

# GeoConnections



JOIN US FOR THE GSC

## FALL 2015 ANNUAL MEETING

### Central Connecticut State University

**Date:** Friday November 13, 2015  
**Location:** Constitution Room, Memorial Hall, CCSU  
**Time:** 4-5pm Open house and department tours  
 5-6:30pm Student posters, dinner, GSC business meeting and presentation of the J.W. Peoples Award  
 6:30pm Keynote Speaker: Dr. Charles Merguerian

For all meeting details, registration, and updates visit:

<http://www.geologicalsocietyct.org>

Register online using Paypal it is fast and convenient  
 You do not have to be a PayPal member!

See the GSC website for mail-in registration form.

Questions? Email us: [Geosocietyct@gmail.com](mailto:Geosocietyct@gmail.com)

Please join us for the 2015 GSC Fall Meeting, a great opportunity to catch up with your GSC colleagues, have dinner, find out who will be honored with the 2015 Joe Webb Peoples Award, all topped off with a stimulating evening lecture by Dr. Charles Merguerian. titled: *Wallrocks of the Hodges Complex and Tyler Lake Granite, West Torrington, Connecticut.*



Dr. Merguerian, Professor Emeritus at Hofstra University, Visiting Research Fellow at Yale University, and Principal of Duke Geological Laboratory, is a leading authority on the geologic structure and tectonics of New York City. His professional experience includes: geologic mapping and structural analysis of complexly deformed metamorphic terrains, petrography, ductile- and brittle-fault analysis, earthquake-hazard assessment, as well as geological mapping of tunnels mapping and

subsurface structure of New York City and vicinity. His work on the relationship between the geology and geotechnical methods of excavating tunnels and shafts has improved subsurface construction techniques.

Dr. Merguerian has been featured in television documentaries aired by the BBC, National Geographic, The History Channel and The Discovery Channel.

### From the... Editor's Desk

Connecticut is "rocking" this Fall! Two big meetings, the New England Intercollegiate Geological Conference on Oct. 9-11 at Wesleyan, and the 2015 Annual Fall meeting of the GSC on Nov. 13 at Central Connecticut State University, testify to the lively community of earth scientists in the region.

Connecticut has long been a leader in geoscience research and education, and the tradition continues with expanding departments, increased interest in geoscience careers, and excellent attendance at GSC, NEGSA, NEIGC, mineral clubs, and public lectures!

I look forward to seeing many GSC members at the NEIGC and the GSC Fall meeting!

~ Peter M. LeTourneau

### The New England Intercollegiate Geological Conference returns to Connecticut!

Connecticut is buzzing with activity this Fall! The busy schedule is kicked off by the 107th Annual NEIGC hosted by Wesleyan University on October 9-11. Each day is packed with fantastic field trips in Connecticut and nearby areas. Everyone will return from the field on Saturday evening for the famous NEIGC banquet, where tales from the trips will be shared, old friends will meet, and students will have the chance to chat with professors and geologists.

As stated in the NEIGC website: "*The sole purpose of the NEIGC is, as it has always been, to present field trips in interesting geologic areas.*"

For full schedule and registration visit:

<http://w3.salemstate.edu/~lhanson/NEIGC/Conference.html>

### In this big issue of *GeoConnections*!

2015 Fall Meeting	1
Message from the President	2
Committee Reports	2
Dinosaur State Park Turns 50!	2
Reports from the Field	3
Mineral Report: Connecticut Columbite	4
Connecticut Rocks! Traprock	8
Meet the Dept.– Central Conn State U	10
Geo-Puzzle	11

COMMITTEE REPORTS

**Message from the President**

In addition to our ongoing initiatives, including support for students doing geological research in Connecticut, and our regular schedule of Board meetings, we are fortunate to have had the opportunity to offer, or participate in, several field-oriented activities this year. Last Spring was particularly busy! The GSC April 2015 coastal geology trip was well attended, and Janet Stone and I led the the “land and river” glacial trip up the Connecticut River for the Friends of the Pleistocene in June. The buzz continues this Fall with a variety of NEIGC trips offered by the GSC Board and members, including J. Stone, H. Moritz, R. Lewis, P. LeTourneau, and D. Vellone, and others. There is a wealth of information in the guidebooks that were produced for these trips, often stuff you will find nowhere else! I am happy that members of the Society had a hand in putting them together!

~Ralph Lewis, GSC President

**The Treasury Report**

Effective Sept 1, 2015:

\$6574.72	PayPal
1595.90	savings
1302.60	checking
<u>6.00</u>	cash
\$9479.22	Total Assets

Scholarship Fund [dollars included in Total Assets reported above]:

\$1283.25	previous balance
<u>100.00</u>	July contribution
\$1383.25	Total

~M.Thomas, GSC Treasurer

**This Just In...**

**From the Secretary’s Portfolio**

Last year at the annual meeting, we voted to change the membership year to begin at registration for the annual meeting until the next annual meeting registration. This makes it easier to remember when to renew your membership. Membership dues allow you to get lower rates on GSC events. You can join or renew using the PayPal link on the society website [www.geologicalsocietyct.org](http://www.geologicalsocietyct.org) (click on “Store”), either now or at the same time you register for the annual meeting. All dues payments from September 2015 going forward will be counted for the 2015-2016 membership year.

Board activities this year have included:

- six board meetings (past minutes are posted on the website)
- migration to a new website
- awarding student research grants
- establishing an Academic Advisory panel, with representatives who attend each Board meeting

Future plans for the Board include:

- planning the 2016 Spring Field Trip
- fund raising activities for the 2016 annual meeting and student research grants
- membership outreach

~ Camille Fontanella  
GSC Secretary

**Scholarship Committee:**

**The GSC Supports Student Research in Connecticut**

Last winter, the Connecticut Geological Society awarded three grants to students doing geological research in Connecticut. These grants will again be offered in 2016. The exact number of grants will be determined by the quality of the applications and the amount of funding available. Many thanks to everyone who purchased the special glassware with the society’s logo as all of these profits have gone into the grant account. If you would like to make a donation to enable us to sponsor these grants, please visit the website. Information regarding the application process for 2016 will be posted in January.

~Meg Enkler

**Dinosaur State Park Celebrates 50 years in 2016**

Hard to believe, but next year in August we will celebrate the 50th anniversary of the discovery of dinosaur tracks in Rocky Hill. The park has an active committee that is planning a series of events that will take place all year long. To help publicize these events, our Friends group has launched a new Facebook Page [www.Facebook.com/DinosaurStateParkFriends](http://www.Facebook.com/DinosaurStateParkFriends). The page already features an album of old black and white pictures from the discovery and the early days of the park. Also featured is an album of pictures from our latest Dinosaur State Park Day celebration. We will be using this page to post information about monthly events. All year our Friends group will be sponsoring “First 50”. On a selected Saturday every month in 2016, the first 50 families to pay admission that day will get a free prize. The dates for this giveaway and the prizes will be posted on the Facebook page 24 hours before the date. Prizes will include books, toys, posters and other items. A full listing of events should be posted in late December. The bookshop will be creating several commemorative items that will only be available for a limited time in recognition of this important anniversary. So “Like us” on Facebook and join us to celebrate 50 years of discovery!

~Meg Enkler, Director Dinosaur State Park

REPORTS FROM THE FIELD

*The GSC Spring 2015 Field Trip*  
**The Coastal Geology of Eastern Connecticut:  
 Bluff Point to Meigs Point**

Trip Leader: Ralph Lewis, UConn Avery Point

The object of the trip was to explore the bedrock and glacial history of the CT coast as expressed in outcrops, landforms and beaches easily and safely visited at Hammonasset, Rocky Neck, and Harkness Memorial State Parks, Bluff Point Coastal Reserve and Waterford Beach. Each of these sites also allowed for an examination of the modern processes that are currently working to modify the coast and a glimpse at a few missteps humans have made while trying to return things to “normal”.

After a brief introduction at UConn Avery Point, where the terminal moraine and most of the offshore recessional moraines of eastern Connecticut could be seen, the group traveled to Bluff Point for an examination of the origins of the various beach types found there.

Stops at Waterford Beach and Harkness Memorial provided an opportunity to examine typical Connecticut sandy beaches, developed on glacial deltas, and pinned between rocky promontories. Some interesting “management” issues were also discussed. Rocky Neck offered bedrock outcrops, glacial deposits, and coastal features/processes that were used to explain the genesis of most of the landforms that are common in eastern CT. Crawling around the coastal moraine at Hammonasset capped things off. - Ralph Lewis



Photos: Drew Hyatt, ECSU

THE FRIENDS OF THE PLEISTOCENE JUNE 2015



Sea Cliff at Griswold Point.

The 2015 Friends of the Pleistocene Field Conference, hosted by the Geological Society of Connecticut was held June 5-7 and headquartered at Dinosaur State Park in Rocky Hill. This was the 78th annual reunion of the FRIENDS and the gathering had not been held in Connecticut since 1935 when Richard Foster Flint hosted the 2nd annual fieldtrip at New Haven. The 3-day fieldtrip entitled “Glacial Lake Hitchcock and the Sea” was led by Janet Stone, Jack Ridge, Ralph Lewis, and Mary DiGiacomo-Cohen. The guidebook (available at the GSC website) was edited by Margaret Thomas. Fieldtrip Stops on Day 1 included:

Griswold Point at the mouth of the Connecticut River where onshore and offshore glacial geology was discussed; DEEP Marine Headquarters in Old Lyme; a boat ride on the Connecticut River from Essex to East Haddam on the RiverQuest Cruise Boat (including Lunch); Haddam Meadows State Park, and ending in Middletown on the lake-bottom surface of glacial Lake Middletown. On Day 2, stops included a view of Rocky Hill Dam for glacial Lake Hitchcock, the New Britain Spillway, several stops in the Farmington delta complex, and Matianuck Dunes State Preserve for lake-bottom surface varves, dunes, and lithalsca scars. The day concluded with Happy Hour and Buffet Dinner at Dinosaur State Park. On Day 3, we visited Riverfront Park in Glastonbury and the clay pit at Redlands Brick Co. (formerly Kelsey-Ferguson) in South Windsor. Participants in the field conference included more than 70 Friends of the Pleistocene from all over New England and the Northeast, and the trip was pronounced a huge success by all who attended.

~Janet Stone, USGS



At DEEP Marine Headquarters, Old Lyme.



Co-leader, Jack Ridge takes a core at Redlands Brick Co., South Windsor.

## *Connecticut Mineral Report: Columbite*

### Solving The Mysteries of the First Columbite Crystal

By Harold Moritz

Columbite,  $(\text{Fe,Mn})(\text{Nb,Ta})_2\text{O}_6$ , is a heavy, black, metallic mineral with a blue to yellow iridescence now commonly found as an accessory mineral in Connecticut pegmatites (and around the world). It is highly sought after by specimen collectors and when concentrated in alluvial deposits is an ore of niobium and tantalum metals. Like all minerals, it was found somewhere first, and history has it that place was in Connecticut. Sadly, though, the rest of the details are murky, because, as is typical with many early finds, documentation was terrible. Many researchers have tried to solve the mystery; I think I was successful only because there were in fact two mysteries to solve that no one knew were potentially connected.

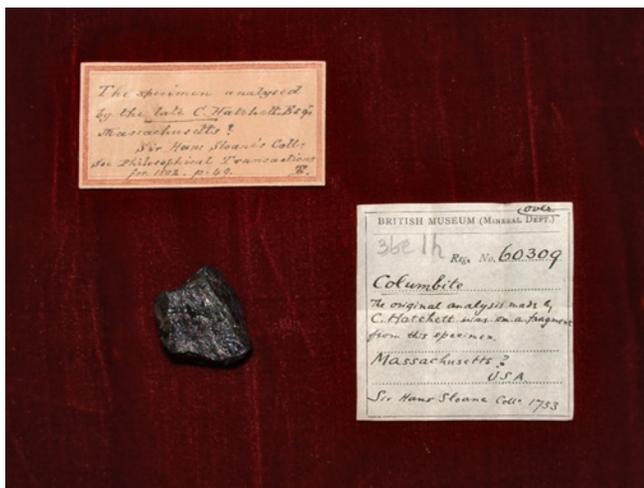


Figure 1. What's left of the first columbite specimen, with British Museum labels (photo from their online catalog).

#### The Specimen

The first crystal has a complex history that begins in the 17th century and is related in the Seventh Edition of James Dana's "System of Mineralogy". Originally, it belonged to John Winthrop, Jr. (1606-1676), first Governor of Connecticut and grandfather of John Winthrop (?-1747), who possessed a collection of natural curiosities and was active in the early iron mining industry of Connecticut (and gold mining at Great Hill near what is now Cobalt). Governor Winthrop's collection was presented by John Winthrop to the Royal Society of London in 1734. The specimen was incorporated into the collection of Sir Hans Sloane (1660-1753), at that time President of the Royal Society. Sloane's catalog described it as "a very heavy black stone, with golden streaks [mica]", and it passed in 1753 into the British Museum, then founded. The original specimen is still preserved (B.M. 60309) was originally described in 1802 by Hatchett, in the

Philosophical Transactions of the Royal Society of London, based on a sample from "Nautneauge" (his admittedly suspect interpretation of barely legible handwriting in Sloan's catalog) perhaps in Massachusetts (based on the affinity of other items in the collection Sloan got it from), but no such name existed even then. Thus the geographic origin of this specimen is unfortunately vague and confusing. Part of John Winthrop's catalog of "objects of Natural History", was published in the American Journal of Science in 1844. In it can be found this listing: *348. A black mineral, very heavy, from the inland parts of the country. (Is this the columbite?\*)* [emphasis added]

The parenthetical part of the entry was added by the AJS editors and their footnote states:

*"It has been supposed that the original specimen on which Mr. Hatchett made the discovery of columbic acid was sent in this invoice, and that some hint as to the locality from whence it came might be had; but we find no other entry than this which corresponds at all with what Mr. Hatchett says, which is—"Upon referring to Sir Hans Sloane's catalogue, I found that this specimen was only described as 'a very heavy black stone with golden streaks,' which proved to be yellow mica; and it appeared that it had been sent with various specimens of iron ores to Sir Hans Sloane, by Mr. Winthrop of Massachusetts. The name of the mine or place where it was found is also noted in the catalogue: the writing however is scarcely legible—it appears to be an Indian name. (Nautneauge.)" We must therefore rest content probably in ignorance of the exact locality of that interesting specimen; although mineralogists have, on what evidence does not appear, considered New London as the locality.—EDS."*



Figure 2. Partial columbite crystal 35mm collected circa 2009 from the "CCC prospect". H. Moritz specimen and photo.

## *Connecticut Columbite...continued*

### The Search

Yet “rest content” in ignorance mineralogists did not. In an early speculation, Mease (1807) wrote: “...we hope every interesting particular concerning this substance, and the place where it was originally found, will be made known to the public. It will then be easy for gentlemen to visit the spot, and to collect other specimens of this singular ore.”

Mr. J. Hammond Trumbull discussed the subject in a July 16, 1882 letter to Professor George J. Brush of, coincidentally, Columbia University:

The name of Naumeg or Naumeag, originally given to the plantation at New London, may have been extended - as were the bounds of the plantation - east of the Thames, to the Mystic, including what is now Groton. I conjectured that the columbite was found near Winthrop’s mill a short distance above the head of Mystic, and there used to be a local tradition to that effect; though it had no definite value.

Item 237 in the catalog is “*Amethyst sand flung up by the waters of a spring near Naumeag, three miles from the beach, where a large quantity of the same sort is found.*” The entry makes no mention of anything resembling columbite. That the word “*Nautneauge*”, which is suspect anyway due to the illegibility of Sloan’s writing, was somehow a corruption of *Naumeg*, *Naumeag* or *Naumeaug* is pure speculation as is the idea that the old name must have encompassed areas far to the northwest of New London. Given Gov. Winthrop’s background in iron mining and because he spent much time mining a gold-bearing quartz vein at the foot of Great Hill near Cobalt in East Hampton, it is much more likely he found it in one of the many pegmatites in the Middletown district in or around East Hampton, where columbite is common. This conclusion is consistent with the note in the catalog stating “*from the inland parts of the country*”.



Figure 3. A 4.5-pound chunk 7.5 x 11.5 cm that was in the Michigan School of Mines for a long time and was just labelled “Haddam, Conn.”. H. Moritz specimen and photo.

Once its significance was understood, in 1822 Doctor John Torrey rediscovered it at Haddam (as tiny crystals at the chrysoberyl locality). Torrey (1824a, b) suggested that Haddam might have been the actual source of the original columbite, but this was before anyone knew how common columbite is in the Middletown district. Note that the towns of the District (such as Haddam or East Hampton (Chatham)) as settlements by Europeans did not exist until the early 1700s, well after Gov. Winthrop’s time in the area, so they were not available for the catalog, whereas potentially now lost Native American names would have been.

Yet Hatchett’s crystal must have come from an outcrop as no pegmatite quarries were active in North America in the 17th through mid-18th centuries, when the Winthrops lived. Thus the crystal must have been large and obvious in outcrop without quarrying. The Hatchett specimen originally weighed “several ounces”. Based on the small columbites found in 1822 at the Haddam chrysoberyl locality ([www.mindat.org/loc-213971.html](http://www.mindat.org/loc-213971.html) - the first confirmed, specific locality for both minerals) compared to Hatchett’s specimen, Torrey (1824b) surmises that: “*It is true that the largest piece of ore yet seen from the later locality, does not much exceed half an inch in diameter, while that in the British Museum is said to weigh several ounces; but it is reasonable to expect that when the new locality is thoroughly explored, masses of considerable size will be discovered.*”

Despite decades of collecting at the chrysoberyl site, only small crystals turned up. But “masses of considerable size” (to 14 pounds) were found at the China-stone Quarry (aka Tollgate Quarry - [www.mindat.org/loc-23478.html](http://www.mindat.org/loc-23478.html)) nearby in Middletown. But they were found during quarrying and weren’t described from there until Shepard (1837), at least 10 years after operations started. Whether any were exposed before quarrying is unknown. And so there the mystery has been for a couple of centuries, a dead end stuck largely in speculation.

### Meanwhile, at the Thankful Arnold House

A couple of years ago, the late Edward Force and I were working to identify and/or verify all the quarries and mineral localities in the town of Haddam, another but unrelated project beset by terrible or lost documentation over the course of a couple of centuries. Part of that effort dealt with learning the history of a place now known as the “CCC prospect”, [www.mindat.org/loc-193458.html](http://www.mindat.org/loc-193458.html), named after the former Civilian Conservation Corps’ (CCC) long-gone Camp Filley barracks (built 1933) on Filley Road, at its intersection with Turkey Hill Road, in the Beaver Meadow District of Haddam and now in the Cockaponset State Forest.

The prospect occurs in a narrow, 0.7 to 1.3-meter-wide, very-coarse-grained pegmatite dike that cross-cuts a much larger, barren, fine-grained pegmatite that makes up most of the outcrop. Besides the usual pegmatite minerals, beryl is the most common accessory and based on collecting trips since about 1990, the crystals range in quality from very corroded and opaque to gem grade and in color

from nearly colorless, through pale green and yellow to deep golden honey, most are internally fractured. Crystals are up to 2.5 to 5 cm in diameter and 15 or 18 cm long, although at one point there were multiple yellow beryl crystals there that were measured in decimeters! The other mineral of note is columbite, which are typically found in thumbnail to small cabinet specimens and sometimes as tiny crystals embedded in yellow beryl.

It is one of 3 places that the Connecticut Department of Energy and Environmental Protection gives out permits for educational mineral collecting on state land. We knew it had no connection to the CCC camp other than proximity. It is one of those places that was not in the usual collector's guides or government mineral surveys and seemed to be completely off the historical radar. So we had to dig into obscure or unpublished records. Documented history of the locality is brief or obscure, primarily because until the camp was built, there were no local landmarks. Working backwards in time from a brief mention in an obscure letter by Williams (circa 1945), "*Near the C.C.C. Camp in Beaver Meadow, large crystals of Columbite occur with Yellow Beryl and Muscovite crystals in a pegmatite dyke*", it is clear Williams also apparently wrote about the prospect in 1899, which is well before the CCC camp existed, with this note: "*Two miles South of the Court House near the Turkeyhill road Golden Beryl and Columbite are found in fine crystals.*"



Figure 4. Large piece about 10 x 13 x 15 cm at the Joe Webb Peoples Museum, Wesleyan U., Middletown, Conn. Labeled simply "Haddam", but certainly from this prolific locality. H. Moritz photo.

Based on this information, the following obscure account by Davis (1901) regarding columbite in Haddam fits the locality: "*[Columbite] has been mined in the Beaver meadow district on land belonging to the Heber Brainerd estate, where it occurs in a coarse granite associated with colorless to light green transparent crystals of beryl. Many fine specimens were taken from here by Nathaniel Cook and are to be seen in the Peabody Museum and other collections. They were small as*

*compared with crystals found in the adjoining town of Middletown, but were extremely well defined and had very brilliant faces.*"

Indeed, the closest home on the 1879 Middlesex county atlas is "H. Brainerd".

The Haddam Historical Society office at the Thankful Arnold House has some information on quarry worker and later mineral collector and dealer Nathaniel Cook, mainly his financial account book that covers the years from about 1818 to 1850. It was worth a look to see what we could learn about old Haddam localities. While there are no notations in it by him regarding minerals, his son John Edwin Cook (1830-1859, who participated in the infamous John Brown raid at Harper's Ferry, Virginia, was caught and hung) made account notes on 3 pages (date not included), which includes the sentence, "*A mineral excursion for Prof Tiliman and Dr. Romer [or Rosner?] of Prussia.*" Based on notes by Nathaniel Cook on adjacent pages, John's notes were probably made in the late 1840s to mid-1850s. He left Haddam for good by around 1857. The "Tiliman" may mean "Silliman", who is mentioned in this account by Hunt (1852) about a Haddam columbite and beryl locality that is vaguely located, but in detail fits the above modern and historic descriptions of the prospect in detail:

*"Columbite. - The specimen here described is from a locality at Haddam, Connecticut, in which the mineral was recognized by myself, while visiting the place, six years since. It occurs some two miles from the famous locality of chrysoberyl, where also columbite is met with in minute crystals, and is in a huge granitic vein traversing gneiss. The vein is made up of large cleavable forms of yellowish-white feldspar and brown muscovite, with quartz and beryl. The latter mineral is sometimes found in crystals four or five inches in diameter, and a foot or two in length; these are subtranslucent and brownish or greenish-yellow, while the smaller crystals are sometimes almost transparent, of a topaz-yellow or straw color, and if they were not fissured, would constitute gems. They are frequently modified by truncations of the terminal edges and solid angles, but the edges are rounded, and do not admit, of accurate admeasurement. The columbite occurs disseminated through the vein, alike in the feldspar, mica and beryl; some of the crystals were said to have been several ounces in weight, and had been carried out by amateur collectors as specular iron; a crystal since procured from the locality by Prof. Silliman, Jr., weighs 36 ounces. The smaller crystals were abundant and often beautifully perfect, some of them are imbedded in translucent yellow beryl, and have the form represented in figure 1, p. 401 of Dana's Mineralogy, 3d edition."*

Hunt also reports the columbite specific gravity as 5.85 and with three times as much Fe as Mn, this makes it columbite-(Fe) and very typical of the region. Note that Hunt mentions the locality is 2 miles from the chrysoberyl locality, which is indeed about 2 miles north (on Walkley Hill Road). The latter locality is not far from the court house mentioned by Williams (1899) as the landmark former locality is also 2 miles away from.

Based on the all of the above, it appears that the prospect was worked by Nathaniel Cook, at least from 1846 when Hunt was there, and was also visited by Benjamin Silliman, Jr. Son John Cook may have brought him there, or to another place Nathaniel was working.

It was known about by local collectors in the later 19th and early 20th centuries, but lacking a name its specific location could not be easily described until the nearby CCC camp was built in 1933.

With this history now secure, we realized that there are many 19th century columbite crystals from Haddam most of which are simply labeled with the town name, such as the one in depicted in Dana as mentioned by Hunt. Some came from the chrysoberyl locality, but these were typically small. There are many large cabinet specimens in museums (American Museum of Natural History, Yale-Peabody, Wesleyan, Michigan School of Mines) that must be attributable to this prospect because no other place in Haddam produced them anywhere near that size and because the place had no name, their catalogs just list them as coming from "Haddam".



Figure 5. My favorite based on the size (about 6 cm), crystal form, and completeness. On display at the American Museum of Natural History, NYC, again just labelled "Haddam, Conn.". H. Moritz photo.

### The "Eureka" Moment!

While I was preparing a presentation for the mineral clubs on the Connecticut DEEP collecting sites I had the "Eureka!" moment. If a bunch of 19th century columbite museum specimens could come from a locality that was essentially lost 100 years later, could it have been lost before then? Here is a locality that is a narrow, very coarse-grained pegmatite - the only place in Connecticut that was never a quarry where plentiful, large columbite specimens were hand mined and obvious in outcrop! And it turns out Cook was mining them in 1846, just 2 years after Winthrop's catalog was published in AJS describing "A black mineral, very heavy, from the inland parts of the country"! Apparently Haddam quarryman and later mineral dealer Nathaniel Cook found the spot, easy to visit, where gentlemen can collect other specimens, as hoped for by Mease, in the sizable masses hoped for by Torrey. And they can still be found there, just down river from Governor Winthrop's supposedly lost gold mine...

### References

- Hachett, Charles. (1802), An Analysis of a Mineral Substance from North America, Containing a Metal Hitherto Unknown. Philosophical Transactions of the Royal Society of London: 92: 49-66.
- Mease, James. (1807), A Geological Account of the United States. (Philadelphia: Birch & Small): 421-423.
- Torrey, John. (1824a), On Columbite and Other North American Minerals in Annals of the Lyceum of Natural History of New York: 1: 89-93.
- Torrey (Torrey), John (1824b), An Account of the Columbite of Haddam (Connecticut). The Annals of Philosophy: 8(24): 359-362.
- Winthrop, John. (1844), Selections from an Ancient Catalogue of Objects of Natural History; formed in New England over 100 years ago. American Journal of Science: 47: 282-290.
- Cook, John E. (1850 circa), Notes by him in the account book of his father Nathaniel Cook. Haddam Historical Society, Thankful Arnold House, Haddam, Connecticut.
- Hunt, T. S. (1852), Examination of some American Minerals. American Journal of Science: s. 2: 14: 340-1.
- Shepard, Charles Upham, Sr. (1870), A new variety (species?) of Columbite. American Journal of Science: s. 2., 50: 90.
- Dana, James D. (1875), A System of Mineralogy, 5th edition. Wiley and sons, New York: 518.
- Delafontaine, Prof. (1877), On the Hermannolite of Shepard, and on the Samarskite of North Carolina. American Journal of Science: s. 3, 13(77): 390.
- Williams, Horace S. (1899), Letter to Miss Eveline Brainerd of Haddam, February 18, 1899. Brainerd Public Library, Haddam, Connecticut.
- Davis, James W. (1901), The Minerals of Haddam, Conn. Mineral Collector: 8(4): 50-54.
- Davis, James W. (1901), The Minerals of Haddam, Conn. Mineral Collector: 8(5): 65-70.
- Williams, Horace S. (circa 1945), Article for New York Society of Mineralogists. Brainerd Public Library, Haddam, Connecticut.

## Connecticut Rocks!

### Connecticut Valley Traprock

by Peter M. LeTourneau, Ph.D.

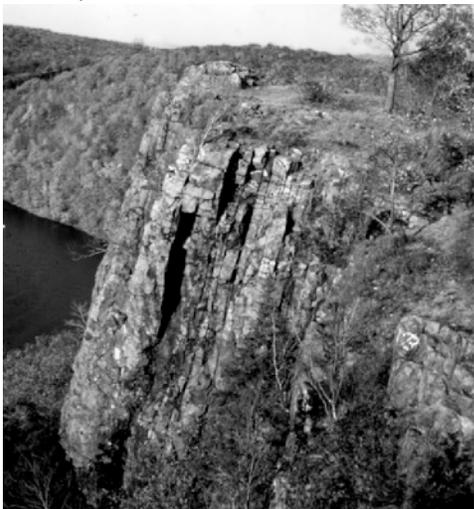


Figure 1. The Holyoke Basalt at Beseck Mountain, Middlefield, Connecticut. Photo: PML.

Although the Connecticut Valley is world famous for its dinosaur tracks, and the fine building stone from Portland, Connecticut and Longmeadow, Massachusetts was once among the most desirable in the nation, over the long run, the layers and veins of basalt lava proved to be the most valuable earth resource.

Born of fire during the planetary upheavals that led to the breakup of the supercontinent of Pangea about 200 million years ago, the Connecticut Valley traprock belong to one of the largest outpourings of basalt in Earth history. Lava flows and dikes that correlate with the Connecticut Valley basalts are found all around the circum-central Atlantic magmatic province (CAMP), including the Iberian Peninsula, North Africa, northeastern South America, and from along the seaboard of North America from Georgia to Maritime Canada. The CO<sub>2</sub> and SO<sub>x</sub> emissions from these CAMP eruptions disrupted the Early Jurassic ecosystems, which were just recovering from the third largest mass extinction that defines the Triassic-Jurassic boundary.

The dense structure, durable minerals, and homogenous texture makes the Connecticut Valley traprock among the best stone for concrete and asphalt aggregate, railroad and highway bedding, and other engineering purposes. As a result, Connecticut Valley traprock has been quarried since the colonial period. Already broken into easy-to-use sizes, the piles of basalt talus found at the base of many of the traprock cliffs formed some of the earliest quarries. Early

New Haven town regulations specified that the talus beneath East Rock and West Rock were free and open for public use. By the mid-to late-1800's large commercial quarries that had begun as talus mines were in operation at East Rock, West Rock, Sleeping Giant, and other cliffs in the region.

The numerous orthogonal fractures that gave the rock its common name, "trap" (from the Swedish "trappen" meaning "stairs" or "steps") allowed relatively easy excavation, but its tough texture made it difficult to crush into smaller sizes for aggregate and general uses. The early "hammer-style" rock crushers proved inefficient, motivating Eli Whitney Blake to invent and patent his revolutionary "reciprocating jaw" crusher—a design still in wide use today. Armed with the Blake patented rock crusher, traprock quarries in the region increased production dramatically, and soon the Connecticut Valley "bluestone" became the most important stone resource in southern New England and the mid-Atlantic (via traprock quarries in New York, New Jersey, Pennsylvania, and Virginia).

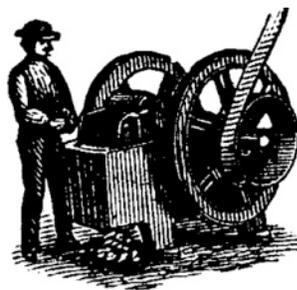


Figure 2. The patented Blake reciprocating-jaw rock crusher.



Figure 3. 1879 advertisement for the Blake rock crusher.

Today, large traprock quarries are operated by the Tilcon Corporation, Suzio, Inc., and several other concerns at Totoket Mountain, North Branford, Chauncey Peak, Meriden, Cook’s Gap, New Britain, Granby, Connecticut, and Westfield, Massachusetts. Other large quarries are operated by O&G, Inc. in the geologically related Pomperaug rift basin in Southbury and Woodbury, Connecticut. The rate of excavation in some quarries reached its peak in the mid-20th century, after which some pits began to encroach on the boundaries of their holdings.

**Changes in Quarry Area  
York Hill 1946 - 2008**

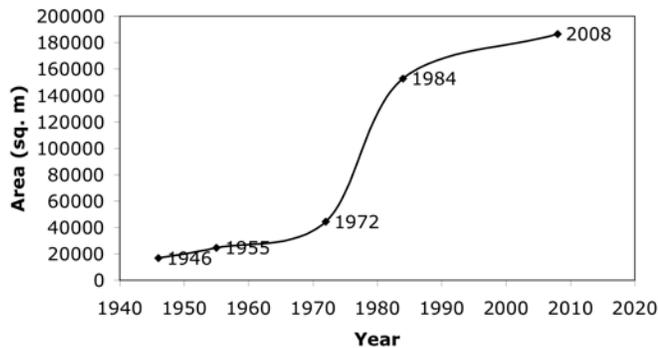


Figure 3. Traprock production, York Hill quarry, Meriden. Source: LeTourneau, 2008.

As the Connecticut Valley traprock quarries enter into a mature stage of production, questions remain about future land use planning options for the large open pits. Tilcon, Inc. recently proposed repurposing their Cook’s Gap quarry as a water supply reservoir after the stone resources are played out. The proposal made a lot of sense since all of the major water supply reservoirs in the Connecticut Valley are located within traprock watersheds. Further study by the effected towns suggested that the local hydrologic basin would not provide enough recharge to support a reservoir, but the idea retains great merit. At some point in the not-too-distant future, quarrying will cease at some of the large mines, and decisions will have to be made on the appropriate land use for the large abandoned pits.



Figure 4. York Hill quarry, Meriden, circa 1980’s. Source: USGS.

**Belay On!.**

The traprock cliffs of the central Connecticut Valley, especially Ragged Mountain in New Britain, are also renowned as some of the best rock climbing localities in the nation. Ragged climbers pioneered the use of machined nuts for protection, ushering in the modern era of “clean climbing” by eliminating rock-damaging, hammered-in pitons. Ragged also boasted of some of the hardest routes in the U.S. in the early to mid-20th century. Today, the Ragged Mountain Foundation manages the traprock crag, assuring access for new generations of climbing enthusiasts.

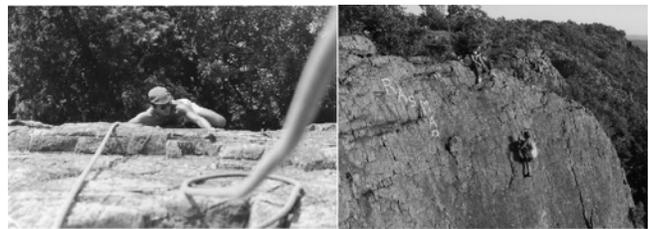


Figure 5. The author climbing on the route *Zambesi Hatchet Head* (5.8), Holyoke Basalt, Pinnacle Mountain, Plainville, Connecticut.



Figure 6. The climbing cliffs at Ragged Mountain, New Britain, Connecticut.

**References**

LeTourneau, P.M., and Pagini, R. 2016, in press. *Great Spaces of Stone: The Traprock Landscapes of the Connecticut Valley*. Wesleyan University Press.

LeTourneau, P.M. McDonald, N.G., Ku, T.C., and Getty, P.R., 2015. *Fossils and Facies of the Connecticut Valley Lowland: Ecosystem Structure and Sedimentary Dynamics Along the Footwall Margin of an Active Rift*. In: M. Gilmore and P. Resor (eds.), *Guidebook for field trips in Connecticut and adjacent regions: New England Intercollegiate Geological Conference, 107th Annual Meeting, October 9, 10, and 11, Wesleyan University, Dept. of Earth & Environmental Sciences*. pp. B1-B45.

LeTourneau, P.M. and Thomas, M.A. (eds.), 2010. *Traprock, Tracks, and Brownstone: The Geology of World-class Sites in the Connecticut Valley*. Geological Society of Connecticut Guidebook No. 1. ISBN 978-0-942081-17-6

LeTourneau, P.M., 2008. *Traprock Ridgeland: The environmental geography of threatened landscapes of the Connecticut Valley*. In: Van Baalen, M.R. (ed.) *Guidebook for field trips in Massachusetts and adjacent regions of Connecticut and New York* : New England Intercollegiate Geological Conference, 100th Annual Meeting, October 10, 11, and 12, 2008, Westfield State College, Westfield, Massachusetts. Cambridge, Harvard University Dept. of Earth & Planetary Sciences. pp. C1-C50.

*Meet the Department...***Geological Sciences at Central Connecticut State University**

Contributed by Mark Evans, Chair, Dept. of Geological Sciences

The Department of Geological Sciences at Central Connecticut State University is a dynamic, growing department that offers students a wide range of opportunities to explore the Earth and Earth processes, as well as the planets within our solar system and the stars beyond. Although our current programs have been in place since 2010, the Department is only one-year old, after splitting with Physics in 2014.

Our Department offers a variety of degrees including an Earth Science: Geology Specialization BS (soon to be renamed Geology BS), and a more general Earth Science BS degree that has an Environmental Geology track and an Astronomy/Planetary Geology track. We also offer an Earth Science BSED to prepare Secondary Education teachers, and minors in Astronomy, Astrobiology, Earth Science, and Geology.

Our programs emphasize field experience, with each student having up to 100 hours in the field for lab exercises and field trips during their four-year program. We also incorporate a strong student research component into our programs, and all students have the opportunity to work on active research projects. In particular, we require our students to do a “senior project” as a capstone experience to their degree. This project enables a student to work under the supervision of a faculty member, write a research report and present the results at a professional conference, with 7 to 15 students per year presenting posters at regional or national professional meetings. Also, doing this research gives our students an advantage in applying to graduate programs. Since 2010, thirteen students have been accepted into geoscience graduate programs with full scholarship plus TA or RA stipends.

We currently have seven full-time faculty in the department, four geology, one astronomy, and two science education.

Dr. Mark Evans is the Chair of the Department and his specialty is structural geology, although he also teaches mineralogy and petrology. Dr. Evans' research focuses on the growth and development of ancient mountain belts and understanding the fluids (oil, gas, brine) that were present during deformation. Dr. Evans' students currently work on projects in the Idaho-Wyoming fold-and-thrust belt and the Pennsylvania Appalachian fold-and-thrust belt.

As winner of the 2014 Connecticut Women in Science Leadership Award from the Petit Family Foundation and the Connecticut Science Center, Dr. Kristine Larsen puts a public face on the Department. Dr. Larsen is an astronomer who studies the intersections between science and society, including women in science, science and popular culture, and misconceptions of science. Her students do research on variable stars and the effectiveness of teaching methodologies. She also works closely with our Planetarium Director, R. Craig Robinson, in developing numerous public outreach events.

Our newest faculty member is Dr. Oluyinka “Yinka” Oyewumi whose areas of expertise are environmental geochemistry and hydrogeology. His research involves the characterization of surface

water, groundwater, and soil contamination. He and his students are currently studying arsenic contamination in the Lebanon, CT area.

Dr. Jennifer Piatek's areas of expertise include planetary astronomy, comparative planetology, and planetary image analysis. Her research focuses on understanding the geology of planetary surfaces through analysis of spacecraft images. Students working with Dr. Piatek have examined the morphology of craters on Mars.

Dr. Michael Wizevich's areas of expertise include sedimentology, stratigraphy, and geomorphology. His research projects include hydrocarbon reservoir and aquifer characterization, and investigating sedimentary rocks that contain unusual features, such as trace fossils and seismites (earthquake generated structures). His students have worked on sedimentology projects in Connecticut, Utah and Switzerland. Currently he has students examining detrital zircons in sedimentary rocks in the Hartford Basin.

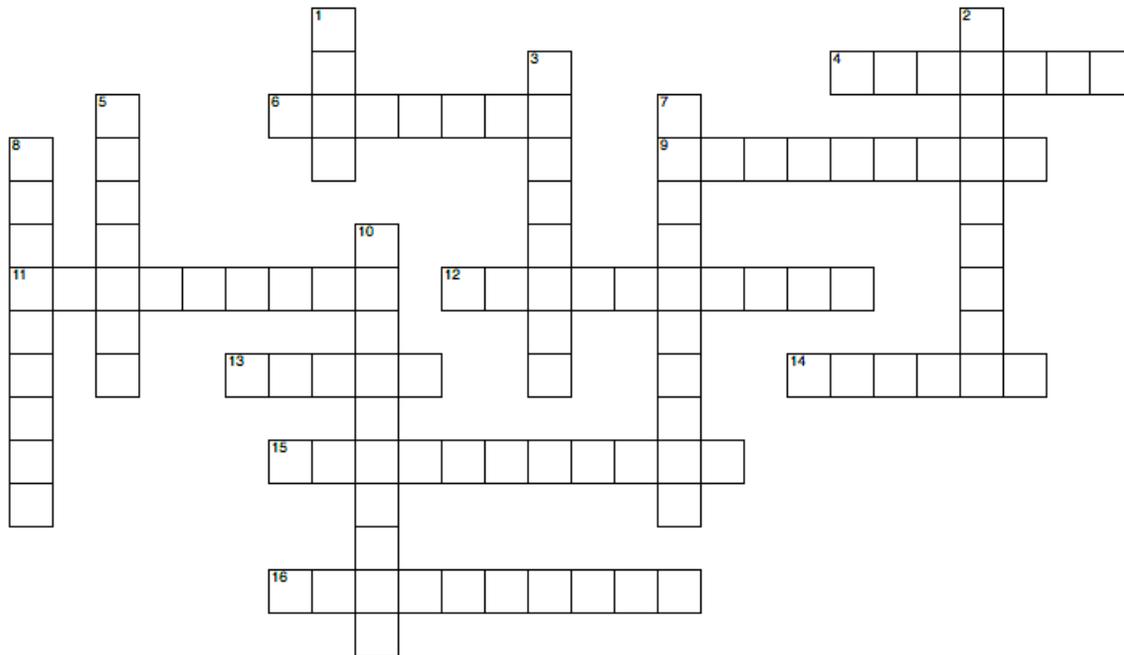
Our two Science Education faculty are heavily involved in a new STEM MS program offered at CCSU and running professional development courses for science teachers. Dr. Marsha Bednarski's research focuses on curriculum, instruction, and assessment aligned with national Science Standards. Dr. Jeff Thomas' research involves investigating secondary science teachers' understanding of inquiry-based instructional methods and how it can improve students' understanding of science.

In the past five years, the Department is fortunate to have acquired numerous pieces of equipment and developed new lab facilities. We now have a dedicated hydrogeology/geochemistry lab, computer lab, mineralogy/petrology lab, fluid inclusion microscopy lab, astronomy lab, sedimentology lab, and rock sample preparation lab. Some of the equipment that we have for teaching and student research includes a thin section machine and several rock saws, research grade petrographic microscope with UV, 16 Leica petrographic microscopes and 36 Leica binocular microscopes, Linkham heating-freezing microscope stage, sediment size analyzer, high-pressure liquid chromatograph, GPR, microwave digestion system, and field spectrometer; along with numerous telescopes up to 16-inch diameter. We also have the Copernican Observatory and Planetarium which were highlighted in the April 2104 edition of GeoConnections.

One of our greatest assets is the Geology and Planetary Science Club. They run our successful Friday ‘Brown Bag Lunch’ speaker series, do outreach, including Earth Science Week activities for the New Britain area, and sponsor field trips like mineral collecting at Herkimer, NY and trips to the American Museum of Natural History in New York.

If you are interested in learning more about our department and our programs please visit our website at [www.ccsu.edu/geosci](http://www.ccsu.edu/geosci) or contact Dr. Mark Evans at [evansmaa@ccsu.edu](mailto:evansmaa@ccsu.edu).

**FALL 2015 GEO-PUZZLE “Connecticut Potpourri”!**



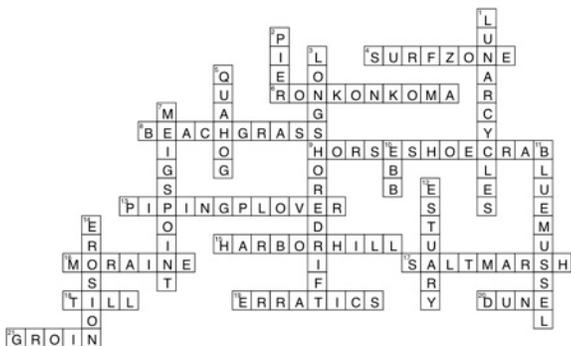
**ACROSS**

- 4 Spherical features in some Connecticut Valley basalts that won't put you to sleep
- 6 What you might do in a mall, what the Conn. River does between Hartford and Middletown
- 9 The Connecticut state fossil
- 11 This month's featured mineral
- 12 Connecticut's most famous historic building stone
- 13 Not BINGO, but what you shout when you come across a water-filled circular pit in glacial deposits
- 14 Annual glacial lake layers
- 15 This geologic period has "Friends"
- 16 Age of the deposits visited on the Spring 2015 FOP trip

**DOWN**

- 1 This Connecticut State department is the place to go for geological maps and reports
- 2 Yet another name for Connecticut basalt, used mainly by miners
- 3 Another name for Connecticut basalt
- 5 The annual GSC award "populated" by prominent Connecticut geologists
- 7 The glacial boulder headland at Hammonasset
- 8 The largest glacial lake in the Conn. Valley
- 10 The GSC Fall 2015 featured speaker

A day at the Beach



**Board of Directors:**

- |                              |                                       |
|------------------------------|---------------------------------------|
| <b>President</b>             | <b>Ralph Lewis</b>                    |
| <b>Vice President</b>        | <b>Peter LeTourneau</b>               |
| <b>Secretaries</b>           | <b>Camille Fontanella, Drew Hyatt</b> |
| <b>Treasurer</b>             | <b>Margaret Thomas</b>                |
| <b>Members-at-Large</b>      |                                       |
| <b>Margaret Enkler</b>       | <b>Mark Lewis</b>                     |
| <b>Harold "Fritz" Moritz</b> | <b>Janet Stone</b>                    |
| <b>Dan Vellone</b>           | <b>Mike Wizevich</b>                  |

**GeoConnections:  
The Bulletin of the Geological Society of Connecticut**

**Editor**

Peter M. LeTourneau

**Contributors, V.4, n.2**

Meg Enkler

Mark Evans

Camille Fontanella

Peter M. LeTourneau

Harold "Fritz" Moritz

Ralph Lewis

Janet Stone

Margaret Thomas

**Layout/Production**

Peter M. LeTourneau

GeoConnections is published at Hadlyme, Conn. All material copyrighted The Geological Society of Connecticut except where noted. GeoConnections is the copyrighted title of the newsletter of the Geological Society of Connecticut, all rights reserved.

Mail: P.O. Box 94, Hadlyme, CT 06439

Email: [geosocietyct@gmail.com](mailto:geosocietyct@gmail.com)