SOME CHESTER OUTCROP AND SUBSURFACE SECTIONS IN SOUTHEASTERN ILLINOIS[1]

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Introduction

This paper is intended to aid studies of the Chester series by presenting electric logs of several formations alongside the descriptions of corresponding cores or outcrops, and, for the basal Chester, insoluble residue zones. For the electric logs, lithologic interpretations are shown in the central columns. For the cores and outcrops, the rocks are described in some detail. Fine dashed lines extending from the electric log to the graphic log are meant to draw attention to the similarities of succession. The locations of all wells, outcrops, and cores are shown on the index map of southeastern Illinois (fig. 1). The Chester formations illustrated include the Kinkaid, Degonia, Clore, Palestine, Menard, Golconda, and Renault (Downeys

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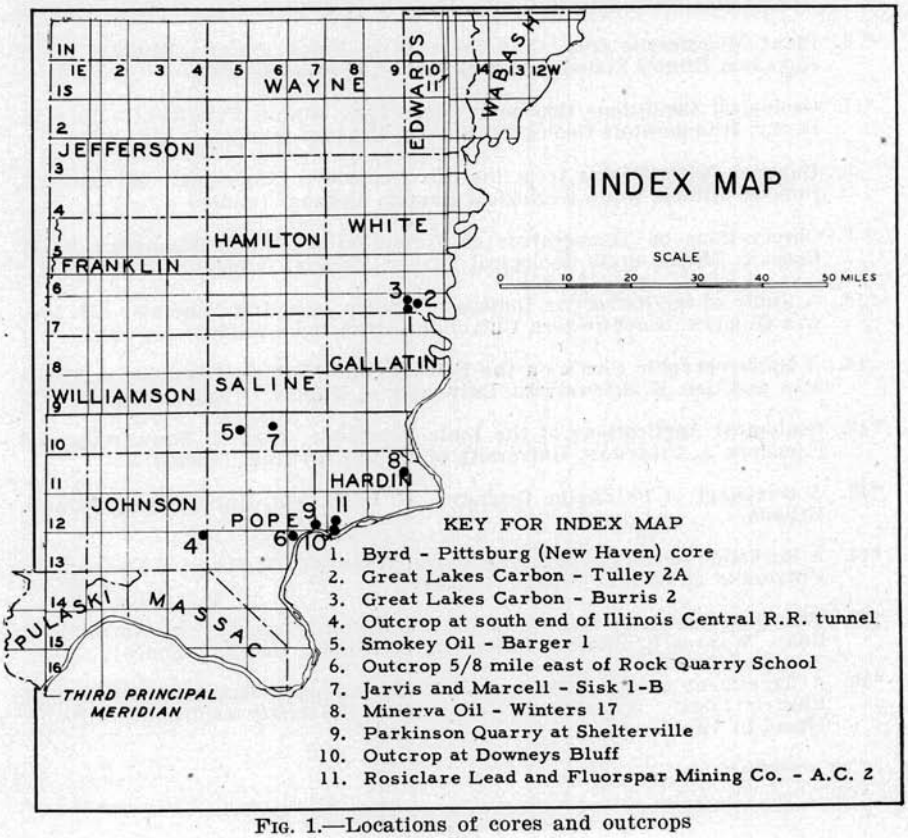

FIG. 1.—Locations of cores and outcrops

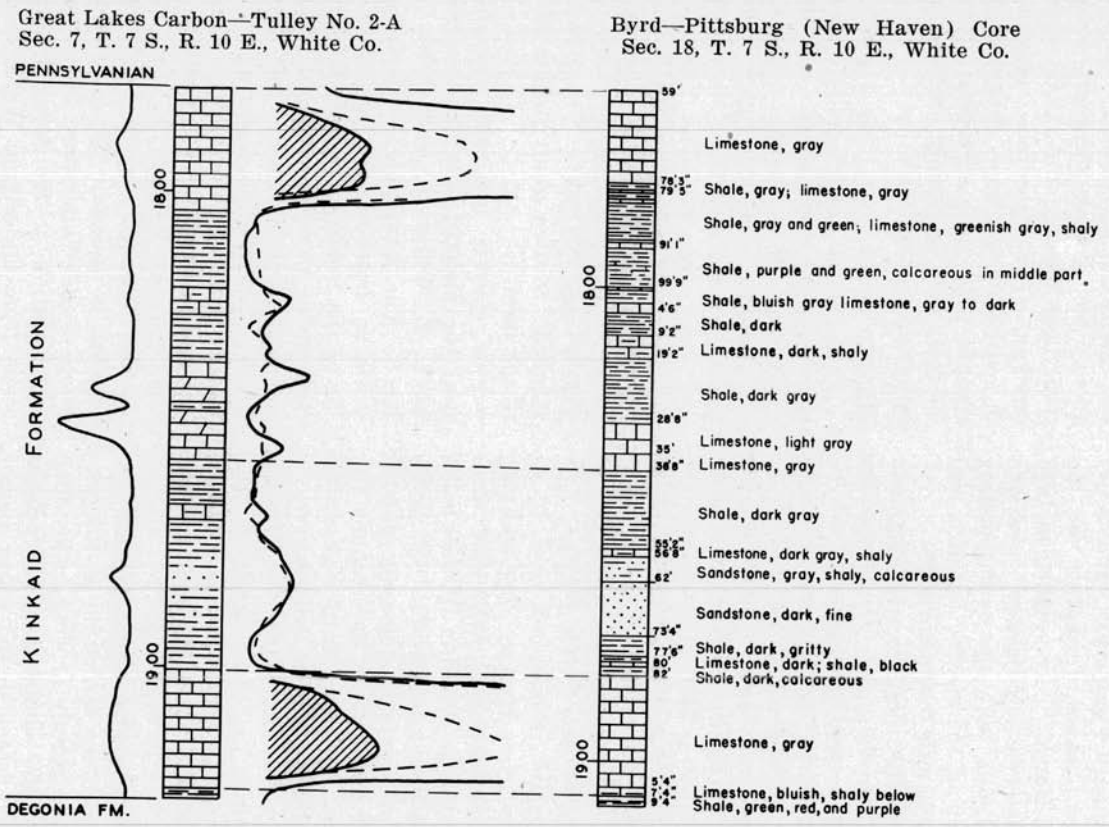

FIG. 2.—Kinkaid formation

Bluff and Shetlerville) formations.

KINKAID FORMATION (FIG. 2)

The Kinkaid formation in the "New Haven" core (drilled in 1913 and described by Savage[2]) is shown graphically with the corresponding portion of the electric log of a well about ⅜ mile to the northeast.

The Kinkaid in the core is immediately overlain by Pennsylvanian sandstone and conglomerate and is underlain by the Degonia shown in fig. 3. Outstanding features of the Kinkaid in both core and electric log are the massive upper and lower limestones. The intervening portion includes some limestone in its central and sandstone in its lower part. At the base are a few feet of green, red, and purple shales.

DEGONIA FORMATION (FIG. 3)

The "New Haven" core and electric logs of nearby wells show three sandstone beds within 100 feet below the Kinkaid formation. Oil geologists in this area generally put the upper two beds in the Degonia formation, and the third bed in the Clore formation, as is done here. It is possible that when the Degonia formation is traced in detail from the type locality in western Illinois across to this area, the bounds shown here may be modified.

CLORE FORMATION (FIG. 3)

The Clore formation in this area consists mainly of shale, shaly limestone, and sandstone. The prominent sandstone in the upper part is known to oil geologists as the "Clore sand." Commonly more green shale is encountered than is reported from the "New Haven" core.

PALESTINE FORMATION (FIG. 4)

The Palestine formation in the "New Haven" core is 105 feet thick and consists of sandstone except for about 5 feet of shale and shaly sandstone near the top, and minor shale laminae. The Palestine formation in southeastern Illinois generally is thinner than this, averaging about 55 feet, and it usually includes a larger proportion of shale.

MENARD FORMATION (FIGS. 4 AND 5)

There is an unconformity below the Palestine formation, and in many parts of southeastern Illinois the Menard includes higher beds than are present in the "New Haven" core (fig. 4). The "massive Menard" occurs between the depths 2170′6″ and 2205′ in the core, and the "little Menard" between 2214′9″ and 2219′9″. The "little Menard" is often sandy in this part of the state.

Few electric logs are available near the Menard outcrop described by L. E. Workman[3] and shown in fig. 5. The formation is sufficiently uniform, however, for the electric log of the Smokey Oil-Barger No. 1 well, about 18 miles northeast of the outcrop, to show considerable similarity. Neither the upper nor the basal portions of the formation are exposed in the outcrop. The top of the "massive Menard" is at 63′11″ in the outcrop. In the well the Menard is underlain by shaly sandstone of the Waltersburg formation.

Separation of the basal Menard shale from underlying Waltersburg shale is usually difficult. Some geologists prefer to mark the base of the Menard formation by the base of the "little Menard" limestone.

GOLCONDA FORMATION (FIG. 6)

The Golconda formation in south-

[2] Technical files, State Geological Survey, Urbana, Illinois.

[3] Field notes. L. E. Workman. State Geological Survey, Urbana, Illinois.

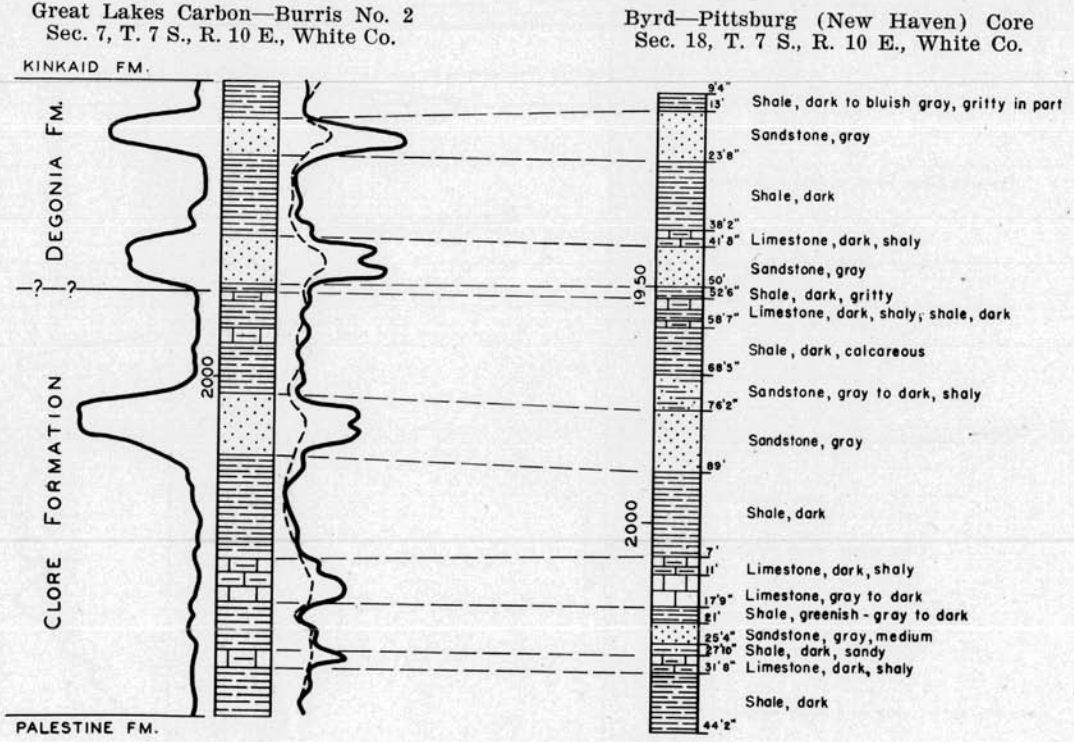

FIG. 3.—Degonia and Clore formations

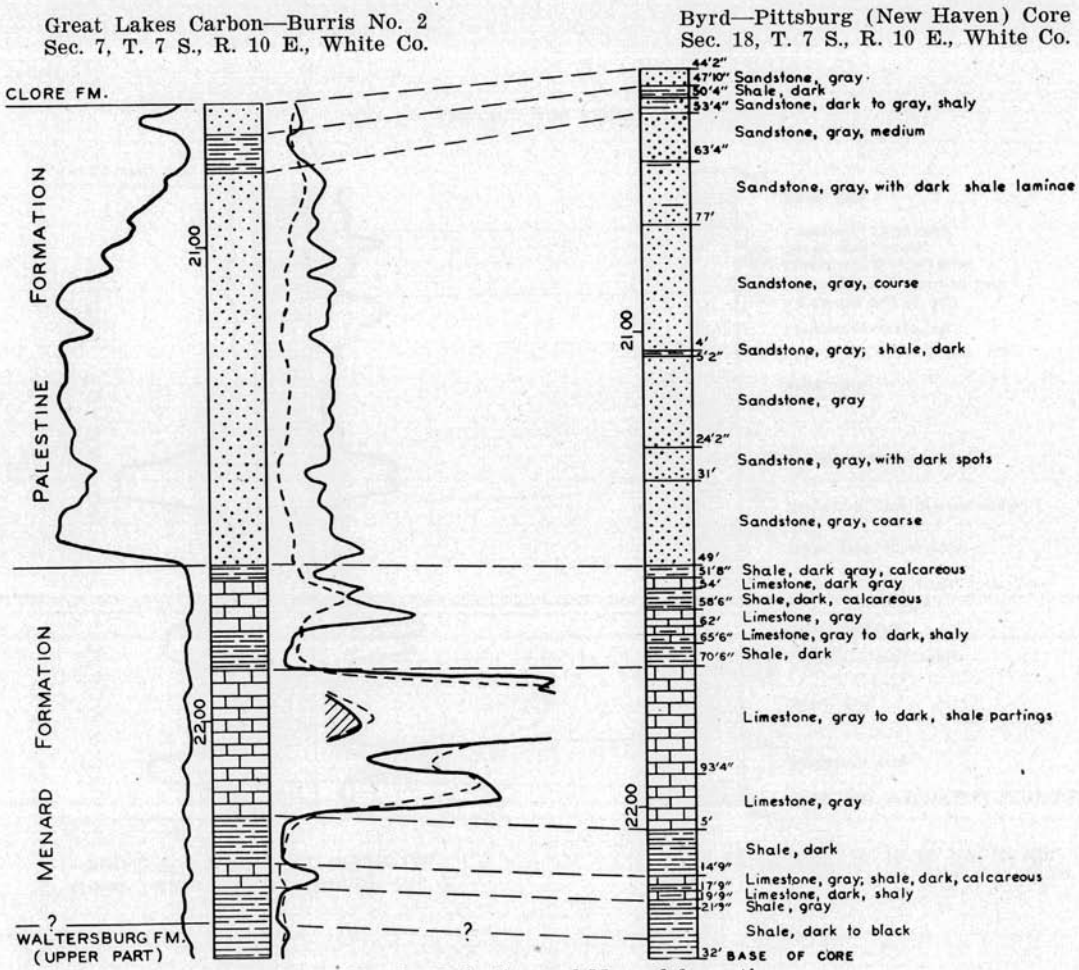

FIG. 4.—Palestine and Menard formations

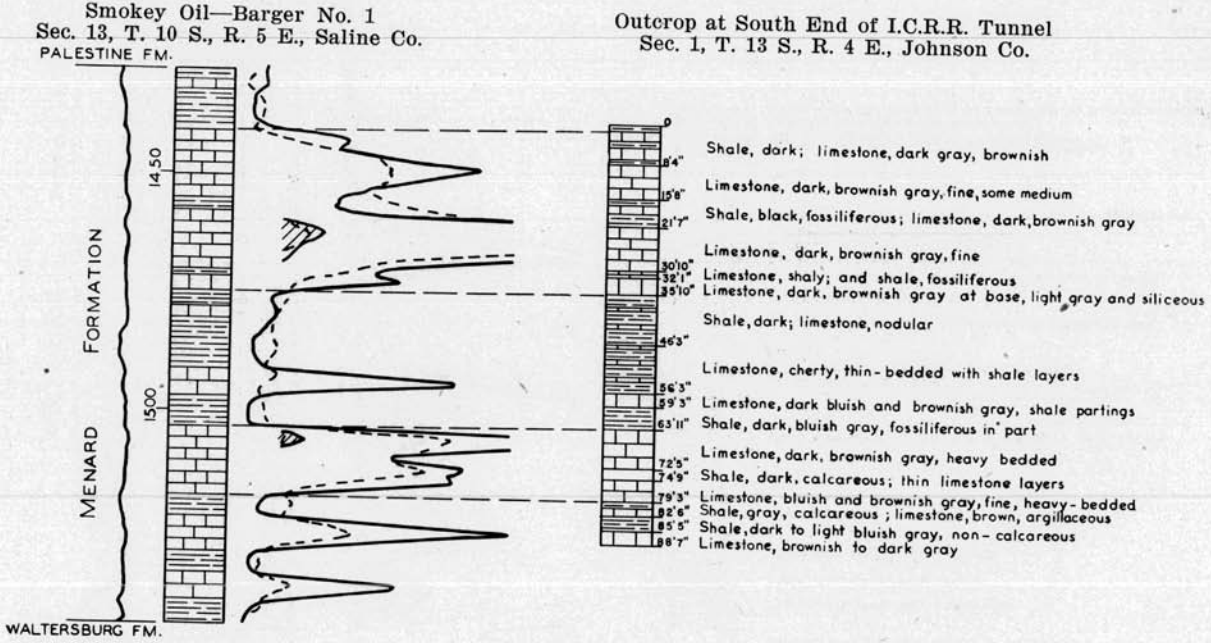

FIG. 5.—Menard formation

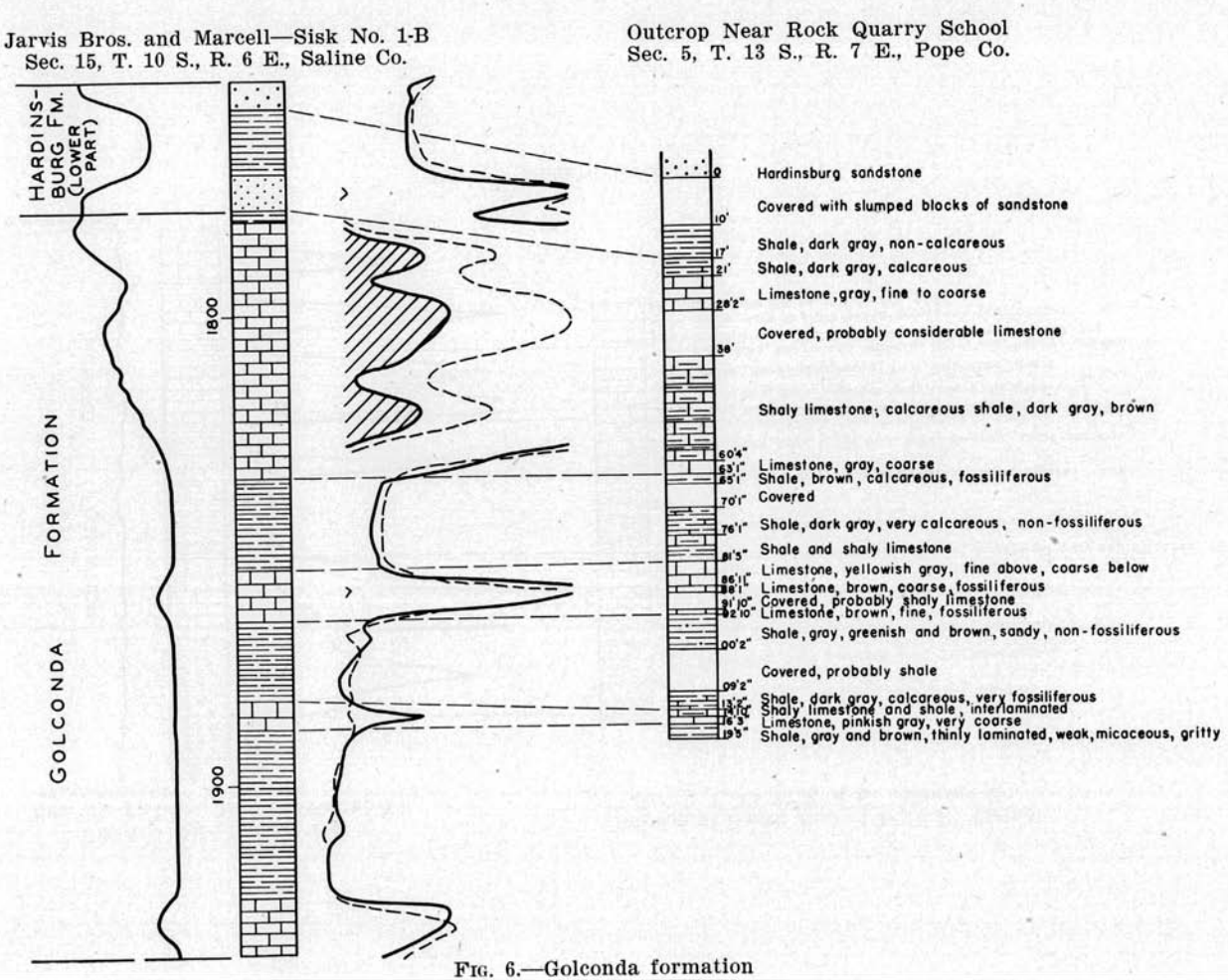

FIG. 6.—Golconda formation

eastern Illinois typically includes at the top dark gray, red, and green shales with thin, brown, sublithographic dolomite. The bulk of the formation consists of a zone which is dominantly limestone, underlain by a zone which is dominantly shale. At the base is the "Barlow limestone," with sometimes a few feet of basal shale. The "Barlow" is a thin extensive bed, often mapped to show subsurface structure. In the sections illustrated, most of the upper shale zone was eroded before deposition of the Hardinsburg formation. The "Barlow limestone" is shown in the electric log at the base of the Golconda. Samples show that in this well the "Barlow" is immediately underlain by dark gray silty shale and sandstone of the Cypress formation. The lower part of the Golconda is not exposed in the outcrop section described by L. E. Workman.[3]

The electric log is from a well located about 17 miles north of the outcrop.

Renault (Downeys Bluff and Shetlerville) Formation

(Figs. 7 and 8)

The lower part of the Chester in Hardin County has been called the Renault formation. Frank Tippie[4] correlates the upper part of the Renault with the basal Paint Creek of western Illinois, and has proposed the name "Downeys Bluff" for this member of the Paint Creek, based on the type section shown in fig. 8 and located at Downeys Bluff in NW¼, SE¼, sec. 5, T. 13 S., R. 8 E. The remainder of the Renault is here referred to as the Shetlerville member.[5]

The Downeys Bluff and Shetlerville are illustrated by an electric log (fig. 7), the outcrop section at Shetlerville[6] (fig. 7), Tippie's type section for the Downeys Bluff[4] (fig. 8), and the core[6] (fig. 8) from which he describes insoluble residue zones of the Renault formation.[7] Tippie subdivides the Renault into five zones, A to E, based on insoluble residues. These zones are shown for the core and approximated for the electric log and two outcrop sections.

In the electric log (fig. 7) it is impracticable to pick the contact of the Shetlerville on the underlying Levias member of the Ste. Genevieve formation, so the position of this contact is estimated. In the Parkinson quarry section (fig. 7), the sublithographic limestone at 15 to 18.5 feet is correlated with the sublithographic limestone at depth 223.8 feet in the core (fig. 8), and therefore is placed in the C zone of the Shetlerville formation.

Acknowledgments

Mr. A. H. Cronk, Superintendent, Rosiclare Lead and Fluorspar Mining Company, Rosiclare, Illinois, has given permission to describe the lithology of part of the core from the Rosiclare Lead and Fluorspar Mining Company—A. C. No. 2 diamond drill hole. Thanks are extended to various members of the Illinois State Geological Survey for their help.

[3] Field notes. L. E. Workman. State Geological Survey, Urbana, Illinois.

[4] F. E. Tippie, Subsurface Stratigraphy of Lower Chester Formations in Parts of Illinois and Western Kentucky. Ill. State Geol. Survey, unpublished manuscript.

[5] cf. Lexicon of Geologic Names of the U. S., U. S. G. S. Bull. 896, p. 1985.

[6] Described by F. E. Tippie, Technical files, State Geological Survey, Urbana, Ill.

[7] F. E. Tippie, Insoluble Residues of the Levias and Renault Formations in Hardin County, Illinois: Trans., Illinois State Acad. Sci., Vol. 36, No. 2, December 1943, p. 155.

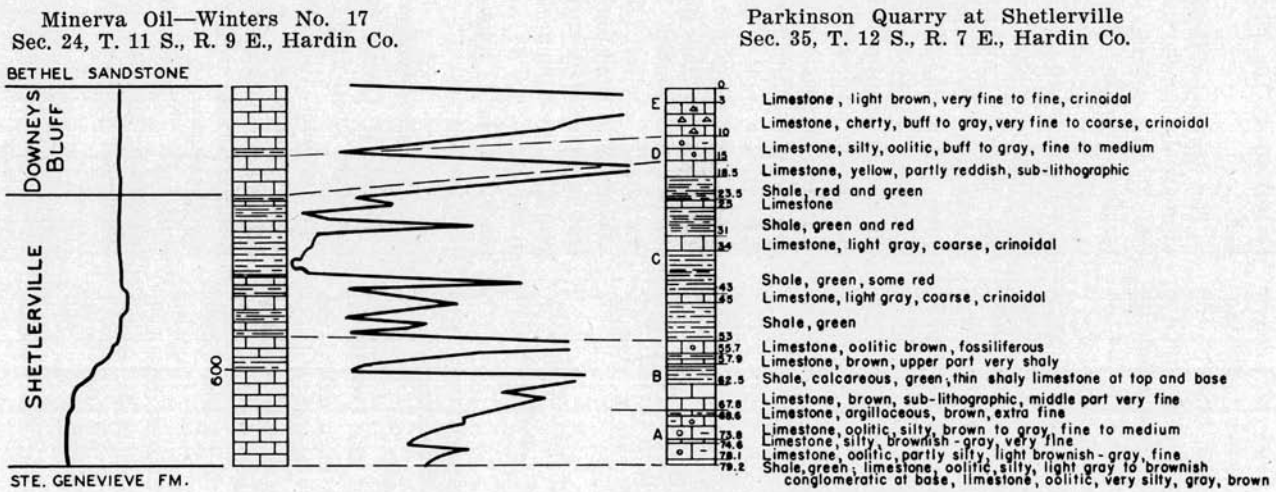

FIG. 7.—Renault (Downeys Bluff and Shetlerville) formation

Downeys Bluff Section
Sec. 5, T. 13 S., R. 8 E., Hardin Co.

Rosiclare Lead and Fluorspar Mng.—A. C.
No. 2 Core
Sec. 32, T. 12 S., R. 8 E., Hardin Co.

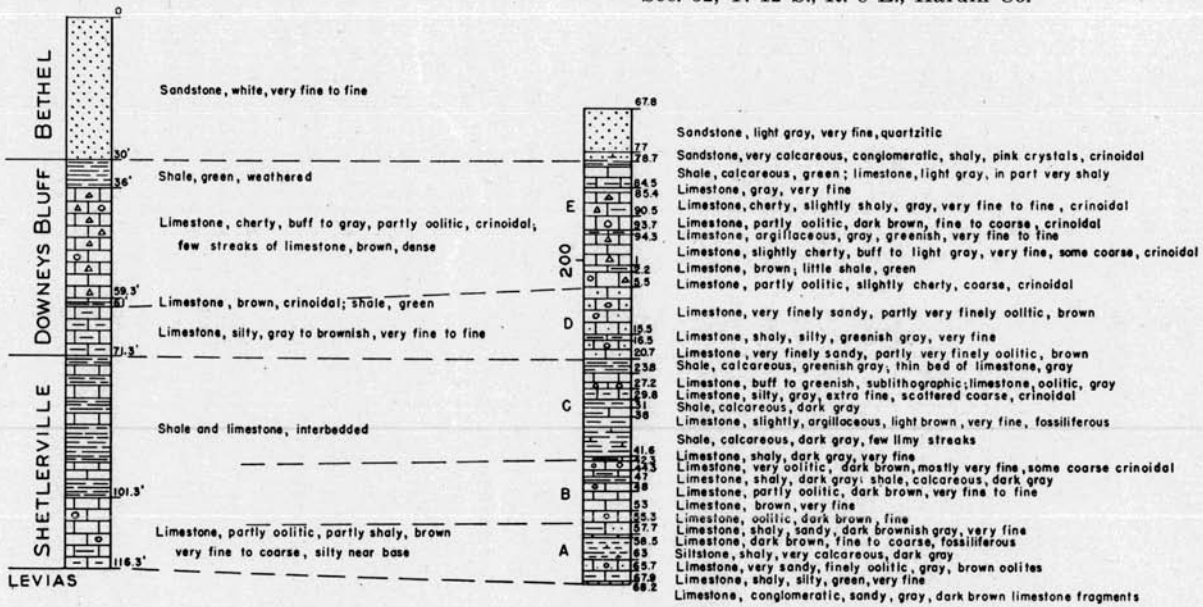

FIG. 8.—Renault (Downeys Bluff and Shelterville) formation