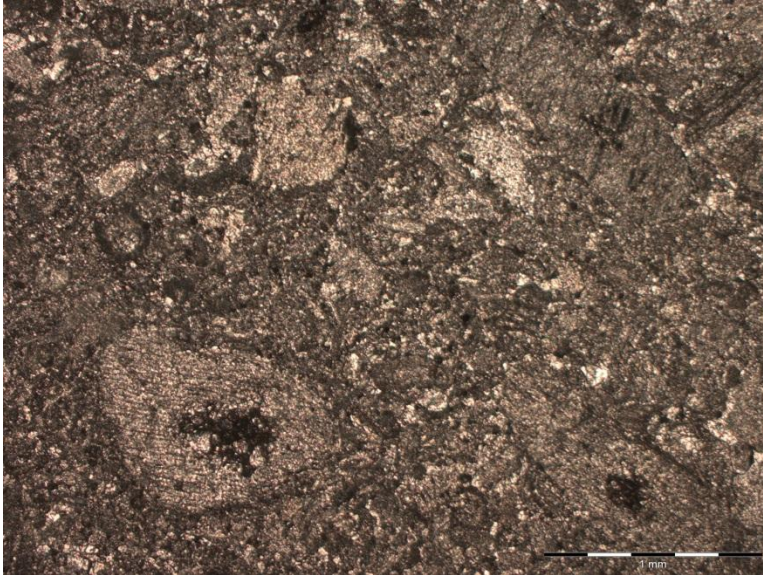
Sample NV4. Photomicrograph of Northview bed NV4, a skeletal wackestone-packstone. This acetate peel is representative of bed NV4 at Bella Vista. Dominant bioclasts include bryozoans and crinoids. Primary non-skeletal grains are quartz silt, with trace amounts of silt-size peloids.



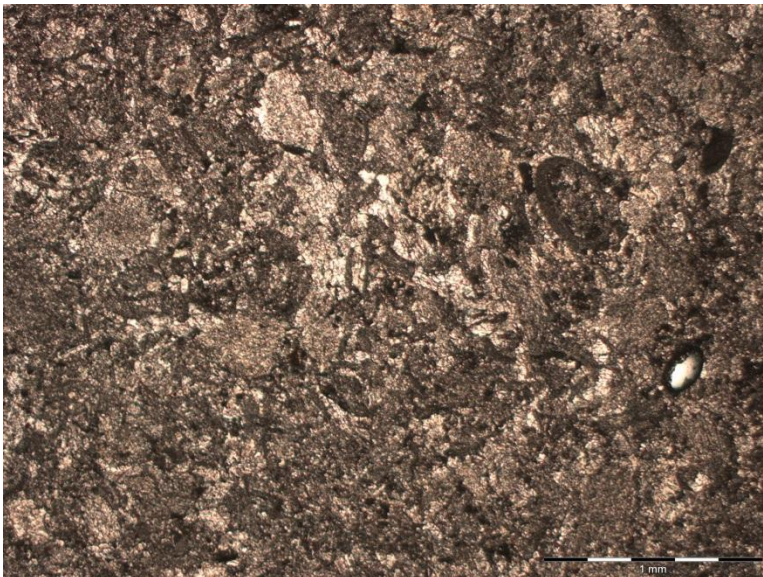
Sample P1. Photomicrograph of Pierson bed P1, a skeletal wackestone. This acetate peel is representative of bed P1 at Bella Vista. Bioclasts include bryozoans and crinoids in relatively equal amounts. Non-skeletal grains include peloids and quartz silt.



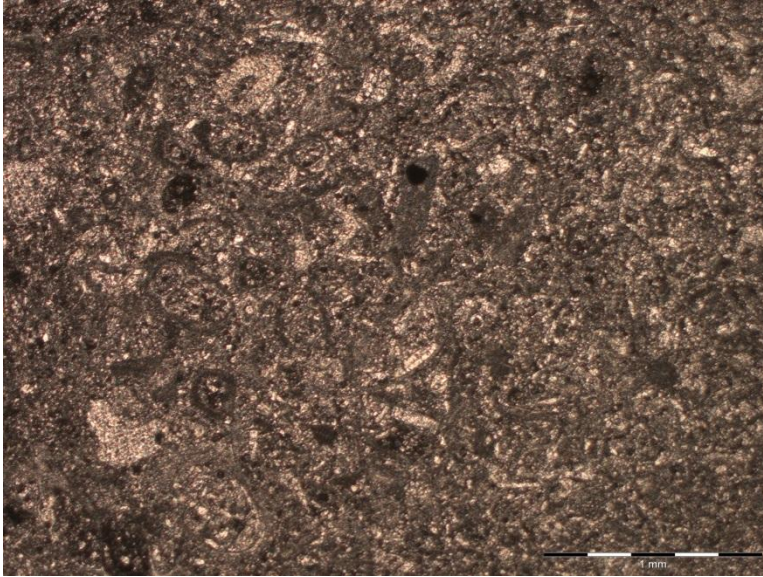
Sample P2. Photomicrograph of Pierson bed P2, an abraded skeletal packstone. This acetate peel is representative of bed P2 at Bella Vista. Dominant bioclasts are bryozoans and crinoids.



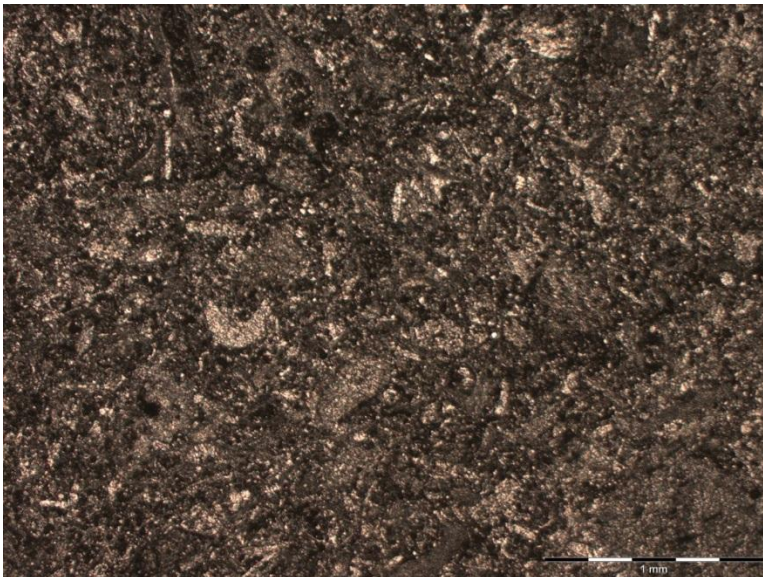
Sample P3. Photomicrograph of Pierson bed P3, a skeletal packstone. This acetate peel is representative of bed P3 at Bella Vista. Primary skeletal fragments include crinoids and bryozoans.



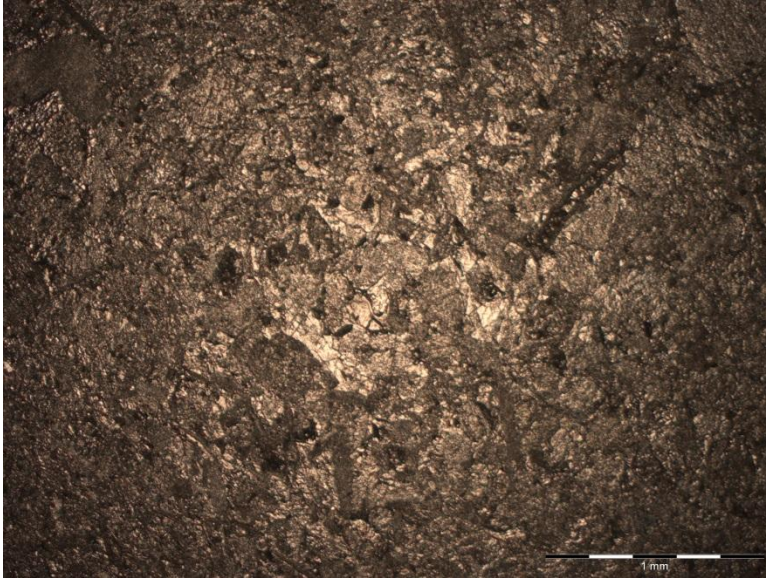
Sample P4. Photomicrograph of Pierson bed P4, an abraded skeletal packstone. This acetate peel is representative of bed P4 at Bella Vista. Many bioclasts are unidentifiable. Dominant skeletal fragments include crinoids and bryozoans.



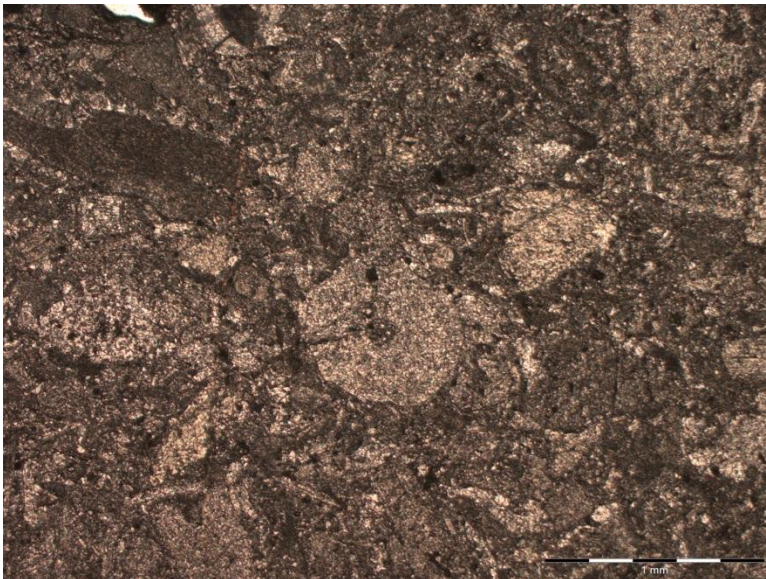
Sample P5. Photomicrograph of Pierson bed P5, a skeletal packstone. This acetate peel is representative of bed P5 at Bella Vista. Dominant skeletal fragments are bryozoans and crinoids. Non-skeletal grains include quartz silt and trace amounts of pyrite concretions.



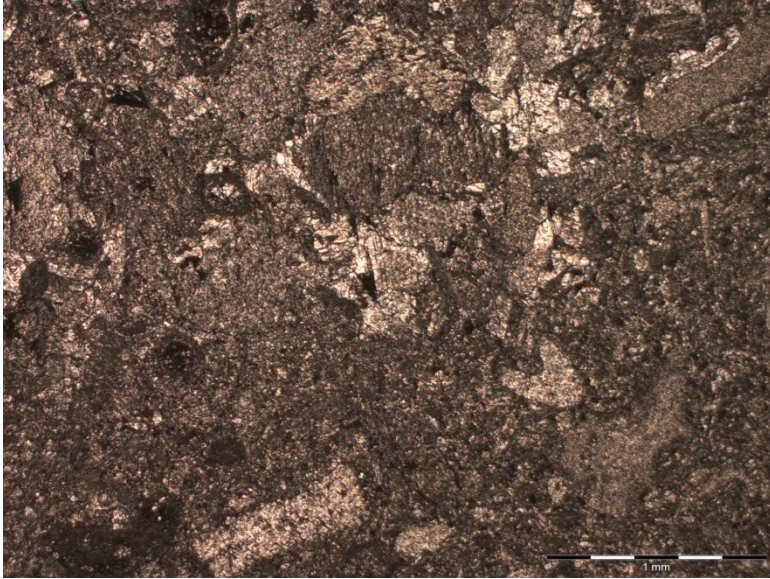
Sample P6. Photomicrograph of Pierson bed P6, a silty skeletal packstone-wackestone. This acetate peel is representative of bed P6 at Bella Vista. Dominant skeletal fragments include crinoids and bryozoans. Primary non-skeletal grains are quartz silt.



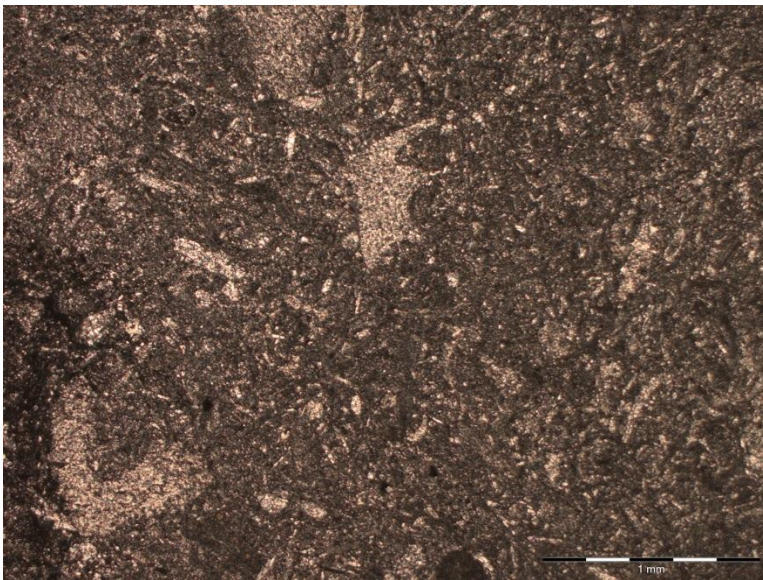
Sample P7. Photomicrograph of Pierson bed P7, a skeletal packstone-grainstone. This acetate peel is representative of bed P7 at Bella Vista. Dominant bioclasts are crinoids and bryozoans.



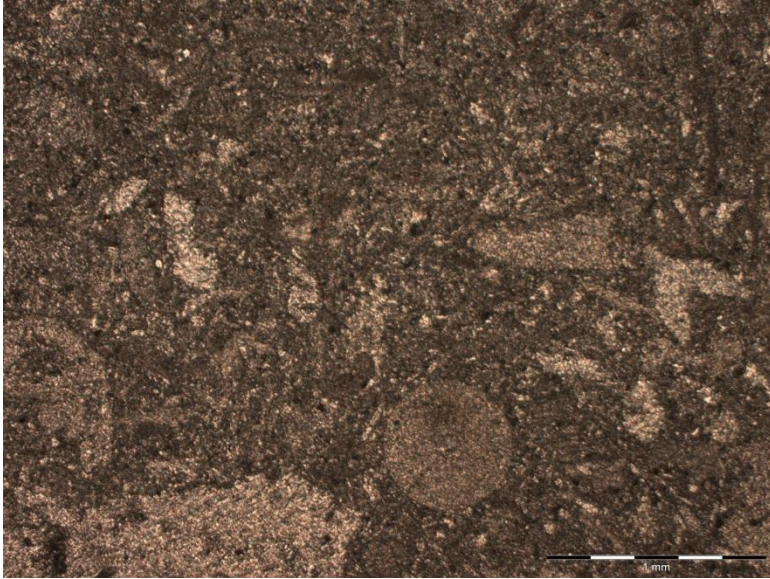
Sample P8. Photomicrograph of Pierson bed P8, a skeletal packstone. This acetate peel is representative of bed P8 at Bella Vista. Primary skeletal fragments are crinoids, with lesser amounts of bryozoans.



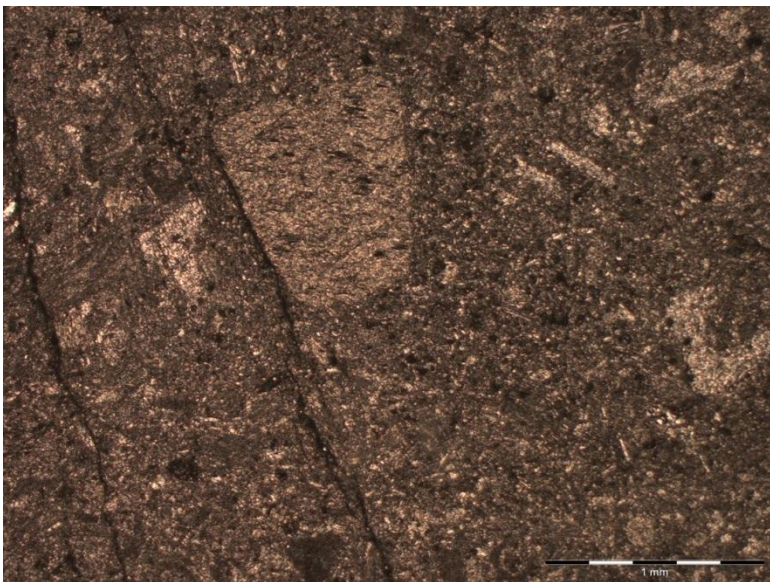
Sample P9. Photomicrograph of Pierson bed P9, a skeletal packstone. This acetate peel is representative of bed P9 at Bella Vista. Dominant bioclasts are crinoids and bryozoans.



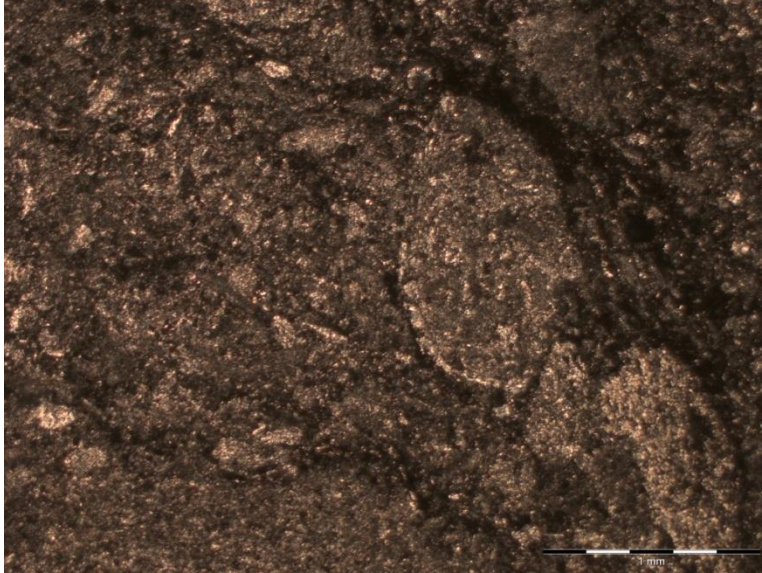
Sample P10. Photomicrograph of Pierson bed P10, a skeletal packstone-wackestone. This acetate peel is representative of bed P10 at Bella Vista. Dominant bioclasts are crinoids, with lesser amounts of bryozoans.



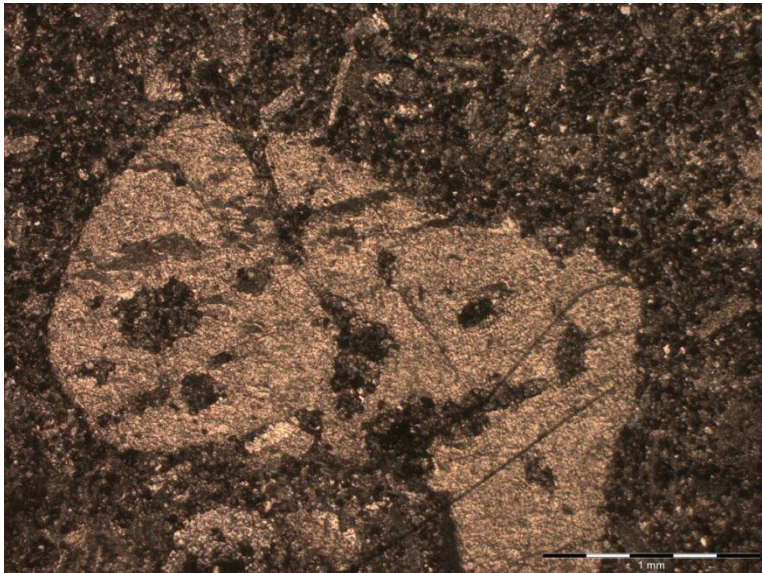
Sample P11. Photomicrograph of Pierson bed P11, a skeletal wackestone-packstone. This acetate peel is representative of bed P11 at Bella Vista. Dominant bioclasts are crinoids.



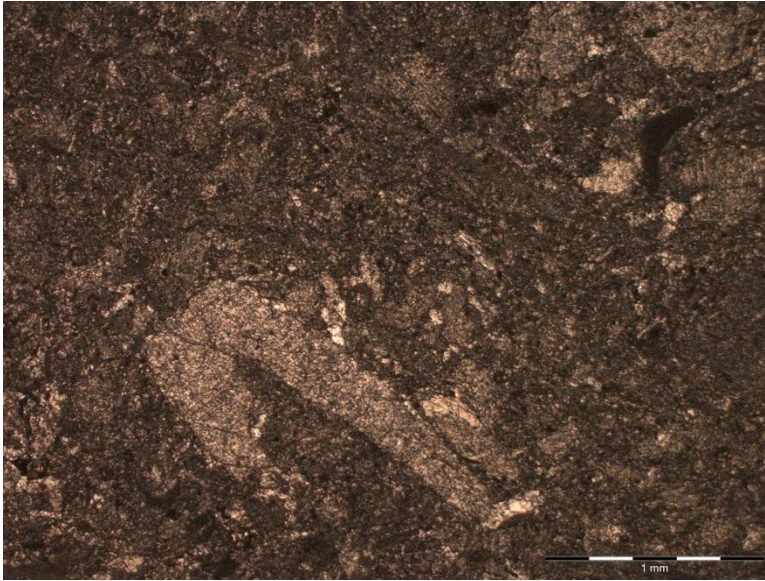
Sample P12. Photomicrograph of Pierson bed P12, a skeletal wackestone-packstone. This acetate peel is representative of bed P12 at Bella Vista. Dominant skeletal fragments are crinoids. Primary non-skeletal grains are quartz silt and scarce amounts of peloids.



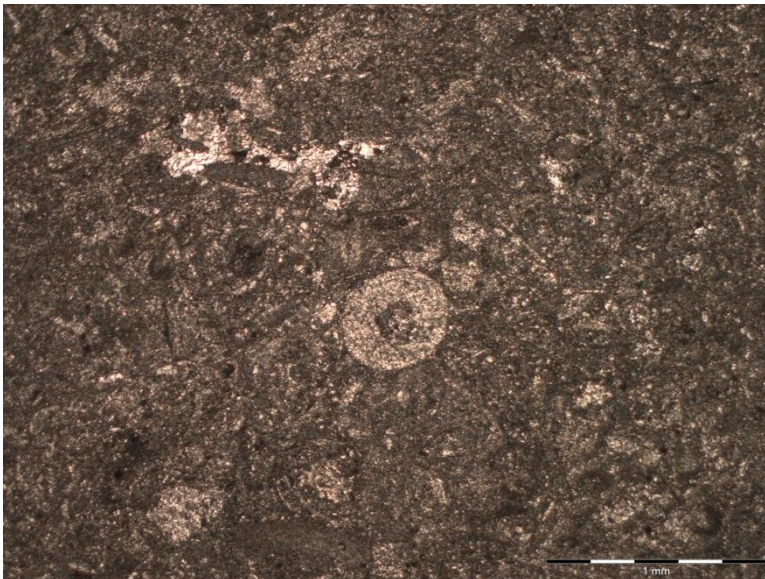
Sample P13. Photomicrograph of Pierson bed P13, a skeletal wackestone. This acetate peel is representative of bed P13 at Bella Vista. Scarce bioclasts includes crinoids and ostracodes. Rare amounts of peloids occur in bed P13.



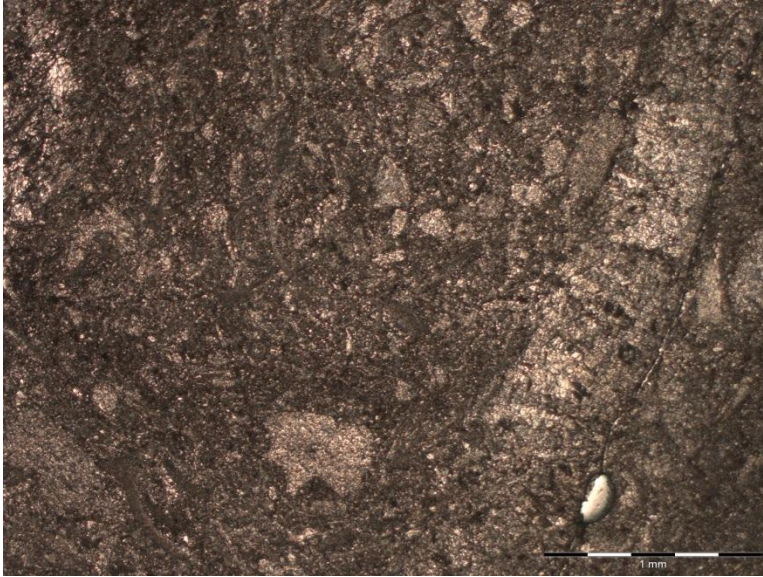
Sample P14. Photomicrograph of Pierson bed P14, a silt-sized peloidal packstone-wackestone. This acetate peel is representative of bed P14 at Bella Vista. Peloids are the primary non-skeletal grains, with lesser amounts of quartz silt. Dominant bioclasts are crinoids. Some bioclasts contain intraparticle micrite.



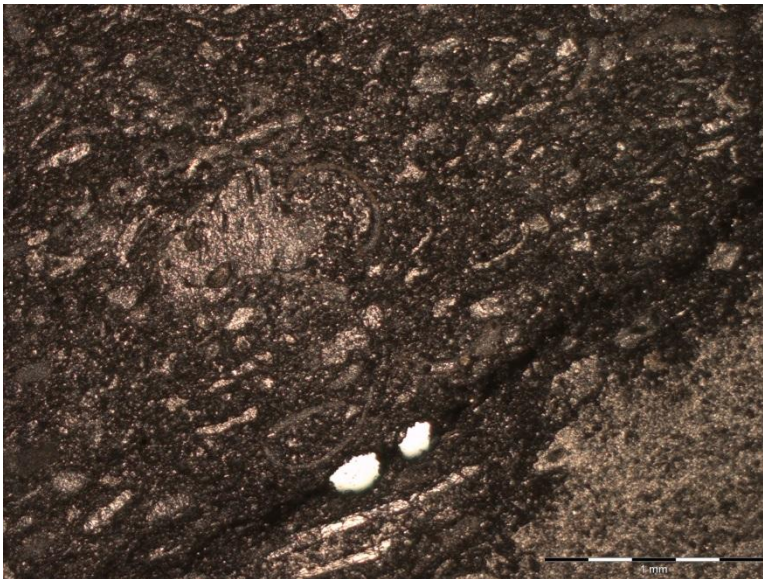
Sample P15. Photomicrograph of Pierson bed P15, a skeletal wackestone-packstone. This acetate peel is representative of bed P15 at Bella Vista. Dominant bioclasts are crinoids and bryozoans.



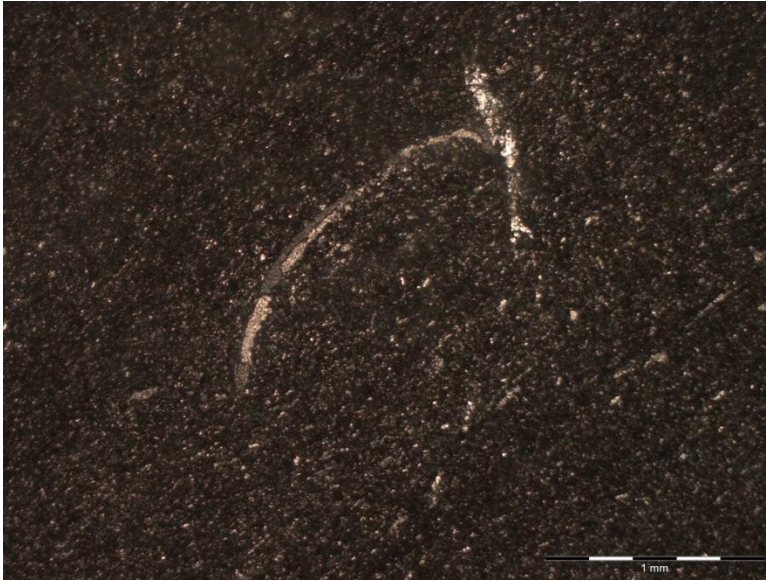
Sample P16. Photomicrograph of Pierson bed P16, a skeletal packstone-wackestone. This acetate peel is representative of bed P16 at Bella Vista. Crinoids and bryozoans represent approximately equal amounts of bioclasts in this rock.



Sample P17. Photomicrograph of Pierson bed P17, a skeletal packstone-wackestone. This acetate peel is representative of bed P17 at Bella Vista. Dominant bioclasts include crinoids and bryozoans. Other skeletal fragments include ostracodes and brachiopods.

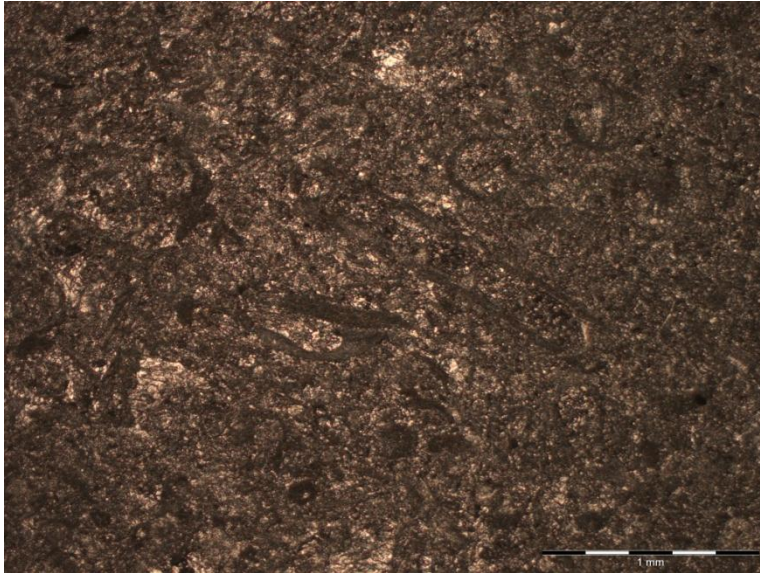


Sample P18. Photomicrograph of Pierson bed P18, a skeletal wackestone-packstone. This acetate peel is representative of bed P18 at Bella Vista. Crinoids dominate this bed. Lesser amounts of skeletal grains include bryozoans and ostracodes. Primary non-skeletal grains are quartz silt. Nearly 25% of bed P18 consists of chert.

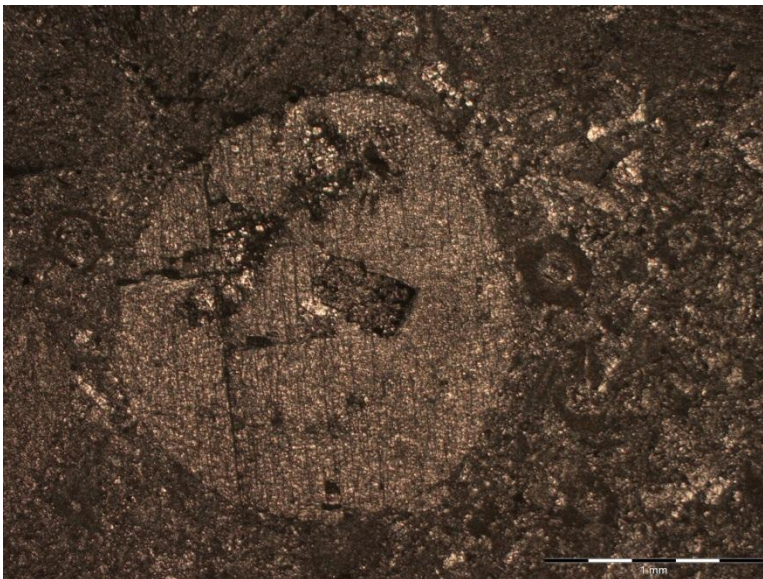


Sample RS1. Photomicrograph of Pierson bed RS1, a mudstone. This acetate peel is representative of bed RS1 at Bella Vista. Scarce bioclasts include brachiopods and bryozoans. Primary non-skeletal grains are quartz silt.

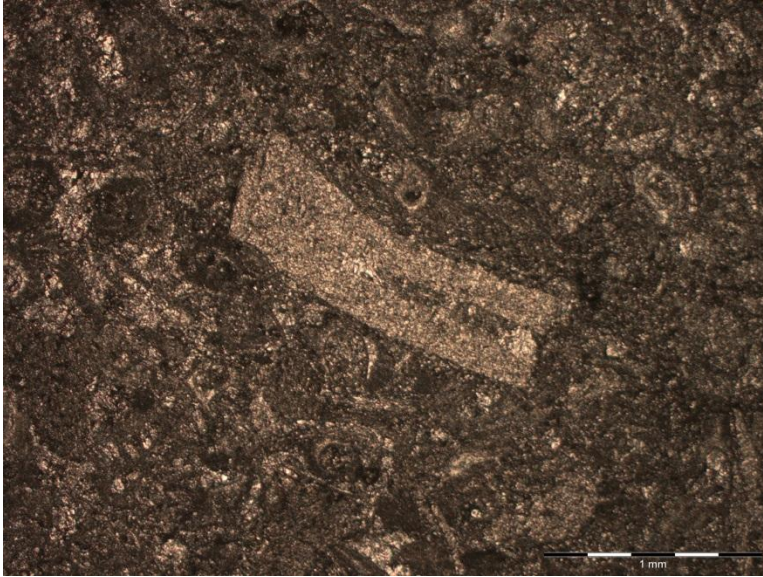
Bentonville Arkansas:



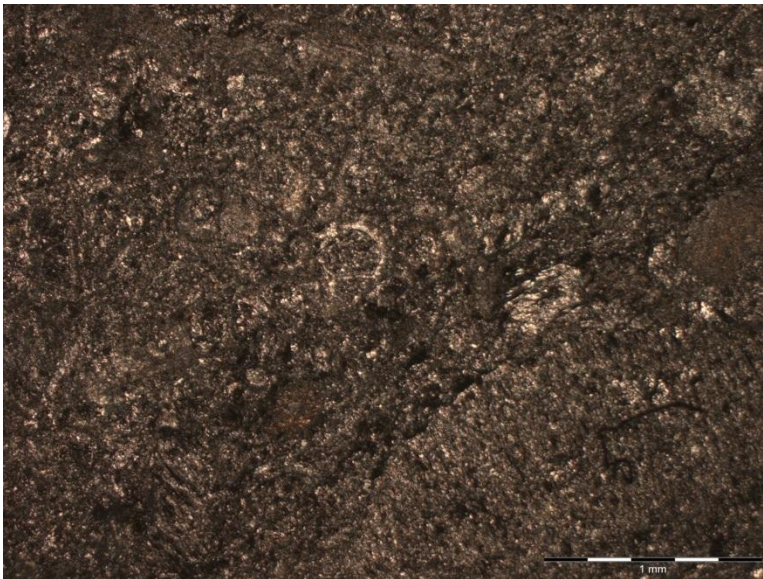
Sample P1. Photomicrograph of Pierson bed P1, a skeletal packstone-wackestone. This acetate peel is representative of bed P1 at Bentonville. Dominant bioclasts are bryozoans.



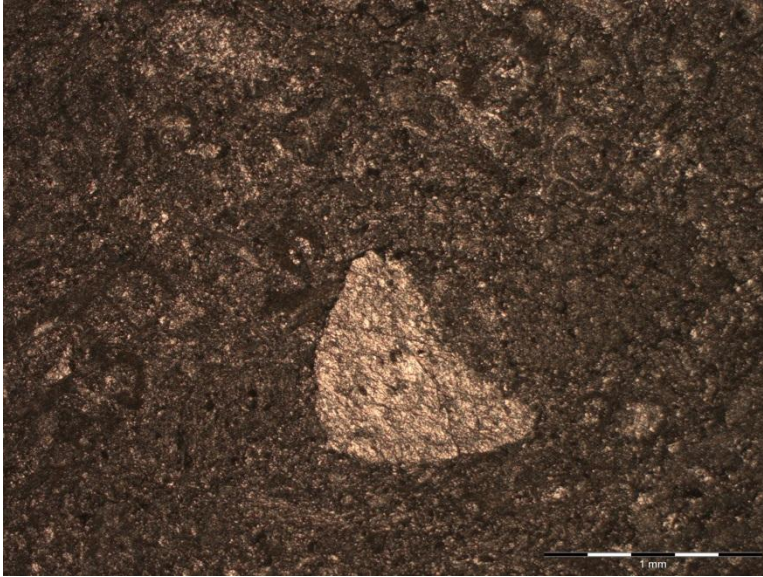
Sample P2. Photomicrograph of Pierson bed P2, a skeletal wackestone-packstone. This acetate peel is representative of bed P2 at Bentonville. This bed contains approximately equal amounts of crinoid and bryozoan bioclasts.



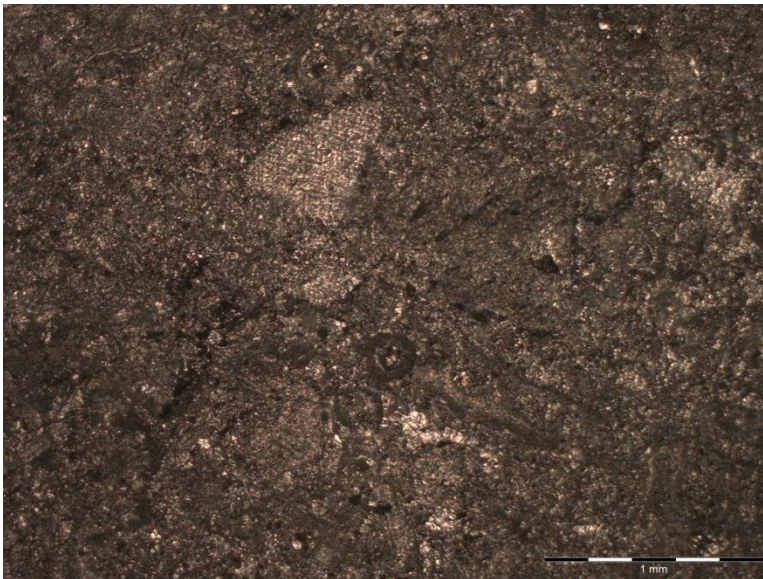
Sample P3. Photomicrograph of Pierson bed P3, a skeletal packstone. This acetate peel is representative of bed P3 at Bentonville. Dominant bioclasts are bryozoans, with lesser amounts of crinoids.



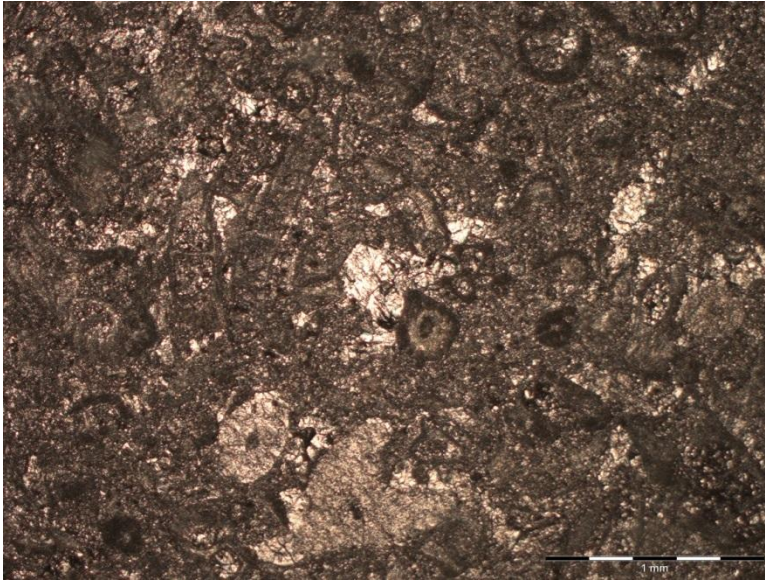
Sample P4. Photomicrograph of Pierson bed P4, a skeletal wackestone-packstone. This acetate peel is representative of bed P4 at Bentonville. Dominant bioclasts are bryozoans. Other skeletal grains include ostracodes and crinoids.



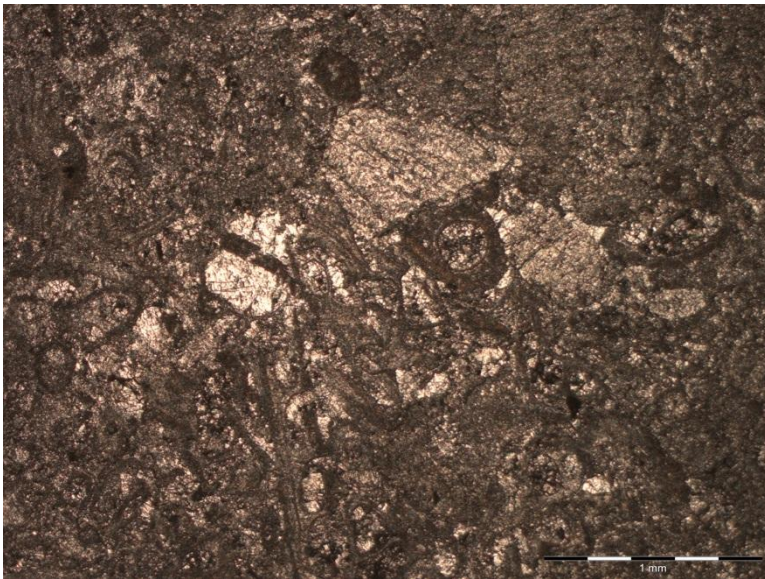
Sample P5. Photomicrograph of Pierson bed P5, a skeletal wackestone-packstone. This acetate peel is representative of bed P5 at Bentonville. Dominant bioclasts in P5 are bryozoans, with scarce amounts of crinoids.



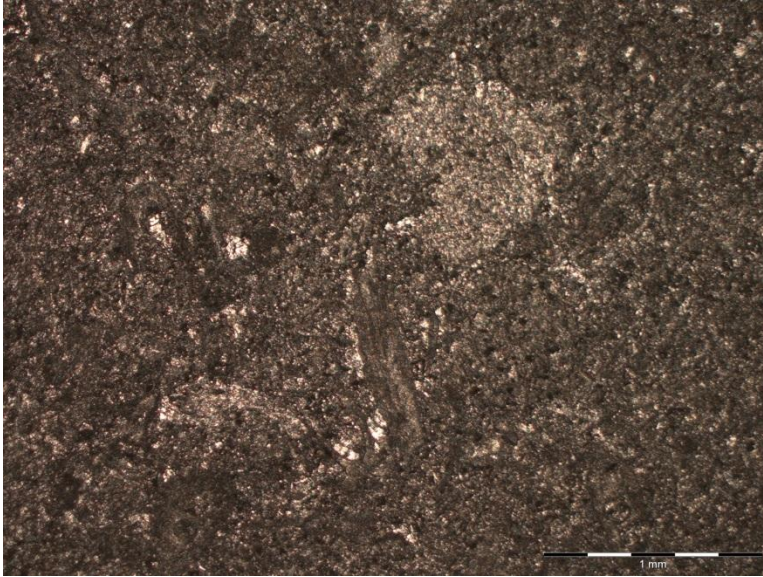
Sample P6. Photomicrograph of Pierson bed P6, a skeletal wackestone-packstone. This acetate peel is representative of bed P6 at Bentonville. Primary bioclasts are bryozoans. Other skeletal fragments include crinoids.



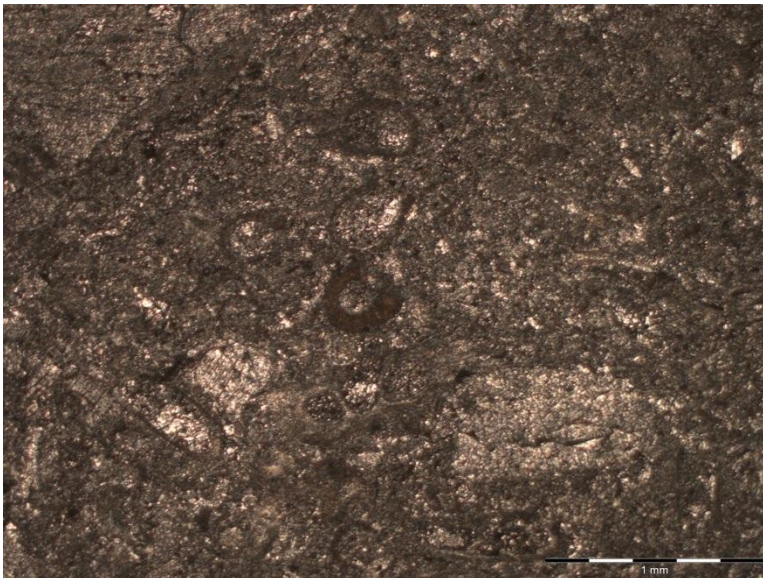
Sample P7. Photomicrograph of Pierson bed P7, a skeletal packstone. This acetate peel is representative of bed P7 at Bentonville. Dominant bioclasts are bryozoans and crinoids. Blocky calcite replaces some skeletal grains.



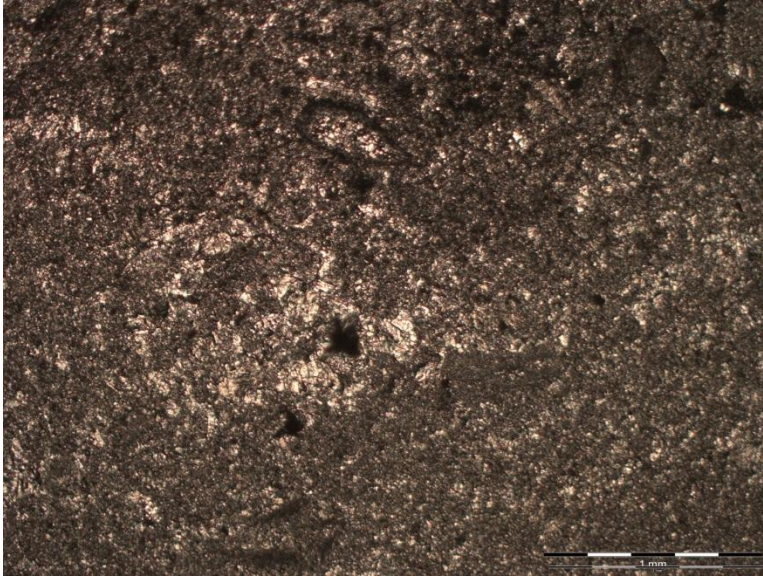
Sample P8. Photomicrograph of Pierson bed P8, a skeletal packstone. This acetate peel is representative of bed P8 at Bentonville. Dominant bioclasts are bryozoans, with lesser amounts of crinoids. Blocky calcite replaces some skeletal grains.



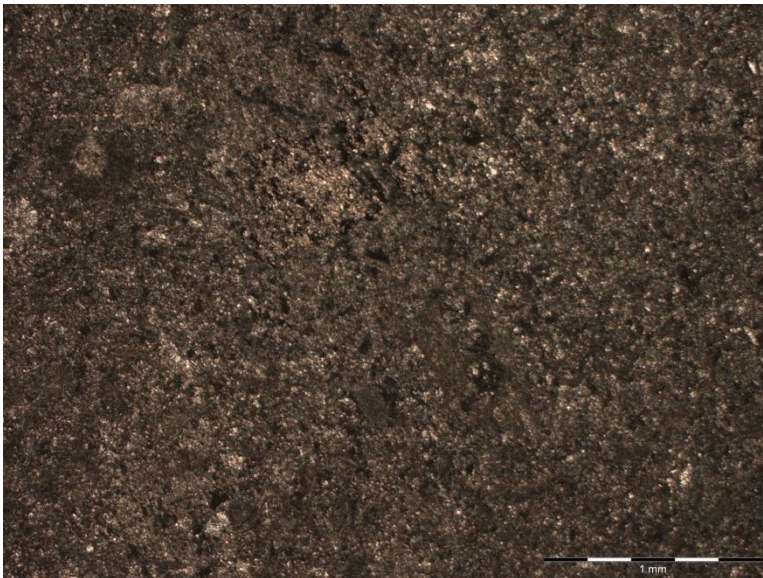
Sample P9. Photomicrograph of Pierson bed P9, a skeletal wackestone. This acetate peel is representative of bed P9 at Bentonville. Crinoids and bryozoans represent approximately equal amounts of skeletal fragments in this rock. Other bioclasts include brachiopods. Peloids occur in sparse amounts.



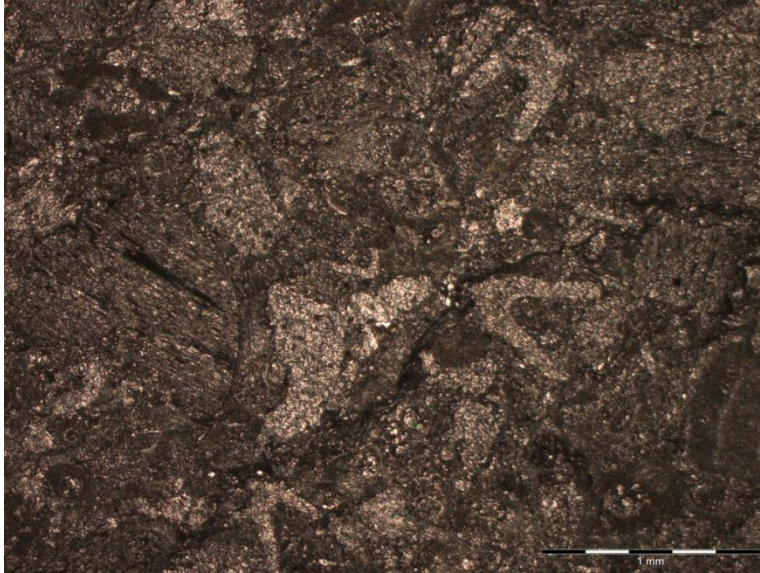
Sample P10. Photomicrograph of Pierson bed P10, a skeletal packstone-wackestone. This acetate peel is representative of bed P10 at Bentonville. Dominant bioclasts are bryozoans, with lesser amounts of crinoids.



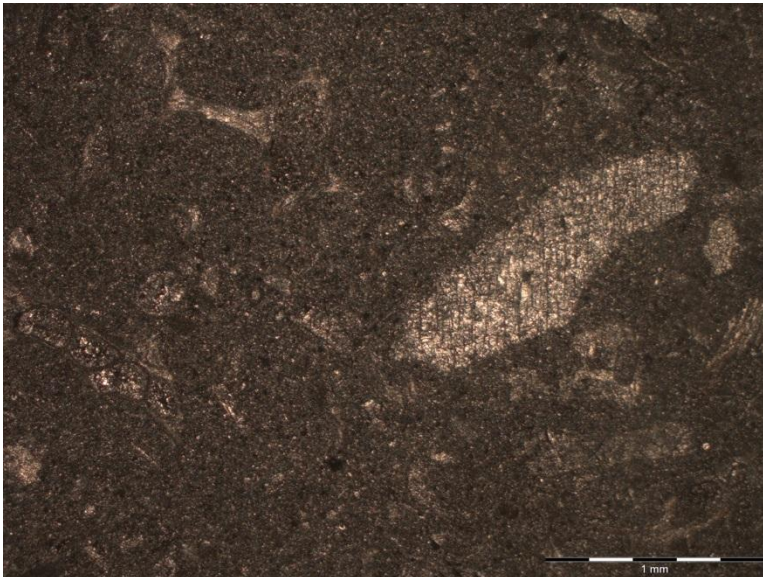
Sample P11. Photomicrograph of Pierson bed P11, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of bed P11 at Bentonville. Scarce skeletal fragments include bryozoans and crinoids. Non-skeletal grains include pyrite concretions.



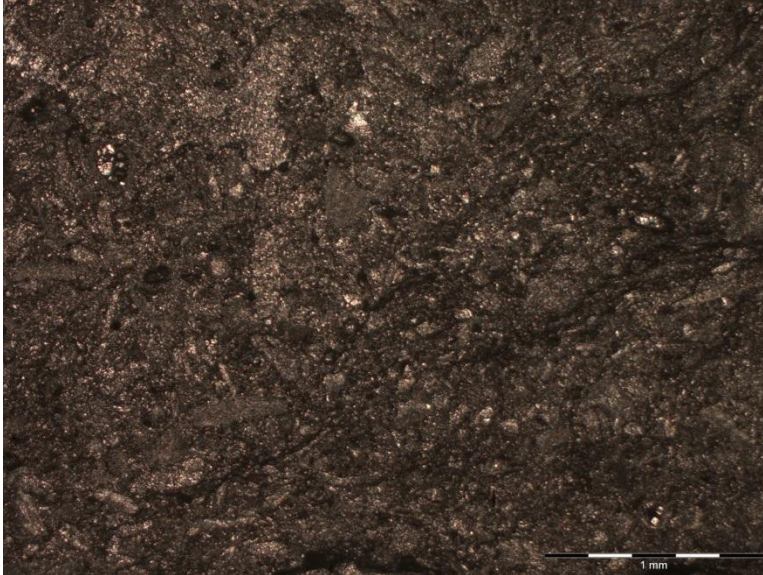
Sample P13. Photomicrograph of Pierson bed P13, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of bed P13 at Bentonville. Primary bioclasts are bryozoans. Dominant non-skeletal grains are fine-quartz silt.



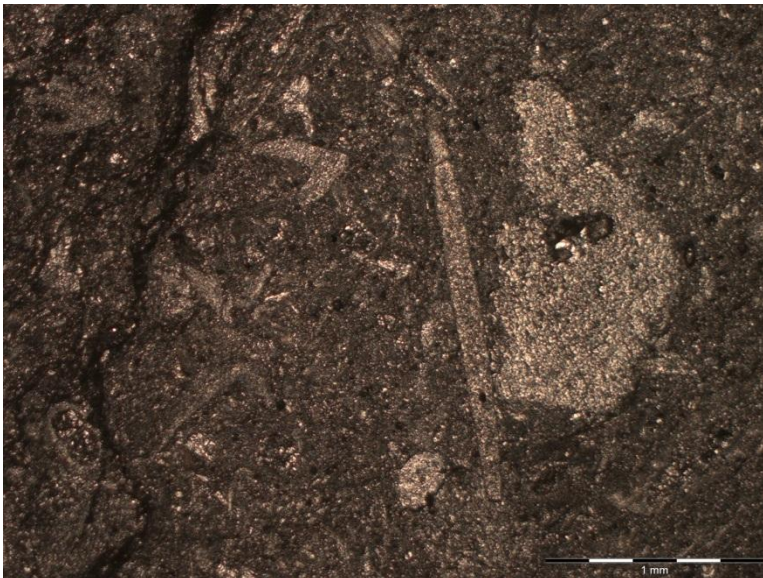
Sample P14. Photomicrograph of Pierson bed P14, a skeletal packstone. This acetate peel is representative of bed P14 at Bentonville. Dominant bioclasts are crinoids and bryozoans.



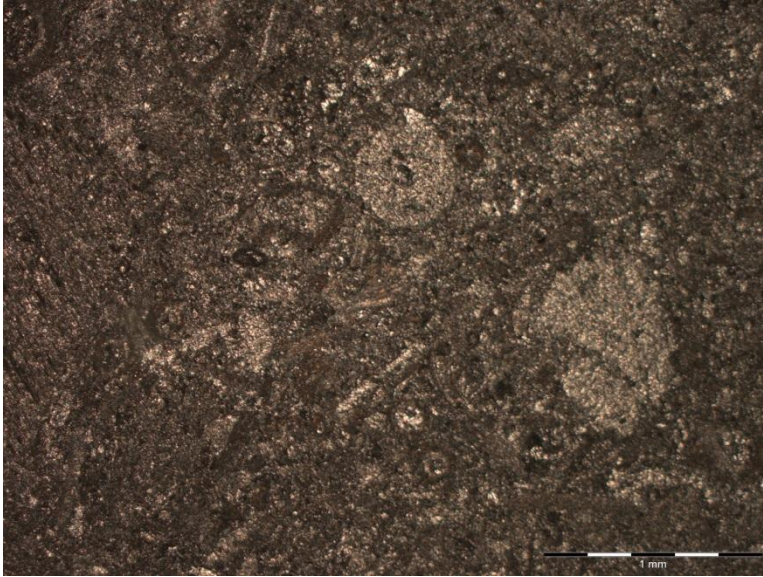
Sample P15. Photomicrograph of Pierson bed P15, a skeletal wackestone. This acetate peel is representative of bed P15 at Bentonville. Primary skeletal fragments are bryozoans, with lesser amounts of crinoids.



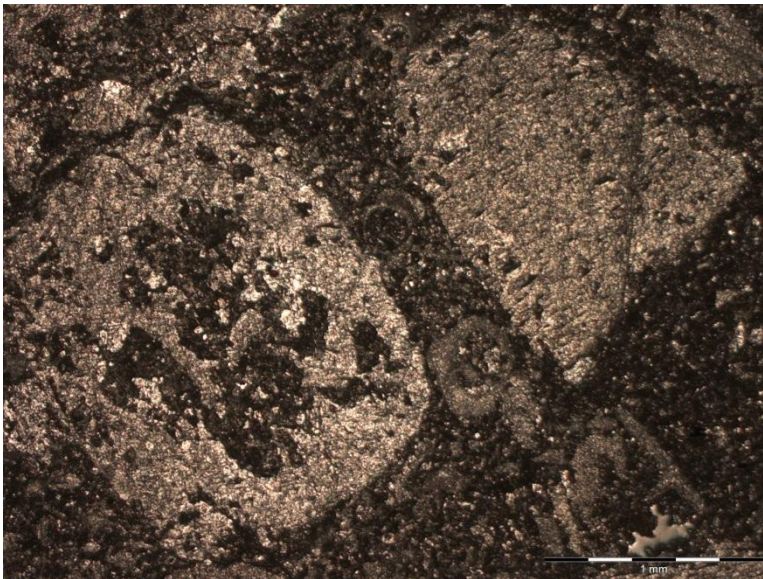
Sample P16. Photomicrograph of Pierson bed P16, a skeletal wackestone-packstone. This acetate peel is representative of bed P16 at Bentonville. Bryozoans and crinoids represent approximately equal amounts of bioclasts in this rock. Most skeletal grains are less than 0.25 mm in diameter. Fine-quartz silt occurs in scarce amounts.



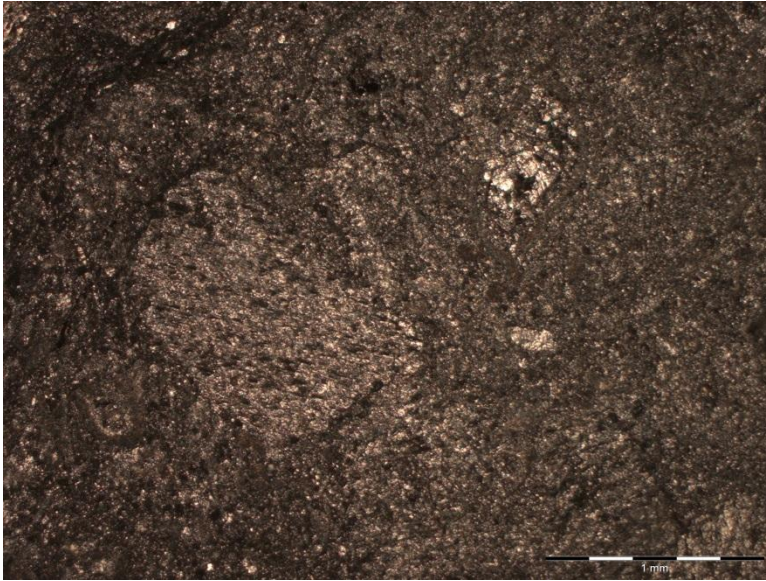
Sample P17. Photomicrograph of Pierson bed P17, a skeletal wackestone-packstone. This acetate peel is representative of bed P17 at Bentonville. Dominant bioclasts are crinoids and bryozoans. Traces of brachiopod fragments occur in this bed. Non-skeletal grains include quartz silt.



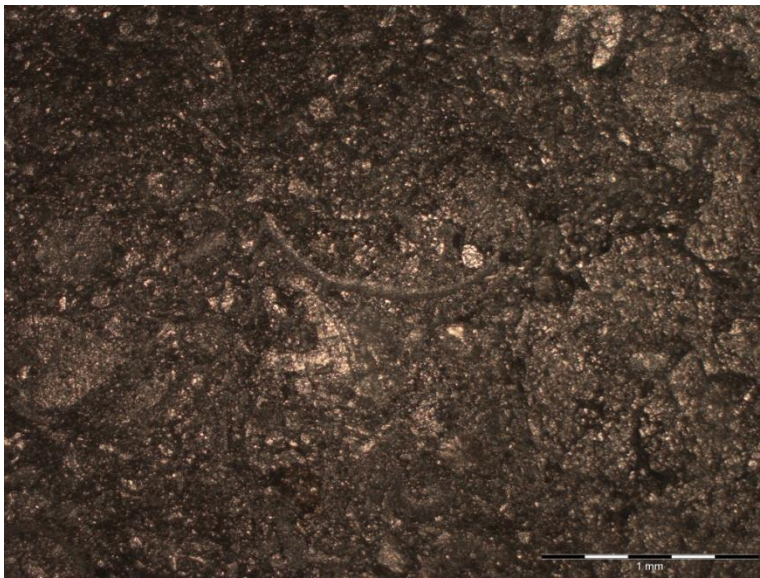
Sample P19. Photomicrograph of Pierson bed P19, a skeletal packstone-wackestone. This acetate peel is representative of bed P19 at Bentonville. Crinoids and bryozoans represent approximately equal amounts of bioclasts in this bed.



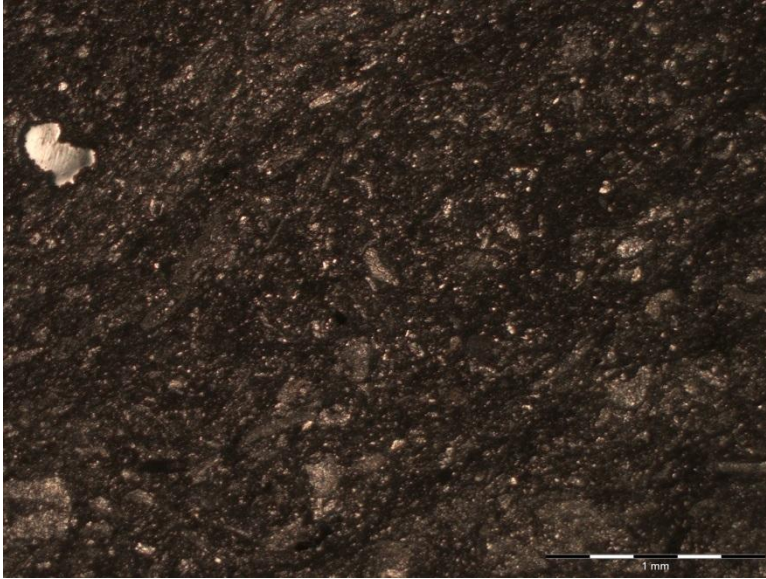
Sample P20. Photomicrograph of Pierson bed P20, a silty skeletal wackestone-packstone. This acetate peel is representative of bed P20 at Bentonville. Dominant bioclasts are large (> 1mm) crinoids, with lesser amounts of bryozoans. Non-skeletal grains include quartz silt and peloids. Image shows a grain-rich area.



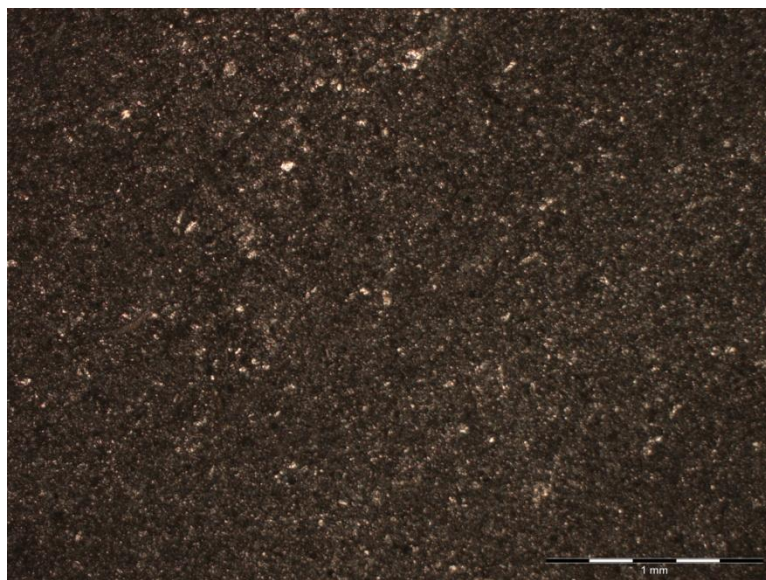
Sample P21. Photomicrograph of Pierson bed P21, a silty, sparse skeletal wackestone. This acetate peel is representative of bed P21 at Bentonville. Primary bioclasts include crinoids and bryozoans. Ostracodes occur in scarce amounts. Intraparticle blocky calcite fill some skeletal grains.



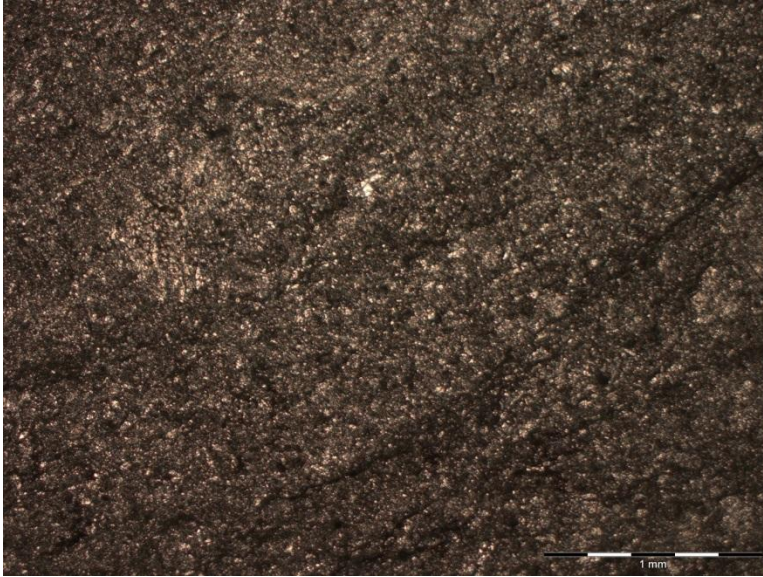
Sample P22. Photomicrograph of Pierson bed P22, a silty, sparse skeletal wackestone. This acetate peel is representative of bed P22 at Bentonville. Primary bioclasts are crinoids, with lesser amounts of brachiopods and bryozoans. Non-skeletal grains include quartz silt.



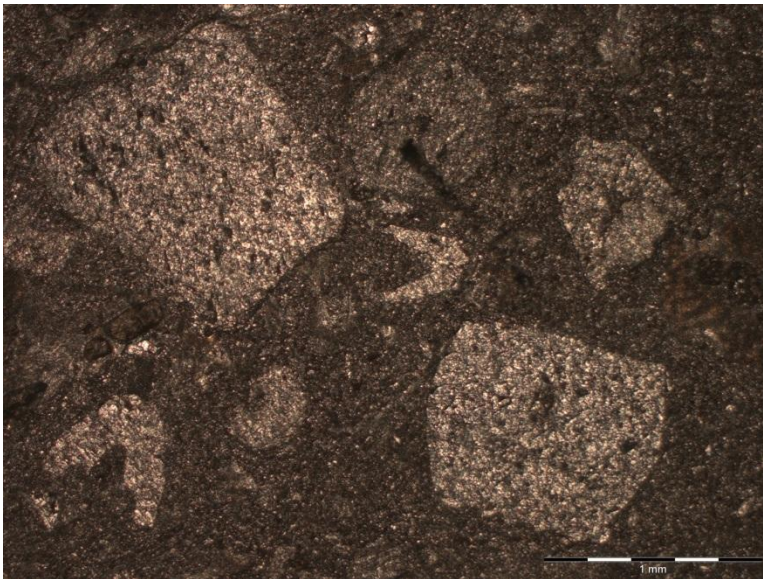
Sample P25. Photomicrograph of Pierson bed P25, a silty skeletal wackestone. This acetate peel is representative of bed P25 at Bentonville. Dominant bioclasts are crinoids bryozoans. Most skeletal fragments are less than 0.25 mm in diameter. Quartz silt make up the primary non-skeletal grains.



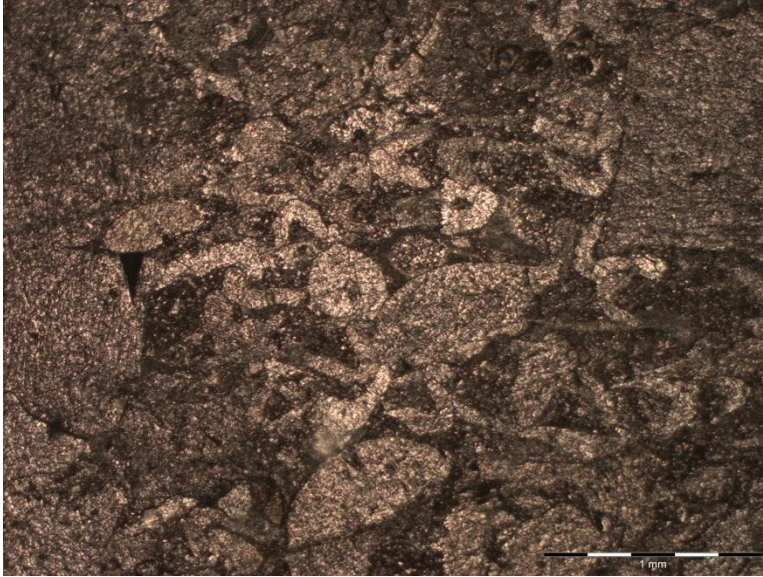
Sample P28. Photomicrograph of Pierson bed P28, a mudstone-silty wackestone. This acetate peel is representative of bed P28 at Bentonville. Scarce bioclasts are bryozoans and crinoids. Primary non-skeletal grains are quartz silt.



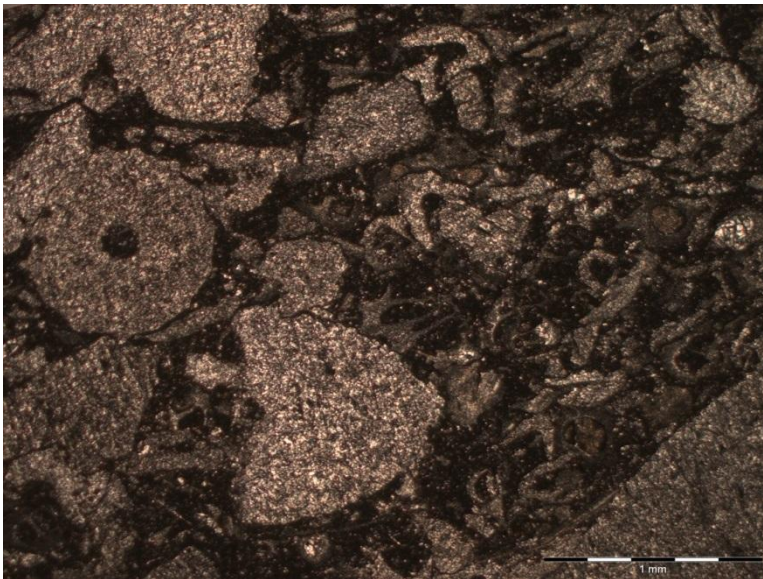
Sample P29. Photomicrograph of Pierson bed P29, a skeletal silty wackestone. This acetate peel is representative of bed P29 at Bentonville. Crinoids occur in scarce amounts. Non-skeletal grains include quartz silt.



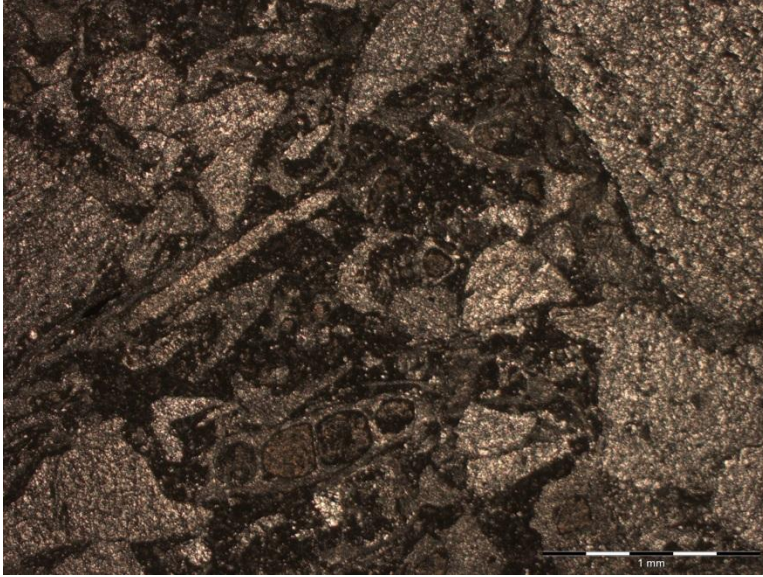
Sample P30. Photomicrograph of Pierson bed P30, a skeletal wackestone. This acetate peel is representative of bed P30 at Bentonville. Dominant bioclasts are crinoids, with lesser amounts of bryozoans.



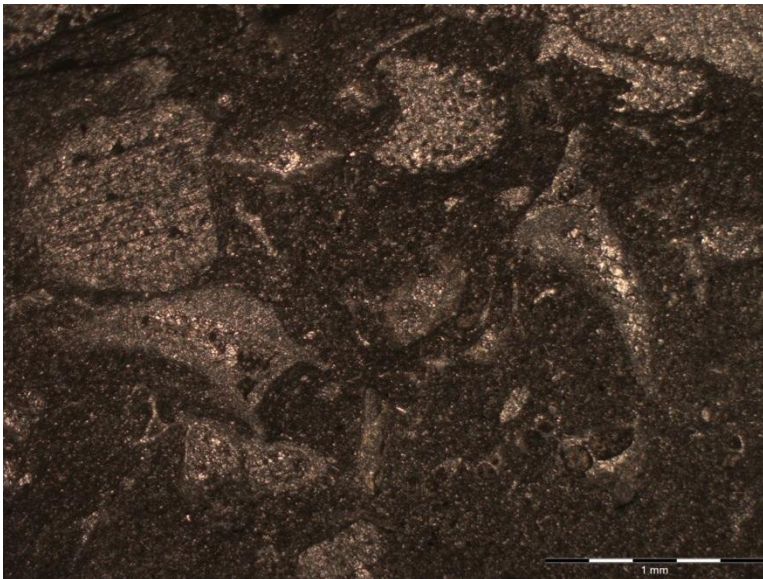
Sample P32. Photomicrograph of Pierson bed P32, a crinoidal packstone. This acetate peel is representative of bed P32 at Bentonville. Dominant bioclasts are crinoids. Other skeletal fragments include ostracodes and bryozoans.



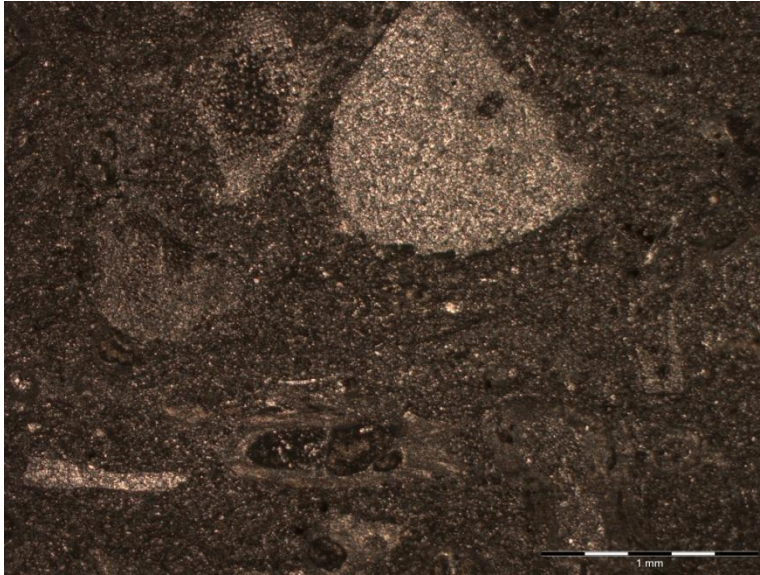
Sample P33. Photomicrograph of Pierson bed P33, a skeletal packstone-wackestone. This acetate peel is representative of bed P33 at Bentonville. Dominant bioclasts are crinoids, with lesser amounts of bryozoans. Quartz silt occurs in trace amounts.



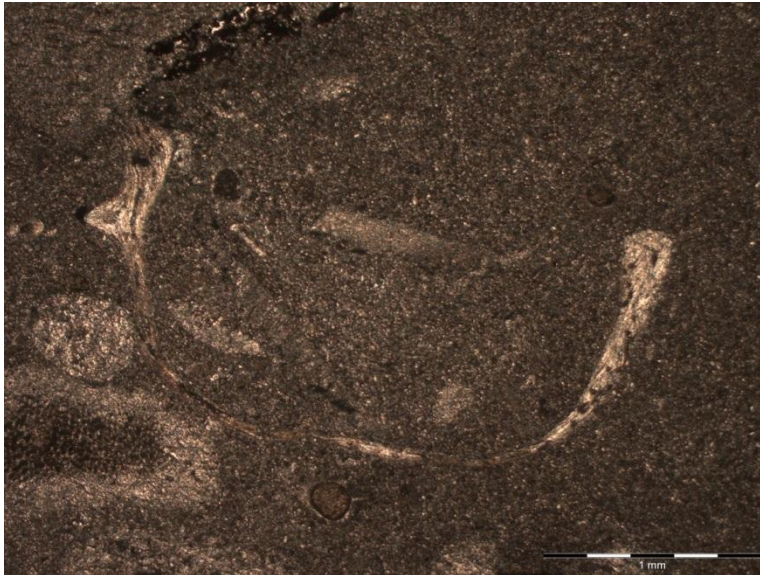
Sample P34. Photomicrograph of Pierson bed P34, a skeletal packstone-wackestone. This acetate peel is representative of bed P34 at Bentonville. Dominant bioclasts are crinoids and bryozoans.



Sample P35. Photomicrograph of Pierson bed P35, a skeletal wackestone. This acetate peel is representative of bed P35 at Bentonville. Crinoids and bryozoans occur in approximately equal amounts in this bed.

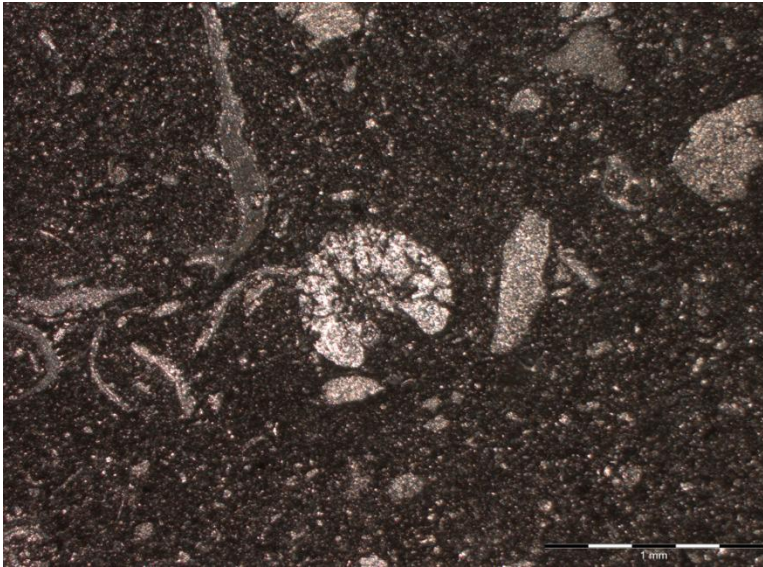


Sample P36. Photomicrograph of Pierson bed P36, a skeletal wackestone. This acetate peel is representative of bed P36 at Bentonville. Dominant bioclasts are crinoids and bryozoans, occurring in approximately equal amounts.

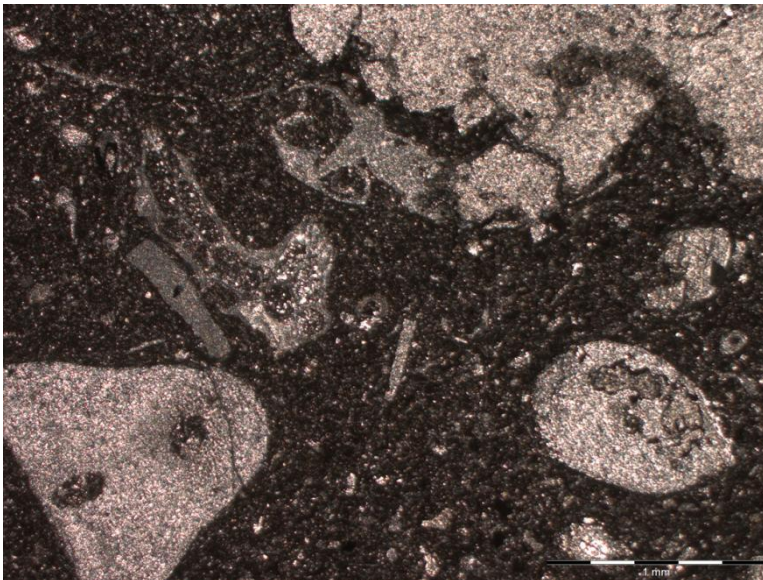


Sample RS1. Photomicrograph of Reeds Spring bed RS1, a skeletal wackestone-mudstone. This acetate peel is representative of bed RS1 at Bentonville. Sparse bioclasts include crinoids, brachiopods, and bryozoans. Image shows a grain-rich area.

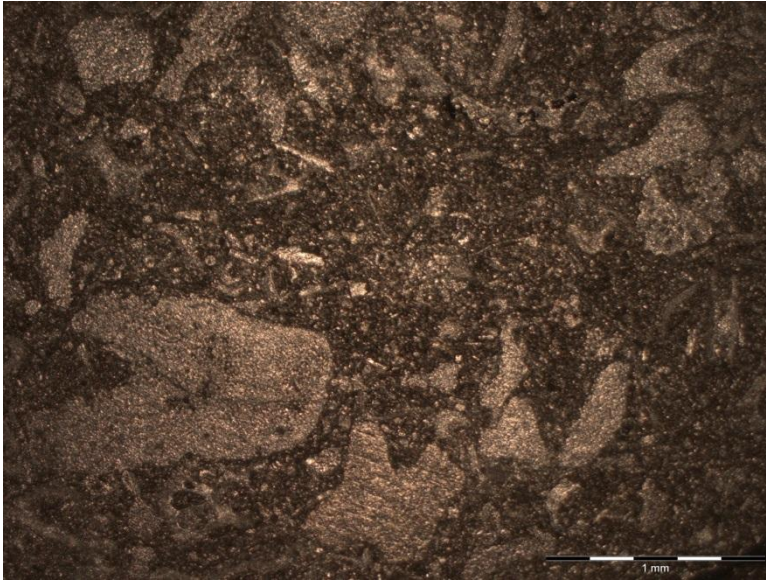
Siloam Springs (South), Arkansas:



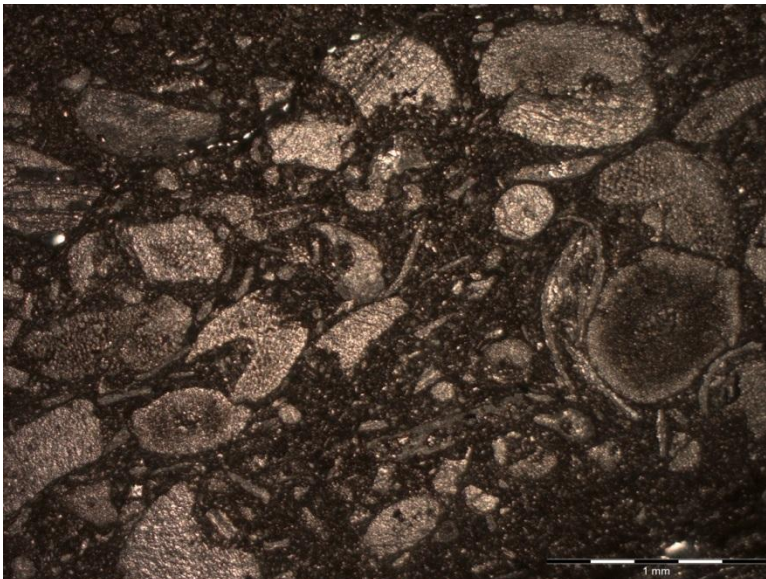
Sample C1. Photomicrograph of Compton bed C1, a silty skeletal wackestone. This acetate peel is representative of bed C1 at Siloam Springs (South). Primary bioclasts include crinoids and bryozoans of approximately equal amounts. Other skeletal grains identified in this bed are brachiopods and conodonts. Non-skeletal grains include peloids and quartz silt.



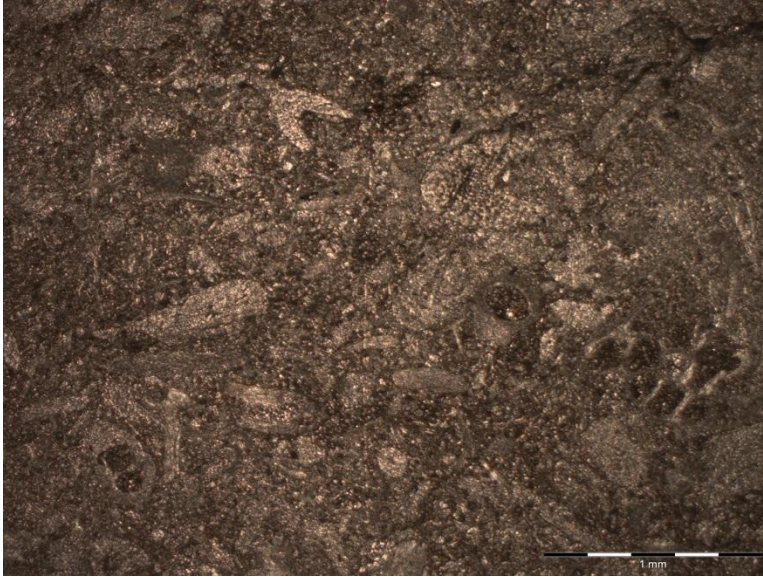
Sample C2. Photomicrograph of Compton bed C2, a silty skeletal wackestone. This acetate peel is representative of bed C2 at Siloam Springs (South). Crinoids represent the primary bioclasts in this bed. Bryozoans occur in sparse amounts. Non-skeletal grains include quartz silt and peloids.



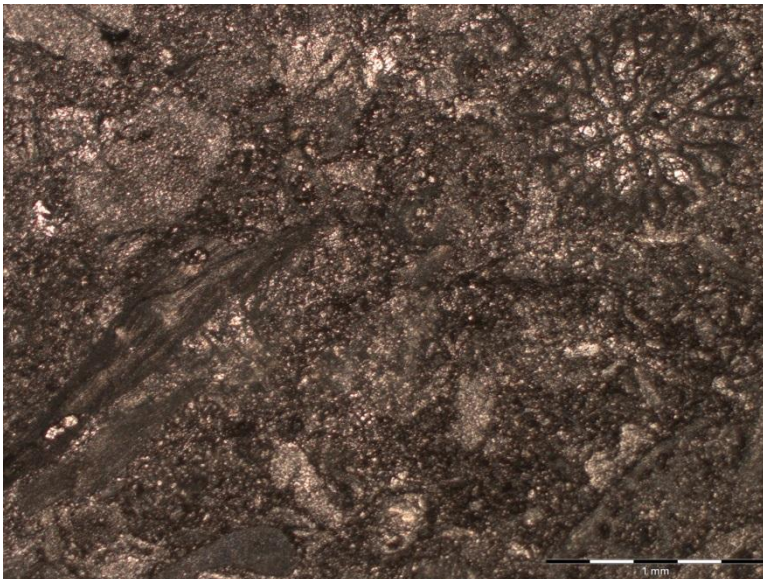
Sample C3. Photomicrograph of Compton bed C3, a silty skeletal wackestone-packstone. This acetate peel is representative of bed C3 at Siloam Springs (South). Primary bioclasts include crinoids and bryozoans. Non-skeletal grains include peloids.



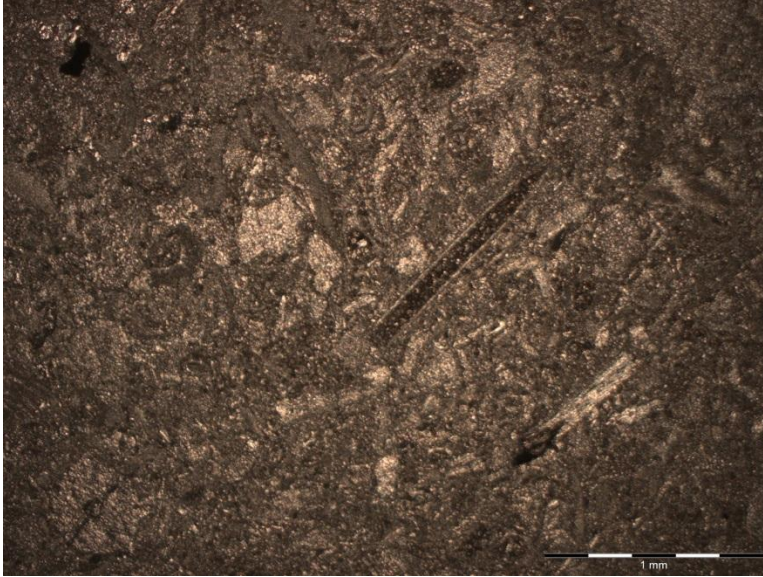
Sample C4. Photomicrograph of Compton bed C4, a skeletal wackestone-packstone. This acetate peel is representative of bed C4 at Siloam Springs (South). Primary bioclasts are crinoids, with lesser amounts of bryozoans and ostracodes. Peloids occur in trace amounts.



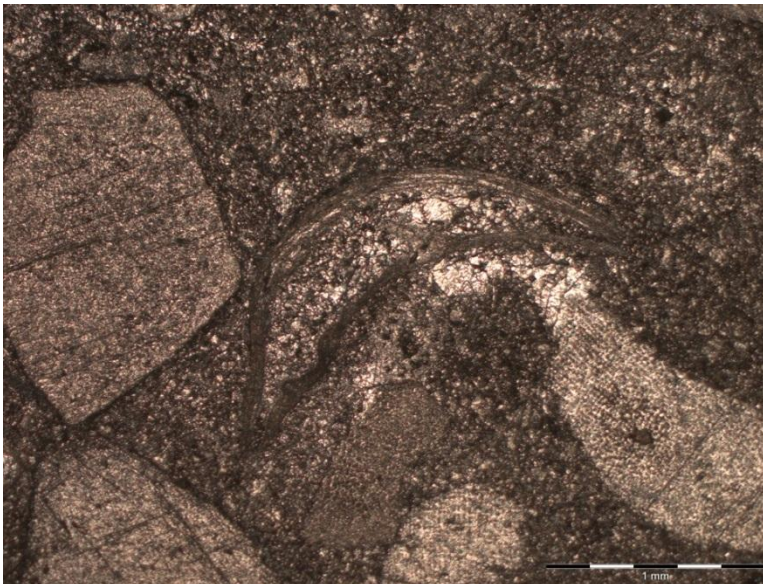
Sample C5. Photomicrograph of Compton bed C5, a skeletal packstone. This acetate peel is representative of bed C5 at Siloam Springs (South). Primary bioclasts are crinoids and bryozoans. Non-skeletal grains include peloids and quartz silt.



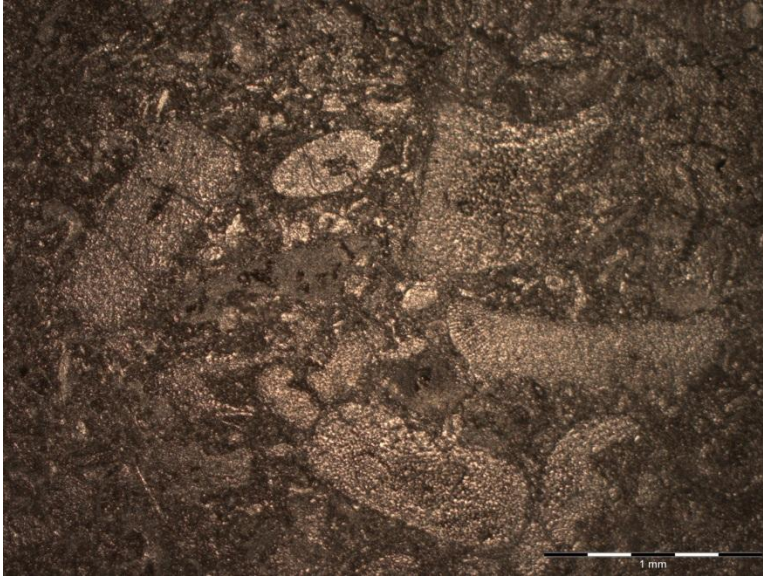
Sample C6. Photomicrograph of Compton bed C6, a silty skeletal packstone. This acetate peel is representative of bed C6 at Siloam Springs (South). Dominant skeletal fragments are bryozoans, with lesser amounts of crinoids and brachiopods. Peloids and quartz silt make up the primary non-skeletal grains.



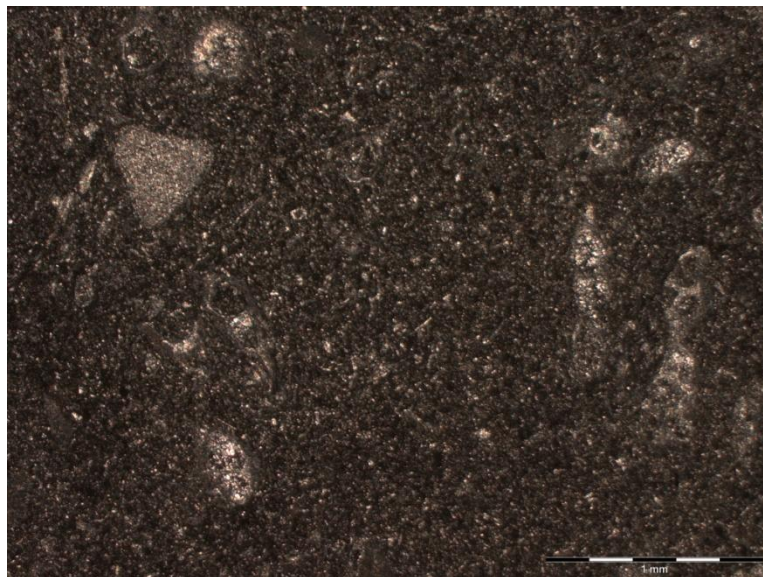
Sample C7. Photomicrograph of Compton bed C7, a skeletal packstone. This acetate peel is representative of bed C7 at Siloam Springs (South). Primary bioclasts include crinoids and bryozoans. Trilobites occur in scarce amounts. Non-skeletal grains are quartz silt and pyrite.



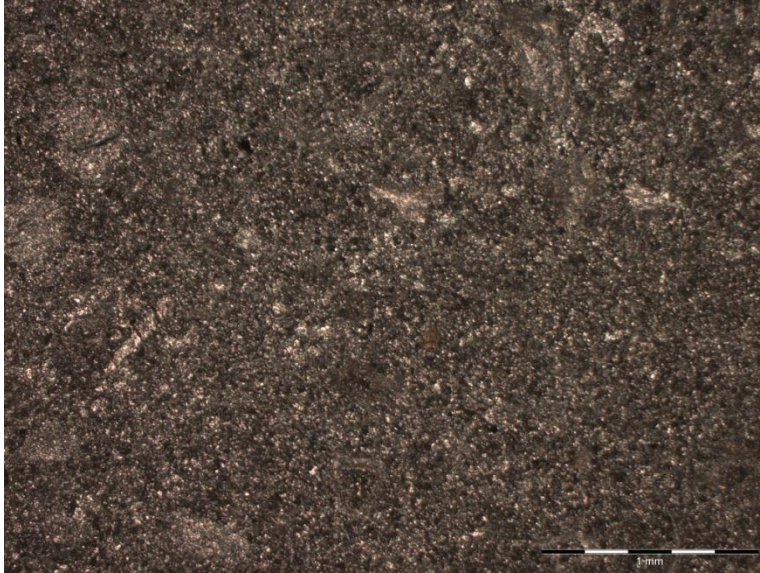
Sample C8. Photomicrograph of Compton bed C8, a skeletal packstone-wackestone. This acetate peel is representative of bed C8 at Siloam Springs (South). Dominant bioclasts are crinoids. Brachiopods occur in sparse amounts. Non-skeletal grains include peloids and quartz silt.



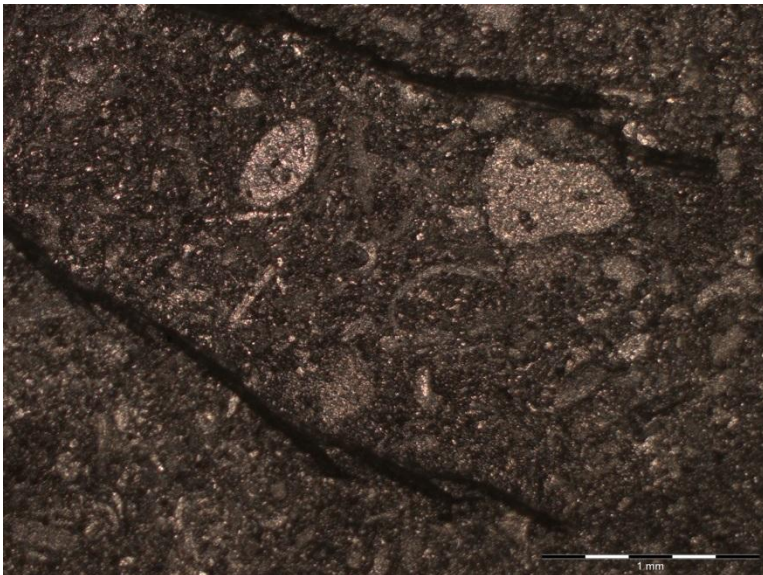
Sample C9. Photomicrograph of Compton bed C9, a skeletal packstone. This acetate peel is representative of bed C9 at Siloam Springs (South). Primary bioclasts include crinoids and sparse bryozoans.



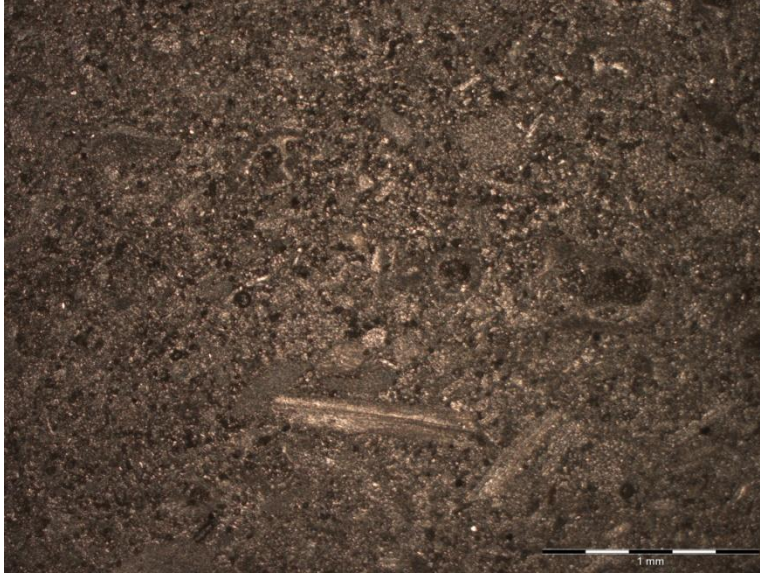
Sample NV3. Photomicrograph of Northview bed NV3, a silty skeletal wackestone. This acetate peel is representative of bed NV3 at Siloam Springs (South). Primary bioclasts are bryozoans, with scarce amounts of crinoids. Non-skeletal grains include peloids and quartz silt.



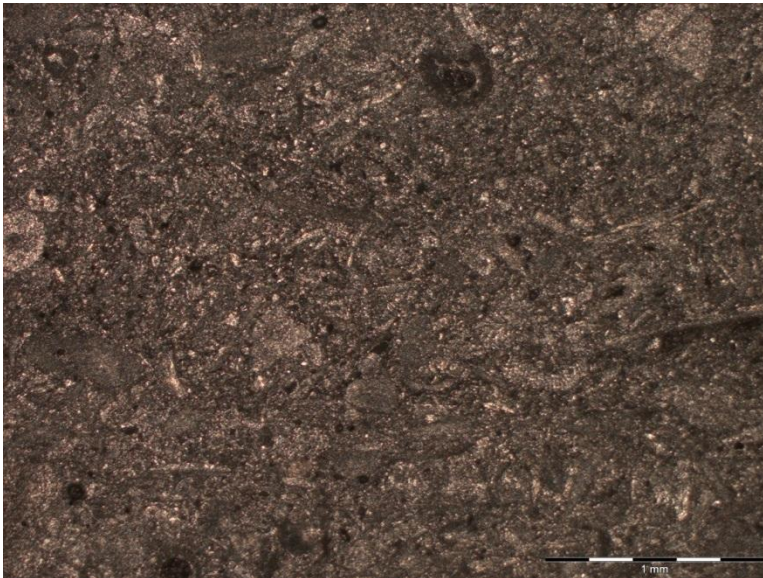
Sample P1. Photomicrograph of Pierson bed P1, a silty, sparse skeletal wackestone. This acetate peel is representative of bed P1 at Siloam Springs (South). Primary bioclasts include crinoids and bryozoans of approximately equal amounts. Quartz silt and peloids make up the dominant non-skeletal grains.



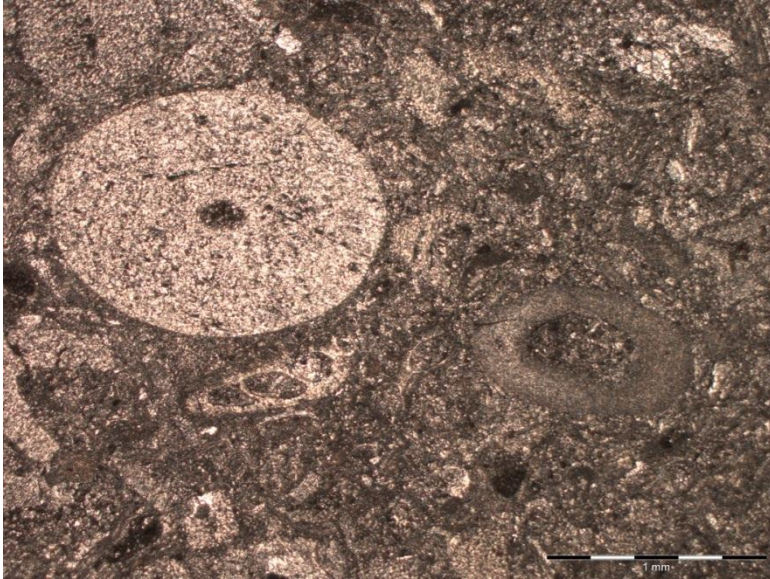
Sample P2. Photomicrograph of Pierson bed P2, a skeletal wackestone-packstone. This acetate peel is representative of bed P2 at Siloam Springs (South). Crinoids and bryozoans are the dominant skeletal fragments. Non-skeletal grains include quartz silt and peloids.



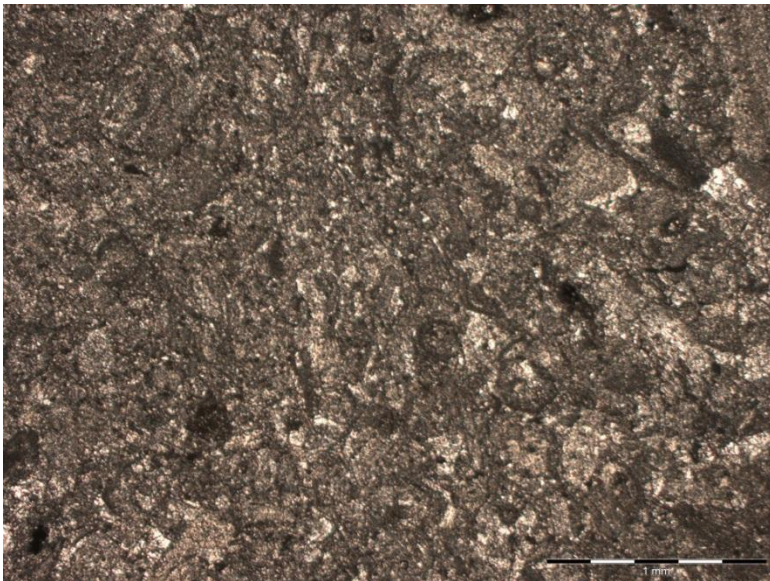
Sample P3. Photomicrograph of Pierson bed P3, a skeletal packstone-wackestone. This acetate peel is representative of bed P3 at Siloam Springs (South). Primary bioclasts include bryozoans, with lesser amounts of brachiopods. Non-skeletal grains include quartz silt and peloids.



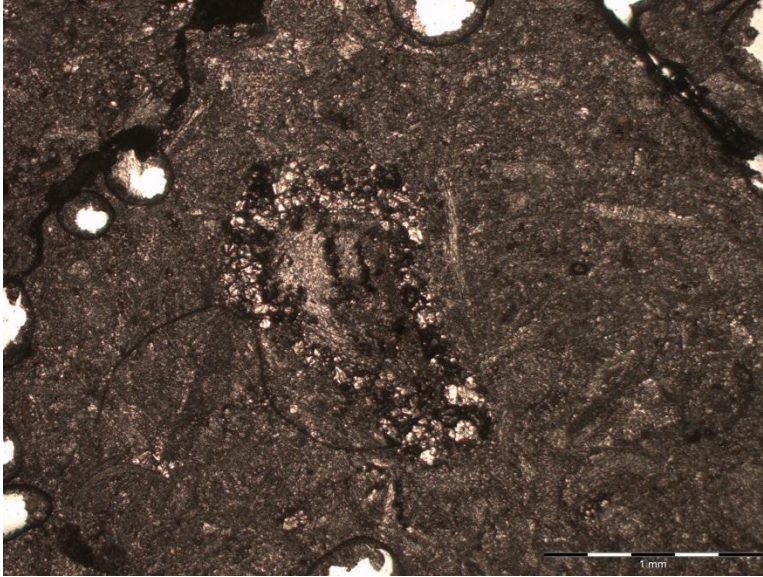
Sample P4. Photomicrograph of Pierson bed P4, a skeletal packstone. This acetate peel is representative of bed P4 at Siloam Springs (South). Bryozoans and crinoids are the dominant skeletal fragments. Non-skeletal grains include quartz silt and peloids.



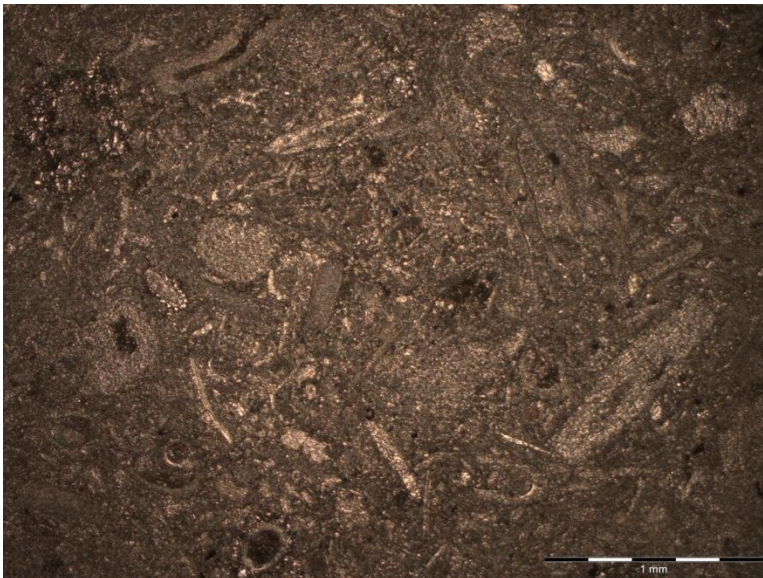
Sample P5. Photomicrograph of Pierson bed P5, a skeletal packstone. This acetate peel is representative of bed P5 at Siloam Springs (South). Dominant bioclasts include crinoids and bryozoans.



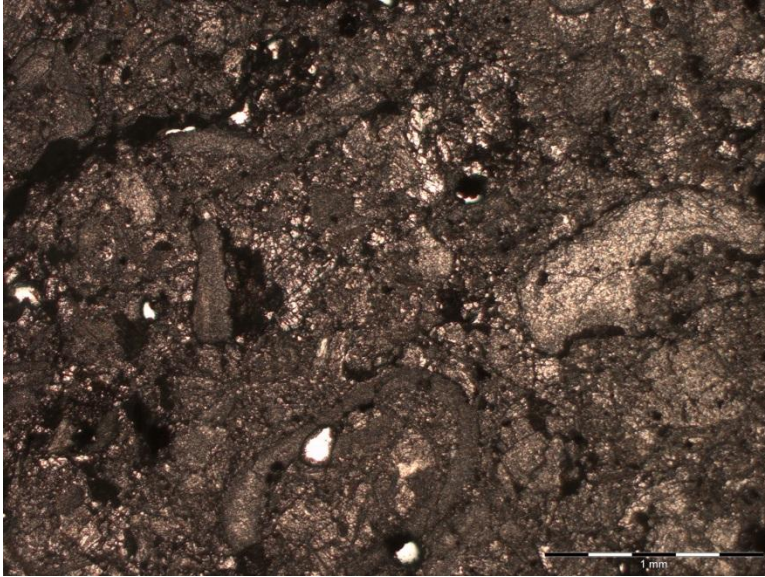
Sample P6. Photomicrograph of Pierson bed P6, a skeletal packstone with recrystallization. This acetate peel is representative of bed P6 at Siloam Springs (South). Crinoids and bryozoans are the dominant skeletal fragments. Many bioclasts are unidentifiable.



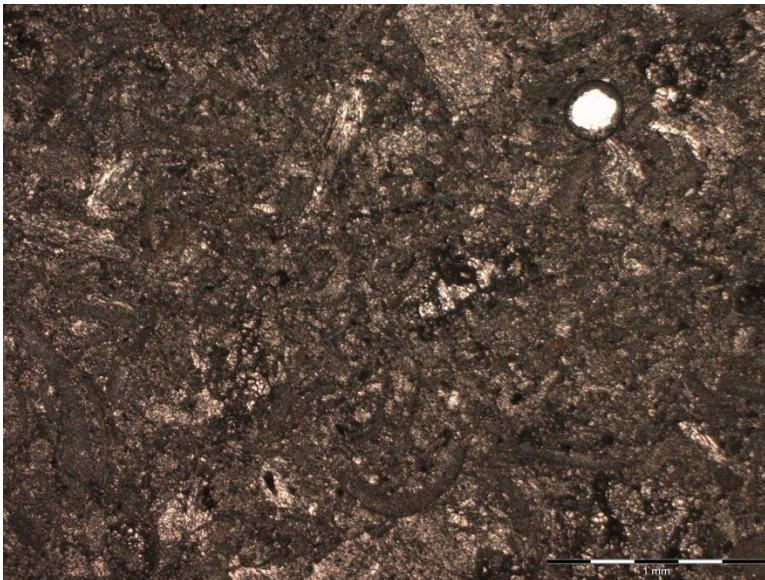
Sample P7. Photomicrograph of Pierson bed P7, a skeletal packstone-wackestone. This acetate peel is representative of bed P7 at Siloam Springs (South). Crinoids and bryozoans are the dominant skeletal fragments. Intraparticle blocky calcite occurs in some skeletal grains. White circles are air bubbles in the acetate peel.



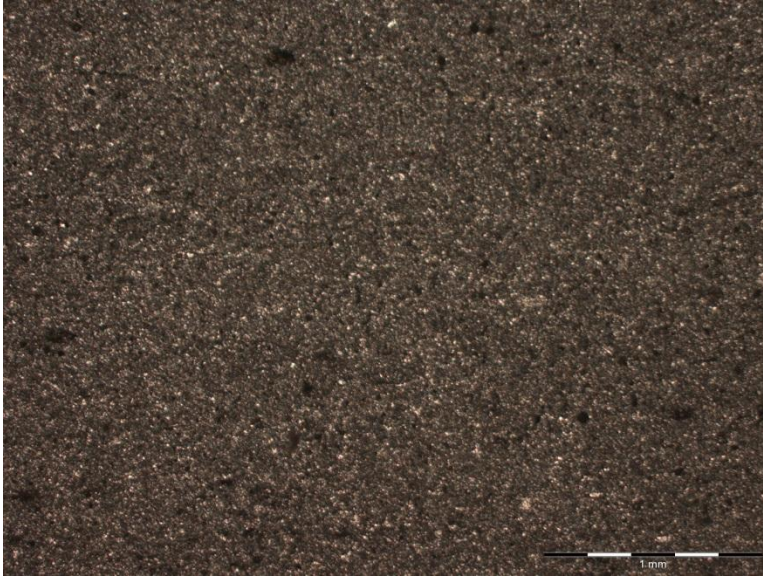
Sample P8. Photomicrograph of Pierson bed P8, a skeletal packstone. This acetate peel is representative of bed P8 at Siloam Springs (South). Dominant bioclasts are crinoids and bryozoans.



Sample P9. Photomicrograph of Pierson bed P9, a skeletal packstone with recrystallization. This acetate peel is representative of bed P9 at Siloam Springs (South). Crinoids and bryozoans are the dominant skeletal fragments. Trace amounts of brachiopods occur in this bed. Primary non-skeletal grains pyrite concretions.

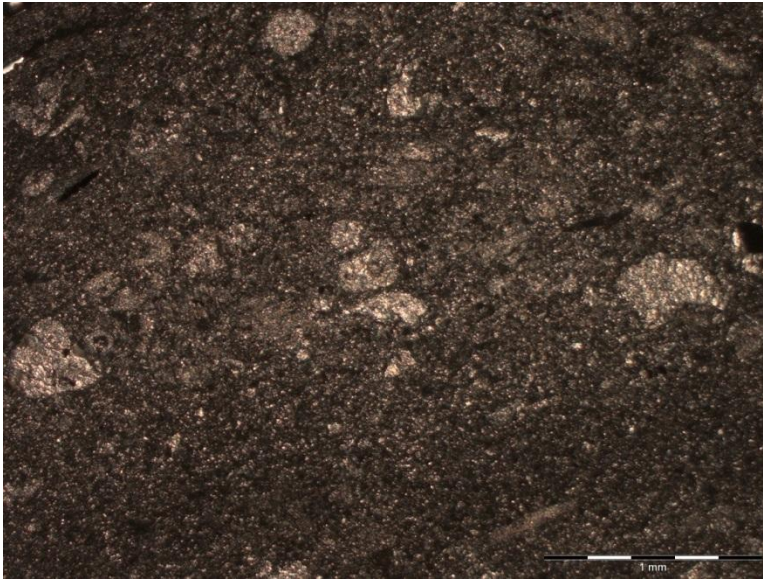


Sample P10. Photomicrograph of Pierson bed P10, a skeletal packstone. This acetate peel is representative of bed P10 at Siloam Springs (South). Bryozoans and crinoids are the dominant skeletal fragments.

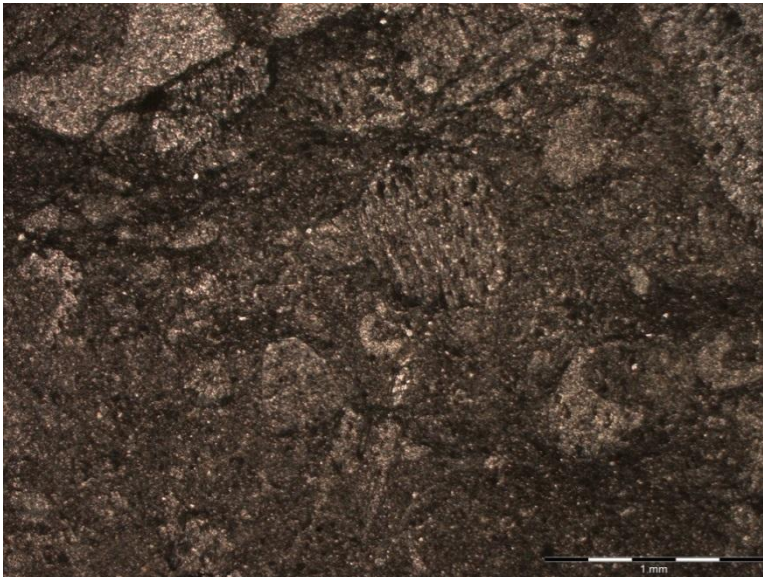


Sample RS1. Photomicrograph of Reeds Spring bed RS1, a silt-rich mudstone. This acetate peel is representative of bed RS1 at Siloam Springs (South). Rare bioclasts include crinoids. Non-skeletal grains include quartz silt and scarce amounts of pyrite concretions and peloids.

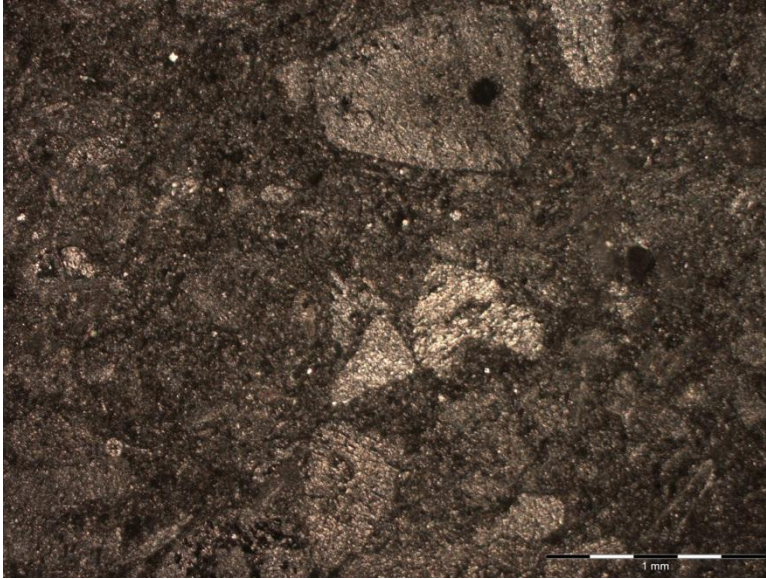
Kansas, Oklahoma:



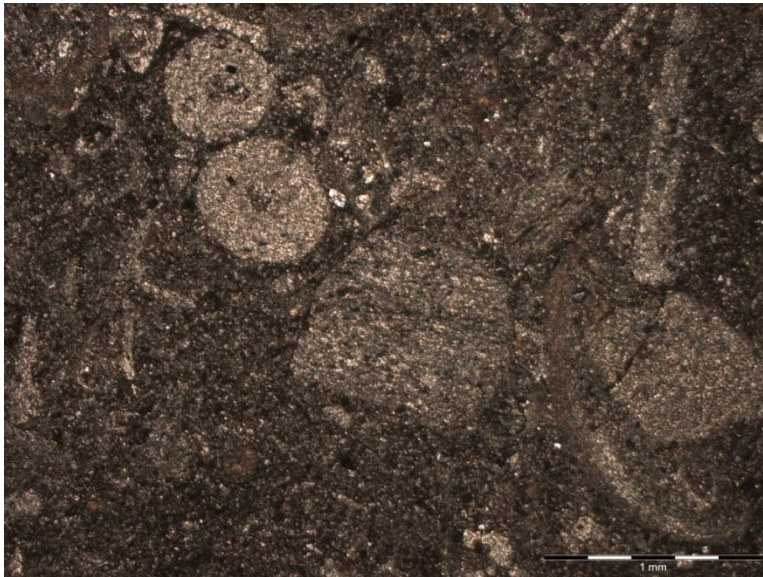
Sample C1. Photomicrograph of Compton bed C1, a silty skeletal wackestone. This acetate peel is representative of bed C1 at the Kansas section. Crinoids are the dominant skeletal fragments. Quartz silt and peloids commonly occur in this bed. Other non-skeletal grains include sand-size pyrite concretions.



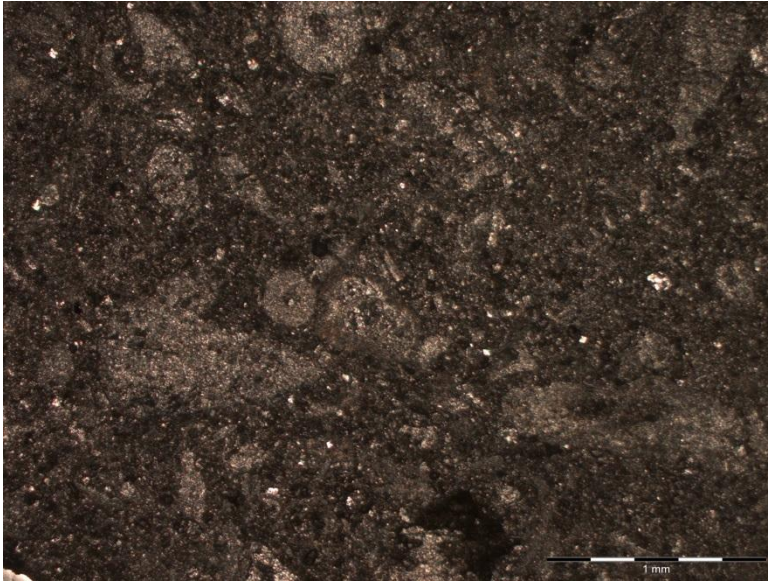
Sample C2. Photomicrograph of Compton bed C2, a skeletal wackestone-packstone. This acetate peel is representative of bed C2 at the Kansas section. Crinoids are the dominant bioclasts in this bed. Primary non-skeletal grains include quartz silt and peloids.



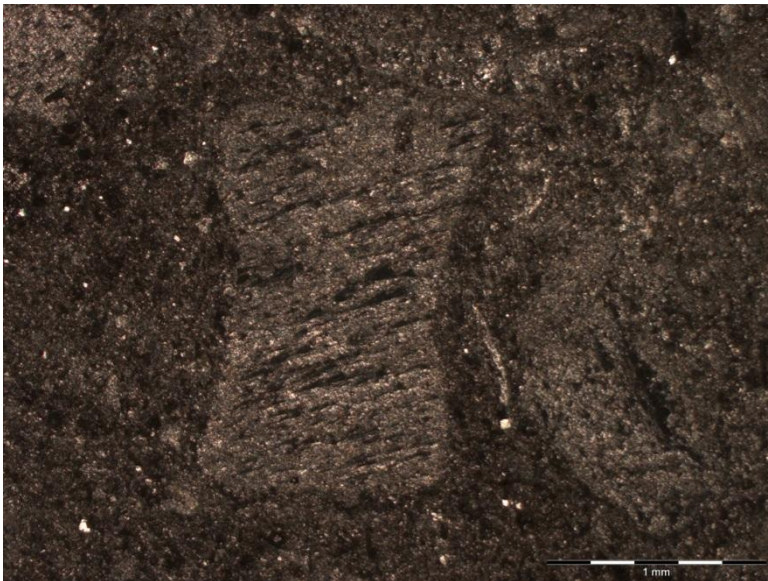
Sample C3. Photomicrograph of Compton bed C3, a silty skeletal wackestone-packstone. This acetate peel is representative of bed C3 at the Kansas section. Crinoids are the dominant skeletal fragments, with lesser amounts of bryozoans. Non-skeletal grains include quartz silt and peloids.



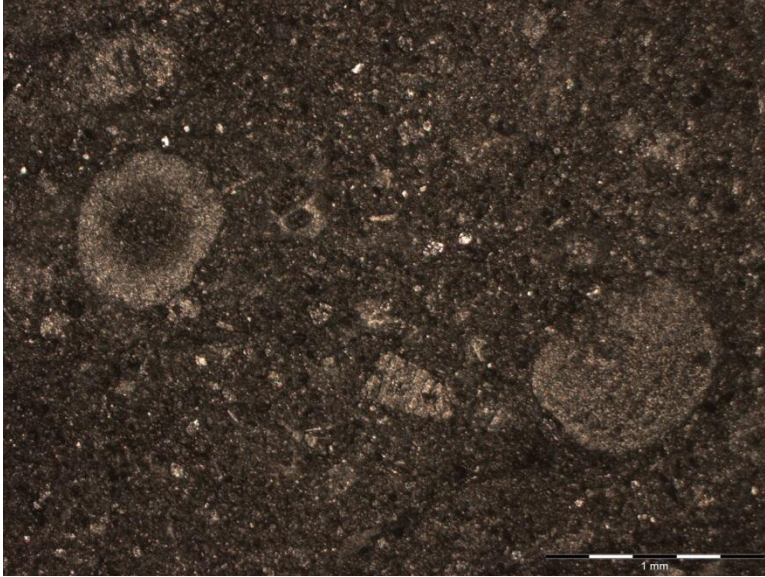
Sample C4. Photomicrograph of Compton bed C4, a skeletal wackestone-packstone. This acetate peel is representative of bed C4 at the Kansas section. Dominant bioclasts are crinoids, with lesser amounts of bryozoans and brachiopods. Primary non-skeletal grains include peloids and quartz silt.



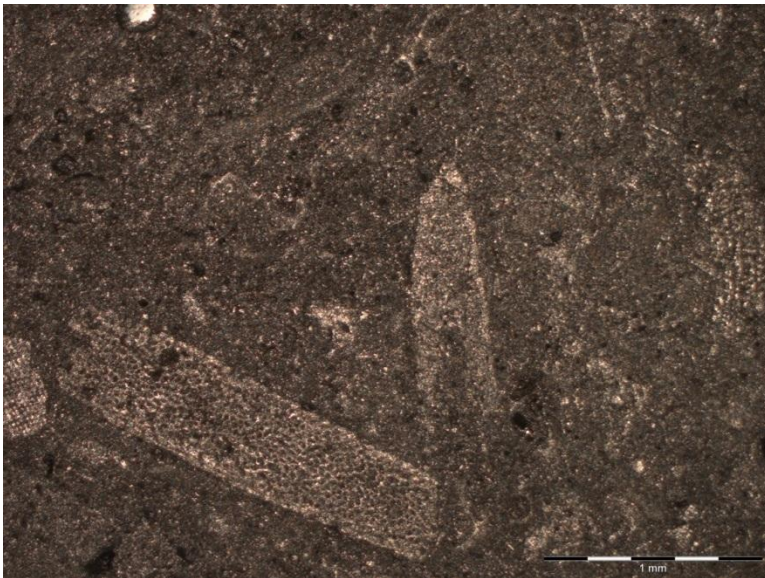
Sample C5. Photomicrograph of Compton bed C5, a silty skeletal wackestone-packstone. This acetate peel is representative of bed C5 at the Kansas section. Crinoids and bryozoans are the dominant skeletal fragments. Primary non-skeletal grains include quartz silt and peloids.



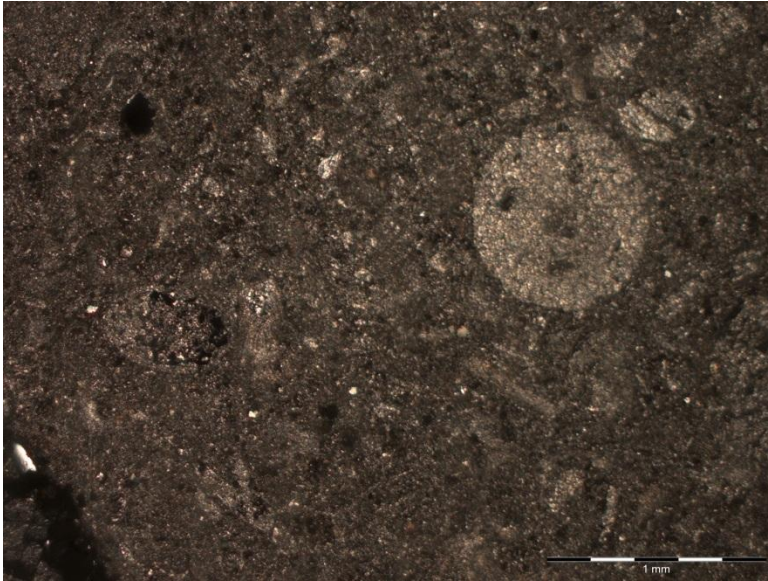
Sample C6. Photomicrograph of Compton bed C6, a skeletal wackestone-packstone and contains mostly crinoid bioclasts. Other skeletal grains identified in this bed are bryozoan fragments. This acetate peel is representative of bed C6 at the Kansas section. Non-skeletal grains include peloids and quartz silt.



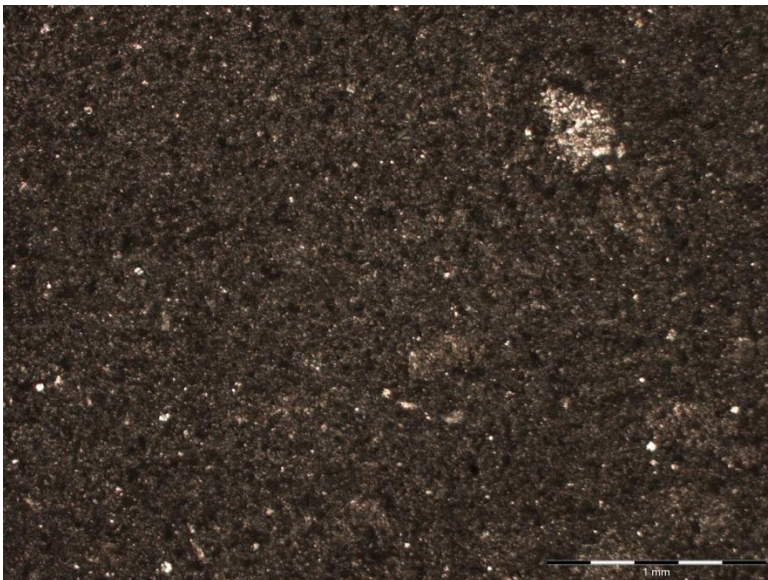
Sample C7. Photomicrograph of Compton bed C7, a silty skeletal wackestone. This acetate peel is representative of bed C7 at the Kansas section. Crinoids are the dominant bioclasts, with lesser amounts of bryozoans. Quartz silt and peloids make up the primary non-skeletal grains.



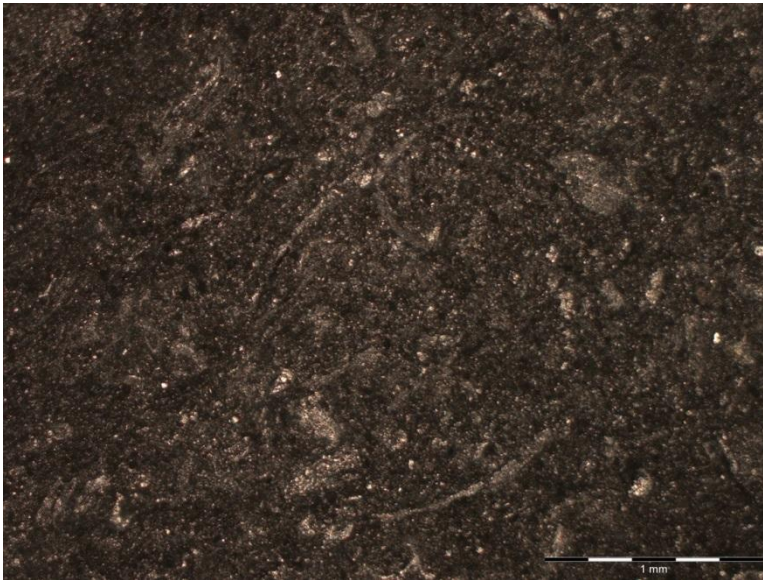
Sample C8. Photomicrograph of Compton bed C8, a skeletal wackestone-packstone. This acetate peel is representative of bed C8 at the Kansas section. Crinoids are the dominant skeletal fragments. Non-skeletal grains include sand-size pyrite concretions and quartz silt.



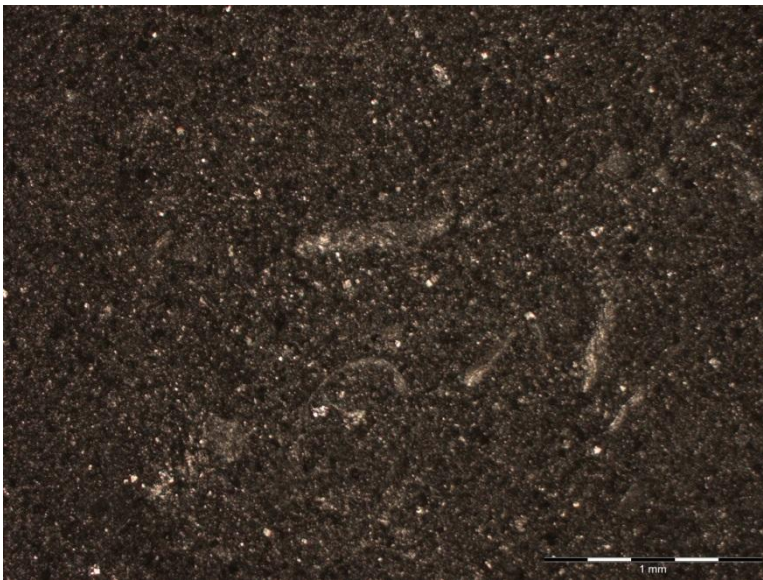
Sample C9. Photomicrograph of Compton bed C9, a skeletal wackestone-packstone. This acetate peel is representative of bed C9 at the Kansas section. Crinoids and bryozoans are the dominant skeletal fragments and occur in approximately equal amounts. Minor amounts of ostracodes occur in bed C9. Non-skeletal grains include sand-size pyrite concretions and traces of quartz silt.



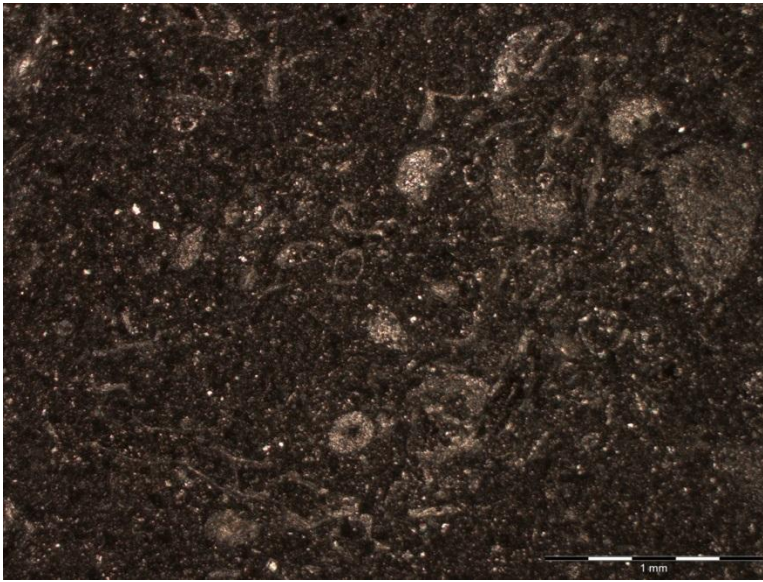
Sample NV2. Photomicrograph of Northview bed NV2, a silty mudstone. This acetate peel is representative of bed NV2 at the Kansas section. Dominant bioclasts include crinoids. Primary non-skeletal grains are quartz silt and silt-size peloids.



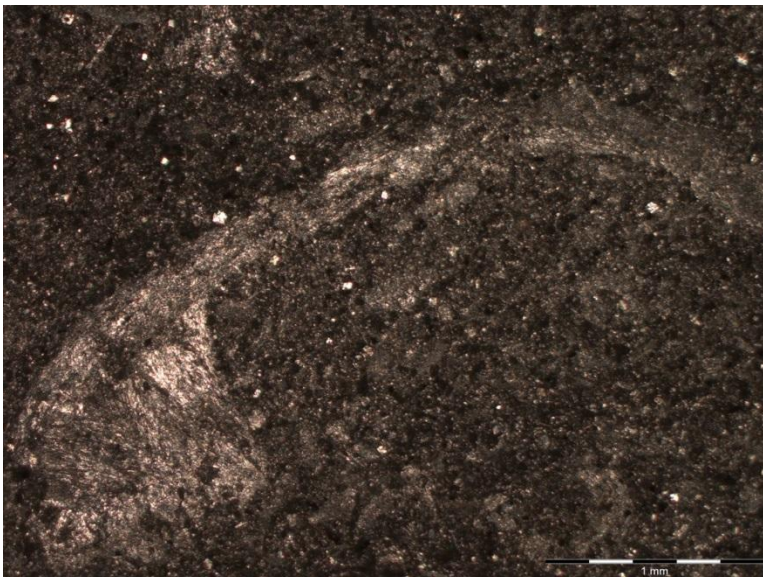
Sample NV4. Photomicrograph of Northview bed NV4, a silty skeletal wackestone. This acetate peel is representative of bed NV4 at the Kansas section. Dominant bioclasts include crinoids, bryozoans, and ostracodes. Primary non-skeletal grains are quartz silt and silt-size peloids.



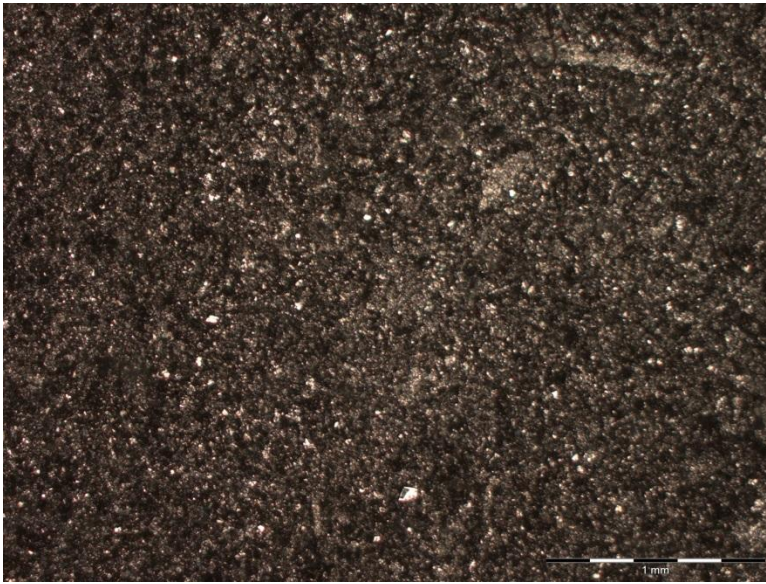
Sample NV6. Photomicrograph of Northview bed NV6, a silty, sparse skeletal wackestone. This acetate peel is representative of bed NV6 at the Kansas section. Primary bioclasts include crinoids, bryozoans, and ostracodes. Primary non-skeletal grains are quartz silt and silt-size peloids.



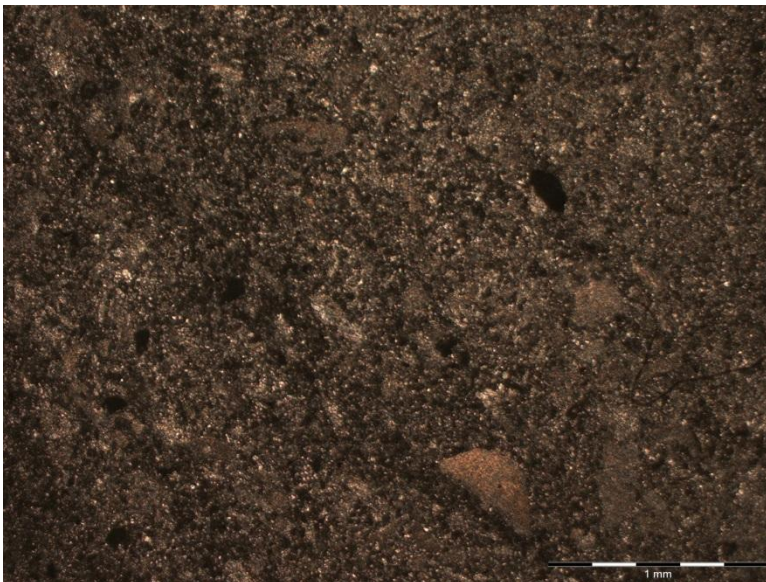
Sample NV8. Photomicrograph of Northview bed NV8, a silty skeletal wackestone. This acetate peel is representative of bed NV8 at the Kansas section. Dominant bioclasts include bryozoans and crinoids. Primary non-skeletal grains are quartz silt and silt-size peloids.



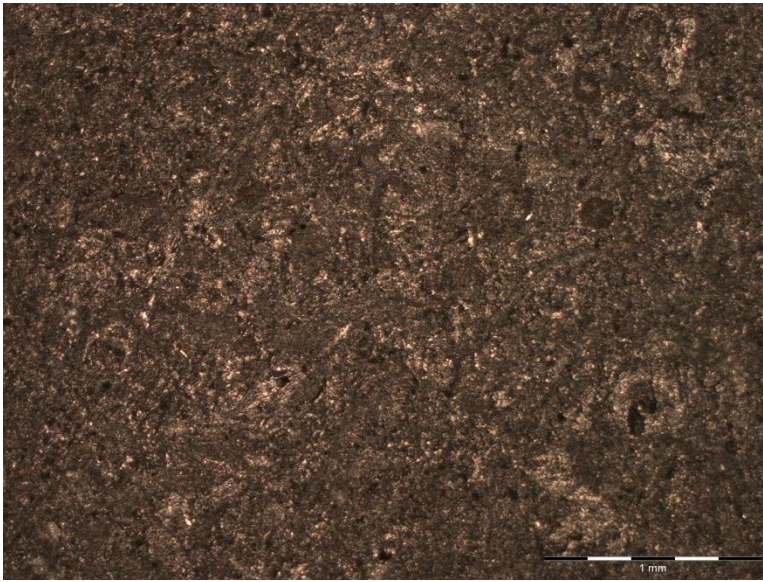
Sample NV10. Photomicrograph of Northview bed NV10, a silty skeletal wackestone. This acetate peel is representative of bed NV10 at the Kansas section. Dominant bioclasts include brachiopods and bryozoans. Primary non-skeletal grains are quartz silt and silt-size peloids.



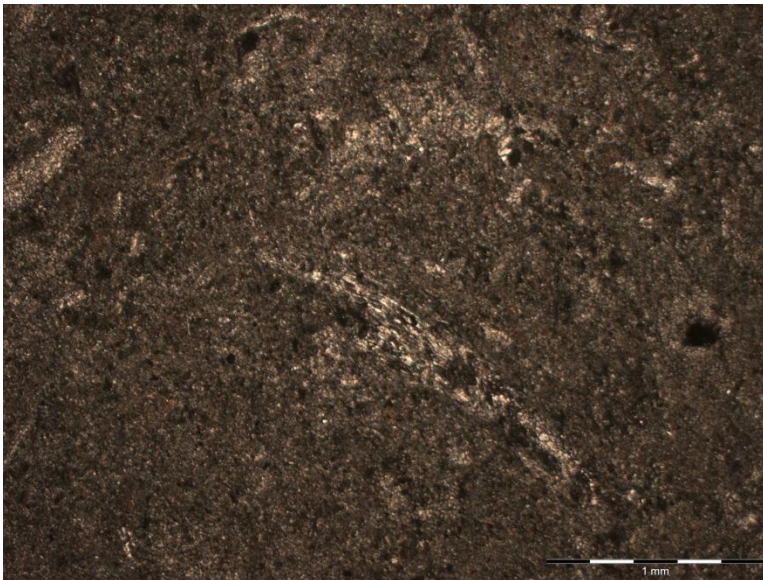
Sample NV12. Photomicrograph of Northview bed NV12, a silt-rich wackestone. This acetate peel is representative of bed NV12 at the Kansas section. This bed primarily consists of quartz silt grains. Scarce bioclasts include crinoids and bryozoans. Other non-skeletal grains include silt-size peloids.



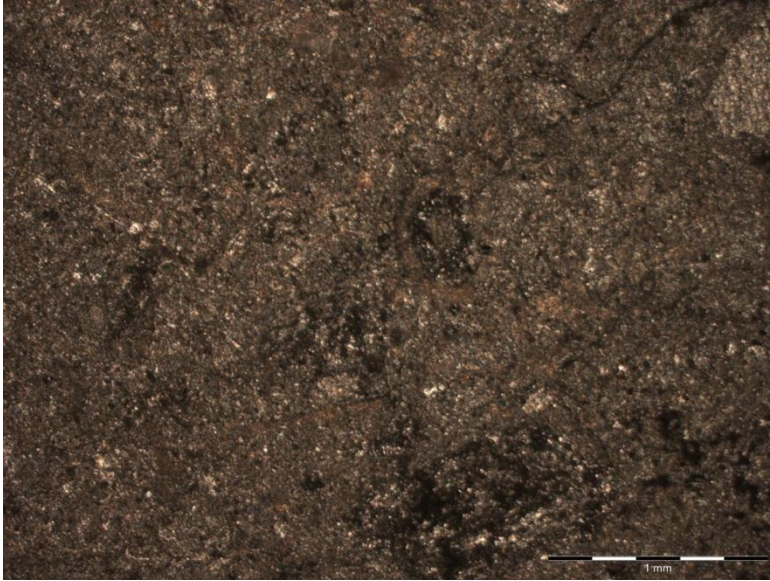
Sample P1. Photomicrograph of Pierson bed P1, a silty skeletal wackestone. This acetate peel is representative of bed P1 at the Kansas section. Dominant bioclasts include bryozoans, with lesser amounts of crinoids. Primary non-skeletal grains are quartz silt and silt-size peloids. Sand-size pyrite concretions occur in sparse amounts.



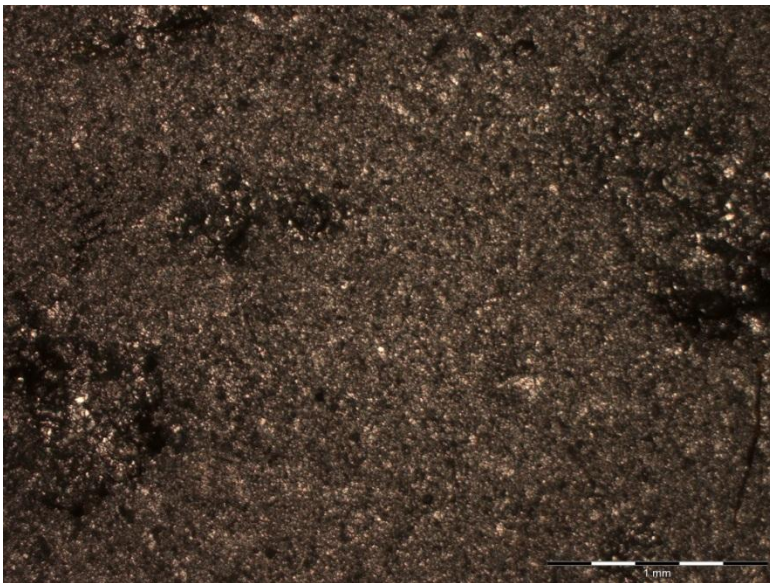
Sample P2. Photomicrograph of Pierson bed P2, a skeletal wackestone-packstone. This acetate peel is representative of bed P2 at the Kansas section. Dominant bioclasts include bryozoans and crinoids. Primary non-skeletal grains are quartz silt and silt-size peloids.



Sample P3. Photomicrograph of Pierson bed P3, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of bed P3 at the Kansas section. Dominant bioclasts include bryozoans and crinoids, with lesser amounts of brachiopods. Primary non-skeletal grains are quartz silt and silt-size peloids.



Sample P4. Photomicrograph of Pierson bed P4, a skeletal wackestone with neomorphosed mud matrix. This acetate peel is representative of bed P4 at the Kansas section. Dominant bioclasts include bryozoans and crinoids. Primary non-skeletal grains are quartz silt.

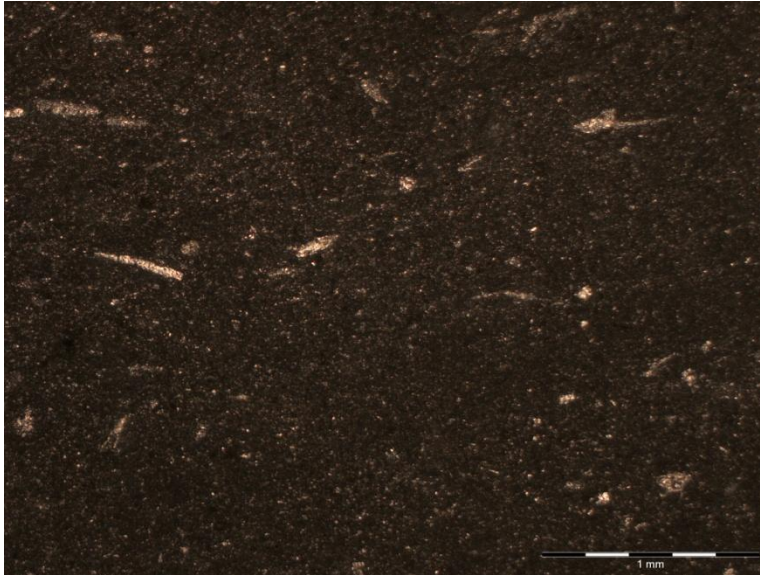


Sample P5. Photomicrograph of Pierson bed P5, a mudstone-sparse skeletal wackestone. This acetate peel is representative of bed P5 at the Kansas section. Scarce bioclasts include ostracodes and crinoids. Primary non-skeletal grains are quartz silt and silt-size peloids.

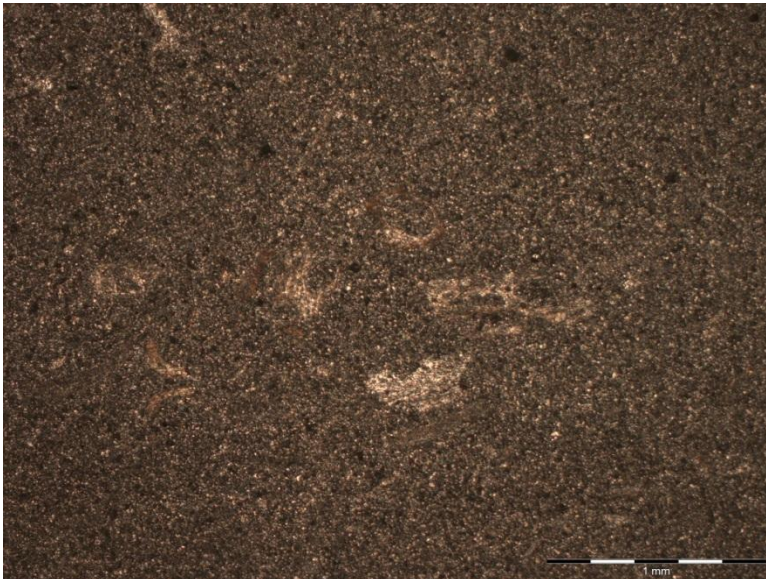


Sample RS1. Photomicrograph of Reeds Spring bed RS1, a mudstone-sparse skeletal wackestone. This acetate peel is representative of bed RS1 at the Kansas section. Scarce bioclasts include bryozoans, crinoids, and brachiopods. Primary non-skeletal grains are quartz silt.

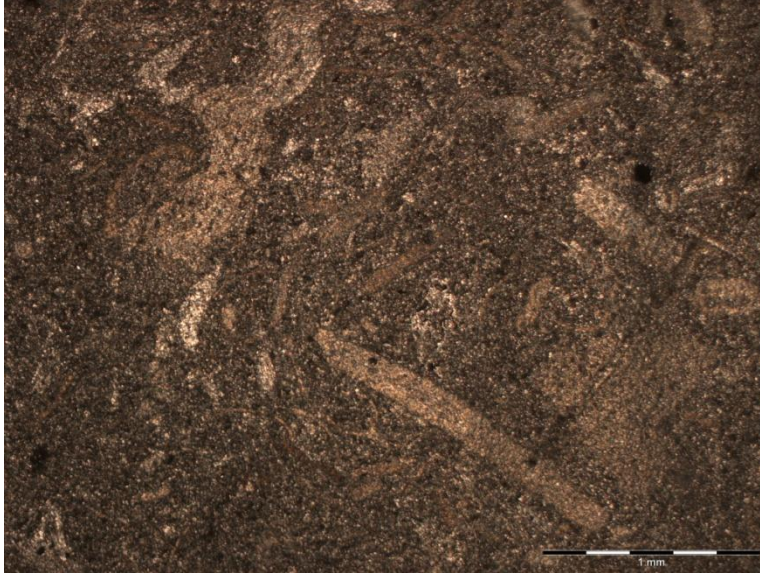
Baron Fork, Oklahoma:



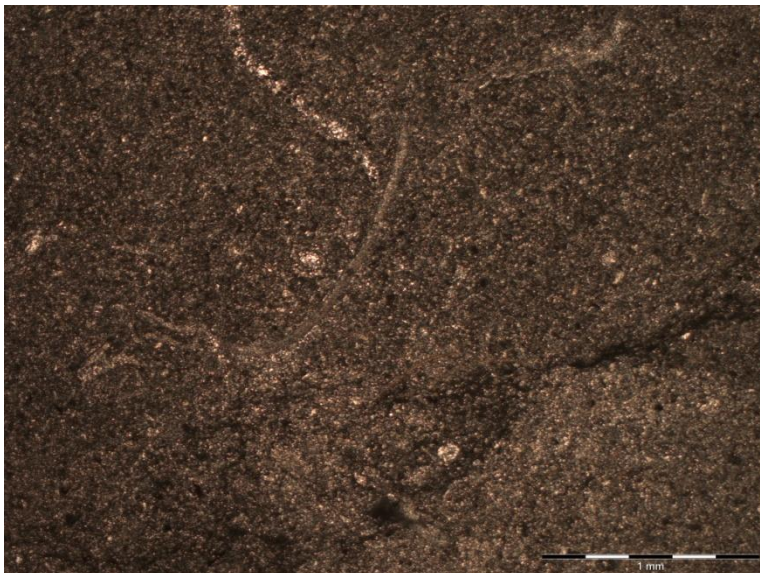
Sample C2. Photomicrograph of Compton bed C2, a mudstone with sparse skeletal fragments. This acetate peel is representative of bed C2 at the Baron Fork section. Bioclasts include crinoids and bryozoans.



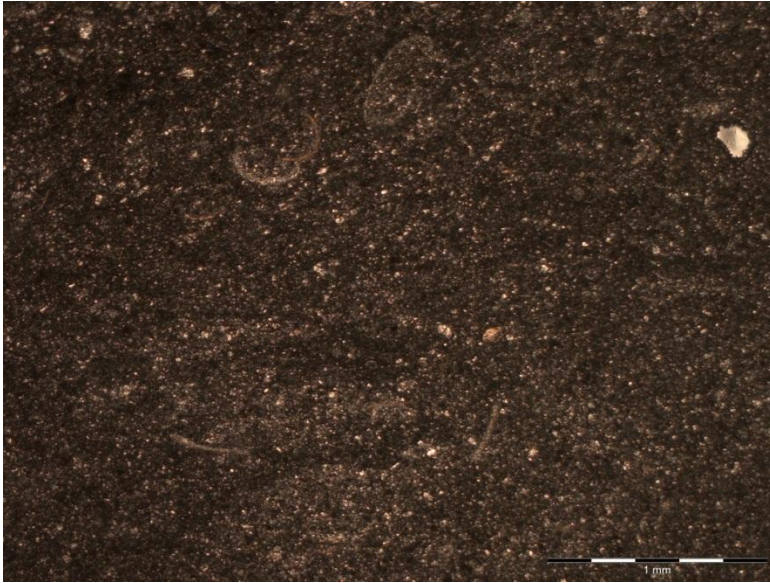
Sample C3. Photomicrograph of Compton bed C3, a silty sparse skeletal wackestone. This acetate peel is representative of bed C3 at the Baron Fork section. Sparse bioclasts include crinoids and bryozoans. Non-skeletal grains include quartz silt and silt-size peloids.



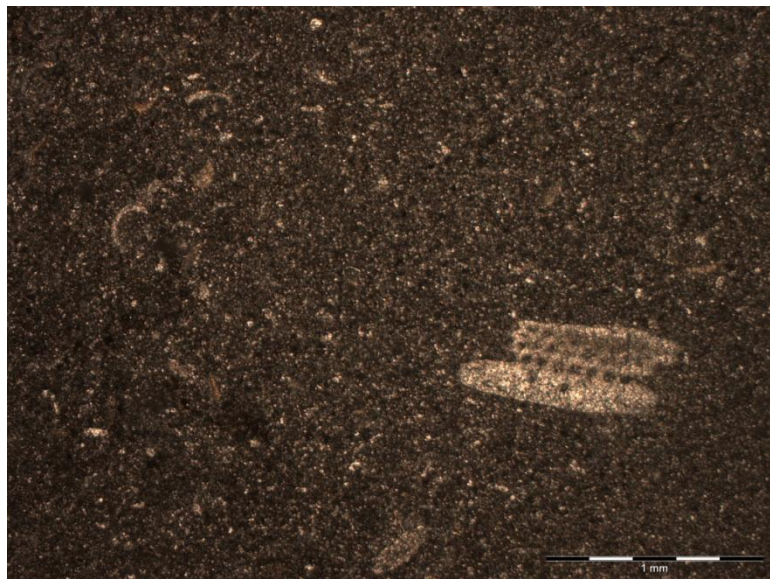
Sample C4. Photomicrograph of Compton bed C4, a skeletal wackestone-packstone. This acetate peel is representative of bed C4 at the Baron Fork section. Bioclasts include crinoids, bryozoans, and sparse ostracodes. Non-skeletal grains include quartz silt and trace amounts of sand-size pyrite concretions.



Sample P1. Photomicrograph of Pierson bed P1, a sparse skeletal wackestone-mudstone. This acetate peel is representative of bed P1 at the Baron Fork section. Primary bioclasts are brachiopods, bryozoans, and ostracodes.



Sample P3. Photomicrograph of Pierson bed P3, a silty mudstone. This acetate peel is representative of bed P3 at the Baron Fork section. Primary bioclasts are ostracodes and crinoids. Common non-skeletal grains are quartz silt.

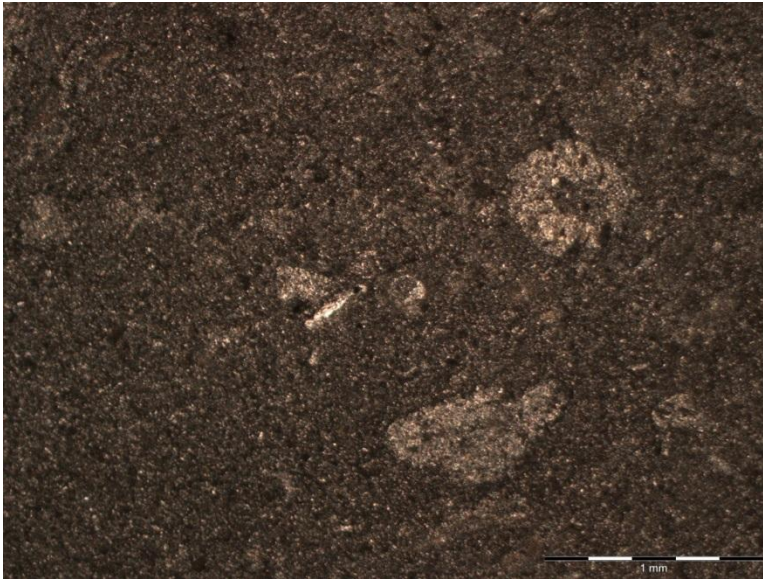


Sample P4. Photomicrograph of Pierson bed P4, a mudstone with sparse skeletal fragments. This acetate peel is representative of bed P4 at the Baron Fork section. Scarce bioclasts include crinoids and ostracodes. Primary non-skeletal grains include quartz silt.

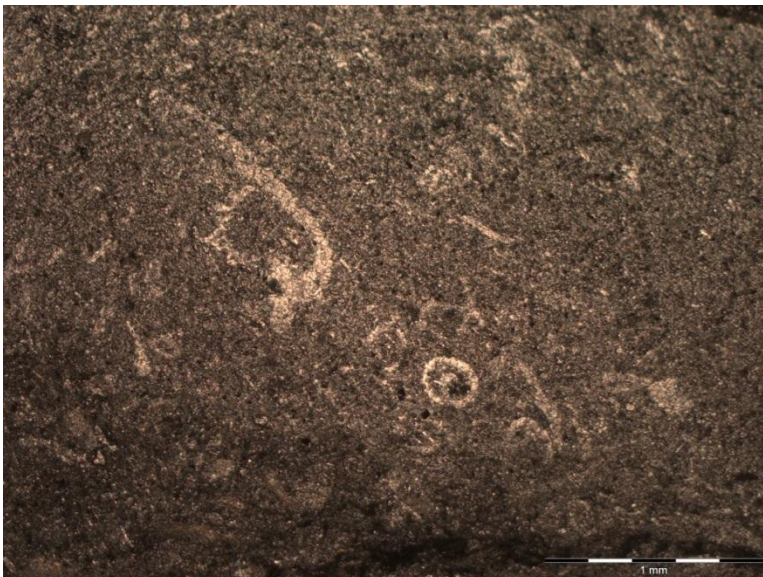


Sample RS1. Photomicrograph of Reeds Spring bed RS1, a mudstone with abundant chert. This acetate peel is representative of bed RS1 at the Baron Fork section. Rare bioclasts include crinoids.

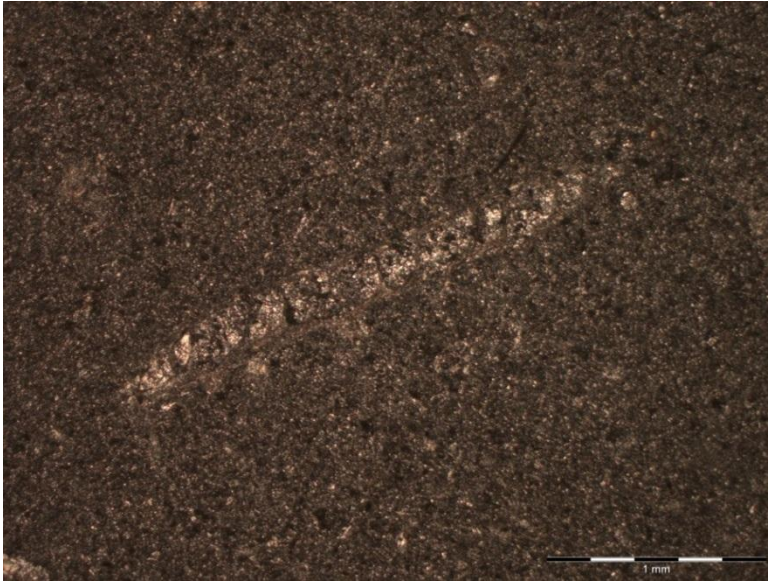
Tahlequah (North), Oklahoma:



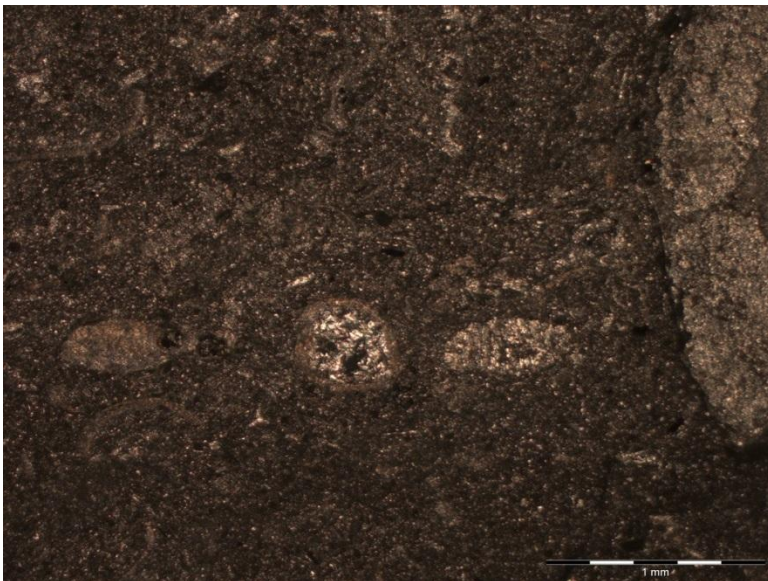
Sample C2. Photomicrograph of Compton bed C2, a silty sparse skeletal wackestone. This acetate peel is representative of bed C2 at the Tahlequah (North) section. Primary bioclasts are crinoids and bryozoans.



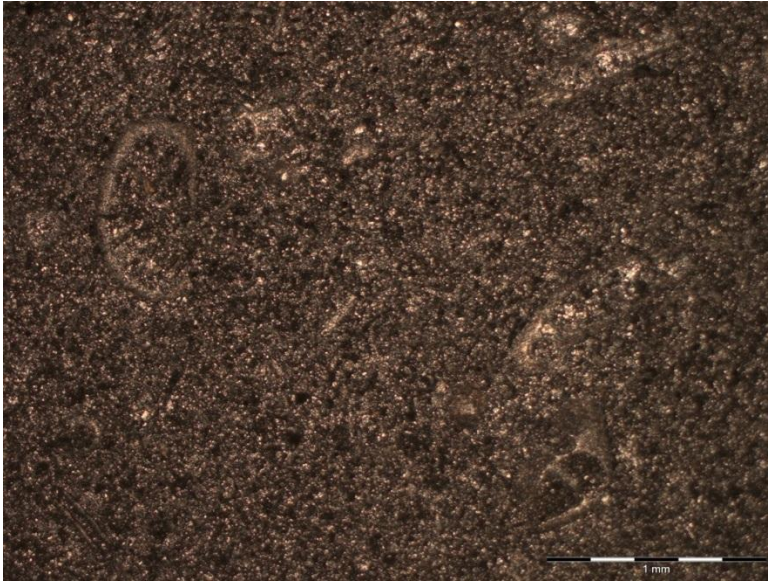
Sample C3. Photomicrograph of Compton bed C3, a skeletal wackestone. This acetate peel is representative of bed C3 at the Tahlequah (North) section. Primary bioclasts are crinoids and bryozoans. This bed contains trace amounts of silt-size pyrite concretions.



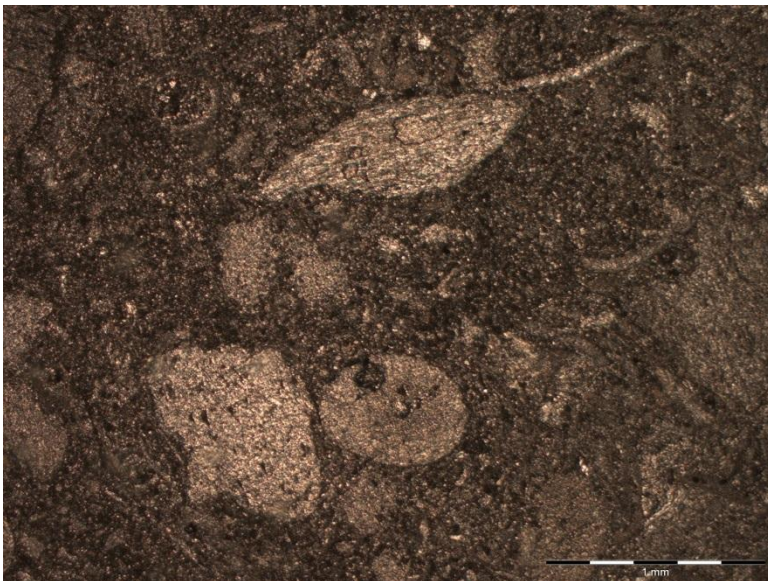
Sample C4. Photomicrograph of Compton bed C4, a mudstone with sparse skeletal grains. This acetate peel is representative of bed C4 at the Tahlequah (North) section. Primary bioclasts are bryozoans. Non-skeletal grains include scarce amounts of quartz silt.



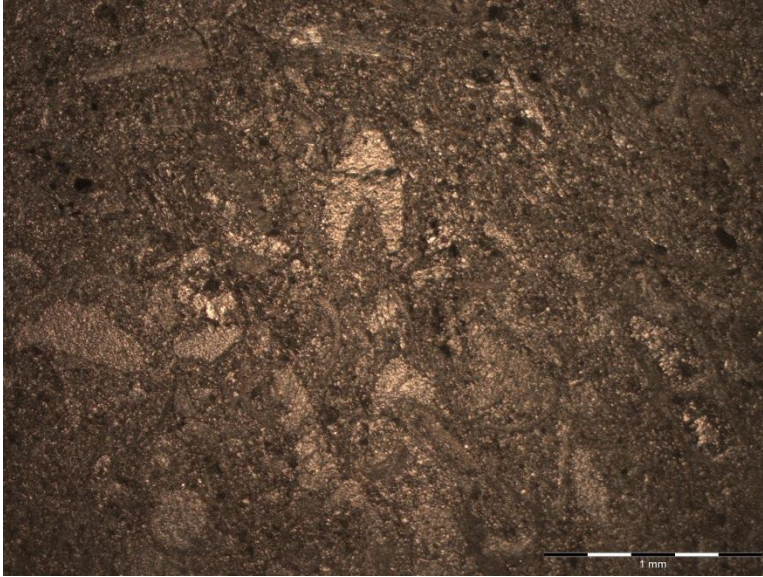
Sample C5. Photomicrograph of Compton bed C5, a skeletal wackestone. This acetate peel is representative of bed C5 at the Tahlequah (North) section. Primary bioclasts are crinoids and bryozoans. Sparsely distributed fine-quartz silt occur in C5.



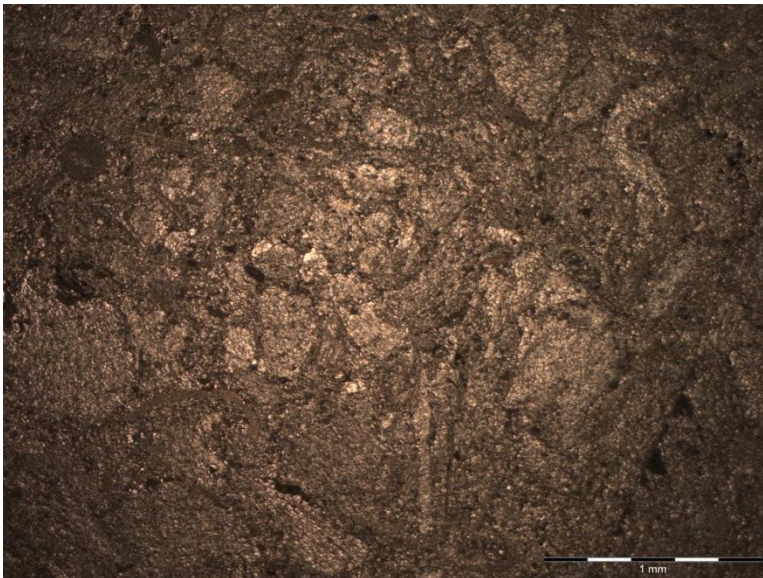
Sample P1. Photomicrograph of Pierson bed P1, a silty sparse skeletal wackestone. This acetate peel is representative of bed P1 at the Tahlequah (North) section. Primary bioclasts are bryozoans. Quartz silt dominates this bed. Other non-skeletal grains include silt-size peloids.



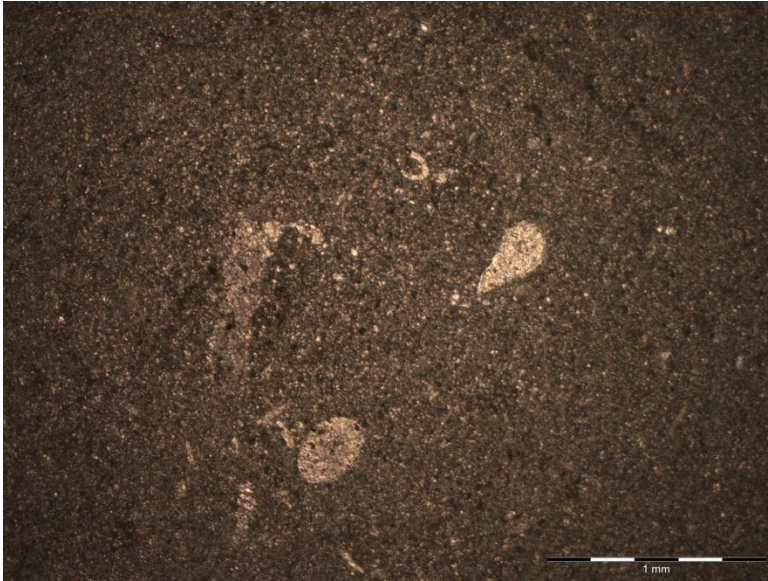
Sample P2. Photomicrograph of Pierson bed P2, a silty skeletal wackestone-packstone. This acetate peel is representative of bed P2 at the Tahlequah (North) section. Primary bioclasts are bryozoans. Non-skeletal grains include fine-quartz silt and silt-size peloids.



Sample P3. Photomicrograph of Pierson bed P3, a skeletal packstone-wackestone. This acetate peel is representative of bed P3 at the Tahlequah (North) section. Primary bioclasts are crinoids and bryozoans. Non-skeletal grains include silt-size peloids and quartz silt.



Sample P4. Photomicrograph of Pierson bed P4, a skeletal packstone. This acetate peel is representative of bed P4 at the Tahlequah (North) section. Primary bioclasts include crinoids and bryozoans, with lesser amounts of brachiopods.



Sample P5. Photomicrograph of Pierson bed P5, a sparse skeletal wackestone-mudstone. This acetate peel is representative of bed P5 at the Tahlequah (North) section. Sparse bioclasts include crinoids, bryozoans, and ostracodes. Non-skeletal grains include quartz silt and silt-size peloids.



Sample RS1. Photomicrograph of Reeds Spring bed RS1, a mudstone with rare bryozoan bioclasts. This acetate peel is representative of bed RS1 at the Tahlequah (North) section.

VITA

Austin Lee McNabb

Candidate for the Degree of

Master of Science

Thesis: HIGH RESOLUTION STRATIGRAPHY OF THE ST. JOE GROUP FROM
SOUTHWEST MISSOURI TO NORTHEAST OKLAHOMA

Major Field: Geology

Biographical:

Education:

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Completed the requirements for the Bachelor of Arts and Science in Geology at Oklahoma State University, Stillwater, Oklahoma, United States in 2011.

Experience: Spent 1 year as an Intern Geologist at LINN Energy, in Oklahoma City, Oklahoma. Worked on increasing production for several waterflood projects. Looked at up-hole potential in shut-in wells. Aided in locating future drilling locations.

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