

Dishmill Creek Education Adventure- A Journey Through Time

By Randy French – Geneseo Middle School



Lesson Plan for 1 day field trip to Letchworth State Park

Overview

This field trip originates on the east side of Letchworth State Park utilizing trail 9 and the Dishmill creek bed itself. The walking can be slippery and wet. It is highly recommended that anyone taking a class on this field trip hike the route beforehand to ensure that the intended group can manage the trip. Seasonal or rainfall fluctuations in water will make this hike unsafe and it should not be attempted during months when ice is likely. Once decided that the adventure is suitable, it is a great hike that students will enjoy and takes a group through a variety of succession ecosystems and literally walks through thousands of years of geologic history. It is the responsibility of individual teachers and schools to assess if this trip is safe and appropriate for students.

Lesson Objectives

At the conclusion of this lesson students will be able to:

- Identify different stages in ecological succession including primary, secondary succession and climax forests.
- Describe or visualize the length of time it took to create the sedimentary rock layers.
- Define and identify what a sedimentary rock is and how it is made.
- Identify, draw or diagram the effects of water erosion including waterfalls, stream bank eroding and rounding of rocks.
- Identify and differentiate local sedimentary rocks from imported glacial rocks.
- Explain why it is important for a society to set aside protected land.

The following objectives and key ideas are taken from the **New York State 5-8 Core Curriculum for Intermediate level science**. Additionally this field trip can be used for concepts such as ecosystems, balance, competition for resources, niches and habitats.

-Standard 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

-3.2a In all environments, organisms with similar needs may compete with one another for resources.

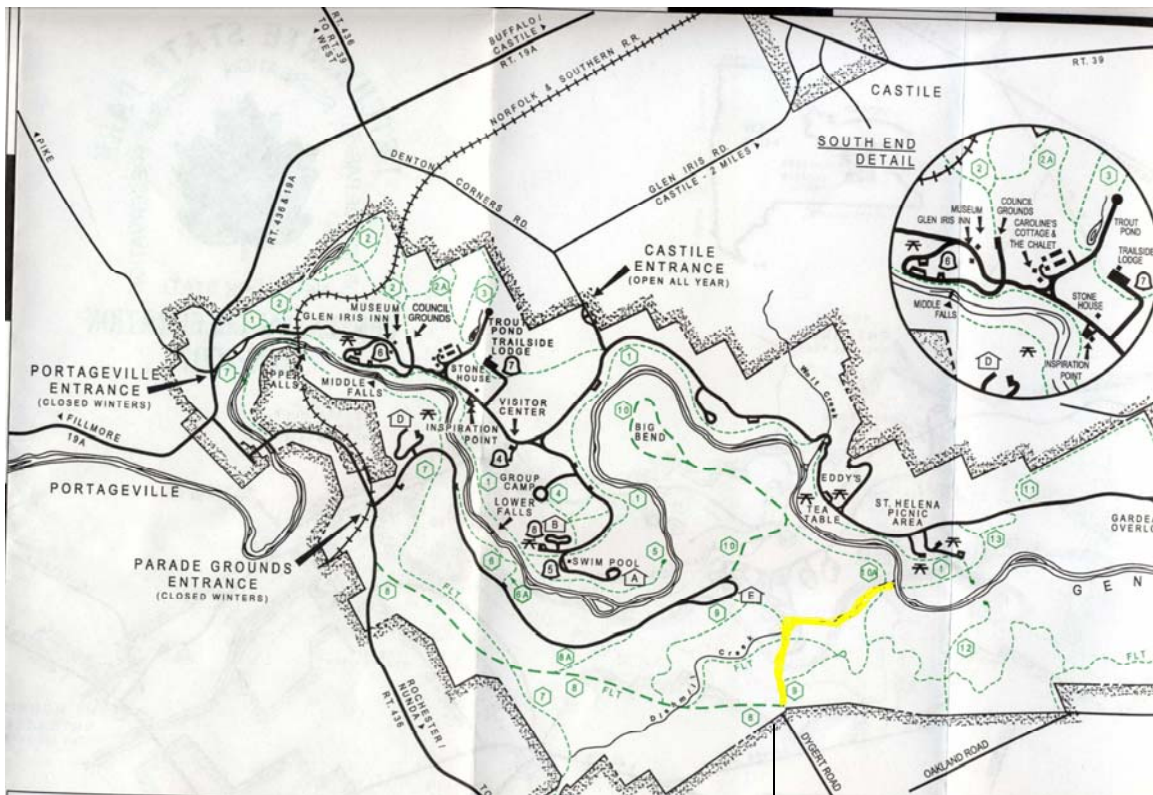
-3.2c Many thousands of layers of sedimentary rock provide evidence for the long history of Earth and for the long history of changing life-forms whose remains are found in the rocks. More recently deposited rock layers are more likely to contain fossils resembling existing species.

-7.2b The environment may be altered through the activities of organisms. Alterations are sometimes abrupt. Some species may replace others over time, resulting in long term gradual changes (ecological succession).

Directions and Contact Information

1 Letchworth State park
Castile, NY 14427
Phone: (585) 493 3600

The following map is copied from the map given at the toll station upon entering the park. For directions to trail 9 look for a map to Portageville Entrance of Letchworth State Park and the trail is accessed via Dygert Road, north of the Parade Grounds entrance. Dygert Road is reached via either River Road and Oakland or route 436 and Oakland. If you leave Mt. Morris on route 408 turn right a few miles after leaving town on River Road. This road will stay paved until the junction with Oakland Road. River road then becomes dirt but is usually in reasonably good shape. River Road from Dygert Road south is a seasonal road.



Park Here

Trail Description: The first .4 mile is on good footing on trail 9 to where it junctions with the Finger Lakes Trail. Upon intersecting the Finger Lakes trail continue straight and cross the creek. After crossing the creek turn right, walking parallel to the creek on the left side on an old forest road which is now not maintained. After cresting a small rise you come to a view down into the gully below a water falls. Carefully descend the gully to the creek bed. The view

of the falls shows the backward erosion of waterfalls. Downstream is in the creek bed and can be slippery and wet. Eventually you will walk out of the gully to the broader Genesee River Valley.

Preparation and Field Trip Materials

This field trip may be best used early in the year as an introduction to topics or late in the year as a summary. (This would also match the need for low water volumes.) Students should bring a day pack, lunch and drink. They should dress in clothes that will get wet and dirty. Sneakers or closed toed sandals are good if it is decided to walk in the creek. Flip flops and other open toe shoes are dangerous. Students may want to bring a change of clothes and shoes for after the hike. Each student should carry a note book or journal and writing implements. Colored pencils may be fun. Teachers should walk this trip before going with students and either be well versed in plant identification (including poison ivy) or know the local flora well. GPS coordinates are given in the activity section to help with general locations on preliminary trips.

It would be a good idea to go to Google Earth on the class prior to the trip so students can see where they are going.

Preparation before the trip will increase the learning on the field trip. Previewing the following vocabulary will improve learning: primary and secondary succession, climax forest, pioneer species, geology, sedimentary rocks, glaciers, erosion, sediments, ecology, niche and mature forest. Students should have field trip forms sent home and signed and also have the program for the day explained.



Field Trip Suggested Itinerary

10:00am Arrive at trail head for trail #9. Discuss and sketch early succession ecosystem. See Activity #1.

10:30am Depart down trail #9. Stop along the way to point out transitional forest types. See Activity #2

11:00am Arrive at Finger Lakes Trail and take forest to lip of gully near falls. Discuss, describe and list climax forest types. See Activity #3.

11:15 Descend into gully and walk upstream to under waterfalls and discuss and label water fall erosion. See Activity #4.

11:30 Descend the creek carefully stopping at some point to discuss the layers of sedimentary rock and how they were formed. See Activity #5.

12:30 Arrive at junction of Genesee River. Discuss and point out the geological history of the Genesee River. See Activity #6. Lunch.

1:00 Start the hike back up the creek. Stop to point out glacial deposited rocks and discuss their origin when found.

2:00pm Arrive back at parking area. Conclude the field trip. See activity 7.

Field Trip Activities

The latitude and longitude are given for GPS readings. The GPS may not work in the gully.

Activity 1- N43 36.081 W77 59.245 At the parking area by Dygert Road there is a small open grass area giving way to early succession plants and pioneer species of shrubs and trees surrounding the grass. Point out the different species of plants in each community. Ask questions so students note that early succession plants thrive in direct sunlight and start out as herbaceous before giving way to woody plants. Have students draw a general diagram of the grass area labeling a few specific species and then sketch a diagram showing the surrounding bushes and shrubs labeling a few species. An extension may be for students to each pick a different plant and to sketch a leaf or flower noting leaf margins, compound, simple, opposite or alternate arrangements. The key in this activity is for students to start to see beyond the general green of plants and to start to learn to look closer at specific species. Sketches of flowers if done carefully can be used later in the year when learning to identify plant parts. Early succession plants found are grass, plantain, dandelion, clover. Secondary succession plants found are goldenrod, blackberry, honey suckle, and buckthorn (invasive). Later succession plants are aspen, ash, black walnut and grape vines.

Discuss what is done to keep the parking area in a state of early succession? (Mowing) If the grass area were not done what would happen in terms of succession? (The grass would eventually give way to the type of plants currently surrounding the grass area) What could happen to the forest to make it go back to pioneer succession? (Ice storm, hurricanes, man cutting trees, snow storm)

Activity 2- N42 26.108 W 77 59.304 On the walk down the trail there are apple trees. These are remnants of farms of bygone days. Look at the trees surrounding the apple trees and note the succession to a climax forest. The apple trees that are being replaced by mature forest types. Start to point out the climax forest trees of hickory, oak, and

maple that represent our northern hardwoods forest. This time is also a good time to look at leaf arrangement such as opposite, alternate, simple and compound.

Stop in a short distance as the trail drops down the hill. On the right are white birch trees. Discuss if these are early or late succession trees? There are early as they need direct sunlight, grow fast and are easily knocked over by wind. Why are there big maples to the left? This may have been an edge of a field or a road.

Activity 3-N42 36.298 W77 59.620. This is about ½ mile from the trail head. At the lip of Dishmill Creek Falls is a nice forest of mature Hemlocks. Stay back from the lip and do not walk in the creek above the falls. This grows on the north facing slopes as these are shade tolerant trees. Compare and contrast the south facing slopes of tree types. Students should list types of vegetation and the growing environment of each. Discuss how communities of plants and small ecosystems have very narrow and limiting parameters. Have students discuss what the trees might be competing for in terms of resources such as sunlight, water, nutrients and soil. Staying back well from the falls there is pitting in the rock in the creek bed attributed to mud at the bottom of ocean.

Activity 4- This activity can be done either at the top of the gully or from underneath. It is up to the individual teacher to decide upon the safety for each group. Have students sketch the water fall labeling the type of forest and trees seen there. In addition the cap rock should be pointed out and labeled as well as erosion underneath the falls. Identify where the lip of the falls had been in prior years and where it has receded. If the Letchworth Gorge is about 14,000 years old calculate the rate of recession of the falls over that time.

Activity 5- If you choose to descend the gully the following can be looked at and discussed. The layers of rock that the creek descends are Gardeau Valley Sandstone and Shale. These are sedimentary rocks laid down during countless years of deposition. The whole of the area you are now walking in was shallow seas that dried up and changed over time. The sediments were washed in from the Appalachian Mountains. When the Appalachian Mountains rose up it isolated seas countless times inland. These seas came and went. Find a pool of water and look and feel how the sediments are coarsest closest to the falls or current and smaller particles are carried further. Then look at the sedimentary rock and discuss if the source of sediments was close or far. Much of the small particles in the shale must have been formed when far from the Appalachian Mountains. When the continental plates pushed together to create the Appalachian Mountains it produced pressure in the sedimentary rock here. This accounts for the east-west cracks that were formed parallel to the pressure. The north-south cracks were created by later pressure. Note how much of the creek erodes along the joints in the rock. See if students can figure out if the north-south or east-west cracks were there first by thinking about a spot where one crack has shifted. Count the number of layers that make up a 5 foot section and discuss how long it might take to lay down and compact that much sediment. See the background sections described further and highlight information for students to discuss. In the student journals have students draw and describe the layers of shale. Stop on the occasion that you find ripple marks in the shale. There are not many

fossils in these layers indicating that the ocean may have been deep during this part of the formation. Discuss how the weight of the glaciers depressed the Earth's surface and that it is still rebounding today.

Activity 6-N42 36.456 W77 59.073. This is 1.8 miles from the parking area. Eventually, if Dishmill Creek is followed, it will cross trail 104a and junction the Genesee River. This is in the vicinity of St. Helenas, an old town site. Somewhere in this area is a good time to discuss the history of Letchworth Gorge and the erosion of the last 14,000 years. Relate that the pre glacial river flowed through the Dansville Valley among other routes and that the current gorge is newer. Although much of the gorge is created by recent water erosion it is believed that the actually valley here is an older valley that the last erosion joined. Look for cobbles and discuss where there came from (Canada?) and have students make a compare and contrast chart between the round, hard, glacial cobbles and the softer, layered shale and sandstone.

Activity 7- Upon arriving back at the start some conclusion should be done. This is a good time to describe briefly the history of William Pryor Letchworth and why the park is in existence today. Have students look around themselves again and describe what they think the area might look like if Letchworth did not preserve and buy the land. In journals have students list out 4 advantages of creating state parks and otherwise preserving land. They should also name at least one disadvantage of preservation such as cost to taxpayer, loss of jobs etc. A brief history of the park can be found below or on the internet.

Background

A Short History of Letchworth Park Taken from

<http://www.letchworthparkhistory.com/history.html> by Tom Breslin and Tom Cook

Letchworth State Park was created by the stroke of the pen of New York State Governor Charles Evans Hughes in 1907. It was a fine addition to the fledgling state Park system, the gift of a retired businessman and philanthropist, William Pryor Letchworth.

The new Park consisted of the thousand acre estate called the "Glen Iris" which Letchworth had lovingly developed over half a century. The Park was a treasure chest full of natural splendor and history, awaiting those who were willing to come and explore it. And for almost a century, they have come.

The Seneca called the place Sehgahunda, the Vale of Three Falls. They were descendants of the Old Ones, the Native People who had lived in the Valley for countless generations. The Senecas hunted, fished, and built their villages within the lands that would become Letchworth Park. Among them was Dehgewanus, known by the white men as the Indian Captive Mary Jemison, the Old White Woman of the Genesee.

Dehgewanus came to the Valley during the Revolutionary War, and from her home on the Gardeau Flats witnessed the transition of the Valley from Indian lands to the western frontier of the new United States. Soon pioneers became her neighbors as they built their farms and communities along the Genesee River. When Dehgewanus and her family left Sehgahunda in the early 1830's, the pioneer era had already passed.

From the 1830's to the Civil War progress swept through the lands of Portage. Soon the inhabitants of the Glen found themselves linked by canal and railroad to the outside world. Local products found new markets, and a growing number of tourists came by boats and trains to see the splendor of the Portage Gorge.

But progress had taken its toll. Much of the ancient forest had been reduced to lumber and potash, and the Upper and Middle Falls had been harnessed by mills. Visitors could gaze from the great Portage Wooden High Bridge, but they could only imagine how beautiful the gorge had been only a few decades earlier.

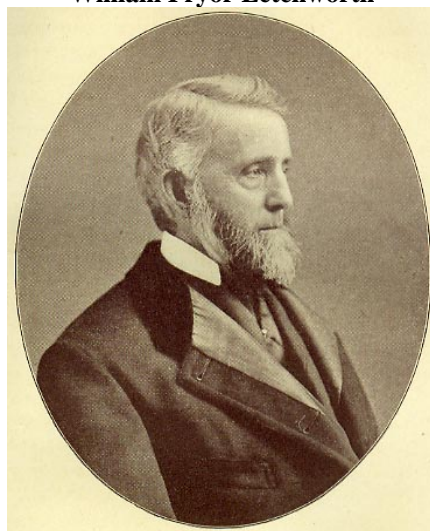
One visitor believed that what had been, could be once more. William Pryor Letchworth bought the land around the Middle Falls and established the Glen Iris Estate. For fifty years he would expand and develop his holdings, carefully restoring the natural beauty of the Valley while opening the grounds to visitors. Mr. Letchworth understood that the Glen's history was also important, and he worked to both preserve and present that history to those who came to his Council Grounds and Museum - both of which are there for today's visitors to enjoy.

It was this Glen Iris Estate, a place of natural beauty and rich history, that he gave to the People of New York State.

After Mr. Letchworth's death at his Glen Iris in 1910, the Park began its transition into being a State Park. At first it was under the control of the American Scenic and Historic Preservation Society, whose Letchworth Park Committee oversaw the first changes. When the Genesee State Park Commission took over in 1930, they planned many additional improvements to the young Park. The Great Depression would have put a halt to all those plans, if not for the Civilian Conservation Corp.

Gasoline rationing closed the Park during much of World War II, but at wars end the stage was set for rapid growth and development. Under the guidance of State Officials, Park administrators, and generations of dedicated Park employees, Letchworth State Park continued to grow and evolve. Now, with nearly 14,000 acres and a wide variety of programs and facilities, the Park is enjoyed by over a million visitors a year.

William Pryor Letchworth



William Pryor Letchworth was born to a Quaker family in Brownville NY on May 26, 1823. The fourth of eight children, William grew up in a family that valued hard work, charity, and the development of the intellect. ([See the Letchworth Genealogy](#))

As a young child William and his family moved to Sherwood, just outside of Auburn. At the age of fifteen he began his career in the saddlery and hardware business, as a clerk in the firm of Hayden & Holmes. Just ten years later he became a partner in the firm of Pratt & Letchworth of Buffalo New York which he built into a successful "malleable iron" business. ([See a 1872 description of his business](#))

Hard work took a toll on the young businessman. Letchworth, now in his middle thirties, began to look for an escape from the burdens of business and city life. When he stepped from the train to join other tourists gazing from the great Portage Bridge of the Genesee, his search was over. The Valley that stretched before him would become his home and his life's work. ([See Image of Letchworth as Young Man](#))

In 1859 he made his first purchase of land near the Portage Falls and began his work on making his [Glen Iris Estate](#) a special place. He enlisted the services of the famous landscape artist William Webster to design winding paths and roadways, rustic bridges, glistening "lakes" and a sparkling fountain. Soon the glories of nature returned to the place the Senecas had called Sehgehunda.

Letchworth also worked to preserve the native history of the Valley. He created the "[Council Grounds](#)" on a bluff above the Glen Iris, and moved the ancient Seneca Council House and a Gardeau cabin to the Grounds. He eventually built a Museum to house his growing collection of artifacts. Most importantly, he allowed the famous Mary Jemison to be buried on the Council Grounds, and erected a statue in her honor. For his work the Seneca People honored him with the name Hai-wa-ye-is-tah, "he who does the right thing."

Letchworth never married, but his Estate was always alive with his relatives and friends. His visitors explored the natural beauty of the Glen as they shared the poetry, literature, and art their host so much enjoyed. Able to retire from business in 1871 at the age of 48, Letchworth looked forward to a peaceful life at the Glen Iris. ([See Letchworth with family at Glen Iris](#))

But Letchworth would soon find another calling. Perhaps it was his Quaker heritage, his "sensitive constitution", or the need to repay society for his financial success that led him to look for ways to help his fellow man. Pressured to run for the State Legislature, he instead accepted an appointment to the New York State Board of Charities in 1873. ([See Glimpse of his humanitarian work.](#))

It would be in the field of social reform that Letchworth true legacy was found. Using only his own funds, he traveled Europe and the United States to study the treatment of epileptics and poor children. He wrote extensively on the two subjects, and slowly pushed New York State forward in creating institutions and systems to care for the helpless of society. The development of epileptic centers and the foster care system can be attributed to him. ([See a list of his Works](#))

Mr. Letchworth retired from the State Board of Charities in 1896. But his work was far from over. From his study in the Glen Iris he continued his writing and correspondence on numerous topics relating to social care, and he continued to oversee the workings of his Estate.

But starting in 1898, the very existence of his beloved Glen Iris was threatened. The Genesee River Company was formed, which desired to tap the Genesee River as a source of power and profit. A dam would be built just south of the Portage Bridge, and the water used to generate electricity. Although Letchworth had planned to turn the Glen Iris into an orphanage, he knew that it would not be protected. In 1906 he offered the Glen Iris and his thousand acres to the State of New York as a public park. Letchworth State Park was born in 1907, saving the lands of the Glen Iris Estate forever. ([More on Saving the Glen Iris](#))

Letchworth had life use of the Glen Iris, and lived in his beloved valley until his death on December 1, 1910. As he wished, he was buried at Forest Lawn Cemetery in Buffalo NY with a plain slab of stone from the Lower Falls of the Genesee marking his [final resting place](#).

Letchworth State Park Geology: The following is taken from <http://it.stlawu.edu/~geoclub/letch1.html> by Maureen Jones and Melisa Jones

Letchworth Gorge, also deemed “the Grand Canyon of the East”, offers a prime example of the power of the mighty Genesee River. The gorge is approximately 22 miles long and up to 550 feet deep. Three major waterfalls (cataracts) can be seen within the gorge (Boyd, 1996). If one looks into the walls of the canyon, the past 400 million years of the region’s geologic history can be unfolded (Van Diver, 1980). After one does this, it can be seen that the fossil record for the Silurian and Devonian in this area are the most diverse compared to anywhere in the world (Van Diver, 1980).

The Genesee River is the only river to completely cross New York State. Its current northward flow has been consistent since the Ice Age. As a result of this, one can see a stratigraphic unit which represents the environments and marine life in which inhabited this area through geologic history.

The rocks seen in the gorge are sedimentary in origin (Figure). These sediments represent the depositional environments of the Ordovician, Silurian, and Devonian Periods. On top of this bedrock, lie poorly consolidated rocks and glacial sediments of Pleistocene age. Even though this seems to be a great deal of time, only 2% of the Earth’s geologic history is represented in the gorge (Figure)(Van Diver, 1980).

During the Ordovician, this region was flooded by a shallow inland sea. As a result, a great deal of sand, silt, and carbonate mud were deposited which later became the sandstone, shale, and limestone we see today (Figure). Also taking place during this time was the beginning stages of the Taconic Orogeny. As the Taconic Mountains rose in the East, the sediments of erosion came to be deposited in the West, which eventually formed the Queenston Delta (Figure). In the gorge, these sediments are seen as the Queenston Formation. This formation is comprised of red shales and siltstones, which contain no fossils. At the base of the lower falls, approximately 55 feet of the Queenstone Formation can be seen. The thickness of this unit reaches close to 1000 feet (Van Diver, 1980)!

The end of the Taconic Orogeny and the beginning of the Silurian can be seen in the Medina Group (Figure). These sandstones are well-known for their oil and gas reservoirs. Directly overlying the Queenston is the Grimsby Sandstone which represents the dying stages of the Taconic Orogeny. The Grimsby is very similar to the Queenston and with both lacking fossils, the contact between the two is uncertain (Van Diver, 1980).

The red color seen in these rocks is due to iron oxide resulting from deposition in a highly oxidizing environment.

The Lower and Middle Silurian Age are represented by the Clinton Group. These sediments are mainly shales and thin limestones that represent a quiet time without and mountain building (Figure). The aquatic environment represented by the Clinton Group is quite contrasting to the Medina Group (Figure). Even though a shallow sea environment still persists, life began to flourish at this time. The Rochester Shale, at the top of the Clinton Group, is quite fossiliferous (Figure). The organisms represented here include brachiopods, bryozoans, trilobites and ostracodes (Figure). The limestones

interbedded with this group formed in clear water where reefs usually flourished. The near complete record of the Clinton Group can be seen in all three falls within the gorge.

Lying above this group is the Lockport Group. It is comprised of gray, coarse textured massive dolomite. As a result of the dolomite being highly resistant to erosion, it forms the caprock to the falls at Rochester and Niagara Falls. In other regions of the Lockport Group, massive coral reefs with vast amounts of fossils can be seen, representing a warm, shallow sea conducive to life. But, as seen at the gorge, very few fossils can be seen. At the upper part of the Lockport Group, a diversity of minerals found in solution cavities can be seen. Some of these minerals being “variously colored fluorite cubes, very clear gypsum, reddish brown sphalerite, celestite, dolomite, and calcite” (Van Diver, 1980).

The Late Silurian is represented by the Salina Group. This unit consists of thick deposits of shale and dolostone interbedded with salt and gypsum. These sediments represent an environment with a generally arid climate and a coastline with shallow bays and lagoons. This type of environment was almost certainly inhospitable to marine life in that very few fossils can be seen. One organism that did adopt well to this type of environment was the eurypteratid (sea scorpion)(Figure). Some eurypteratids have been found to have grown to close to nine feet in length. The Salina Group is not very well represented within the gorge due to the sediment not being very well resistant to erosion. The Devonian is not very well represented in this area due to erosion of most of the sediments (Van Diver, 1980).

The Onondaga Formation represents the Middle Devonian. These limestones are at the base of the Catskill delta. The sediments were deposited in a clear, warm, shallow sea where sea life again flourished. But, again, these sediments are represented further south at a prominent escarpment in Syracuse (Van Diver, 1980).

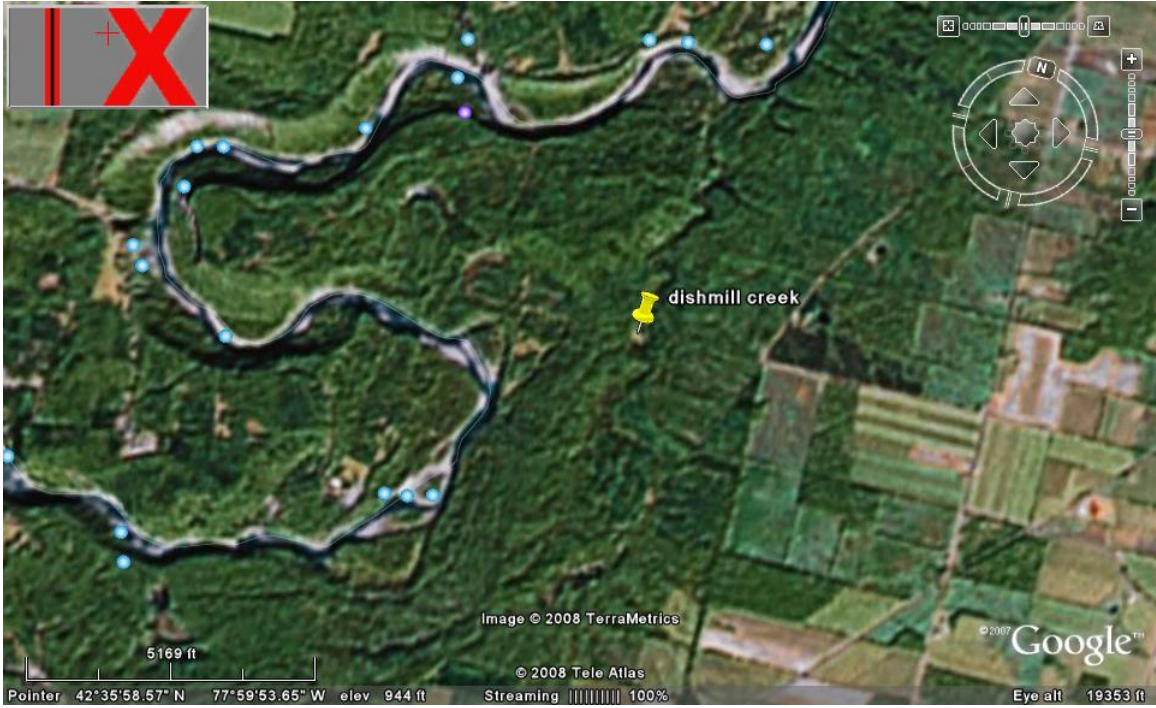
Overlying are black to blue-gray shales with thin interbedded limestone which forms the Hamilton Group. These deposits represent the far western edge of the Catskill delta. The lower unit shales represent a depositional environment that had a stagnant, poorly oxygenated waters that contained only sparse fauna. The upper Hamilton is one of contrast to the lower part. The upper sections are seen as calcareous and richly fossiliferous with abundant corals, bryzoans, brachiopods, trilobites, crinoids, mollusks, ostracodes, and a great deal of plant material (Figure)(Van Diver, 1980).

Following are the Sonyea and West Falls Groups. This is the main section exposed at the gorge. The sediments seen are mainly black shales at the base that grade into grayish interbedded shales, siltstones, and sandstones at the top. This sequence is part of a prograding delta (Van Diver, 1980).

At the southern parts of the gorge, progressively younger formations are seen in the walls due to the gentle, southward dip of the beds. All three falls within the gorge are capped by resistant sandstone beds within the West Falls Group. Only the lower part of this group is seen within the walls. The Nunda sandstone is seen to cap the upper falls and many of the smaller falls to the south. This region was mainly mined for its building stone, bluestone, which some old abandoned quarries may be seen (Van Diver, 1980).

The falls and gorge at Letchworth are also noted around the area by legends. “The legend of Mon-a-sha-sha is haunting, tragic and beautiful. It is a story of a young Seneca bride who perished with her child, in the great cataract (Letchworth Gorge). Their spirits are said to live today in the elusive white deer of Letchworth State Park...” (Clarion Pub, 1996). Two other people as legends within the gorge are Mary Jemison and William Pryor Letchworth. “Mary Jemison, the White Woman of Genesee, was captured by Indians from her Pennsylvania home at age 15 and brought to the Genesee Country. Here, she married, raised her children and lived to age 90 among her adopted Seneca people. Her cabin on the Garden Flats, just north of the falls, was her home for many years. A cabin she built for her daughter, Nancy, along with the Caneadea Seneca Council House have been moved to Letchworth Park and open to visitors. Like many modern initiates to the gorge’s splendor, William P. Letchworth fell in love with the land around the canyon on his first visit and wished to make it his home. First, he acquired 100 acres and began a lifetime of restoring the cut-over forests and building the estate he called Glen Iris, now a restaurant and an inn. His holdings had increased to 1000 acres when, in 1909, he deeded his property to the State of New York as a park. “Letchworth Park’s many legends echo in the thunder of their falls. Their voices whisper in the canyon winds. They are the voices of the Red Jacket and Cornplanter. Of ghost towns like St. Helena and Gibsonville. They are heard in the voices of men who built impossible canals, towering bridges, and mighty dams” (Clarion Pub., 1996).

More information: There is plenty of information on Letchworth Park on the internet. The spring edition 1992 of the Genesee Naturalist has a good history of geology by Douglas Bassett.



dishmill creek

Image © 2008 TerraMetrics

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5169 ft
Pointer 42°35'58.57" N 77°59'53.65" W elev 944 ft Streaming 100%

Eye alt 19353 ft