

RECENTLY DISCOVERED UPPER ORDOVICIAN-LOWER MISSISSIPPIAN STRATIGRAPHIC SECTION IN WHICH THE CHATTANOOGA SHALE IS ABSENT

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INTRODUCTION

The Chattanooga Shale is commonly used as a datum in stratigraphic work in central Tennessee, due to distinctive physical characteristics which allow easy identification and to the major unconformity at its base. It is therefore noteworthy when a stratigraphic section is found in which the Chattanooga Shale is absent. This paper reports the recent discovery of such an area.

LOCATION

An investigation of roadcuts resulting from the construction of Interstate Highway 24 between Clarksville and Nashville led to the discovery of this section. The

section is in a roadcut at Interstate Mile 41.5 in the southeastern part of the Whites Creek quadrangle (307 SE) in Davidson County, approximately 1300 feet west-southwest of the WLAC-TV (recently re-named WTVF-TV) transmission tower (Fig. 1).

PHYSIOGRAPHY

The area investigated is located in the dissected zone of the Highland Rim escarpment. This is a zone of moderate relief that has resulted from extensive dissection of the Highland Rim Plateau. Remnant hills of the Highland Rim extend into the Central Basin. The roadcut containing the stratigraphic section in which

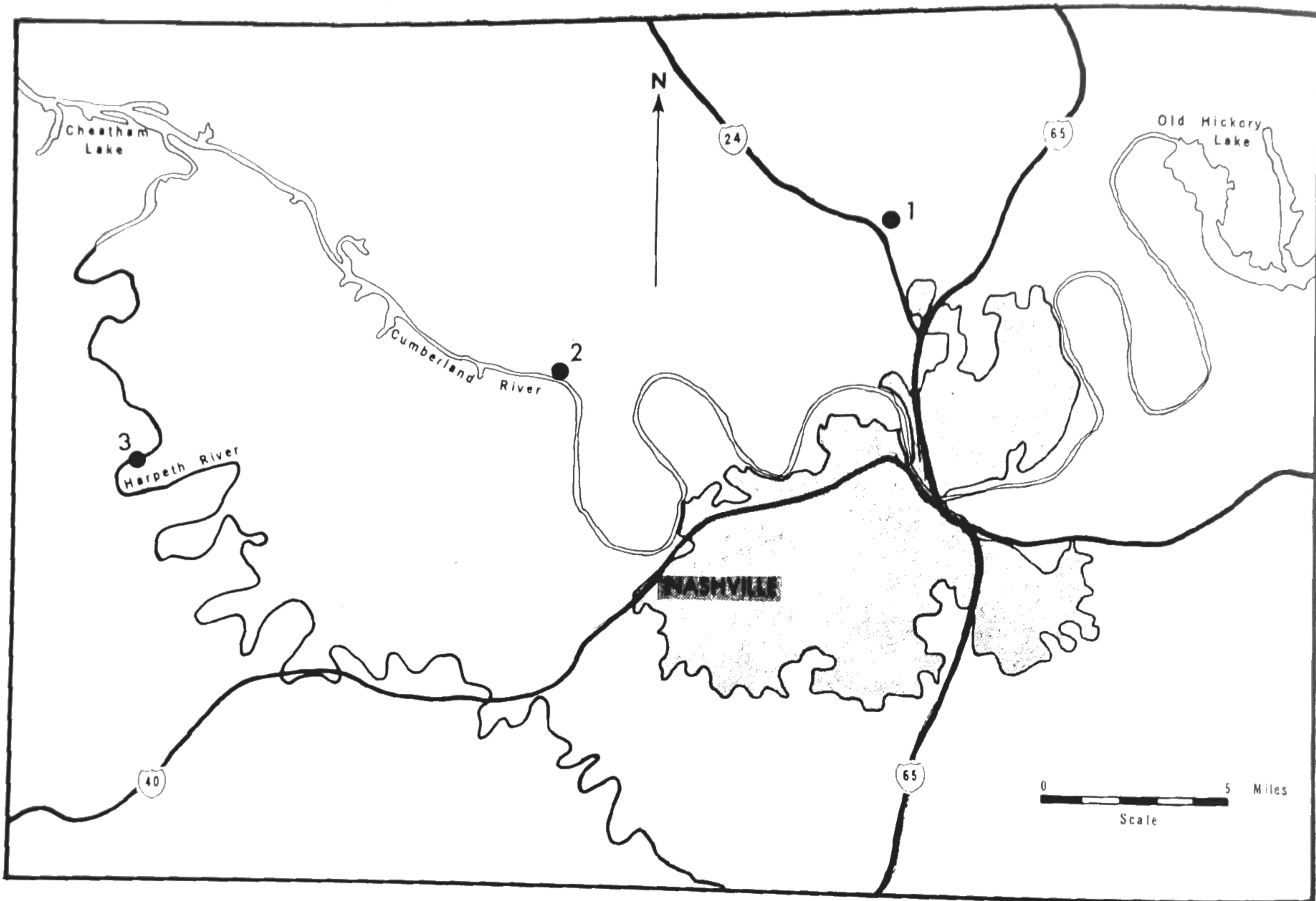


FIG. 1: Location of newly discovered section with missing Chattanooga Shale as 1. The others, 2 and 3, are known similar locations.

the Chattanooga Shale is absent is located in one such outlier.

GEOLOGY

The hill, like most of these outliers, is capped by typical Ft. Payne Formation (calcareous siltstone, shale, bioclastic limestone, and dolostone with distinctive small quartz geodes) which is exposed in the upper part of the cut. The Maury Shale underlies the Ft. Payne Formation and at this location closely resembles the Maury in other areas where the Chattanooga is missing (Conant & Swanson, 1961). It is approximately one foot thick and is composed of greenish, glauconitic, sandy shale containing small, irregular, phosphatic nodules throughout. Although normally the Maury Shale conformably overlies the Brassfield Limestone (Plate 1). The Brassfield Limestone is easily distinguished in this area by numerous lenses of white-bordered gray to black chert. The Sequatchie Formation, an argillaceous limestone characterized by numerous gypsum nodules, underlies the Brassfield Limestone and is the oldest unit exposed in the cut.

OBSERVATIONS AND CONCLUSIONS

Several complete, 25-30 foot sections of Chattanooga Shale with both the Gassaway and Dowelltown members present are known in relatively close proximity to this roadcut. The closest of these sections is approximately 1.3 miles to the southwest, with another complete section approximately 2.8 miles to the northwest. The nearest, and most important, outcrop of Chattanooga Shale is located on the same hill as the roadcut, approximately .4 miles to the northeast. Near the top of a partially covered interval of 13 feet between exposures of the Ft. Payne and Brassfield Formations, 2 feet of the Gassaway (upper) member of the Chattanooga Shale is exposed. The Dowelltown (lower) member in this area is normally at least 13 feet thick. Therefore, the presence of any Gassaway in this 13-foot interval indicates that non-deposition of Chattanooga during Dowelltown time, rather than erosion, may explain the absence of shale in the roadcut. If erosion were completely responsible, it is probable that the exposure to the northeast would consist of the Dowelltown member. This leads to the conclusion that a relatively small area in the vicinity of the roadcut (probably a small island) remained near or above sea level during at least some Dowelltown and possibly

some Gassaway time. An interesting observation about this location is that it is aligned with two other nearby areas to the west-southwest where the Chattanooga Shale is absent (Fig. 1). This suggests a west-southwest to east-northeast linear trend of islands or shoal areas during Chattanooga time in this area.

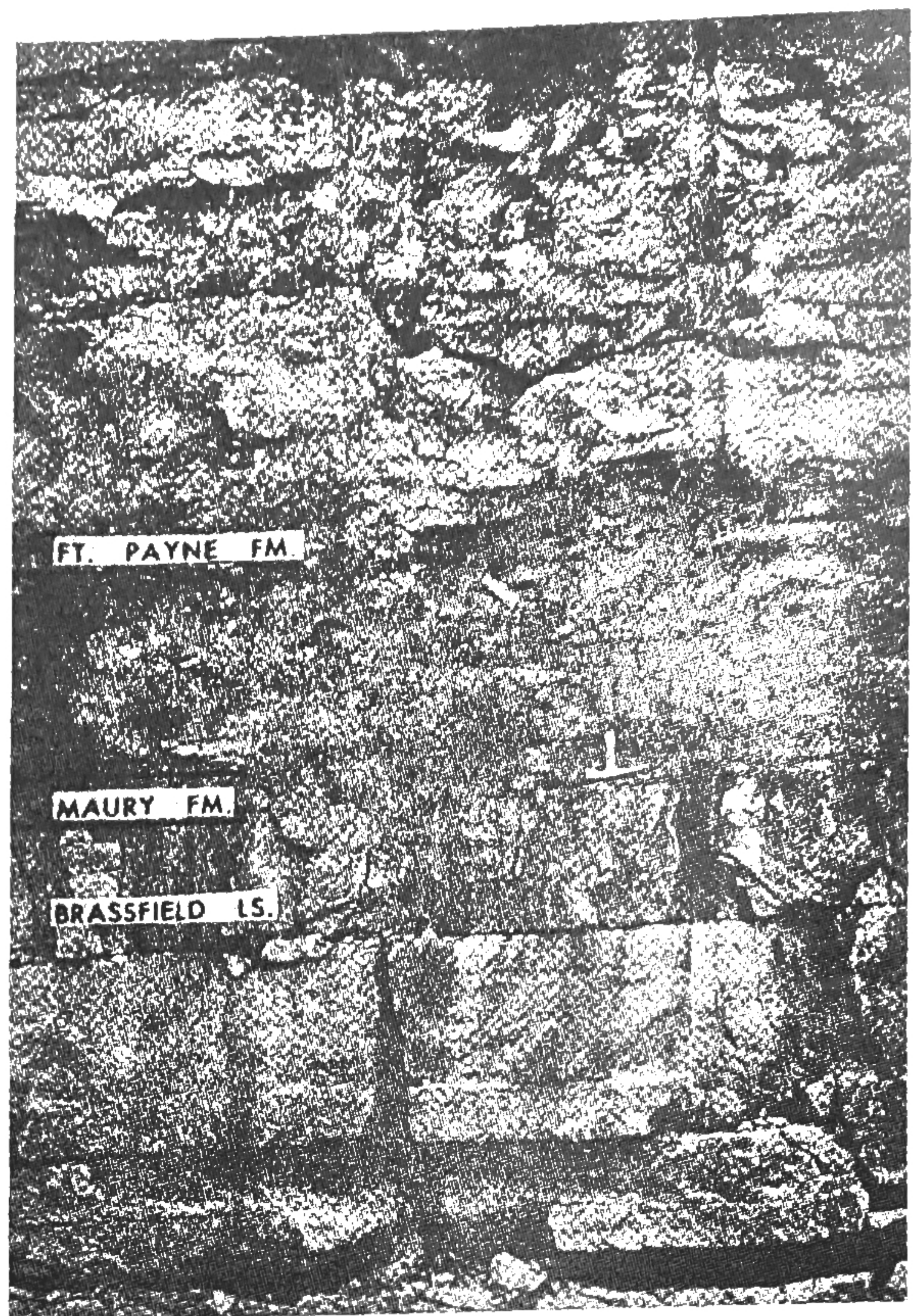


PLATE 1: Photo shows Maury Formation on Brassfield Limestone.

LITERATURE CITED

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