TRIP 5

THE TRENTON GROUP OF THE BLACK RIVER VALLEY

by

Robert Titus, Hartwick College

The Trenton Group is made up of six formations (Kay, 1937, 1968). In ascending order these are the Napanee, Kings Falls, Sugar River, Denley, Steuben and Hillier limestones (Fig. 1). To the east it grades into the Dolgeville facies and the Utica Black Shale. The unit is thickest in the Watertown area where it is about 160 m thick. Eastward it thins to about 130 m in the Trenton Falls vicinity, losing strata at both the bottom and top (Fig. 2). East of Trenton Falls the unit thins dramatically and at Canajoharie Creek it is only 5 m thick. Early Trentonian rocks continue to be found east as far as Glens Falls and the Champlain Valley.

The Trenton Group was deposited during the Vermontian phase of the Taconic Orogeny. The dominant events affecting the Trenton Group were two episodes of inversion of topography, one occurring at the beginning of Trentonian deposition and the other occurring at its close.

During the early Trentonian (Rocklandian, Kirkfieldian, Shorehamian and early Denmarkian) the first inversion of topography occurred. Uplift in the source areas of the east was accompanied by very gradual downwarping in the New York State vicinity. The shallow carbonate seas of the Trenton Group invaded New York west and east of the Adirondack Arch (Fig. 2 & 3). To the east carbonates equivalent to the Kings Falls and Sugar River limestones were deposited. These were overlapped by the Utica Black Shale during the middle Shorehamian (Fisher, 1977). By the end of the Shorehamian, the Adirondack Arch had been submerged and breached by the black shales (Fig. 2 & 3). The shale facies migrated almost as far as Middleville.

During the early Denmarkian the advance of the black shale facies slowed and the carbonate - black shale boundary settled in an area just east of Trenton Falls (Fig. 3). The Dolgeville facies represents a bank margin slope transitional between these facies. The early Trentonian version of topography was over and subsidence slowed sufficiently for the carbonate deposition to catch up with and exceed it (Fig. 3), The middle Trentonian was thus a period of shallowing seas and a regressive facies pattern is found. Shallow water facies migrated in from the west and the bank margin steepened (Fig. 3 & 5).

The period of shallowing culminated during deposition of the middle Steuben Limestone (Figs. 3 & 5). Thereafter the second and final inversion of topography occurred. The deeper, more micritic facies of the Hillier Limestone first appears in the vicinity of Westernville (Fig. 2) during the middle Cobourgian. The carbonate of that vicinity were soon overlapped by the Holland Patent Shale. With time, the Hillier Limestone migrated westward followed by the black shale facies. By late Cobourgian the carbonates had retreated to well up in the Black River Valley area (Fig. 3 & 5). They were soon overwhelmed by black shales which swept across them into the interior of North America as the Hudson Valley phase of the Taconic Orogeny quickened.

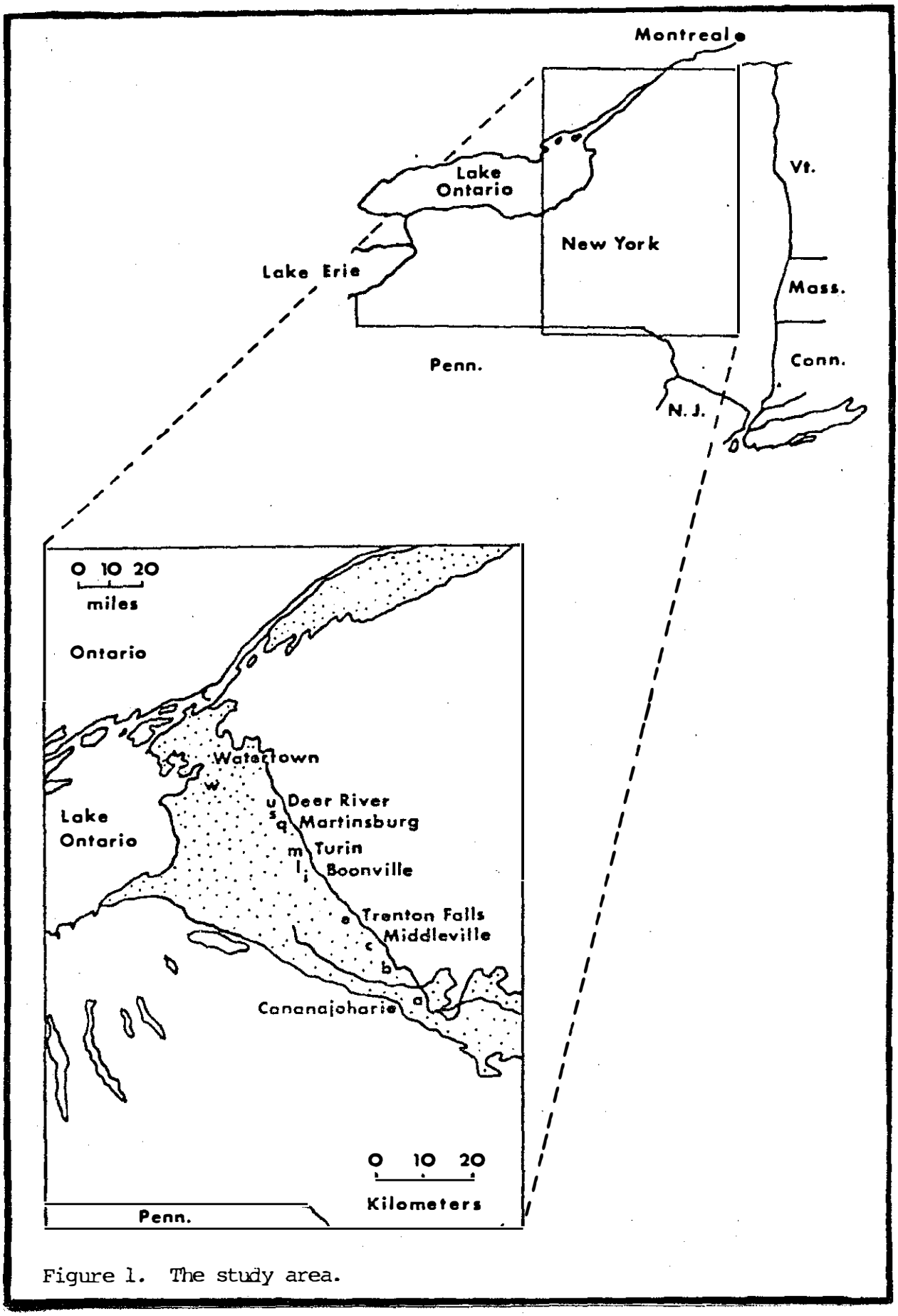


Figure 1. The study area.

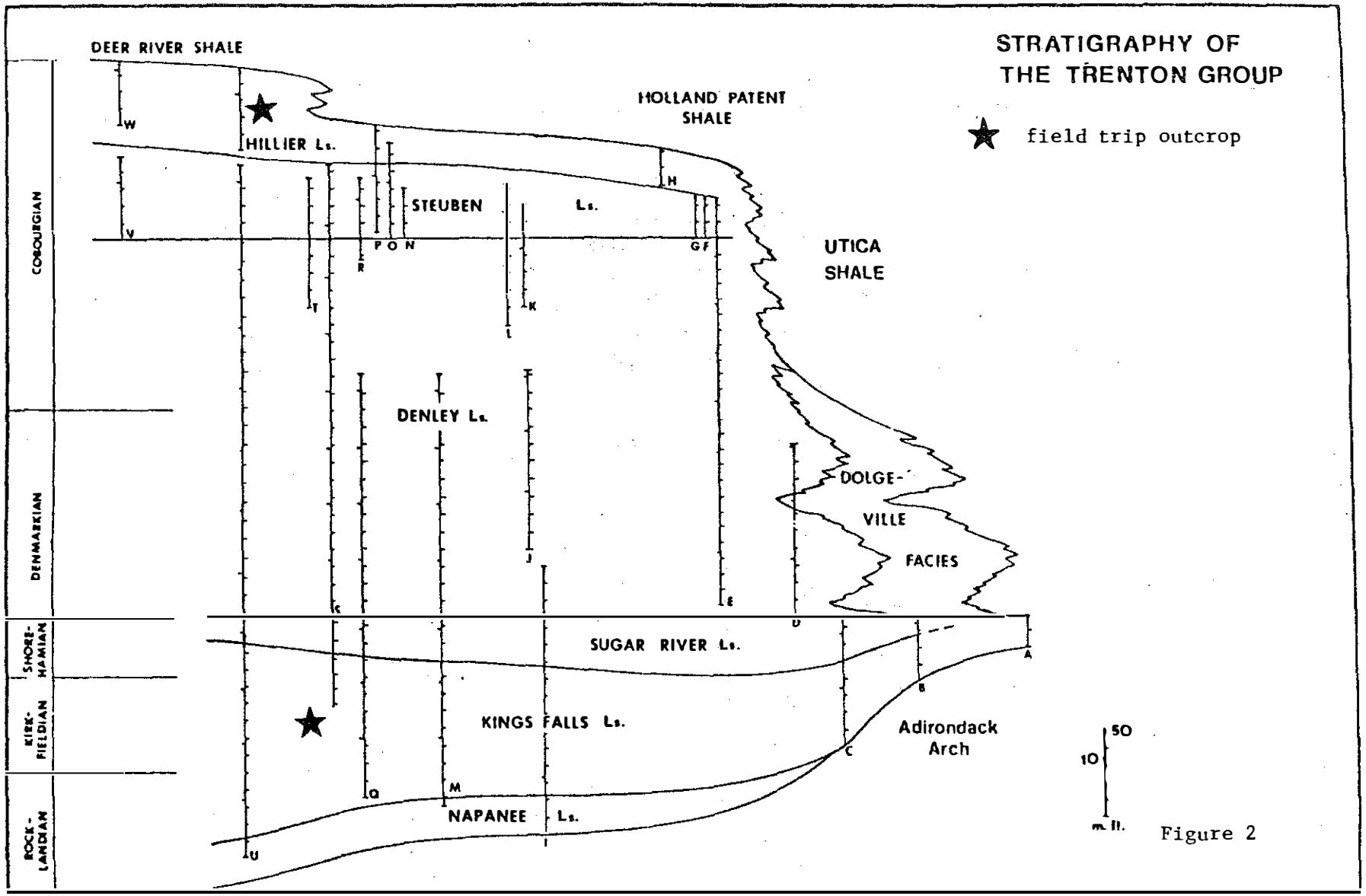


Figure 2

Figure 2. Stratigraphy of the Trenton Group. Vertical lines indicate the important outcrops studied. They are as follows: A. Canajoharie Creek; B. Inghams Mills, below the dam on East Canada Creek; C. Buttermilk Creek, 4 km. north of Middleville; D. Mill Creek, Gravesville; E. Trenton Falls; F. Quarry on West Canada Creek, Prospect; G. Quarry on Rt. 365, south of Barneveld; H. Stream cut along Rt. 274, near Westernville; I. Sugar River along Rt. 12, north of Boonville; J. Moose Creek, upstream from the Sugar River; K. Moose Creek, along Rt. 12D; L. Talcottville, along Rt. 12D; M. Mill Creek, Turin; N. Douglass Creek; O. Wheatstone Gulf, below Rt. 26; P. Atwater Creek, southwest of Martinsburg; Q. Roaring Brook, Martinsburg; R. Roaring Brook, Martinsburg; S. Mill Creek, Lowville; T. Black Creek, along Boshart Road, west of Lowville; U. Deer River; V. Gulf Stream, Rodman; W. Rt. 177 west of Rodman. Correlations of the eastern outcrops of the Steuben Limestone are tentative.

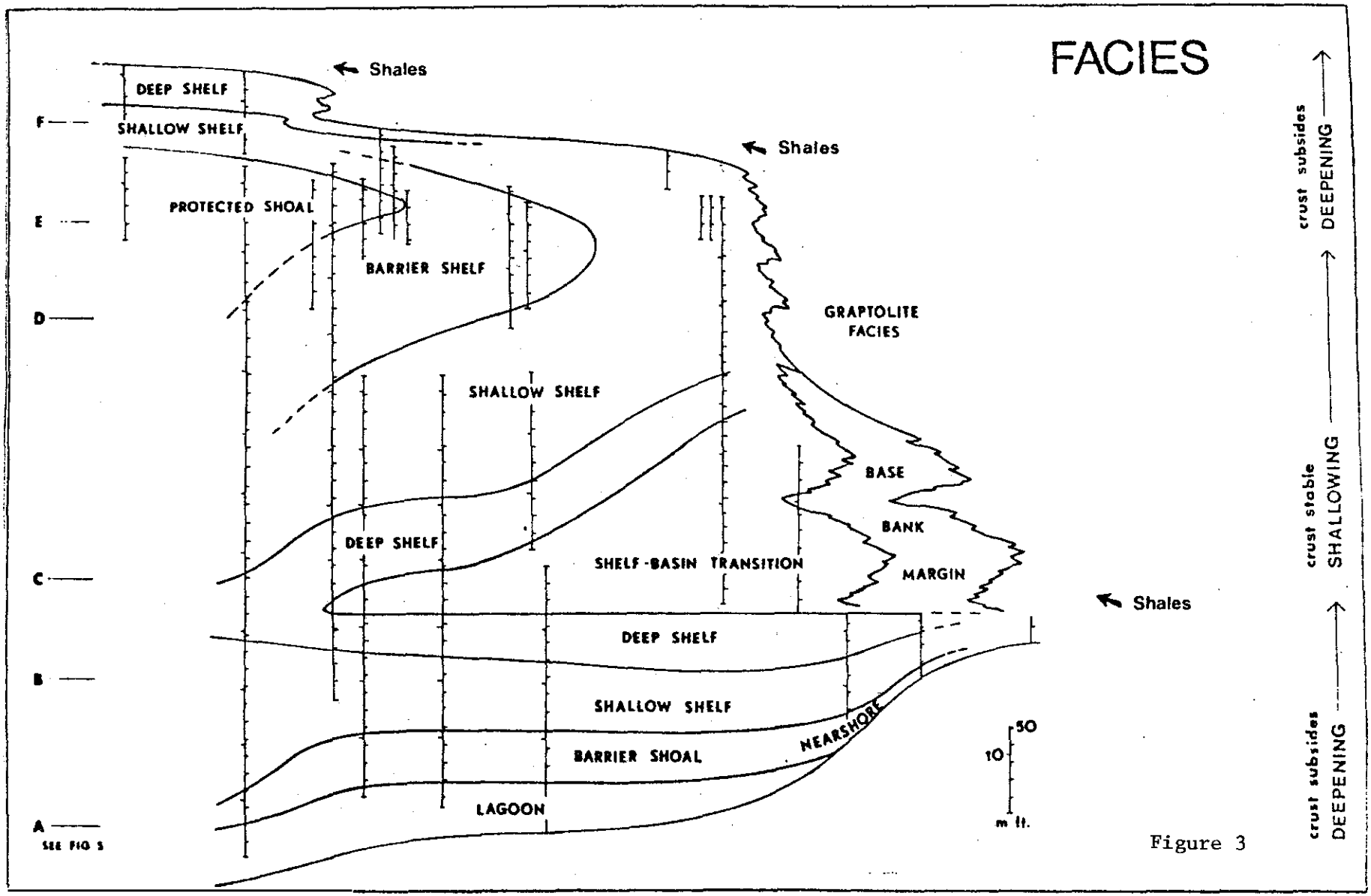

FACIES
Shales
DEEP SHELF
SHALLOW SHELF
PROTECTED SHOAL
BARRIER SHELF
GRAPTOLITE FACIES
SHALLOW SHELF
DEEP SHELF
SHELF-BASIN TRANSITION
BASE
BANK
MARGIN
DEEP SHELF
SHALLOW SHELF
BARRIER SHOAL
NEARSHORE
LAGOON
F
E
D
C
B
A
SEE FIG 5
50
10
m ft.
crust subsides
DEEPENING
crust stable
SHALLOWING
crust subsides
DEEPENING

Figure 3

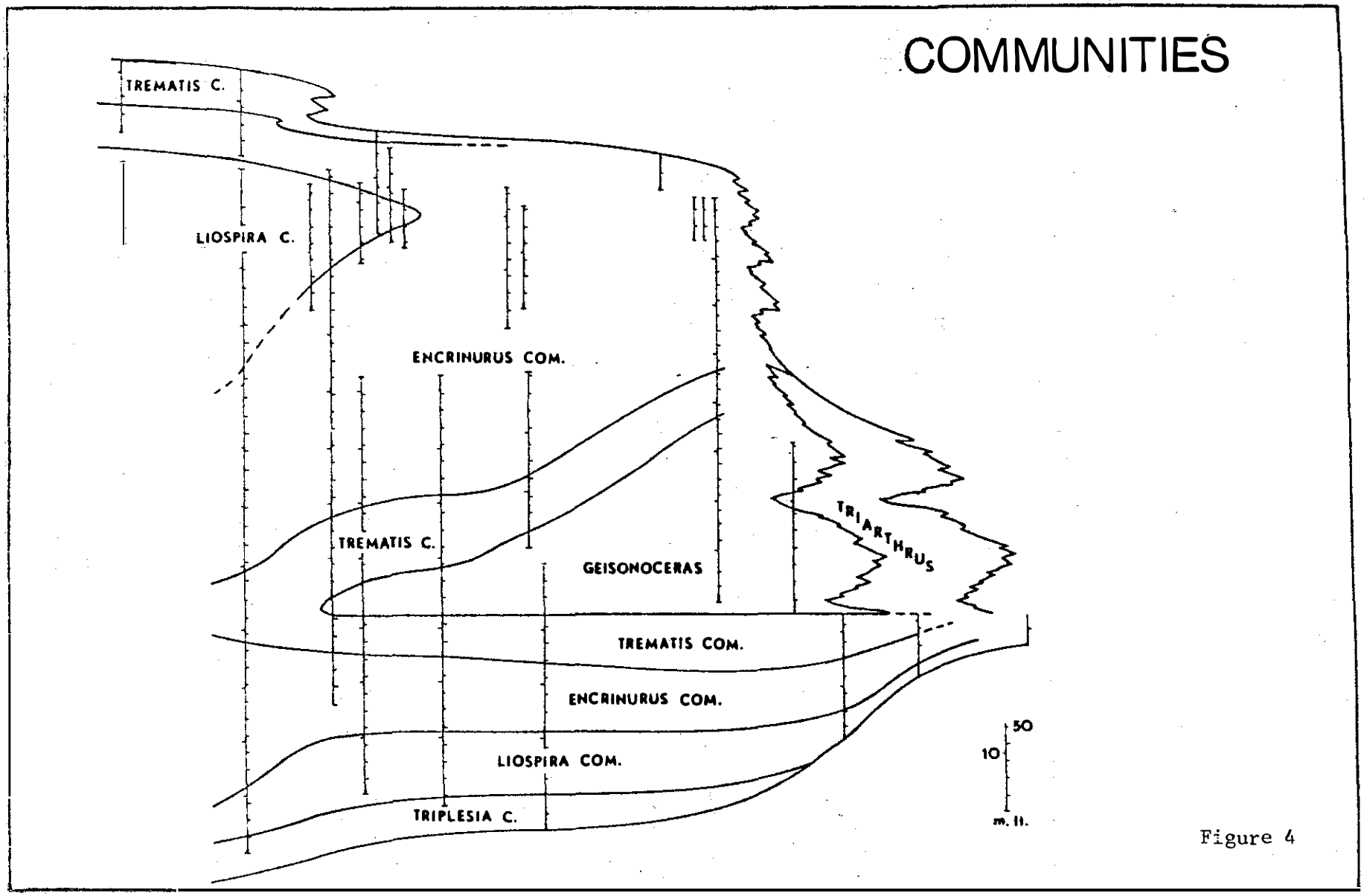

COMMUNITIES
TREMATIS C.
LIOSPIRA C.
ENCRINURUS COM.
TREMATIS C.
GEISONOCERAS
TRIARTHRUS
TREMATIS COM.
ENCRINURUS COM.
LIOSPIRA COM.
TRIPLESIA C.
50
10
m. ft.

Figure 4

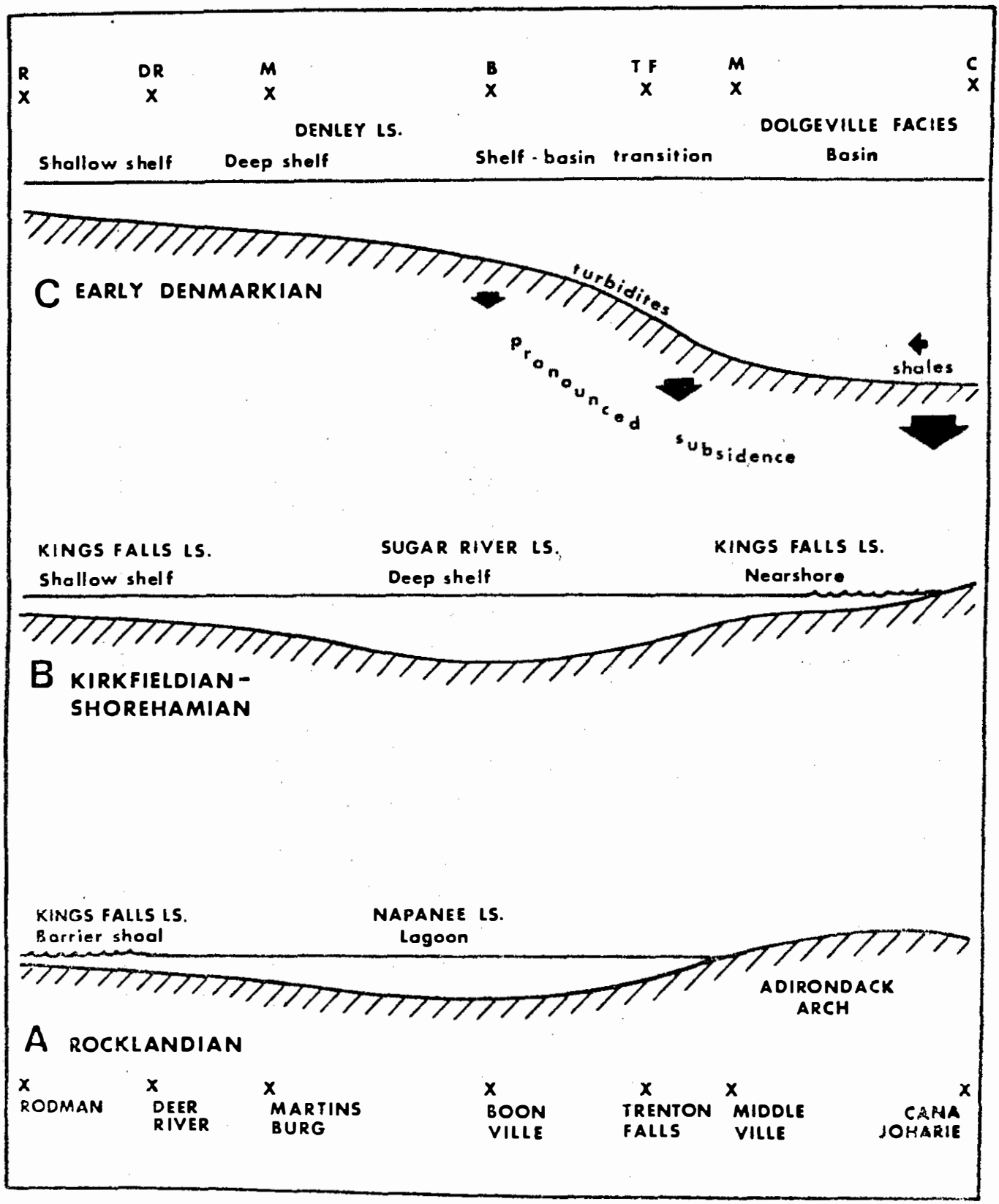
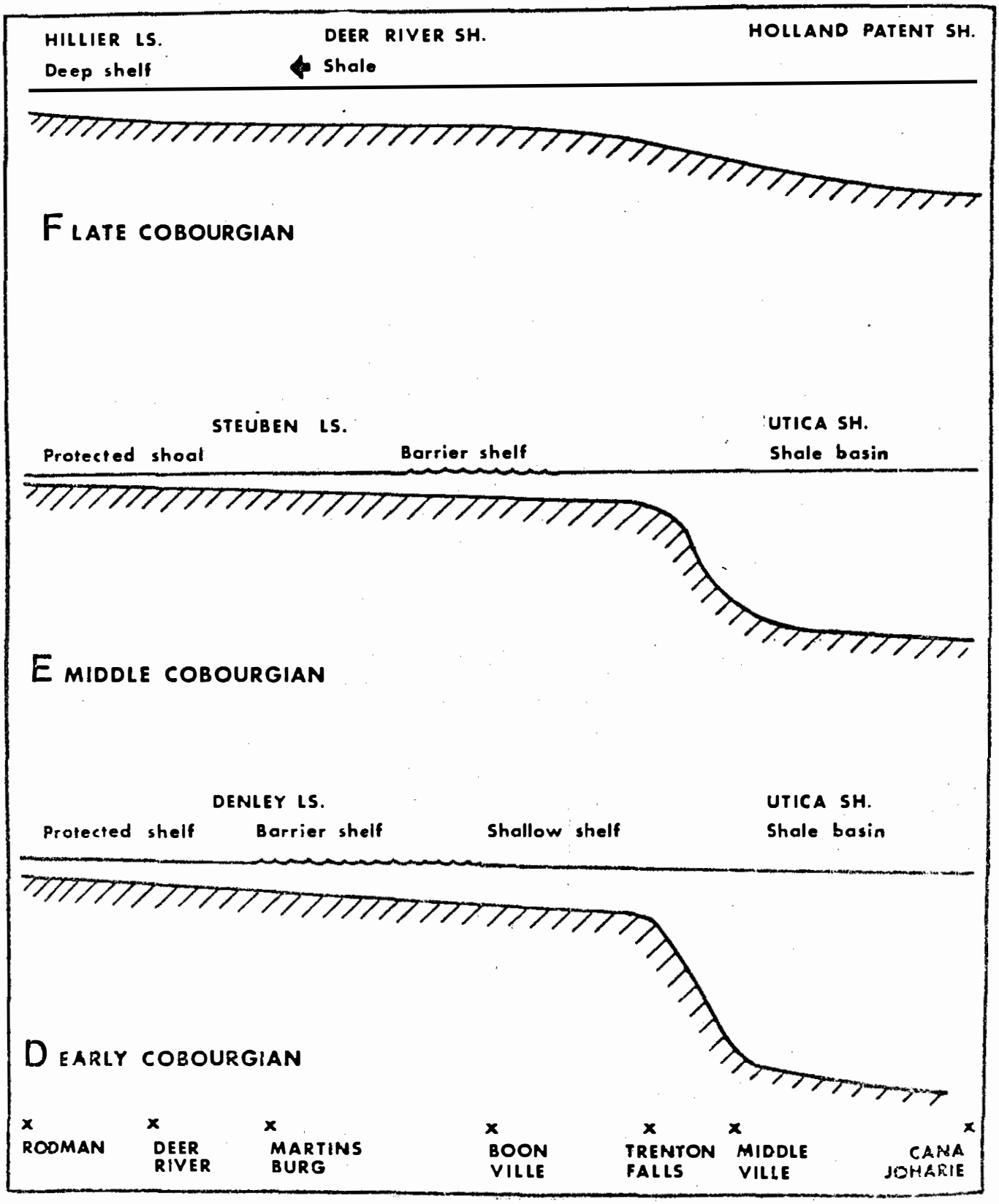


Figure 5. Tectonic evolution of the Trentonian carbonate platform. Letters A through F refer to the time lines on the left of figure 4.


HILLIER LS.
Deep shelf
DEER RIVER SH.
Shale
HOLLAND PATENT SH.
F LATE COBOURGIAN
STEUBEN LS.
Protected shoal
Barrier shelf
UTICA SH.
Shale basin
E MIDDLE COBOURGIAN
DENLEY LS.
Protected shelf
Barrier shelf
Shallow shelf
UTICA SH.
Shale basin
D EARLY COBOURGIAN
RODMAN
DEER RIVER
MARTINS BURG
BOON VILLE
TRENTON FALLS
MIDDLE VILLE
CANA JOHARIE

Road Log

Total Mileage	Mileage From Last Stop	
		This road log begins at the intersection of routes 12 and 26 in the center of Lowville, New York.
0.0	0.0	Proceed north on route 12.
0.8	0.8	Park beyond bridge which crosses Mill Creek.
		About 90 m of the Trenton Group are exposed at this location. The 16 m of strata below the bridge display the upper Kings Falls Limestone and all of the Sugar River Limestone. Upstream there is a complete exposure of the Denley Limestone. There is only one short break in the section. Finally, the entire Steuben Limestone can be seen along the upper reaches of Mill Creek. The Steuben Limestone begins just below the quarry. Thus, most of the lower Trentonian transgression and all of the middle Trentonian regression are represented at this location.
12.5	11.7	Proceed north on Route 12 to Copenhagen. Park beyond the bridge which crosses the Deer River.
		About 17 m of the uppermost Trenton Group Hillier Limestone is exposed here. This may be the most complete section of the Hillier Limestone. The rocks become progressively more micritic towards the top reflecting deepening seas. The outcrop thus records the upper Trentonian transgression.

End of trip

Bibliography

Chenoweth, P. A., 1952, Statistical methods applied to Trentonian stratigraphy in New York. Geol. Soc. Am. Bull. 63:521-560.

Fisher, D. W., 1977, Correlation of the Hadrynian, Cambrian and Ordovician rocks in New York State. N. Y. State Mus. Map and Chart Ser. 25, 75 p.

Kay, G. M., 1937, Stratigraphy of the Trenton Group. Geol. Soc. Am. Bull. 48:233-302.

_____, 1968, Ordovician formations in northwestern New York. Le Naturaliste Canadien 95:1373-1378.

Titus, R., 1982, Fossil communities of the middle Trenton Group (Ordovician) of New York State. Journ. of Paleon. 56:477-485.

_____ and B. Cameron, 1976, Fossil communities of the lower Trenton Group (Middle Ordovician) of central and northwestern New York State. Journ. of Paleon. 50:1209-1225.