

The Relation of the Changing Facies of the Mansfield¹ Formation to Possible Park Sites in Western Indiana

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General

The cooperation of many groups of people, and many disciplines, are necessary in the planning for park sites in the future. Two disciplines which can work closely together in the search for small natural areas are Geology and Geography. An example of how Geology may be used to aid the Geographer or other planning experts is set forth in the following study of the Mansfield formation in western Indiana.

Over a period of several years, other geological studies involving glass-sand investigation (2) took the writer to many small recreational areas of the people in west central Indiana. A surprising number of the sites follow patterns of cliffs, steep trails, woods, springs, and caves, which are associated with the Mansfield formation (Pennsylvanian Age).

Mansfield Formation

Sampling of the Mansfield formation along the strike of the rock in west central Indiana demonstrates that facies change is a notable feature. The rock varies from chert and quartz pebble conglomerate (usually near the base) to fine-grained sandstone, siltstone, and shale. The coarser sediments including the sandstones were probably originally laid down on a plain sloping gently to the southwest (3). Broad channels carried reworked older sediments (mostly of upper and middle Mississippian age) in variable currents to resting places in and near the channels. Inter-channel areas were covered with finer silty sediments. The channel sediments were later cemented with iron oxides and compacted to form cross-bedded sandstones. The cross beds indicate water action and the direction of flow (1). The coarser-grained channel facies have resisted post Pennsylvanian weathering. These ancient channel fills now stand out as picturesquely eroded cliff-makers. As this one formation is followed for some 200 miles from west of Lafayette to the Ohio River, one notes that these sandstone hills have been used as recreation sites since the settlement of the land in the last century. Many of these areas have been visited during this study, and the rock sampled. At outcrops the sandstone may comprise all of the rock exposed, or as near the eastern margins, may overlies the Mississippian rocks in striking unconformities. The locations have been numbered and are presented on the included table 1 and map (Fig. 1).

Features

Resting on the sandstone in the northern part of the area are glacial tills. Percolating calcareous waters have cemented these gravel terraces in spotty fashion so that the terrace materials weather to odd

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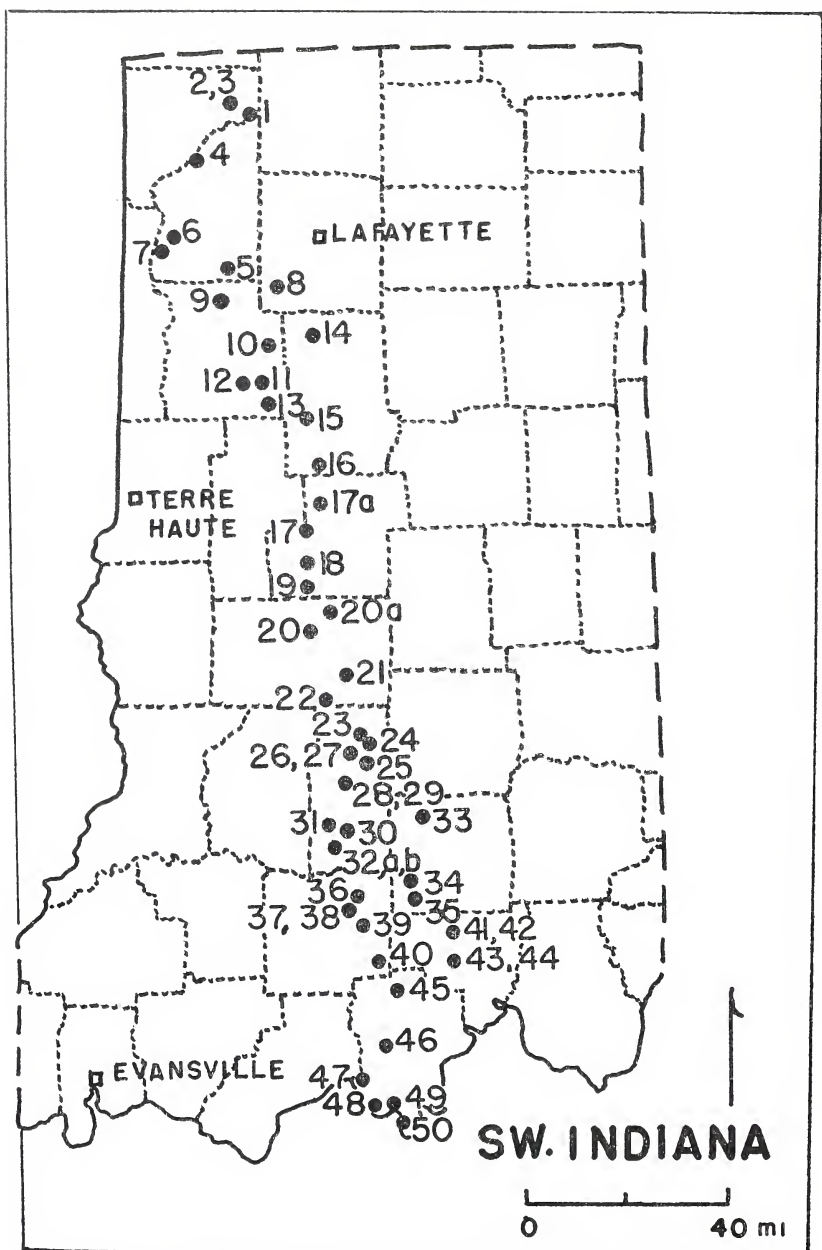


Figure 1. Locations of areas which have been visited during the study.

TABLE 1

LOCAL (or other) NAME	LOCATION	NOTED FOR
WARREN COUNTY		
1. Black Rock	SE $\frac{1}{4}$ sec.9, T.22N., R.6W	B
2. High Bridge ("Fallen Rock")	Center sec.5, T.22N., R.6W	B,T,V
3. Hanging Rock	SW $\frac{1}{4}$ sec.36, T.21N., R.9W	B,V
FOUNTAIN COUNTY		
4. Portland Arch	NW $\frac{1}{4}$ sec.4, T.20N., R.8W	B,A
5. Wallace	S $\frac{1}{2}$ sec.24, T.18N., R.6W	S
6. Coal Creek	SW $\frac{1}{4}$ sec.6, T.18N., R.8W	B
7. Perrysville (East) Bluff Wabash River	W $\frac{1}{2}$ sec.35, T.19N., R.9W	B
PARKE COUNTY		
8. Shades	State Park	B,U,T,C,Co
9. Turkey Run	State Park	B,C
10. Hollandsburg	E $\frac{1}{2}$ sec.3, T.15N., R.6W W $\frac{1}{2}$ sec.2	B,X
11. Natural Bridge	W $\frac{1}{2}$ sec.33, T.16N., R.6W	A,B
12. Mansfield (Dam & Old Quarry)	NW $\frac{1}{4}$ sec.8, T.14N., R.6W	J,B,Co
13. "Fallen Rock"	SE $\frac{1}{4}$ sec.22, T.14N., R.6W	B,C
PUTNAM COUNTY		
14. Fincastle	N $\frac{1}{2}$ sec.25, T.16N., R.5W	B,V,Co
15. Fern Cliffs	Center sec.33, T.14N., R.5W	B,C
16. Hoosier Highlands	NE $\frac{1}{4}$ sec.14, T.5W, R.12N	B,C,U
OWEN COUNTY		
17. Hubble Cliff	W $\frac{1}{2}$ sec.35, T.11N., R.5W	C
17a. Jordon	SW $\frac{1}{4}$ sec.7, T.11N., R.5W	B,X
18. Stahl Farm	SE $\frac{1}{4}$ sec.35, T.10N., R.5W	C,P
19. Southwest Owen Co.	N $\frac{1}{2}$ sec.33, T.9N., R.5W	B,X
GREENE COUNTY		
20. Gandy Bluffs	NW $\frac{1}{4}$ sec.3, T.7N., R.5W	B
20a. Lemley Bluffs	NE $\frac{1}{4}$ sec.7, T.8N., R.4W	B
21. Ledgewood	SW $\frac{1}{4}$ sec.5, T.6N., R.4W	B,C
22. Alum Cave	S $\frac{1}{2}$ sec.31, T.6N., R.4W	B,Cv
MARTIN COUNTY		
23. Indian Springs	N $\frac{1}{2}$ sec. 8, T.4N., R.3W	B
24. Temy Hill	SE $\frac{1}{4}$ sec.9, T.4N., R.3W	B
25. Raven Cliffs	NW $\frac{1}{4}$ sec.15, T.4N., R.3W	B
26. Bear Hill	S $\frac{1}{2}$ sec.16, T.4N., R.3W	B
27. Trinity Springs	NW $\frac{1}{4}$ sec.28, T.4N., R.3W	S
28. McBride Bluff	SE $\frac{1}{4}$ sec.31, SW $\frac{1}{4}$ sec.32, T.3N., R.3W	B
29. Choals—N. and W. of City	sec.24,25, T.3N., R.4W	B,C,E,Cv

LOCAL (or other) NAME	LOCATION	NOTED FOR
30. Spout Springs	S $\frac{1}{2}$ sec.25, T.3N., R.4W	S,B
31. Callahan Bluffs	SW $\frac{1}{4}$ sec.26, T.3N., R.4W	B
32. Hindostan Falls	W $\frac{1}{2}$ sec.10, T.2N., R.4W	J,F,X
32a. Hindostan east	NW $\frac{1}{2}$ NE $\frac{1}{4}$ sec.11, T.2N., R.4W	B,X
32b. Graveyard Cliffs	SW $\frac{1}{4}$ sec.34, T.2N., R.4W	B

ORANGE COUNTY

33. Grindstone (Hopper Quarry) area	SW $\frac{1}{4}$ sec.24, T.3N., R.2W	Fo
34. Drake's Cliff	NE $\frac{1}{4}$ sec.32, T.1N., R.2W	B,U
35. Sutton Cliffs	SW $\frac{1}{4}$ sec.32, T.1N., R.2W	B

DUBOIS COUNTY

36. Arch Rock & Straight Rock	SE $\frac{1}{4}$ sec.8, T.1S., R.3W	B
37. Raven Rock	NE $\frac{1}{4}$ sec.17, T.1S., R.3W	B,Cv
38. High Rock	NW $\frac{1}{4}$ sec.16, T.1S., R.3W	B,C
39. Indian Kitchen Rock	W $\frac{1}{2}$ sec.26, T.1S., R.3W	B,C
40. Nate Waddell Cave	NE $\frac{1}{4}$ sec.35, T.2S., R.3W	B,Cv

CRAWFORD COUNTY

41. Taswell	SE $\frac{1}{4}$ sec.18, T.2S., R.1W	B,C
42. Ivory Falls	NW $\frac{1}{4}$ sec.30, T.2S., R.1W	
43. Mesmore Cliffs	NW $\frac{1}{4}$ sec.4, T.3S., R.1W	B
44. Fodder Cave	Center sec.4, T.3S., R.1W	B,Cv

PERRY COUNTY

45. Peter's Cave	Center sec.6, T.4S., R.2W	B,Cv
46. Cat Rocks	SE $\frac{1}{4}$ sec.36, T.5S., R.3W	B
47. Troy	S $\frac{1}{2}$ sec.18, T.6S., R.3W	B
48. Lupp's Cave	SW $\frac{1}{4}$ sec.10, T.7S., R.3W	B,C
49. Lafayette Spring	S $\frac{1}{2}$ sec.12, T.7S., R.3W	B,S
50. Becker Farm	SE $\frac{1}{4}$ sec.8, T.7S., R.2W	B

A arch	Fo fossils
B bluffs	J joint pattern
C canyons	P potholes
Cv cave	S spring
Co conglomerate	T travertine
E erosion remnants	U unconformity
F falls	X cross beds

shapes. The cemented gravels and travertine overlying the Mansfield formation are features found from the vicinity of Lafayette southward to Owen County.

Springs issuing from the sandstone are common. Some well-known springs are those one half of a mile west of Wallace in Fountain County, Spout Spring one mile south of Shoals, and Lafayette Spring on the north bluff of the Ohio River south of Cannelton. Basal conglomerates are locally common in the northern outcrops, while quartz pebble conglomerate is quarried for gravel in Martin County. Chert pebbles in the conglomerate carry Mississippian fossils in northern areas.

Caves are present, but are not long or winding. Openings are spectacular as they erode in the massive sands where variable cementation and grain combine. Caves represent differential weathering along joint sets. Examples may be seen one mile north of Shoals in Martin County.

Arches are rare, but a few have developed by unusual stream erosion along joints in cross-bedded facies. Portland Arch in Fountain County is such an example. A small but spectacular arch in Parke County was destroyed by quarrying about 1955. Other cave-like openings will probably be arches in the geological future.

Rugged cliffs and canyons are probably most characteristic of the eroded channel facies of the Mansfield formation. These are features admired by many people who live in these areas. Paths lead over these hills and valleys made by several generations of citizens who enjoy the woodlands associated with these natural features. Turkey Run State Park is an example of such an area. Many more smaller sites with similar characteristics are located along the strike of the Mansfield formation.

Erosion forms and remnants are striking. Jug Rock in the western limits of Shoals is one of these. Hindostan Falls is an example of stream erosion along a joint pattern in resistant crossbedded sandstone.

Plant fossils are common. Well preserved logs and stumps are in the "whetstone" facies north of French Lick, as well as in other scattered areas. At least one of the best of these locations should be preserved.

Possible Future Sites

Samples were taken and sections measured at all conspicuous sandstone cliffs. Special note was taken of sites most commonly used as recreation areas by the local people. By following one formation along the strike, a series of plausible recreation areas can be mapped across the state. It is especially important to the education of youth, as well as for the well-being of adults, that many small natural areas (which are often of little economic worth) be located, and eventually preserved. With federal and state cooperation, it is here suggested that local schools lead out in efforts to preserve and provide small nature-study and recreation sites for the future generations of the smaller political units.

Literature Cited

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