N.Y.S.G.A. - 14th Annual Meeting, 1938
Buffalo Museum of Nat. Science

Frontier Draws Geologists

State Association Meets Here

By Irving G. Reimann

Irving G. Reimann, in his joint capacity as Curator of Geology at the Buffalo Museum of Science and as President of the New York State Geological Association, welcomes the members of the Association to Western New York. As official host, he has laid out the several field trips and compiled the data for the stratigraphy tables and, with Prof. William P. Alexander, Hayes Professor of Natural Science at the Museum and Secretary of the Association, has completed all arrangements for the meeting.—*Editor's Note.*

● ● ● For the first time since its organization in 1925 the New York State Geological Association has chosen the Niagara Frontier for its Annual Field Meeting.

This organization was originated as a practical means of offering students the opportunity to visit New York State localities of geologic interest and importance under the leadership of men familiar with the respective regions. The benefits have extended to both instructors and students. To many the greatest pleasure afforded by these meetings is the opportunity of renewing old friendships and of making new ones among the State's geologists. The value of these field conferences is indicated by the increasing number of out-of-state geologists who join us each year.

Foreshadowing the present organization were field parties conducted by Prof. Herman L. Fairchild and Prof. George H. Chadwick in 1914, and in a few of the subsequent years. Later, in 1925, Prof. Nelson C. Dale of Hamilton College and Prof. Harry N. Eaton of Syracuse University provided the necessary stimulus to cause the present group to organize.

Membership in the Association is variable, that status being conferred upon all of the registrants for the field meetings.

The Director and the Geological Staff of the New York State Museum have given the organization support and helpful cooperation throughout its existence.

The Buffalo Society of Natural Sciences extends its most cordial welcome.

RECORD OF PAST MEETINGS

1925 Hamilton College
1926 Syracuse University
1927 Vassar College
1928 Cornell University
1929 New York State Museum
1930 Union College
1931 Port Henry
1932 University of Rochester
1933 Columbia University
1934 Colgate University
1935 Hamilton College
1936 Anthracite Region (joint meeting with Pennsylvania State Ass'n.)
1937 Syracuse University

Mother Earth's Diary is an ancient book but one whose pages are becoming increasingly legible to both the scientist and the layman.

While this issue of *Hobbies* is largely devoted to material designed for the use of those attending the New York State Geological Association meeting, other readers of *Hobbies*, judging by past requests for just such information about this earth of ours, will find it of interest and use.

The analysis of Erie and Niagara Counties, given here, provides background for understanding; exhibits in the Hall of Earth Science and in the Hall of Geology and Paleontology present this knowledge dramatically; and the field guide on the pages that follow invites motorists to "ride with a purpose."—*Editor's Note.*

98

Let Us Speak Geologically

Erie, Niagara Counties Analyzed

● ● ● Erie and Niagara Counties are underlain by a series of paleozoic strata extending from the Upper Ordovician Queenston shale on the north to the Upper Devonian Westfield shale above Cattaraugus Creek on the southeast corner of Erie County, dipping about 34 feet a mile to the southeast.

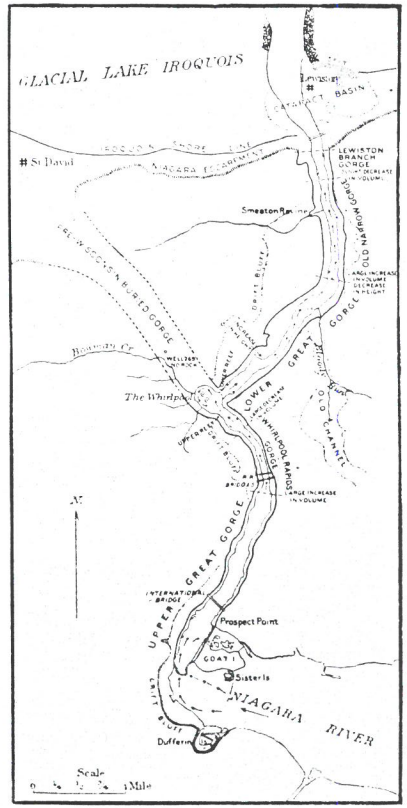
The topography is of the cuesta type, developed on a paleozoic coastal plain. The prominent cuestas of the area are caused by the resistant Lockport dolomite, the Onondaga limestone, and the Portage and Chemung shales, which form the front of the Allegheny Plateau. The relief varies from a low of 247 feet above sea level at Lake Ontario to a maximum elevation of 1,940 feet between Holland and East Concord. The southern highlands are dissected by a series of northward-draining valleys, parallel to and similar in origin to the Finger Lake valleys of Central New York.

The drift mantle is for the most part thin, but a few thicker morainal belts traverse the area in a general southwest to northeast pattern.

Deposits of glacial Lake Iroquois may be seen along the base of the Niagara Escarpment. Lake Tonawanda lay south of and above the Escarpment. Beaches and bars of Lakes Warren and Whittlesey occur east and south of the present Lake Erie shore.

Physiographically the area is divided between the Interior Lowland and the northwestern fringe of the Allegheny Plateau.

The area's most famed geological localities are the Niagara Gorge and Eighteen Mile Creek, the former important for its bearing upon the geological history of the Great Lakes, the latter chiefly for its fossils.



The 5 named divisions of the Gorge and changes in volume of the River.

Lewiston Branch Gorge, cut during the first lake stage; small volume. Old Narrow Gorge, second lake stage; small volume. Lower Great Gorge, third lake stage; large volume. Whirlpool Rapids Gorge, fourth lake stage; small volume. Upper Great Gorge, fifth lake stage; full volume of upper four lakes. Reproduced with the permission of the U. S. Geological Survey from *Geologic Atlas of the United States*, Folio 190, by Kindle and Taylor.

Field Guide, New York State Geological Association
Friday Afternoon, May 13, 1938
Eighteen Mile Creek

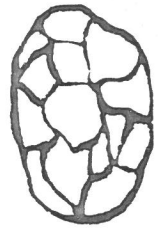
Mileage	
.0	Meeting place on South Park Avenue, south of Ridge Road, opposite Basilica, Our Lady of Victory. Proceed south. Level topography represents Lake Warren bottom.
3.6	Rush Creek.
0.9	Gutter outcrop on left. Rhinestreet shale.
1.3	Beach of lower Lake Warren stage.
1.3	Crossing Lake Warren beach into Hamburg.
0.3	Turn right on Buffalo Street.
0.4	Turn right at signal into Main Street.
0.6	Turn left on route U. S. 62. This road follows the Lake Warren beach for several miles.
0.8	North branch of Eighteen Mile Creek. Hatch shales (Water Valley).
1.0	Stop. Notice wave-cut hill, Lake Whittlesey shore line. Lake Warren shore on immediate right.
0.1	Take right fork.
0.9	Angola shale in ravine.
0.6	South Branch Eighteen Mile Creek. Lake Warren delta deposits. Angola shale. (Eden Valley.)
0.9	Right on Shadagee road.
0.3	Straight ahead at fork, on Bley Road. Following a lower Lake Warren shoreline.
0.7	Right.
0.4	Turn left. Valley of South Branch of Eighteen Mile Creek on right. Lake Warren delta deposits.
0.5	Stop. Contact between Angola and Hatch shales under bridge.
1.4	Turn right.
0.9	Right (Rhinestreet and Hatch shales at right). Division plane evident. (North Evans.)
0.9	Southwestern Boulevard. Continue straight.
1.0	Stop. Leave cars to see Upper Devonian exposure.
0.9	Cross new Lake Shore road.
0.3	Turn left on old Lake Shore road.
0.1	Turn right in private drive. Leave cars to collect in Middle Devonian (Hamilton).
0.0	Turn left into old Lake Shore road. Eighteen Mile Creek at bottom of hill. Grabau's Section 7 is on the right, Section 8 on the left.*
3.5	Route 5. New Lake Shore road.
2.5	Avery's Creek. If time permits a stop will be made here to examine the Ledyard shale. Party disbands.

*A. W. Grabau. 1898-1899. Geology and Paleontology of Eighteen Mile Creek and the Lake Shore Sections of Erie County, N. Y. Buffalo Society of Natural Sciences, Bulletin, vol. 6.

General Stratigraphy for Field Trips Friday and Sunday

All of the strata exposed in Erie County are included in this table. Only those from the Angola shale to the Ledyard shale will be observed on Friday. Some of the others may be visited on Sunday's optional trips.

CHAUTAUQUAN EPOCH	Canadaway Group	180′	**Westfield shale** Sandstones, flags, hard sandy shales, and soft clayey shales. Calcareous concretions. Naples fossils. Becomes sandy to the east, with Chemung brachiopods.
		22′	**Laona sandstone** Chemung fossils. Identity uncertain to east.
		350′	**Gowanda shale** Lithologically and faunally similar to the Westfield.
		55′	**Dunkirk shale** Black shale with two septarium zones. Genesee facies. Becomes sandy to east.
SENECAN EPOCH	Chemung Group	112′	**Hanover shale** Light gray shales with sandy flags and black bands. Sparse Naples fauna. Correlates with the Wiscoy of the Genesee section.
		2′	**Pipe Creek black shale.** Included in Wiscoy to the east.
		168′	**Angola shale** Soft light shales with thin black bands and tiers of flattened concretions. Naples fauna. Correlates with the West Hill and Highpoint of the Canandaigua section.
	Naples Group	145′	**Hatch shales** Black bituminous shales, in fissile and thick, dense beds. Contains layers of sometimes immense concretions and septaria. The black shales contain Lingulas, conodonts, and fish. Lighter beds have a sparse Naples fauna. Correlates with Enfield.
		38′	**Rhinestreet black shales.** Genesee fauna and fish.
		32′	**Cashaqua shales** Soft, light, calcareous shales. Naples fauna. Correlates with the Ithaca of Central New York.
		6′	**Middlesex shale** Black shale. Fossils scarce (plants, Lingula, conodonts). Correlates with Lower Ithaca.
	Genesee Group	8′	**West River shale** Dark shales. Sparsely fossiliferous.
		6″-1′	**Genundewa limestone** Dark impure limestone, sometimes concretionary, or shaly. Composed largely of Styliolina.
		0-3″	**Conodont bed** Crystalline limestone, mostly organic. Contains abundant conodonts and fish remains.
		0-2′	**Geneseo shale** Black shale, with Styliolina, Chonetes, Pterochaenia.
		0-4″	**Geneseo pyrite** Lenticular patches of marcasite at base of Geneseo. Absent at Lake Erie. Status debatable. Formerly Tully pyrite. Probably Hamilton.

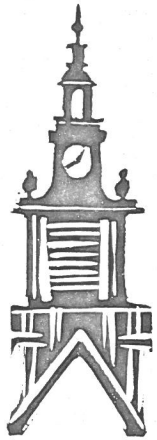


ERIAN EPOCH	Hamilton Group	17′ **Moscow shale** Windom shale member. Gray, calcareous shale with concretions. Fossiliferous, particularly in the lower few feet. 100′ **Ludlowville shale** 1′6″ Tichenor limestone member (Encrinal). Impure, semicrystalline, highly fossiliferous limestone. Underside frequently coated with marcasite. 66′ Wanakah shale member. Gray shales, with numerous concretions, and several persistent calcareous bands. Highly fossiliferous. 30′ Ledyard shale member. Gray shales with numerous calcareous and marcasite concretions. Limited above by the calcareous *Strophalosia* bed. Moderately fossiliferous. 2′ Centerfield limestone member. Represented at the Lake Shore by pteropod-bearing shales. **Skaneateles shale** 43′ **Levanna shale member.** Dark, calcareous shale, with tiers of calcareous concretions. Fossils scarce. 70′ **Marcellus shale** (This and the underlying strata are not exposed on the south shore of Lake Erie. The Onondaga forms the north shore.) 15′ Stafford limestone member. Hard, compact bluish-gray limestone, in thick layers. Chert-bearing. Fossiliferous. 55′ Dense, black bituminous shale, with thin calcareous layers and tiers of spherical concretions.
ULSTERIAN EPOCH		168′ **Onondaga limestone** Dark bluish-gray limestone, with considerable chert. Lowest beds crystalline, crinoidal, chert-free. Rich in fossils.
ORISKANIAN EPOCH		0-6″ **Oriskany horizon** Coarse quartz sand in thin discontinuous lentils and dikes. Sometimes represented by a breccia of Akron dolomite fragments with green shale (which may be Springvale. Contains Onondaga corals [Chadwick]).
CAYUGAN EPOCH	Salina Beds	5′ **Cobleskill (Akron) dolomite** Dark limestone, weathering to buff, and containing numerous cavities (molds of Cyathophyllum hydraulicum).
		55′ **Bertie waterlime** Drab, fine-grained, argillaceous limestone, slightly dolomitic. Bears a eurypterid fauna. 390′ **Camillus shale** "Fine-grained, massive, ashen gray, magnesian lime-mud rock." Gypsum and salt horizon. Barren.

The Devonian strata superjacent to this table (those outcropping in Chautauqua County, N. Y., and Erie County, Pa.), fall into the Canadaway group (Shumla sandstone, Northeast shale); the Conneaut group (Volusia shale and Chadakoin beds); and the Conewango group (Venango formation, with its three oil sands, and the Riceville shale).

In Allegany State Park (Cattaraugus County, N. Y.) occur the Haymaker (Chemung) shale, Cattaraugus beds, and the Oswayo (?Flat-iron) shale. Type Oswayo is much older (Chadwick).

Saturday Morning, May 14, 1938
Niagara Falls



Mileage	
0.0	Meeting place. Niagara Falls Boulevard (opposite the University of Buffalo, running north from Main Street near the city line). The University is situated on the Onondaga Escarpment. The route proceeds northward, dropping past the Cobleskill (Akron) dolomite and the Bertie waterlime to the Huron plain, underlain by the Camillus shales. The inconspicuous Niagara Falls moraine is crossed.
3.0	Beach deposits of Lake Tonawanda. The following twelve miles of the route is principally over Lake Tonawanda silts. A few drumloids are hidden by clumps of woods.
3.8	Tonawanda Creek (Barge Canal).
1.0	Wurlitzer musical instrument plant on left (North Tonawanda).
1.7	Drumloids.
6.0	Take right fork.
2.2	Wave-cut shoreline (Lake Tonawanda).
2.3	Angle right (on Lewiston Road) route over Wisconsin ground moraine.
4.3	Barre moraine.
0.2	Right. Niagara Escarpment. Roadcut in Lockport Dolomite. Lake Ontario visible ahead on clear day. Niagara River on left.
0.7	Left at foot of hill.
0.4	Left, following Lake Iroquois spit.
0.5	Left.
0.5	Lewiston Water Works. Park cars for a walk up the gorge. Bring collecting kits and lunches.

Stratigraphy for Niagara Gorge

NIAGARAN EPOCH	Niagara Group	122′ **Guelph dolomite** (43 feet exposed, above brink of Falls.) Fine-grained, hard to porous, saccharoidal. Essentially unfossiliferous in this area. 78′ **Lockport dolomite** 12′ Eramosa member Thin, even-bedded, argillaceous, arenaceous or bituminous dolomites. Sparingly fossiliferous. 44′ Undifferentiated Lockport dolomite Dominantly light gray, semicrystalline to fine-grained and compact, magnesian limestone. Frequent cavities. Chert nodules in some horizons. Thin or thick bedding. 14′ Gasport dolomite member Hard, gray, subcrystalline, crinoidal, dolomitic limestone, with occasional reefs. Fossiliferous. 8′ Decew waterlime member Argillaceous, dolomitic limestone, fine-grained, dark. Very sparse Rochester fauna.

NIAGARAN EPOCH	Clinton Group	70′ **Rochester shale** Soft bluish-gray argillaceous shale, with thin limestone beds in the upper part. Lower shales more calcareous. Very fossiliferous. 10′ **Irondequoit limestone** Light gray coarsely crystalline limestone, containing numerous pink crinoid stems. Non-crystalline reef structures common. Zone of styliobites. Very fossiliferous. 10′ **Reynales limestone** Dark gray, fine, even-grained dolomitic limestone. Few fossils. 5′ **Neagah shale** Green to blue-gray soft fissile shales. Essentially unfossiliferous.
MEDINAN EPOCH	Medina Group	10′ **Thorold sandstone** Light gray, thin to thick-bedded, commonly cross-bedded. Essentially unfossiliferous. 84′ **Medina (Albion, Cataract) formation** 50′ Grimsby member Red and gray shale and sandstone, with cross-bedding, lenses, and pillow structure. A few fossils. 4′ Cabot Head member Gray shale. Few fossils. 30′ Manitoulin member Dark greenish argillaceous or arenaceous shales with some thin-bedded argillaceous magnesian limestone. Fossils rare. 25′ Whirlpool sandstone member Coarse, white, cross-bedded sandstone. Unfossiliferous at the Niagara River.
ORDOVICIAN		1200′ **Queenston shale (300 feet exposed)** Bright red friable shale with intercalated thin (1-2 inches) beds of green shale and some sandstone. Shows mud cracks at contact with Whirlpool. Unfossiliferous. Interfingers to northwest with beds bearing fossils of Richmond age.

The Queenston shale is exposed beside the road just beyond the parking zone. Follow narrow quarry roadway to Quarry in the Whirlpool sandstone. Leave Quarry east side and follow R. R. tracks south. These tracks cross all of the formations above the Whirlpool sandstone. Today's route follows to the lower part of the Rochester shale.

Warning! Rock falls along these tracks are frequent. Watch out for them!

	Return to cars.
0.5	Right.
0.5	Right.
1.1	Straight.
1.0	Quarry in Lockport Dolomite on right.
0.4	Niagara University.
0.3	Devil's Hole. Park cars to observe third gorge section, cut during Port Huron stage of Lake Algonquin. Old channel of Lake Tonawanda outlet.
0.3	Right.
0.4	Foster's flats opposite. Crest of old falls wide at this point.
0.9	Right, into Whirlpool State Park. Park cars. Fourth section of gorge (formed when upper lakes drained through North Bay outlet) extends from south margin of Eddy basin, ¾ mile, to R. R. bridges. Inlet and outlet reefs at Whirlpool caused by Whirlpool sandstone. The old drift-filled St. David's Gorge is plainly visible directly across the Whirlpool.
0.3	Turn right.
0.5	Old bank of river to left.
0.5	Cross tracks, turn right.
1.1	Turn right.
0.2	Hydroelectric canal.
0.1	Left.
0.05	Right.
0.05	Left.
0.1	Site of Falls View Bridge.

Because of limited parking facilities and the probability that the group will wish to divide at this point to take separate advantage of the several features of interest, the caravan will disband at this point and proceed in smaller parties. The following suggestions are offered:

1. Views of the Falls from the American side, including the view from the bottom of the American Falls and Goat Island.
2. Trip on "Maid of the Mist" (through the cauldron by boat—cost extra).
3. Views of the Falls from the Canadian side. Arrangements will be made to pass the party over the Lower Arch Bridge. *The group must stay together and must return via the same bridge unless individual arrangements are made with the immigration authorities.* The return trip to Buffalo can be made via Queen Victoria Parkway and the Peace Bridge at Buffalo.
4. Foster's Flats (Niagara Glen), site of former pirated side falls. Notable for its pot holes, etc. (See No. 3 above, regarding return.)

A Few Facts About Niagara

Height: American Falls, 167 feet; Canadian Falls, 158 feet.

Rate of Recession: 5-10 feet a year at Horseshoe. Erosion at American Falls almost negligible.

Depth of water at Brink: Canadian Falls, 20′; American, 1′6″.

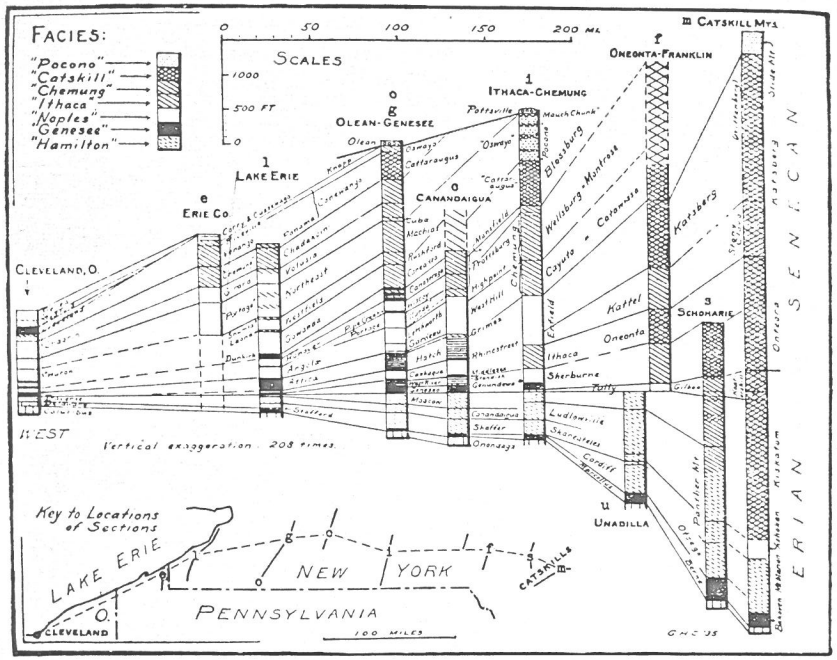
Depth of Water in Gorge: Below Horseshoe Falls, 150-200′. Upper Great Gorge, 160-195′. Whirlpool rapids, 35′. Whirlpool, 150′. Lower Great Gorge, 70′.

Crest Line: Canadian Falls, 3000′; American Falls, 1000′.

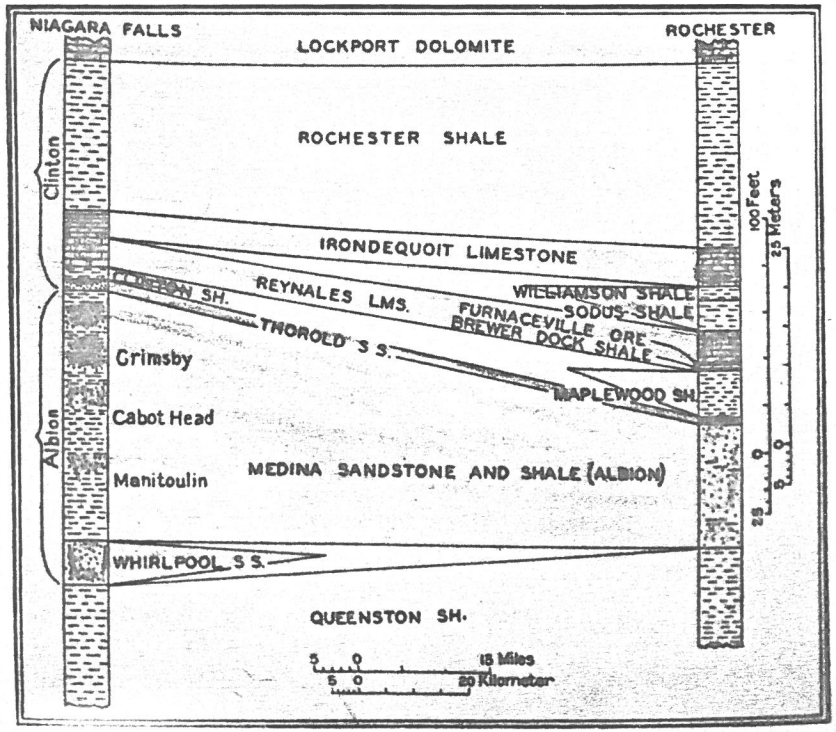
Average top widths of Gorge Sections: Upper Great Gorge, 1,350 feet; Whirlpool Rapids, 750; Lower Great Gorge, 1,600 feet; Old Narrow Gorge, 1,300 feet; Lewiston Branch Gorge, 1,400 feet.

Illustrations by Edward J. Whetzle

Grateful acknowledgment is made to Dr. George H. Chadwick for many suggestions, particularly on the stratigraphy.



Correlation Chart—See opposite page.



Niagara Frontier Bookshelf

Geology Books Give Background

By Irving G. Reimann

● ● ● The brief list of books on this geology bookshelf are to be found in the libraries of the Buffalo Museum of Science where they are available the year 'round. During the meeting of the New York State Geological Association, May 13-15, however, they will be assembled and placed in the Research Library for convenient reference by the delegates. Other geological material can also be consulted there.

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SCHUCHERT, CHARLES. 1914. Medina and cataract formations of the Siluric of New York and Ontario. Geological Society of America, Bulletin, 25: 277-320.

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Geological maps will also be on display in the Lobby during the convention, and attention is called to the rare books in the "Milestones of Geology" collection listed elsewhere in this issue.

The Charts on the Opposite Page

The top chart shows the correlation of Catskill and higher so-called "Catskill" red-beds from Catskill, N. Y., to Cleveland, Ohio. The red sediments are cross-hatched. Reproduced with the permission of the U. S. Geological Survey and New York State Museum from New York State Museum Bulletin 307.

The Stratigraphic Section is reproduced with the permission of the U. S. Geological Survey from *The Paleozoic Stratigraphy of New York* by Alling and Hoffmeister (International Geology Congress Guidebook 4).