Selleck Road, West Pierrepont, NY

This St. Lawrence County collecting site has been rejuvenated by recent activity, discoveries, and literature. The club has a slide show put together by Steve Chamberlain in 2011 with maps, field pictures and photos of lots of mineral specimens. Fred Haynes has updated it with recent information, also from Dr. Chamberlain. In addition, members should bring in any specimens they have from the location or others in St. Lawrence County that they would like to show and tell about.

Further, the 2014 Field Trip Committee will meet prior to the club meeting to plan this summer’s field season. Anyone interested in helping is invited to join us in the church basement meeting room from 5:30-7:00 PM on Feb. 14th.

Three inch diameter core from seepage remediation work at Wolf Creek Dam in Kentucky. Pink dolomite crystals partially fill cavities in the karsted limestone. The “gold” colored material on the left side of the photo is fine grained pyrite. Jamie Fisher won WCGMC’s Best Mineral of 2013 Youth Division with this unique piece.

Geology in Action, Wolf Creek Dam, Lake Cumberland, Kentucky

By Fred Haynes

The construction of Wolf Creek Dam in central Kentucky began in 1941, but work was interrupted by WW2 and the dam was not completed until 1951. Potential problems with the integrity of the underlying Ordovician Leipers limestone were appreciated during construction and extensive cement was placed in a number of cave features that

(see Wolf Creek Dam on page 6)
In this Groundhog Day issue of WCGMC News, I introduce a new feature. “New York Site of the Month” will highlight a collecting or otherwise geologically interesting location in our fine state. The idea is to present a little of everything, some history, some geology, some nice pictures, and, of course, the rocks, minerals, or fossils that make the site of special interest to us.

I’m hoping to feature some of the lesser known, but interesting locales across our state. There has probably been enough written about Herkimer diamond locations to fill several books and the special collecting sites like Bower Powers Farm in Pierepont or the Penn-Dixie Fossil site near Buffalo are well known to all. But our state is blessed with many lesser known mineral and fossil collecting sites with interesting geology and history.

To kick start the idea I have chosen Benson Mines in Star Lake. The mineral specimens are not world famous, but the iron mines of St. Lawrence and Jefferson County are historically and economically important in New York history and the open pit at Benson Mines was the largest of these occurrences. Of course, it is helpful that I was able to visit the mine last September with the St. Lawrence County Rock and Mineral Club.

If you have an idea for a mine, mineral, or fossil location to feature, please let me know. Perhaps we can work them around our upcoming field season. Or perhaps one of you had an interesting experience at a lesser known New York site, or have some great pictures to share. I’m easily reached at fredhaynes55@gmail.com or at any club meeting. I don’t think we will run short of locations for many years.

Another new feature in this month’s WCGMC news requires some work from you! On page 7 you will find a crossword puzzle that was designed to occasionally challenge the experienced digger among you, but also be friendly to the younger generation (most of whom are quite capable of “googling” for needed answers to the more difficult clues). The goal for puzzles of this type is to both fun and educational for folks of all ages and backgrounds. I hope to hear from you whether I succeeded.

Let’s hope that the groundhog does not see his shadow and we can commence digging soon!

Our first scheduled dig is on opening Day at the Ace of Diamonds Mine, that’s Tuesday April 1.

Check the RMS link at www.rasnyny.org for details of the 4 day event including the list of speakers and registration information.

Another quality paper on a historic New York state mineral site can be found in the final 2013 issue of Rocks and Minerals (v. 88, #6), an issue featuring pegmatites:

Minerals of the Scott Farm Pegmatite near Fine, St. Lawrence County, NY (by S. Chamberlain, M. Lupulescu, and D. Bailey) provides a systematic description of the mineralogy and geology of a location first referenced by Dana in 1892. From a quarry mined for feldspar for ceramics come some of the finest crystallized specimen of zircon and titanite ever recovered in New York state.
Have you driven Route 3 in southern St. Lawrence County? Did you know that as you pass just east of the small hamlet of Star Lake you are just hundreds of feet south of what was once the largest open pit iron mine in the world? That’s right, in 1958, during the height of its life, the Benson Mines open pit iron mine held that lofty title. The pit was 4 kilometers long, 250 meters across and 400-600' deep. Today the pit is host to a whole lot of brilliant blue water and the surrounding Appalachian Park region is forest covered and virtually pristine wilderness.

The high concentration of iron in the rocks of the region was first recognized in 1810 when engineers surveying for a military road found their compasses wandering. But until the timber industry built a railroad to the region the iron ore could not be exploited. Even with rail, the area was still remote and from 1890 to 1940 mining was sporadic and limited. In 1941, Jones and Laughlin Steel Company leased the properties and constructed plant facilities.

Looking south, note the steep pit walls on the right (west) side of the lake at Benson Mines. Photo by F. Haynes

Three “map” views of the Benson Mine open pit near Star Lake, NY
For over four decades the region thrived as iron ore was extracted and concentrated on site. The ore averaged 23% iron and was concentrated to over 60% for shipment to steel centers like Pittsburgh. Mining ceased to be economic in 1978 when the US steel industry declined and taconite processes in Minnesota captured the remaining demand. The Benson Mine deposit is not mined out. Rather, iron can be recovered less expensively elsewhere.

As is true across the Adirondack region, the original character of the rocks in the iron district surrounding Star Lake has been virtually obliterated by upper amphibolite to granulite facies metamorphism during the Grenville orogeny some 1.1 Billion Years ago. However, geologists working with the full rock exposures available when the open pit was being mined ascribed the origin of the iron to precursor sedimentary processes. In 1970, in a professional journal article on the mine, Palmer wrote “In view of the impressive conformity of ore to a single horizon in the paragenesis, the ore is believed to have a metasedimentary origin”. This would suggest an origin similar to the banded iron formations in northern Minnesota except that those rocks were not buried, metamorphosed, and intensely folded.

The product of all the metamorphism and structural activity in the Benson Mines area was a series of mafic gneisses with minor granitic component and skarn bodies that are now overturned and steeping dipping along a N-S trend. Some units are rich in garnet, others contain abundant sillimanite, but the economically important minerals are magnetite and hematite, presumably marking the locations of the original iron-rich sedimentary units. The hematite often occurs as martite (i.e. pseudomorph after magnetite). None of the iron oxides make for spectacular mineral specimens, but what the region may lack in quality specimens, it makes up for in quantity, not to mention the scenic beauty of the newly formed lake.

Sillimanite is not only found in the host gneiss, but also in pegmatites that crosscut the metasediments. The alumino-silicate is associated with chrysoberyl, muscovite, and quartz and forms crystals up to 20 cm in length. The muscovite books are also large in some of the pegmatites. A few rare molybdnite specimens were found there (see page 1).

A visitor to the site today likely won’t find sillimanite like that depicted in Lupulescu’s 2008 Rocks and Minerals article (see photo upper left), but one will find abundant large sillimanite phenocrysts within the gneiss of the mine dumps and the muscovite site is most impressive on a sunny day. Magnetite ore is everywhere; the non-magnetic ores with martite can be distinguished from magnetite if you remember to bring your magnet. But remember, your compass won’t help you here should you get lost.

References:
Buddington, A.F., and Leonard, B.F., 1972, Regional Geology of the St. Lawrence County Magnetite District, Northwest Adirondacks, NY, USGS Prof. Paper 376, including a 1:62,500 scale geologic map of the entire mining district
An Online Fossil Guide for New York

Ever wanted to identify a fossil and wondered what resources might be available to you? Did you know that Special Publication #21 of the Paleontological Research Institute is available online? The 472 page volume entitled Devonian Paleontology of New York was authored by David Linsley in 1994. The treatise contains 342 full page plates with wonderful line drawings of all your favorite Devonian friends. For those interested in the sedimentary rock formations cropping out in western New York, there is a thorough discussion of the local stratigraphy. And the best part is the download is free.

To Download, visit www.museumoftheearth.org and navigate to Publications/Special publications. Then open the Book List and go to Result page #3 for PRI SP #21. The full document can be downloaded with the push of a button.

Best of the Year Specimens for 2013

The picture does not do justice to this past year’s award specimens, but no one ever claimed rockhounds could moonlight as photographers. At our November meeting, votes were cast and awards were given for the best specimen collected (or obtained) by club members during 2013.

And the winners were:

- Upper left: the mold and body of a full trilobite collected by Bill Lesniak at Penn Dixie won in the Best Fossil Adult Division,
- Upper middle: Roxanna Rowe’s creations with agate, amethyst and other goodies was awarded Best Jewelry/Craft in Adult Division.
- Fred Haynes’ copper fulgarite found atop Rose Road Hill in Pitcairn won Best Mineral in the Adult Division (upper right).
- Pictured in the lower left are two cephalopods that Jamie Fisher collected on Lake Ontario in Wolcott. They were awarded the Best Fossil in the Youth Division.
- The drill core with pink dolomite crystals is from recent work on the Wolf Creek Dam, Lake Cumberland in central Kentucky and it won first prize in the Best Mineral Youth Division for Jamie Fisher (see article in this issue for more on this piece).
Wolf Creek Dam (continued from page 1)

were known to exist before the earthen dam was built above. However, that early work proved to be insufficient in preventing seepage from Lake Cumberland through the underlying karst.

1947 photograph highlighting cavernous regions in the dam’s base that were filled with cement.

In 1968, it was observed that seepage was occurring through (and/or below) the embankments and foundation of the dam, and sinkholes were observed at the toe of the dam. Geologists suspected that the known karst geology was the culprit and a short-term solution involving grouting of all known channels was quickly initiated. In the mid 1970’s, a cement cut-off wall was emplaced extending through the embankment and into the bedrock. It was hoped this would permanently seal the dam and its foundation.

Despite the remedial action of the 1970’s, continuous monitoring of the dam revealed that the seepage had not been completely alleviated. When increased seepage rates were documented in 2005, Lake Cumberland water levels were lowered to reduce pressure on the foundation while another “permanent” solution was sought. During the investigative work, drill core was collected from the full length of the dam foundation. The drill core on page 1 is from that work and clearly shows the solution karst in the underlying limestone.

In 2006, the entire length of the dam’s foundation was regrount and in 2009, a $340 concrete barrier was installed within the earthen dam embankment. Over 1200 pilings were drilled through the earthen dam and into the karsted basement. Over 300,000 tons of cement were pumped into these vertical pilings. The work was completed last summer and it is hoped that Lake Cumberland can be restored to its originally designed level.

Construction workers place cement in one of 1197 piles that are approximately four feet in diameter and extend 275 feet into bedrock below the foundation of the 4000’ long earthen dam and embankment.

References:
US Army Corp Engineers, 2013, Nashville District Completes Wolf Creek Dam Barrier Wall, March 2014
Wikipedia entries for Wolf Creek Dam and karst
Zoccala, M., 2007, Wolf Creek Dam Seepage Major Rehabilitation Evaluation, ppt. file found online.
ACROSS
1. pegmatite mineral
2. found in mines or in baseball
3. midwestern state
4. fossil with age information
5. transition element (abbr.)
6. pyrite and galena are this
7. color of bixbyite
8. long period of geologic time
9. this stuff covers rocks
10. vein/fissure of ore in rock
11. forms in vugs in volcanic rock
12. type of saw mineral folks use
13. Canadian Province (abbr.)
14. element in spodumene (abbr.)
15. a logging tool
16. salt by any other name
17. element #4 (abbr.)
18. last one, time to _____
19. a gem with hardness 8
20. a really fun group (abbr.)
21. think Ni, think S, think Antwerp
22. Continent (abbr.).
23. a bird with rock in his name
24. a gem with hardness 8
25. a really fun group (abbr.)
26. element in bestrandite (abbr.)
27. element in dioptase (abbr.)
28. a gem with hardness 8
29. element in bauxite (abbr.)
30. a gem with hardness 8
31. a gem with hardness 8
32. a gem with hardness 8
33. recovered from drilling
34. a gem with hardness 8
35. just a wildebeest (Xword favorite)
36. a gem with hardness 8
37. we travel to collect in one of these
38. a gem with hardness 8
39. recovered from drilling
40. element in bestrandite (abbr.)
41. opposite of beginning
42. mafic intrusive rock with calcic plagioclase and pyroxene
43. a gem with hardness 8
44. a gem with hardness 8
45. element in bertrandite (abbr.)
46. a gem with hardness 8
47. a gem with hardness 8
48. a gem with hardness 8
49. we repair specimens with this
50. a gem with hardness 8
51. a gem with hardness 8
52. Continent (abbr.).
53. a bird with rock in his name
54. a gem with hardness 8
55. think Ni, think S, think Antwerp
56. a gem with hardness 8
57. a gem with hardness 8
58. a gem with hardness 8
59. we repair specimens with this
60. a gem with hardness 8
61. stalagmites point __
62. we all love a garage _____
63. professional sports league (abbr.)
64. a gem with hardness 8
65. a gem with hardness 8
66. mineral hardness scale
67. mineral hardness scale
68. a gem with hardness 8
69. the color of aurichalcite
70. a warm field breakfast.
71. a black tourmaline
72. a gem with hardness 8
73. element #4 (abbr.)
74. last one, time to _____

DOWN
1. Zinc district in New York
2. granite, shale, schist (i.e.)
3. element in spodumene (abbr.)
4. element in bertrandite (abbr.)
5. a gem with hardness 8
6. salt by any other name
7. a gem with hardness 8
8. a gem with hardness 8
9. a gem with hardness 8
10. element in dioptase (abbr.)
11. CaO for the lawn
12. element in ilmenite (abbr.)
13. element in ilmenite (abbr.)
14. element in ilmenite (abbr.)
15. element in ilmenite (abbr.)
16. used to clean lichen off rocks
17. first Paleozoic Period
18. we travel to collect in one of these
19. a gem with hardness 8
20. a gem with hardness 8
21. a gem with hardness 8
22. a gem with hardness 8
23. a gem with hardness 8
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69. a gem with hardness 8
70. a gem with hardness 8
71. a gem with hardness 8

attend Feb. mtg. for answers or wait until next WCGMC news
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Club meets 2nd Friday of each month.
Mini-miner meeting at 6:30 PM.
Regular meeting at 7:00 PM
Park Presbyterian Church, Maple Court, Newark, NY
Website – http://www.wcgmc.org/

Dues are only $15 individual or $20 family for a full season of fun. Send to WCGMC, P. O. Box 4, Newark, NY 14513

Mark your calendar:
June 7-8, 2013
Wayne County Gem and Mineral Club Show
St. Michael’s School, Newark NY
More details in the months ahead