

TRIP C: STRATIGRAPHY AND STRUCTURE OF SILURIAN AND DEVONIAN STRATA IN THE SYRACUSE AREA

Newton E. Chute and James C. Brower

<u>Total miles</u>	<u>Miles</u>	<u>Route description</u>
0.0	0.0	Syracuse University Field House at corner of Colvin St. & Comstock Ave. Turn right (N) on Comstock Ave. and continue to Euclid Ave.
0.8	0.8	Turn right (E) on Euclid Ave. and continue to Wescott St. (fire station on corner).
1.4	0.6	Turn left (N) on Wescott St. and proceed to Erie Blvd.
2.0	0.6	Cross E. Genesee St. (traffic light).
2.3	0.3	Exposure of Syracuse formation on right behind Alwain Upholstering Co.'s. building. Turn right (E) on Erie Blvd. Erie Blvd. follows the S. side of a cross channel that carried glacial meltwater drainage eastward from Onondaga Valley.
3.1	0.8	Seeley Road intersection (traffic light), continue on Erie Blvd. for 0.1 mile.
3.2	0.1	Turn right (S) to the excavation in the Syracuse formation behind the Victor Comptometer Corporation and other buildings.
		<u>STOP 1. Upper part of the Syracuse formation.</u>
		The contact of the Syracuse formation with the overlying Camillus shale is near the highest part of the excavation. The members exposed are as follows:
		Upper dolomite member - Most of this member is exposed in the face above the bench. A distinctive porous dolomite bed, referred to in the literature as "vermicular" dolomite, is exposed in the lower part of the member. The holes of the vermicular dolomite probably were filled originally by salt or anhydrite.
		Upper clay member - This member is about 10 feet thick here according to Leutze (1955, M.S. thesis, Syr. U.). It is mostly concealed under the floor of the bench and the talus debris.
		Middle dolomite member - Thin- to medium-bedded dolomite. A few exposures of the upper part of this member may be seen below the bench.
3.3	0.1	Return to Erie Boulevard and turn right (E).
4.3	1.0	Thompson Road (traffic light), continue on Erie Blvd. for 0.2 mile.

TRIP C (Continued)

<u>Total Miles</u>	<u>Miles</u>	<u>Route description</u>
4.6	0.3	Turn right to excavation at rear of the Victory Market.
4.7	0.1	<u>STOP 2. Syracuse formation</u> A bed of gypsum 2 to 4 feet thick in the Lower Clay member is exposed near the bottom of the excavation behind the Victory Market and the Towne Mart. This gypsum bed is overlain by the Middle Dolomite member composed of impure thin- to medium-bedded dolomite and gypsiferous shale to the top of the excavation.
4.8	0.1	Return to Erie Blvd. and turn right (SE). Proceed to E. Genesee St.
6.4	1.6	Turn right (NW) on E. Genesee St. and proceed to Hillsboro Parkway and Meadowbrook Drive (double traffic lights).
8.0	1.6	Turn half left onto Meadowbrook Drive and proceed a short distance to Kimber Road. Meadowbrook Drive follows a well-defined glacial cross-channel that carried meltwater drainage eastward.
8.1	0.1	Turn left (S) on Kimber Road on east side of school grounds and continue to Euclid Avenue at top of hill.
8.3	0.2	Turn right (W) on Euclid Avenue for one block.
8.5	0.2	Turn right into high school grounds opposite Guilford Road and park. <u>STOP 3. Camillus shale.</u> Some of the upper part of the Camillus shale formation is exposed in small gulleys on the hillside. The rock units visible are as follows: 1½' Greenish gray thin-bedded dolomitic shale 6½' Massive greenish gray dolomitic shale with scattered quartz sand grains. This rock weathers rapidly into small angular fragments. 2' Dolomitic thin-bedded shale that breaks into thin slabs and resists weathering better than the greenish shale above. 5' Gypsiferous shale and gypsum? now partly leached to clay. 8' Covered 2' Massive greenish gray dolomitic shale with scattered quartz sand grains similar to the greenish shale above. This exposure is in the ditch on the east side of the macadam roadway.

Downhill, about 50 feet lower stratigraphically, 4½ to 5 feet of greenish shale with thin beds of brownish dolomite are exposed in the

Total miles	Miles	<u>Route description</u>
		bank at the uphill side of the playground behind the Washington School. These exposures probably are near the middle of the Camillus. The Camillus of the Syracuse area seems to be unfossiliferous. Return to Euclid Avenue and turn left (E).
8.7	0.2	Turn right (S) on Kimber Road. For the next 2 miles the route passes through a group of drumlins and bedrock exposures are scarce.
9.3	0.6	Randall Road junction, continue south. Between Randall Road and Guintard Road (McGee Road) the route swings west around the end of a drumlin. Continue south on Peck Hill Road.
10.6	1.3	Exposure of Cobleskill dolomite on the left side of Peck Hill Road.
10.7	0.1	Junction of Peck Hill Road with Nottingham Road. Turn left (SE) on Nottingham Road.
11.1	0.4	Entering Rock Cut gorge, the largest of the cross channels, eroded by the outflow from glacial lakes in Onondaga Valley to the west. The floor of this channel is the Fiddlers Green dolomite member of the Bertie formation. It "hangs" about 140 feet above the Onondaga Valley on the west and about 50 feet above the Butternut Creek Valley on the east.
11.4	0.3	Junction of Nottingham Road with Jamesville Toll Road. Turn right (W).
12.1	0.7	Turn right at the General Crushed Stone Company and proceed to the quarry.

STOP 4. Rondout dolomite, Thacher limestone, and Olney limestone exposed in quarry.

The quarry section is as follows:

- 33 $\frac{1}{2}$ ' Olney limestone
- 9' Thacher limestone
- 14 $\frac{1}{2}$ ' Rondout dolomite

The Rondout and part of the Thacher are exposed in the old lower part of the quarry near the primary crusher. The main operating face is in the Olney limestone.

The Thacher here has the lithologic characteristics of the lower part of the member farther east. The contact with the overlying Olney is placed at the top of the highest zone of algal colonies and at the bottom of the lowest "drab and blue" limestone unit characteristic of the Olney.

As elsewhere in central New York, the lower Thacher exposed in this quarry is characterized by two or three zones of algal colonies and

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Total
Miles Miles

Route description

a yellow dolomite bed from about 6 inches to 3 feet in thickness. This variation in thickness appears to be due to a diastem at the top of the dolomite bed.

Subsidence structures are well exhibited in plan and section in this quarry.

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|------|-----|---|
| 13.1 | 1.0 | Return to Jamesville Toll Road and turn left (E). |
| 13.8 | 0.7 | Nottingham Road junction. Continue east on Jamesville Toll Road. |
| 14.0 | 0.2 | Road cut in the Rondout and Cobleskill dolomite formations to top of grade. |
| 14.5 | 0.5 | Bridge over the D. L. & W. Rwy. |
| 14.6 | 0.1 | Junction of Jamesville Toll Road with Jamesville Road. |
| 14.9 | 0.3 | Turn left on the road into the Solvay Process Division's quarry property and stop at the bridge over Butternut Creek. |

STOP 5. Type section of the Fiddlers Green member of the Bertie Formation.

The Fiddlers Green dolomite has a total thickness of about 27 feet in this area. The bottom contact with the Camillus shale is exposed on the east side of the gorge several hundred feet down stream from the bridge. The top contact is not exposed, but the mudcracked beds near the bridge probably are close to the top of the member.

Ostracodes are numerous in a few thin layers, other fossils are rare. Eurypterids have been found in the top beds in other localities.

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| 15.0 | 0.1 | Return to Jamesville Road and turn right (N). |
| 15.3 | 0.3 | Keep right on Jamesville Road at Junction with Jamesville Toll Road. |
| 15.5 | 0.2 | Butternut Creek bridge. |
| 15.8 | 0.3 | Turn right (E) on Woodchuck Hill Road. |
| 16.9 | 1.1 | Maple Hill Drive junction. |
| 17.0 | 0.1 | Exposure of Fiddlers Green dolomite on left. |
| 17.3 | 0.3 | Turn left (NE) on Old Quarry Road. |
| 17.6 | 0.3 | Old gypsum quarry on right. |
| 17.7 | 0.1 | Road cut in Cobleskill dolomite. |

TRIP C (Continued)

<u>Total miles</u>	<u>Miles</u>	<u>Route description</u>
17.8	0.1	<u>STOP 6. Old gypsum quarries in the Scajaquada (Forge Hollow) Member of the Bertie Formation.</u>

Park at bend in road and walk 250 feet south to the roadway into the north quarry. This quarry exposes the upper part of the Scajaquada (Forge Hollow) gypsum member overlain by the Williamsville (Oxbow) impure dolomite member and the lower part of the Cobleskill dolomite.

Walk back to the entrance of the quarry and go southeast up the hill to the west side of the south quarry. Here there is an exceptionally good opportunity to observe the top of the Scajaquada member, all of the Williamsville member, and the lower half of the Cobleskill formation. A composite section of the north and east sides of the quarry is as follows:

17' Cobleskill (to top of east side of quarry)

2 $\frac{1}{2}$ ' dolomite with numerous closely spaced fractures in the plane of the bedding. A few stromatoporoids.

10' Stromatoporoid biostrome. Numerous partly silicified undolomitized stromatoporoids in dolomitic limestone. Some small horn corals, tabulate corals, ostracodes, and small fossil fragments. This is the only locality where this biostrome is known near Syracuse, elsewhere the Cobleskill is completely dolomitized and only a few silicified stromatoporoids remain.

4 $\frac{1}{2}$ ' Mottled dolomitic limestone with abundant small fossil fragments and some small horn corals. This unit also is not known elsewhere in the Syracuse area.

17' Bertie formation

6' Williamsville member - thin to medium-bedded argillaceous dolomite

11' Scajaquada member -

8 $\frac{1}{2}$ ' Thin-bedded argillaceous dolomite with 30% or more collapse breccia due to solution of interbedded salt or gypsum

2 $\frac{1}{2}$ ' Top of dark brown bedded gypsum. The gypsum is reported to attain its maximum thickness of 60 to 65 feet in this area.

The location of the contact between the Williamsville and Scajaquada members is uncertain and is one of the problems to be considered at this stop.

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<u>Total miles</u>	<u>Miles</u>	<u>Route description</u>
		A cross-section of a small subsidence structure is well exposed in the northeast corner of the quarry.
		Return to Woodchuck Hill Road.
18.3	0.5	Junction of Old Quarry Road with Woodchuck Hill Road. Turn right (NW) on Woodchuck Hill Road and return to Jamesville Road.
19.8	1.5	Turn left (S) on Jamesville Road.
20.3	0.5	Junction with Jamesville Toll Road. Continue south into the village of Jamesville on Jamesville Road.
21.2	0.9	Turn right over the railroad on Route 173 (Seneca Turnpike) in Jamesville and proceed west to Clark Reservation State Park.
22.5	1.3	Turn right into Clark Reservation State Park and stop in the parking lot.

Note: Collecting of rock samples and fossils is not permitted in this park; you will have better collecting at other stops.

STOP 7. Onondaga and Manlius formations. (Lunch Stop)

The remarkable abandoned waterfall and plunge basin in this park were formed by a river that drained a glacial lake in Onondaga Creek Valley to the west when glacial ice blocked the drainage to the north.

The lip of the falls is on the Edgecliff member of the Onondaga limestone. The Nedrow and Moorehouse members are exposed nearby at higher elevations and are at the edge of the plunge basin on the north side.

This is the type locality for the Clark Reservation and Jamesville members of the Manlius formation. These and other members of the Manlius, except the Thacher which is covered, are well exposed along the stairway on the south side of the plunge basin. The section here is as follows:

Onondaga limestone

17 to 18' Edgecliff member, 2' of sandy limestone and calcareous sandstone at base.

Disconformity

Manlius limestone

5'9" Pools Brook member, dolomitic limestone

19' Jamesville limestone, numerous stromatoporoids in upper 8 feet.

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<u>Total</u> <u>miles</u>	<u>Miles</u>	<u>Route description</u>
		3'3" Clark Reservation oolitic limestone
		9'10" Elmwood dolomite and dolomitic limestone member
		2'7" Elmwood C argillaceous dolomite submember
		2'9" Elmwood B dolomitic limestone submember
		4'6" Elmwood A argillaceous dolomite submember
		22' Olney limestone to bottom of exposure
23.0	0.5	Return to the park entrance and turn left (E) on Route 173.
24.3	1.3	Junction with Jamesville Road on east side of railroad tracks in Jamesville. Continue east on 173 to Route 91.
24.4	0.1	Turn right (S) on Route 91.
		Road cut on left in the upper few feet of the Rondout dolomite and the Thacher and Olney limestone members of the Manlius. Some unusually large algal colonies are present in the Thacher in a zone about 3 feet thick.
24.9	0.5	Turn left into quarry.

STOP 8. Onondaga County Penitentiary quarries

The two penitentiary quarries provide exceptionally good exposures of most of the Manlius and Onondaga limestone formations. Also a thrust fault can be seen in the upper quarry.

The stratigraphic section of the quarries is as follows:

- Onondaga limestone formation
 - 5' Seneca limestone member (to top of quarry)
 - 24' Moorehouse limestone member
 - 13' Nedrow limestone member
 - 23' Edgecliff member including 4½ feet of sandstone at the base (Springvale sandstone bed)
- disconformity
- Manlius limestone formation
 - 7'3" Pools Brook limestone member
 - 22'2" Jamesville limestone member
 - 3'3" Clark Reservation limestone member
 - 11'4" Elmwood member
 - 3'6" C submember
 - 3'0" B submember
 - 4'8" A submember
 - 19' Olney limestone member

TRIP C (Continued)

Total
miles Miles

Route description

The strata exposed in the lower quarry range from the lower part of the Olney member to the bottom 1-foot of the Pools Brook member. The main floor of this quarry is at the top of the Olney limestone with a few inches of the bottom of Elmwood A dolomite in places. The Elmwood A and C submembers are distinguished by their yellow brown weathering color, the Clark Reservation limestone by its very light gray weathering color and diagonal fractures, and the Jamesville limestone by the massive stromatoporoid biostrome that constitutes its upper half.

Most of the Pools Brook member and the overlying sandstone (Springvale sandstone bed of the Edgecliff member) are exposed in the stripped area between the two quarries. The Pools Brook is easily recognized by its thin bedding and sparseness of fossils. The Springvale sandstone is brown and contains scattered black phosphatic nodules.

The upper quarry is entirely in the Onondaga limestone. Most of the floor is on the top of the Springvale sandstone. On the downthrown side of the thrust fault, at the north side of the quarry, the floor is in the lower part of the Moorehouse limestone member. The middle and upper parts of the Moorehouse member are most accessible for examination on the downthrown side of the thrust fault at the north side of the quarry, where loosely coiled cephalopods of the Halloceras bed are exposed on the floor. Oliver (1954, G.S.A. v. 65) designated this quarry as the type locality of the Moorehouse member. He derived its name from Moorehouse Flats nearby. The Seneca member is poorly represented in the quarry. All but a few feet has been eroded.

The Edgecliff member contains numerous rugose and tabulate corals and much crinoid debris including some unusually large columnals. It is most easily seen at the west end of the north side of the quarry. The Nedrow member also is most accessible here.

The reverse fault on the north side of the upper quarry strikes about N 70 W, dips about 20 degrees south, and has a throw of 31 feet. It is complicated in places by multiple slip planes, drag, and crushing. Small veins in north-south joints near the fault contain calcite, dolomite, fluorite, quartz, and a solid hydrocarbon. These are best seen in the Olney limestone of the lower quarry.

25.0	0.1	Return to entrance of the lower quarry and turn right (N) on Route 91 and proceed to Route 173.
25.5	0.5	Turn right (E) on Route 173.
25.7	0.2	Exposure of Edgecliff on left near top of grade.
26.1	0.4	Turn right (S) on Taylor Road.

TRIP C (Continued)

<u>Total miles</u>	<u>Miles</u>	<u>Route description</u>
		<p><u>STOP 9.</u> View to south of the stripped surface on the Onondaga limestone which forms a prominent bench about 150 feet above the bottom of Butternut Creek Valley. The Marcellus and Skaneateles formations of the Hamilton Group form the steep slopes to the southeast.</p> <p>Continue south on Taylor Road for 0.8 mile to wooded tract at bend in road.</p>
26.9	0.8	<p><u>STOP 10. Coral bioherm in the Onondaga limestone.</u> Taylor Road crosses a coral bioherm here. Most of the exposures are in the wooded tract on the west side of the road. This is the only bioherm known in the Onondaga limestone in the Syracuse area. Usually these bioherms start in the Edgecliff member and, if thick enough, extend upward into higher members. In the absence of exposures of the adjacent limestone, it is not possible to determine the stratigraphic range of this bioherm, but it appears to extend well up into the formation.</p> <p>Return to Route 173.</p>
27.7	0.8	Turn left (W) on Route 173 and proceed west through Jamesville.
29.6	1.9	Entrance to Clark Reservation State Park. Continue west on Route 173.
31.6	2.0	Turn sharp left (S) on LaFayette Road.
		<p>A thrust fault, which strikes about N 70 W, dips about 20 degrees south, and has a throw of 42 feet, crosses Route 173 near this road junction. Formerly it was exposed in one of the old quarries that are now filled. Present exposures east of the road junction show the Onondaga and Manlius limestones offset by the fault.</p>
31.8	0.2	Outcrop of Onondaga limestone at edge of road on left.
31.9	0.1	Subsidence structure in Onondaga limestone in field on left. Exposed beds have an anomalous dip west because of this structure.
33.0	1.1	Road crosses west end of Smoky Hollow cross channel at an altitude of about 780 feet. This is the southernmost of the well-developed cross channels eroded between Onondaga Valley and Butternut Creek Valley by the outflow from glacial lakes in Onondaga Valley. The channel was eroded in Marcellus shale down to the more resistant Onondaga limestone.
33.1	0.1	Turn right onto Graham Road and continue south.

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Total miles	<u>Miles</u>	<u>Route description</u>
33.5	0.4	<p><u>STOP 11. View of Onondaga Creek Valley</u></p> <p>Some of the topographic, glacial, and stratigraphic features of this part of the valley will be pointed out at this stop.</p> <p>Continue south.</p>
33.8	0.3	Turn right (downhill) on Sentinel Heights Road.
34.1	0.3	Turn left (S) on Kennedy Road. Road cuts on the new divided highway (Route 81) to right are in the Edgecliff and Nedrow members of the Onondaga limestone. The road cuts on Kennedy Road are in the Moorehouse member and the top few feet of the Nedrow member.
35.0	0.9	Turn right and proceed a short distance to Route 11.
35.1	0.1	Turn right (N) on Route 11 and park.
35.2	0.1	<p><u>STOP 12. Top of the Onondaga limestone and Union Springs shale displaced by a small thrust fault.</u></p> <p>The upper 8 feet of the Onondaga limestone and about 10 feet of the Union Springs shale are exposed on the side of the deep drainage ditch on the east side of the road. Exposures of the top contact of the Onondaga such as this are rare.</p> <p>At the south end of the drainage ditch a thrust fault with a throw of about 5 feet cuts the top of the Onondaga but is absorbed in the Union Springs shale above by complex crumpling and jointing.</p> <p>Continue north to north end of large road cut on the opposite side of the bridges. Park off the road.</p>
35.4	0.2	<p><u>STOP 13. Road cut in the Manlius and Onondaga formations.</u></p> <p>The stratigraphic units exposed in the road cut are as follows:</p> <p style="margin-left: 40px;">Onondaga limestone formation</p> <p style="margin-left: 80px;">11'6" Moorehouse limestone member (to top of exposure)</p> <p style="margin-left: 80px;">11-12' Nedrow limestone member</p> <p style="margin-left: 80px;">12'8" Edgecliff limestone member</p> <p style="margin-left: 40px;">-----disconformity-----</p> <p style="margin-left: 40px;">Manlius limestone formation</p> <p style="margin-left: 80px;">10' Pools Brook limestone member</p> <p style="margin-left: 80px;">18' Jamesville limestone member</p> <p style="margin-left: 80px;">4' Clark Reservation limestone member</p> <p style="margin-left: 80px;">Elmwood C (only the top few inches exposed)</p>

TRIP C (Continued)

Total
miles Miles

Route description

The lowest part of the section is at the north end of the cut where the top few inches of Elmwood C, the Clark Reservation, and the Jamesville are exposed.

This stop provides an opportunity to compare the stratigraphic units with the same units seen at the Penitentiary quarries (stop 8) 4 miles northwest. Most of the units are similar, but one significant difference at this stop is the absence of the Springvale sandstone bed at the base of the Edgecliff member, and another is the presence of a bed with stromatoporoids and favositid corals at the top of the Pools Brook member. This bed has a small erosion surface at its base, suggesting that it might correlate with the Bishop Brook limestone exposed on the hill northeast of Manlius, which is in a similar stratigraphic position and also has an erosion surface at its base. However, the bed appears to resemble the Jamesville more closely than the Bishops Brook both faunally and lithologically.

Inclined joints are well developed in the Nedrow member on the south side of the exit road from Route 81. Many of these are limited to certain beds and end upward against prominent shaly partings. They also are numerous in the Manlius at the north end of the road cut where the beds are slightly arched.

Continue north on Route 11 a short distance.

- 35.5 0.1 Cross to the south bound lanes and proceed south to the first road right.
- 35.8 0.3 Turn right (W) on road into the Indian Reservation at the junction of Routes 11 and 81. Keep right at next road junction.
- 36.0 0.2 Turn left into large quarry.

STOP 14. Indian Reservation quarry in the Onondaga limestone, the type locality of the Nedrow member.

This quarry formerly was worked for building stone.

The stratigraphic units exposed in the quarry are as follows:

- Onondaga limestone formation
 - 15'9" Seneca limestone member (To top of quarry).
 - 18'6" Moorehouse limestone member
 - 11-12' Nedrow limestone member
 - 12'0" Edgecliff limestone member (base not exposed).

The main floor at the south end of the quarry is at the top of the Edgecliff member. The south face exposes the Nedrow, Moorehouse, and Seneca members. The Tioga bentonite bed (8" to 9" thick), which Oliver (1954, Bull. G.S.A., v. 65) uses as the boundary between the Moorehouse and Seneca members, can be seen in the upper part of the

TRIP C (Continued)

Total
miles Miles

Route description

face where it forms a reentrant a few inches above a 4-inch layer of black chert.

The best fossil collecting is on the main floor of the quarry where brachiopods, corals, bryozoa, and crinoid debris, including segments of unusually large columnals, are abundant.

Climb up the south side of the quarry to observe the Tioga bentonite and the Seneca member at the top. A zone of pink chonetid brachiopods is exposed about 2 feet below the highest beds at the edge of the stripping.

Walk east to the fence on Route 81 to observe the Union Springs shale and the Cherry Valley limestone exposed in a new road cut.

Return to Route 11.

36.4	0.4	Junction with Route 11. Turn left (N) on Route 11 and continue to Seneca Turnpike (Route 173).
39.2	2.8	Intersection of Routes 11 and 173. Turn left (W) on Route 173.
41.0	1.8	Junction with South Avenue. Hold right on Route 173 where the road forks a short distance west of South Avenue.
41.9	0.9	Ravine in Marcellus shale on left a short distance west of the County Home.
43.7	1.8	Junction with Fay Road. Keep left on Route 173.
44.1	0.4	Turn left on Onondaga Blvd. toward Split Rock Gulf and continue to the end of the road.
44.9	0.8	<u>STOP 15. Split Rock Quarries in the Manlius and Onondaga limestones.</u>

Park in old part of quarry at end of road and walk east into the easternmost quarry in the Manlius.

The Edgecliff member of the Onondaga limestone can be seen in this quarry to rest disconformably on Elmwood A bed of the Elmwood member. The 33 feet of limestone between the Elmwood A bed and the Rondout dolomite exposed on the floor of the quarry, is considered to be the Olney member of the Manlius formation by Rickard (1962, N.Y.S. Mus. Bull., 386). The bottom 5 feet of this limestone, however, has beds characteristic of the lower part of the Thacher limestone member to the east. These beds will be examined in an attempt to evaluate their significance in resolving the problem of the "disappearance" of the Thacher.

End of Trip