STRATIGRAPHY AND PALEONTOLOGY OF THE ROUBIDOUX FORMATION OF MISSOURI

by

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Rolla, Missouri
December 20, 1954

Honorable Phil M. Donnelly
Governor of Missouri
Jefferson City, Missouri

Dear Governor Donnelly:

I have the honor and pleasure to transmit herewith a report on the STRATIGRAPHY AND PALEONTOLOGY OF THE ROUBIDOUX FORMATION OF MISSOURI by Robert L. Heller.

The Roubidoux is economically important both as a major aquifer and as a source for dimension stone. This report will serve as a valuable reference for geologists working in Missouri and will also be a useful reference for those working outside of the state.

Respectfully submitted,

EDWARD L. CLARK
State Geologist

Stratigraphy and Paleontology of the Roubidoux Formation of Missouri

By

ROBERT L. HELLER

ABSTRACT

The Roubidoux formation of early Canadian age is widely distributed throughout most of the Ozark uplift of Missouri. In the central and southeastern sectors it is the surface formation; in the north and west and beyond the state boundaries it is known only from the subsurface.

Detailed stratigraphic studies of the Roubidoux formation, the upper part of the Gasconade formation, and the lower part of the Rich Fountain formation were made at twenty-seven separate localities. In the areas studied the Roubidoux formation was found to vary in thickness from 105 feet in Franklin County to 250 feet in the southwestern part of the Ozark region. Thick sections of dolomite are most characteristic of the formation, although locally sandstone and chert are the predominant lithologic constituents.

Sparingly fossiliferous over most of the Ozark region, the chert of the Roubidoux locally contains numerous well-preserved fossils. A largely molluscan fauna consisting of 20 genera and 23 species was collected and described. Two new genera and twelve new species are represented in the fauna.

The faunal elements of the Roubidoux formation are similar to those reported from the Gorman formation of central Texas, the Cool Creek formation of the Arbuckle and Wichita Mountains, and the Longview limestone of the Appalachian region.

As originally defined, the Roubidoux formation was without a specifically designated type area section. The Roubidoux Creek section, located in Texas County, is here designated the type area section for the formation.

INTRODUCTION

The Roubidoux formation, by definition (Nason, 1892, p. 114), a series of sandstones, dolomites, and cherts that overspread the Ozark region of Missouri (Plate I, back pocket), has long been accepted as a valid formation without ever having

been adequately described or defined. It is the purpose of this report to define the formation and to present a detailed regional study of its fauna. This study will contribute to a better understanding of lower Ordovician stratigraphy and paleontology.

Detailed stratigraphic studies of the Roubidoux formation, the upper part of the Gasconade formation, and the lower part of the Rich Fountain formation were made at twenty-seven separate localities around the Ozark uplift. Sections were measured and lithologic samples collected at each of these localities. The location of these sections and the areal extent of the Roubidoux formation are shown on Plate I (back pocket).

Reconnaissance studies and fossil locations have been made at numerous other localities around the uplift where exposures were not adequate to provide good measured sections. Reference to some of these localities is given in the text, and a complete list of fossil localities is appended to the report.

A study of subsurface samples obtained from the Missouri Geological Survey has provided data on the formation for two areas in which the surface exposures are extremely poor. Location of the Doniphan and Wappapello Dam wells is indicated on Plate I.

REVIEW OF PREVIOUS INVESTIGATIONS

Swallow (1855), and others who published in the early reports of the Missouri Geological Survey, referred to the various sandstones and dolomites of the Ozark region of Missouri as the First, Second, and Third Sandstones, and the First, Second, Third, and Fourth Magnesian Limestones of the Silurian System. In this usage the Second Sandstone included essentially those beds included in the Roubidoux formation of this report.

This usage was continued until 1892, when Nason (p. 114), after discovery of more than three sandstones in the Ozark region, concluded that the old terms First, Second, and Third should be abandoned. To replace the term Second Sandstone he (Nason, 1892, p. 114) proposed the name Roubidoux. Although not designated as a type section, the exposures along Roubidoux Creek in Pulaski and Texas counties were undoubtedly meant to represent the formation. In the same publication (1892, p. 115) Nason suggested that the First Sandstone at Pacific and Crystal City was an extension of the Roubidoux formation

of central Missouri. This supposition is now known to be in error; the First Sandstone is the St. Peter sandstone of present day reports.

Winslow (1894, p. 331), in his "Table of Lower Silurian Formations of the Mining Districts", applied the name Roubidoux to the sandstones of St. Peter age in central Missouri and included both the Jefferson City formation and the underlying sandstone, which he called the Moreau sandstone, in the Gasconade dolomite in that area.

Ball and Smith (1903, pp. 50-68), in their work in Miller County, Missouri, introduced the term St. Elizabeth for the complex of sandstone, chert, and dolomite lying between the Gasconade formation and the Jefferson City formation, and applied the term Bolin Creek sandstone member to the prominent sandstones within that interval.

The term St. Elizabeth was employed in a similar sense by Van Horn and Buckley (1905, pp. 21-23) in their work in Moniteau County.

Bain and Ulrich (1905, pp. 12-13), in their work on the copper deposits of Missouri, define the Roubidoux formation as a complex of sandstone, chert, quartzite, dolomite, and shale of uncertain thickness and indefinite areal extent. Its position in the stratigraphic column is stated as lying beneath the Jefferson City formation and above the Gasconade limestone (dolomite). The terms Second Sandstone, Moreau Sandstone, and St. Elizabeth formation are listed as synonyms of the term Roubidoux.

Lee (1913, pp. 21-30) divided the Roubidoux formation in the Rolla quadrangle, Missouri, into four sandstone members and three dolomite members and provisionally correlated the second sandstone member with the Bolin Creek member of Miller County. In this seven-fold division the basal member, a sandstone, is overlain by alternate dolomite and sandstone beds. Lee's subdivisions are essentially those used by the Missouri Geological Survey for Phelps County.

Ulrich (1911, pp. 627-632), in his Revision of the Paleozoic Systems, described briefly the lithologic character of the Roubidoux and referred the formation to his Ozarkian system. In 1915, after additional study in the field, he changed the top of his Ozarkian system to the top of the Gasconade formation, transferring the overlying Roubidoux and Jefferson City for-

mations to his proposed Canadian system (Bassler, 1915). The Missouri Geological Survey has continued to follow Ulrich in this classification.

Intermittently from 1922 until 1932, C. L. Dake mapped and studied the Roubidoux and other lower Ordovician formations of the state for the Missouri Geological Survey. Unpublished data compiled in this work were used in preparation of the Geological Map of Missouri (1939); and were also used by the writer in the preparation of this report.

In 1929, Cordry (pp. 59-85) published the results of a study of the heavy minerals in the Roubidoux and other sandstones of the Ozark region. The conclusions reached were that the sandstones of the Ozark region cannot be differentiated on the basis of heavy mineral content alone, and that they were derived from a common source, probably pre-existing sediments.

Bridge (1930), in his work in the Eminence and Cardareva quadrangles, Missouri, mapped and described the Roubidoux formation for that area. Descriptions of several genera and species and a list of fossil localities for Reynolds, Shannon, and Carter counties are also included in the report.

McQueen (1931, pp. 120-121), in his original studies on the use of insoluble residues as a guide in stratigraphic work, designated several lithic types as being diagnostic of the Roubidoux. These diagnostic residues have been used with good results in both surface and subsurface studies.

A paper, indirectly concerned with the Roubidoux formation is that by Cullison (1944) on the stratigraphy of some lower Ordovician formations of the Ozark uplift. In this report the term Jefferson City is elevated to group status, and the terms Theodosia and Rich Fountain introduced as formational names for the strata formerly included in the Jefferson City formation. In this work the stratigraphic relationship between the Rich Fountain formation, basal member of the Jefferson City group, and the Roubidoux was not determined because of uncertainty as to where the lower boundary should be placed.

The most recent paper concerning the Roubidoux formation is that by McCracken (1952) on the insoluble residue zones of the Canadian of southwestern Missouri. Twelve insoluble residue zones for recognition of the Roubidoux, Jefferson City, and Cotter formations are listed.

FIELD WORK

The need for more detailed study on the Roubidoux formation was first realized by the writer while mapping rock units of similar age in central Texas. In attempting to use the Roubidoux formation of the Ozark uplift as a standard for comparison it soon became apparent that the fauna and lithologic character of that formation were not sufficiently well-defined to be used for studies in other regions.

With this need for more detailed information on the Roubidoux in mind, the writer began work on the present problem in the summer of 1948, continued the work through the field season of 1949 and then completed it during the field season of 1954. The primary purpose of the field work has been: to locate and measure well-exposed sections of Roubidoux strata around the Ozark uplift; to collect and define the fauna of the Roubidoux; to establish faunal zones; and where possible to correlate surface lithologies with those of the subsurface.

ACKNOWLEDGMENTS

The writer is indebted to: Dr. Edward L. Clark, State Geologist of Missouri, for providing financial aid and for making available unpublished data in the files of the Missouri Geological Survey; Dr. A. G. Unklesbay, Department of Geology, University of Missouri for his assistance and criticism in all phases of the preparation of this report; Dr. Raymond E. Peck, Department of Geology, University of Missouri, Dr. P. E. Cloud, Jr., United States Geological Survey, Dr. J. Brookes Knight, United States National Museum, and the late Dr. Josiah Bridge, for many helpful suggestions and criticisms; Mr. C. I. Overman of Birch Tree, Missouri, for making available his private collections and for aiding the writer in the field.

Special thanks are due Mr. Thomas D. Crutcher, Missouri Geological Survey, who assisted the writer in the field and in the preparation of illustrations and collections; Mr. Earl McCracken, Missouri Geological Survey, for many helpful comments on the subsurface occurrence of the Roubidoux formation; and Geraldine Hanson Heller, who assisted in the preparation of illustrations and manuscript.

General Stratigraphy

INTRODUCTORY REMARKS

To aid in understanding the stratigraphic relations of the Roubidoux formation a brief discussion of the underlying Gasconade formation and of the overlying Rich Fountain formation is given. Additional information on the Gasconade formation can be obtained from a number of the quadrangle reports of the Missouri Geological Survey; on the Rich Fountain formation from a recent paper by Cullison (1944).

The stratigraphic position of the formation under consideration is shown in the geologic column for the lower Paleozoic strata of the Ozark uplift (Plate II).

GASCONADE FORMATION

The name Gasconade was proposed by Nason in 1892 (p. 115) for the thick series of dolomite beds exposed beneath the Roubidoux sandstone in the Ozark region. Poorly defined originally, the name was used loosely for many years and at one time was even expanded to include the dolomites beneath the St. Peter sandstone (Winslow, 1894, p. 331). In 1908 Marbut (pp. 26-32) redefined the formation making the Gunter sandstone the basal member of the formation and the base of the Roubidoux the top of the formation. This concept of the formation is the one used in this report.

Although exposed throughout most of the Ozark region of Missouri the Gasconade is the surface formation only along the major stream and river valleys and in a small area in the central part of the uplift. Elsewhere it is capped by thick sections of Roubidoux sandstone which form the upland. These sandstones protect the underlying dolomite from rapid decomposition.

Measurements of the the Gasconade formation including the Gunter member indicate a thickness ranging from 250 feet in the west to 700 feet in the southeast (McCracken, personal

SYSTEM	SERIES	FORMATION
ORDOVICIAN	MIDDLE ORD.	St. Peter formation
		Everton formation
	LOWER ORDOVICIAN	Smithville formation
		Powell formation
		Cotter formation
		Jeff. City group — Theodosia formation
		Jeff. City group — Rich Fountain formation
		Roubidoux formation
		Gasconade formation *Gunter member*
CAMBRIAN	UPPER CAMBRIAN	Eminence formation
		Potosi formation
		Elvins group — Derby-Doerun formation
		Elvins group — Davis formation
		Bonneterre formation
		Lamotte formation
PRE-Є		Porphyry and granite

Lower Paleozoic geologic column in the Ozark region, Missouri.

communication, 1954). Over most of the central part of the Ozark uplift the thickness averages 315 feet.

The Gasconade formation consists predominantly of light-gray to light brownish-gray, fine- to coarse-grained, medium- to massive-bedded, non-sandy dolomite. The dolomite of the formation characteristically weathers to a coarse-pitted, medium-gray surface. When compared with the dolomites of the overlying Roubidoux formation (see lithology under Roubidoux formation) this lithologic character is quite distinctive. The grain size is generally larger, the bedding better developed, and there is marked absence of floating sand grains in the dolomite. According to Grohskopf and McCracken (1949, p. 30) the last of these criteria, the absence of sand grains, "is a striking feature" of the Gasconade-Van Buren formations in the subsurface.

Chert, ranging from white, porcelaneous, and quartzose oolitic varieties to gray and blue-gray oolitic, to porcelaneous varieties, is an important constituent in the lower part (245-265 feet) of the Gasconade formation. The upper portion in contrast, rarely contains chert in any abundance. According to Grohskopf and McCracken (1949, p. 30) the upper Gasconade in the subsurface rarely contains more than ten percent by volume of chert. Brownish-gray and gray quartzose chert which occurs as irregular masses in the dolomite is most common in this zone. At some localities chert of this type is also known to occur in the basal part of the Roubidoux formation. In the SW¼ SE¼ sec. 21, T. 33 N., R. 10 W., chert of this description contains the *Syntrophina* fauna (MR-38) of the lower Roubidoux.

In addition to the chert lithologies mentioned above, the Gasconade also contains abundant cryptozoan chert. One of these cryptozoan chert beds which occurs from 50 to 70 feet below the top of the formation seems to be fairly widely distributed.

Fossils indicating equivalence to the Tanyard formation of Texas, the McKenzie Hill limestone of Oklahoma, and the Chepultepec dolomite of the Appalachian region are locally abundant in the Gasconade formation. Unfortunately, because of the small amount of chert in the upper part of the formation, Gasconade fossils were not much help in delimiting the Gasconade-Roubidoux contact. Between 30 and 50 feet below the

top of the formation the following genera occur at several different localities: *Gasconadia*, *Helicotoma*, *Sinuopea*, *Rhachopea*, and *Ophileta*.

JEFFERSON CITY GROUP

RICH FOUNTAIN FORMATION

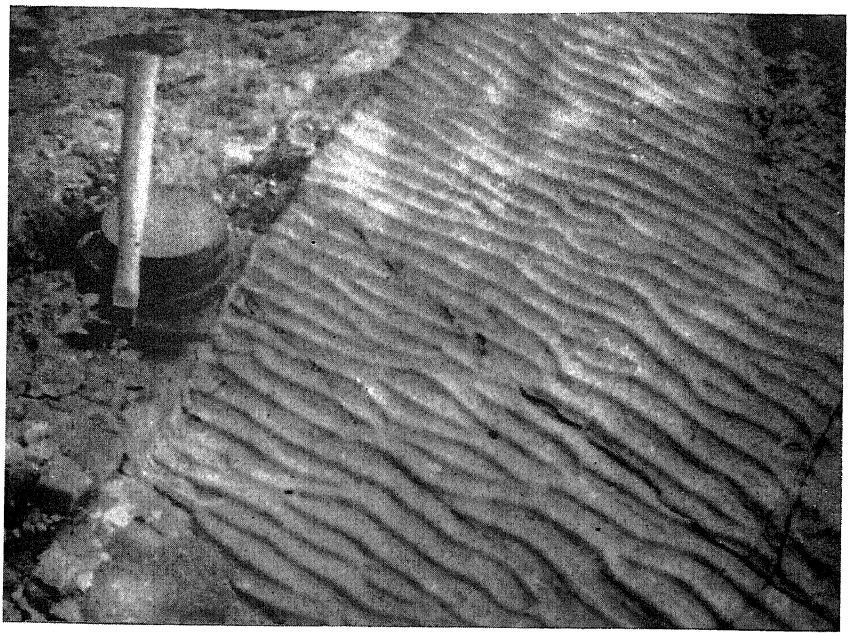
The name Jefferson City was first applied to the series of cherty dolomites exposed along the Missouri River in the vicinity of Jefferson City (Winslow, 1894). In this usage the term Jefferson City replaced exactly the old term "Second Magnesian Limestone". Several years later, in 1911, Ulrich redefined the formation and included in it a series of younger beds. This series of younger beds was later placed by Ulrich in the newly established Cotter formation (Bassler, 1915), and the term Jefferson City restricted to the beds beneath the Cotter.

In 1944, Cullison elevated the term Jefferson City to group status and introduced the terms Rich Fountain and Theodosia as formational names for the subdivisions of the group. The faunal zones established by Cullison in this work have been extremely useful in drawing the Roubidoux-Rich Fountain contact over most of the Ozark area. In the subsurface, however, the lithologic units designated by Cullison as subdivisions of the Jefferson City Group are evidently not easily distinguished. According to McCracken (personal communication, 1954) a lithologic unit consisting of the Rich Fountain interval and the lower part of the Theodosia interval is much more distinctive. To this unit he (McCracken, 1952) has applied the term Jefferson City formation.

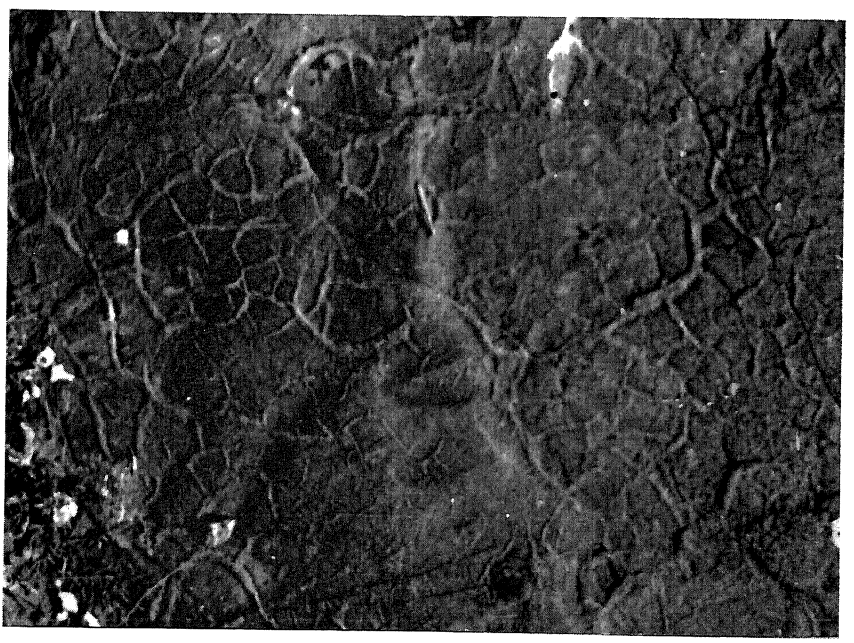
The Rich Fountain formation is widely distributed in the Ozark region of Missouri, extending from Callaway County in the north, southward into Arkansas, and from Cedar County in the west, eastward to Perry County.

Surface and subsurface studies made by Cullison indicate a thickness of 140 to 150 feet for the Rich Fountain formation in Phelps County. At Cotter, Arkansas the thickness of the formation is stated to be 180 feet.

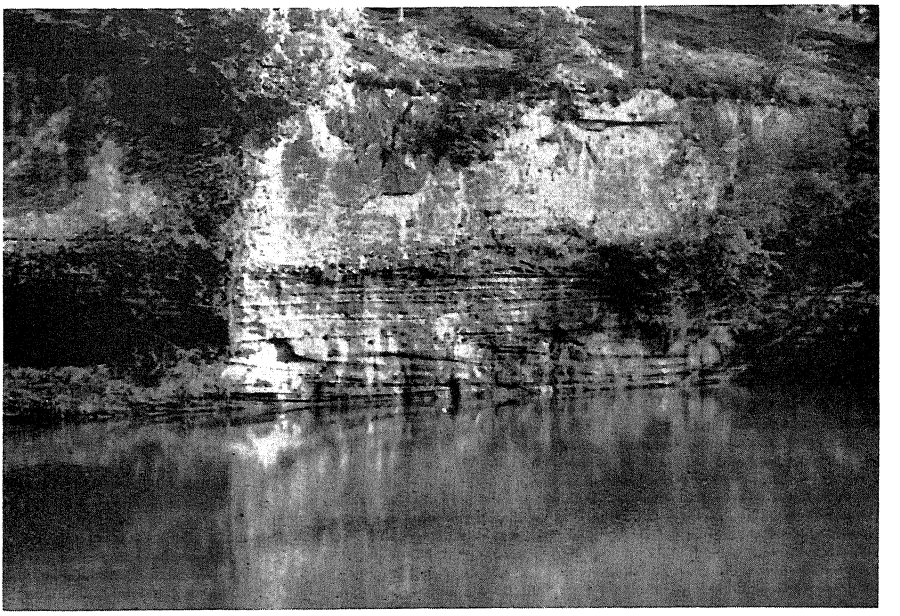
Where observed in the course of field studies on the Roubidoux formation the Rich Fountain appeared to be composed predominantly of dolomite. The dolomite is of two lithologic



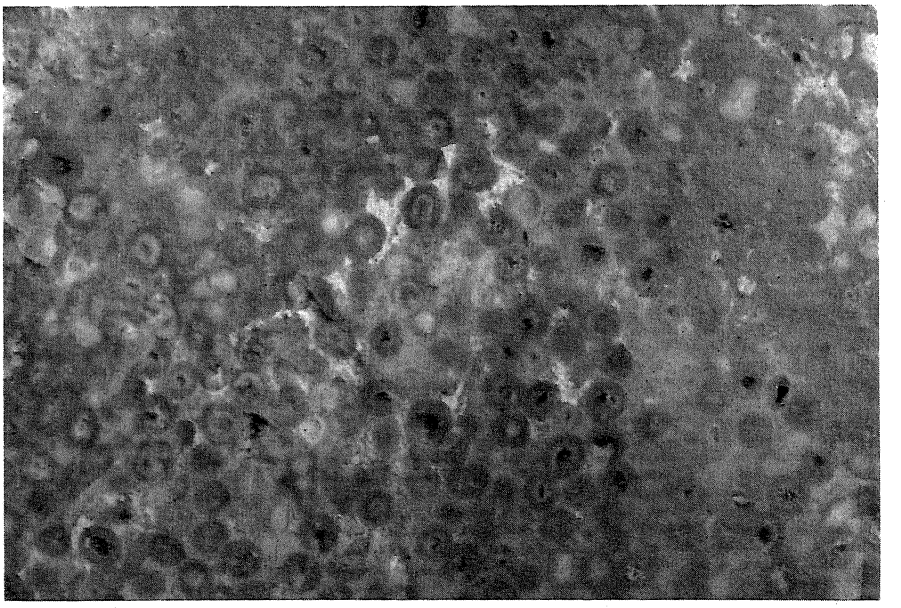
A. Well-developed ripple marks on large slab of Roubidoux sandstone, NE¼ NE¼ sec. 15, T. 42 N., R. 1 W., Franklin County, Missouri.



B. Desiccation cracks developed on thin sandstone bed in upper part of Roubidoux formation, E-W sec. line, sec. 29 and 32, T. 44 N., R. 11 W., Cole County, Missouri.



A. Cross-bedded sandstones in the lower part of the Roubidoux exposed along Big Piney River, SE¼ SE¼ sec. 2, T. 30N., R. 10 W., Texas County, Missouri.



B. Brown, oolitic, quartzose chert (X10) from near top of Roubidoux formation. Dark centers in oolites are small, singly and doubly terminated quartz crystals. SE¼ NW¼ SW¼ sec. 10, T. 33 N., R. 12 W.

types; a very fine-grained, thin- to massive-bedded, argillaceous to silty, gray to buff "cotton rock", and a thin- to massive-bedded, buff to gray, somewhat siliceous crystalline dolomite. From the base of the formation to approximately twenty-five feet above the base "cotton rock" is the most common lithology. From twenty-five feet to approximately 50 feet above the base gray crystalline dolomite, which in most places contains abundant fine white quartz druse and weathers to a uniformly pitted, medium gray surface, is the predominant lithology. Above the pitted dolomite the formation is largely "cotton rock".

In contrast, the dolomites of the Roubidoux formation (see section on Roubidoux lithology) are mostly light brownish-gray, fine-grained, arenaceous and cherty, and weather to a more or less smooth, dull, brownish-gray and slightly pitted surface.

The chert of the Rich Fountain formation is predominantly white, porcelaneous to porous, and commonly occurs as rounded nodules. Other types of chert found in the formation consist of a tan to brown, crypto-oolite near the base and a white spicular chert just above the "pitted dolomite".

In addition to the lithologies mentioned above, thin sandstones and shales also occur in the Rich Fountain, but are neither abundant or conspicuous.

The Rich Fountain formation contains two well-marked faunal zones which have been useful in determining the position of the Roubidoux-Rich Fountain contact. The *Ozarkocoelia irregularis* zone occurs twenty-five to forty feet above the base of the formation; the *Jeffersonia* zone thirty-five to fifty feet above the base. The following species are common in these two zones: *Ozarkocoelia irregularis*, *Archaeoscyphia annulata*, *Hormotoma dubia*, *Pilotoceras brunei*, *Jeffersonia missouriensis*.

The fauna of the Rich Fountain formation indicates its equivalence with the Honeycut formation of central Texas, the lower part of the Kindblade formation of Oklahoma, and in part with the Newala limestone of the Appalachian region.

YOUNGER ROCKS

Rocks representing several Mississippian, Pennsylvanian, and Cretaceous formations rest unconformably on beds of Roubidoux age in various parts of the Ozark uplift. In the northern

part of the uplift, in Osage and Franklin counties, residual chert and sandstone of Cherokee age rest unconformably on Roubidoux sandstone. To the west and south, residual cherts of Osage age and beds of sandstone thought to be of Chester age lie unconformably upon the Roubidoux formation. In the southeastern part of the state, near the town of Lutesville, beds of Cretaceous age (Gulf Series) rest with profound unconformity on rocks of Roubidoux age.

ROUBIDOUX FORMATION

Scope of formation.—Delineation of the base and the top of the Roubidoux formation is, in most cases, difficult. The lower Canadian of the Ozark region is predominantly a dolomite series, not particularly fossiliferous and without major unconformities between the formations.

The base of the Roubidoux formation is below the *Syntrophina* zone and above a prominent *Cryptozoon* chert which occurs about fifty to seventy feet below the top of the Gasconade formation. Actual placing of the contact has of necessity been based on lithology. The upper Gasconade is commonly a medium to coarse-grained, light gray to light brownish-gray, non-sandy, vuggy dolomite which contains small amounts of medium brownish-gray, quartzose chert. By contrast, the lower Roubidoux is commonly either a fine-grained, light-brownish-gray, compact, slightly-sandy to sandy dolomite which contains sandy, oolitic chert, or a fine-grained, light gray to reddish-brown sandstone.

The top of the formation, drawn above the zone of *Lecanospira* and below the zone of *Ozarkocoelia-Archaeoscyphia*, is also based on lithology. Lithologic differences between the upper Roubidoux and the lower Rich Fountain are as follows: the upper part of the Roubidoux formation typically consists of either fine-grained, light brownish-gray, sandy, dirty-weathering dolomite with abundant light-gray, sandy, oolitic chert, or massive, fine-grained, light gray to reddish-brown sandstone; the lower part of the Rich Fountain formation in most exposures consists of "cotton rock" (15-25 feet) overlain by light gray, medium-grained dolomite (12-15 feet) which contains abundant fine white quartz druse and weathers to a uniformly-pitted, medium-gray surface. This pitted dolomite ("School Mine ledge" of

Cullison, 1944, p. 19) contains the *Ozarkocoelia-Archaeoscyphia* fauna.

Areal distribution.—The Roubidoux formation is widely distributed throughout most of the Ozark uplift in Missouri. In the central and southeastern sectors it is the surface formation over extensive areas, while nearer the margins it is exposed only in the bottom of the stream valleys. The location of particularly well-exposed sections of the Roubidoux formation and the areal extent of the formation are shown on Plate I.

The formation, although not known to be exposed beyond the boundaries of the state, has been encountered in deep wells in all adjacent states.

Type area section.—As originally defined, the Roubidoux formation was without a specifically designated type section. By inference the area of exposure along Roubidoux Creek in Pulaski and Texas counties came to be known as the "type area" and has since often been cited as such. During the course of this investigation exposures in this area were studied and measured at several localities, but only one complete section, the Roubidoux Creek Section, was located.

The Roubidoux Creek Section, which is here designated the type area section for the Roubidoux formation is exposed along a southeast-facing hillside above Roubidoux Creek in the SE¼ NW¼ SW¼ sec. 10, T. 33 N., R. 12 W., Texas County, Missouri.

Approximately eighteen feet of the Gasconade formation, the entire thickness (150 feet) of the Roubidoux formation, and the lower twelve feet of the Rich Fountain formation are exposed in this section.

Thickness.—The Roubidoux formation varies considerably in thickness. It is thickest, 225-250 feet, in the southwestern part of the Ozark region of Missouri, and thinnest, 105-110 feet, along the northeastern margin of the uplift. This difference in thickness can probably be attributed to the same factors suggested by Cloud and Barnes (1948, pp. 36, 101) for differences in thickness of the Tanyard formation of Texas: namely, unequal sedimentation, cumulative local and temporary nondeposition, and continuing or intermittent relative subsidence of bottom with respect to wave base. Although the contact between the Roubidoux and the Rich Fountain formations

superficially appears to be one of conformity, it is conceivable that locally numerous beds of the formation could have been removed by post-Roubidoux, pre-Jefferson City truncation.

In the northern part of the area studied (see Moreau River and Osage River sections, Appendix A) measurements indicate a thickness of 110 to 115 feet for the Roubidoux formation. Along the western margin of the uplift the formation varies in thickness from 129 feet in the vicinity of the Lake of the Ozarks to more than 150 feet near Houston in Texas County.

Along Roubidoux Creek in Pulaski and Texas counties the formation is 150 feet thick.

Lithologic Character.—The Roubidoux formation, which is highly variable in character, consists predominantly of dolomite, sandstone, and chert. In the areas studied, dolomite was found to be the most abundant lithologic type, although locally the formation was found to be composed largely of sandstone and chert. For more detailed information on the lithologic character of the formation and the distribution of lithologic types within the formation, the reader is referred to the section on Local Stratigraphy (Appendix A).

Dolomite.—The dolomites of the Roubidoux formation are for the most part fine-grained, light-gray to light brownish-gray and brown, and thinly to massively bedded. The average grain size of the fine-grained dolomites, as determined from thin sections, is between 0.09 and 0.16 mm. Coarser grain sizes are present in the formation but only in minor amounts.

Sand grains scattered through the dolomite are common and locally are sufficiently abundant to make up a major part of the rock. Chert, as angular fragments, thin lenses, and small irregular masses, is also frequently abundant in the dolomite.

In areas of low relief the dolomites of the Roubidoux formation weather to cherty and sandy, red clay slopes; in areas of greater relief to smooth or slightly pitted, dirty-gray to brownish-gray ledges.

Difference in grain size between the dolomites of the Roubidoux and those of the Gasconade formation, the presence of sand grains in the Roubidoux dolomites as compared to the relatively sand-free beds of the Gasconade and sparingly arenaceous strata of the Rich Fountain formation, and the dis-

tinctive character of the weathered surfaces of the Roubidoux dolomites are useful but not diagnostic in field determination.

Sandstone.—Although not as abundantly represented in the formation as is dolomite, sandstone is, nevertheless, a conspicuous constituent. Massive, protruding sandstone ledges of Roubidoux age, familiar sights throughout the Ozark area, have often given the erroneous impression that the formation consists predominantly of sandstone.

In general the sandstone members of the formation are fine- to medium-grained, gray through shades of brown and red, and medium- to massively bedded. Data obtained from screening tests made for a limited number of samples (see Table I) show the sandstones to be of fine sand size in Wentworth's classification. In the field the sandstones screened, as well as many others, appeared to be fine-grained and were described as such in the measured sections.

Shades of gray and brown are most characteristic of Roubidoux sandstones, although locally beds with light-yellow, cream, tan, and pink hues occur. Where well-bedded, these more colorful sandstones are frequently quarried for building stone.

Individual sandstone members range in thickness from a fraction of an inch to almost 30 feet, and are extremely sporadic in occurrence. They are distributed throughout the formation, but are more abundant and more massive in its upper part (Frontispiece). Locally, the more massive sandstone ledges exhibit well-developed cross-bedding (Pl. IV A p. 15).

The chief mineral constituent of the sandstones of the Roubidoux is quartz. Other minerals, namely zircon, tourmaline, and anatase (Cordry, 1929, pp. 78-85) occur in most of the sandstones but only in very minor amounts. In general the individual grains are angular and unfrosted. Rounded, frosted grains, although observed in practically all of the samples examined, are the exception rather than the rule. Angularity of the grains, many of which show well-defined crystal faces, is due to regeneration of the crystal form of quartz in crystallographic continuity with the quartz of the original grain.

Cementing materials present in the sandstones studied are dolomite, quartz, and iron oxide. Of the three, dolomite is the most common, although locally some of the sandstones are highly ferruginous.

TABLE I

GRAIN SIZE ANALYSES OF ROUBIDOUX SANDSTONE*

Wentworth Grade Scale mm.	Retained on Tyler Screen		Locality Numbers						
	mm.	Mesh	1	2	3	4	5	6	7
Granule	1.98	9	—	—	—	—	—	—	—
Very Coarse Sand	0.991	16	—	0.25	—	—	0.50	—	—
Coarse Sand	0.495	32	2.50	6.10	6.15	7.00	16.90	2.20	2.50
Medium Sand	0.246	60	41.25	27.90	46.50	53.75	51.15	25.90	34.75
Fine Sand	0.124	115	48.50	57.90	43.10	31.10	24.25	53.20	54.20
Very Fine Sand	0.061	250	3.50	6.10	3.00	6.50	4.75	9.25	4.70
Silt and Clay		Pan	4.25	1.90	1.15	1.25	1.90	9.10	3.40

*Analyses given in grams.

KEY TO LOCALITIES

1. Moreau River section, unit 29
2. Cole Camp Creek section, unit 26
3. Big Piney section, unit 23
4. Rockbridge section, unit 19
5. Jack's Fork section, unit 19
6. Minnith section, unit 7
7. Union section, unit 14

Surfaces with well-developed ripple marks and fillings of desiccation cracks (Pl. III A, B) occur throughout the areal extent of the formation.

Chert: The chert of the Roubidoux formation is highly variable in character ranging from porcelaneous, banded varieties to sandy and oolitic varieties (Pl. IV A). The various types do not seem to be restricted to definite horizons, except locally, and are not persistent in occurrence. McCracken (1952, p. 64) states that the Roubidoux formation in the subsurface of Missouri has a brown, quartzose, oolitic chert zone at its top, which is persistent and is important in both local and regional correlation.

In surface studies this zone was difficult to recognize because of the abundance of more common chert types near the top of the formation.

Chert occurs in the Roubidoux as irregular layers ranging from a fraction of an inch to 10-12 feet in thickness, and as thin, irregular nodules and lenses in the dolomite members.

Sandy and oolitic cherts, although not always the most abundant, are most characteristic of the formation. The sandy cherts range from sparingly sandy varieties to chert matrix sands, in which sand is the predominant constituent. In the oolitic types the individual oolites range in size from cryptooolites to those easily visible with the naked eye, in shape from spherical to elliptical forms, in color from white to dark-gray and brown, and in structure from radial to concentric forms. In a few of the oolitic cherts observed, secondarily enlarged quartz crystals form the nuclei of the oolites. Dolomolds, although present in some of the Roubidoux cherts, are not common.

Porcelaneous, smooth-weathering, white to dark-gray and brown, banded cherts also occur in the formation but not as abundantly as the above-mentioned type.

In the southern part of Missouri, in Douglas, Ozark, Shannon, and Carter counties, a dull white, in part quartzose, vuggy, fossiliferous chert horizon occurs within about 15 feet of the base of the formation. Other chert zones in the formation contain fossils but usually only in local areas.

Stromatolites are common structures in Roubdioux cherts in certain areas of the Ozark uplift. Several different types occur, cryptozoan and archaeozoan being the most common.

The chert of the Roubidoux differs from that of the upper part of the underlying Gasconade formation and that of the overlying Rich Fountain formation in the following respects: (1) the Roubidoux formation contains relatively larger amounts of chert than the adjacent parts of either formation; (2) cherts of the Roubidoux are commonly arenaceous, whereas those of the underlying Gasconade formation are non-sandy and those of the overlying Jefferson City formation only sparingly arenaceous; (3) Roubidoux cherts are, in general, lighter in color than those of the upper Gasconade.

Shale: Primary shale, if present in the formation, is rare. Thin, discontinuous beds of argillaceous material occur along bedding planes in the dolomite, but there is some question as to whether any of them are of primary origin. It is the opinion of the writer that most of this argillaceous material is actually the residue from the solution of an indeterminable thickness of dolomite. Concentration along bedding planes could easily be accomplished by ground water.

Stratigraphic Relations.—The Roubidoux may rest unconformably upon the Gasconade formation, but there is little field evidence to support this view. At most places the contact appears to be conformable. A gradual change in conditions of sedimentation is indicated, however, by the appearance of abundant sand grains in the dolomites of the lower part of the Roubidoux and in the development of massive sandstone beds higher in the formation. Sedimentary structures indicative of shallowing seas (ripple marks and stromatolites) and subaerial exposure (fillings of desiccation cracks), common in Roubidoux strata and relatively rare or absent in Gasconade strata, furnish additional evidence of a change in environmental conditions. The faunal change also indicates a change in conditions if not an interruption of sedimentation.

The Roubidoux-Rich Fountain contact appears to be one of conformity, although slight changes in lithology, and a marked change in the fauna of the overlying Rich Fountain formation indicate an interruption in sedimentation.

Paleontology.—Although sparingly fossiliferous over most of the Ozark uplift, the chert of the Roubidoux formation locally contains numerous well-preserved fossils. The fauna, which is predominantly molluscan, is best developed in the southern

FAUNAL DISTRIBUTION CHART
ROUBIDOUX AND ADJACENT FORMATIONS

LOWER ORDOVICIAN

GASCONADE FORMATION | ROUBIDOUX FORMATION | RICH FOUNTAIN FORMATION

OZARKOCOELIA	PORIFERA
ARCHAEOSCYPHIA	PORIFERA
FINKELNBURGIA	BRACHIOPODA
SYNTROPHINA	BRACHIOPODA
PROPLINA	GASTROPODA
HYPSELOCONUS	GASTROPODA
OZARKOCONUS	GASTROPODA
EUCONIA	GASTROPODA
RHOMBELLA	GASTROPODA
JARLOPSIS	GASTROPODA
MAGLURITELLA	GASTROPODA
PLETHOSPIRA	GASTROPODA
HORMOTOMA	GASTROPODA
LECANOSPIRA	GASTROPODA
RAPHISTOMINA	GASTROPODA
OROSPIRA	GASTROPODA
CERATOPEA	GASTROPODA
OPHILETA	GASTROPODA
GASCONADIA	GASTROPODA
HELICOTOMA	GASTROPODA
OZARKINA	GASTROPODA
SINUOPEA	GASTROPODA
MONOGONOCERAS	CEPHALOPODA
PROTOCYCLOCERAS	CEPHALOPODA
COTTEROCERAS	CEPHALOPODA
BURENOCERAS	CEPHALOPODA
CAMPBELLOCERAS	CEPHALOPODA
PILOTOCERAS	CEPHALOPODA
MOREAUOCERAS	CEPHALOPODA
ECTENOLITES	CEPHALOPODA
HYSTRICURUS	TRILOBITA
PARAPLETHOPELTIS	TRILOBITA
JEFFERSONIA	TRILOBITA
BATHYURELLUS	TRILOBITA
RANANASUS	TRILOBITA

SCALE IN FEET 0 10 20 30 40 50

part of the state where fossils occur in two, and in some places, three zones. The lower zone, which occurs 10-20 feet above the base of the formation, contains numerous representatives of the genus *Syntrophina*. Associated with *Syntrophina campbelli* and *Syntrophina missouriensis* in this zone are the trilobites *Hystricurus elevatus*, *Hystricurus* sp., *Hystricurus* sp. A, and *Paraplethopeltis minuta*, the gastropods *Lecanospira* sp., *Rhombella umbilicata*, *Hormotoma* cf. *H. gracilis*, and *Jarlopsis conicus*, and the cephalopods *Monogonoceras subrectum*, *Protocycloceras* sp., and *Burenoceras* sp. To the north, in Phelps, Pulaski, and Laclede Counties the *Syntrophina* fauna occurs at several localities but is not as well developed as it is farther south. *Syntrophina campbelli*, *Syntrophina missouriensis*, and *Jarlopsis conicus* appear to be the only elements of the fauna present in these counties.

The middle faunal zone, known only in the Ava area, occurs approximately 70 feet above the base of the formation. It is predominantly a zone of trilobites. In this zone *Hystricurus deflectus* and *Jeffersonia bridgei* are the most conspicuous elements present.

Near the top of the formation (155-180 feet above its base) the well-known *Lecanospira* fauna occurs in a fossiliferous zone that is rather widespread in the southernmost areas of Roubidoux outcrop. Associated with *Lecanospira compacta* and *Lecanospira soluta* in this zone are the gastropods *Hypseloconus compressus*, *Proplina elongata*, *Ozarkoconus prearcuatus*, *Rhombella umbilicata*, *Macluritella stantoni*, *Plethospira extensa*, *Hormotoma* sp., *Ophileta* (?), *Jarlopsis conicus*, and the cephalopod *Campbelloceras overmani*.

Outside of these three zones fossils are erratically and sparingly distributed through the formation. Representatives of the genus *Lecanospira* are the forms most commonly encountered in the cherts occurring above and below the principal fossil zones.

Cryptozoan and archaeczoan stromatolites occur intermittently throughout the extent of the Roubidoux but are only of local extent. In southern Laclede County (Osage Fork measured section, page 60) well-developed stromatolites occur at several different horizons.

Stratigraphic distribution of the faunal elements of the Roubidoux and adjacent formations is shown on Plate V, p 22.

Age and Correlation.—Over much of the area of outcrop of the Roubidoux formation, particularly in the northern part of the Ozark uplift, paleontological evidence on which to base stratigraphic correlation is wanting. In such areas correlations are based entirely on stratigraphic position, lithologic character, and paleontologic evidence obtained from adjacent formations. In most cases this method of correlation proved satisfactory.

Faunas with elements similar to those found in the Roubidoux formation of Missouri have been reported from the Gorman formation of central Texas, the Cool Creek formation of the Arbuckle and Wichita Mountains, and the Longview limestone of the Appalachian region. Bridge (1930, p. 124) also suggests the lower part of Division C of the New York Beekmantown as an approximate equivalent.

Most widely distributed and most characteristic of the elements of the Roubidoux fauna is the gastropod genus *Lecanospira*. In Missouri numerous species of this genus occur intermittently from the top to the bottom of the formation. Exception to this intermittent occurrence can be found in the Ava, Rockbridge, and Eminence areas in the southern part of the state, where *Lecanospira* seems to occur in definite zones.

Economic Geology.—Over much of the Ozark region in Missouri, sandstone beds of Roubidoux age are quarried locally (Pl. VI A p. 60) to produce attractive building stone. Varieties of white to buff and brown, ripple-marked, sun-cracked sandstone (Pl. VI B p. 60) are most often used. Practically all of these quarrying operations are intermittent and on a small scale. For this reason, estimates of the value of their output are not available.

In some areas of Roubidoux outcrop, sand from stream beds is used for concrete and the manufacture of concrete blocks. In general, however, the small grain size of these sands prevents them from being of economic importance.

Less obvious as an economic product but of far more importance than the products obtained from the formation at the surface is the water taken from Roubidoux strata in the subsurface. Wells, both shallow and deep, obtain water from porous sandstone layers of the formation throughout the state.

Structure.—Roubidoux strata are essentially horizontal over the greater part of the Ozark uplift, although locally steep

dips and minor faults have resulted from solution of underlying rocks. The regional dip in the areas studied is radial outward from the center of the uplift. Average dip in these areas is between 20 and 50 feet per mile.

Small anticlinal and synclinal structures (Pl. VII A p. 61) produced by solution are common in Roubidoux beds throughout the Ozark area. Such structures are usually best seen and understood in natural and artificial excavations. In such places the true relationship of the structure to the surrounding strata can be seen.

Solution and subsidence are probably also responsible for many of the irregularities along bedding planes and for local thinning of the Roubidoux.

Systematic Description of Fauna*

Phylum BRACHIOPODA

Class ARTICULATA

Order PROTREMATA

Suborder ORTHOIDEA

Family FINKELNBURGIIDAE

Genus *Finkelnburgia* Walcott, 1905

Finkelnburgia sp.

Plate IX, figure 11

Shell small, subelliptical in outline. Hinge line straight, narrower than the greatest shell-width, cardinal extremities appear to be obtuse. Anterior commissure appears to be faintly sulcate.

Ventral valve gently convex. Beak low, gently convex. Ventral interior with a well-developed pseudospondylium which is extended anteriorly into a short, narrow ridge that does not attain mid-length of the valve.

Dorsal valve gently convex with greatest convexity at the umbo. Beak very low. Lateral areas steep, gently convex to lateral and anterior margins where they become gently concave. Dorsal interior with short brachiophore supporting plates and a low, simple cardinal process.

Discussion.—The several specimens of *Finkelnburgia* included here resemble *F. bellatula* Ulrich and Cooper. In general, the Roubidoux forms are smaller than average specimens of *F. bellatula* from the Gasconade formation, but this may be due to different stages of growth attained. The Roubidoux specimens described above are not well-preserved and are difficult to identify specifically.

Occurrence.—Hypotype, U. Mo. No. 10,301, from residual chert near the base of the Roubidoux at locality MR-14, along

*A new classification for the gastropods will be available when Parts I and J (J. B. Knight, R. L. Batten, E. L. Yochelson) of the Treatise on Invertebrate Paleontology are published. It is suggested that the reader consult these works for determining the systematic position of the gastropods described in this report.

State Highway 5 just north of New Bryant, Douglas County, Missouri.

Suborder SYNTROPHIOIDEA

Family CLARKELLIDAE

Genus *Syntrophina* Ulrich, 1928

Syntrophina campbelli (Walcott)

Plate IX, figures 1-8

Syntrophia campbelli Walcott, Smithsonian Misc. Coll., vol. 53, pp. 107-108, Pl. 10, 1908; U. S. Geol. Survey, Mon. 51, p. 801, 1912.

Syntrophina campbelli (Walcott), Ulrich and Cooper, Geol. Soc. America, Special Paper 13, p. 218, Pl. 46, 1938.

Shell small, a little wider than long, subequally biconvex; hinge narrow, its width equalling, or slightly less than, half the greatest width. Surface ornamented only by concentric lines of growth.

Ventral valve roundly elliptical in outline, evenly and gently convex in profile. In anterior view the median portion of the profile slightly sulcate and the sides gently convex. Sulcus moderately deep and wide, defined in the front half. Tongue slightly elongated, rounded; lateral lobes bounding the sulcus strongly convex. Lateral lobes steep, faintly concave. Beak low, interarea curved.

Dorsal valve evenly but flatly convex in lateral profile, trilobate in anterior profile. Fold low, visible about half the length of the valve, sharply rounded to sub-angular and bounded by shallow sulci. Lateral slopes moderately convex, a little depressed below the fold in lateral profile. Umbo gently convex, beak incurved, inconspicuous.

Septum strong, extending to the middle of the valve or beyond; spondylium small, brachiophore plates short, slightly divergent.

Dimensions of average specimens are: length, 7-7.5 mm.; width, 9-10 mm.; hinge width, 4-5 mm.

Discussion.—*S. campbelli* closely resembles *S. missouriensis*. It differs in having a rounder contour, valves a little more inflated, a gentler sulcus, and a more prominent fold which extends about to the middle of the valve. *S. campbelli* and *S. missouriensis* occur together in the lower part of the Roubidoux formation in Missouri.

Occurrence.—Hypotypes, U. Mo. Nos. 10,303, 10,304, from chert zone 10-20 feet above the base of the Roubidoux at localities MR-18, MR-26, and MR-28.

Syntrophina missouriensis Ulrich and Cooper

Plate IX, figures 9, 10

Description.—Shell small, wider than long, forming a flattened ellipse in outline, with narrowly rounded lateral margins. The valves about equal in depth. The ventral valve most strongly inflated in the region bounding the sulcus, which originates at about the middle of the valve and deepens and widens rapidly to the front. The tongue long and narrowly rounded. A narrow, shallow groove extends from a point near the beak to the front of the tongue. The slopes on the flanks of the shell steep and gently concave. The beak low and incurved.

The dorsal valve strongly inflated in the umbonal region and on the flanks of the shell. The low and rounded fold originates at about the center of the valve. The slopes to the margins swollen and convex. The fold often shorter than the flanks of the shell, giving the valve a bilobed appearance in the dorsal view.

Dimensions of average specimens are: length, 5-5.5 mm.; width, 7-8 mm.; hinge width, 2-2.5 mm.; thickness, 1-2 mm.

Occurrence.—Hypotypes, U. Mo. No. 10,305, from chert zone 10-20 feet above the base of the Roubidoux at localities MR-18 and MR-26.

Phylum MOLLUSCA

Class GASTROPODA

Subclass STREPTONEURA

Order ASPIDOBRANCHIA

Family TRIBLIDIIAE

Genus *Proplina* Kobayashi, 1933

Proplina elongata Cullison, 1944

Plate IX, figure 14

Proplina elongata Cullison, University of Missouri, School of Mines and Met. Bull., Tech. Ser., vol. 15, no. 2, p. 50, Pl. 25, 1944.

Patelliform or cap-shaped gastropods with apex directed toward and extending well beyond the margin of the narrower end, here arbitrarily designated as anterior. Aperture elongate, oval, broadly rounded posteriorly, narrowly rounded anteriorly, seemingly with thin margins. Apex relatively large, moderately pointed, strongly curved dorso-ventrally to form a hook anterior to base. Ornamentation consists of a few transverse rugae. Shell structure and muscle scars unknown.

Figured specimen, a rubber cast of an internal mold, measures about 24 mm. in length, 16.5 mm. in width.

Occurrence.—Hypotype, U. Mo. No. 10,306, from chert of the upper part of the Roubidoux at locality MR-27, approximately 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Genus *Hypseloconus* Berkey, 1898

Hypseloconus compressus Ulrich and Bridge

Plate IX, figures 12, 13

Hypseloconus compressus Ulrich and Bridge, Missouri Bur. Geol. and Mines, 2d ser., vol. 24, p. 187, Pl. 20, figs. 20-22, 1930.

Shell conical, compressed anteriorly, expanding posteriorly. Apex pointed, directed posteriorly, anterior profile convex, posterior profile concave, the sides sloping uniformly, flaring outward as they approach the posterior margin. Aperture ovoid, subangular anteriorly. Surface marked with fine concentric lines. Dimensions of figured specimen are: length 9.0 mm.; width 6.7 mm.; height 8.7 mm.

Occurrence.—Homeotype, U. Mo. No. 10,307, from chert near top of Roubidoux at locality MR-27, 2.7 airline miles northwest of Birch Tree, Shannon County, Missouri.

Genus *Ozarkoconus* Heller, n. gen.

Genotype: Ozarkoconus prearcuatus Heller, n. sp.

Shell small to moderately large, conical, gradually expanding, commonly with the length and height subequal. Apex curved forward and terminating directly above the anterior end of the aperture in most specimens, but in other extending beyond or falling short of it. Aperture oval, narrowest anteriorly. Surface with fine radiating costellae extending from the apex to the margin. Muscle scars unknown.

Specimens of this genus vary in length from 8-43 mm., in width from 6-29 mm., in height from 5-60 mm.

Discussion.—This genus is proposed to include *O. prearcuatus* n. sp. from the Roubidoux formation and several undescribed species from the Eminence, Van Buren, and Gasconade formations in Missouri. The smaller forms of this genus resemble representatives of the genera *Proplina* Kobayashi and *Helcionopsis* Ulrich and Scofield. Specimens of *Ozarkoconus* may be distinguished, however, by their proportionately greater height and somewhat compressed sides, as well as by their characteristic surface ornamentation. The name *Ozarkoconus* was coined by Ulrich.

Ozarkoconus prearcuatus Heller, n. sp.

Plate IX, figure 15

Shell small, conical, gradually expanding, height slightly greater than length. Apex pointed, directed anteriorly, extending slightly beyond the anterior margin. Aperture seemingly oval in shape, narrowest anteriorly. Anterior profile slightly concave, posterior profile strongly convex. Muscle scars unknown. Surface ornamentation consists of radiating costellae. Dimensions of the holotype are: length 8 mm.; width 6 mm.; height 10 mm.

Occurrence.—Holotype, U. Mo. No. 10,308, from chert of the upper Roubidoux at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Family Undetermined

Genus *Euconia* Ulrich and Scofield, 1897

Euconia sp.

Plate IX, figure 19

Shell moderately large, trochiform, phaneromphalus, with a flat base and an angular periphery. Pleural angle 68 to 75 degrees. Whorls 6 to 8, gradually expanding, more or less rhomboidal in cross-section. Whorl profile between sutures flat and sloping outward with a narrow, slightly raised band just above the periphery. Sutures linear, the line of suture falling at the periphery of the previous whorl. Umbilicus moderately wide, with rounded borders. Band above suture

is apparently a selenizone generated by what must have been at least a notch. Ornamentation unknown.

Occurrence.—Hypotype, U. Mo. No. 10,310. from chert near middle of Roubidoux at locality MR-15, along State Highway 5, just north of New Bryant, Douglas County, Missouri.

Genus *Rhombella* Bridge and Cloud, 1947

Rhombella umbilicata (Ulrich and Bridge)

Plate X, figures 1-5; Plate XI, figure 5

Roubidouxia umbilicata Ulrich and Bridge, Geol. Soc. America Bull., vol. 43, pp. 725-748, Pl. 12, 1932.

Rhombella umbilicata (Ulrich and Bridge) Bridge and Cloud, Am. Jour. Sci., vol. 245, pp. 550-555, Pls. 1-2, 1947.

Shell large, depressed trochiform, with flat base and wide umbilicus. Pleural angle 90 to 105 degrees. Whorls five to six in number, rapidly expanding, rhomboidal in cross-section, the upper and lower surfaces essentially flat and approximately parallel. Whorl profile between sutures flat to slightly convex; umbilical slope gently convex. Umbilicus wide, deeply conical, exposing part of all the whorls. Peripheral carina well-defined in outer whorl, less so in inner whorls.

Aperture seemingly of the same shape as the whorl cross-section. Parietal and columellar lips unknown.

Ornamentation consists of fine, concentric growth lines. These curve slightly forward from the suture to about the middle of the shoulder of the whorl and then swing sharply backward to the peripheral band, crossing it a considerable distance behind their point of origin. On base and umbilical slope growth lines are sigmoid.

Figured specimens are from 40 to 73 millimeters in diameter and from 23 to 40 millimeters in height.

Occurrence.—The figured specimen, U. Mo. No. 10,311, was collected from residual cherts in the upper part of the Roubidoux at locality MR-27 northwest of Birch Tree, Shannon County, Missouri. Figured specimen, U. Mo. No. 10,312, was collected from residual cherts near the base of the formation at locality MR-28 in Pine Hollow, Shannon County, Missouri.

Genus *Jarlopsis* Heller, n. gen.

Genotype: Jarlopsis conicus Heller, n. sp.

Shell of medium size, conical, moderately phaneromphalus. Pleural angle 80-85 degrees. Whorls 6 to 8 in number, gradually expanding, rhomboidal in cross-section. Whorl profile between sutures flat, sloping outward to a well-defined peripheral band. Band, which is narrow and almost vertical, is apparently a selenizone generated by what must have been a notch in the outer lip. Sutures linear, the line of suture falling at the periphery of the previous whorl. Base gently convex, sloping in to umbilicus at an angle of 45 to 48 degrees. Umbilicus moderately wide, with angular borders. Aperture seemingly of the same shape as whorl cross-section. Nucleus unknown. Ornamentation unknown.

Discussion.—The genus *Jarlopsis* is proposed to include certain forms which resemble but are not congeneric with those of the genus *Euconia*. Representatives of these two genera are found associated with each other in the Roubidoux formation of Missouri and in the Gorman formation of central Texas.

The fewer number of whorls, the steeply sloping gently convex base, and the greater pleural angle (80-85 degrees) of *Jarlopsis* are features which differentiate it from *Euconia*.

The genus is named after Jarl W. Hanson who aided materially in making this report possible.

Jarlopsis conicus Heller, n. sp.

Plate X, figures 6-8

Shell of medium-size, trochiform, phaneromphalus, with numerous gradually enlarging whorls. Whorl profile between sutures flat, sloping steeply outward to well-defined peripheral band. Band apparently a selenizone generated by what must have been at least a notch in the outer lip. Sutures linear, the line of suture falling at the periphery of the previous whorl. Pleural angle approximately 84 degrees. Base gently convex, sloping in the umbilicus at an angle of about 47 degrees. Umbilicus wide, with angular borders. Nucleus unknown. Ornamentation not known. Holotype measures about 11.3 mm., in height and 15 mm., in width.

Occurrence.—The holotype, U. Mo. No. 10,313, is from chert of the lower part of the Roubidoux at locality MR-14 between Ava and Mansfield in Douglas County, Missouri. Associated fossils at this locality are *Syntrophina campbelli*, *Monogonoceras subrectum*, and *Hystricurus* sp. Paratype, U.

Mo. No. 10,314, from residual cherts near top of the Roubidoux at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Family Undetermined

Genus *Macluritella* Kirk, 1927

Macluritella stantoni Kirk

Plate IX, figures 16-18

Macluritella stantoni Kirk, Am. Jour. Sci., vol. 14, pp. 282-292, 1927.

Small, discoidal gastropods with a depressed spire, and a nearly flat base. Whorls rapidly expanding, and coiled out of contact. Whorl profile roughly subcircular but somewhat flattened below and with an obscure notch-keel above. Sutures missing since the whorls are not in contact. Nucleus unknown. Aperture seemingly of the same shape as the whorl cross-section. Apertural lip with a broad, quite shallow sinus in the upper part of the outer lip culminating at about the middle of the upper surface of the whorl, in some cases in an obscure notch which gives rise to an equally obscure notch-keel. Ornamentation consists of fine concentric growth lines which more or less parallel the outline of the aperture.

The largest specimens known from the Roubidoux are about 21 millimeters in diameter and 9 millimeters in height.

Discussion.—The occurrence of *Macluritella stantoni* in the Roubidoux of Missouri is of interest because heretofore it has been known to occur only in the Rocky Mountain region of western North America.

Occurrence.—Figured specimen, homeotype U. Mo. No. 10,339, was collected from residual chert boulder near top of Roubidoux formation at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Figured specimen, homeotype U. Mo. No. 10,309, from chert of the lower part of the Roubidoux at locality MR-28, Shannon County, Missouri.

Genus *Plethospira* Ulrich and Scofield, 1897

Plethospira extensa Heller, n. sp.

Plate XI, figures 2-4

Shell large, turbiniform, with a moderately high spire and an extended base. Whorls rapidly expanding, strongly rounded, with a pronounced carina just above mid-height. Pleural angle 63 to 66 degrees. Sutures deep well-defined, with strong shoulders. Base rounded, anomphalus to narrowly phaneromphalus. Nucleus unknown. Outer lip with a broad, rather shallow sinus culminating at the periphery in what is seemingly a notch or shallow slit which gives rise to a selenizone. Ornamentation consists of fine growth lines and occasional obscure lamellae.

An average specimen is about 23 millimeters in diameter, 42 millimeters in height, and has a pleural angle of about 65 degrees.

Discussion.—This species resembles *P. cassina* (Whitfield) from the Fort Cassin beds of Vermont, but differs from it in having a larger pleural angle, a more pronounced shoulder above the sutures, and the selenizone higher on the whorl.

Occurrence.—Holotype, U. Mo. No. 10,315, from residual chert in the upper part of the Roubidoux formation at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Paratypes, U. Mo. No. 10,316, from same locality as holotype.

Family MURCHISONIIDAE

Genus *Hormotoma* Salter, 1859

Hormotoma cf *H. gracilis* (Hall)

Plate XI, figure 1

Murchisonia gracilis Hall, Paleontology of New York, vol. 1, p. 181, 1847.

Hormotoma gracilis (Hall), Salter, Canadian Organic Remains, Decade 1, p. 22, 1859.

Shell high-spired, anomphalus, consisting of numerous rounded whorls. Whorl profile strongly rounded between sutures and slightly angulated at the selenizone. Sutures deep. Nucleus unknown. Selenizone gently depressed, situated slightly below mid-whorl height. Base rounded, seemingly anomphalus. Aperture unknown. Ornamentation not known. Apical angle approximately 17 degrees. Apical five whorls measure approximately 10.5 mm. in height.

Discussion.—In general, the specimens representing this genus are not well enough preserved to permit specific differentiation. Additional collecting should result in the discovery of better preserved specimens which will permit further classification and more complete description.

Occurrence.—Hypotype, U. Mo. No. 10,317, was collected from residual chert near the base of the Roubidoux at locality MR-28, along old Birch Tree road, Shannon County, Missouri.

Family Undetermined

Genus *Lecanospira* Butts

Lecanospira compacta (Salter)

Plate XII, figures 6-9; Plate X, figure 9

Lecanospira compacta (Salter), Ulrich and Bridge, Missouri Bur. Geol. and Mines, 2d ser., vol. 24, p. 205, Pl. 22, fig. 1, 1930. (Complete synonomy)

Lecanospira sigmoidea Ulrich and Bridge, Missouri Bur. Geol. and Mines, 2d ser., vol. 24, p. 206, Pl. 22, fig. 2, 1930.

Shell large, discoidal, with a flat base and a deeply depressed spire. Whorls 5 to 6, rapidly expanding, diameter of the final whorl is about twice that of preceding one. Carina prominent, slightly elevated, situated a little over one-third the width of the whorl from the outer margin. Upper and lower sutures moderately shallow. Outer wall of whorl gently convex, inner wall concave. Surface ornamentation consists of parallel lines of growth which arise from outer margin, curve slightly forward and then backward, passing over the keel some distance behind the point of origin, and then curve forward, intersecting the suture about opposite the point of origin. Dimensions of an average specimen are: diameter 38-50 mm.; height of outer whorl 12-15 mm.; depth of spire 8-12 mm.

Occurrence.—Figured specimen, Mo. S. M. No. 3447, from chert of the Roubidoux near Bartlett, Shannon County, Missouri.

Figured specimen, Mo. S. M. No. 3076 from chert in lower part of Roubidoux at locality Mo. S. M. 90.10, Reynolds County, Missouri.

Figured specimen, U. Mo. No. 10,321, from chert in lower part of the Roubidoux at locality MR-32, 0.9 mile airline southeast of Winona, Shannon County, Missouri.

Lecanospira biconcava Ulrich and Bridge

Plate XIII, figures 7, 8; Plate XV, figure 1

Lecanospira biconcava Ulrich and Bridge, Missouri Bur. Geol. and Mines, 2d ser., vol. 24, p. 206, Pl. 22, fig. 4, 1930.

Shell moderately large, discoidal, with a concave base and a moderately depressed spire. Whorls 6 to 7, slowly expanding, ratio of the width of final whorl to preceding one about 5:3. Carina prominent, elevated, situated about mid-width of whorl. Upper and lower sutures shallow. Outer wall of whorl gently convex, inner wall concave below carina, strongly convex above suture. Lower margins of the whorl smoothly rounded. Base of shell concave, its depth about one-fourth the depth of the spire. Ornamentation consists of growth lines. Dimensions of an average specimen are: diameter 40 mm.; height of outer whorl 13-14 mm.; depth of spire 7 mm.

Occurrence.—Figured specimens, U. Mo. No. 10,324 and Mo. S. M. No. 626, from chert of the Roubidoux south of Festus, Jefferson County, Missouri. This locality is a Missouri School of Mines locality and has the number 75.20.

Lecanospira depressa Heller, n. sp.

Plate XI, figures 6-9

Shell large, discoidal, with a depressed base and deeply depressed spire. Whorls 7 to 8, rapidly expanding, sharply carinate above, outer wall of whorl slightly concave below carina and convex in lower part, inner wall slightly concave below carina and almost vertical in lower portion. Carina prominent, elevated, situated a little beyond midwidth of whorl from outer margin. Upper sutures strongly incised, lower sutures moderately deep. Base slightly to moderately depressed. Surface marked with closely spaced lines of growth. Dimensions of holotype are: diameter 48 mm.; height of outer whorl 15 mm.; depth of spire 9 mm.

Discussion.—*L. depressa* resembles *L. biconcava* Ulrich and Bridge which also has a depressed base, but differs from it in

shape and rate of expansion of whorls, and in position of dorsal carina.

Occurrence.—Holotype, U. Mo. No. 10,318, from chert in lower part of formation at MR-32, 0.9 mile airline southeast of Winona, Shannon County, Missouri.

Lecanospira soluta Heller, n. sp.

Plate XII, figures 1-5

Shell of moderate size, discoidal, with a flat base and a moderately depressed spire. Whorls 5 to 6, rapidly expanding, sharply carinate above, in contact near base of shell. Ratio of width of final whorl to the one preceding it about 2:1. Carina prominent, elevated, situated about one-third the width of the whorl from the outer margin. Upper sutures moderately deep between inner whorls, very deep in outer whorls. Outer wall of whorl flat to very gently convex, inner wall concave above, convex below. Surface ornamentation consists of fine, sigmoid growth lines as in the genotype. Dimensions of holotype are: diameter 30-32 mm.; height of outer whorl 9 mm.

Discussion.—This species resembles *L. salteri* Ulrich and Bridge in size and rate of expansion of whorls but is distinguished by its less-depressed spire, position of dorsal carina, and by its deeper sutures.

Occurrence.—Holotype, U. Mo. No. 10,319, from chert of the upper Roubidoux at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Paratypes, U. Mo. No. 10,320, from same locality as the holotype.

Lecanospira perplana Heller, n. sp.

Plate XIII, figures 1-6

Shell of medium size, discoidal, with a flat base and a moderately depressed spire. Whorls 6 to 7, moderately expanding, ratio of width of final whorl to preceding one about 5:3. Outer wall of whorl gently convex, inner wall flat to slightly concave. Carina not conspicuous, situated about one-half the width of the whorl from the outer margin. Upper sutures relatively shallow. Ornamentation consists of fine growth lines. Di-

mensions of holotype are: diameter 42 mm.; height of outer whorl 12-13 mm.; depth of spire 7 mm.

Discussion.—*L. perplana* is somewhat similar to *L. salteri* Ulrich and Bridge but may be distinguished by its less-depressed spire and more moderately expanding whorls.

Occurrence.—Holotype, U. Mo. No. 10,322, from chert of the lower part of the Roubidoux formation at locality MR-23, 1.3 miles airline northeast of Winona, Shannon County, Missouri.

Paratype, U. Mo. No. 10,323, from chert float at locality MR-32, approximately 0.9 mile airline southeast of Winona, Shannon County, Missouri.

Lecanospira carinata Heller, n. sp.

Plate XIII, figures 9-11; Plate XIV, figure 1

Shell moderately large, discoidal, with a slightly depressed base and a deeply depressed spire. Whorls 7 to 8, rapidly expanding, diameter of final whorl about twice that of preceding one. Carina greatly elevated, situated about mid-width of whorl. Upper sutures deep, V-shaped, sharply incised, lower sutures quite shallow. Outer wall of whorl convex, inner wall concave just below carina, convex in lower part of whorl. Base slightly depressed toward center of shell. Ornamentation consists of closely spaced growth lines. The holotype has a height of 15 mm., equal to the height of the final whorl; a diameter of 44 mm.; spire depth of 8 mm.

Discussion.—*L. carinata* is distinguished by its elevated carina, large number of whorls, incised upper sutures, and slightly depressed base.

Occurrence.—Holotype, U. Mo. No. 10,325A, and paratypes, U. Mo. No. 10,325B, from chert of the lower Roubidoux at locality MR-32, approximately 0.9 mile airline southeast of Winona, Shannon County, Missouri.

Class CEPHALOPODA

Subclass NAUTILOIDEA

Family BASSLEROCERATIDAE

Genus *Monogonoceras* Ulrich, Foerste, Miller, and Unklesbay, 1944

Monogonoceras subrectum Ulrich, Foerste, Miller, and Unklesbay

Plate XVI, figures 1-5; Plate XVII, figure 2

Monogonoceras subrectum Ulrich, Foerste, Miller, and Unklesbay, Geol. Soc. America Special Paper 58, p. 51, Pl. 14, figs. 1-6, 1944.

Conch moderately slender, slightly curved exogastrically, and oval in cross-section, laterally compressed and much more narrowly rounded ventrally than dorsally. Aperture bears a prominent hyponomic sinus. Rate of adoral expansion of the conch is small. Traces of the growth lines are directly transverse on the lateral and dorsal zones of the conch but form a rather prominent more or less V-shaped ventral sinus. Surface of test has an annulated appearance. Along the venter there is a moderately large longitudinal ridge on both the phragmacone and the living chamber.

The sutures are directly transverse and appear to be almost straight, and the septa are moderately convex apicad. The siphuncle is small and is ventral in position but is not quite in contact with the ventral margin of the conch.

Occurrence.—Holotype, U. S. N. M. No. 109468, from the Roubidoux formation about 5 miles south of Mansfield, on the road to Ava, Douglas County, Missouri. Several poorly preserved specimens belonging to this species were collected from the Roubidoux at locality MR-14, just north of New Bryant, Douglas County, Missouri.

Family SPYROCERATIDAE

Genus *Protocycloceras* Hyatt, 1900

Protocycloceras doniphonense Ulrich, Foerste, Miller, and Unklesbay

Plate XVII, figures 3-5

Protocycloceras doniphonense Ulrich, Foerste, Miller, and Unklesbay, Geol. Soc. America Special Paper 58, p. 82, Pl. 29, figs. 9-11, 1944.

Conch straight, annulated, circular in cross-section, and gradually expanded orad. Camerae short. Sutures parallel to annulations, slightly sinuous, and directly transverse. The septa are moderately convex apicad. The siphuncle is small

for this genus and is ventral and almost marginal in position. The holotype measures about 13.8 mm. in length and about 7.5 mm. in diameter near its mid-length. At the adapical end of the holotype the siphuncle is about 1.5 mm. in diameter.

Occurrence.—Holotype, U. S. N. M. No. 109522, from Roubidoux along road from Doniphan to Oxly, Ripley County, Missouri. Poorly preserved specimens closely resembling this species were collected from the upper part of the Roubidoux at locality MR-27, 2.7 miles airline northwest of Birch Tree, Shannon County, Missouri.

Family ENDOCERATIDAE

Genus *Cotteroceras* Ulrich and Foerste, 1936

Cotteroceras gregeri Ulrich, Foerste, Miller, and Unklesbay

Plate XVI, figures 6, 7

Cotteroceras gregeri Ulrich, Foerste, Miller, and Unklesbay, Geol. Soc. America Special Paper 58, p. 113, Pl. 11, figs. 16, 17, 1944.

Conch moderately large, long, straight, gradually expanded orad, and typically elliptical in cross-section. The camerae are short and those of the holotype average about 1.5 mm. in length. The sutures are slightly oblique to the long axis of the conch, sloping orad from the venter. They are almost straight, but their dorsal portion is somewhat curved orad to form a dorsal saddle. The siphuncle is ventral and marginal. The length of the holotype measures about 70 mm., of which 37 mm. represent the living chamber. At its adapical end the holotype is about 18 mm. high and about 14 mm. wide, and corresponding dimensions near the adoral end of the same specimen are about 23 mm. and 18 mm. respectively. The siphuncle is about 6 mm. in diameter at the adapical end of the holotype.

Discussion.—No representatives of this species were collected by the writer in the course of the field work. All information concerning the species is from Ulrich, Foerste, Miller, and Unklesbay.

Occurrence.—Holotype, U. S. N. M. No. 109572, from the Roubidoux at Poverty Flats, Crawford County, Missouri.

Family CYRTENDOCERATIDAE

Genus *Burenoceras* Ulrich and Foerste, 1930

Burenoceras cf. *B. pumilum*

Plate XVII, figure 1

Burenoceras pumilum Ulrich and Foerste, Missouri Bur. Geol. and Mines, 2d ser., vol. 24, p. 25, Pl. 20, figs. 32, 33, 1930.

Conch small, short, rapidly expanded orad, and strongly curved endogastrically. Cross-section of conch oval as it is laterally compressed and more narrowly rounded dorsally than ventrally. Adapertural portion of conch flared on ventral side. Camerae short, septa slightly curved. Sutures are nearly straight, directly transverse, and form very slight lateral lobes and dorsal and ventral saddle. Siphuncle small, somewhat flattened ventrally, located close to but not quite in contact with ventral wall of conch. Dimensions of figured specimen are: length 10 mm.; height 9.2 mm.; width 7.4 mm.; length of preserved portion of siphuncle 3 mm.

Occurrence.—Figured specimen, hypotype U. Mo. No. 10,326, from chert zone near base of the Roubidoux at locality MR-28, along old Birch Tree road, Shannon County, Missouri.

Family TARPHYCERATIDAE

Genus *Campbelloceras* Ulrich and Foerste, 1935

Campbelloceras overmani Heller, n. sp.

Plate XVII, figures 6-8

Conch, which appears to be subdiscoidal, is about 92 mm. (estimated) in diameter. Whorls subcircular in outline, slightly flattened and impressed dorsally. At the adoral end of the outer volution of the holotype the conch is 37 mm. high and 39 mm. wide. Apertural margins appear to be slightly flared. Sutures essentially straight. Siphuncle ventral and marginal, 3.3 mm. in diameter at adapical end of the holotype. Surface markings of the test consist of fine growth lines.

Discussion.—Although the holotype of this species is an incomplete specimen, enough of the conch is present to reveal characters which set it off from all known species of the genus. The ventral-marginal position of the siphuncle and the dorso-

ventrally flattened whorls serve to differentiate *C. overmani* from other species of *Campbelloceras*.

Occurrence.—Holotype, U. Mo. No. 10,327, from *Lecanospira* zone near top of Roubidoux formation at locality MR-27, northwest of Birch Tree, Shannon County, Missouri.

Phylum ARTHROPODA

Class CRUSTACEA

Subclass TRILOBITA

Order OPISTHOPARIA

Family SOLENOPLEURIDAE

Genus *Hystricurus* Raymond, 1913

Hystricurus elevatus Heller, n. sp.

Plate XVIII, figures 1-3, 10-12

Glabella broadly rounded posteriorly, almost vertical at anterior edge, elevation above rest of cranidium. Circumglabellar furrow strongly incised forming glabellar angle of about 14 degrees. Occipital furrow straight, incised. No glabellar furrows. No trace of an occipital spine. Facial sutures cut anterior margin just inside the eyes, continue backward in a sigmoid line to the eye, curve abruptly outward and cut the posterior margin just inside the genal angle.

Brim convex, strongly deflected downward to marginal furrow. Marginal furrow deep, rounded, arched toward midpoint of brim. Border strongly upturned. Palpebral lobes small, sharply elevated, located near mid-length of the cranidium. The surface of the entire cephalon with the exception of the furrows is pustulose. Pustules vary greatly in size. Free cheeks and thoracic segments are not known. Pygidium unknown.

Holotype.—

Length of cranidium—6.1 mm.
Length of glabella—5.0 mm.
Breadth of cranidium at palpebral lobes—8.6 mm.
Breadth of glabella at mid-length—4.8 mm.
Height of cranidium—4 mm.
Height of glabella—1.4 mm.

Discussion.—*H. elevatus* differs from *H. missouriensis* Ulrich in having a more convex brim, a V-shaped marginal furrow and a less prominent border. *H. missouriensis* is also much larger than this species.

H. elevatus differs from *H. conicus* (Billings) in shape of glabella and in surface ornamentation. In *H. conicus* the glabella is more conical and the brim contains only one row of pustules, whereas in this form there are numerous pustules on the brim. This species is similar to *H. abruptus* Cullison but differs in having a more abruptly deflected glabella at anterior end and in having sides of glabella less parallel.

Occurrence.—Holotype, U. Mo. No. 10,328, from cherts of the *Syntrophina* zone at locality MR-26, along old Birch Tree road, Shannon County, Missouri.

Paratype, U. Mo. No. 10,330, from cherts of the lower Roubidoux at locality MR-26. Paratype, U. Mo. No. 10,331, also from locality MR-26, Shannon County, Missouri.

Hystricurus deflectus Heller, n. sp.

Plate XVIII, figure 6

Pygidium large, semicircular in outline, strongly tri-lobed with lateral and posterior margins abruptly deflected. Axial lobe strongly convex, bears at least four strong ribs, bounded by strong axial furrows. Pleural lobes convex, subtriangular in outline, bear at least four strong ribs that have short terminal spines. Pleural furrows extend on lateral margins. Margins large, gently convex. Marginal furrow very shallow. Border very gently turned out. Surface ornamentation consists of scattered large pustules.

Holotype.—Pygidium
Width—25.3 mm.
Length—15.7 mm.
Width of axial lobe—9 mm.
Length of axial lobe—12.6 mm.

Discussion.—This species is represented by one large pygidium, which under ordinary circumstances would not be considered adequate material on which to base a new species. However, the unusual character of this pygidium and its oc-

currence in a heretofore unknown trilobite zone near the middle of the formation in Douglas County makes it of stratigraphic importance. The large size of this pygidium and the well-developed terminal spines on its ribs set it off from all known species of the genus.

Occurrence.—Holotype, U. Mo. No. 10,329, from chert zone near middle of Roubidoux, locality MR-15, just north of New Bryant, Douglas County, Missouri.

Hystricurus sp. A

Plate XVIII, figures 4, 5

Cranidium longer than wide, subrectangular in outline. Glabella moderately high, subelliptical in outline, gently convex both anteriorly and posteriorly. Circumglabellar furrow strongly incised. No glabellar furrows. Occipital furrow not known. Facial sutures cut anterior margin just inside the eyes, cut posterior margin just inside genal angle.

Brim gently convex, deflected downward to marginal furrow. Shallow V-shaped depression, apex at anterior margin of glabella, near midpoint of brim. Marginal furrow moderately deep, rounded, and straight. Border upturned, rounded. Palpebral lobes of moderate size, located near midpoint of cranidium. Surface of cephalon, with exception of furrows, pustulose.

Free cheeks, pygidium and thoracic segments not known.

Described specimen.—

Length of cranidium approx.—10 mm.
Length of glabella—6.5 mm.
Breadth of cranidium at palpebral lobes—10.5 mm.
Breadth of glabella at midlength—5 mm.
Height of cranidium—2.8 mm.
Height of glabella—1 mm.

Discussion.—Suggests *H. missouriensis* Ulrich but differs in shape and convexity of glabella.

Occurrence.—Hypotype, U. Mo. No. 10,332, from cherts of lower Roubidoux at locality Mo. S. M. 98.8 in Shannon County, Missouri.

Hystricurus sp.

Plate XVIII, figures 7, 8, 18

Discussion.—Associated with the cephalons described above are numerous free cheeks and pygidia, the exact relationships of which are not known. For this reason only generalized descriptions will be given for these parts.

Pygidia.—Semicircular in outline, composed of five segments. Axial lobe strongly convex, anterior three segments prominent, posterior two somewhat distinct. Pleural lobes have four distinct, pustulose ribs separated by non-pustulose furrows. Near lateral margin of each of these ribs is a very large pustule. Area between pleural lobes and marginal furrow smooth, sharply deflected downward. Specimens range in length from 2.5-5 mm. and in width from 4-9 mm.

Free cheeks.—Evenly convex along lateral margin. Border a thickened ridge produced posteriorly into a short genal spine. Marginal furrow shallow. Ocular platform strongly convex. Surface, with exception of marginal furrow, pustulose.

Family Undetermined

Genus *Paraplethopeltis* Bridge and Cloud, 1947

Paraplethopeltis minuta Heller, n. sp.

Plate XVIII, figures 13-15

Cephalon opisthoparian. Cranidium approximately as wide as long. Glabella smooth, moderately convex transversely and longitudinally, subelliptical in outline. Circumglabellar furrow well-defined. Occipital furrow very shallow, poorly defined. Glabellar furrows not present. Facial sutures cut posterior margin inside genal angle. Brim very gently convex, strongly deflected downward toward the anterior margin. Fixed cheeks level with circumglabellar furrow. Marginal furrow shallow, gently rounded. Border slightly elevated. Palpebral lobes small, located posterior to mid-length of the cranidium.

Free cheeks, thoracic segments, and pygidium not known.

Holotype.—

Length of cranidium—9.7 mm.
Length of glabella—5.3 mm.
Breadth of cranidium at palpebral lobes—9.3 mm.
Breadth of glabella at mid-length—5 mm.
Height of cranidium—2.5 mm.
Height of glabella—0.8 mm.

Discussion.—Differs from *P. obesa* in having a less convex glabella and smaller size. *P. minuta* is similar to *P. depressa* except for the general shape of the glabella which is less tapering in *P. minuta.*

Occurrence.—Holotype, U. Mo. No. 10,355 from basal Roubidoux at locality MR-26, along old Birch Tree road, Shannon County, Missouri.

Family BATHYURIDAE

Genus *Jeffersonia* Poulsen, 1927

Jeffersonia bridgei Heller, n. sp.

Plate XVIII, figures 16, 17

Cranidium longer than wide, moderately convex. Glabella well-defined, moderately convex, subelliptical in outline. Circumglabellar furrow shallow but well-marked. No glabellar furrows. Occipital furrow shallow and straight. Occipital ring incomplete. Facial sutures sinuous, shaped like an open, rounded W viewed from the side. Marginal furrow well-defined, very gently curved. Brim moderately convex, strongly deflected downward toward anterior margin. Border slightly convex, very gently turned up. Palpebral lobes large, slightly elevated, situated just posterior to middle of cranidium. Posterolateral limbs long and narrow. Surface of cephalon smooth.

Free cheeks, thoracic segments, and pygidium unknown.

Holotype.—

Length of cranidium—6.0. mm.
Length of glabella—3.3 mm.
Breadth of cranidium at palpebral lobes—5.3 mm.
Breadth of glabella at mid-length—3.0 mm.
Height of cranidium—1.7 mm.
Height of glabella—0.5 mm.

Discussion.—*Jeffersonia bridgei* differs from other species of the genus in having a more tapering glabella, a straighter marginal furrow, and a slightly turned up border.

Occurrence.—Holotype, U. Mo. No. 10,337, and paratype, U. Mo. No. 10,338, from massive chert bed near middle of the

Roubidoux at locality MR-15 just north of New Bryant, Douglas County, Missouri. Associated fossils at this locality are *Euconia* sp. and *Hystricurus deflectus*.

LIST OF MISSOURI ROUBIDOUX FOSSIL LOCALITIES

The localities listed below are those from which the writer collected during the course of this investigation.

MR-1. Cole County. Jefferson City Quadrangle (SW¼ NW¼ sec. 5, T. 43 N., R. 11 W.). On south side of small ravine approximately 1,300 feet west of the Moreau River. Fossils in chert. Upper Roubidoux—*Euconia* sp.

MR-2. Cole County. Meta Quadrangle (SW¼ NE¼ sec. 17, T. 43 N., R. 11 W.). On south facing bluff overlooking the Osage River. Fossils in cindery chert bed near top of unit 10 of Osage River section. Lower Roubidoux—*Hormotoma* sp.

MR-3. Osage County. Bland Quadrangle (SE¼ SE¼ sec. 34, T. 43 N., R. 7 W.). One hundred feet north of county road just west of where road makes very sharp bend to the south. Fossils in chert boulders. Pennsylvanian.

MR-4. Osage County. Linn Quadrangle (NW¼ NE¼ sec. 11, T. 41 N., R. 9 W.). Approximately 1.8 miles airline east of Freeburg on north side of a deep cut of the Chicago, Rock Island, and Pacific Railroad. Fossils in pieces of chert float. Lower Roubidoux—*Euconia*, *Hormotoma* sp.

MR-5. Osage County. Linn Quadrangle (SE¼ sec. 6, T. 41 N., R. 9 W.). From Pennsylvanian sandstone channel fill on north side of Chicago Rock Island and Pacific Railroad cut. Fossils in chert boulders in sandstone conglomerate. Pennsylvanian.

MR-6. Osage County. Linn Quadrangle (SE¼ SE¼ sec. 1, T. 41 N., R. 10 W.). From cannonball chert nodules on south facing slope 100-300 feet north of Chicago Rock Island and Pacific Railroad track. Lower Rich Fountain—*Hormotoma* sp., *Orospira* sp.

MR-7. Benton County. Lakeview Heights Quadrangle (SW¼ NW¼ sec. 3, T. 40 N., R. 21 W.). Near top of south facing slope overlooking the Lake of the Ozarks. About 300 feet SE of sharp bend in road, on west side of wide valley. Lower Rich Fountain—typical fauna.

MR-8. Benton County. Lakeview Heights Quadrangle (NW¼ SE¼ sec. 3, T. 40 N., R. 21 W.). On southwest facing slope overlooking the Lake of the Ozarks. Approximately 500 feet NW of Rockcrest Resort, just north of entrance road. Lower Rich Fountain.

MR-9. Benton County. Lakeview Heights Quadrangle (NW¼ SE¼ sec. 3, T. 40 N., R. 21 W.). On southwest facing bluff overlooking the Lake of the Ozarks. Approximately 100 feet south of road leading to Rockcrest Resort and 500 feet west of main entrance road to this resort. Lower Rich Fountain—*Archaeoscyphia annulata, Hormotoma* sp.

MR-10. Texas County. Big Piney Quadrangle (NW¼ SW¼ sec. 10, T. 33 N., R. 12 W.). Near top of southeast facing slope approximately 1,000 feet southwest along county road from the Cedar Bluff Schoolhouse. Fossils in chert float. Lower Rich Fountain.

MR-11. Douglas County. Ava Quadrangle (Near center of SE¼ sec. 25, T. 27 N., R. 15 W.). Near highest point on southeast trending ridge. Fossils in white, porcelaneous chert on either side of a pasture road that runs down along the ridge. Lower Rich Fountain.

MR-12. Douglas County. Buckhart Quadrangle (NW¼ NW ¼ sec. 4, T. 25 N., R. 13 W.). Near base of northeast facing slope on west side of Fox Creek approximately 0.5 mile airline north of State Highway 14. Fossils in chert. Lower Roubidoux.

MR-13. Douglas County. Mansfield Quadrangle (SW¼ sec. 17, T. 27 N., R. 15 W.). In O. F. Beushausen sandstone quarry on the north side of a large ravine that drains into Bryant Creek. Fossils in chert bed exposed by quarrying operations. Roubidoux—*Lecanospira* zone 30-50 feet from top of formation.

MR-14. Douglas County. Mansfield Quadrangle (SW¼ NW¼ sec. 16, T. 27 N., R. 15 W.). On west side of State Highway 5 approximately .25 mile by speedometer north of Bryant Creek. Fossils in lowest massive chert bed exposed in roadcut (unit 2 of Ava section). Lower Roubidoux (10-20 feet above base)—*Syntrophina campbelli*, *Hystricurus* sp., *Monogonoceras* sp., and *Jarlopsis conicus*.

MR-15. Douglas County. Mansfield Quadrangle (SW¼ NW¼ sec. 16, T. 27 N., R. 15 W.). On west side of State Highway 5 approximately 0.5 mile by speedometer north of Bryant Creek. Fossils in blocky, thoroughly weathered chert bed exposed in roadcut (unit 17 of Ava section). Roubidoux (near middle of formation)—*Hystricurus deflectus* and *Euconia* sp.

MR-16. Douglas County. Mansfield Quadrangle (SW¼ SW¼ sec. 9, T. 27 N., R. 15 W.). In roadcut of Missouri State Highway 5 approximately 0.8 of a mile north of Bryant Creek. Fossils in chert. Lower Rich Fountain.

MR-17. Ozark County. Buckhart Quadrangle (NW¼ SE¼ NW¼ sec. 5, T. 24 N., R. 13 W.). Approximately 10 feet below top of southwest facing slope and about 200 feet above Spring Creek. About 0.5 mile airline northwest of Rockbridge. Fossils in sandy chert. Upper part of the Roubidoux—*Lecanospira* zone.

MR-18. Ozark County. Buckhart Quadrangle (NW¼ SW¼ NW¼ sec. 5, T. 24 N., R. 13 W.). Just north of Spring Creek approximately 0.1 mile airline east of N-S section line. Fossils in chert boulders and in massive chert bed 17 feet above base of formation (unit 5 of Rockbridge section). Lower Roubidoux—*Syntrophina campbelli*, *Syntrophina missouriensis*, *Rhombella umbilicata*, *Lecanospira* sp., and *Hystricurus* sp.

MR-19. Ozark County. Gainesville Quadrangle (SE¼ NE¼ NW¼ SE¼ sec. 16, T. 23 N., R. 12 W.). Approximately 35 feet below top of southeast-facing slope at southern end of Horseshoe Bend on Bryant Creek. Fossils in sandy chert. Upper Roubidoux—*Lecanospira* sp. and *Rhombella umbilicata*.

MR-20. Douglas County. Topaz Quadrangle (NW¼ SW¼ sec. 16, T. 25 N., R. 11 W.). About one-third of the way up a southeast-facing slope at the southeast end of a bluff along the North Fork River. Single fossil found in chert boulder approximately 20 feet above Roubidoux-Gasconade contact. Roubidoux—*Rhombella* sp.

MR-21. Oregon County. Gatewood Quadrangle (NW¼ SW¼ NE¼ sec. 20, T. 23 N., R. 2 W.). On both sides of an old lumbering road that runs SE along ridge from the Negro Hill School. Fossils in chert float. Lower Rich Fountain?—*Hormotoma* sp.

MR-22. Oregon County. Gatewood Quadrangle (SE¼ SW¼ SE¼ sec. 26, T. 23 N., R. 2 W.). On west side of Calm road approximately 2.4 miles airline south of State Highway 14. Single fossil in chert float. Roubidoux—*Rhombella* sp.

MR-23. Shannon County. Eminence Quadrangle (NE¼ NE¼ SE¼ sec. 7, T. 27 N., R. 3 W.). On east side of old Rocky Road, approximately 1.3 miles airline northeast of town square at Winona. Fossils in chert. Roubidoux—*Lecanospira perplana*, and *Rhombella umbilicata*.

MR-24. Shannon County. Eminence Quadrangle (SW¼ NE¼ SW¼ sec. 30, T. 28 N., R. 3 W.). On both sides of old State Highway 19 about half-way up the south slope of Saddler Hill. Fossils in chert. Roubidoux—*Euconia* sp., *Hystricurus* sp.

MR-25. Shannon County. Eminence Quadrangle (NW¼ NE¼ SE¼ sec. 31, T. 29 N., R. 4 W.). In roadcut and on hillside above roadcut on north side of State Highway 106 approximately 500 feet west of its junction with County Road E. Near Alley Spring State Park. Roubidoux—*Lecanospira* sp.

MR-26. Shannon County. Eminence Quadrangle (NW¼ NW¼ NW¼ sec. 30, T. 28 N., R. 4 W.). On southeast-facing slope, southwest of old Pine Hollow School. Approximately 110 feet above the old Birch Tree Road. Fossils in chert float, approximately 15 feet above

base of Roubidoux. Altitude 930 feet. Lower Roubidoux—*Syntrophina campbelli*, *Syntrophina missouriensis*, *Rhombella umbilicata*, *Hormotoma* cf. *H. gracilis*, *Hystricurus elevatus*, and *Hystricurus* sp.

MR-27. Shannon County. Summersville Quadrangle (NW¼ SE¼ sec. 8, T. 27 N., R. 5 W.). On northeast side of Johnny Hollow approximately 0.5 mile west and 0.15 mile south of Berea Church. Fossils in residual chert near level of valley floor. Altitude 1,072 feet. Upper Roubidoux—*Rhombella umbilicata*, *Lecanospira soluta*, *Ozarkoconus prearcuatus*, *Hypseloconus compressus*, *Jarlopsis conicus*, *Plethospira extensa*, *Macluritella stantoni*, *Proplina elongata*, and *Campbelloceras overmani*.

MR-28. Shannon County. Eminence Quadrangle (SW¼ NE¼ sec. 36, T. 28 N., R. 5 W.). On top of a flat bench on long ridge at Hairpin Bend in the Birch Tree Road. Altitude approximately 960 feet. Fossils in chert float. Roubidoux—*Rhombella umbilicata*, *Hystricurus* sp., *Syntrophina campbelli*, *Syntrophina missouriensis*.

MR-29. Shannon County. Eminence Quadrangle (NW¼ SE¼ sec. 36, T. 28 N., R. 5 W.). On east facing slope just south of Hairpin Bend in Birch Tree Road. Altitude approximately 960 feet. Fossils in chert ledge just above Roubidoux-Gasconade contact. Roubidoux—*Syntrophina campbelli*, *Ophileta* (?).

MR-30. Shannon County. Birch Tree Quadrangle (SE¼ NW¼ SE¼ sec. 9, T. 26 N., R. 4 W.). On west side of north-south gravel road approximately 0.45 mile by speedometer south of its intersection with the Trot Road. On north side of road leading into farmhouse. Fossils in sandy chert. Roubidoux—*Rhombella* sp., *Lecanospira* sp., *Ophileta* (?).

MR-31. Shannon County. Birch Tree Quadrangle (SW¼ SW¼ SW¼ sec. 8, T. 26 N., R. 4 W.). On both sides of a north-south gravel road approximately 1 mile south of its intersection with the Trot Road. On north-facing slope of a deep draw. Fossils in chert. Roubidoux—*Ophileta* (?), *Lecanospira* sp.

MR-32. Shannon County. Birch Tree Quadrangle (SW¼ NW¼ sec. 20, T. 27 N., R. 3 W.). Along gravel road approximately 0.2 mile airline due south of U. S. Highway 60. Fossils from chert boulders on southeast facing slope. Roubidoux—*Lecanospira depressa*, *Lecanospira carinata*, *Rhombella* sp.

MR-33. Shannon County. Birch Tree Quadrangle (SE¼ NE¼ sec. 19, T. 27 N., R. 3 W.). On southeast facing slope approximately 0.44 mile southwest of U. S. Highway 60. Fossils in chert. Roubidoux (?).

MR-34. Perry County. Higdon Quadrangle (NW¼ NE¼ sec. 29, T. 34 N., R. 9 E.). On southwest-facing slope at an altitude of 800 feet, approximately 0.25 mile northwest of Bess Schoolhouse. Fossils in chert float. Roubidoux—*Rhombella* sp., unidentified trilobite.

MR-35. Jefferson County. Fletcher Quadrangle (NW¼ SE¼ sec. 4, T. 40 N., R. 3 E.). Near top of a north facing slope on south side of Big River, approximately 0.35 mile west of Pine Ford Bridge. Roubidoux—*Lecanospira* sp.

MR-36. Jefferson County. Fletcher Quadrangle (NW¼ SE¼ sec. 4, T. 40 N., R. 3 E.). Near top of west-facing slope just up the hill from an artificial pond. Fossil in chert float. Roubidoux—one large *Rhombella*.

MR-37. Pulaski County. Waynesville Quadrangle (SW¼ NE¼ sec. 30, T. 36 N., R. 11 W.). On west-facing slope near top of hill just north of new by-pass route on Highway 66. Fossils in chert float. Roubidoux (?).

MR-38. Texas County. Big Piney Quadrangle (SW¼ SE¼ sec. 21, T. 33 N., R. 10 W.). About half way up northeast-facing bluff on west side of Big Piney River. Fossils occur in brown to brownish-gray quartzose chert in a three-foot thick ledge. Exposure down the slope and to the south of a good exposure of massively bedded sandstone. Lower Roubidoux—*Syntrophina campbelli*, *Euconia* sp., *Hystricurus* sp., *Jarlopsis conicus*.

MR-39. Laclede County. Stoutland Quadrangle (NW¼ SE¼ SE¼ sec. 28, T. 36 N., R. 16 W.). At base of south

facing slope approximately 0.3 mile NW along Goodwin Hollow from where Missouri State Highway 5 crosses it. Gasconade—*Gasconadia* sp., *Ophileta* sp.

MR-40. Laclede County. Lebanon Quadrangle (SE¼ SW¼ 32, T. 33 N., R. 15 W.). Along SE facing slope above bluff overlooking Osage Fork. Fossils in brown to gray quartzose chert which has partially replaced a thick dolomite bed. Lower Roubidoux—*Syntrophina campbelli*, *Hystricurus* sp., *Euconia* sp., *Jarlopsis conicus*.

MR-41. Laclede County. Lebanon Quadrangle (SE¼ SW¼ sec. 32, T. 33 N., R. 15 W.). Same location as above, but as float. Roubidoux—*Syntrophina campbelli*.

MR-42. Laclede County. Lebanon Quadrangle (SE¼ SW¼ sec. 32, T. 33 N., R. 15 W.). Along SE facing slope above bluff overlooking Osage Fork. Fossils in brown to gray quartzose chert which has partially replaced a thick dolomite bed. Lower Roubidoux—*Syntrophina campbelli*, *Euconia* sp., *Jarlopsis conicus*.

MR-43. Ste. Genevieve County. Farmington Quadrangle (NE¼ NE¼ sec. 20, T. 38 N., R. 7 E.). Just above stream level on east side of Fourche a du Clos. Approximately 1,400 feet upstream from junction with Goose Creek. Fossils silicified in dolomite. Roubidoux—*Jarlopsis conicus*, *Euconia* sp.

MR-44. Ste. Genevieve County. Weingarten Quadrangle (NW¼ SE¼ sec. 31, T. 37 N., R. 8 E.). On south-facing slope on north side of Jonca Creek. Fossils in chert float about half way up steep slope. Roubidoux and Gasconade—*Rhombella umbilicata*, *Lecanospira* sp., *Gasconadia* sp., *Hystricurus* sp.

MR-45. Phelps County. Edgar Springs Quadrangle (NE¼ NE¼ sec. 21, T. 35 N., R. 8 W.). On south-facing bluff above Little Piney Creek approximately 130 feet below the top of the hill and just above Gasconade bluff. Fossils in gray, quartzose chert in dolomite (unit 5 of Little Piney Creek Measured Section). Lower Roubidoux—*Ophileta* sp., *Rhombella umbilicata*.

MR-46. Ste. Genevieve County. Weingarten Quadrangle (NE¼ NE¼ NW¼ sec. 31, T. 36 N., R. 9 E.). Near

base of low southwest-facing bluff above road which has been built on old bed of Cape Girardeau Northern Railroad. Fossils in white, weathered chert. Gasconade—*Finkelnburgia* sp., *Sinuopea* sp.

MR-47. Ste. Genevieve County. Weingarten Quadrangle (SW¼ NW¼ SE¼ sec. 31, T. 37 N., R. 8 E.). About 75 feet above base of Gunter sandstone on a south-facing bluff above Jonca Creek. Fossils in white porcelaneous chert in a dolomite bed. Gasconade—*Gasconadia putilla*, *Ophileta* sp., *Ozarkina* sp.

MR-48. Laclede County. Lebanon Quadrangle (SE¼ SW¼ sec. 32, T. 33 N., R. 15 W.). Along southeast-facing slope above bluff overlooking Osage Fork. Fossils in brown to gray quartzose chert which has partially replaced a thick dolomite bed. Base of Roubidoux—*Jarlopsis conicus*, *Syntrophina campbelli*.

MR-49. Laclede County. Lebanon Quadrangle (SW¼ SE¼ SW¼ sec. 28, T. 33 N., R. 15 W.). Along west-facing bluff above Osage Fork just east of point where Missouri State Highway 5 crosses the river. Fossils in gray, quartzose chert. Roubidoux (?).

MR-50. Jefferson County. De Soto Quadrangle (SW¼ NE¼ sec. 18, T. 39 N., R. 5 E.). Near top of northeast-facing slope above McMullen Branch. Fossils in white cannonball chert float. Rich Fountain.

MR-51. Ste. Genevieve County. Weingarten Quadrangle (NE¼ NW¼ SE¼ sec. 29, T. 36 N., R. 9 E.). Near top of south-facing hillside above Saline Creek (unit 19 Minnith Measured Section). Rich Fountain—*Archaeoscyphia annulata*, *Hormotoma dubia*, *Raphistomina* sp.

MR-52. Dent County. Montauk Quadrangle (NE¼ NW¼ SW¼ sec. 31, T. 32 N., R. 6 W.). Near top of southeast-facing bluff overlooking the Current River. Approximately 300 feet due east of fork in private road. Silicified fossils in dolomite ledge about 15 feet above a massive cryptozoon chert bed. Gasconade—*Gasconadia* sp., *Ozarkina* sp., *Sinuopea* sp., *Ophileta* sp.

LIST OF JOSIAH BRIDGE'S ROUBIDOUX LOCALITIES

Mo. 90.10 Reynolds County. SW corner sec. 5, T. 29 N., R. 1 W. On divide between Pumpkin Hollow and Carr Creek, west side of divide, altitude 960-970. Horizon-Roubidoux—*Lecanospira* zone.

Mo. 98.1 Shannon County. Near center sec. 31, T. 29 N., R. 4 W., on road, at altitude 910. Ledge of chert in place and float boulders. Horizon-base of Roubidoux.

Mo. 98.2 Shannon County. On line between secs. 35 and 36, T. 28 N., R. 5 W. In Dry Camp Hollow. Float boulders. Horizon-Roubidoux.

Mo. 98.5 Shannon County. About the center of the SE¼ sec. 30, T. 27 N., R. 3 W. On the Eminence-Winona road, State Highway No. 19 (temporary), along road ditch on steep grade known as Saddler Hill. Horizon-5. Gasconade-5. a Roubidoux.

Mo. 98.7 Shannon County. On spur a little south of center SW¼ sec. 25, T. 29 N., R. 5 W., near edge of cliff. Altitude 850 feet and up. Horizons-Roubidoux-Gasconade.

Mo. 98.8 Shannon County. SW cor. NW¼ sec. 33, T. 29 N., R. 4 W., on nose of hill. Altitude 915. Horizon-Basal Roubidoux.

Mo. 98.9 Shannon County. NW¼ SE¼ sec. 5, T. 27 N., R. 3 W., about 40 feet above valley floor, northwest of creek forks on point of hill. Horizon-Roubidoux.

Mo. 98.10 Shannon County. NW¼ sec. 1, T. 29 N., R. 5 W., in Lot 8 on the Eminence-Ink road, on steep hill going down to Reinhart's ranch. Horizon-Roubidoux-Gasconade.

Mo. 98.13 Shannon County. NE¼ sec. 25, T. 28 N., R. 5 W., at point where Birch Tree road turns onto section line. Northwesterly up the hill from this point. Horizon-Roubidoux-*Syntrophina* zone-Gasconade-cryptozoan ledge at road.

Mo. 98.24 Shannon County. NE¼ SE¼ sec. 7, T. 27 N., R. 3 W., along the road to Flip, south side of shallow valley. Altitude 1000 feet. Horizon-Roubidoux-*Lecanospira* zone.

Mo. 98.39 Shannon County. On the north line of the SW¼ sec. 16. T. 28 N., R. 3 W., near the sink. Horizon-Basal Roubidoux-*Syntrophina* zone.

Mo. 99.1 Carter County. NW¼ sec. 26, T. 27 N., R. 2 W., on top of hill overlooking Midco. Horizon-Basal Roubidoux.

RESULTS OF INVESTIGATION

1. A type area section, the Roubidoux Creek section in Texas County, has been established for the Roubidoux formation.

2. The fauna of the Roubidoux has been studied and described in detail for the first time. Two new genera and 12 new species are represented in the fauna.

3. Three geographically restricted faunal zones were discovered in the formation in the Ava-Rockbridge area.

4. Twenty-seven sections of Roubidoux strata were measured, and the lithologic constituents described in detail.

5. Grain size determinations have been made for both the sandstones and the dolomites of the Roubidoux.

6. The stratigraphic relations of the Roubidoux to the underlying Gasconade formation and the overlying Rich Fountain formation have been clarified.

Appendix A

LOCAL STRATIGRAPHY

INTRODUCTION

The following detailed descriptions of the Roubidoux and adjacent formations as exposed in selected areas around the Ozark uplift are included here to supplement the more general discussion of the lithologic character of these formations presented earlier in this report. Locations of the sections measured are shown on Plate I (in envelope).

Roubidoux Creek Section

The Roubidoux Creek Section, herein designated the type area section for the Roubidoux formation, was measured along a southeast-facing hillside overlooking Roubidoux Creek in Texas County. Located just south of the Cedar Bluff school along a secondary road which leads from Missouri State Highway 17 to the Gulf Oil Pumping Station, the section is easily located and readily accessible. Geographic location of the section is: SE¼ NW¼ SW¼ sec. 10, T. 33 N., R. 12 W.

The upper eighteen feet of the Gasconade formation, the entire thickness (150 feet) of the Roubidoux formation, and the lower twelve feet of the Rich Fountain formation are exposed in this section.

Altitude at the top of Roubidoux formation 1132 feet.

		Thickness	
		Feet	Inches
Rich Fountain formation			
44.	Dolomite, fine-grained, light brownish-gray, slightly vuggy, massively bedded; contains abundant light to medium-gray, banded, porcelaneous, non-sandy chert as large rounded nodules	3	0
43.	Covered, numerous poor exposures of very fine-grained, argillaceous, tan dolomite ("cotton rock")	9	8
		12	8
Roubidoux formation			
42.	Sandy dolomite and dolomitic sandstone, dolomite fine-grained, light brownish-gray, very sandy; sandstone fine-grained, light brownish-gray, dolomitic, unit thin-bedded; contains small amount of light gray, sandy, oolitic chert	1	0

		Thickness Feet	Inches
41.	Dolomite, fine-grained, light brownish-gray, vuggy, massively bedded; contains moderate amount of light to medium-gray, porcelaneous to sandy chert as irregular nodules	5	0
40.	Chert, quartzose to sandy and oolitic, light to medium gray, massively bedded	2	6
39.	Dolomite, fine-grained to very fine-grained, light brownish-gray to cream, non-sandy to sandy, medium-bedded; contains occasional thin beds of light gray to medium brownish-gray, oolitic chert (many oolites contain sand grains as nuclei)	3	4
38.	Cherty dolomite, fine-grained, light brownish-gray, slightly sandy; contains abundant light to dark gray, quartzose to drusy and sandy, oolitic chert as irregular nodules and masses, chert exhibits some algal structure.	1	0
37.	Sandstone, fine-grained, light gray, quartzitic, thin-bedded	0 to 0	4 to 8
36.	Dolomite, fine-grained, light brownish-gray, sandy, medium-bedded; contains occasional irregular nodules and angular fragments of light to dark gray oolitic chert	10	8
35.	Chert, oolitic and sandy to sub-chalcedonic (some oolites have sand grains as nuclei), light gray to medium dark brown	1 to 1	0 to 6
34.	Dolomite, fine to coarse-grained, light gray, vuggy, massively bedded	3	10
33.	Sandstone, fine-grained, light gray, quartzitic, conglomeratic near top of unit; contains some medium-gray, porcelaneous chert	0 to 0	6 to 10
32.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, massively bedded	2 to 3	6 to 0
31.	Chert, porcelaneous to quartzose to sandy and oolitic, light gray to medium brownish-gray, banded, bedding irregular; contains some interbedded fine to medium-grained, light brownish-gray dolomite	2	6
30.	Dolomite, very fine-grained, light brownish-gray, locally sandy, medium-bedded; contains occasional thin beds and nodules of light to medium-gray porcelaneous to sandy chert and thin lenses of fine-grained sandstone.	5	0

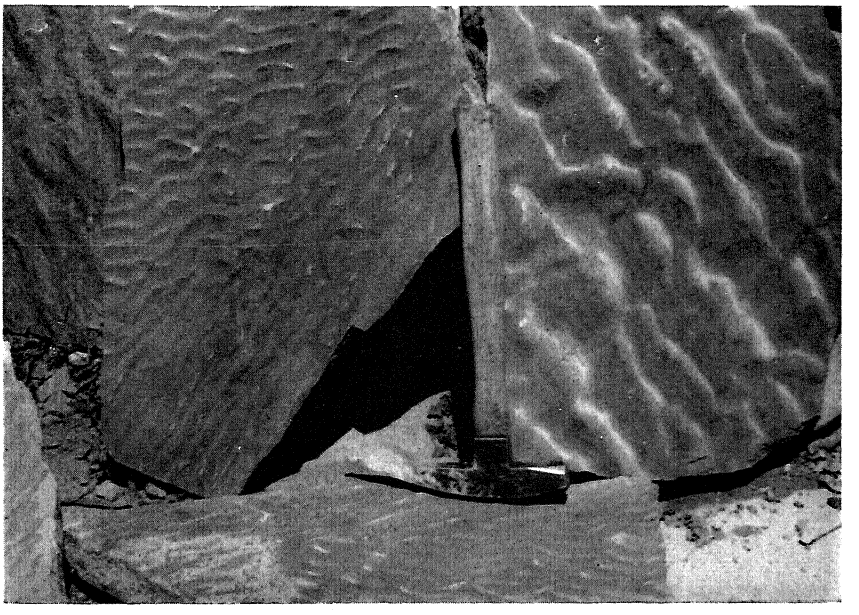
		Thickness Feet	Inches
29.	Chert, sandy and oolitic, light to medium-gray, medium-bedded	1	2
28.	Covered	5	8
27.	Sandstone, fine-grained, light gray, massively bedded; contains a few thin quartzitic sandstone lenses	8 to 12	0 to 0
26.	Dolomite, fine to medium-grained, light gray to steel gray, thin-bedded (¼ to 1 inch); forms recess under massive sandstone above	1	2
25.	Dolomite, fine-grained, light brownish-gray to medium-gray, very sandy, thin-bedded	0	8
24.	Sandstone, fine-grained, light gray, medium bedded	0	8
23.	Dolomite, fine-grained, light brownish-gray to steel gray, thin-bedded; contains some white, porcelaneous chert	2	0
22.	Covered	2	9
21.	Dolomite, medium-grained, light brownish-gray, vuggy, massively bedded; contains abundant light to to medium-gray, porcelaneous to quartzose chert as irregular masses	16	1
20.	Covered	4	4
19.	Dolomite and chert, dolomite fine to medium-grained, light brown to tan, slightly sandy, irregularly bedded; chert light to medium-gray, porcelaneous to sandy and oolitic	5	8
18.	Covered	2	8
17.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, massively-bedded; contains abundant small nodules of light gray to medium-dark brown, porcelaneous, sandy chert	9	8
16.	Chert, porcelaneous to sub-chalcedonic, light to medium-dark-gray, irregularly banded; exhibits some poorly developed algal structure; contains some inclusions of light brown, fine-grained dolomite	5	8
15.	Dolomite and chert, dolomite medium-grained, light gray to tan, irregularly bedded; chert white to light gray, porcelaneous, occurs as irregular lenses, stringers, and angular fragments throughout the dolomite	5	0
14.	Dolomite, fine-grained, light brownish-gray, vuggy, medium-bedded; contains abundant small botryoidal masses of light gray, sub-chalcedonic chert and large nodules of dead-white, porcelaneous chert	4	9
13.	Chert matrix sand, fine-grained, light gray, matrix light gray, porcelaneous chert, thin to medium-bedded	1	4

		Thickness Feet	Inches
12.	Covered	3	10
11.	Dolomite, fine-grained, light brownish-gray, sandy to very sandy, massively bedded, weathers to dirty-gray surface	2	9
10.	Sandstone, fine-grained, light gray, locally quartzitic, irregularly bedded	4	10
9.	Cherty dolomite, fine-grained, light brownish-gray, medium-bedded; contains abundant smooth, white-weathering chert	2	4
8.	Sandstone, fine-grained, light brown, massively bedded; at top of unit contains occasional lenses of very sandy, oolitic, medium-gray chert breccia	2	1
7.	Dolomite, fine to medium-grained, light brownish-gray to light brown, vuggy, weathers to pitted surface	2	1
6.	Dolomitic sandstone, fine-grained, light brownish-gray, thin-bedded; locally quartzitic; locally grades into sandy dolomite, contains abundant light to medium-gray, porcelaneous to sandy chert as thin lenses and nodules	2	6
5.	Dolomite, fine to medium-grained, light brown, slightly vuggy, medium to massive-bedded; contains small nodules of light to dark-gray, porcelaneous chert	6	0
4.	Dolomite, fine-grained, light brownish-gray, argillaceous, thin-bedded	0	3
3.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded; contains thin bed of dolomitic sandstone at top of unit	2	0
2.	Dolomitic sandstone and sandy dolomite, sandstone fine-grained (grains rounded and frosted), light brownish-gray, well-cemented; dolomite fine-grained, light brownish-gray, very sandy; unit thin to medium-bedded	2	4
		150	3
Gasconade formation			
1.	Dolomite, fine to coarse-grained, light brownish-gray to light gray, massively bedded, non-cherty	18	4
		18	4

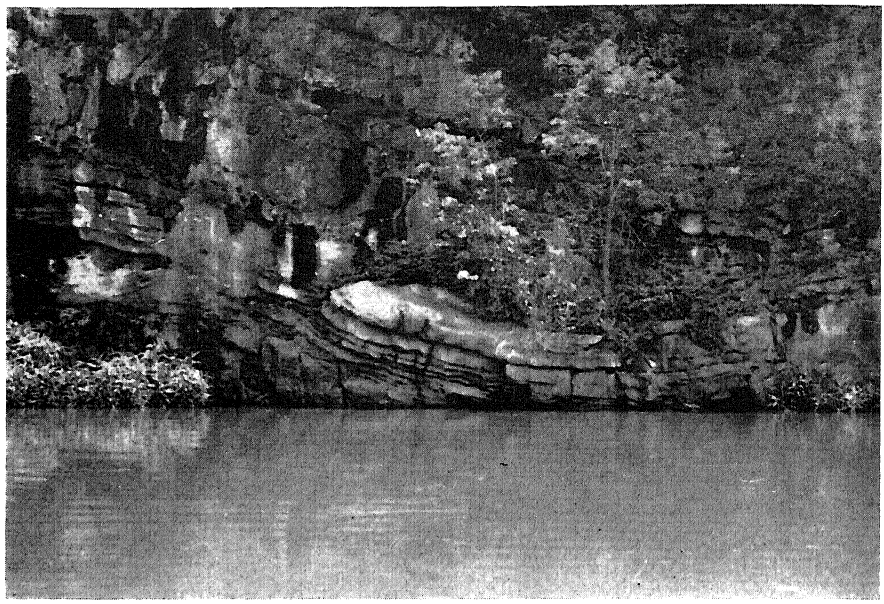
Osage Fork Section

The Osage Fork Section, which includes part of the Gasconade formation and almost the entire thickness of the Roubidoux formation, was measured along the north bank of Osage Fork, approximately 11.7 miles airline southeast

A. Sandstone slabs for small home construction being quarried in O. F. Beushausen quarry north of Ava, Douglas County, Missouri.



B. Quarried slabs of ripple-marked sandstone showing variation in marking and color. O. F. Beushausen quarry north of Ava.



A. Small synclinal fold in sandstone and dolomite strata exposed along north shore of the Lake of the Ozarks, SW¼ SE¼ sec. 3, T. 40 N., R. 21 W.

B. General view of the Rockbridge measured section, NE¼ SW¼ NW¼ sec. 5, T. 24 N., R. 13 W., Ozark County, Missouri.

of the intersection of U. S. Highway No. 66 and State Highway No. 5 in Lebanon. The geographic location of this section is as follows: SE¼ SW¼ sec. 19, T. 33 N., R. 14 W.

Top of the section is at an altitude of 1157 feet. Thickness of the Roubidoux formation is 142 feet.

Roubidoux formation		Thickness Feet	Inches
28.	Covered, abundant blocks of sandstone and sandy chert present as float	11	0
27.	Dolomite, fine-grained, light brownish-gray to brown, massively bedded, vuggy, non-cherty; weathers to pitted surface	6	0
26.	Sandstone, fine to medium-grained, light gray to buff, thin-bedded, friable, dolomitic; contains thin, irregular lenses of oolitic and sandy, light to medium-gray chert	7	0
25.	Dolomite, medium-grained, light brownish-gray to light brown, massively bedded, in part sandy; contains large amount of porcelaneous, light to medium dark gray, sandy and oolitic chert in thin, irregular lenses	8	6
24.	Sandstone, fine to medium-grained, light gray, thin-bedded, dolomitic	0	6
23.	Dolomite, fine-grained, light brownish-gray to tan, massively bedded, sandy; contains thin lenses of oolitic, medium-gray chert. Weathers to massive, irregular surface	2	0
22.	Sandstone, fine to medium-grained, light gray, thin-bedded, friable	1	0
21.	Dolomite, fine to medium-grained, light brownish-gray, thin-bedded, extremely sandy; contains abundant porcelaneous, light to medium-gray, sandy chert as large irregular masses	7	6
20.	Sandstone, medium-grained, light to medium-gray, locally quartzitic; forms blocky ledge	1	0
19.	Dolomite, fine to medium-grained, tan to brownish-gray, medium-bedded, sandy	8	4
18.	Sandstone breccia, medium-grained with abundant small (1-4 mm.), angular, porcelaneous, white to medium-gray chert particles; sand light gray to medium-brown, cemented with silica	0	8
17.	Dolomite, fine-grained, light brownish-gray to buff, massively bedded, locally very sandy; contains abundant fine quartz druse which weathers out as excrescences on the surface	4	6
16.	Sandstone, fine-grained, light gray to tan, medium-bedded, locally cemented with silica; contains some thin lenses of porcelaneous, light to medium-gray, sandy, oolitic chert	0	8-12

		Thickness Feet	Inches
15.	Dolomite, fine-grained, light brownish-gray to medium-gray and tan, medium-bedded, locally slightly sandy; contains small amount of porcelaneous, light gray, sandy chert as thin lenses	21	0
14.	Chert, porcelaneous, banded, light gray to medium dark gray and bluish-gray, massively bedded, smooth-fracturing; contains numerous inclusions of dolomite and exhibits well-developed stromatolites	1	8
13.	Dolomite and chert, dolomite fine to medium-grained, tan to buff, irregularly bedded, in part sandy; chert porcelaneous, banded, white to bluish-gray, massively bedded, weathers white	12	0
12.	Chert, porcelaneous, banded, white to medium-gray, massively bedded, in part sandy; contains small inclusions of dolomite and exhibits well-developed stromatolites	2	6
11.	Dolomite, fine to medium-grained, light brownish-gray, medium-bedded, slightly sandy; weathers to dark gray, pitted surface	13	0
10.	Chert, porcelaneous, banded, light gray to bluish-gray, massively bedded, smooth-fracturing, shows well-developed stromatolites; weathers to blocky, angular ledge	2	0
9.	Dolomite and chert, dolomite medium-grained, light brownish-gray to medium-gray, thin-bedded; chert, porcelaneous, banded, light to medium-gray	3	0
8.	Chert, porcelaneous, banded, white to light bluish-gray, massively bedded, slightly sandy; contains numerous small inclusions of dolomite and shows poorly developed algal structures	2	0
7.	Dolomite, fine to medium-grained, light brownish-gray to light gray, medium-bedded, locally sandy; contains abundant nodules and lenses of porcelaneous, light gray chert in upper part of unit	12	6
6.	Sandstone, fine-grained, light gray, massively bedded, locally cemented with silica; contains occasional thin lenses of oolitic, sandy, light gray chert, and some fine-grained dolomite	2	3
5.	Dolomite, fine-grained, light brownish-gray to light brown, thin-bedded, locally extremely sandy; contains thin lenses of light gray, well-cemented sandstone	4	6
4.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded, locally very sandy; contains thin lenses of porcelaneous, banded, light to medium-gray, in part very sandy chert	1	6

		Thickness Feet	Inches
3.	Dolomite, fine-grained, light gray to light brown, massively bedded, locally very sandy	5	5
2.	Sandstone, medium-grained, poorly sorted, light gray to light brown, irregularly bedded, in part dolomitic, locally cemented with silica	0	1-3
		142	4

Gasconade formation

1.	Dolomite, fine to coarse-grained, light brownish-gray to light brown, massively bedded, vuggy, non-cherty; weathers to deeply pitted surface	25	0
		25	0

Slabtown Spring Section

This section receives its name from Slabtown Spring located on the east side of Big Piney River in northern Texas County. The section was measured along a northeast-facing bluff on the west side of Big Piney River in the SW¼ SE¼ sec. 21, T. 33 N., R. 10 W. Altitude at the top of the section is 1209 feet.

Roubidoux formation		Thickness Feet	Inches
20.	Sandstone, fine-grained, light gray to pink, not well-cemented, except locally where cemented with chert, massively bedded	30	0
19.	Chert matrix sand, fine-grained, light gray to white, matrix white, porcelaneous chert, medium-bedded; contains small amount of weathered dolomite near top of unit	7	2
18.	Covered	23	0
17.	Sandstone, fine-grained, light gray to red, thin to medium-bedded, poorly cemented	2	0
16.	Covered	8	0
15.	Sandstone, fine-grained, light gray to red, quartzitic, thin to medium-bedded	1	6
14.	Chert, quartzose, medium-brown to brownish-gray, cavernous, with abundant inclusions of medium-grained, light brownish-gray, sandy dolomite, weathers to rough, irregular surface, fossiliferous (MR-38, *Syntrophina*, *Hystricurus*, *Jarlopsis*)	3	0
		74	8

Gasconade formation

13.	Dolomite, fine-grained, light brownish-gray, vuggy, medium to massive-bedded; contains small amount of white, quartzose chert	20	1

		Thickness Feet	Inches
12.	Dolomite, fine-grained, light brownish-gray, thin to medium-bedded	12	10
11.	Dolomite, fine-grained, light brownish-gray, sandy, thin-bedded	8	8
10.	Covered	3	5
9.	Dolomite, fine-grained, light brownish-gray, slightly vuggy, massively bedded; contains small amount of fine, white, quartz druse	5	6
8.	Dolomite, fine-grained, light brownish-gray, locally sandy, vuggy, medium- to massively-bedded; contains abundant light gray, quartzose chert	12	0
7.	Sandstone and sandy dolomite, sandstone fine-grained (grains rounded and frosted), light gray, cemented with dolomite; dolomite fine-grained, light brownish-gray, medium-bedded; contains small amount of brownish-gray, porcelaneous to oolitic chert	3	4
6.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, massively bedded, weathers to massive, pitted surface	9	10
5.	Chert, porcelaneous, locally drusy, light gray to medium dark gray, irregularly banded, massively-bedded; contains occasional stringers of fine-grained, light brownish-gray dolomite	5	10
4.	Dolomite, fine-grained, light brownish-gray, irregularly bedded; contains abundant lenses and stringers of light to medium-gray, porcelaneous chert	4	4
3.	Dolomite, medium to coarse-grained, light brown to greenish-gray, vuggy, massively bedded, weathers to massive, pitted surface	4	6
2.	Chert, porcelaneous to oolitic, medium-gray; contains irregular stringers of fine-grained dolomite	0	7
1.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, thin to medium-bedded	3	6
		94	5

Big Piney Section

The Big Piney section was measured along the north wall of a deep valley just west of Big Piney River in the NW¼ NE¼ sec. 2, T. 30 N., R. 10 W., Texas County, Missouri.

The top of the section is at an altitude of 1200 feet, approximately 2.6 miles airline northwest of the town of Houston. Thickness of the Roubidoux strata exposed in this section is approximately 156 feet.

Roubidoux formation		Thickness Feet	Inches
27.	Sandstone, fine-grained, light gray streaked with pink and red, massively bedded, well-cemented. Weathers into almost square blocks	10	2

		Thickness Feet	Inches
26.	Covered, probably dolomite	22	0
25.	Sandstone, fine to medium-grained, light gray to tan, dark brown and red, cross-bedded to massive-bedded, well-cemented. Ripple marks well-developed	35	0
24.	Dolomite, fine to medium-grained, light brownish-gray to tan, thinly bedded	3	6
23.	Sandstone, fine-grained, light gray to salmon-pink, cross-bedded. Weathers to massive, rounded ledge	11	0
22.	Dolomite, fine to medium-grained, light brownish-gray to tan, medium-bedded, sandy. Middle 12 inches of unit medium-grained, dolomitic sandstone	3	0
21.	Sandstone, medium-grained, light-gray to light brown, massively bedded	6	0
20.	Dolomite, fine-grained, light brownish-gray to light brown, grades laterally into dolomitic sandstone; contains abundant porcelaneous, dull-white to light gray chert as irregular, thin beds	1	2
19.	Dolomite, medium-grained, light gray to tan, massively bedded, slightly sandy, slightly vuggy; contains occasional thin lenses of oolitic chert (matrix, medium-gray, oolites, spherical and elongate, white)	5	0
18.	Sandstone, medium to coarse-grained, light gray to tan and buff, cross-bedded to massive-bedded. Ripple marks well-developed	6	0
17.	Dolomite, fine to medium-grained, light gray to steel-gray and medium-brown, medium-bedded; contains small, irregular nodules of porcelaneous, banded, light gray chert	4	0
16.	Sandstone, fine-grained, light-gray, medium-bedded. Weathers to massive, rounded ledge	2	6
15.	Dolomite, fine-grained, light brownish-gray to medium-brown, thin to medium-bedded; contains a 6-inch bed of light gray, sandy, oolitic chert near middle of unit	4	4
14.	Covered	6	0
13.	Sandstone, medium-grained, light gray to tan and light brown, massively bedded	1	6
12.	Dolomite, medium-grained, light brownish-gray to tan, vuggy, massively bedded	2	2
11.	Sandstone, fine to medium-grained, light gray to pink and buff, massively bedded	1	0
10.	Covered	2	0
9.	Sandstone, fine-grained, light gray, massively bedded, friable	6	0

		Thickness Feet	Inches
8.	Covered	3	0
7.	Sandstone, fine-grained, white to light gray streaked with pink and red, medium-bedded, friable	4	2
6.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded, vuggy; weathers to massive, pitted surface	3	0
5.	Sandstone, fine-grained, light gray to tan, thin-bedded, in part dolomitic	1	4
4.	Dolomite, fine to medium-grained, light brownish-gray to light brown, medium-bedded; contains abundant quartzose, light gray chert as small, irregular masses, and oolitic, sandy, light to medium-gray chert as thin beds	9	0
3.	Dolomite, fine-grained, light brownish-gray to light brown, thin-bedded, locally sandy	1	8
2.	Sandstone, medium to coarse-grained, light gray, massively bedded, slightly dolomitic, slightly vuggy	1	8
		156	2

Gasconade formation

1.	Dolomite, coarse-grained, light gray, massively bedded, vuggy, a few sand grains in upper two feet of unit. Weathers to massive, pitted surface	15	0
		15	0

Ava Section

The Ava section (Pl. VI), as described below, displays a nearly complete thickness (185 feet) of the Roubidoux formation. The lower part of the formation, that between the base of the formation and the zone of *Syntrophina*, is covered in this section. To the southeast, in the Rockbridge area, this interval is approximately 17 feet thick. A comparable thickness is thought likely for this interval in the Ava area.

The section is along State Highway No. 5, between Ava and Mansfield, in sections 9 and 16, T. 27 N., R. 15 W., Douglas County, Missouri. The base of the measured section is at an altitude of 1077 feet, about 250 feet north of New Bryant.

		Thickness Feet	Inches
Rich Fountain formation			
25.	Covered, abundant porcelaneous, dull-white, fossiliferous chert present as float. *Jeffersonia* and other typical Rich Fountain fossils occur in the chert	Undetermined	
Roubidoux formation			
24.	Covered, oolitic, white to light gray, sandy chert and small amount of fine-grained dolomite present as float	30	0

		Thickness Feet	Inches
23.	Chert, cavernous, oolitic, sandy, light to medium-gray, massively bedded, contains *Lecanospira* sp. and *Rhombella* sp. (MR-13)	7	0
22.	Sandstone, fine-grained, light gray to red, thin to massively bedded, shows ripple marks and fillings of desiccation cracks. Upper 15 to 25 feet of this unit are quarried for building stone in the area	55	0
21.	Covered	5	0
20.	Dolomite, fine-grained, light gray to light brownish-gray, thin-bedded, sandy near top of unit; contains abundant porcelaneous, light gray to medium-brown chert exhibiting algal-like structures as rounded reef-like masses; some porcelaneous, white to light gray, smooth fracturing chert as nodules, and some sandy oolitic, brownish-gray chert as thin lenses	16	0
19.	Chert, porcelaneous to oolitic and sandy, light to medium-gray, banded, massively bedded; contains small, irregular inclusions of dolomite	0	10
18.	Dolomite, fine-grained, light gray to light brown, thinly bedded, slightly sandy, non-cherty. Weathers to slabby surface	3	8
17.	Chert, decomposed, chalky, light-gray to buff, thinly bedded, contains numerous thin beds of fine to medium-grained, light gray to buff dolomite. Chert contains *Hystricurus deflectus*, *Euconia sp.*, and *Jeffersonia bridgei* (MR-15)	4	0
16.	Dolomite, fine to medium-grained, light gray, thin to medium-bedded, non-cherty; weathers to slabby surface	4	0
15.	Dolomite, fine to medium-grained, light gray, massively bedded, slightly vuggy. Weathers to massive, pitted surface	3	6
14.	Dolomite, fine-grained, light gray to light brownish-gray, thin-bedded, locally sandy. Weathers to slabby outcrop	6	0
13.	Covered	9	0
12.	Sandstone, fine-grained, porous, light gray to red, massively bedded, well-cemented with iron oxide and dolomite	2	0
11.	Covered, probably dolomite	3	0
10.	Sandstone, fine-grained, porous, light gray to red, friable, thin to massively bedded, shows well-developed ripple marks and fillings of desiccation cracks	4	6
9.	Covered, probably dolomite	2	6

		Thickness Feet	Inches
8.	Chert, compact, light to medium-gray, finely oolitic and sandy, massively bedded. Weathers to chalky texture	1	3
7.	Covered, probably interbedded sandstone and chert, beds not well-exposed	5	0
6.	Sandstone, fine-grained, poorly cemented, friable, brick-red, massively bedded	1	6
5.	Covered	1	6
4.	Dolomite, fine-grained, light brownish-gray, medium-bedded	1	8
3.	Chert, compact, light to medium-gray and buff, massively bedded, extremely sandy and finely oolitic. Locally weathered to chalk-like material	1	8
2.	Chert, quartzose to oolitic and sandy, white to light gray and light brownish-gray, massively bedded; contains large amount of fine quartz druse. Weathers to irregular, cavernous surface. Fossils occurring in chert include *Syntrophina campbelli*, *Hystricurus elevatus*, and *Monogonoceras* sp. (MR-14)	7	4
1.	Dolomite, fine-grained, light brownish-gray to light brown, thin-bedded, slightly sandy, vuggy	9	2
		185	1

Rockbridge Section

The Rockbridge Section (Pl. VII B), located 0.6 mile airline northwest of Rockbridge in Ozark County, includes a nearly complete thickness (195 feet) of the Roubidoux formation and the upper 40 feet of the Gasconade formation. The bottom of the section is at stream level (altitude 775 feet) on Spring Creek in the NE¼ SW¼ NW¼ sec. 5, T. 24 N., R. 13 W. Its top is at an altitude of 1000 feet approximately 0.2 mile east along the ridge.

The section is most accessible from the south. Good county roads exist between Rockbridge and Gainesville.

This section is designated a standard for comparison.

Roubidoux formation		Thickness Feet	Inches
25.	Residual chert float	10	0
24.	Covered, abundant fine to medium-grained, light gray to buff sandstone and compact to cavernous, oolitic, light to medium-gray chert as float. Chert contains *Lecanospira* (MR-17)	10	0
23.	Sandstone, fine-grained, buff to red, medium-bedded, shows some cross-bedding. Weathers to light gray, massive blocks	6	0
22.	Covered, probably dolomite	7	6

		Thickness Feet	Inches
21.	Dolomite, fine-grained, light brownish-gray, massively bedded; contains abundant light gray oolitic, sandy chert in thin beds. Weathers to massive, pitted surface	6	6
20.	Covered, probably dolomite	3	0
19.	Sandstone, fine to medium-grained, light gray to red, massively bedded, shows cross-bedding. Weathers to massive, rounded ledges	30	8
18.	Dolomite, fine-grained, light gray to light brownish-gray, medium-bedded, extremely sandy near top of unit; contains abundant sandy, oolitic, light to medium gray chert in thin beds and lenses. Weathers to dirty gray surface	13	4
17.	Sandstone, fine to medium-grained, light gray to tan, medium-bedded, locally quartzitic; contains thin (1-3 inch) lenses of sandy, oolitic, light to medium-gray chert	1	6
16.	Dolomite, fine-grained, light brownish-gray, thin-bedded	1	6
15.	Covered, probably dolomite	5	6
14.	Chert and dolomite, chert porcelaneous to sandy and oolitic, light to medium-gray, banded, massively bedded. Dolomite fine-grained, light brownish-gray, massively bedded. Weathers to dark gray lichen-covered surfaces	5	6
13.	Dolomite, fine-grained, light gray to light brownish-gray, thin to medium-bedded, locally sandy; contains abundant thin lenses of porcelaneous to sandy and finely oolitic, medium-gray chert and a few thin lenses of sand	18	6
12.	Covered	2	0
11.	Sandstone, fine to medium-grained, light gray to brown, medium-bedded. Weathers to a rounded ledge	2	11
10.	Dolomite, fine-grained, light brownish-gray to tan, medium-bedded, sandy	4	10
9.	Sandstone, fine-grained, light gray to brown, medium-bedded, locally cemented with silica; contains a few thin beds of light brownish-gray to tan, sandy dolomite.	10	0
8.	Dolomite, fine to medium-grained, light brownish-gray to tan, medium to massively bedded, sandy, vuggy. Weathers to a dirty gray, pitted surface	8	0
7.	Sandstone, fine to medium-grained, poorly sorted, light gray to tan, medium-bedded, locally dolomitic. Weathers to light gray, rounded ledge	3	0

		Thickness Feet	Inches
6.	Dolomite, fine to medium-grained, light brownish-gray to light brown, medium to massively bedded, locally sandy; contains small amount of white to light gray, thoroughly decomposed chert as small nodular masses.	25	0
5.	Chert, porcelaneous to cavernous, light gray to brown banded, in part finely oolitic, massively bedded; contains *Syntrophina campbelli* and associated fauna (MR-18)	2	6
4.	Dolomite, extremely fine-grained, light brownish-gray to buff, massively bedded, smooth fracturing. Weathers to smooth, blocky surface	2	0
3.	Covered	15	0
		194	9
Gasconade formation			
2.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded, non-cherty. Weathers to a smooth, massive surface	30	0
1.	Dolomite, medium to coarse-grained, light gray to buff, vuggy, massively bedded. Weathers to massive, pitted surface. Upper surface of unit slightly irregular	10	0
		40	0

North Fork White River Section

The North Fork White River Section, an incomplete section in which neither the top nor the base of the Roubidoux formation is exposed, was measured along a southwest-facing bluff in sections 18 and 19, approximately 1200 feet from the west line of the sections in T. 26 N., R. 11 W. Altitude at top of section is approximately 995 feet.

Roubidoux formation		Thickness Feet	Inches
31.	Sandstone, fine-grained, light gray to orange red, massively bedded	5	1
30.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, massively bedded; exhibits good cryptozoan structure	1	2
29.	Dolomite and chert, dolomite fine-grained, light brownish-gray, sandy, vuggy, thin-bedded, with small nodules of yellow brown, porcelaneous chert; chert sandy and oolitic, light to medium-gray; unit contains a few thin beds of fine-grained sandstone	6	0
28.	Dolomite, fine-grained, light brownish-gray, sandy, vuggy, massively bedded	2	5

		Thickness Feet	Inches
27.	Dolomitic sandstone, fine-grained, light gray, thin-bedded, grades into light brownish-gray sandy dolomite; contains a 10-inch bed of light gray oolitic chert near center of unit	4	0
26.	Covered	4	4
25.	Sandstone, fine to medium-grained, light gray to light brown, massively bedded; beds exhibit desiccation cracks and ripple marks	13	2
24.	Dolomite, fine-grained, light brownish-gray, sandy, vuggy, massively bedded; locally contains abundant light to medium-gray, porcelaneous to oolitic chert	10	4
23.	Sandstone, fine-grained, light gray to orange red, locally quartzitic, massively bedded; contains occasional brown oolites	21	8
22.	Sandy dolomite, fine-grained, light brownish-gray, very sandy (grains rounded and frosted), massively bedded.	2	0
21.	Sandstone, fine-grained, light gray to light brown, massively bedded	8	6
20.	Dolomite, fine-grained, light brownish-gray, vuggy, massively bedded	3	6
19.	Dolomite, microgranular, light-gray, slightly sandy to very sandy, thin-bedded; contains a 1-foot bed of medium-grained, tan dolomite near middle of unit	10	0
18.	Dolomite, fine-grained, light brownish-gray to light gray, slightly sandy to very sandy, locally quartzitic, medium-bedded	5	0
17.	Sandstone, fine-grained, light gray, locally cemented with light gray chert, massively bedded; contains some dolomite as cement	6	2
16.	Dolomite, fine-grained, light gray to medium brown, slightly sandy to sandy, medium-bedded; contains numerous thin beds of fine-grained, light gray sandstone and abundant light to medium gray, porcelaneous to sandy chert	11	4
15.	Sandstone, fine-grained, light gray, quartzitic to dolomitic, medium-bedded	2	9
14.	Dolomite, fine-grained, light brownish-gray, locally sandy, medium-bedded; contains some light to medium dark gray, porcelaneous chert as irregular nodules	4	8
13.	Covered	1	6
12.	Chert, sandy to conglomeratic, light gray, matrix light gray, porcelaneous, fragments (¼ mm.-15 mm.) composed of same material	0	6
11.	Dolomite, fine-grained, light brownish-gray, slightly sandy, vuggy, medium-bedded	2	0

		Thickness Feet	Inches
10.	Sandstone, fine to medium-grained, light gray, friable, medium-bedded	1	1
9.	Dolomite, fine-grained, light brown, irregularly bedded.	5	2
8.	Sandstone, fine-grained, light gray to tan, massively bedded	4	10
7.	Sandstone, fine-grained, light gray to reddish-brown, thin to medium-bedded; contains small pockets of dolomite	6	4
6.	Sandstone, fine-grained, light gray to rusty-red, locally quartzitic, massively bedded	10	2
5.	Dolomite, fine-grained, light brownish-gray, sandy, thin-bedded	4	6
4.	Sandstone, fine-grained, light gray to light brown, massively bedded, upper foot of unit very dolomitic	12	10
3.	Dolomite, fine to medium-grained, medium brownish-gray, medium-bedded, locally contains thin (6-12 inch) lenses of fine-grained, light gray sandstone	5	9
2.	Dolomite, microgranular, light brownish-gray, thin-bedded; contains thin beds of sandstone	2	1
1.	Dolomite, fine-grained, light gray to light brown, locally sandy, thin to medium-bedded; unit contains small amount of light gray, oolitic chert and thin lenses of fine-grained, light gray sandstone	7	0
		185	10

Eleven Point River Section

The Eleven Point River Section is located in Howell County. It was measured along a southeast-facing hillside above a small tributary to the Eleven Point River in the SW¼ SW¼ sec. 34, T. 26 N., R. 7 W.

Approximately 190 feet of the Roubidoux formation is exposed at this locality. Neither the Gasconade formation nor the Rich Fountain formation are exposed in this section.

Onyx Cave, a fair sized cavern, occurs in a thick dolomite unit (unit 20) in this section.

Altitude at the top of the section is approximately 985 feet.

Roubidoux formation		Thickness Feet	Inches
25.	Sandstone, fine-grained, light gray, quartzitic, locally cemented with light gray chert, massively bedded	1	6
24.	Chert, porcelaneous to cavernous, medium dark gray, massively bedded; contains abundant inclusions of dolomite	3	9
23.	Covered, a few beds of dolomite and chert are partially exposed	7	7

		Thickness Feet	Inches
22.	Sandstone, fine-grained, light gray to tan, locally dolomitic and quartzitic, thin-bedded; upper 8 inches of unit light gray, porcelaneous chert	3	8
21.	Dolomite, fine-grained, light brownish-gray, thin-bedded; contains several thin (2-4 inch) beds of light gray chert matrix sand	5	8
20.	Dolomite, fine-grained, light brownish-gray, slightly sandy, vuggy, massively bedded; contains abundant light to medium-gray, porcelaneous to oolitic, sparingly fossiliferous (*Rhombella*) chert as irregular nodules and lenses	25	0
19.	Sandstone, fine-grained, light brownish-gray, dolomitic, massively bedded	1	8
18.	Dolomite, fine-grained, light brownish-gray, vuggy, massively bedded	10	0
17.	Dolomite and chert, dolomite fine to medium-grained, light brownish-gray, sandy; chert light gray to medium dark brown, porcelaneous; chert and dolomite interbedded	1	4
16.	Sandstone, fine-grained, light gray to medium dark brown, quartzitic, thin-bedded	1	0
15.	Dolomite, fine-grained, light brownish-gray, slightly sandy, slightly vuggy, massively bedded	28	2
14.	Covered	2	0
13.	Sandstone, fine-grained, light gray to light brown, locally dolomitic, massively bedded, locally shows cross-bedding	5	8
12.	Dolomite, fine-grained, light gray, sandy, slightly vuggy, massively bedded; locally contains abundant light gray, porcelaneous chert as irregular masses	17	9
11.	Sandstone, fine-grained, light brownish-gray, massively bedded; upper part of unit is chert matrix sand	2	0
10.	Dolomite, fine-grained, light gray to light brownish-gray, thin to medium-bedded	16	1
9.	Sandstone, microgranular, light gray to rusty-brown, massively bedded, locally dolomitic	5	7
8.	Dolomite, fine-grained, light brownish-gray, sandy, thin to medium-bedded, contains occasional thin beds of sand	17	0
7.	Sandstone, fine-grained, poorly sorted, light gray to light brown, thin-bedded	2	1
6.	Dolomite, medium to coarse-grained, light gray to tan, slightly sandy to sandy, medium-bedded	7	11
5.	Covered	3	7

		Thickness Feet	Inches
4.	Dolomite, fine-grained, light brownish-gray, sandy, vuggy, massively bedded	2	5
3.	Sandstone, fine-grained, tan to light reddish-brown, massively bedded	5	4
2.	Covered	5	4
1.	Dolomitic sandstone, fine-grained, light brownish-gray, medium to massive-bedded, grades into sandy dolomite	8	5
		190	6

Jack's Fork Section

The Jack's Fork Section is exposed along State Highway No. 17 just north of Jack's Fork in the southeastern corner of Texas County. The base of the Roubidoux is at an altitude of 913 feet approximately 0.1 mile north of the north abutment of the bridge over Jack's Fork in the E½ NW¼ sec. 36, T. 28 N., R. 7 W.

Approximately 121 feet of Roubidoux strata are exposed in this section.

Roubidoux formation		Thickness Feet	Inches
29.	Residual soil, red, sandy, with abundant blocks of sandstone		
28.	Sandstone, fine-grained, light gray to reddish-brown, friable, very weathered	3	0
27.	Covered, probably dolomite	22	0
26.	Sandstone and sandy dolomite, fine-grained, light gray to light brownish-gray, medium-bedded, grades from sandstone into dolomite	2	6
25.	Dolomite, fine-grained, light gray, locally sandy, thin-bedded; contains abundant lenses of light to medium-gray, porcelaneous, banded chert	7	0
24.	Dolomite, fine-grained, light gray, massively bedded; contains thin beds of medium-grained sandstone	1	0
23.	Sandstone, fine to coarse-grained, light gray to tan, medium-bedded, weathers to rusty colored surface	1	0
22.	Dolomite, fine-grained, light gray to light brown, thin-bedded; contains small amount of oolitic chert	6	0
21.	Sandstone, fine to coarse-grained, light gray, massively bedded, weathers to rusty surface, surface bed exhibits desiccation cracks	3 to 3	0 to 6
20.	Dolomite, fine to medium-grained, light gray to buff, thin-bedded; contains several beds of white to light gray, sandy, oolitic, sparingly fossiliferous chert; (*Rhombella* sp.)	12	0

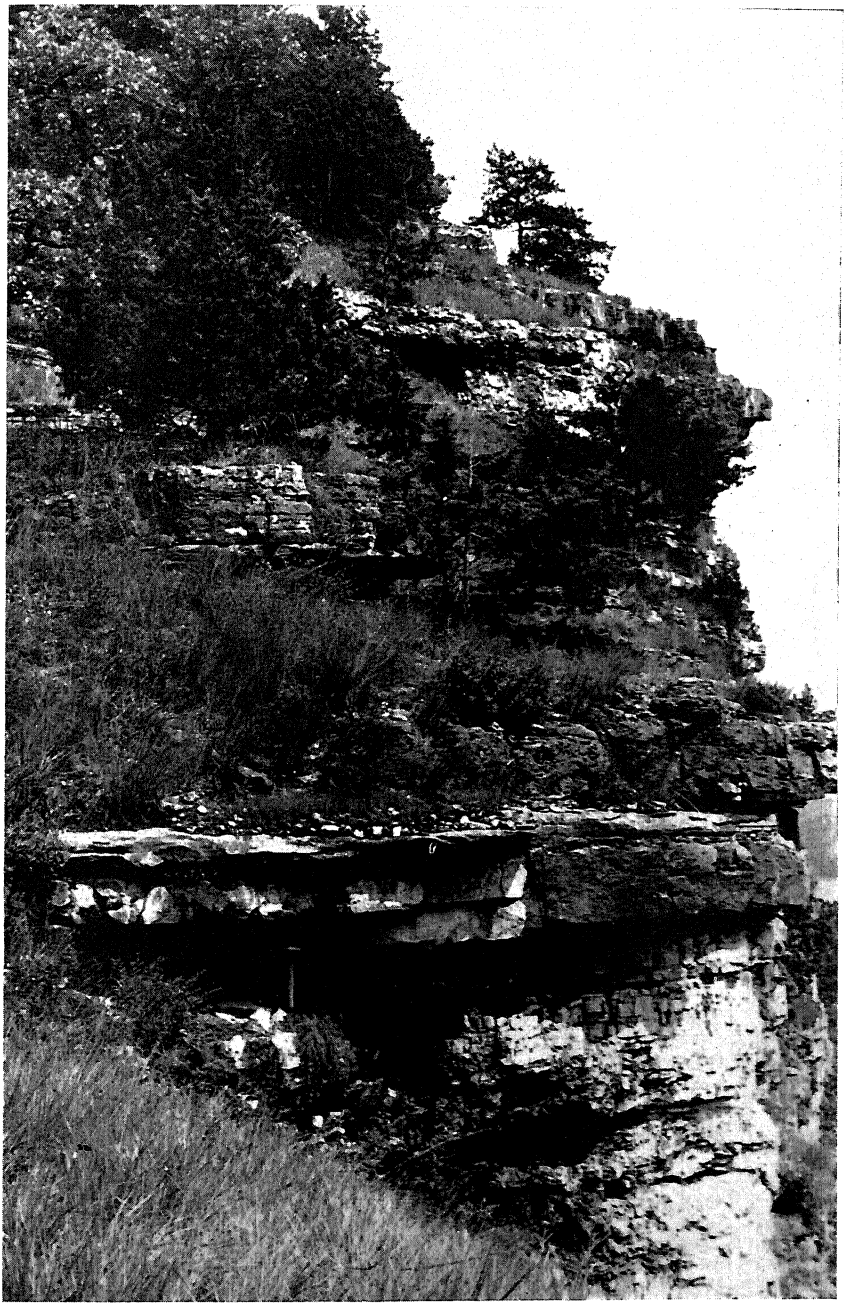
		Thickness Feet	Inches
19.	Sandstone, fine to coarse-grained, light brown, massively bedded; contains small amount of fine-grained, medium-gray dolomite; exhibits well-developed fillings of desiccation cracks	4	0
18.	Dolomite, fine to medium-grained, light brownish-gray, thin to medium-bedded	6	0
17.	Sandstone, fine to medium-grained, light gray to brown, locally quartzitic; contains thin beds of light gray, porcelaneous to oolitic chert at top and bottom of unit.	3	8
16.	Dolomite, fine-grained, light to medium-gray, locally sandy, thin to massive-bedded	2 to 4	0 0
15.	Sandstone, fine-grained, light gray to red, massively bedded	3	6
14.	Dolomite, fine to medium-grained, light gray, thin-bedded; contains abundant lenses and nodules of light gray to brown oolitic chert and some ropy, vuggy, weathered chert	2	0
13.	Sandstone, fine-grained, light gray to red, massively bedded, shows cross-bedding	3	8
12.	Dolomite, fine-grained, medium-gray, sandy, thin- to medium-bedded, locally cherty	3	0
11.	Sandstone, fine-grained, light gray to reddish-brown, medium-bedded	4	6
10.	Dolomite, fine-grained, medium-gray to medium brownish-gray, thin-bedded, slightly vuggy	2	6
9.	Sandstone, fine to medium-grained, reddish-brown, thin-bedded	1	6
8.	Dolomite, fine to medium-grained, light gray, thin-bedded, with 1-foot bed of fine-grained, tan, argillaceous dolomite near middle of unit	5	6
7.	Dolomite, fine-grained, light gray to tan, argillaceous, medium-bedded, locally sandy, weathers to blocky surface	2	0
6.	Dolomite, medium-grained, medium brownish-gray, thin to medium-bedded, locally very sandy	2	6
5.	Sandstone, fine-grained, light brownish-gray, poorly sorted, thin-bedded, locally dolomitic; surface exhibits desiccation cracks	4	0
4.	Dolomite, fine-grained, light brownish-gray, medium to massive-bedded, locally contains some sand	6 to 7	0 0

	Thickness Feet	Inches
3. Dolomite, microgranular light gray to cream, thin to massive-bedded, unit thickens and thins rapidly, very silty	1 to 4	0 0
2. Sandstone, and sandy dolomite, fine to medium-grained, light gray to light brownish-gray, poorly sorted, thin to medium-bedded, locally grades into sandy dolomite	0	11
	120	9
Gasconade formation		
1. Dolomite, fine to coarse-grained, light brownish-gray to light gray, medium to massive-bedded, upper five feet of unit slightly sandy, weathers to medium-gray, pitted surface	53	0
	53	0

Doniphan Section

The Doniphan Section, described below, is a subsurface section located one mile south of the town of Doniphan in Ripley County. Samples of this section were obtained from a well (Mo. Survey No. 9384) drilled at Weldon's Lodge in the NW¼ NE¼ sec. 34, T. 23 N., R. 2 E. Altitude at the top of the well is 390 feet. Thickness of the Roubidoux in this section is approximately 230 feet.

	Thickness Feet	Inches
Rich Fountain		
33. Dolomite, fine-grained, light brownish-gray to light brown, slightly sandy; contains abundant medium gray to bluish gray translucent chert	5	0
32. Dolomite, fine- to medium-grained, light brown to tan, argillaceous; contains small amount of light gray to light bluish-gray translucent chert	5	0
31. Dolomite, fine- to coarse-grained, medium-brown to tan; contains abundant light gray to light bluish-gray, porcelaneous chert	10	0
30. Dolomite, fine-grained, dark brownish-gray to medium dark-brown; contains abundant light gray to light bluish-gray, translucent, in part sandy chert	15	0
29. Dolomite, fine- to medium-grained, dark gray to dark brownish-gray, slightly sandy; contains small amount of light gray, porcelaneous chert	5	0
	40	0
Roubidoux formation		
28. Dolomite and chert, dolomite fine-grained, medium brown, sugary texture; contains small amount of medium-grained sandstone; chert light gray, extremely sandy	5	0



General view of the Gasconade River measured section showing the Gasconade-Roubidoux contact at the top of the hammer head. Contrast in weathered surfaces of these two formations is clealy shown in this view. The Gasconade River section is in the SW¼ NW¼ NW¼ sec. 31, T. 37 N., R. 10 W. Pulaski County, Missouri.

		Thickness Feet	Inches
27.	Dolomite, fine-grained, light brown to buff, sandy; contains abundant light gray, porcelaneous, in part sandy chert	5	0
26.	Chert, compact, light- to medium-gray, in part sandy; contains small amount of fine-grained, medium brown, sandy dolomite	5	0
25.	Sandstone, fine-grained, light yellowish-gray; contains small amount of fine-grained, medium brown, sandy dolomite	10	0
24.	Sandstone and dolomite, sandstone fine- to medium-grained, light yellowish-gray, individual grains angular to sub-round; dolomite medium- to coarse-grained, medium brown, sandy	5	0
23.	Dolomite, fine-grained, medium brownish-gray to medium brown, in part slightly sandy	10	0
22.	Dolomite and chert, dolomite medium-grained, light brownish-gray to light brown, slightly sandy; chert porcellaneous, light to medium gray, in part sandy	5	0
21.	Sandstone, fine-grained, light gray to light yellowish-gray; contains small amount of medium-grained, medium gray dolomite	10	0
20.	Dolomite, medium-grained, light gray to light brownish-gray, sandy; contains small amount of light gray, sandy chert	15	0
19.	Dolomite and sandstone, dolomite fine- to medium-grained, light gray to light brown, sandy; sandstone fine-grained, light gray	5	0
18.	Dolomite, fine-grained, light brownish-gray to light brown, slightly sandy	5	0
17.	Sandstone, fine-grained, light yellowish-gray to light brown; contains small amount of fine-grained dolomite.	10	0
16.	Dolomite, fine-grained, light brownish-gray to light brown; contains occasional sand grains and some light gray to light brown, sandy chert	15	0
15.	Dolomite, fine-grained, light brownish-gray to medium gray, sandy	15	0
14.	Dolomite, fine to medium-grained, medium brown, slightly sandy	5	0
13.	Dolomite, fine-grained, light gray to light brown, sandy; contains small amount of porcelaneous, light to medium gray chert	10	0
12.	Dolomite and chert, dolomite fine- to medium-grained, light brownish-gray to medium brown, sandy; chert porcelaneous, light gray to dark brownish-gray	5	0

		Thickness Feet	Inches
11.	Dolomite, fine to medium-grained, medium brownish-gray, very sandy, in part dolomitic sandstone; contains small amounts of pyrite and limonite	10	0
10.	Chert, oolitic and sandy, light to medium dark gray and medium brown; unit contains small amount of fine-grained dolomite	5	0
9.	Dolomite, fine- to medium-grained, light to medium gray, very sandy; contains small amount of porcelaneous, light to medium gray chert	15	0
8.	Dolomite, medium-grained, light gray to medium brown, sandy; contains small amounts of dark brownish-gray, translucent chert and limonite	5	0
7.	Chert and dolomite, chert porcelaneous, smooth-fracturing, light to medium dark gray, in part sandy; dolomite fine-grained, light brownish-gray, sandy	10	0
6.	Sandstone, medium-grained, light gray to light yellowish-gray; contains abundant fragments of limonite and a small amount of medium gray, porcelaneous chert	10	0
5.	Dolomite, fine-grained, light gray to light brown, sandy; contains small amount of medium dark gray, porcelaneous chert	20	0
4.	Dolomite, fine- to medium-grained, light to medium brown, sandy; contains fragments of limonite	10	0
3.	Chert and dolomite, chert porcelaneous, light to medium gray; dolomite fine-grained, medium brown, slightly sandy	5	0
		230	0

Gasconade formation

2.	Dolomite, fine-grained, light brownish-gray, slightly sandy; contains small amount of porcelaneous, light to medium dark gray chert	25	0
1.	Dolomite, medium-grained, light gray to tan; sample contains a few grains of sand which may have come from higher up	5	0
		30	0

Wappapello Dam Section

The Wappapello Dam Section is a subsurface section located in northern Butler County. Samples of this section were obtained from a well (Mo. Survey No. 5013) drilled in the NE¼ NE¼ sec. 10, T. 26 N., R. 7 E. Altitude at the top of the well is 472 feet. The thickness represented in this well is not the complete thickness for the Roubidoux formation in this area.

		Thickness Feet	Inches
Residuum			
15.	Clay, sandy, cherty, red	105	0
		105	0
Roubidoux formation			
14.	Sandstone, medium-grained, light yellowish-gray to buff; contains abundant fine- to medium-grained, light brown dolomite and some light to medium dark gray, sandy, oolitic, translucent chert	15	0
13.	Sandstone, medium-grained, light yellowish-gray; contains small amounts of gray, translucent chert and light brown dolomite	10	0
12.	Dolomite and sandstone, dolomite fine-grained, light brownish-gray to light brown. Sandstone medium-grained, light yellowish-gray; unit contains abundant light gray to light brown, translucent chert	5	0
11.	Sandstone, medium-grained, light yellowish-gray, grains sub-rounded and frosted; contains small amount of light gray, sandy chert	5	0
10.	Sandstone, medium-grained, light yellowish-gray; contains abundant light brownish - gray, translucent, smooth-fracturing chert and a small amount of fine-grained dolomite	30	0
9.	Sandstone, medium-grained, light yellowish-gray; contains small amount of brownish-gray, translucent chert and fine-grained dolomite	5	0
8.	Dolomite, fine-grained, medium brownish-gray to medium dark brown, sandy; contains small amount of light gray, translucent chert and abundant sand grains.	5	0
7.	Sandstone and dolomite, sandstone fine to medium-grained, light gray to light yellowish-gray, grains well-rounded, not frosted; dolomite fine-grained, light brownish-gray. Unit contains small amount of light to light brown, translucent chert	15	0
6.	Sandstone, fine- to medium-grained, light yellowish-gray to tan, grains well rounded; contains small amounts of fine-grained, light gray, sandy dolomite and light brown to gray, translucent chert	25	0
5.	Dolomite, fine-grained, light brown, sandy; contains small amount of light gray to medium dark brown oolitic chert	5	0
4.	Sandstone and dolomite, sandstone medium-grained, light yellowish-gray to tan; dolomite fine- to medium-grained, light brown. Contains small amount of light brown, oolitic chert	10	0

		Thickness Feet	Inches
3.	Sandstone, medium-grained, light yellow to tan; contains small amounts of porcelaneous, light yellowish-gray chert and fine-grained dolomite	10	0
2.	Sandstone and chert, sandstone medium-grained, light yellow to tan; chert porcelaneous to oolitic and sandy, light to medium gray and brown; unit contains small amount of fine-grained dolomite	5	0
		145	0
Gasconade formation			
1.	Dolomite, medium to coarse-grained, light gray; contains small amount of porcelaneous chert	15	0
		15	0

Glenallen Section

The Glenallen Section was measured on both walls of a deep cut of the Missouri Pacific Railroad, 2.15 miles airline north-northwest of the town of Glenallen in Bollinger County. Position of the section as shown on the Marquand quadrangle topographic map is: NE¼ SW¼ sec. 22, T. 31 N., R. 9 E.

The Roubidoux is not well-exposed in the Glenallen area and consequently only a small part (62 feet) of the formation could be measured. According to the Missouri Geological Survey, subsurface data indicate a thickness of 205 feet for the Roubidoux in this area.

The base of the Roubidoux formation is at an altitude of 586 feet.

Roubidoux formation		Thickness Feet	Inches
10.	Covered, abundant chert and sandstone boulders as float to top of hill	10	0
9.	Sandstone, fine-grained, light gray to red, bedding indistinct, cemented with silica; contains abundant porcelaneous brownish-gray banded, in part sandy chert	11	0
8.	Covered	14	0
7.	Sandstone, fine- to medium-grained, light gray to red, medium bedded, locally cemented with silica, in part conglomeratic; contains irregular lenses and thin beds of porcelaneous, brown chert	6	4
6.	Dolomite, fine- to medium-grained, light gray, massively bedded, vuggy; contains small amount of ropy chert	5	11
5.	Sandstone, fine- to coarse-grained, poorly sorted, light gray to brown, bedding irregular	2	8
4.	Dolomite, medium-grained, light brownish-gray, massive-bedded, vuggy	9	0

		Thickness Feet	Inches
3.	Dolomite, fine- to medium-grained, medium gray, thin-bedded, locally sandy; contains numerous thin lenses of porcelaneous, light brownish-gray, brown weathering chert	0	8
2.	Sandstone, fine- to medium-grained, light gray to light brown, massively bedded to cross-bedded; lower surface very regular	2	0
		61	7

Gasconade formation

1.	Dolomite, coarse-grained, light to medium gray, massively bedded; contains numerous thin lenses and beds of porcelaneous, brownish-gray to brown, banded chert.	11	0
		11	0

Minnith Section

The Minnith Section is exposed along Saline Creek approximately 0.5 mile airline southwest of Minnith in Ste. Genevieve County. The lower 55 feet of the Rich Fountain formation and the upper 66 feet of the Roubidoux formation are exposed in this section. Geographic location of the section as indicated on the Weingarten quadrangle topographic map is: NW¼ SE¼ sec. 29, T. 36 N., R. 9 E.

The top of the measured section is at an altitude of 559 feet.

Rich Fountain formation		Thickness Feet	Inches
19.	Covered, chert float contains *Archaeoschyphia annulata*, *Jeffersonia* sp. and other typical Rich Fountain fossils.	9	0
18.	Chert, porcelaneous to quartzose, white, massively bedded; contains inclusions of dolomite	2	1
17.	Dolomite, fine- to medium-grained, medium brownish-gray to buff, thin- to medium-bedded; contains abundant white to light brownish-gray, porcelaneous chert as irregular lenses and stringers. Float at surface of this unit contains *Archaeoscyphia* sp.	18	3
16.	Dolomite, fine to very fine-grained, medium gray to tan, thin to medium bedded, upper 5 feet of unit is "cotton rock"; contains occasional rounded nodules of light-gray to pure white, porcelaneous chert	12	7
15.	Dolomitic sandstone, fine-grained light brownish-gray, thin-bedded, locally grades into dolomite	1	6
14.	Dolomite, fine-grained, light brownish-gray to light brown, thin- to medium-bedded; contains abundant white, porcelaneous, slightly fossiliferous chert as irregular masses	13	0
		55	5

Roubidoux formation		Thickness Feet	Inches
13.	Chert, sandy, light to medium gray, bedding irregular; contains abundant thin beds of fine-grained sandstone.	5	2
12.	Dolomite, fine-grained, brownish-gray to buff, thin-bedded, weathers to blocky surface	1	2
11.	Chert, porcelaneous to sandy, light to medium gray; contains abundant thin lenses of fine-grained sandstone and fine-grained tan dolomite	6	6
10.	Dolomite, fine-grained, light brown to buff, thin- to medium-bedded; contains some porcelaneous, medium gray chert	6	0
9.	Dolomite, very fine-grained, tan, banded, massive, weathers to smooth surface	0	8
8.	Dolomite, fine- to medium-grained, light gray to buff, medium-bedded, sandy. Contains abundant sandy, oolitic, light gray chert as small lenses and nodules	4	2
7.	Sandstone, fine-grained, light gray to buff, massive	3	1
6.	Dolomite, fine- to medium-grained, light brownish-gray to buff, bedding irregular	2	8
5.	Sandstone, fine-grained, buff to pink, massive, weathers to round ledge	2	6
4.	Dolomite, fine-grained, light brown to buff, medium-bedded	6	5
3.	Sandstone, fine-grained, tan to buff, bedding indistinct, calcareous; contains abundant light to medium gray, porcelaneous to sandy chert	0	8
2.	Dolomite, fine-grained, brownish-gray, massive, locally sandy	15	0
1.	Dolomite, fine- to coarse-grained, light gray to light brownish-gray, massively bedded	12	0
		66	0

Fourche a du Clos River Section

The Fourche a du Clos River Section takes its name from a small river that flows through the northern part of Ste. Genevieve County. The section was measured along a northwest-facing bluff in the SW¼ NE¼ NE¼ sec. 20, T. 38 N., R. 7 E.

From the base of the section, which is at an altitude of about 470 feet, to the top of the bluff approximately 85 feet of Roubidoux strata are exposed.

Roubidoux formation		Thickness Feet	Inches
22.	Dolomite, microgranular, light brownish-gray, slightly sandy, thin to medium-bedded	0	6
21.	Covered	2	10

		Thickness Feet	Inches
20.	Dolomite, fine to medium-grained, light brownish-gray, slightly sandy to sandy, vuggy, thin to medium-bedded; contains light bluish-gray, sandy chert.....	1	10
19.	Chert, porcelaneous to sandy, light bluish-gray, irregular bedding; sparingly fossiliferous (*Rhombella sp.*), exhibits reef structure; contains small pockets of dolomite.....	1 to 2	8 2
18.	Chert, quartzose to chalky, white to light gray, irregularly bedded; contains irregular masses of fine-grained dolomitic sandstone.....	3 to 4	0 0
17.	Chert, sandy, light gray, vuggy, medium-bedded; contains numerous inclusions of fine-grained dolomite....	0	10
16.	Dolomite, medium-grained, light gray, sandy, medium-bedded.....	0	10
15.	Covered.....	4	11
14.	Cherty dolomite, fine-grained, light brownish-gray, irregularly-bedded; contains abundant light gray to light bluish-gray, porcelaneous to quartzose chert as thin lenses and irregular stringers.....	5	8
13.	Sandstone, fine to medium-grained, with granules and pebbles in lower part of unit, light gray to light brown, thin to massive-bedded; upper part of unit contains a few beds (¼-½ inch) of fine-grained dolomite.....	5 to 6	0 0
12.	Dolomite, fine to medium-grained, light brownish-gray, slightly sandy, thin to medium-bedded; contains small amount of light gray, porcelaneous chert.....	2	0
11.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded; contains abundant angular fragments of light gray, porcelaneous to quartzose, sparingly fossiliferous chert (unidentified orthoconic cephalopods).....	7	6
10.	Dolomite, fine-grained, light brownish-gray, irregularly-bedded, weathers to breccia-like surface; contains abundant light gray to brown, porcelaneous chert as small angular fragments in upper part of unit.....	2	10
9.	Dolomite, fine-grained, light brownish-gray, medium-bedded; contains occasional thin (1-4 inch) lenses of light gray, porcelaneous chert.....	7	4
8.	Covered.....	3	6
7.	Dolomite, fine-grained, light brownish-gray, slightly sandy, medium to massive-bedded.....	7	11

		Thickness Feet	Inches
6.	Dolomite and chert, interbedded; dolomite fine-grained, light brownish-gray, sandy; chert light bluish-gray, porcelaneous to sandy; unit irregularly-bedded	10	9
5.	Chert, sandy, light bluish-gray, medium-bedded	0 to 0	4 to 10
4.	Dolomite, fine-grained, light brownish-gray, vuggy, thoroughly decomposed	0	10
3.	Chert, porcelaneous, light gray to light bluish-gray, irregularly banded, medium-bedded	1	2
2.	Covered	4	1
1.	Cherty dolomite, fine-grained, light brownish-gray, medium to massive-bedded; contains abundant light gray to tan, quartzose to oolitic, fossiliferous (MR-43, *Syntrophina*, *Jarlopsis*) as irregular stringers; upper part of unit grades into chert	8	2
		84	7

McMullen Branch Section

The McMullen Branch Section is located in Jefferson County, 3.65 miles airline southeast of the Missouri Pacific Railroad station in DeSoto. The bottom of the section is at water level (altitude 579 feet) on the southwest side of McMullen Branch in the SW¼ NE¼ sec. 18, T. 39 N., R. 5 E. Approximately 25 feet of the Rich Fountain formation and 52 feet of the Roubidoux formation are included in this section.

		Thickness Feet	Inches
Rich Fountain formation			
13.	Dolomite, fine-grained, light to medium-brown, thin- to massive-bedded; contains abundant dull, white, fossiliferous chert. Fossils in chert include *Campbelloceras* sp. and *Jeffersonia* sp.	25	0
		25	0
Roubidoux formation			
12.	Dolomite, fine-grained, light gray to buff, medium-bedded, extremely sandy	2	0
11.	Dolomite, microgranular, light gray to tan, thin-bedded, locally sandy; contains thin beds of fine-grained, light brown sandstone	6	5
10.	Sandstone, fine-grained, light gray to rust brown, thin-bedded, lower 2 inches of unit are conglomeratic. Exhibits ripple marks	1	2
9.	Dolomite, fine-grained, medium gray to brownish-gray, thin-bedded	5	2

		Thickness Feet	Inches
8.	Chert and dolomite interbedded, chert porcelaneous, light to medium gray, thin-bedded, locally sandy; dolomite fine-grained, brownish-gray to medium gray, thin-bedded	2	0
7.	Sandstone, fine-grained, light brown to reddish-brown, thin-bedded, poorly sorted, ripple marked	2	4
6.	Dolomite, fine-grained, light gray to buff, thin-bedded.	6	6
5.	Covered	3	0
4.	Dolomite, fine- to medium-grained, light gray, medium-bedded, locally sandy; contains abundant porcelaneous, banded, light to medium gray chert as irregular nodules and lenses	15	6
3.	Sandstone, fine-grained, light to dark brown, bedding indistinct; contains small amount of sandy, bluish-gray chert as thin lenses and nodules	2	0
2.	Dolomite, fine-grained, medium gray, thin-bedded, locally sandy; contains small amount of sandy, bluish-gray chert	1	6
1.	Dolomite, fine-grained, medium gray, medium-bedded, locally sandy; contains one thin bed of porcelaneous, light bluish-gray chert	4	0
		51	7

Big River Section

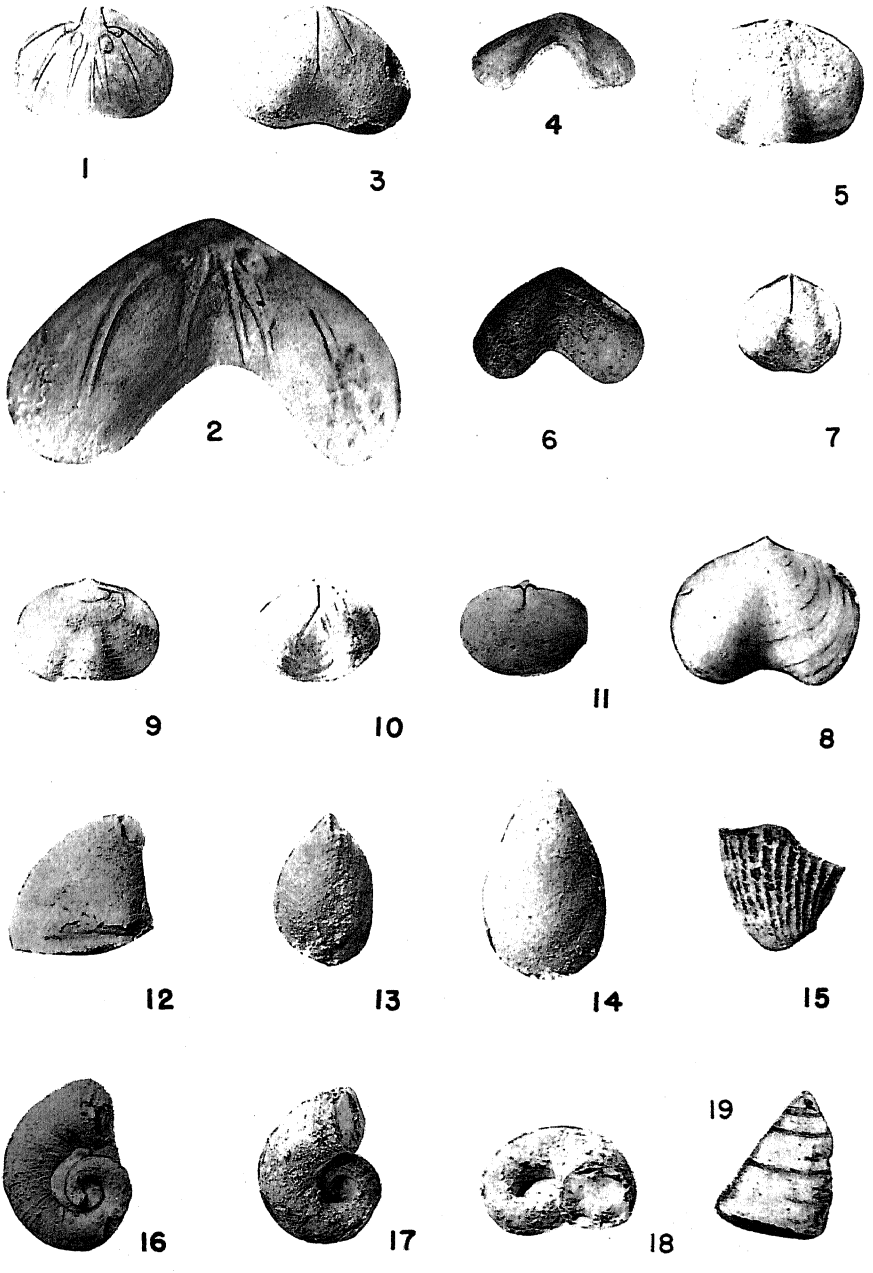
The Big River Section, as described below, includes 80 feet of the Roubidoux formation and the upper 86 feet of the Gasconade formation.

The top of the section is at an altitude of approximately 690 feet at the top of a north-facing bluff above Big River. Geographic location of the section is: NE¼ NW¼ SW¼ sec. 4, T. 40 N., R. 3 E.

Roubidoux formation		Thickness Feet	Inches
15.	Covered, abundant fine-grained, light gray sandstone as float	16	0
14.	Sandstone, fine to medium-grained, poorly sorted, light-gray to reddish-brown, massively bedded	3	10
13.	Sandstone, fine-grained, tan to reddish-brown, locally quartzitic, thin-bedded; contains thin beds of light gray, sandy, oolitic chert	1	10
12.	Sandstone, fine-grained, tan to reddish-brown, massively bedded, shows some cross-bedding	6	2
11.	Dolomite, fine-grained, light brown, vuggy, massively bedded; contains scattered pockets of barite and white, oolitic chert	2	6

APPENDIX B

PLATES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Explanation of Plate X

Figures

1-5. *Rhombella umbilicata* (Ulrich and Bridge). Figure 1 basal view (X1) of a chert steinkern from Ulrich's locality 457v, 1.5 miles southeast of Arden, Douglas County, Missouri; 2 an apical view (X1) of a poorly preserved specimen, homeotype, U. Mo. No. 10,312, from the lower part of the Roubidoux at locality MR-28, Shannon County, Missouri; 3, 4 are lateral (X1) and apical (X1) views of homeotype, U. Mo. No. 10,311, from locality MR-27; and 5 is camera drawing (X1) of whorl cross-section of homeotype, U. Mo. No. 10,311.

6-8. *Jarlopsis conicus* n. sp. Figure 6 is a lateral view (X1.5) of the holotype, U. Mo. No. 10,313, from locality MR-14, Douglas County, Missouri; 7, 8 lateral (X1.5) and basal (X2) views of paratype, U. Mo. No. 10,314, from locality MR-27, Shannon County, Missouri.

9. *Lecanospira compacta* (Salter). Basal view (X1) of a hypotype, U. Mo. No. 10,321, from locality MR-32, Shannon County, Missouri.

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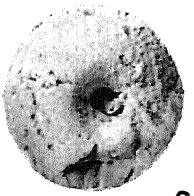

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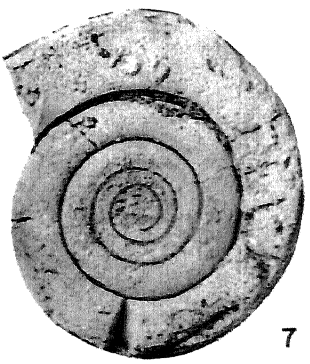

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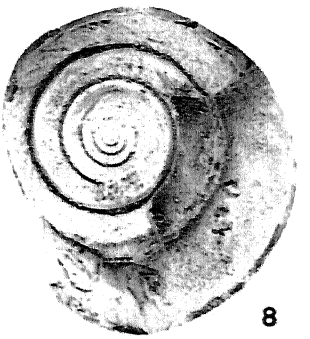

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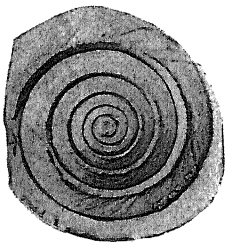
Explanation of Plate XII

Figures

1-5. *Lecanospira soluta* n. sp. Figure 1 view (X1) of the external mold of spire of the holotype; 2 is a cross-section (X1) of a rubber cast of the holotype; 3 an apical view (X1) of a rubber cast of the holotype; 4, 5 apical views (X1) of rubber casts of paratypes, U. Mo. No. 10,320. Holotype, U. Mo. No. 10,319, from chert of the upper Roubidoux at locality MR-27, Shannon County, Missouri. Paratypes from same locality.

6-9. *Lecanospira compacta* (Salter). Figure 6 apical view (X1) of rubber cast of a hypotype, Mo. S. M. No. 3447; 7 basal view (X1) of a large hypotype, Mo. S. M. No. 3076; 8 cross-section (X1) of a rubber cast of specimen, Mo. S. M. No. 3447; 9 view (X1) of external mold of spire of specimen, Mo. S. M. No. 3447.



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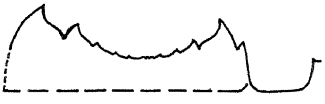

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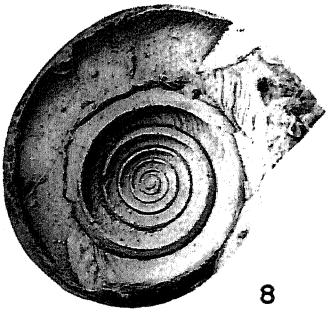

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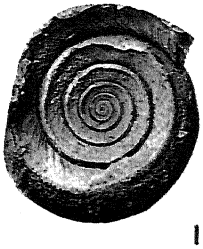

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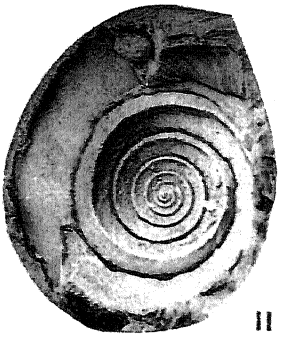

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Explanation of Plate XIV

Figure

1. *Lecanospira carinata* n. sp. Large piece of chert in which the holotype and several paratypes are preserved (X1). Fossils from the lower part of the Roubidoux at locality MR-32, approximately 0.9 mile airline southeast of Winona, Shannon County, Missouri.

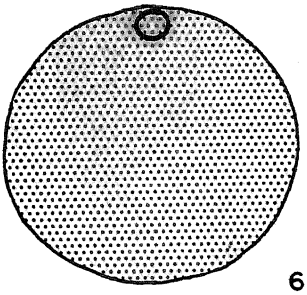
Explanation of Plate XVI

Figures

1-5. *Monogonoceras subrectum* Ulrich, Foerste, Miller, and Unklesbay. Figures 1, 2 are ventral and lateral views of the adapical portion of an artificial cast of the holotype (X3); 3 is a dorsal view of another artifical cast of the adapical portion of the holotype (X1.5); and 4, 5 are ventral and lateral views of the internal mold of the living chamber (X1.5). Holotype, U. S. N. M. 109468. Illustrations after Ulrich, Foerste, Miller, and Unklesbay.

6,7. *Cotteroceras gregeri* Ulrich, Foerste, Miller, and Unklesbay. Two views of the holotype (X1.5) from the Roubidoux formation at Poverty Flats, Missouri. Holotype, U. S. N. M., 109572. Illustrations from *Ozarkian and Canadian Cephalopods Part III: Longicones and Summary* by Ulrich, Foerste, Miller and Unklesbay.

1



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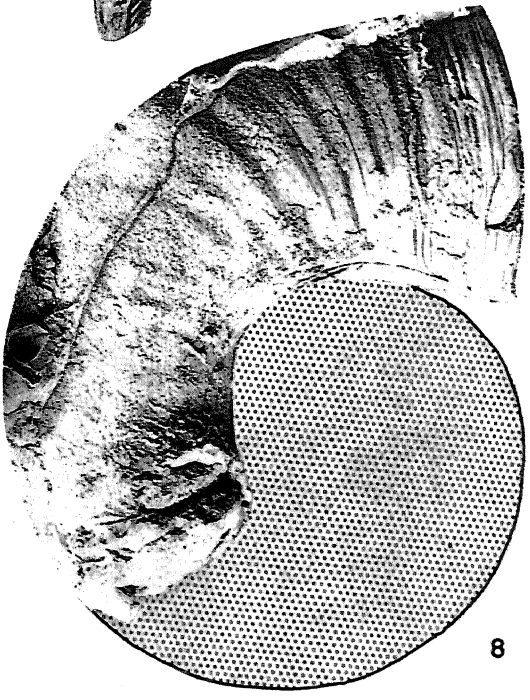

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Explanation of Plate XVIII

Figures

1-3. *Hystricurus elevatus* n. sp. Dorsal, anterior, and lateral views (X2) of the holotype. Holotype, U. Mo. No. 10,328, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri.

4,5. *Hystricurus* sp. A. Dorsal and anterior views (X2) of specimen, U. Mo. No. 10,332, from the lower part of the Roubidoux at locality Mo. S. M. No. 98.8, Shannon County, Missouri.

6. *Hystricurus deflectus* n. sp. Dorsal view (X1) of the holotype. Holotype, U. Mo. No. 10,329, from chert zone near middle of the Roubidoux at locality MR-15, just north of New Bryant, Douglas County, Missouri.

7,8. *Hystricurus* sp. Dorsal views (X5) (X2) of free cheeks, U. Mo. No. 10,334, from chert of the *Syntrophina* zone at localities MR-26 and MR-28, Shannon County, Missouri.

9. *Hystricurus* sp. Dorsal view of an undescribed specimen.

10-12. *Hystricurus elevatus* n. sp. Figure 10 dorsal view (X2) of paratype, U. Mo. No. 10,330; 11, 12 dorsal and anterior views (X5) of a rubber cast of paratype, U. Mo. No. 10,331. Paratype, U. Mo. No. 10,330, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri. Paratype, U. Mo. No. 10,331, from same locality.

13-15. *Paraplethopeltis minuta* n. sp. Figure 13 dorsal view (X5) of paratype, U. Mo. No. 10,336; 14, 15 dorsal and anterior views (X1.6) of the holotype. Holotype, U. Mo. No. 10,335, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri. Paratype from same locality as holotype.

16,17. *Jeffersonia bridgei* n. sp. Figure 16 a dorsal view (X5) of holotype; 17 a dorsal view (X2) of paratype, U. Mo. No. 10,338. Holotype, U. Mo. No. 10,337, from chert zone near middle of Roubidoux at locality MR-15, just north of New Bryant, Douglas County, Missouri. Paratype from same locality.

18. *Hystricurus* sp. Dorsal view (X2) of a well-preserved pygidium from chert of the *Syntrophina* zone at Ulrich's locality 261z, 1.5 miles up Spring Creek from Rockbridge, Ozark County, Missouri.

		Thickness Feet	Inches
10.	Sandstone, fine-grained, light gray, massively bedded, exhibits cross-bedding, weathers to a massive ledge....	18	0
9.	Covered.....	26	6
8.	Dolomite, fine-grained, light brownish-gray, sandy, medium-bedded.....	5	0
		79	10
Gasconade formation			
7.	Covered.....	6	4
6.	Dolomite, fine-grained, light gray to buff, bedding indistinct, non-cherty.....	21	8
5.	Covered.....	2	6
4.	Dolomite, fine-grained, light brownish-gray, medium-bedded.....	3	6
3.	Chert, porcelaneous to quartzose, medium-gray, bedding irregular; unit thickens and thins rapidly, weathers to angular, blocky surface.....	2	8
2.	Dolomite, fine to medium-grained, light brownish-gray to tan, medium-bedded, non-cherty.....	10	0
1.	Dolomite, medium to coarse-grained, light gray to buff, vuggy, massively bedded, weathers to pitted surface...	40	0
		86	8

Union Section

The Union Section takes its name from the town of Union in Franklin County. It was measured along a southwest-facing slope at the apex of a horseshoe bend in the Bourbeuse River south of Union. Geographic location is: NE¼ NE¼ NE¼ sec. 15, T. 42 N., R. 1 W.

The upper 15 feet of the Gasconade formation and practically the complete thickness (105 feet) of the Roubidoux formation are displayed in the section. The Roubidoux-Rich Fountain contact, if present, is not well-exposed. Three miles to the northwest, where the North Bend School Road crosses the Bourbeuse River, Rich Fountain strata can be observed just above the massive sandstone bed which is present at the top of the measured section.

Altitude at the top of the section is 659 feet.

		Thickness Feet	Inches
Roubidoux formation			
15.	Covered, abundant boulders of sandstone as float on top of hill.....	10	0
14.	Sandstone, fine-grained, light gray to reddish-brown and red, cross-bedded to massive-bedded, ripple-marked.....	40	0
13.	Covered, probably dolomite.....	5	6

		Thickness Feet	Inches
12.	Sandstone, fine-grained, light brown, thin-bedded, locally dolomitic and conglomeratic	16	6
11.	Dolomite, fine-grained, light brownish-gray, thin- to medium-bedded, locally very sandy; contains occasional thin beds of fine-grained, silica-cemented sandstone	1	0
10.	Sandstone, fine- to medium-grained, light gray to brick red, thin-bedded, poorly sorted, locally conglomeratic	1	2
9.	Dolomite, fine-grained, light brown, thin- to medium-bedded, vuggy; contains small amount of porcelaneous, light gray, fossiliferous chert. Fossils *Lecanospira* sp.	1	0
8.	Covered, probably dolomite	2	6
7.	Sandstone, fine-grained, light brown, thin-bedded	3	0
6.	Covered, probably dolomite	6	8
5.	Sandstone, fine- to coarse-grained, light brown, cross-bedded, locally conglomeratic	1	9
4.	Covered	3	0
3.	Sandstone, fine-grained, light brown to reddish brown, thin-bedded, locally dolomitic and conglomeratic	2	2
2.	Dolomite, fine- to medium-grained, light brownish-gray to light brown, medium-bedded, sandy; contains thin beds of porcelaneous, light to medium gray chert	11	4
		105	7
Gasconade formation			
1.	Dolomite, coarse-grained, light gray, massively bedded; contains angular fragments of porcelaneous, light gray chert	15	0
		15	0

Bourbeuse River Section

The Bourbeuse River Section is located in Franklin County, 0.85 mile airline northwest from Spring Bluff. It was measured along a northwest-facing bluff above the Bourbeuse River in the SE¼ NE¼ SW¼ sec. 10, T. 41 N., R. 3 W.

The upper 44 feet of the Gasconade formation and practically the complete thickness (104 feet) of the Roubidoux formation are exposed in this section.

Altitude at the top of the section is 770 feet.

		Thickness Feet	Inches
Roubidoux formation			
15.	Sandstone, fine-grained, light gray to reddish-brown, locally quartzitic, massively bedded; contains small angular fragments of light gray, porcelaneous chert; exhibits ripple marks, desiccation cracks, and cross-bedding	42	0

		Thickness Feet	Inches
14.	Covered, several poor exposures of sandstone	16	8
13.	Dolomite, coarse-grained, light gray to buff, thin to medium-bedded	2	1
12.	Covered	5	8
11.	Chert, matrix sand, fine-grained, cemented with light gray, porcelaneous chert and locally with dolomite, thin to medium-bedded	1	8
10.	Covered	1	8
9.	Sandstone, fine-grained, light gray to reddish-brown, locally quartzitic, locally cemented with light gray, porcelaneous chert, thin to medium-bedded	2	6
8.	Dolomite, fine-grained, light brownish-gray, medium-bedded; contains abundant light to medium gray, porcelaneous, irregularly banded chert as irregular masses.	2	4
7.	Covered	3	10
6.	Sandstone, fine-grained, white to light gray to reddish-brown, thin to massive-bedded; contains scattered small, brown oolites	7	1
5.	Dolomite, fine to coarse-grained, light brownish-gray to buff, massively bedded	2	0
4.	Covered	3	5
3.	Dolomite, fine to coarse-grained, light brownish-gray to tan, locally sandy, medium to massive-bedded	8	4
2.	Dolomite, fine-grained, light brownish-gray to buff, sandy, thin to medium-bedded	4	8
		103	11
Gasconade formation			
1.	Dolomite, medium to coarse-grained, light gray to buff, medium to massive-bedded; contains small amount of light to medium-gray, porcelaneous to quartzose chert.	44	0
		44	0

Dry Fork Section

The Dry Fork measured section was measured along a southwest-facing bluff above Dry Fork, approximately 4.75 miles airline south-southeast of the intersection of U. S. Highway 66 and Missouri State Highway 68 in St. James, Phelps County, Missouri. Land Survey System designation for the section is NW¼ NW¼ sec. 16, T. 37 N., R. 6 W. Altitude at the top of the section is 975 feet.

Roubidoux formation		Thickness Feet	Inches
20.	Sandstone, fine-grained, light gray to reddish-brown, thin to massive-bedded	31	8
19.	Covered, probably dolomite	11	4
18.	Sandstone, fine-grained, light gray to tan, irregularly bedded	1	8
17.	Dolomite, medium-grained, light gray to tan, vuggy, thin-bedded	1	2
16.	Chert matrix sand, fine-grained, white to light gray, matrix light gray, porcelaneous chert	0	4
15.	Dolomite, fine to medium-grained, light gray to buff, medium to massive-bedded	12	8
14.	Covered	4	0
13.	Sandstone, medium to coarse-grained, light gray to reddish-brown, thin-bedded; contains a few small pebbles of light gray chert	1	2
12.	Chert matrix sand, fine-grained, white to light gray, matrix light gray, porcelaneous chert, locally quartzitic, medium-bedded	1	4
11.	Sandstone, fine-grained, light gray to reddish-brown, locally cemented with quartz and light gray, porcelaneous chert, medium-bedded	5	0
10.	Dolomite, medium to coarse-grained, light brownish-gray to buff, medium to massive-bedded; contains some light gray, quartzose chert and nodules of goethite	11	8
		82	0
Gasconade formation			
9.	Dolomite, fine to medium-grained, light gray, medium-bedded	48	4
8.	Dolomitic sandstone, fine-grained (grains rounded and frosted) light brown to buff, well-cemented; contains numerous angular fragments of light gray, porcelaneous chert	1	3
7.	Dolomite, medium-grained, light to medium-gray and buff, medium-bedded; contains thin beds of light gray to bluish-gray, sub-chalcedonic to quartzose and oolitic chert	6	9
6.	Dolomite, very fine-grained, light brownish-gray, thin-bedded	1	0
5.	Chert, sub-chalcedonic to quartzose and oolitic, light gray to light bluish-gray, massively bedded, exhibits some algal structure; contains abundant irregular beds of fine to medium-grained, light gray dolomite	5	10

		Thickness Feet	Inches
4.	Dolomite, fine to medium-grained, light brownish-gray, medium-bedded; contains light gray to light bluish gray, sub-chalcedonic to chalky chert as irregular masses and stringers	1	2
3.	Dolomite, fine to medium-grained, light-brownish-gray to tan, thin-bedded; contains thin beds of white, chalky chert	2	0
2.	Dolomite, coarse-grained, light gray, medium-bedded; contains occasional sand grains and a medium amount of light gray, sub-chalcedonic to chalky chert in upper part of unit	4	8
1.	Chert, sub-chalcedonic to quartzose, light gray to light bluish-gray, weathers to white chalky surface; contains abundant inclusions of dolomite	1	5
		72	5

Little Piney Creek Section

The Little Piney Creek Section, as described below, includes the lower 129 feet of the Roubidoux formation and the upper 54 feet of the Gasconade formation. It was measured along a south-facing hillside above the Little Piney Creek in the NE¼ NE¼ sec. 21, T. 35 N., R. 8 W., 0.1 mile west of the Phelps County-Dent County line.

Altitude at the top of the section is 1112 feet.

Roubidoux formation		Thickness Feet	Inches
28.	Covered, abundant sandy chert and sandstone float	22	8
27.	Sandstone, fine-grained, light gray to reddish-brown, thin to massive-bedded, exhibits cross-bedding and ripple-marks	22	0
26.	Covered	20	2
25.	Sandstone, fine-grained, light gray to reddish-brown, thin-bedded	4	4
24.	Covered	2	0
23.	Dolomite, fine to medium-grained, light brownish-gray to medium-gray, massively bedded; contains abundant light gray, oolitic (oolites irregular in size and shape), chert as irregular stringers and angular fragments	4	6
22.	Covered	1	0
21.	Chert, sandy, light gray, massively bedded	1	3
20.	Sandstone, fine-grained, light gray to tan, locally cemented with light gray, porcelaneous chert; contains abundant light gray, porcelaneous chert as thin stringers	2	0

		Thickness Feet	Inches
19.	Chert and dolomite, chert porcelaneous, light to medium-gray, irregularly banded; contains inclusions of dolomite; dolomite fine-grained, light brownish-gray, thin-bedded	4	4
18.	Covered	3	0
17.	Chert matrix sand, fine-grained, light gray to light brownish-gray, matrix light gray, porcelaneous chert; contains inclusions of dolomite and a few brown oolites.	0	4
16.	Cherty dolomite, fine-grained, light brownish-gray, irregularly bedded; contains abundant white to light gray porcelaneous chert as angular fragments	1	0
15.	Covered	1	10
14.	Sandstone, fine-grained, light gray to reddish-brown, massively bedded	11	0
13.	Dolomite, fine-grained, medium gray, sandy, irregularly bedded	1	2
12.	Chert, porcelaneous to very sandy, light gray; contains scattered small oolites	0	8
11.	Dolomite, fine to medium-grained, light brownish-gray, sandy, medium-bedded	0	6
10.	Sandstone, fine-grained, light gray to buff, thin-bedded.	0	10
9.	Dolomite, fine-grained, light brownish-gray, vuggy, weathers to massive, pitted surface	5	0
8.	Chert, oolitic and sandy, light-gray to white, irregularly bedded	1	0
7.	Dolomitic sandstone, fine-grained, light brownish-gray, medium-bedded, locally cemented with light gray, porcelaneous chert	1	2
6.	Sandstone, fine-grained, light gray to reddish-brown, medium-bedded; exhibits cross-bedding and desiccation cracks	1	2
5.	Dolomite, fine-grained, light brownish-gray, thin to medium-bedded; contains occasional sand grains and in lower part of unit some medium-gray, quartzose, sparingly fossiliferous chert (MR-45). Upper three feet of unit contains beds of white to light gray, sandy, oolitic chert	17	0
		129	11

Gasconade formation

4.	Dolomite, medium to coarse-grained, light gray to buff, medium to massive-bedded, weathers to coarsely pitted surface; contains occasional thin beds and irregular nodules of light to medium gray, quartzose chert	41	5

		Thickness Feet	Inches
3.	Chert and dolomite, chert quartzose to porcelaneous, light gray to medium dark gray, with abundant inclusions of dolomite; dolomite fine-grained, light brownish-gray, medium-bedded	2	4
2.	Chert, quartzose to sub-chalcedonic, light gray to medium dark gray, irregularly bedded; contains small inclusions of dolomite	3	0
1.	Dolomite, fine to medium-grained, light gray to light brownish-gray, thin to massive-bedded; contains abundant light to medium-gray, sub-chalcedonic to quartzose chert as irregular stringers and masses, and a small amount of fine quartz druse	7	9
		54	6

Jerome Section

The following section was measured on both sides of a series of St. Louis, San Francisco Railroad cuts in the SW¼ sec. 14, T. 37 N., R. 10 W., Phelps County, Missouri. The section includes 50 feet of the Roubidoux formation and 102 feet of the Gasconade formation, partial thicknesses for both formations in this area.

Altitude at the base of the Roubidoux formation is 846 feet.

Roubidoux formation		Thickness Feet	Inches
33.	Chert matrix sand, fine-grained, light gray to pink, matrix light gray, porcelaneous chert, medium-bedded.	0	10
32.	Sandstone, fine-grained, light gray to pink, massively bedded, top bed of unit exhibits desiccation cracks	2	0
31.	Dolomite and chert, dolomite fine-grained, light brownish-gray, sandy, medium-bedded; chert light to medium-gray, sandy, irregularly banded	8	0
30.	Chert, porcelaneous to oolitic and slightly sandy, medium dark gray	1	6
29.	Dolomite, fine-grained, light brownish-gray, vuggy, medium-bedded, weathers to pitted surface; contains thin (1-4 inch) lenses of light to medium-gray, banded, porcelaneous chert	4	0
28.	Dolomite, fine-grained, light brownish-gray to tan, sandy to very sandy, thin-bedded; contains occasional thin lenses of light to medium-gray, porcelaneous chert.	4	0
27.	Dolomite, fine to medium-grained, light brownish-gray, vuggy, medium-bedded, weathers to deeply pitted surface; contains small amount of light gray to white, porcelaneous to chalky chert	3	3
26.	Dolomite, medium-grained, light gray, thin-bedded; contains thin lenses of light gray, banded, porcelaneous chert	1	4

		Thickness Feet	Inches
25.	Chert and dolomite, chert porcelaneous to quartzose, light to medium-gray, with small inclusions of fine-grained sandstone; dolomite fine to medium-grained, light brownish-gray, irregularly bedded	5	6
24.	Dolomite, medium to coarse-grained, dirty gray, friable, medium-bedded, weathers to granular surface; contains abundant small nodules of medium-gray, porcelaneous chert	2	10
23.	Chert and chert matrix sand, chert cavernous, sandy, light to medium-gray, grades into chert matrix sand of same description	0	8
22.	Dolomite, medium-grained, light brownish-gray, medium-bedded	1–2	
21.	Sandstone, fine to medium-grained, light-gray with red mottling, sparkling, massively bedded, weathers to rusty-red surface	2–4	
20.	Dolomite, fine to medium-grained, brownish-gray, thin-bedded (¼-2 inches), weathers to blocky, irregular surface	3	0
19.	Sandstone, fine to medium-grained, white to light gray, well cemented; contains small amount of light gray, porcelaneous chert in thin lenses	0	8
18.	Dolomite, medium to coarse-grained, light brownish-gray, locally sandy, slightly vuggy, thin to massive-bedded; contains abundant angular fragments of light to medium-gray, banded, porcelaneous chert	7	0
17.	Chert, quartzose, cavernous, slightly sandy, medium-gray	0	3
16.	Dolomite, medium-grained, light brownish-gray, sandy	0	5
15.	Chert, oolitic, light to medium-gray, made up of angular fragments, weathered surface rusty-red color	0	5
		50	2

Gasconade formation

14.	Dolomite, medium to coarse-grained, light pinkish-gray with some orange-brown mottling, vuggy (vugs lined with dolomite crystals), massively bedded, stylolites common	40	0
13.	Dolomite, medium to coarse-grained, light brownish-gray, slightly vuggy, massively bedded; contains occasional concentrations of angular particles of medium dark gray, porcelaneous chert	5	0

		Thickness Feet	Inches
12.	Dolomite, fine to coarse-grained, light brownish-gray, vuggy, bedding thin and irregular; contains abundant brownish - gray, porcelaneous, and brownish - gray, quartzose chert as irregular nodules and lenses	4 to 5	6 to 6
11.	Covered	3	6
10.	Dolomite, medium to coarse-grained, light brownish-gray to orange-gray, massively bedded, slightly pitted.	12	0
9.	Dolomite, fine to medium-grained, light brownish-gray, irregularly bedded; contains abundant white weathering, porcelaneous, fossiliferous (*Helicotoma* sp., *Ozarkina* sp.) chert	2 to 5	6 to 0
8.	Chert breccia, angular fragments (5-40 mm.) of light gray, porcelaneous to quartzose chert in matrix of light gray, quartzose chert; weathers to light gray, massive surface	5	0
7.	Dolomite, fine to medium-grained, orange gray, massively bedded	1	0
6.	Chert, porcelaneous, light gray, cavernous (openings lined with fine, quartz druse), medium-bedded	1	0
5.	Dolomite, medium to coarse-grained, light, brownish-gray, slightly vuggy, medium-bedded; contains small amount of medium-gray to brownish-gray, banded, porcelaneous, fossiliferous (*Ozarkina* sp., *Ophileta* sp.) chert	7	6
4.	Chert, porcelaneous to slightly oolitic, white to medium-gray, numerous cavities lined with dolomite crystals	0	8
3.	Dolomite, fine to medium-grained, light brownish-gray, medium-bedded, slightly vuggy; contains small amount of light gray to light brown, porcelaneous chert as small nodules	11	4
2.	Chert and dolomite, chert porcelaneous to quartzose light to medium-gray, in part oolitic; dolomite medium-grained, light brownish-gray, vuggy, irregularly bedded	4	6
1.	Dolomite, medium-grained, light brownish-gray, vuggy, massively bedded, weathers to light gray, pitted surface	2	6
		102	6

Gasconade River Section

The Gasconade River Section described below was measured along a southwest-facing bluff overlooking the Gasconade River in Pulaski County. The section is in the SW¼ NW¼ NW¼ sec. 31, T. 37 N., R. 10 W., approxi-

mately 1800 feet east of State Highway No. 28. An incomplete thickness of the Roubidoux formation (65 feet) and the upper 130 feet of the Gasconade formation are exposed in this section (see Pl. VIII). Altitude at the base of the Roubidoux is 863 feet.

Roubidoux formation		Thickness Feet	Inches
21.	Chert, sandy, light to medium-gray, locally oolitic, thin-bedded; contains some inclusions of sandy dolomite	2	0
20.	Dolomite, fine-grained, light brownish-gray to buff, thin-bedded; contains irregular lenses of porcelaneous, medium-gray chert	2	6
19.	Dolomite and chert interbedded, dolomite fine-grained, light gray to tan, bedding irregular, slightly vuggy; chert porcelaneous, light to dark gray, irregularly bedded	3	6
18.	Sandstone breccia, medium-grained, buff, with angular particles (1 mm.-5 mm. across) of porcelaneous, light to dark gray chert	0	4
17.	Chert, porcelaneous, light to dark gray, locally sandy and oolitic, massively bedded	0	8
16.	Dolomite and chert interbedded, dolomite fine to medium - grained, light brownish - gray, massively bedded; contains abundant fine, milky quartz druse; chert porcelaneous, light to dark gray and medium-brown, in part oolitic; contains small inclusions of dolomite	17	6
15.	Dolomite, medium-grained, light gray to rust-brown, massively bedded; contains abundant fine quartz druse, which weathers in relief	6	0
14.	Chert, porcelaneous, light to dark brownish-gray, massively bedded, locally oolitic	2	9
13.	Dolomite, medium-grained, tan to brownish-gray, irregularly bedded, locally sandy; contains large amount of porcelaneous, white to dark brownish-gray chert as irregular lense-like masses	4	4
12.	Chert, porcelaneous, medium to dark gray and dark brown, massively bedded, locally sandy and oolitic; contains minor inclusions of dolomite	0	6
11.	Sandstone, fine to medium-grained, light gray to brownish-gray, massively bedded	11	2
10.	Chert, oolitic and sandy, light gray to brownish-gray	0	4
9.	Sandstone, fine-grained, light gray, cross-bedded, desiccation crack fillings present on weathered surfaces	1	6
8.	Dolomite, coarse-grained, medium-gray to buff, medium-bedded, vuggy	2	0

		Thickness Feet	Inches
7.	Dolomite, medium to coarse-grained, light gray to buff, massively bedded, slightly sandy; contains thin lenses of porcelaneous, medium-gray, sandy chert	2	2
6.	Sandstone, fine to medium-grained, light gray, thin-bedded; contains thin lenses of quartz-cemented sandstone breccia	0	10
5.	Dolomite, fine to medium-grained, light gray to tan, thin-bedded	0	10
4.	Dolomite, medium to coarse-grained, light gray to tan, massively bedded, vuggy; contains small angular fragments of porcelaneous, medium-gray, white weathering chert	4	0
3.	Sandstone, medium-grained, light gray to tan, thin-bedded	0	10
2.	Sandstone, medium-grained, light gray to tan, medium-bedded, dolomitic, poorly sorted, grades laterally into dolomite	1	8
		65	5
Gasconade formation			
1.	Dolomite, coarse-grained, light gray, medium to massive-bedded; weathers to massive, pitted surface. Upper 30 feet of unit relatively chert free	130	0
		130	0

Henderson Ford Section

The Henderson Ford Section is exposed along a southwest-facing bluff above the Gasconade River 1.8 miles airline northeast of where U. S. Highway 63 crosses the river in the southern part of Maries County. The exact geographic location of this section as shown on the Vienna quadrangle topographic map is: NW¼ SW¼ SW¼ sec. 29, T. 40 N., R. 8 W.

The lower 8 feet of the Rich Fountain formation, the entire thickness of the Roubidoux formation (115 feet), and the upper 6 feet of the Gasconade formation are exposed in this section. Altitude at the top of the section is 750 feet.

		Thickness Feet	Inches
Rich Fountain			
31.	Dolomite, microgranular, tan to buff "cotton rock," medium-bedded, weathers to smooth surface	8	4
Roubidoux formation			
30.	Sandstone, fine to medium-grained, light gray to buff, dolomitic	0 to 1	4 to 3

		Thickness Feet	Inches
29.	Dolomite, fine-grained, light brownish-gray to light gray, slightly sandy to sandy, medium-bedded; contains occasional angular fragments of light gray to light bluish-gray, porcelaneous chert	3	2
28.	Dolomite, very fine-grained, cream to tan, thin to medium-bedded; contains occasional small nodules of light to medium-gray, porcelaneous chert	8	8
27.	Covered	2	0
26.	Dolomite, fine to medium-grained, light brownish-gray to buff, medium-bedded	2	6
25.	Sandy dolomite, fine-grained, light brown to tan, very sandy, locally grading into sandstone, thin-bedded	2	2
24.	Sandstone, fine-grained, light gray, medium-bedded	0	11
23.	Dolomite, fine-grained, light brownish-gray to buff, slightly sandy to sandy, massively bedded, top surface of unit irregular; contains small amount of light to medium-gray, porcelaneous, slightly sandy chert as irregular nodules	1	3
22.	Covered	3	2
21.	Sandstone and dolomite, sandstone fine-grained, light gray to tan, dolomitic; dolomite fine-grained, light brownish-gray to tan, sandy; unit thin-bedded; contains abundant light gray to medium brownish-gray, sandy, oolitic chert in lower foot	4	0
20.	Dolomite, fine-grained, light brownish-gray to buff, locally very sandy, massively bedded; contains small amount of light gray to medium-bluish-gray, irregularly banded, porcelaneous, slightly sandy chert as angular fragments	6	2
19.	Dolomite, coarse-grained, tan to buff, medium-bedded; contains abundant light gray to medium bluish-gray, irregularly banded, porcelaneous chert as rounded nodules and thin lenses	4	0
18.	Sandstone, fine-grained, light gray to buff, locally quartzitic, locally cemented with light gray, porcelaneous chert, thin-bedded; contains occasional thin beds of fine-grained, medium brownish-gray dolomite	1	10
17.	Dolomite, fine-grained, light brownish-gray to tan, sandy to very sandy, thin to medium-bedded; contains abundant light gray to light bluish-gray, sandy, oolitic chert as thin beds and lenses	3	3
16.	Sandstone, fine to medium-grained, white to light brownish-gray, locally dolomitic, massively bedded except near top of unit where beds becomes thin, exhibits some cross-bedding	6	9

		Thickness Feet	Inches
15.	Dolomite, fine to medium-grained, light brownish-gray to tan, locally very sandy, thin to medium-bedded; contains occasional nodules and thin lenses of light to medium-gray, irregularly banded, porcelaneous chert..	5	3
14.	Cherty dolomite, fine to medium-grained, tan to buff, slightly sandy, irregularly bedded; contains abundant angular fragments and irregular masses of light to medium-gray, irregularly banded, porcelaneous chert.....	5	8
13.	Chert, oolitic and sandy, light to medium-gray, massively bedded; contains abundant inclusions of fine-grained, buff dolomite.....	2	10
12.	Dolomite and chert, dolomite fine to medium-grained, light brownish-gray to tan, locally sandy, irregularly bedded; chert porcelaneous to finely oolitic and sandy, light to medium-gray with abundant inclusions of dolomite.....	8	10
11.	Dolomite, fine to medium-grained, light brownish-gray to buff, locally very sandy, massively bedded; contains occasional thin beds of light gray, sandy, oolitic chert and light gray porcelaneous chert.....	12	6
10.	Chert, sandy and oolitic to porcelaneous, white to medium-gray, irregularly bedded. weathers to angular surface; contains numerous inclusions of fine-grained, tan dolomite.....	4 to 5	6 to 6
9.	Dolomite, fine to medium-grained, light gray, medium-bedded; contains abundant thin lenses of white to light gray, irregularly banded, porcelaneous chert; chert conglomeratic at base of unit.....	3	2
8.	Dolomite, medium-grained, light gray to tan, vuggy, slightly sandy, massively bedded; contains occasional small nodules of light gray, sandy chert.....	3	5
7.	Chert, oolitic, sandy, light to medium-gray; contains occasional thin lenses of sandy dolomite.....	0 to 0	6 to 11
6.	Dolomite, fine to medium-grained, light brownish-gray to tan, slightly sandy, medium-bedded; contains occasional thin lenses of light gray to white, porcelaneous to chalky chert.....	2	2
5.	Dolomite, medium-grained, light gray to tan, massively bedded.....	3	10
4.	Sandstone, fine-grained, light gray to orange, locally dolomitic, medium-bedded.....	2	1

		Thickness Feet	Inches
3.	Dolomite, fine-grained, light to medium brownish-gray, slightly sandy, massively bedded	1	9
2.	Dolomite, fine-grained, light brownish-gray, locally contains thin beds of dolomitic sandstone at top of unit, thin to medium-bedded; contains small amount of dark bluish-gray, quartzose to porcelaneous chert in upper part of unit	3	4
		114	7
Gasconade formation			
1.	Dolomite, medium-grained, light gray to medium brownish-gray, vuggy, massively bedded, top surface irregular	6	0
		6	0

Freeburg Section

The Freeburg Section was measured in a series of cuts along the Chicago, Rock Island, and Pacific Railroad tracks starting approximately 1 mile airline east-northeast from U. S. Highway No. 63 in Freeburg, Osage County, Missouri. The geographic location of this section as shown on the Linn quadrangle topographic map is: along north line of sections 10 and 11, T. 41 N., R. 9 W.

The top of the Roubidoux formation in this section appears to be badly slumped due to solution. The measured thickness of 95 feet, therefore, is probably not representative for this area. It is believed that 105-110 feet is more nearly the correct thickness.

Altitude at the top of the section is 731 feet.

		Thickness Feet	Inches
Rich Fountain formation			
29.	Dolomite, fine-grained, light brownish-gray, massively bedded; weathers to medium gray, pitted surface	20	0
		20	0
Roubidoux formation			
28.	Sandstone, fine to medium grained, light gray, thin-bedded, ripple marked	10	0
27.	Chert, quartzose, dolomoldic, light gray to red, bedding irregular	2	2
26.	Sandstone, fine- to medium-grained, light gray to reddish-brown, thin-bedded, not well exposed	2	0
25.	Covered	5	0
24.	Sandstone, fine-grained, tan to buff, massively bedded, dolomitic	2	2
23.	Dolomite, medium-grained, light gray, thin-bedded	2	6
22.	Dolomite, very fine grained, yellowish gray to tan, thin-bedded, argillaceous	4	0

		Thickness Feet	Inches
21.	Dolomite, fine-grained, light gray to buff, medium-bedded, sandy and oolitic	2	2
20.	Covered	2	0
19.	Sandstone, fine-grained, light gray, massively bedded	2	0
18.	Sandstone, medium-grained, white to red, massively bedded	3	0
17.	Chert, porcelaneous to cavernous, light to medium gray, massively bedded, in part sandy and oolitic	12	0
16.	Dolomite, medium to coarse grained, light gray, thin to medium bedded; contains nodules of porcelaneous, light gray chert	4	0
15.	Dolomite, fine- to medium-grained, light gray to tan, massively bedded	3	0
14.	Dolomite, fine-grained, light gray, medium-bedded, upper part of unit slightly sandy	4	8
13.	Dolomite, fine-grained, light gray, massively bedded, vuggy; weathers to irregular, pitted surface	3	8
12.	Dolomite, fine- to medium-grained, light gray to tan, thin-bedded, sandy; contains some lenses of oolitic, light to medium gray chert and dolomitic sandstone	1	4
11.	Chert, porcelaneous, oolitic and drusy, finely banded, light to medium gray, massively bedded, white weathering; shows some algal structures	4	0
10.	Dolomite and sandstone, dolomite fine-grained, light gray to tan, medium-bedded, sandy, vuggy; sandstone medium-grained, tan to gray; contains lenses of porcelaneous, finely banded, light to medium gray, white weathering chert	4	0
9.	Dolomite, fine-grained, light brownish-gray, massively bedded, vuggy	2	4
8.	Dolomite, medium-grained, light yellowish-gray to tan, massively bedded, sandy; contains one thin bed of oolitic, sandy, finely banded light to medium gray chert	1	2
7.	Dolomite, fine-grained, light brownish-gray, massively bedded, has well developed stromatolitic structures; contains abundant irregular lenses and angular fragments of porcelaneous, light to medium gray, banded chert	2	3
6.	Dolomite, medium-grained, light gray, very thin bedded	2	0
5.	Dolomite, fine-grained, light brownish-gray, thin-bedded, slightly sandy, vuggy; contains irregular masses of porcelaneous, light gray, slightly banded chert	1	8

		Thickness Feet	Inches
4.	Dolomite, fine- to medium-grained, light gray to buff, massively bedded, grades laterally into medium-grained sandstone; contains thin lenses of light-gray, sandy, oolitic chert	0	7
3.	Sandstone, medium-grained, light gray to buff, bedding irregular, dolomitic, conglomeratic; contains rounded and angular pebbles and fragments of oolitic, sandy, medium gray chert. Lower surface of unit slightly irregular	0	4
2.	Dolomite, fine- to medium-grained, light gray to light brownish-gray, slightly sandy, thin to massive-bedded; contains a small amount of light to medium gray, porcelaneous to sandy, oolitic chert as irregular nodules	9	3
		95	3
Gasconade formation			
1.	Dolomite, coarse-grained, light gray, massively bedded, vuggy, non-cherty; weathers to deeply pitted surface	6	0
		6	0

St. Thomas Section

The St. Thomas Section, as described below, includes only the lower 30 feet of the Roubidoux formation and the upper 75 feet of the Gasconade formation. The purpose of this section is to show the relationship between the Roubidoux-Gasconade contact in the area between the Cole County section and the Gasconade River section. The top of the section is at an altitude of 729 feet near the crest of a high southwest-facing bluff above the Osage River, about 1.95 mile airline southwest of St. Thomas in Cole County. Exact geographic location of the section is: NE¼ SW¼ sec. 35, T. 42 N., R. 12 W.

		Thickness Feet	Inches
Roubidoux formation			
11.	Chert, porcelaneous to sandy, light to medium-gray, banded, massively bedded; contains thin (2-6 inch) lenses of fine-grained sandstone	10	0
10.	Dolomite, fine-grained, light to medium-gray, medium-bedded; contains occasional lenses of very sandy, oolitic, medium-gray chert	5	0
9.	Chert, oolitic to sandy, light to dark gray, massively bedded; composed of angular fragments	3	0
8.	Dolomite, fine-grained, light gray, medium-bedded; contains lenses of light gray, porcelaneous chert	1	6
7.	Chert, porcelaneous to sandy and oolitic, light to dark gray; composed of angular fragments	1	4
6.	Dolomite, fine-grained, light brownish-gray, thin-bedded	1	9

		Thickness Feet	Inches
5.	Chert, porcelaneous to sandy and oolitic, light to dark gray, banded; composed of angular fragments	0	10
4.	Dolomite, fine-grained, light brownish-gray to light brown, thin-bedded; contains angular fragments of light to medium-gray, banded, porcelaneous chert	2	6
3.	Covered	3	0
2.	Sandstone, medium-grained, light gray, medium-bedded; contains angular fragments of light to medium gray, porcelaneous chert	1	6
		30	5

Gasconade formation

1.	Dolomite, coarse-grained, light gray, medium to massive-bedded, weathers to light gray, pitted surface; relatively chert free	75	0
		75	0

Cole County Composite Section

The Moreau River and Osage River sections constitute the Cole County Composite Section. This composite section displays the lower few feet (6½ feet) of the Rich Fountain formation, the complete thickness (113 feet) of the Roubidoux formation, and the upper part (15 feet) of the Gasconade formation. The lower part of the Rich Fountain formation and the upper part of the Roubidoux formation are exposed in the Moreau River Section; the lower part of the Roubidoux and the upper part of the Gasconade in the Osage River Section.

Correlation of the two sections was based on lithologic similarities as lateral tracing of beds was not possible. A massive sandstone, unit number 29 of the Moreau River Section, is present in both sections and was used as a key bed for correlation.

Altitude at the top of the Roubidoux formation in the Moreau River Section is 632 feet. Altitude at the base of the formation in the Osage River Section is approximately 598 feet.

The Moreau River Section (Frontispiece) is located along a west-facing bluff above the Moreau River on the E-W section line between sections 29 and 32, T. 44 N., R. 11 W.

The Osage River Section was measured along a steep slope on the north side of the Osage River. Geographic location of this section as shown on the Meta quadrangle topographic map is: NE¼ sec. 17, T. 43 N., R. 11 W.

Moreau River Section

Rich Fountain formation		Thickness Feet	Inches
35.	Dolomite, microgranular, medium to dark gray, thin-bedded	1	0
34.	Dolomite, fine-grained, tan to dark gray, thin-bedded; contains occasional thin lenses of sand	1	0

		Thickness Feet	Inches
33.	Dolomite, fine-grained, light brownish-gray to light gray and buff, medium-bedded; contains thin lenses of sand	2	0
32.	Covered	2	6
		6	6

Roubidoux formation

31.	Sandstone, fine-grained, light gray, massively bedded; weathers to reddish-brown and brown surfaces	3	0
30.	Sandstone, medium to coarse-grained, light gray to reddish-brown, massively bedded; contains abundant angular fragments of porcelaneous, light to medium-gray, smooth-fracturing chert in uppermost bed	7	0
29.	Sandstone, fine to medium-grained, light gray, massively bedded; contains a few white to gray oolites near top of unit	27	0
		37	0

Osage River Section

Roubidoux formation

29.	Sandstone, same as unit 29 in Moreau River Section	27	0
28.	Sandstone, fine to medium-grained, light gray, massively bedded	1	10
27.	Sandstone, fine to medium-grained, light gray to tan, thin-bedded; contains abundant thin, irregular lenses of porcelaneous, banded, light gray to brownish-gray, sandy chert	1	6
26.	Dolomite, fine-grained, light brownish-gray, massively bedded, sandy; contains abundant thin lenses of porcelaneous, banded, light gray to bluish-gray chert	3	4
25.	Sandstone, fine-grained, light gray, thin-bedded, locally cemented with silica	1	4
24.	Chert, porcelaneous, banded, medium- to dark-gray, massively bedded, oolitic, bed has a brecciated appearance	1	4
23.	Covered	2	0
22.	Chert, oolitic and sandy, light to medium-gray, occurs as two massive beds	1	8
21.	Dolomite, medium-grained, light gray, massively bedded; contains small amount of porcelaneous, light gray, smooth-fracturing chert as thin lenses	3	4
20.	Covered	2	0

		Thickness Feet	Inches
19.	Sandstone, fine to medium-grained, light gray to tan, massively bedded; grades laterally into very sandy, light gray dolomite; contains thin lenses of porcelaneous, light gray chert	3	4
18.	Chert, brecciated appearing, quartzose to sandy, light to dark gray, massively bedded	4	10
17.	Dolomite, fine-grained, light brown to brownish-gray, massively bedded; contains large amount of porcelaneous, light to medium-gray chert as angular fragments and thin lenses; chert contains an occasional *Hormotoma* sp.	1	10
16.	Chert breccia, angular fragments of porcelaneous, light to dark gray chert in matrix of light gray, sandy chert, massively bedded	5	0
15.	Dolomite, medium-grained, light gray, thin-bedded	0	11
14.	Dolomite, fine to medium-grained, light brownish-gray, irregularly bedded; contains thin lenses of porcelaneous, light to medium-gray chert in lower foot of unit	4	3
13.	Dolomite, fine to medium-grained, light gray, massively bedded	9	6
12.	Dolomite, medium-grained, individual grains of dolomite cemented with white, calcareous cementing material, thin-bedded, sandy; contains minor amounts of porcelaneous, light gray chert as angular fragments	1	6
11.	Dolomite and chert, dolomite fine to medium-grained, tan to beige, irregularly bedded, vuggy; chert porcelaneous, light gray to light brownish-gray, occurs as irregular, brecciated appearing masses	6	6
10.	Dolomite, medium - grained, beige - gray, massively bedded; contains large irregular lenses of porcelaneous, light to medium-gray, in part oolitic chert	3	0
9.	Dolomite, medium-grained, light-brownish-gray, medium-bedded; contains thin (½-2 inch) lenses of porcelaneous, medium- to bluish-gray, sandy chert	5	0
8.	Dolomite and dolomitic sandstone, dolomite medium-grained, light gray, medium-bedded; sandstone medium-grained; contains abundant thin lenses of oolitic, medium-gray, sandy chert, a 2 to 4 inch bed of chert breccia occurs at bottom of this unit	3	4
7.	Dolomite, medium-grained, light gray, massively bedded, very sandy; contains thin lenses of oolitic, light gray, sandy chert	4	6
6.	Sandstone, medium to coarse-grained, light gray, thin-bedded, poorly sorted	1	1

		Thickness Feet	Inches
5.	Dolomite, medium-grained, light gray to light brownish-gray, bedding irregular; contains thin, irregular lenses of sand at base of unit	0	11
4.	Dolomite, medium-grained, brownish-gray, thin-bedded	1	0
3.	Dolomite, medium to coarse-grained, light brownish-gray, massively bedded, sandy, grains well-rounded	1	0
2.	Sandstone, medium to coarse-grained, light gray, thin-bedded, conglomeratic; contains angular fragments of porcelaneous, light to medium-gray chert	0	6
		76	4

Gasconade formation

1.	Dolomite, coarse-grained, light gray, massively bedded, vuggy, non-cherty; weathers to light gray, deeply pitted surface	15	0
		15	0

Lake of the Ozarks Composite Section

The Rockcrest, Cole Camp Creek, and Lakeview Heights sections, measured along the Lake of the Ozarks, comprise the composite Lake of the Ozarks Section. Total thickness of the Roubidoux formation in this area is approximately 129 feet.

The lower part of the Rich Fountain formation and the upper part of the Roubidoux formation are exposed in the Rockcrest section, the middle part of the formation in the Cole Camp Creek section, and the lower part of the Roubidoux formation and upper part of the Gasconade formation in the Lakeview Heights section.

Correlation of the upper and middle parts of the composite section was made by lateral tracing of two persistent sandstone beds (units 25 and 26 of the Cole Camp Creek section), which are well-exposed for about 2 miles along this part of the lake. The middle and lower parts of the composite section were correlated on the basis of similar lithologies since individual beds could not be traced laterally from the one area to the other.

The Rockcrest portion of the composite section is exposed at the Rockcrest Resort on the northeast side of the lake in the SW¼ SE¼ sec. 3, T. 40 N., R. 21 W.

The Cole Camp Creek section is exposed along the west side of the Cole Camp Creek Arm of the Lake of the Ozarks approximately 0.2 mile northwest of its intersection with the main part of the lake (NW¼ NE¼ sec. 11, T. 40 N., R. 21 W.).

The Lakeview Heights section is located along a southwest-facing bluff overlooking the lake, in the NE¼ NE¼ sec. 7, T. 40 N., R. 20 W., approximately 0.8 mile airline west-northwest of Lakeview Heights.

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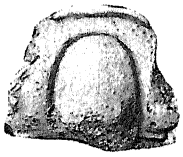

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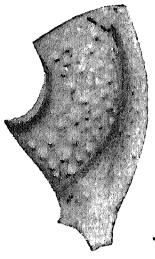

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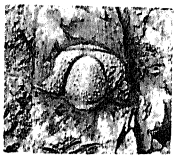

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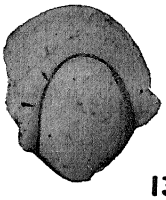

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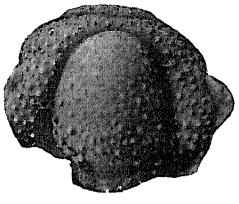

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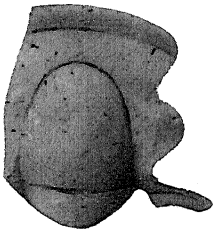

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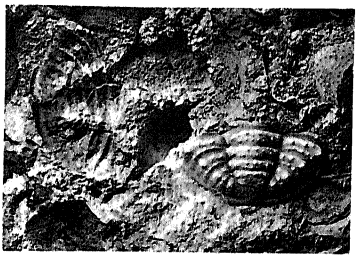


		Thickness Feet	Inches
18.	Dolomite, fine to medium-grained, light gray to brownish-gray, massively bedded, vuggy	5	0
17.	Dolomite, medium-grained, light brownish-gray, medium-bedded, vuggy	10	0
		63	8
Lakeview Heights Section			
16.	Chert, porcelaneous, light to medium-gray, oolitic and sandy, has brecciated appearance. Forms very irregular, blocky ledge	0	4–12
15.	Dolomite, fine-grained, light brownish-gray, massively bedded; contains angular fragments of oolitic, dark gray chert near top of unit	3	0
14.	Dolomite, medium-grained, light gray, massively bedded; contains small amount of porcelaneous, banded, light gray chert near top of unit	10	0
13.	Covered	2	4
12.	Chert, porcelaneous, medium to dark gray, has breccia-like structure, massively bedded	0	2-8
11.	Dolomite, fine-grained, light brownish-gray, massively bedded, vuggy	3	2
10.	Dolomite, fine to medium-grained, light brownish-gray, massively bedded, slightly vuggy	3	8
9.	Sandstone, fine to medium-grained, light to medium-gray	2	2
8.	Chert, oolitic, light to medium-gray with white oolites, massively bedded; contains some chert matrix sand	1	10
7.	Sandstone, fine to medium-grained, poorly sorted, light gray, cross-bedded to massively bedded; contains occasional thin lenses of oolitic, sandy, light gray chert	4	8
6.	Covered	1	8
5.	Dolomite, fine to medium-grained, light gray to light brownish-gray, massively bedded, vuggy; contains occasional thin lenses of sand	7	2
4.	Sandstone, medium-grained, light gray, cross-bedded to irregularly bedded, dolomitic	2	6
3.	Dolomite, coarse-grained, light pinkish-gray, bedding irregular, sandy; contains very small amount of porcelaneous, medium-gray chert	1	0
2.	Sandstone, medium-grained, light gray, massively bedded	2	0
		46	4
Gasconade formation			
1.	Dolomite, coarse-grained, light gray, vuggy, massively bedded; weathers to deeply pitted surface	35	0
		35	0

APPENDIX B

PLATES

Explanation of Plate IX

Figures

1-8. *Syntrophina campbelli* (Walcott). Figures 1, 2 are internal impressions of dorsal valve (X2.5), (X5.5) of hypotype, U. Mo. No. 10,304; 3 an internal impression of ventral valve (X2.5) of a hypotype, U. Mo. No. 10,303; 4, 5 two views (X2.5) of internal impression of dorsal valve of a hypotype, U. Mo. No. 10,303; 6 internal impression (X2.5) of dorsal valve of a hypotype, U. Mo. No. 10,304; 7 an internal impression (X2.5) of ventral valve of a hypotype, U. Mo. No. 10,303; 8 rubber cast of exterior of ventral valve (X2.5) of a hypotype, U. Mo. No. 10,303. Hypotypes, U. Mo. No. 10,303, from locality MR-26, Shannon County, Missouri. Hypotypes, U. Mo. No. 10,304, from locality MR-28, Shannon County, Missouri.

9,10. *Syntrophina missouriensis* Ulrich and Cooper. Figure 9 a rubber cast of the exterior of dorsal valve (X2.5) of hypotype, U. Mo. No. 10,305, from locality MR-26, Shannon County, Missouri; 10 an internal impression of ventral valve (X2) of hypotype, U. Mo. No. 10,305.

11. *Finkelnburgia* sp. Internal impression of ventral valve (X5) of hypotype, U. Mo. No. 10,301, from locality MR-14, just north of New Bryant, Douglas County, Missouri.

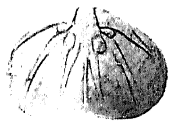
12,13. *Hypseloconus compressus* Ulrich and Bridge. Lateral and dorsal views (X2) of homeotype, U. Mo. No. 10,307, from the upper part of the Roubidoux at locality MR-27, Shannon County, Missouri.

14. *Proplina elongata* Cullison. Dorsal view of a rubber cast of a hypotype, U. Mo. No. 10,306, from the upper part of the Roubidoux at locality MR-27, Shannon County, Missouri.

15. *Ozarkoconus prearcuatus* n. sp. Lateral view (X1.8) of a rubber cast of the holotype. Holotype, U. Mo. No. 10,308, from chert of the upper part of the Roubidoux at locality MR-27, Shannon County, Missouri.

16-18. *Macluritella stantoni* Kirk. Figure 16 apical view (X2) of a homeotype, U. Mo. No. 10,309, from locality MR-28, Shannon County, Missouri; 17, 18 apical and apertural views (X1) of another homeotype, U. Mo. No. 10,339, from the upper part of the Roubidoux at locality MR-27, Shannon County, Missouri.

19. *Euconia* sp. Lateral view (X2) of a hypotype, U. Mo. No. 10,310, from locality MR-15 north of New Bryant, Douglas County, Missouri.



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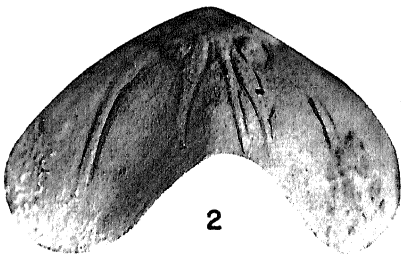

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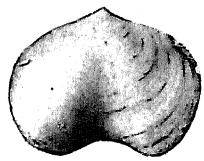

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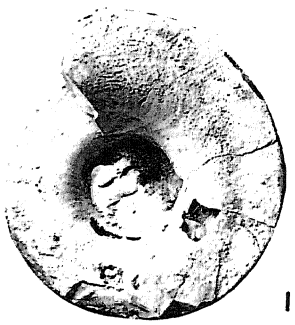

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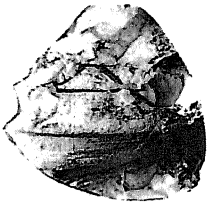

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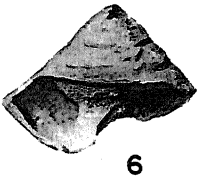

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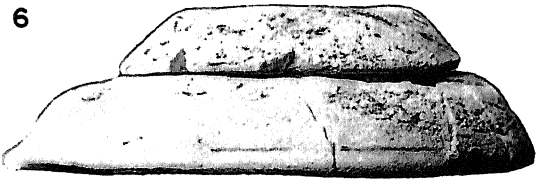

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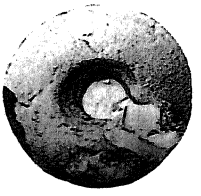

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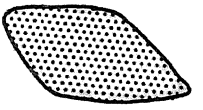

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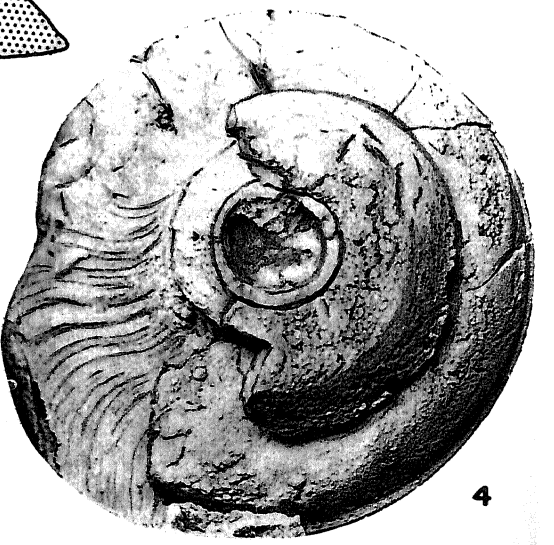

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Explanation of Plate X

Figures

1-5. *Rhombella umbilicata* (Ulrich and Bridge). Figure 1 basal view (X1) of a chert steinkern from Ulrich's locality 457v, 1.5 miles southeast of Arden, Douglas County, Missouri; 2 an apical view (X1) of a poorly preserved specimen, homeotype, U. Mo. No. 10,312, from the lower part of the Roubidoux at locality MR-28, Shannon County, Missouri; 3, 4 are lateral (X1) and apical (X1) views of homeotype, U. Mo. No. 10,311, from locality MR-27; and 5 is camera drawing (X1) of whorl cross-section of homeotype, U. Mo. No. 10,311.

6-8. *Jarlopsis conicus* n. sp. Figure 6 is a lateral view (X1.5) of the holotype, U. Mo. No. 10,313, from locality MR-14, Douglas County, Missouri; 7, 8 lateral (X1.5) and basal (X2) views of paratype, U. Mo. No. 10,314, from locality MR-27, Shannon County, Missouri.

9. *Lecanospira compacta* (Salter). Basal view (X1) of a hypotype, U. Mo. No. 10,321, from locality MR-32, Shannon County, Missouri.

Explanation of Plate XI

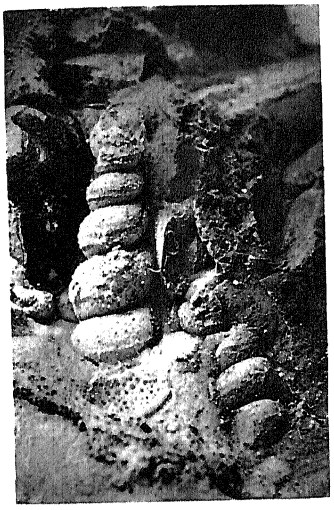
Figures

1. *Hormotoma* cf. *H. gracilis* (Hall). Lateral view (X3) of a rubber cast of hypotype, U. Mo. No. 10,317, from locality MR-28, Shannon County, Missouri.

2-4. *Plethospira extensa* n. sp. Figure 2 basal view (X1) of paratype, U. Mo. No. 10,316, from locality MR-27, Shannon County, Missouri; 3, 4 lateral (X1) and basal (X1) views of holotype, U. Mo. No. 10,315, from the upper part of the Roubidoux at locality MR-27.

5. *Rhombella umbilicata* (Ulrich and Bridge). Lateral view (X1) of a chert steinkern from Ulrich's locality 457v, 1.5 miles southeast of Arden, Douglas County, Missouri.

6-9. *Lecanospira depressa* n. sp. All views of the holotype, U. Mo. No. 10,318, from locality MR-32, Shannon County, Missouri. Figure 6 a view of the external mold of the spire (X1); 7 basal view (X1); 8 apical view (X1) of rubber cast of external mold of spire; and 9 camera drawing (X1) of whorl cross-section.



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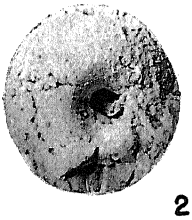

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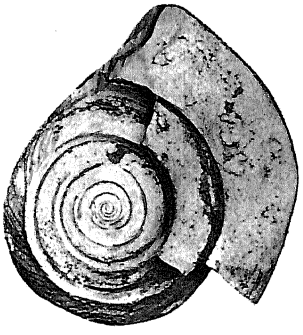

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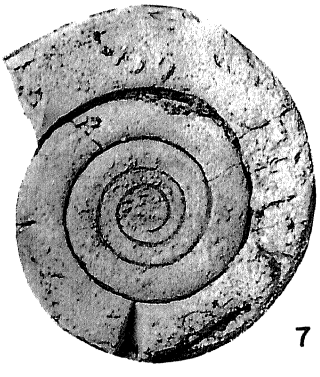

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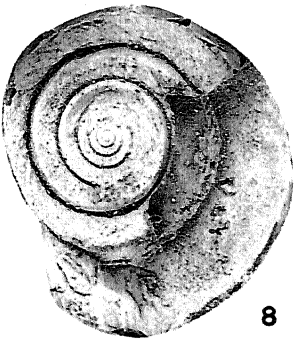

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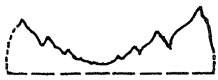

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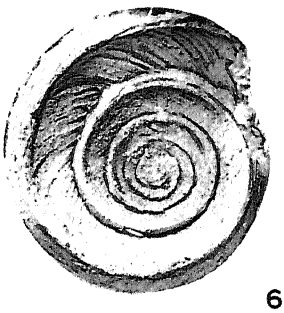

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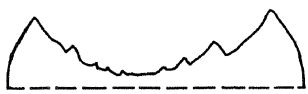

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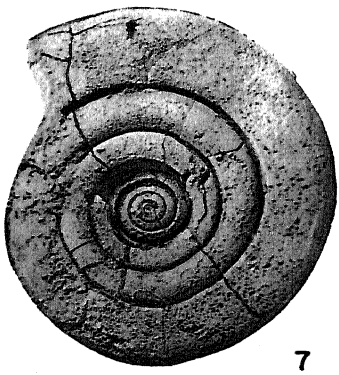

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Explanation of Plate XII

Figures

1-5. *Lecanospira soluta* n. sp. Figure 1 view (X1) of the external mold of spire of the holotype; 2 is a cross-section (X1) of a rubber cast of the holotype; 3 an apical view (X1) of a rubber cast of the holotype; 4, 5 apical views (X1) of rubber casts of paratypes, U. Mo. No. 10,320. Holotype, U. Mo. No. 10,319, from chert of the upper Roubidoux at locality MR-27, Shannon County, Missouri. Paratypes from same locality.

6-9. *Lecanospira compacta* (Salter). Figure 6 apical view (X1) of rubber cast of a hypotype, Mo. S. M. No. 3447; 7 basal view (X1) of a large hypotype, Mo. S. M. No. 3076; 8 cross-section (X1) of a rubber cast of specimen, Mo. S. M. No. 3447; 9 view (X1) of external mold of spire of specimen, Mo. S. M. No. 3447.

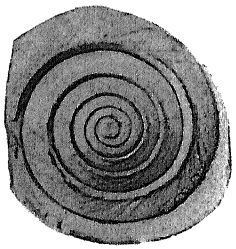
Explanation of Plate XIII

Figures

1-6. *Lecanospira perplana* n. sp. Figure 1 external mold of the spire of the holotype (X1); 2 a cross-section (X1) of a rubber cast of the holotype; 3 apical view (XI) of a rubber cast of the holotype; 4 a view of the external mold of the spire of paratype, U. Mo. No. 10,323; 5 cross-section (X1) of a rubber cast of paratype; 6 apical view (X1) of rubber cast of paratype. Holotype, U. Mo. No. 10,322, from chert of the lower Roubidoux at locality MR-23 in Shannon County, Missouri.

7,8. *Lecanospira biconcava* Ulrich and Bridge. Figure 7 is a cross-section (X1) of a rubber cast of hypotype, U. Mo. No. 10,324; 8 apical view (X1) of a rubber cast, U. Mo. No. 10,324, of specimen, Mo. S. M. No. 626.

9-11. *Lecanospira carinata* n. sp. Figure 9 cross-section (X1) of a rubber cast of the holotype; 10 apical view (X1) of a rubber cast of paratype, U. Mo. No. 10,325; 11 apical view (X1) of a rubber cast of the holotype. Holotype, U. Mo. No. 10,325 A, from chert of the lower Roubidoux at locality MR-32, Shannon County, Missouri.



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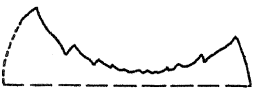

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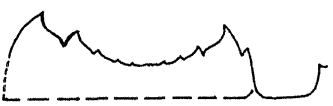

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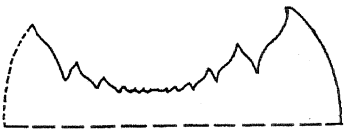

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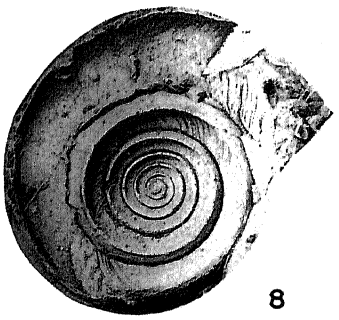

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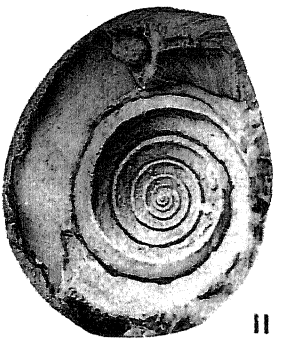

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Explanation of Plate XIV

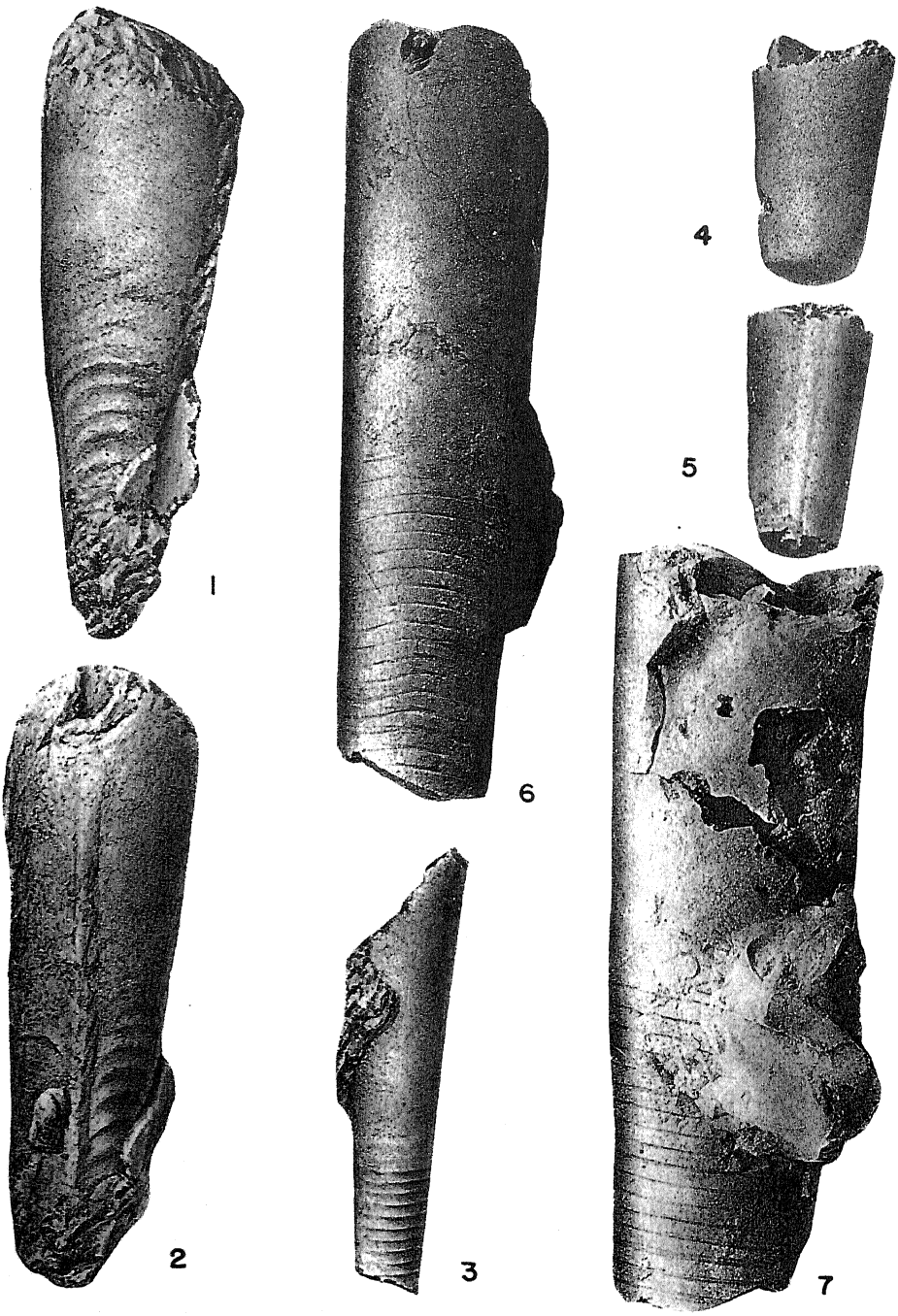
Figure

1. *Lecanospira carinata* n. sp. Large piece of chert in which the holotype and several paratypes are preserved (X1). Fossils from the lower part of the Roubidoux at locality MR-32, approximately 0.9 mile airline southeast of Winona, Shannon County, Missouri.

Explanation of Plate XV

Figure

1. *Lecanospira biconcava* Ulrich and Bridge. Large piece of chert showing several specimens of this species (X1). Fossils from the Roubidoux at locality Mo. S. M. 75.20 south of Festus, Jefferson County, Missouri.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Explanation of Plate XVI

Figures

1-5. *Monogonoceras subrectum* Ulrich, Foerste, Miller, and Unklesbay. Figures 1, 2 are ventral and lateral views of the adapical portion of an artificial cast of the holotype (X3); 3 is a dorsal view of another artifical cast of the adapical portion of the holotype (X1.5); and 4, 5 are ventral and lateral views of the internal mold of the living chamber (X1.5). Holotype, U. S. N. M. 109468. Illustrations after Ulrich, Foerste, Miller, and Unklesbay.

6,7. *Cotteroceras gregeri* Ulrich, Foerste, Miller, and Unklesbay. Two views of the holotype (X1.5) from the Roubidoux formation at Poverty Flats, Missouri. Holotype, U. S. N. M., 109572. Illustrations from *Ozarkian and Canadian Cephalopods Part III: Longicones and Summary* by Ulrich, Foerste, Miller and Unklesbay.

Explanation of Plate XVII

Figures

1. *Burenoceras* cf. *B. pumilum* Ulrich and Foerste. Apical view of small specimen, U. Mo. No. 10,326, from the lower Roubidoux at MR-28, Shannon County, Missouri.
2. *Monogonoceras subrectum* Ulrich, Foerste, Miller, and Unklesbay. Ventral view of an artificial cast of holotype (X1.5). Holotype, U. S. N. M., 109468, from the Roubidoux formation south of Mansfield, Missouri. After Ulrich, Foerste, Miller, and Unklesbay.

3-5. *Protocycloceras doniphonense* Ulrich, Foerste, Miller, and Unklesbay. Three views of the holotype (X1.5) from the Roubidoux between Doniphan and Oxly, Missouri. Holotype, U. S. N. M., 109522. After Ulrich, Foerste, Miller, and Unklesbay.

6-8. *Campbelloceras overmani* n. sp. Figure 6 a cross-section of the holotype, showing shape of conch and position of siphuncle near adoral end; 7 a dorsal view of a rubber cast of section of the holotype showing impressed zone and the ventral position of siphuncle; and 8 a lateral view of same cast of holotype (all views X1). Holotype, U. Mo. No. 10,327; from locality MR-27, Shannon County, Missouri.

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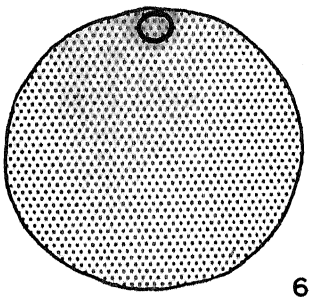

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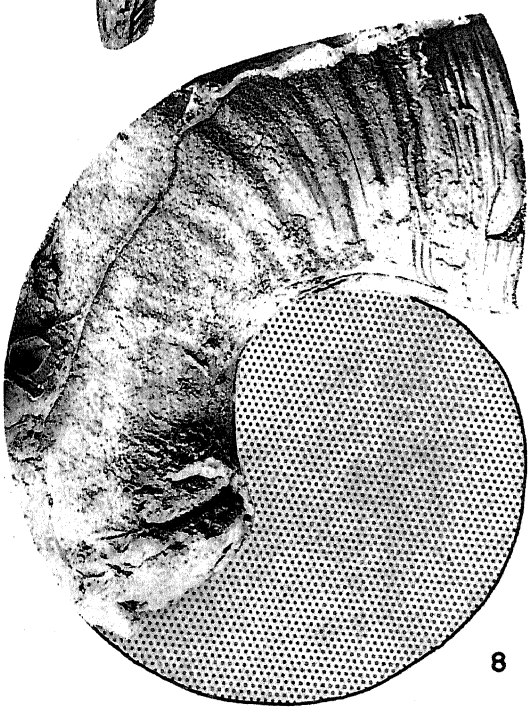

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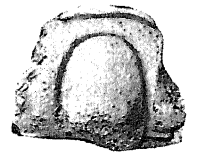
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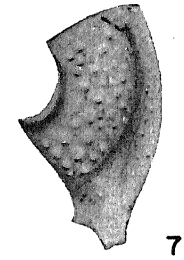
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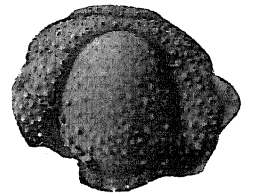
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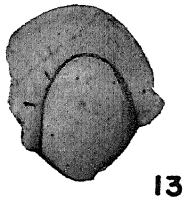
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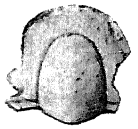
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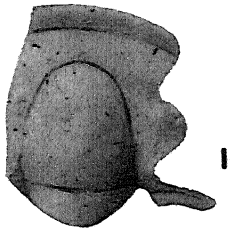
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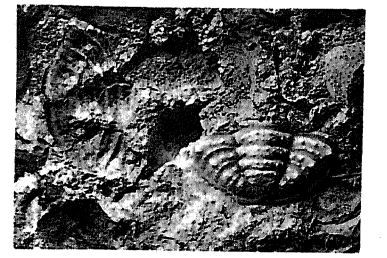

Explanation of Plate XVIII

Figures

1-3. *Hystricurus elevatus* n. sp. Dorsal, anterior, and lateral views (X2) of the holotype. Holotype, U. Mo. No. 10,328, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri.

4,5. *Hystricurus* sp. A. Dorsal and anterior views (X2) of specimen, U. Mo. No. 10,332, from the lower part of the Roubidoux at locality Mo. S. M. No. 98.8, Shannon County, Missouri.

6. *Hystricurus deflectus* n. sp. Dorsal view (X1) of the holotype. Holotype, U. Mo. No. 10,329, from chert zone near middle of the Roubidoux at locality MR-15, just north of New Bryant, Douglas County, Missouri.

7,8. *Hystricurus* sp. Dorsal views (X5) (X2) of free cheeks, U. Mo. No. 10,334, from chert of the *Syntrophina* zone at localities MR-26 and MR-28, Shannon County, Missouri.

9. *Hystricurus* sp. Dorsal view of an undescribed specimen.

10-12. *Hystricurus elevatus* n. sp. Figure 10 dorsal view (X2) of paratype, U. Mo. No. 10,330; 11, 12 dorsal and anterior views (X5) of a rubber cast of paratype, U. Mo. No. 10,331. Paratype, U. Mo. No. 10,330, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri. Paratype, U. Mo. No. 10,331, from same locality.

13-15. *Paraplethopeltis minuta* n. sp. Figure 13 dorsal view (X5) of paratype, U. Mo. No. 10,336; 14, 15 dorsal and anterior views (X1.6) of the holotype. Holotype, U. Mo. No. 10,335, from chert of the *Syntrophina* zone at locality MR-26, Shannon County, Missouri. Paratype from same locality as holotype.

16,17. *Jeffersonia bridgei* n. sp. Figure 16 a dorsal view (X5) of holotype; 17 a dorsal view (X2) of paratype, U. Mo. No. 10,338. Holotype, U. Mo. No. 10,337, from chert zone near middle of Roubidoux at locality MR-15, just north of New Bryant, Douglas County, Missouri. Paratype from same locality.

18. *Hystricurus* sp. Dorsal view (X2) of a well-preserved pygidium from chert of the *Syntrophina* zone at Ulrich's locality 261z, 1.5 miles up Spring Creek from Rockbridge, Ozark County, Missouri.

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