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Geologic map of the Harrison 1°×2° quadrangle, Missouri and Arkansas

by

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FOLIO NOTE

This map is the fifth in a folio of maps of the Harrison 1°×2° quadrangle, Arkansas and Missouri, prepared under the Conterminous United States Mineral Assessment Program. Previously published maps in this folio relate to the geochemistry of the subsurface carbonate rocks (Erickson and others, 1988), the geophysics of the basement terranes (McCafferty and others, 1989), the carbonate depositional lithofacies and mineralization in the Caulfield district (Hayes and others, 1992), and the mineral-resource potential of the quadrangle (Pratt and others, 1993). A multicolor version of this map is being processed for publication in the U.S. Geological Survey Miscellaneous Investigations Map series. Additional maps showing various other geologic aspects of the Harrison quadrangle will be published as U.S. Geological Survey Miscellaneous Field Studies Maps bearing the same serial number with different letter suffixes (MF-1994-E, -F, etc.).

DISCUSSION

The rocks exposed in the Harrison quadrangle are exclusively sedimentary. They range in age from Early Ordovician to Middle Pennsylvanian and are represented principally by dolostone and limestone, although sandstone, and to a lesser degree shale, are also present. Bedrock outcrops are common, but of limited areal extent. The bedrock is usually covered by a relatively thin layer of surficial materials (soil, residuum, colluvium and (or) alluvium). The stratigraphic nomenclature of the quadrangle is summarized in figure 1.

The Harrison quadrangle is in a stable cratonic region on the southwest flank of the Ozark uplift and contains a moderate number of mapped faults. High-angle normal faults and long, narrow grabens are dominant. A northwest trend in the eastern three-quarters of the northern half of the quadrangle changes to east-west and northeast in the western part. In the northeastern part of the quadrangle, discontinuous faults extending from T. 27 N., R. 14-15 W., to T. 24 N., R. 10 W., are along the trend of the Bolivar-Mansfield tectonic zone, which extends into this quadrangle from the Springfield quadrangle to the north (see Middendorf and others, 1991, and Kisvarsanyi, 1991). Similarly, in the west-central part of the quadrangle, a sinuous fault extending from T. 23 N., R. 22 W., into T. 21 N. (Missouri), R. 20 W., is approximately along the trend of the Chesapeake tectonic zone in the Springfield quadrangle. Structures in Canadian post-Roubidoux Formation units are difficult to discern because of the great thickness of the units and the lack of good marker beds. In the southern half of the quadrangle, two major faults and at least one minor fault are discernible; major structural trends are northeast and east-west, and a minor west-northwest trend is apparent.

This map is the product of two different state geological surveys whose approaches to geologic mapping and interpretations of regional stratigraphy are similar but not identical—as are the rocks themselves. In particular this is true of the Lower Mississippian strata, which in Missouri are divisible into two mappable units but in Arkansas are lumped as the Boone Formation (see fig. 1); the lower part of the Boone, designated in Arkansas as the St. Joe Limestone Member, consists of the same four units as the lowermost Mississippian in Missouri, but is too narrow in outcrop width to be mapped separately. Consequently the Description of Map Units that follows is divided into two sections, one for Missouri and the other for Arkansas. "State-line" contacts at the Missouri-Arkansas border are artificial and indicate only the change in map units, not a change in the nature of the rocks.

The Missouri portion of the map was compiled by M.A. Middendorf from sources indicated in the Sources of Geologic Mapping. The Arkansas portion was compiled from 7-1/2 minute (1:24,000) and local maps prepared by W.V. Bush, E.E. Glick, B.R. Haley, and J.D. McFarland III. Some of the mapping data used in Arkansas were developed especially for this project, but most were transferred from sheets produced as a result of the reconnaissance mapping for the Geologic Map of Arkansas (Haley and others, 1976). Following are descriptions of unique map problems in Arkansas and how they were handled:

(1) Exaggeration of thin outcrops: Owing to the scale of the map, the thinness of the section, and (or) the steepness of the hillsides, some stratigraphic units have been represented with a wider areal outcrop strip than they actually have. This exaggeration normally results in the underlying units being slightly restricted.

(2) Formations represented by more than one map symbol: Units that are thick enough to be areally important in part of the quadrangle, but become areally insignificant at the map scale in other areas of the quadrangle, are a special problem. Where such units are thin they are combined with underlying units, which may result in a single unit being indicated by more than one map symbol. An example of this is designation of the Chattanooga and Clifty Formations as Dcc where they are areally significant, or as DOce where they are combined with the underlying Everton Formation (see descriptions of these units below). The most serious problem presented by this practice is the decision of where to change the notation. The compiler has tried to change map notation where clean breaks could be made.

(3) Combined symbol used near contacts: Some undivided map areas have one symbol used in areas far removed from unit boundaries and a combined symbol used near its contacts. This somewhat unconventional usage is meant to indicate the presence of stratigraphic units too thin to be individually shown, in the vicinity of the contacts.

DESCRIPTION OF MAP UNITS—MISSOURI

IPc **Cherokee Group (Middle Pennsylvanian—Desmoinesian)**—White to light-gray to red, fine- to medium-grained, medium- to thick-bedded sandstone, some portions of which contain mica flakes, and associated gray to black fissile shale. A pebble to boulder conglomerate of reworked Ordovician and Mississippian cherts in a sandy, hematitic matrix occurs locally. While the chert conglomerate may be basal in part, it appears to be part of a channel deposit, as do the sandstones and shales. Maximum exposed thickness about 150 ft

Mc **Fayetteville, Batesville, and Hindsville Formations (Upper Mississippian—Chesterian)**—Fayetteville Formation is a black to blue to brown, fissile, calcareous shale overlain by a massive, cross-stratified, nonmarine sandstone known as the Wedington Sandstone Member. Maximum exposed thickness about 20 ft. Batesville Formation is a yellowish-brown, fine-grained, calcareous sandstone with thin beds of gray, medium-crystalline, oolitic limestone. Brachiopods and pelecypods are common. Maximum exposed thickness about 50 ft. Hindsville Formation consists of medium- to finely crystalline, oolitic, arenaceous limestone with chert fragments and glauconite. Maximum exposed thickness about 50 ft

Mm **Warsaw Formation (Upper Mississippian—Meramecian)**—Light-gray to medium-gray, coarsely to medium-crystalline crinoidal limestone that is lithologically similar to the main body of the underlying Keokuk Limestone and separated from such by the

Short Creek Oolite Member of the Keokuk (see below). Some white nodular chert, bryozoans of genus *Archimedes* and the brachiopod *Spirifer pellaensis* are common. Maximum exposed thickness about 100 ft. In Arkansas the Warsaw is included at the top of the Boone Formation

Mkr **Keokuk and Burlington Limestones and Elsey and Reeds Spring Formations (Lower Mississippian—upper Osagean)**—The contact between the Keokuk and Burlington Limestones is transitional and often impossible to identify. This unit is light-gray to medium-gray, coarsely to finely crystalline, massive bedded crinoidal limestone (generally, the crystallinity fines upward); in the lower part, white to light-gray nodules and bands of chert are locally abundant. Solution has produced a highly irregular surface with pinnacles of bedrock surrounded by residuum. Short Creek Oolite Member of the Keokuk, a thin, oolitic limestone, 2-8 ft thick, is a marker bed between the main body of the Keokuk Limestone and the overlying Warsaw Formation. Maximum exposed thickness of the combined Keokuk and Burlington about 200 ft. Elsey Formation is light-gray, micritic to medium-crystalline limestone having some crinoids and conchoidal fracture; white to gray nodular or elongate lenses of chert with irregular brown mottling locally comprise as much as 60 percent of formation. Maximum exposed thickness about 80 ft. Reeds Spring Formation consists of alternating beds of dense, gray to brown, finely crystalline, thin-bedded limestone with irregular beds and nodules of blue, brown, and dark-gray chert; locally, chert content exceeds 50 percent. Maximum exposed thickness about 200 ft

Mpb **Pierson Limestone, Northview Formation, Compton Limestone, and Bachelor Formation (Lower Mississippian—lower Osagean and Kinderhookian)**—Pierson Limestone is brown to tan, medium-crystalline, thin- to thick-bedded, partly argillaceous limestone with moderate amounts of brachiopod and sparse coral debris. Chert normally occurs in the upper quarter of the formation as nodules and beds. Maximum exposed thickness about 80 ft. Northview Formation is green to gray calcareous shale that weathers to form a reentrant between the Compton and Pierson Limestones. In part the shale is capped by a dark-red, fossiliferous, argillaceous limestone, 1-3 ft thick, known as the Baird Mountain Limestone Member of the Northview. Maximum exposed thickness about 10 ft. Compton Limestone is gray, medium- to finely crystalline, thin-bedded limestone with poikilotopic (glint) calcite cement in part. Green wavy shale partings, glauconite, and small crinoid stems are common. Maximum exposed thickness about 12 ft. Bachelor Formation is pale-green, poorly sorted, angular to subrounded quartz sandstone or conglomeratic sandstone with poikilotopic cement; overlain in some areas by a very thin, green, sandy shale. Disseminated grains of glauconite, chert fragments from underlying formations, and rounded black phosphatic nodules are common. Maximum exposed thickness about 1 ft. NOTE: Northward, the Elsey and Reeds Spring Formations gradually transgress the time boundary from late Osagean to early Osagean; therefore on the geologic map of the Springfield 1°×2° quadrangle (Middendorf and others, 1991), these formations are included in the lower Osagean

Dcf **Chattanooga Shale (Upper Devonian) and Fortune Formation (Middle Devonian)**—Thin and of limited areal extent, cannot be shown as separate map units. They are present in part at the Mpb/Ocj contact. **Chattanooga Shale** is black, fissile, carbonaceous, slightly arenaceous shale. Pyrite nodules and concretions are common locally. This unit breaks down quickly, and in its outcrop area in McDonald and

Barry Counties in Missouri is usually covered. Maximum exposed thickness about 30 ft. **Fortune Formation** is composed of a lower brown, poorly sorted sandstone, a middle cream to tan chert, and an upper black, dense limestone. The Fortune Formation is restricted to southern Barry County in Missouri and its maximum exposed thickness is about 6 ft

Ocj **Cotter and Jefferson City Dolomites (Lower Ordovician—Canadian)**—Cotter Dolomite is generally a sequence of buff to gray, finely crystalline, argillaceous to siliceous dolomite with varying amounts of chert, and gray, medium-crystalline, mottled, generally noncherty dolomite with some thin lenses of white to light-gray, medium-grained sandstone. At least two massive to crossbedded, white to red, medium-grained sandstones, as much as 8 ft thick, have been found in the lower Cotter Dolomite. Jefferson City Dolomite is buff to light-gray, finely to medium-crystalline, thin- to thick-bedded dolomite and argillaceous dolomite; typically contains banded chert nodules or thin seams of white to light-gray chert; some thin, generally discontinuous lenses of fine- to medium-grained, poorly sorted, white to light-gray sandstones are found. A persistent marker bed, about 30-60 ft thick, of brown- and gray-mottled, medium-crystalline, thick-bedded dolomite ("Quarry Ledge" of local usage) that weathers to a distinctive, coarsely pitted ledge, occurs about 30 ft above the base. The "Quarry Ledge" interval in the northeastern part of the quadrangle is composed of several repeating "ledge" lithologies separated by thin-bedded, finely crystalline, argillaceous dolomite or finely to medium-crystalline dolomite. "Quarry Ledge" lithology has also been identified in the upper 40 ft of the Roubidoux Formation, where it is interbedded with white to light-gray, medium-grained sandstone. A local marker for the top of the Jefferson City Dolomite is a silicified breccia 1-3 ft thick that weathers into large chert boulders. Maximum exposed thickness about 530 ft

Or **Roubidoux Formation (Lower Ordovician—Canadian)**—Interbedded light-gray to light-brownish-gray, medium- to finely crystalline cherty dolomite and light-gray to light-brown, fine- to medium-grained sandstone. White to dark-gray or brown chert present as irregular layers, nodules, and lenses in the dolomite; sandy and oolitic cherts are characteristic, but porcelaneous, banded varieties are also present. Cryptozoan reef structures are present locally as concentrically banded chert masses as much as 3 ft in diameter. In many exposures in the eastern part of the quadrangle, a massive to crossbedded, medium-grained sandstone, approximately 20 ft thick, is found near the middle of the formation. Maximum exposed thickness about 220 ft

Og **Gasconade Dolomite (Lower Ordovician—Canadian)**—Light-gray, medium- to coarsely crystalline, thin- to thick-bedded, cherty dolomite, divisible into two units. Upper unit is massively bedded, relatively chert-free dolomite that forms bluffs and pinnacled glades. Dolomite is medium- to coarsely crystalline, vuggy, and weathers to a coarsely pitted surface; contains sparse dark-gray or brown chert nodules or stringers with some druse. Thickness 40-70 ft. Lower unit is similar to upper, consisting of light-gray, medium- to coarsely crystalline dolomite, but contains as much as 30 percent of thin beds or nodules of white to gray porcelaneous chert. Cryptozoan structures are common; top of lower unit marked by a persistent, locally silicified cryptozoan reef as much as 4 ft thick. Thin beds of silicified oolites are common, as are karst features. Maximum exposed thickness about 150 ft

DESCRIPTION OF MAP UNITS—ARKANSAS

IPa **Atoka Formation (Middle Pennsylvanian—Atokan)**—Brown to orange sandstone, shaly sandstone, and siltstone, interbedded with yellow to brown to black mudstone and claystone. Thinner beds commonly contain abundant mica flakes and some plant remains. Thin calcareous sandstone layers occur in some locations. Lower contact generally placed at base of first sandstone above the Kessler Limestone Member of the Bloyd Formation. Formation caps higher regions in southwestern part of quadrangle. Thickness varies from 0 to more than 700 ft

IPm **Bloyd and Hale Formations (Lower Pennsylvanian—Morrowan)**—Bloyd Formation consists of four units: Kessler Limestone Member may be a single limestone bed or limestone interbedded with shale; present only in western part of Morrowan outcrop area. Kessler is underlain by unnamed member, shale with thin sandstones. "Middle Bloyd sandstone" is a dominantly fluvial, crossbedded, bluff-forming sandstone. Brentwood Member is mostly dark shale and minor calcareous quartz arenite with a basal portion of quartzose, crossbedded calcarenites, which tends to be a bluff former and augments the cliff of the underlying Prairie Grove Member of the Hale Formation; discrimination of the two units is often subjective in this area. Hale Formation consists of two members: Prairie Grove Member is massive, bluff-forming calcareous sandstone, often mottled or pitted; pits are normally flattened ovoids up to several decimeters long, apparently the result of a differential weathering of carbonate concentrations. Upper few feet is limestone in some areas. Cane Hill Member is silty shale with some intervals of siltstone and sandstone; a basal conglomerate is common where underlying Mississippian beds are limestone, but is not common where underlying beds are shale. Contact with underlying Mississippian strata is unconformable

Mpm **Pitkin Limestone, Fayetteville Shale, Batesville Sandstone (Hindsville Limestone Member), and Moorefield Formation (Mississippian—Chesterian and Meramecian (part))**—Pitkin Limestone is a ledge-forming, gray, fossiliferous, commonly oolitic limestone; extent limited to the southernmost part of the quadrangle. Fayetteville Shale is a black shale; near its center is a deltaic sandstone, the Wedington Sandstone Member, which is a good ledge-former and commonly forms buttes near its northern limits along the Arkansas-Missouri border. Batesville Sandstone is a tan, medium-grained, locally calcareous sandstone, normally with a basal limestone known as the Hindsville Limestone Member; the lower beds of the Hindsville commonly contain chert debris where the underlying unit is the Boone Formation. Moorefield Formation is a dark-gray to tan, calcareous, silty shale of limited areal extent on the extreme southern margin of the quadrangle

Mb **Boone Formation (Mississippian—Meramecian (part), Osagean and Kinderhookian)**—Fine- to coarse-grained crinoidal limestone, generally with abundant chert; thickness 300-350 ft. Upper part is normally dominated by chert, although quantity of chert is variable both vertically and laterally. Cherts in lower portion of this sequence tend to be dark and anastomosing, whereas cherts in upper portion are lighter. The Short Creek Oolite Member, an oolitic grainstone, is present near top; beds above this are mapped in Missouri as Warsaw Formation. Lower 0-60 ft of the Boone is relatively chert free and is known in Arkansas as St. Joe Limestone Member; it is divisible into four units that correlate with the Missouri

section: an upper limestone (equivalent to Pierson Limestone); a subcentral shaly limestone unit (equivalent to Northview Formation); a lower limestone (equivalent to Compton Limestone); and a thin, greenish, phosphatic shale and (or) conglomeratic sandstone (equivalent to Bachelor Formation). Kinderhookian-Osagean Series boundary is generally found at base of or within the lower few inches of the Pierson interval

Dcc **Chattanooga Shale (Upper Devonian) and Clifty Formation (Middle Devonian)**—The Devonian formations together are so thin that they are shown as a discrete unit on this map only where they occur as the bedrock over a large enough area. Chattanooga Shale is a fissile, black, pyritic shale with a basal, white to brown, phosphatic, medium- to coarse-grained orthoquartzite called the Sylamore Sandstone Member. Clifty Formation is normally an orthoquartzite distinguishable from the Sylamore by its lack of phosphatic and chert detritus and by its more massive bedding and greater resistance. Unit Dcc mapped only in Arkansas, in western part of quadrangle. Hachured solid line shows approximate location of pinchout, in subsurface

DOce **Chattanooga Shale (Upper Devonian), Clifty Formation (Middle Devonian), and Everton Formation (Middle Ordovician)**—Used where the Devonian strata occupy a thin sequence at the top of an Everton Formation section. The Clifty may not be present in all areas indicated by this symbol

DOc **Chattanooga Shale (Upper Devonian), Clifty Formation (Middle Devonian), Everton Formation (Middle Ordovician), and Powell and Cotter Dolomites (Lower Ordovician)**—Used where all of the post-Cotter, pre-Boone stratigraphic units occupy a much reduced sequence at the top of a thick succession of Cotter Dolomite. Not all of the post-Cotter, pre-Boone units may be present at every locality

Ssc **St. Clair Limestone (Middle Silurian) and Cason Shale (part) (Middle and Lower Silurian)**—St. Clair Limestone is a light-gray (sometimes pinkish), coarse-grained, bioclastic lime wackestone; lower few feet is normally pyritic and silty. Averages about 15 ft thick where present. Area of Silurian outcrop is restricted to a small region along the south-central margin of the Harrison quadrangle; only one delineated unit on this map is exclusively Silurian

SOse **St. Clair Formation (Middle Silurian), Cason Formation (Middle Silurian to Upper Ordovician), Fernvale Limestone (Upper Ordovician), and Kimmswick and Plattin Limestones, Joachim Dolomite, St. Peter Sandstone, and Everton Formation (Middle Ordovician)**—Used where the post-Everton, pre-Boone stratigraphic units listed above are, in aggregate, too thin to be indicated separately from the Everton Formation but do include Silurian strata. Not all of the units listed above may be present in all outcrops. This symbol is restricted to five small areas along the southern margin of the quadrangle, in T. 16 N., R. 16 W.

Ocfj **Cason Shale (part) and Fernvale Formation (Upper Ordovician), Kimmswick and Plattin Limestones, and Joachim Dolomite (Middle Ordovician)**—Cason Shale is thought to span the Ordovician-Silurian boundary and is normally a calcareous, phosphatic shale with occasional beds of sandstone and limestone. Fernvale Limestone is composed almost completely of thick-bedded calcirudites and calcarenites (crinozoan grainstone) that are frequently crossbedded and pinkish in color. Kimmswick Limestone is a fine- to coarse-grained, bioclastic limestone. Plattin Limestone is normally a lime mudstone or intraclastic grainstone, often with

calcite-filled vugs and fenestra. Joachim Dolomite is dominated by dolomicrite, laminated and mudcracked dolomicrite, and fine-grained, sometimes intraclastic, lime-dolowackestone-packstone-grainstone. Calcite pseudomorphs after halite are common in some intervals, as are stromatolites. Most of these formations are separated from the next overlying formation by a bedding-plane disconformity. Unit mapped only along south-central edge and in extreme southeast part of quadrangle

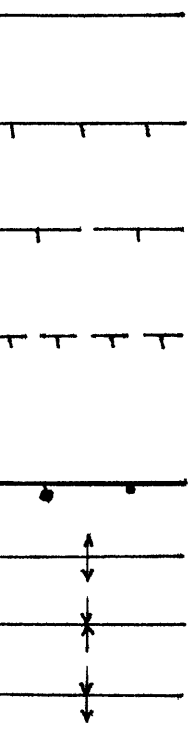
Oce **Cason Shale (part) and Fernvale Limestone (Upper Ordovician) and Kimmswick and Plattin Limestones, Joachim Dolomite, St. Peter Sandstone, and Everton Formation (Middle Ordovician)**—Used in the southeast part of the map for a sequence generally dominated by the Middle Ordovician Everton Formation. The other stratigraphic units listed make up a limited interval at the top of this sequence. Hence this unit represents a combination of the Ocfj and Ose units where Ocfj is too thin or discontinuous to map separately, and the symbol representing the pinchout of Ocfj is the contact between Oce and Ose

Ose **St. Peter Sandstone and Everton Formation (Middle Ordovician)**—St. Peter Sandstone consists of well-rounded, fine- to coarse-grained quartz sandstone often called saccharoidal sandstone. The unit is normally quite massively bedded and, on outcrop, porous and friable. Calcitic and dolomitic cement are most common but quartz overgrowth cementation is known. Thickness ranges from a feather edge to 150 ft or more. The St. Peter rests disconformably on the Everton Formation. Everton Formation is a widespread sequence of thin to massive beds of dolostone, sandstone, and limestone and minor conglomerate, breccia, and chert. Everton dolostones are very fine to coarsely crystalline. The limestones consist of lutites and arenites with variable amounts of dolomite. Both include variable amounts of pellets, intraclasts, oolites, and fossil fragments as allochems. Quartz sand ranges from scattered grains to very sandy lithologies. Everton sandstones are fine- to coarse-grained, generally well rounded, frosted, often friable, occasionally well sorted quartz arenites, and are very similar to other Ordovician sandstones, particularly the St. Peter Sandstone. Cements are dolomite or calcite (sometimes producing a poikilotopic texture) or interlocking overgrowths of silica

Op **Powell Dolomite (Lower Ordovician)**—Generally fine textured limy dolostone, locally containing dolomitic green shale and a basal conglomerate. Chert nodules with concentric banding are sparsely dispersed through some parts of the formation. A thin sequence of rather fossiliferous chert and drusy quartz known as the "Black Ledge" is in the lower middle part of the formation. Maximum thickness 200 ft; generally thinner. The Powell pinches out just south of the Arkansas-Missouri border along a somewhat arbitrary line

Oc **Cotter Dolomite (Lower Ordovician)**—Dolostone, locally containing shale, chert, or sandstone. Typical outcrops consist of massively bedded, medium-grained, gray dolostone that weathers to a dark gray, and fine-grained, punky, buff to white dolostone known locally as "cotton rock." Chert nodules with concentric banding are common in some parts of the formation. In and adjacent to T. 19 N., R. 23 W., includes a sequence of Powell Dolomite too thin to be mapped separately. Jefferson City Dolomite may be present in some deeper valleys near the Arkansas-Missouri border, but exposures are inadequate to prove its presence

EXPLANATION OF MAP SYMBOLS



Contact, approximately located; "state-line" contacts in Mississippian units indicate change in map units from Missouri to Arkansas

Pinchout of Devonian formations (Dcf), approximately located; hachures on side where Devonian formations are present

Pinchout of St. Peter Sandstone and Everton Formation (Ose) in subsurface, approximately located; hachures on side where formations are present

Pinchout of Cason Shale, Fernvale and Kimmswick Limestones, Plattin Limestone, and Joachim Dolomite (Ocfj), approximately located; hachures on side where formations are present

Fault, (bar and) ball on downthrown side; dashed where inferred

Anticline; dashed where inferred

Syncline; dashed where inferred

Monocline; dashed where inferred

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SOURCES OF GEOLOGIC MAPPING

This geologic map of the Harrison 1°×2° quadrangle was compiled directly from the sources cited below and shown in the accompanying diagram.

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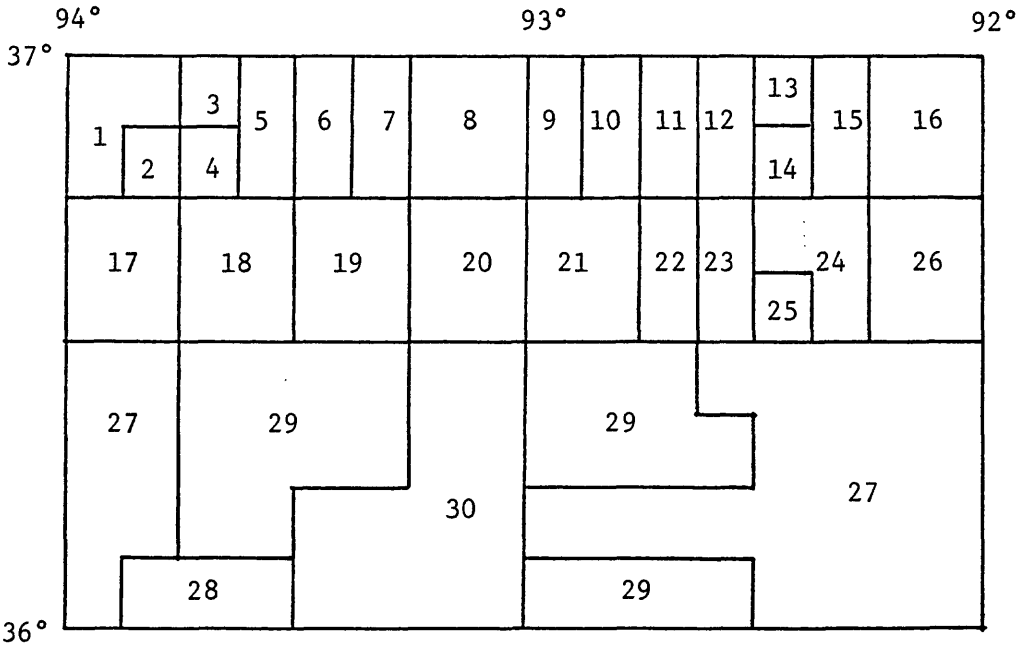
SYSTEM	SERIES		STRATIGRAPHIC UNIT	
			MISSOURI	ARKANSAS
PENNSYLVANIAN (PART)	Middle	Desmoinesian	Cherokee Group	
		Atokan		Atoka Formation
	Lower	Morrowan		Bloyd Formation Hale Formation
MISSISSIPPIAN	Upper	Chesterian	Fayetteville Formation Batesville Formation Hindsville Limestone	Pitkin Limestone Fayetteville Shale Batesville Sandstone Hindsville Limestone Member
		Meramecian	Warsaw Formation	Moorefield Formation
	Lower	Osagean	Keokuk Limestone Short Creek Oolite Member Burlington Limestone Elsey Formation Reeds Spring Formation Pierson Limestone	Short Creek Oolite Member Boone Formation
		Kinderhookian	Northview Formation Compton Limestone Bachelor Formation	St. Joe Limestone Member Boone Formation
DEVONIAN	Upper		Chattanooga Shale	Chattanooga Shale Sylamore Sandstone Member
	Middle		Fortune Formation	Clifty Formation
SILURIAN	Middle and Lower			St. Clair Limestone Cason Shale
ORDOVICIAN	Upper	Cincinnatian		Fernvale Limestone
	Middle	Mohawkian		Kimmswick Limestone Plattin Limestone Joachim Dolomite St. Peter Sandstone Everton Formation
	Lower	Canadian	Cotter Dolomite Jefferson City Dolomite Roubidoux Formation Gasconade Dolomite	Powell Dolomite Cotter Dolomite Jefferson City Dolomite

Figure 1.--Stratigraphy of exposed formations, Harrison 1° x 2° quadrangle, Missouri and Arkansas



SOURCES OF GEOLOGIC MAPPING

HARRISON 1°x2° QUADRANGLE, MISSOURI AND ARKANSAS

CORRELATION OF MAP UNITS