



Term: Spring | Issue 6 | Date: March 15th, 2020

## COOL ROCKS III: HERKIMER DIAMONDS

by Renee Aubry

Most of us in New York have heard of Herkimer Diamonds. Of course, they are not true diamonds. They are actually quartz crystals. The best of the crystals are very clean and clear. The very best ones are



doubly-terminated, meaning they have points on both ends. I've been to the Herkimer County area several times. Sometimes I've had better luck than other times, but it's always a good time. There are a few different locations to hunt for the crystals. Herkimer Diamond Mines and Ace of Diamonds Mine are the two locations that I have visited, although not very recently. An internet search located other collecting localities in the Mohawk Valley, but I have no experience with those, so I will confine this article to the two locations mentioned above.

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## EARTH SCIENCE 3D PRINTING

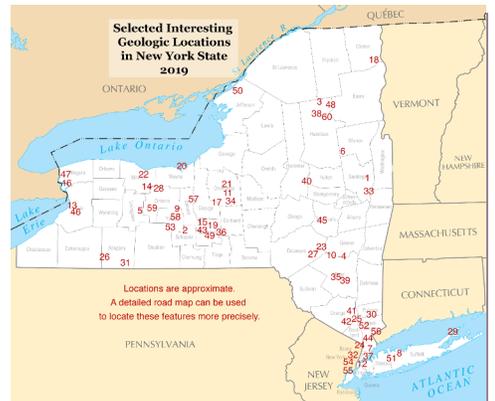
By Rob Lawry



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## NYS GEOLOGY PLACES OF INTEREST

. By Tom McGuire



New York State Geology/Earth Science  
Features of Interest

Compiled by Thomas McGuire of Cave

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# MESSAGE FROM THE NYESTA PRESIDENT

## TEACHING REMOTELY

BY LAURA VAN GLAD

Hi NYESTA Members,

Welcome to our first online newsletter! As an Earth Science Teacher organization, we felt it was our duty to save paper and be sustainable. Hence, our newsletter is now digital. We hope that you like the new format and delivery.

I hope all of you and your families are staying safe and healthy. COVID-19 has dramatically changed the way we are living and teaching. As we navigate through this new way of remote teaching and learning, remember you are not alone. We are all in this together. It is a great time to take advantage of all the free resources out there. Let's all help each other.

In November, we had our annual meeting in Rochester in conjunction with the STANYS conference. We met for a dinner meeting at the Dinosaur BBQ. It was great to see so many of you there. I love socializing and getting to know you better. We started our meeting by introducing those members who hold office in our organization. Rob Lawry worked diligently on revisions to our Constitution and bylaws that needed to be made. He led a discussion of those revisions, and the members present voted to approve them. Election results were read, and the transfer of elected officers occurred. It is my honor to serve this organization as it's current President. Shaundra Davis was elected as our new Vice President, and Rob Lawry is now the current Past President. Renee Aubry kept her position as Treasurer. Our secretary, Erica Bornhoft, resigned. Mary Rodgers was kind enough to accept the secretary position for the remaining term after an emergency appointment by the Executive Committee.

I want to thank Ken Abbott, our previous past President (President and Vice President), for all his many years of hard work and dedication to this organization. He has been an integral part of the success that we have and continue to have. We wish you the best and look forward to continuing to work with you as a member of this organization.

It is my pleasure to serve with this Executive Committee, the Conference Committee, and our appointed position members. Sean Ellison- webmaster, Frank Aurigema- conference coordinator, Paul Levin- membership chair, Andrew Boyd- NESTA Liaison, and Joe Malave- our new Publications Editor.

We have been diligently working all year on the summer conference. However due to COVID-19 concerns, our summer will be canceled for this year. We will keep you posted on developments.

My Best,

Laura Van Glad  
NYESTA President

The Herkimer Diamonds can be found in a formation known as the Little Falls Dolostone, which is late Cambrian in age. It is about 122 meters thick at the type locality in Little Falls, NY. The unit which contains the quartz is a crystalline dolostone with sandstone beds. The dolostone contains many pockets and vugs where the quartz crystals were able to form in open space, allowing for the double termination. Some of the crystals have inclusions of various kinds. Liquid and gaseous inclusions have even been found. Within the unit are stromatolites (See Cool Rocks I in a previous issue of this newsletter). The first time I went to collect at Herkimer Diamond Mines, the first rock I picked up and turned over was a beautiful piece of stromatolite. I yelled out in glee "stromatolite!" Several people turned and looked at me strangely, but that's ok. I'm used to that. On another trip, I collected mostly stromatolite and went home with buckets full to give away to my local colleagues in Westchester. We teach on the Manhattan Prong. No sedimentary rocks, much less stromatolites anywhere near here.

On one trip, I found a large cavity that had been emptied of large crystals,



but there were lots of tiny (1-3mm) ones that

were collected. I was able to get a jewelry pendant with a small glass jar into which I put some of the small crystals, and I wear it on a chain. I've also found a few just looking in the rubble of the quarry. And, of course, there's always the gift shop!

You can search for the crystals in a couple of ways. Both of these locations will rent you tools like hammers and chisels for you to break into the solid rock to look for pockets. The dolomite is HARD!

(Continued on page 4)



In our last newsletter edition, I described the costs and uses of FDM 3D Printing in your Earth Science Classroom.

If you were at the STANYS Conference this past November, you may have seen the 3D printer I brought along with me and some of the landscapes I made. I had conversations with many of you regarding the process I used, but it was just a primer and hopefully a good taste of the things you could try yourself.

I'll reiterate a few points I had made during that time:

1. If you want to 3D Print, you'll want to get a printer for your own classroom. Asking others in the building to accomplish your tasks is inefficient to produce the product you are hoping for or in a useful time frame. I have asked others to print things for me, and it extends this timeline from days into weeks.
2. Learn how to obtain and modify models. Thingiverse/Touch Terrain are great ways to quickly obtain models and work on printing techniques. Picking something and trying it out is how you will learn.
3. Learn how to use Autodesk Fusion 360 (free for educators). Fusion 360 is cloud based and you can work on projects at school and at home.
4. Ask for a better computer - something that can handle 3D manipulation. Gone are the days of thinking 4gb of RAM are sufficient for the data we use. Desktops are cheaper than laptops and have greater processing capabilities (for the same cost it's not even close).
5. Join a Facebook group or subreddit for your printer to learn the problems people face and how to remedy them. These communities are vibrant and active, full of people ready to answer your questions.

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## ANNOUNCEMENTS

2020 Summer Field Conference @ Oneonta  
Canceled due to COVID-19.

Check our website for a COVID-19 friendly summer alternative.

<http://nyesta.org/>

# COOL ROCKS III: HERKIMER DIAMONDS

(CONTINUED FROM PAGE 3)

BY RENEE AUBRY

Herkimer Diamond Mine charges \$14 and Ace of Diamonds charges \$10 for adults for the day. You can come and go as you please. These mines are open areas. Be prepared for the weather. The mines are open in all weather conditions, but it is certainly more fun without rain. Keep hydrated. I brought a cooler with water and drinks. Don't forget the sunblock! Dress properly for digging rocks. Jeans are best and shoes for climbing over rocks are a must. Gloves will protect you from cuts. I suggest bringing containers like buckets for carrying large rock samples, an old newspaper for wrapping them, and small bags for small crystals.

Both locations have snacks for sale. Herkimer Diamond Mine has a café with hot food. When I was there, a deli was not far away for sandwiches. I don't know if it is still there, but there are a few towns not far away (Herkimer, Little Falls, Middleville). Ace of Diamonds has a picnic area. Both mines have camping available, and Herkimer Diamond Mine is near a KOA Campground.

An interesting idea at Ace of Diamonds is Guided Mining. This is for more serious collectors. They will prepare an area in advance with excavators and bulldozers to open a new area. This must be arranged in advance at a cost of \$1900. Is anyone interested? When they open in April, I will call them for more details. If enough people are interested, perhaps I could arrange that trip. Email me and let me know if you are. I'm planning to head to the Herkimer area this July. Anyone care to join me? Happy Herkimer Hunting!

(Herkimer Diamond Mine)

<https://herkimerdiamonds.com/>(Ace of Diamonds)

<https://www.roadsideamerica.com/story/6164>(basic info but also lists hotels and mine information)

<https://herkimerhistory.com/index.htm>(interesting site. Very busy)

<https://geology.com/articles/herkimer-diamonds.shtml>(info on Herkimers)

<http://archives.datapages.com/data/bulletns/1974-76/data/pg/0060/0009/1550/1570.htm#purchaseoptions>(AAPG Abstract)  
<https://herkimerdiamond.com/herkimer-diamond-mines/>

<https://www.mindat.org/loc-4010.html%5BRock>(scroll to the bottom for a map of locations for mining)

## Earth Science 3D Printing

by Rob Lawry (Continued)

6. Try and use a slicer that allows you to pause and unload filament at specified height intervals. You can make 3D contour maps of the landscapes you are trying to print. PrusaSlicer includes this feature.

7. PLA is the filament material of choice. ABS and Nylon are difficult to work with and require intense heat and environment control. If you are new, avoid these.

8. Buy a heat-gun. For \$20 you can avoid sanding your prints to remove strings and just blow some hot air on them to shrivel them up.

Some projects I have made for my classroom besides landscapes:

- Drawing Compasses
- Discharge Lamp bulb holders
- Plaques and Awards
- Lithophanes of Galaxies (Thin panes of plastic where if you shine a light through it, you see an image)

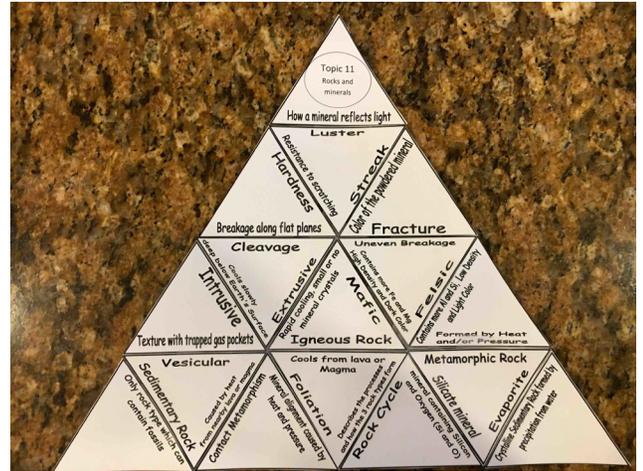


Images from left to right:  
Viruses, Sling Psychrometer,  
Above- Lithophane of Galaxy

# DISTANCE TEACHING

BY KEN ABBOTT

We are all in the new reality of trying to teach our classes remotely. It is a challenge to keep the activities interesting and to engage the students. Originally my district suggested only review work could be assigned. Carol-Ann Winans of Wantagh suggested using science triangles for a fun at home activity to share with students. Years ago Melissa Torre and I had developed an entire set of Earth Science review activities based on a 2011 STANYS workshop presented by Rodelio Abuan. Fortunately I had created a website that contains all of the files and solutions for Earth Science and Living Environment triangle sets. There are even a few more games and templates that Melissa created that are contained on our website. The materials are available at <http://sciencetriangles.weebly.com/>. The password for the site is nyesta.



I have been posting 5 sets of triangles each week to my classes and they have enjoyed it. Some of the students print out the 2 pages of triangles, cut them out and then solve them. Some have just worked with the grids as a



**Kenneth Abbott**

8:07 AM

Earth Science Triangle Challenge – 2020

Moving on to Insolation triangles. Please check your answers for the energy triangles. Our next Regents review packet will be on Energy.



**topic5energy-done.pdf**

PDF



**topic\_6\_grid.pdf**

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**topic\_6\_triangles.pdf**

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**topic\_5\_energy\_triangles...**

PDF

vocabulary and concept review. I post the solutions the next day with the next set of triangles on Google classroom. There are 36 sets available so I may run out (especially since we have lost our April break). I will then ask students to develop their own triangle sets based on the templates available on the website. Students can then solve the student created sets.

Another activity I plan to use remotely is to have students create and submit 5 - 10 minute videos to explain specific models taken from Regents exams. I call these videos "Boring Diagram Explanations" or BDE's. I came up with this idea after attending a workshop given by Tom Gazda at the STANYS conference in Rochester.

# DISTANCE TEACHING

BY KEN ABBOTT

(CONTINUED FROM PAGE 5)

Tom's method for creating quick videos for the classroom can also be used by students to create their own videos. Tom recently posted a new video on how to film your own videos for teachers new to making videos for their classrooms.

<https://www.youtube.com/watch?v=nYfLYJMHEMw&feature=youtu.be>

He has even more information and suggestions available on his website at

<https://www.gazdonianproductions.com/filmyourownvideos.html>.

Inspired by Tom's ideas I started to create my own classroom videos and then asked the students to create their own videos. I really got some great examples from some of my students. It was also easy to determine which students have major misconceptions when you see and hear them explain a concept on video. You do not need to create any of your own "Boring Diagram" worksheets because I posted 80 BDE's for you to use. There are 15 examples of BDE videos on the site so students can see an example of what they should look like.

<https://abbottearthscience.weebly.com/boring-diagram-explanations.html>.

Rubrics and directions for this video assignment (at the bottom of the page) can be found at:

<http://abbottscience.weebly.com/es-phenomenon-video--time-lapse-project.html>

This year I intend to have students use Flipgrid to post and share their videos.

Another activity I plan to use remotely is to have students create and submit 5 to 10-minute videos to explain specific models taken from Regents exams. I call these videos "Boring Diagram Explanations" or BDE's. I came up with this idea after attending a workshop given by Tom Gazda at the STANYS conference in Rochester. Tom's method for creating quick videos for the classroom can also be used by students to create their own videos.

There have been so many great resources and ideas that have been shared through Esprit Listserv since we have moved towards remote and online discussion. If you are not signed up for listserv you are missing a great professional resource at this critical time.

Information about joining the listserv is found at:

<https://suny.oneonta.edu/oneonta-mentor-network-initiative/listservs>.

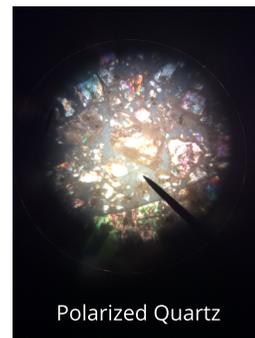
# LETTER FROM THE EDITOR

BY JOE MALAVE

As the newly assigned newsletter editor for NYESTA, I thought it would be appropriate to introduce myself and share some of my teaching experiences. However, before I write about my background, I need to ask you a favor. If you have something related to Earth Science education that you wish to share with our members, feel free to submit an article for the newsletter. If your article can't be used in the upcoming edition, it will be saved for future editions. I have to imagine that with all of our members, we could learn a lot from each other and read about interesting ideas. Send all articles to [nyesta.newsletter@gmail.com](mailto:nyesta.newsletter@gmail.com), Subject: Article for Newsletter



Ok, back to the intro...my name is Joe Malave and I've been teaching Honors Earth Science in [Montauk School](#) for 22 years. Montauk Point is an amazing place for teaching glacial earth science and has an extremely thick till layers, moraines, eskers, kettle holes, and glacial erratics. Montauk is located on the ocean which leads to many lessons on hurricanes, oceanography, and the geology of coastal regions, and sand studies. I'm currently a Section Director for Suffolk STANYS and I urge anyone that is not a member of STANYS to join. [STANYS](#) promotes professional development and is working



with [NYSED](#) on the new science standards [NYSSLS](#).

In the past, I worked to build an observatory in Montauk as a co-founder of the [Montauk Observatory](#) project. I started working on this project in 2003. We formed a board and charter in 2005, and I took a seat on the advisory board in 2005 due to time constraints. In 2011, after land use issues in Montauk, I initiated a move to relocate the proposed observatory to a private school named [Ross School](#) in East Hampton. I then slowly drifted away from the project. The group is still active, and a small observatory was constructed at Ross School. As I moved away from that project, I drifted into the [Faulkes Project](#). The Faulkes Project allows teachers and students to use \$30 million dollar telescopes located in Hawaii, and Australia. The image of M104 to the right was taken and photo processed by my students using a Faulkes telescope. [Las Cumbres Observatory](#) merged with Faulkes and expanded the network of telescopes, but added a higher level of professionalism and unfortunately more restrictions to teacher/student access to the telescopes network.



I studied geology at [Stony Brook University](#) and was president of the Geology Club during my undergraduate work. Being involved in the Geology Club was amazing for field experiences, and it was a great way to be more involved with research labs and projects in the geosciences division at Stony Brook University. I found the Stony Brook undergraduate geology program to be fascinating as well as extremely challenging, but a good balance between the two. I am still in contact with a few professors when my student research interest requires guidance or support, and they are generally very helpful. One of the



highlights of my teaching career was having a proposal accepted by NASA/ASU/JPL under the project name of the [Mars Student Imaging Project](#) (MSIP). During the years 2008 & 2009 school year, my students actively developed a proposal and multiple hypotheses about certain geologic features on the surface of Mars. My Earth Science class flew out to the Mars Space Flight Facility at Arizona State University and worked with Mars scientists while analyzing instrument data. The photo to the left shows Earth Science students receiving an image from their selected region. The images were obtained from the Mars orbiting THEMIS instrument package onboard the Odyssey spacecraft in 2008.

(Continued on the next page)

The scientist also took my classes out on a day trip to the Berringer impact crater, and a volcanic field full of cinder cones, and a particular cinder cone called SP crater (you can look up the local name!). When we returned to Montauk, my students continued to analyze the images and wrote a research paper on their findings.



Speaking of research, I just started a research class in Montauk School. For this class, all of the research questions need to be within the Earth Science curriculum. One of the interesting aspects of this class is that students often ask me for research question suggestions even though they were given adequate time to research their own questions. That often leads students to research ideas that I have had spinning around my head for years. So in a way, it actualizes my science thoughts in a way that is quite fun for my students and myself.

Well, that's enough about me, I hope to meet you in person at a conference in the future, and please consider writing an article for the newsletter!

## New York State Geology/Earth Science Features of Interest

Compiled by Thomas McGuire of Cave Creek, AZ: [cavecreekdigital@msn.com](mailto:cavecreekdigital@msn.com)

A. The New York State Geological Association (<https://www.nysga-online.net/>) website has links to hundreds of field trip stops and field trip routes in Google Earth. If you click on individual dots, you will get a brief description of the field trip stop and the reference to the Field Trip Guidebook that includes that stop. As of this time, it was last updated about 2013.

B. New York State Museum: Geology Department: New York State Geological Survey (NYSGS); research and education. Descriptions of various aspects of the State's geology are presented in the Museum Bulletin, Memoir, Map & Chart, Miscellaneous Publications, and Circular series publications.

<http://www.nysm.nysed.gov/research-collections/geology>

C. Waterfall Map of New York State: Interactive map shows locations and descriptions of hundreds of waterfalls in New York State. <https://beta.nyfalls.com/waterfalls/map/>

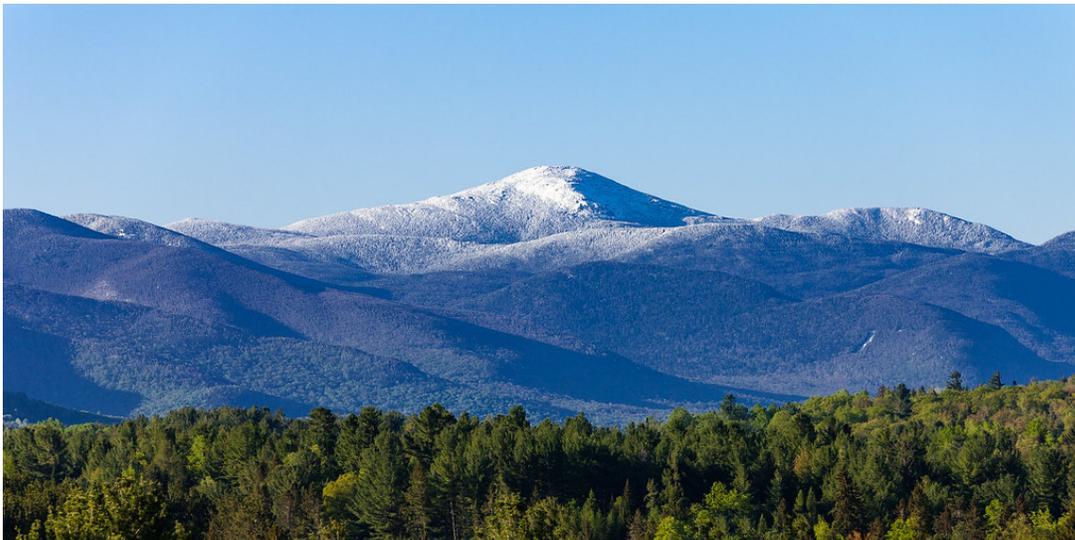
### Selected Unique Locations for Earth Science Travelers

(In no particular order. See the accompanying map.)

1. Lester Park near Satatoga (stromatolite fossils)
2. Watkins Glen (hanging valley gorge)
3. Whiteface Mountain - 5th highest in New York State with a toll road and a tunnel & elevator to the top. Anorthosite (moon) rock.
4. Kaaterskill Falls (stream capture by Kaaterskill Creek from the upper Schoharie Creek)
5. Letchworth Gorge (created when the glaciers blocked the Genesee River from it's former valley to the east)
6. Barton Garnet Mine (beautiful pods of red garnet in hornblende-rich garnet amphibolite Also Northway near Exit 23 (No collecting.))
7. Fordham Gneiss (beautiful banded gneiss observed in Westchester County road cuts)

8. Long Island beaches (north shore till makes pebble beaches below bluffs while south shore outwash creates broad sandy beaches)
  9. Finger Lakes (U-shaped glaciated valleys dammed by terminal (Valley Heads) moraines)
  10. Glacially polished bedrock with striations near the summit of Hunter Mountain (Shows the minimum thickness of (geologically) recent glaciers) Also Pocantico Hills, NY, and throughout the Hudson Valley, the Adirondacks and in limestone in central New York
  11. Clark Reservation (abandoned huge waterfall something like the Dry Falls in the Washington State Channeled Scablands)
  12. Central Park, NYC glacial features (erratics, striations, grooves, roche moutonnees)
  13. Penn Dixie Fossil Park south of Buffalo\* (abundant Devonian marine fossils & collecting)
  14. Mendon Ponds County Park (south of Rochester has eskers and kettle lakes)
  15. Taughannock Falls (Highest single drop falls east of the Rockies) Also see #19 below.
  16. Niagara Falls (need one say more?)
  17. Tully Landslide (rather overgrown now.)
  18. Ausable Chasm (probably as close as it gets to some of our western slot canyons. See Watkins Glen above)
  19. Buttermilk Falls, Ithaca\* (Grimes Glen, Filmore Glen, Stony Brook, Trenton Falls & countless others) See [https://www.newyorkupstate.com/outdoors/2016/05/waterfalls\\_upstate\\_ny\\_new\\_york\\_see\\_in\\_person\\_best\\_outdoors.html](https://www.newyorkupstate.com/outdoors/2016/05/waterfalls_upstate_ny_new_york_see_in_person_best_outdoors.html)
  20. Chimney Bluffs (Wave eroded drumlins on Lake Ontario)
  21. Green Lakes\* (Green Lake itself is perhaps the most studied meromictic lakes)
  22. Falls of the Genesee River in Rochester
  23. Gilboa Pump Storage (at times water flows in the wrong direction in Schoharie Creek.)
  24. Ramapo-Canopus Fault zone (quite the linear valley along Canopus Creek)
  25. Hudson River through the Hudson Highlands (one of the few East Coast fjords)
  26. Rock City Park (Passages among the rocks. New York's answer to slot canyons. Similar to John Boyd Thacher Park escarpment SW of Albany. Nearby Thunder Rocks.
  27. Gilboa "Forest" Trees (big Devonian tree stumps near the Gilboa Pump-Storage project.)
  28. Hill Cumorah (drumlin, drumlin field. The whole are north of the Thruway along NY 31 between Rochester and Syracuse.)
  29. Montauk Point (till bluffs, rocks that clink in the waves, magnetite sand)
  30. Peached erratic at North Salem, NY (See Westchester Field Guide glacial geology trip that includes a remarkable suite of glacial landforms)
  31. Oil Museum at Bolivar, NY. (The NY town rhymes with Oliver.)
  32. Fort Tryon Park, upper Manhattan (Bedrock hill with wonderful views of the Palisades and the Cloisters, museum of unicorn tapestries)
  33. Stark's Knob north of Albany (Lava pillows)
  34. Through Valleys along I 81 near Tully Center. There are multiple glacial features.along here. A trough valley is a place where the glaciers plowed a (usually) north-south valley right through a drainage divide. There are many through valleys including the Finger Lakes and probably NY route 42 north of Shandaken. Chapel Pond south of Keene Valley in the 'dacks)
  35. Yngvar Isachsen's "Circular Structure" which is probably the base of an impact crater SW of Phoenicia. The bedrock evidence is subtle, but the roads and valleys show the landform.
  36. Esker along NY 79 west of Whitney Point.
  37. Many geology/Earth science museums. The American Museum of Natural History on Central Park West is probably the best.  
<https://www.amnh.org/research/physical-sciences/earth-and-planetary-sciences/public-outreach/new-york-city-geology>
- The [Paleontological Research Institute Museum \(PRI\)](#) north of Ithaca, NY (Check out their books about Finger Lakes area geology.)

38. Avalanche scars on the High Peaks, especially between Mts Marcy and Algonquin
39. The quartz pebble climbing cliffs of Shawangunk (Show'gum) Mountain west of New Paltz
40. Hanging Stream Pothole at Moss Island, Little Falls. Potholes in Harriman State Park. Hulls Falls south of Keene has active potholes.
41. Grooves, polish, chatter marks, crescent gouges on Bear Mountain across the Hudson River from Peekskill. (See 109 Years, A Guide to the Geology of Westchester County, NY, McGuire, (1991))
42. Grooves, dikes, sills erratics, etc in the Hudson Highlands. (See "Rock Scenery of the Hudson Highlands by Jerome Wykoff (1991))
43. Hanging Waterfall, Montour Falls, NY.
44. Croton Point glacial lake varves. See Glacial Legacies of New York State on Slide Share, and 109 Years, A Guide to the Geology of Westchester County, NY, McGuire, (1991))
45. Howe Caverns and Secret Caverns east of Cobleskill, NY.
46. Eternal Flame in Chestnut Ridge Park, south of Buffalo. Natural gas seep.
47. The Niagara Gorge at The Whirlpool Rapids. Ride the Aero cable car if you dare.
48. Large bedrock exposure at the covered bridge on Route 9N at Jay, NY. (Adirondack lithologies).
49. Kimberlite deep origin volcanic rock (from small, explosive eruptions) near Ithaca (no diamonds): Cornell Campus, Taughannock Creek, etc.
50. Unconformity and a major change in rock types at the edge of the Frontenac Arch at the base of the Potsdam Sandstone east Alexandria Bay on NY 12) (There are numerous unconformities around the Precambrian Adirondacks, at the edge of the Taconic Mountain sequence and above and below rock formations throughout the state.)
51. Harbor Hill and Ronkonkoma terminal moraines on Long Island. The Valley Heads moraine south of the Finger Lakes displays hummocky terrain on NY 21 south of Naples, NY. There are other locations.
52. Giant erratic (20 feet tall) south of NY 117 in Rockefeller Park. Large erratics and erratics of exotic lithologies (crystalline rocks) can be found in western NY. (I don't have specific locations.)
53. Drainage altered from southward to northward by glacial debris at Keuka Lake and elsewhere at the southern ends of several Finger Lakes at the Valley Heads Moraine.
54. Roche moutonnees in New York City's Central Park, the Hudson Valley such as in Canopus Lake and the Adirondacks.
55. Palisades Sill (zoned intrusion) from the western bank of the Hudson River opposite northern Manhattan and north to Haverstraw.
56. Migmatite at I 684 at NY 172 east of Mt. Kisco. See 109 Years, A Guide to the Geology of Westchester County, NY, McGuire, (1991)
57. Ammonite fossils embedded in limestone somewhere near the north end of Kayuga Lake. I don't have the specific location nor do I know if it's still accessible.
58. Finger Lakes in western NY: about 11 of them.
59. U-shaped dry valley overlook at Bristol Mountain. The Finger Lakes are U-valleys. There are numerous others in western NY.



60. Mt. Marcy - highest point in New York State (About a 10-mile tough hike to an altitude of 5344 ft.)

See the Location Map on The Next Page



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