UPPER DEVONIAN TURBIDITES IN WESTERN NEW YORK: CHARACTERISTICS AND IMPLICATIONS FOR SUBMARINE FAN DEPOSITION MODELS

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PREFACE

The object of this field trip is to acquaint you with some of the characteristics of Upper Devonian turbidites in western New York* (WNY). We will examine three coarsening-upward clastic depositional cycles within the West Falls, Perrysburg and Java formations. The many gorges and ravines in WNY provide the control necessary to trace individual sandstone beds across the region, allowing us to characterize their interrelationships and their lateral variabilty in bedforms, texture, and thickness. From these and other data we believe the WNY turbidites in this part of the sequence represent lobe fringe and sand lobe deposition on a submarine fan. Continued study of these turbidites will help resolve problems encountered in both modern and ancient submarine fan research. Construction of a depositional model based on this research will entail 1) deposition and flow characteristics for individual non-channelized turbidity currents, 2) relationships among various fan elements, and 3) fan vs. clastic ramp development. A more detailed discussion of the research rationale and results is presented in Jacobi et al. (in press).

STRATIGRAPHY AND SEDIMENTOLOGY OF THE UPPER DEVONIAN

Overview

The Upper Devonian section in WNY and central New York (CNY; Figs. 1,2) records an infilling of the Catskill Sea from sources to the east. The Upper Devonian in this region consists of a number of major sedimentation cycles; each coarsening-upward cycle is marked by a basal black shale that grades upward into gray and greenish-gray shales, which in turn are interbedded with sandstone/siltstone** beds near the top of a particular cycle (e.g., Pepper and de Witt, 1951; Pepper et al., 1956; Sutton, 1963; Buehler and Tesmer, 1963; Kirchgasser and House, 1981; van Tyne, 1982, 1983; Sevon and Woodrow, 1985). It is these sandstone beds that we will observe on this field trip.

The origin proposed for these sandstones varies markedly among different units, different regions of the same unit, and even among different researchers. A large number of paleoecological studies have been conducted on the Upper Devonian "sandy" sections east of, and older than, the units we will examine on this field trip (e.g., McGhee and Sutton, 1985, and references therein). These paleoecological studies suggest that the Frasnian Chemung facies (Caster, 1934) of CNY represent a collage of shallow marine environments, including delta front, delta platform, and channel/estuary environments.

** WNY is defined here as the area west of the Genesee Gorge (Fig.2).*
*** "sandstone/siltstone" will be referred to as simply "sandstone".*

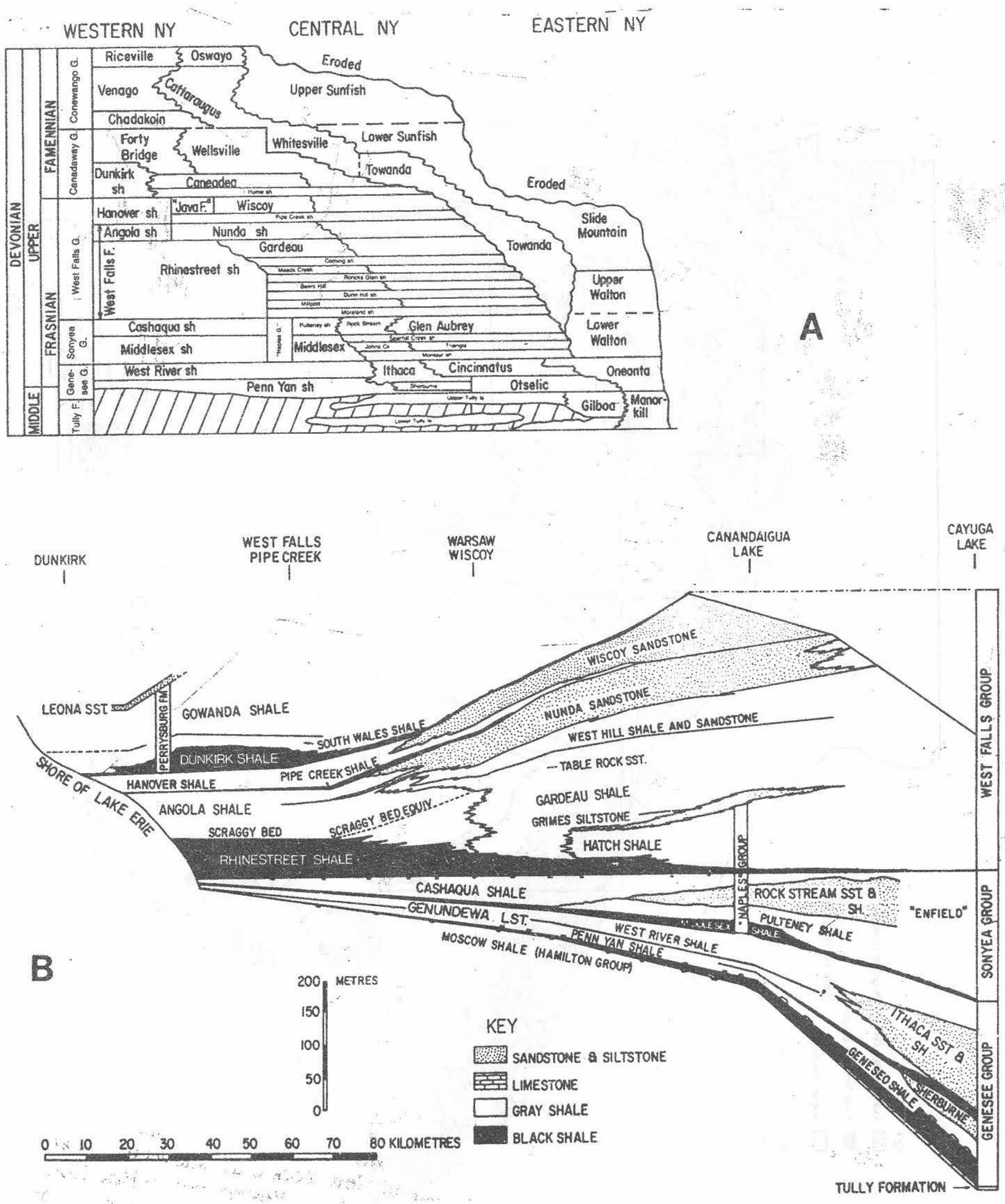


Figure 1. Stratigraphic correlation diagrams. A) Stratigraphic correlation diagram for the Upper Devonian of New York State (after Sevon and Woodrow, 1985; Rickard, 1975). Following Sevon and Woodrow (1985), lithologies are not capitalized. In this chart, rocks of the Perrysburg Formation are included in the Dunkirk shale. B) Facies diagram of the Upper Devonian in western and central New York (from Kirchgasser and House, 1981; Johnson, et al., 1985).

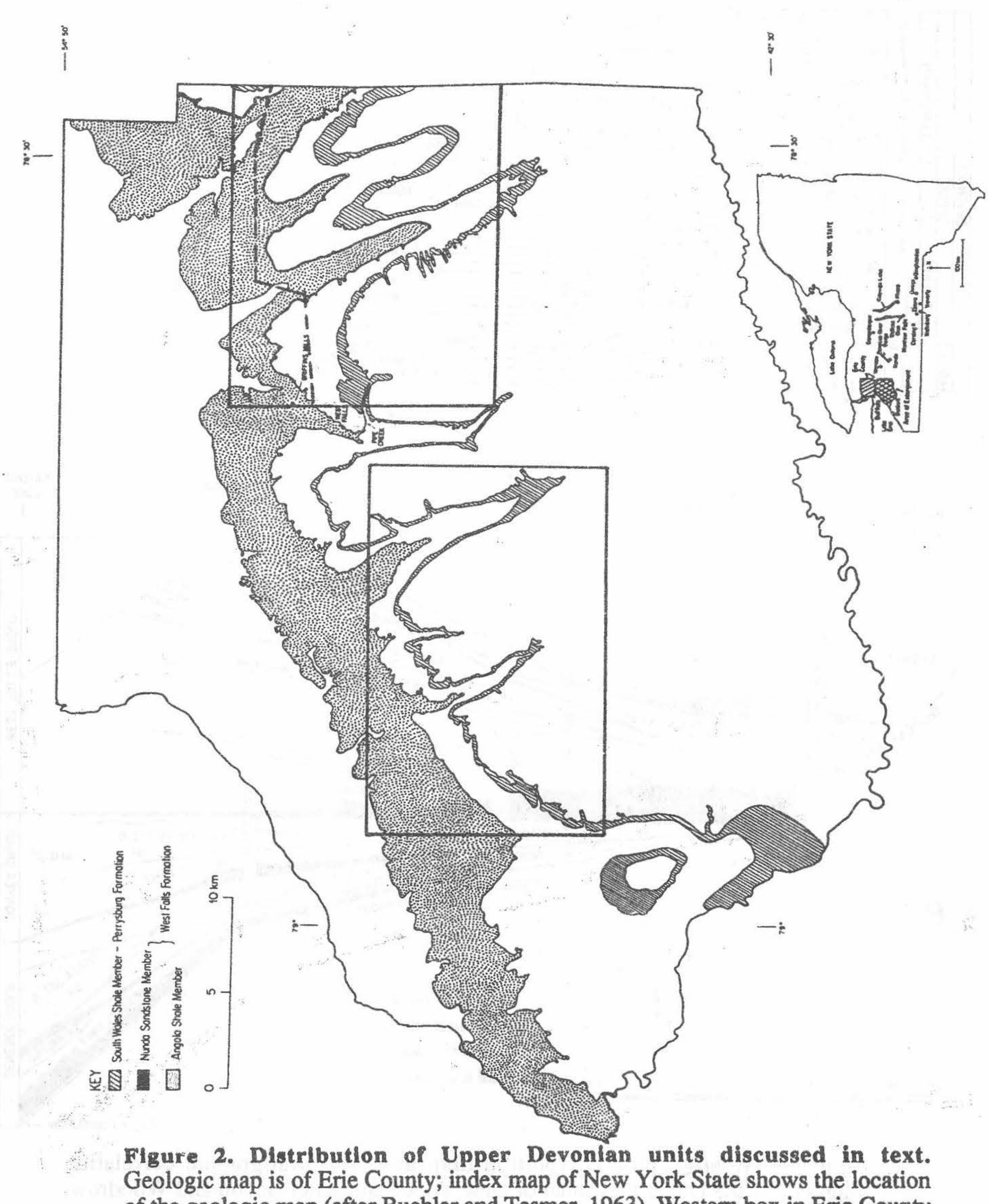


Figure 2. Distribution of Upper Devonian units discussed in text. Geologic map is of Erie County; index map of New York State shows the location of the geologic map (after Buehler and Tesmer, 1963). Western box in Erie County shows location of South Wales Shale Member maps (displayed in Fig. 4), and eastern box shows location of Nunda Sandstone Member maps (displayed in Fig. 6). Dashed line locates stratigraphic cross section displayed in Figure 5.

Sedimentological studies typically have concentrated on a few discrete vertical sections in the lower sandy units of the Frasnian in CNY (Walker and Sutton, 1967; Woodrow and Isley, 1983; Craft and Bridge, 1987). These detailed studies suggest that sandstones in the western part of CNY represent turbidites deposited on the basin slope and floor (broadly, the Portage facies of Caster, 1934), whereas some of the eastern sands represent storm deposits on a platform. In WNY there have been no sedimentological studies of the sandy units in the Upper Devonian Portage facies that postdate the recognition of turbidites and storm deposits.

Devonian turbidites in the Catskill Sea generally have been thought to be more similar to nonchannelized, ramp deposits rather than to modern submarine fan deposits (Woodrow and Isley, 1983; Woodrow, 1985; Lundegard et al.,1985; Van Tassell, 1987). The clastic ramp model involved sheet flows from line sources such as storms, rather than from point sources at channel mouths or slide complexes. However, data gathered by our research group suggest that a submarine fan model is appropriate for the Devonian turbidites in WNY. The arguments promoting a clastic ramp model centered on two lines of negative evidence: 1) absence of submarine channels; and 2) the lack of radial flow patterns in nonchannelized turbidites. However, our initial research in WNY reveals a systematic areal variation in paleoflow that describes a partial radial flow pattern of 40^{o} over a distance of 18 km., and van Tyne (1982) identified macroscale submarine channels in the Upper Devonian sequence, based on isopach variations.

"SANDSTONE" UNITS TO BE OBSERVED ON THE FIELD TRIP

We will examine the Portage facies sandstone packets in three coarsening-upward cycles that occur above the lower West Falls Formation in WNY (Figs. 1,2). Our main focus will be on the South Wales Shale Member of the Perrysburg Formation and the Nunda Sandstone Member of the West Falls Formation. We also will observe the Wiscoy Sandstone Member of the Java Formation.

*South Wales Shale Member of the Perrysburg Formation (Pepper and de Witt, 1951)**

The South Wales Shale Member consists of fine-grained sandstones and siltstones interbedded with greenish-gray shale (Figs. 1, 3; Pepper and de

**Stratigraphic designations for each unit we propose to study have not been consistently employed (Clarke, 1903; Clarke and Luther, 1908; Hartnagel, 1912; Pepper and de Witt, 1951; Pepper et al., 1956; Buehler and Tesmer, 1963; Rickard, 1975; Kirchgasser and House, 1981; Sevon and Woodrow, 1985; compare Fig. 1A vs. Fig. 1B). We will employ the conventions of Pepper and de Witt, (1951), Pepper et al. (1956), and Kirchgasser and House (1981) (Fig. 1B).*

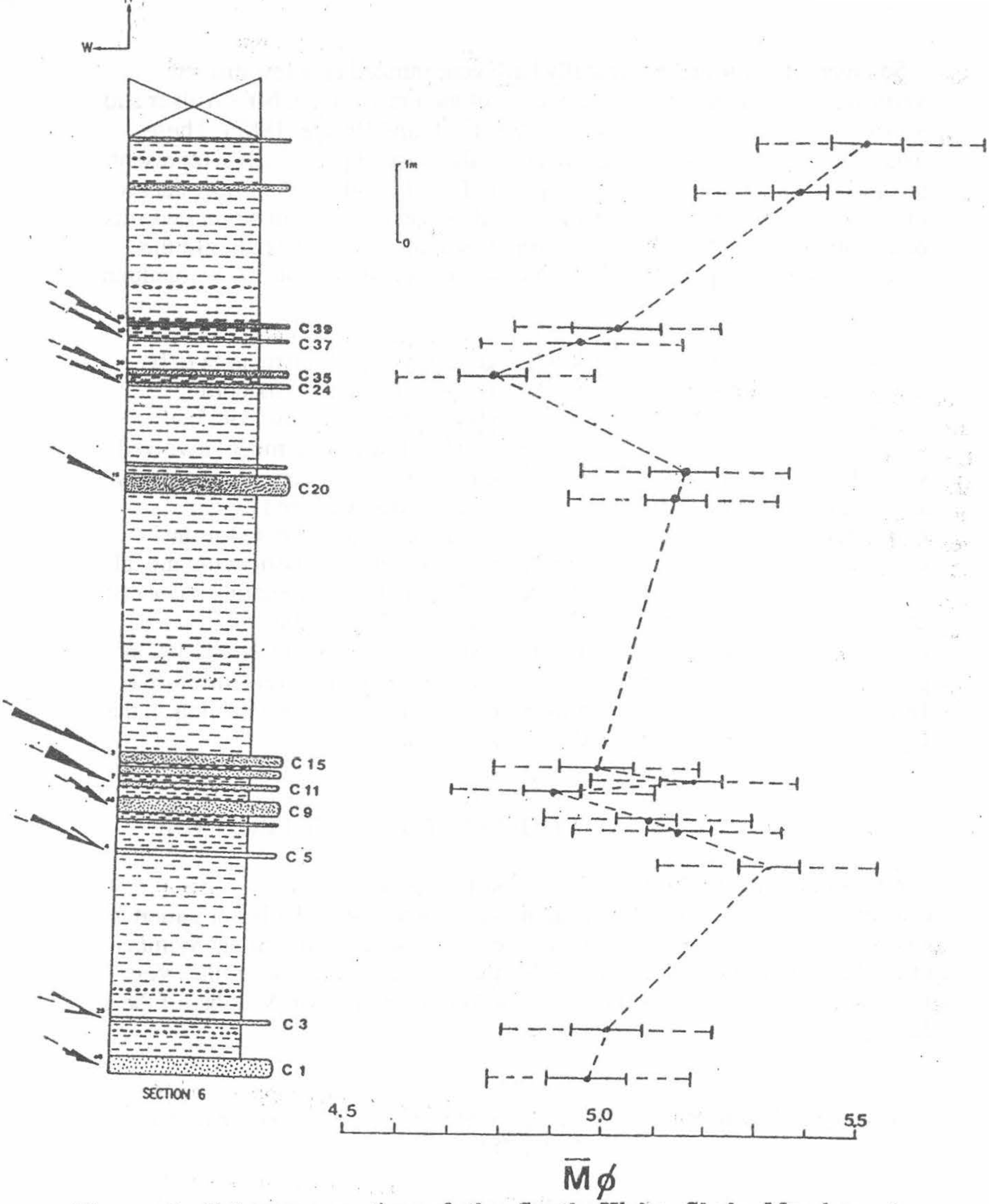


Figure 3. Columnar section of the South Wales Shale Member at STOP 1 and upsection grain size variations. Locality of measured section shown in Figures 7 and 8. In the columnar section calcareous concretion horizons are shown as layers of small circles. Both rose diagrams and averages for current indicators in sandstone units are displayed left of the columnar section. Upsection variations in grain size are displayed right of the columnar section. Solid error bar indicates sampling error and dashed error bar indicates measuring error. Figure after Gutmann and Jacobi (1988) and Gutmann (1989).

Witt, 1951; Buehler and Tesmer, 1963). The South Wales Shale thins from a maximum of 24m at Lake Erie to a minimum of 6m at the Genesee Gorge (Pepper and de Witt, 1951). Because the only study of the South Wales that included sedimentology predates the common knowledge of turbidites, the turbiditic nature of the South Wales sandstone units was not recognized; rather, Pepper and de Witt (1951) believed the sands represented stream deposits and delta deposits.

Nunda Sandstone Member of the West Falls Formation (Clarke , 1897)

The Nunda Sandstone generally displays either a massive or an undulatory, flaggy bedded character (Pepper et al., 1956; Buehler and Tesmer, 1963). A tongue of Nunda Sandstone contained within the Angola Shale extends west into Erie County. The Nunda is ~75 m thick near the Genesee Gorge and thins westward to an abrupt pinchout in central Erie County (Pepper et al., 1956; Buehler and Tesmer, 1963; Piechocki et al., 1990).

Wiscoy Sandstone Member of the Java Formation (Group) (Hartnagel, 1912)

The Wiscoy Sandstone Member consists of interbedded sandstone and shale. To the west the Wiscoy correlates with the Hanover Shale which consists of ~30m of gray shale interbedded with black shales at the base and thin sandstones near the middle. The thick sections of sandstones typical of the Wiscoy in the east (e.g., Elmira) thin to the west (e.g. the Genesee Valley) and correlate with the thin sections of Sandstone in the middle of the Angola. From west (the Genesee Valley) to east (Elmira), the Wiscoy sandstone is thought to represent a series of different environments: open shelf, prodelta and delta platform (McGhee and Sutton, 1981). To the best of our knowledge there are no definitive paleoenvironmental studies of the Java Formation west of the Genesee Valley.

RESULTS OF OUR PRELIMINARY FIELDWORK

We have begun fieldwork in WNY on all the units described above; greater effort has been devoted to fieldwork and laboratory analyses on the South Wales Shale Member and the Nunda Sandstone Member (e.g., Gutmann and Jacobi, 1988; Piechocki et al., 1990; Jacobi et al., in press). The following section summarizes our findings for primarily the South Wales Shale in western and central Erie County (Fig. 2).

South Wales Shale Member

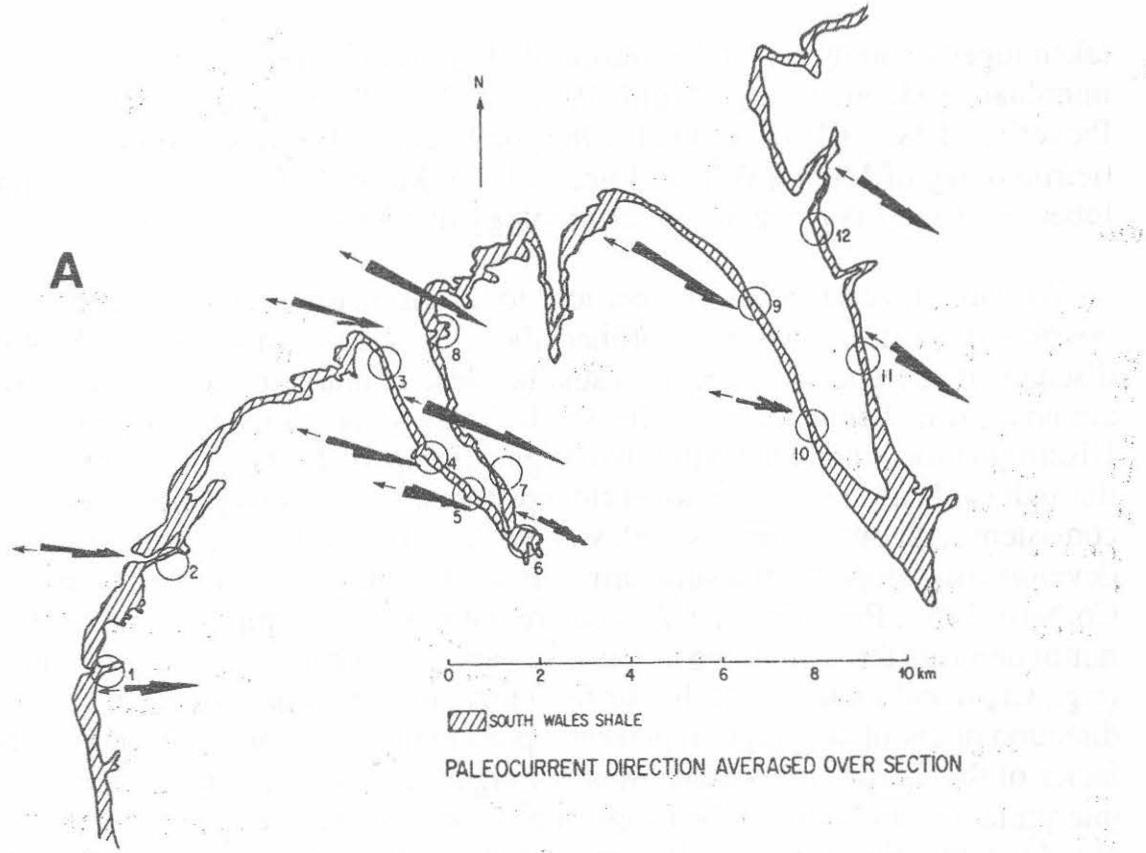
In the western exposures of the South Wales Shale Member (SWSM, Fig. 2), the SWSM can be divided into two units-a lower division with a relatively thick basal sandstone (bed C1 in section 6 at stop 1, Fig. 3), and an upper division that also has a thick basal sandstone (bed C20 in section 6, Fig. 3). The lower division varies from 5 to 7 m thick, and the upper division ranges from 4.5 to 6.5 m thick. Both divisions generally consist of two or more packets of sandstones (Fig. 3). Within the lower division, the average thickness of the sandstone beds varies from about 5 cm in the northeast to more than 9 cm in the southwest and southcentral areas. The average thickness of sandstone beds in the upper division varies from 1 cm to more than 10 cm. The percent of sandstone in the lower division varies from 0% to more than 10%. The percent-of-sandstone contours form a distinctly lobate pattern, which is somewhat consistent with the observed transport directions, especially in the western sections. The percent of sandstone in the upper division varies from 7% to 17%.

The lower contacts of the thicker sands in the South Wales Shale Member typically display abundant sole marks, including groove casts, groove with chevron casts, bounce and prod marks, and flute casts. Grooves and striations orthogonal to the ripple crestlines are both prominent and abundant, and were carved most likely by water-logged plant remains, although shell debris cannot be totally dismissed. Based on the sole marks and bedforms, paleocurrent determinations in all sandstone units reveal an overall west-northwesterly transport direction (Fig. 4). In detail, however, the paleoflow indicators on most individual beds display a systematic swing of about 40^{o} across western Erie County, a distance of some 18km (Fig. 4).

Many sandstone units display prominant straight-crested climbing ripples; these asymmetrical ripples are transverse to current flow deduced from sole marks, as well as parting lineations. Most of the sandstones exhibit Bouma sequences Tc, Tcd/e and a few display Tbc, Ta, and Tab. Additionally, the basal sandstone shows a systematic progression of Bouma sequences from east to west across Erie County, from Ta/Tab and Tbc to Tc. Based on the thickness and texture of the sandstones, Walker's (1967) ABC index, and the sand/shale ratio, most of the sandstones in the South Wales Shale Member are "distal" turbidites. Significantly, the sandstone units lack shallow marine or nearshore bedforms such as hummocky cross-stratification and herringbone pattern.

A working hypothesis for the origin and depositional environment of sandstones in the South Wales Shale Member can be constructed from the results of our preliminary study. First, as stated above, the bedforms are consistent with a "distal" turbidite origin. Second, individual turbidites appear to be nonchannelized because the sandstones display minimal sharp variations in character (e.g., thickness) across Erie County, and we observe neither significant erosion at the basal contacts nor typical channel facies.

The critical remaining question concerns the depositional setting of the non-channelized "distal" turbidites. The thin-bedded and continuous nonchannelized nature of the sands, the sand/shale ratio, and the bedforms



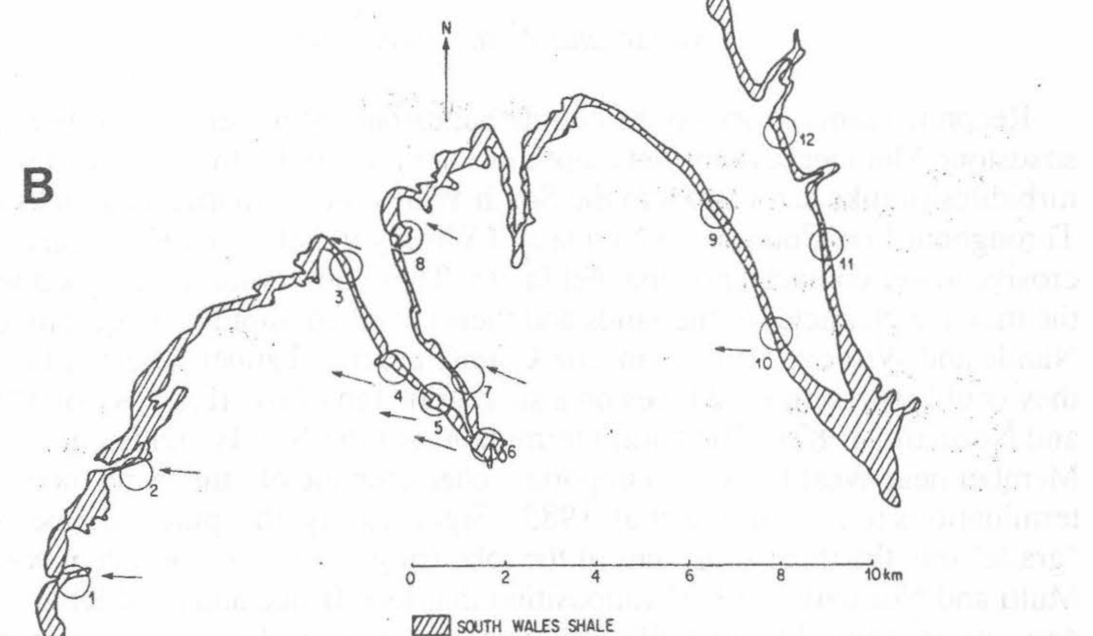


Figure 4. Paleocurrent directions maps. A) Paleocurrent directions for all sandstones at each measured section of the South Wales Shale Member; arrow denotes average direction. B) Average paleocurrent direction for the basal sand unit in the South Wales Shale Member. Figure from Gutmann and Jacobi (1988) and Gutmann (1989).

taken together suggest that the thin-bedded sandstones are either: 1) interchannel deposits (e.g., Mutti, 1977), 2) "distal" ramp deposits (e.g., Pickering, 1982; Chan and Dott, 1983) or 3) sand lobe-fringe deposits (terminology of Mutti and Ricci Lucchi, 1975; Mutti, 1977; "nonchannelized lobes" of Type I deposits in the terminology of Mutti and Normark, 1987).

We can utilize several considerations to discriminate among the three possible depositional settings outlined above for the sandstone beds. We have discounted interchannel facies as a suitable depositional setting because there are no known channel facies at the South Wales Shale horizon in the field area. Discrimination among the latter two origins (ramp vs. fan) may be achieved through evaluation of the regional flow patterns. Radial flow patterns are consistent with either crevasse splay deposits or lobe-fringe deposits that develop downslope from a submarine channel mouth (e.g. Hampton and Colburn, 1967; Pickering, 1982), and are not typical of ramp (or modified ramp) deposits that exhibit no systematic variation in paleocurrent direction (e.g., Chan and Dott, 1983). In our field area, the swing in paleoflow direction of about 40° might represent a portion of the radial flow pattern. The facies of the South Wales Shale Member argues against a crevasse splay interpretation, and thus a lobe fringe deposit seems consistent with our observations. We cannot yet dismiss, however, the possibility that the radial flow pattern is caused by local variations in topography on a clastic ramp.

Nunda and Wiscoy members

Reconnaissance work on the Nunda Sandstone Member and the Wiscoy snadstone Member reveals that these units are not similar to either "distal" turbidites (unlike sandstones in the South Wales) or submarine channel sands. Throughout Erie County, the Nunda and Wiscoy members exhibit neither an erosive lower contact s nor channel facies. These observations, coupled with the massive character of the sands and their lateral continuity, suggest that the Nunda and Wiscoy members in Erie County are not channel sands; rather, they could represent sand lobes on a submarine fan (Type II deposit of Mutti and Normark, 1987). The abrupt termination of the Nunda Sandstone Member near West Falls is an important characteristic of other sand lobe terminations (e.g., Cazzola et al, 1985). Significantly, this pinchout does not "grade" into the thin sandstones of the lobe fringe deposits, consistent with Mutti and Normark's (1987) supposition that lobe fringe and sand lobe deposits are caused by two different types of turbidity flows: sand-poor, highly efficient flow and sand-rich, poorly effeicient flows, respectively.

In western New York the Nunda Sandstone Member generally consists of two packets of sandstone beds -- one at the base of the Nunda Sandstone Member and one near (or at) the top of the Nunda Sandstone Member (Fig. 5). The total number of sandstone beds in the Nunda Sandstone Member varies from 1 to 8, and the total thickness of the Nunda Sandstone Member varies from 0 to 38 m (Fig. 6). The mean grain size of the uppermost sand bed

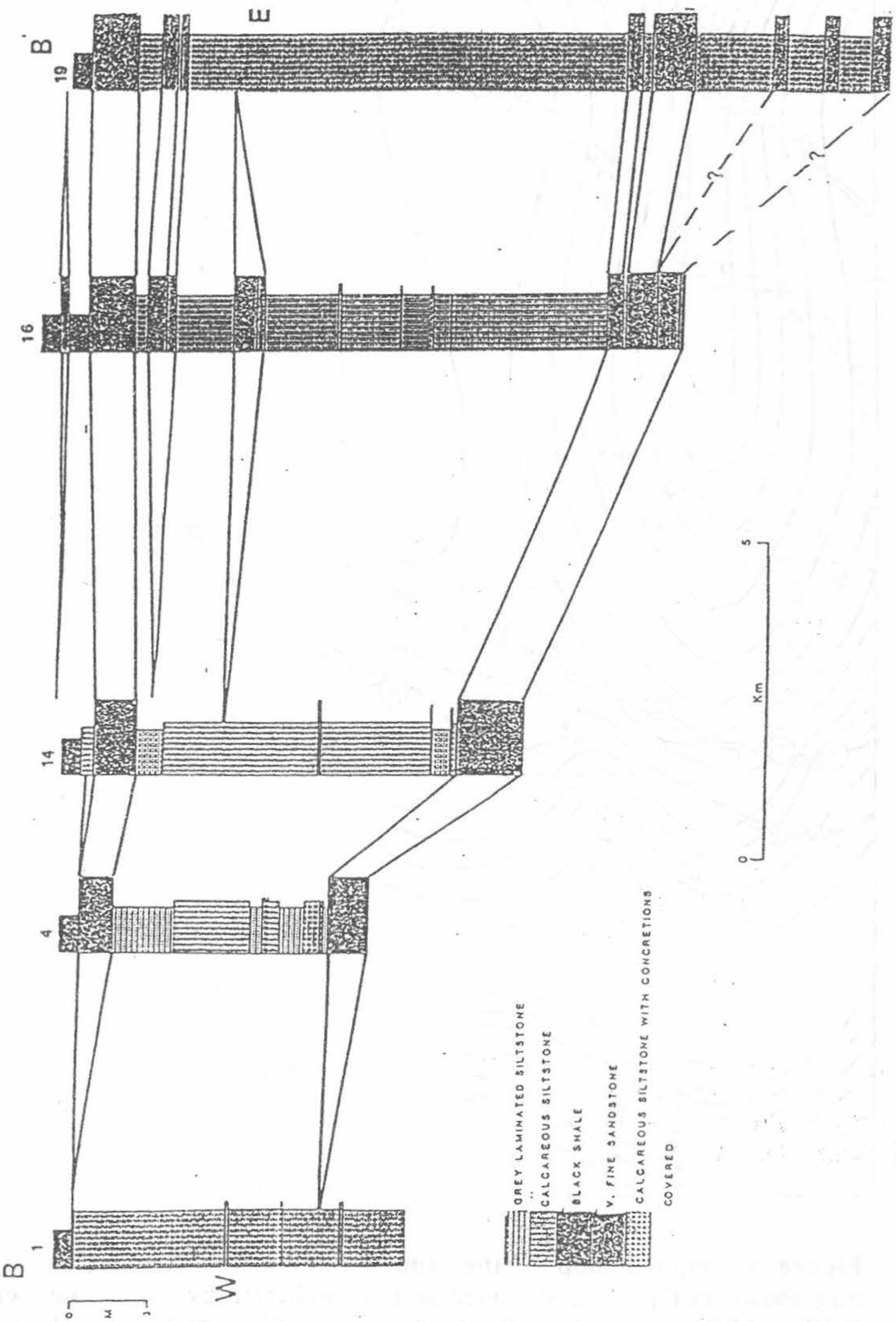


Figure 5. East-West stratigraphic cross section of Nunda Sandstone Member. Location of cross section shown in Figure 2. Figure from Piechocki et al. (1990) and Piechocki (1990).

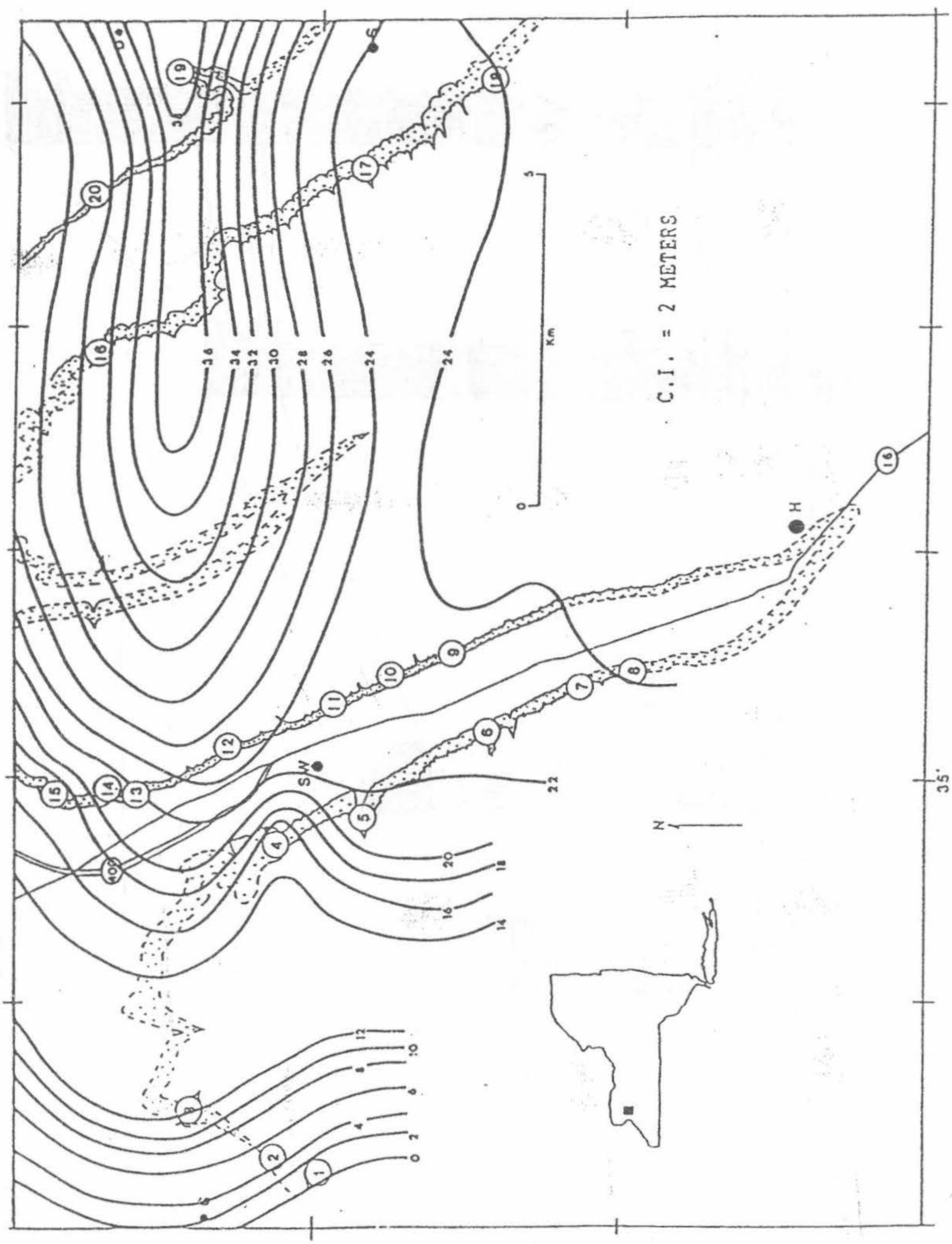


Figure 6. Isopach map of the Nunda Sandstone Member. Location of map shown in Figure 2. Measured sections indicated by circled numbers. G = Griffin's Mills, H = Holland, S = Strykersville, SW = South Wales. Figure from Piechocki et al. (1990) and Piechocki (1990).

varies from 7.5 Ø in the central area to 8.2 Ø at the termination. The overall east-west trend of the grain size is coincident with the zone of thickest Nunda Sandstone Member. The grain size contours display several apparent lobes near the Nunda Sandstone Member termination, and the grain size dramatically fines in the area where the uppermost sand abruptly terminates. There are very few recognizable flow directional indicators in the Nunda Sandstone Member; the few grooves that we have observed in the western sections are transverse or highly oblique to the local isopach contours for the upper and lower sandstone packets. Vertical escape burrows are common in the sandstones of the Nunda Sandstone Member (e.g., Hasiotis and Piechocki, 1990), and indicate very rapid deposition.

ACKNOWLEDGMENTS

This research was partly supported by NSF grant EAR 8904713 awarded to RDJ, SOC and CM.

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Road Log

(see Fig. 7)

Mileage		
Interval	*Cumulative*	
0.00	0.00	Start mileage at NY Thruway Exit 57 Toll Barrier (Eden, NY).
0.35	0.35	T-intersection of Thruway exit ramp and Eden-Evans Center Road. Turn left onto Eden-Evans Center Rd. (this road is called Church Street in the town of Eden).
3.25	3.60	Intersection of Church St. and Route 62. Continue straight on Church St.
1.35	4.95	Intersection of Church St. and Jennings Road. Continue straight on Church St.
1.30	6.25	T-intersection of Church St. and Route 75. Turn right onto Rte. 75
1.00	7.25	Bridge crossing the South Branch of 18 Mile Creek. Excellent exposures of Java Formation shales on the left.
0.30	7.55	Intersection of Rte. 75 with New Oregon Road. Turn left onto New Oregon Rd.
0.30	7.85	Bridge crossing the South Branch of 18 Mile Creek. The contact between Java Formation shales and the overlying Dunkirk Shale Member of the Canadaway Formation is exposed near the base of the section to the left. For permission to inspect outcrop, ask owners at house along the creek (driveway to the west of bridge)
0.48	8.33	Intersection of New Oregon Rd. and Clarksburg Road. Proceed straight on New Oregon Rd.
0.07	8.40	Waterfall in creek to the right of road. Falls is in the Dunkirk Shale. In periods of summer overgrowth, the falls can be viewed from the bridge on Clarksburg Rd., 0.07 mi. back.
0.75	9.15	**Stop 1** Creek bed near a sharp turn to left on New Oregon Rd. For permission to view outcrop, ask owners at the second house past barn along the turn and also ask at the house on the left past the private bridge on the driveway to the outcrop (Fig. 8)

Figure 7. Generalized route of field trip. Note that U.S.G.S. base map is outdated, and does not show the modern route of U.S. 219.

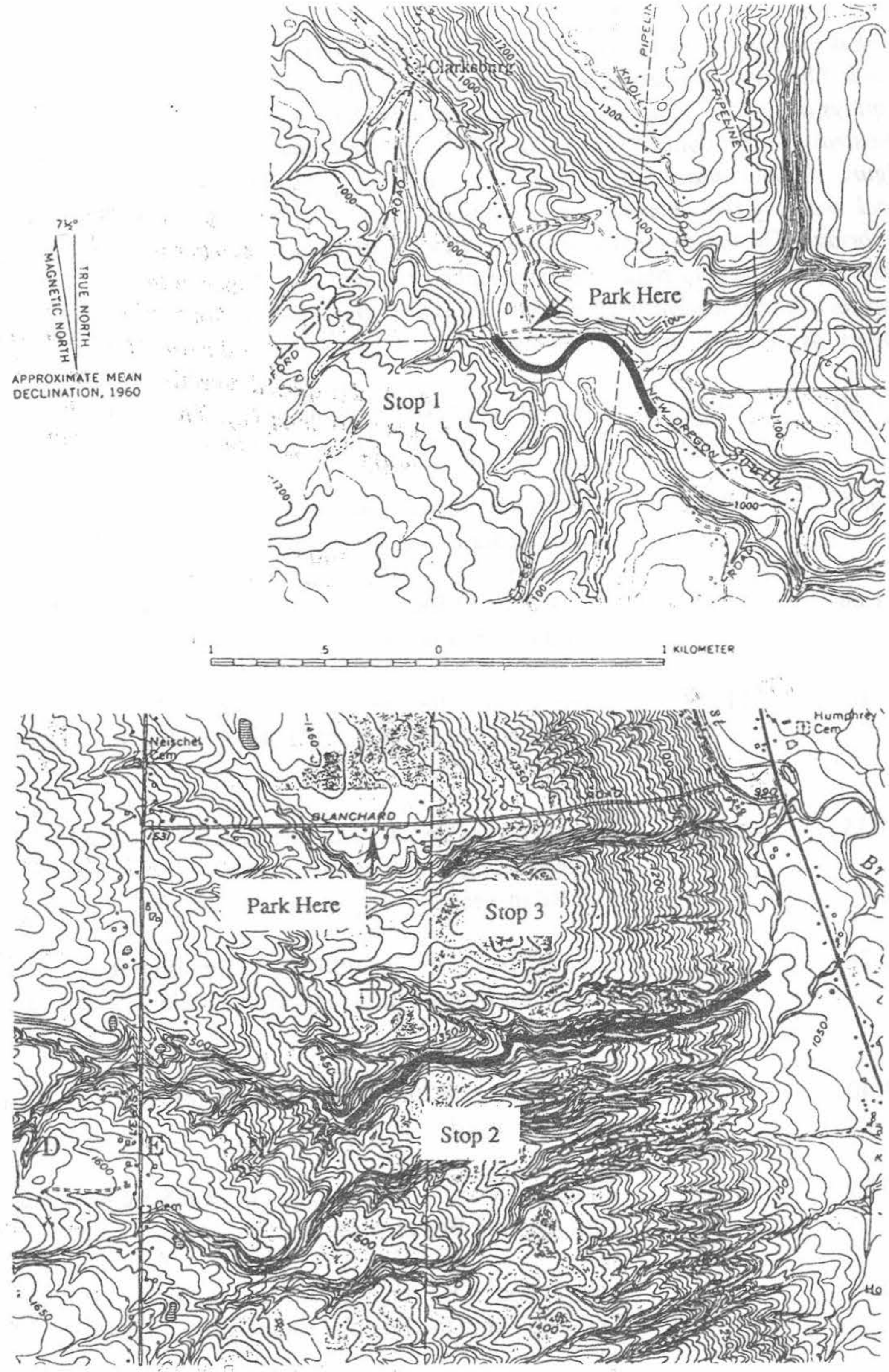

Figure 8. Topographic maps displaying locations of stops 1, 2 and 3.

Walk down the driveway toward the private bridge over the South Branch Eighteen Mile Creek. The creek bed directly below the bridge, as well as the creek bed upstream, (south) displays a "typical" exposure of the South Wales Shale Member of the Perrysburg Formation. The stratigraphic column for the South Wales Shale Member at this locality is portrayed in Figure 3. The contact between the basal sandstone of the South Wales Shale Member and black shales of the Dunkirk Shale Member is exposed at the waterfall north (downstream) of the bridge. The upper surface of the basal bed (exposed directly beneath the bridge) displays prominent straight to sinuous-crested ripples (Bouma Tc). The sandstone bed that forms the cap rock of the waterfalls upstream (south) from the bridge also shows prominent ripples, as well as orthogonal grooves.

0.30	9.45	View of upper portion of the South Wales Shale Member of the Perrysburg Formation on the right.
0.05	9.50	Intersection of New Oregon Rd. and Belcher Road. Turn left onto Belcher Rd.
1.68	11.18	Intersection of Belcher Rd. and paved Boston Road. Continue straight on Belcher Rd.
0.02	11.20	Intersection of Belcher Rd. and Feddick Road. Continue straight on what is now called Feddick Rd. (Feddick Rd. makes a 90° turn at this intersection).
1.55	12.75	Intersection of Feddick, Zimmerman, and Brown Hill Roads. Proceed straight through intersection on Brown Hill Rd. (Brown Hill Rd makes a 90° turn at this intersection).
0.30	13.05	Intersection of Brown Hill Rd. and Emerling Road. Continue straight on Brown Hill Rd. (pass under US 219 immediately after intersection).
1.40	14.45	T-intersection of Brown Hill Rd. and Trevett Road. Turn left onto Trevett Rd.
0.55	15.00	T-intersection of Trevett Rd. and Boston State Road (the old 219). Turn left onto Boston State Rd.
0.30	15.30	Intersection of Boston State Rd. and the Boston Colden Road. Turn right onto the Boston Colden Rd.
1.09	16.39	Y-intersection of the Boston Colden Rd. and Cole Road. Bear to right on the Boston Colden Rd.

1.96	18.35	Intersection of the Boston Colden Road with Route 240 in the center of the town of Colden. Proceed straight across this intersection to the bridge on Heath Rd. (the Boston Colden Rd. becomes Heath Rd. east of this intersection).
0.05	18.40	View of waterfall on right from bridge. This falls is also in the Dunkirk Shale Member of the Perrysburg Formation.
1.50	19.90	T-intersection of Heath Rd. and Hayes Hollow Road (Irish Road). Turn left onto Hayes Hollow Rd.
0.55	20.45	Intersection of Hayes Hollow Rd. and Partridge Road. Turn right onto Partridge Rd.
1.65	22.10	Intersection of Partridge Rd. and Center Road. Continue straight on Partridge Rd.
1.45	23.55	Intersection of Partridge Rd. and Lewis Road. Turn left onto Lewis Rd.
1.60	25.15	Intersection of Lewis Rd. and Blanchard Road. Turn right onto Blanchard Rd.
0.72	25.87	**Stop 2** For permission to view outcrop, ask owners at: 10983 Blanchard and also at two homes at Route 16 (see road log below and Fig. 8).

This stop consists of much of the ravine (indicated on Figure 8) south of Blanchard Road. We will walk south from the parking site to the ravine via farmers' roads, then logging roads, and finally deer trails. We will walk down (east) the ravine and come out on Rte 16. This stop displays a complete section from Nunda Sandstone Member at the base near Route 16 to South Wales Shale Member near the top of the ravine. We will hand out a measured section of this locality on the field trip. In the South Wales Shale Member section, notice that the basal sandstone is no longer prominently rippled, unlike the same sand at stop 1 to the west; rather, it is massive to planar bedded (Bouma Ta/b). The transition from rippled to massive/planar occurs between this section and that exposed at optional stop 3. In the Nunda Sandstone Member note the escape burrows (vertical worm burrows) and undulatory bedding

0.13	26.00	**Stop 3** (optional) To view outcrop, ask owners' permission at 11025 1/2 Blanchard Rd. The owners need proof of self insurance or a signed statement releasing them of all responsibility (Fig. 8).

Walk south from the A-frame house (west of the owner's house) to the waterfall in the ravine that is closest to the Blanchard Road. This stop displays a fairly complete section of the South Wales Shale Member. Although we are about 22 km east-northeast of stop 1, the general appearance of the sandstone beds in the South Wales Shale Member remains the same as that at stop 1, including the prominently rippled basal sandstone.

1.00	27.00	Intersection of Blanchard Rd. and Rte 16. Turn right onto Rte 16.
0.40	27.40	Residence of landowner on right for permission to view Stop 2.
0.10	27.50	Residence of landowner #3 on right for permission to view Stop 2 Reverse direction at this point, returning to Blanchard Rd.
0.40	27.90	Intersection of Rte. 16 and Blanchard Rd. Turn left onto Blanchard Rd.
1.80	29.70	Intersection of Blanchard Rd. and Lewis Rd. Turn right onto Lewis Rd.
0.80	30.50	Intersection of Lewis Rd. and Darien Road. Turn left onto Darien Rd.
1.40	31.90	Intersection of Darien Rd. and Center Road. Turn right onto Center Rd.
3.00	34.90	Intersection of Center Rd. and Blakely Corners Road. Turn left onto Blakely Corners Rd.
1.23	36.13	Intersection of Blakely Corners Rd. and Mill Road. Turn left onto Mill Rd.
0.07	36.20	**Stop 4** (optional) For permission to view outcrop, ask owners at house adjacent to creek section (1437 Mill Rd). The owners need proof of self insurance or a signed statement releasing them of all responsibility (Fig. 9).

This stop displays the upper sandstone of the Nunda Sandstone Member along the north wall of the ravine immediately west of the road. Note that its appearance (e.g., thickness) has not changed significantly from the Nunda exposed at stop 2, some 10 km to the southeast. However, this sandstone bed abruptly pinches out about 3 km south of here (in a ravine 2 km south of here the sandstone is still a meter thick, but in an adjacent ravine at Pipe Creek 4 km south of here, the Nunda is nonexistent).

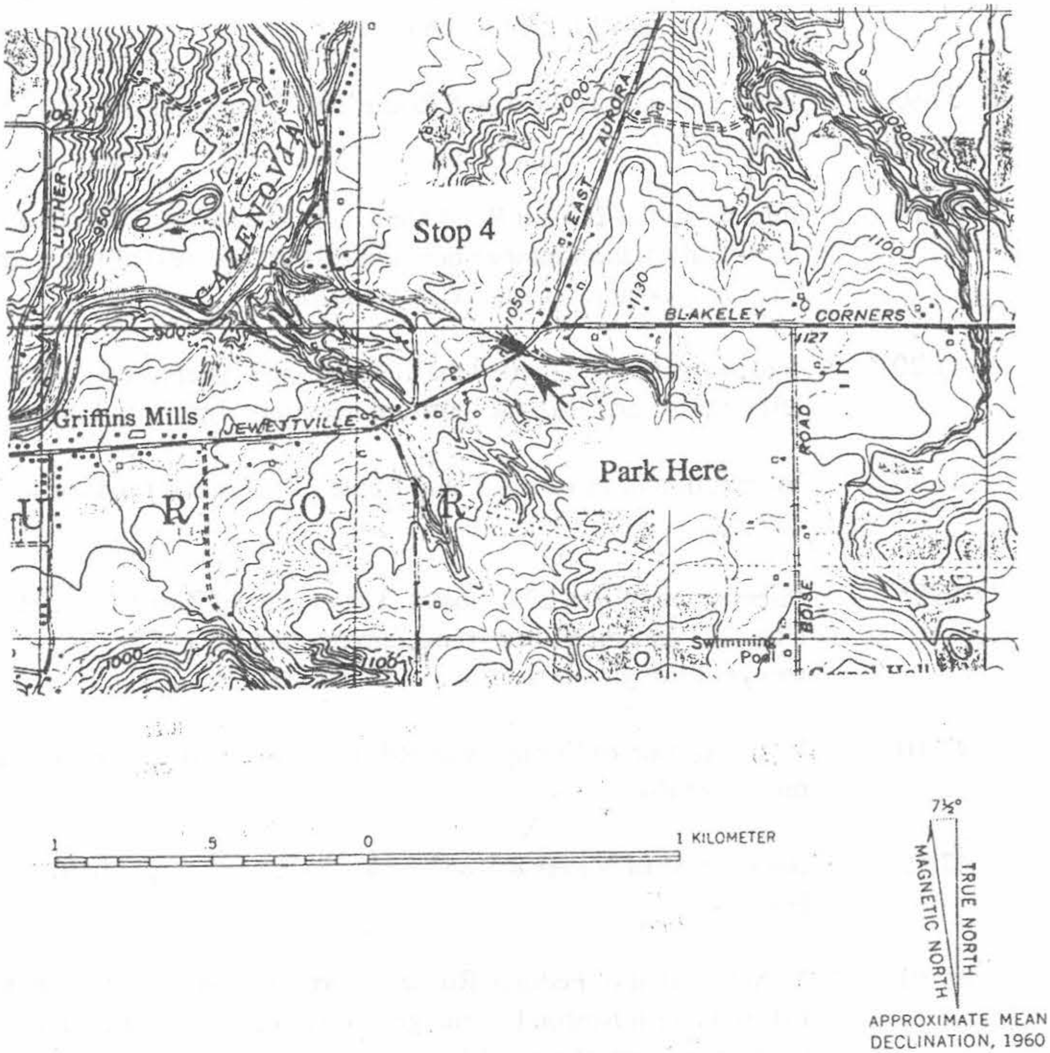

Figure 9. Topographic map displaying location of stop 4.

1.05	37.25	Bridge crossing the West Branch of Cazenovia Creek. Exposures of the Angola Shale Member of the West Falls Formation are seen in the vertical cliff face to the right.
0.70	37.95	Intersection of Mill Rd. and Route 240. Turn right onto Rte. 240 (240 north).
0.65	38.60	Intersection of Ellicott Road and Davis Road (Rte. 240 follows Davis Rd south of intersection and Ellicott Rd west of intersection Turn left, continuing on Rte. 240 "north".
2.60	41.20	Intersection of Rte. 240, Scherff Road and Powers Road. Turn left onto Scherff Rd., then turn immediately right onto Powers Rd
1.00	42.20	Intersection of Powers Rd. and Route 277. Turn left onto Rte. 277
4.15	46.35	Intersection of Rte. 277, Boston State Rd., and Zimmerman Rd (Rte. 277 ends here, becoming Zimmerman Rd.). Proceed straight through intersection on Zimmerman Rd.
0.75	47.10	Y-intersection of Zimmerman Rd. and Mayer Road. Bear to right on Mayer Rd.
0.85	47.95	Intersection of Mayer Rd. and Feddick Rd. Turn right onto Feddick Rd.
0.85	48.80	Y-intersection of Feddick Rd. and North Boston Road (Feddick Rd. and North Boston Rd. merge at this intersection, Feddick Rd. becoming North Boston Rd.).
0.20	49.00	Intersection of North Boston Rd. and Taylor Road. Continue straight on North Boston Rd.
1.35	50.35	Intersection of North Boston Rd. and East Eden Road. Continue straight on North Boston Rd.
1.55	51.90	Intersection of North Boston Rd. and Route 75. Continue straight on North Boston Rd.
0.85	52.75	Intersection of North Boston Rd. and Eden Valley Road. Turn right onto Eden Valley Rd.
0.05	52.80	Intersection of Eden Valley Rd. and Route 62. Turn left onto Rte. 62.

0.20	53.00	Cross bridge over Eden Valley.
2.17	55.17	Intersection of Rte. 62 and Church St. (Eden-Evans Center Rd.). Turn right onto Church St.
3.25	58.42	Intersection of Church St. (Eden-Evans Center Rd) and onramp for NY Thruway Exit 57 (Eden, NY). Turn right for Thruway.
0.35	58.77	NY Thruway Exit 57 Toll Barrier.