



Granite State Geologist

The Newsletter of the Geological Society of New Hampshire,
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MESSAGE FROM THE PRESIDENT

I hope everyone had a great holiday whether it was Christmas, Hanukkah, Kwanza or another, and is looking forward with hope and expectations for the new year.

As the new year approaches I am reminded that someone once told me we should make New Year's resolutions even if we fail to follow through on them: The intention to do better is also important. For example, today, I realized that I need to take stock of and better use my resources. After slipping on ice last week and falling twice on my keister (yes, that IS the anatomical term), I only now remembered those crampons that hang all year on the hook behind my door awaiting precisely these conditions. So, the point is, I plan to take a look around at the resources and opportunities available to me and find better ways to employ them. I hope you are finding improvements and making plans for your new year, too.

The Board has changed with new members Shane Csiki, secretary, and Sharon Lewandowski, member at large. The Board met in December to plan future meetings and this summer's field trip. The January meeting will feature UNH professor Will Clyde's presentation on the Bighorn Basin and his book on the subject. The Board is investigating a summer field trip that explores the geology of western NH quadrangles with a likely stop at St. Gaudens National Historical Site in Cornish.

In a very exciting change, the Board, but especially, webmaster Abby Fopiano, has worked to develop a new GSNH website that will bring a new look to the way we, the Society,



present ourselves to the public. In the transition, we lost the support of our web people and so I expect the last quarter's newsletter will come out at the same time as this one. I hope.

FRANCONIA IRON WORKS by Rick Russack

THE IRON WORKS AND THE MINES IN FRANCONIA

There were two separate iron works in Franconia, NH during the 19th century. The earliest started about 1801, and in one form or another, operated until after the Civil War. The second company started in 1808 and lasted until 1828.

The iron mines that supplied these iron works were in nearby Sugar Hill, which at that time was part of the town of Lisbon, NH. Iron ore was discovered in the 1790s and it turned out to be a very high grade. Both of the iron works owned interests in the mines; both contracted the actual mining to others, having the ore delivered to their works.

The stone furnace that remains in Franconia today, (the only surviving iron smelter in the state of New Hampshire) can trace its ancestry back to 1801 or 1802 when an iron forge was built there. It was owned by three men and in 1805, through a variety of transactions, the New Hampshire Iron Factory Company was incorporated. This operation became known as the "Lower Works" after the incorporation of the second company, known as the Haverhill and Franconia Iron Works. That company became known as the "Upper Works". (We'll use these terms when referring to the two operations as the formal names changed over the years.) The Upper Works were located where the Ham Branch joins the Gale River, about a mile from the Lower Works. Little remains of the smelter and other buildings associated with the Upper Works and much less is known about its operations. It was out of existence before the advent of photography.



The furnace was enclosed within the building with the gambrel roof.

In 1810, the owners of the Lower Works, most of whom were from Salem, Ma, hired Joseph Bray to do a survey of their iron works. Bray's report, published in Salem that year, provides a great deal of detailed information. The company owned 5,456 acres (needed to supply logs for making charcoal), a farm, a sawmill, a grist mill, a tavern and cook house, a blacksmith shop, a store in Franconia and a

store in Bath. The company owned several houses, one of which was used for boarding the workmen, a home for the miller, several barns, the iron furnace, and storage buildings. Bray notes that there is a steel furnace "in a complete state, awaiting a steel maker". The company also owned a 60' boarding house at the mines. Bray says the total value of the buildings and land added up to \$28,720. Bray also tells us that the company owned 180,000 bushels of charcoal, almost 1,000 tons of ore, 20 tons of moulding sand, 20 tons of limestone, and more. In 1816, the owners commissioned Isaac Williams to review their operations and make suggestions for improving the output of the works. The report, written by William Page, was critical of the methods being used and included suggestions for improvement. In 1823, a published report describes the output of the Upper Works and the Lower Works combined. According to this document, which does not differentiate between the two companies, they made stoves, cooking hollow ware, potash kettles, machinery and bar iron with a market value of over \$24,000. The two companies employed 90 men with a payroll of \$8,000 annually and they 1,000 tons of ore and 300,000 bushels of charcoal.

In 1825, the New Hampshire Patriot advertised the sale of the Upper Works and included a detailed description of the buildings and equipment. The property included a (water) mill privilege with 240 acres adjoining, a furnace, a forge, blacksmith shop, grist and sawmills, two warehouses, a store, three large barns, six dwelling houses and more. The advertisement contains an extensive list of the finished products on hand: bar iron, castings, ox chains, tire iron, shovels, scythes, stoves, and many more items. The Upper Works burned in 1827. Although some sources indicate that the works were not reopened, it is likely that they were rebuilt. Published sources in 1829, 1832 and 1833 refer either to the Upper Works by name, or state that there were two companies operating at the time.

It's quite apparent that the two companies were large, with a wide variety of products. Most of the production was consumed locally; transportation by wagon for any distance would have been quite expensive. (Railroads did not reach the area until the early 1850s.) In 1832, the Lower Works produced 300 tons of castings and 130 tons of bar iron, valued at \$34,000. The same report indicates that the Upper Works produced fifty tons of bar iron, worth \$5,500. Both companies were profitable.

The manufacture of iron in the early years of the 19th century required three raw materials: iron ore; limestone, which acted as a flux, and charcoal. Limestone was produced nearby. (Remnants of one lime kiln survive in Lisbon and another in Haverhill.) The need for charcoal was enormous. In 1841, Charles T. Jackson, in his *Geology of New Hampshire*, quotes figures supplied by the company's agent. According to Jackson, the furnace was kept in blast from 16-26 weeks at a time, consuming 200,000 to 300,000 bushels of charcoal. A single charge of the furnace used 280 pounds of ore, 15 bushels of charcoal, and one box of limestone. 160 bushels of charcoal were needed to smelt one ton of ore.

In 1859, the present stone furnace was re-built by S. Pettee, Jr. His name and the date are cut into the granite. It appears that the furnace did not operate much longer although there was a later attempt to resurrect it. In 1865, according to the *Granite State Monthly*, "work at the furnace and mine was suspended". In 1870, the US Census terms the site "inoperative". However, in 1881, a new company was incorporated but no information is known about its production, if any. In 1884, the buildings burned and it was stated that they were not in use at the time of the fire. All that survived the fire was the stone furnace, which is still there and, hopefully, will be there for future generations. It has recently become apparent that the iron works, or at least the mines, were in operation in the early 1880s. Sylvester Marsh, builder of the Cog Railway, was one of the principals involved with the company in its later years.

Quotations from the *Littleton Journal* follow:

Dec. 23, 1881 "There have been various rumors and newspaper items going the rounds regarding the starting of the Franconia Iron mines. We have seen some of the parties who are interested and they say it is true that Concord capitalists are taking hold of the enterprise and the mine will probably be worked again in the near future".

4/21/1882: extensive article concerning ore from Franconia being sent to Alexandria, Va. The ore was accompanied by a committee representing the Franconia Iron Company "for the purpose of witnessing a test reduction of Franconia ore by the Vapor-Fuel Process" The ore was taken from a dump at the mine and the company in Va was known as the Potomac Mfg. Co. and they converted the ore into ingots. The committee apparently was impressed and recommended licensing the technology for use in Franconia for making steel. Profits were estimated at over \$100,000 if this technology was adopted. The committee was comprised of Sylvester Marsh, C.M. Ransom and T.H. Ford "The ingots

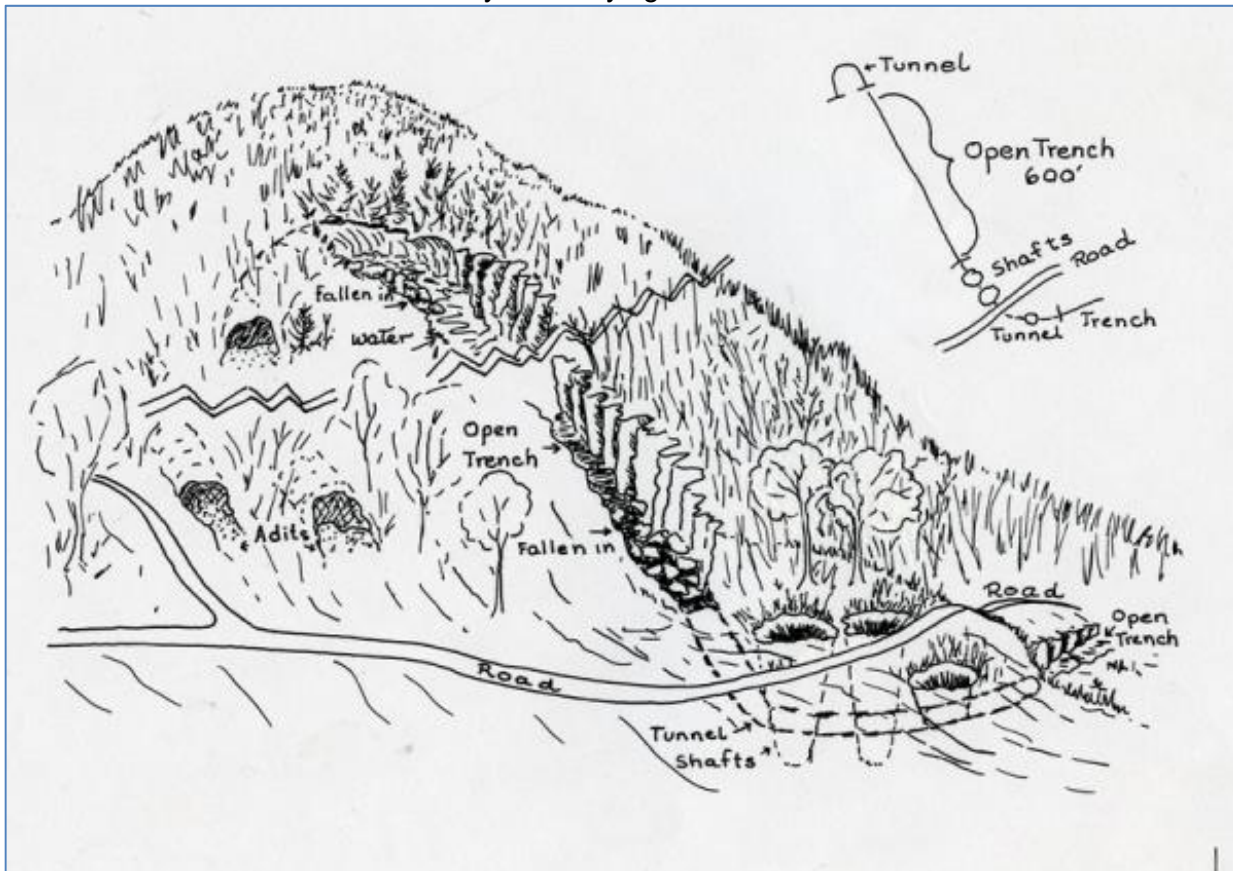
of steel were taken by Messer's Marsh and Ford to Concord where they were made into chisels, etc, and are now on exhibition".

6/31/1882: In the Sugar Hill section: ""Some twenty men are at present employed in the ore mines and more wanted, we understand they intend to push operations as fast as possible and will soon open up the main shaft."

7/14/1882: "The Iron Miners are getting to be quite an attraction. The steam pumping machinery is at work and the car for lifting ore has arrived."

9/15/1882: "The mines are now well opened and the ore is coming to the surface by the steampower which has been put in for that purpose. We learn that 100 tons have been sold to go to Alexandria, Va.. The present force in the mine is eight men. There are others engaged in outside work, taking down buildings at Franconia and building a boarding house at the mines, etc."

7/23/1883: "Isaac Howland of Sugar Hill, recently found a mine of iron on the surface of Peter Goddard's farm. Some of the Franconia Iron Co. along with others made a satisfactory investigation last week. E.B. Parker says "It's the richest looking ore he (sic) ever saw". The company bonded the whole farm for \$1,600. or the minerals for \$300. Mr. Howland has engaged to commence work with a force of men on the mines immediately after haying".



Map of the mines on Ore Hill, drawn by Nancy Aldrich

The Franconia Heritage Society has created an informative interpretative center opposite the furnace. Their museum in Franconia has objects made and used by the iron works on display. (The furnace is on private property and cannot be visited.)

Suggested Reading: The single best volume on the iron works and the mines is "The Iron Industry in Franconia and Sugar Hill, 1805-1860" by Roger Aldrich, illustrated by his wife, Nancy. The author has lived most of his life in close proximity to the iron works and the mines, has visited other early iron works, and has done much research on the subject.

Much of the information used above has been taken from an unpublished 13 page report by James Garvin, "Chronology of the Development of the New Hampshire Iron Factory Company from 1805 to 1884" Click here to read the full report.

http://www.whitemountainhistory.org/uploads/Chronology_Iron_Works.pdf

More media at http://www.whitemountainhistory.org/Franconia_Iron_Works.html.

WHAT IS YOUR BOARD DOING? By Shane Csiki, Secretary

On Thursday, December 8, 2016, Lee Wilder and Wayne Ives hosted the quarterly board meeting at the Department of Environmental Services conference rooms in Concord. The board discussed several items.

The summer field trip to Mount Washington was deemed a huge success, as a result of Brian Fowler's hard work in putting it together. There was discussion regarding ideas and locations for this upcoming summer's field trip. Two ideas discussed as possibilities were the area of Mount Ascutney and Pawtuckaway, with its glacial erratics and ring dike. Though these were discussed, the Board would like to hear from any GSNH member who has field trip ideas. If so, please share them with any member of the Board.

The next dinner meeting will be held at the Makris Steak House on January 12, 2017, where Will Clyde will present. Future ideas for speakers and meeting locations were discussed. As always, if any member has an idea for a speaker at a future meeting, contact any Board member. Also, the Board is exploring the possibility of holding a future dinner meeting in a banquet hall with catered meal, as opposed to the traditional restaurant format, possibly for the fall 2017 meeting. So, stay tuned!

Abby Fopiano has been working to transition the GSNH website to a new, up-to-date platform, as the existing site can no longer be edited. The new page is still in the development phase and will be made live with newsletters and minutes once web page development is completed. The existing web address (gsnhonline.org) will be maintained. In the meantime, the old page is not being updated. The Board discussed the possibility of using the new website to accept online dinner meeting registrations, though this will be discussed further at a later date.

The Board is exploring options to enable placement of New Hampshire Geology "sites of interest" on a web-based publicly available interactive mapping platform.

The Board is continuing to discuss the non-profit status of GSNH, and whether it could be either a 501(c)(3) or 501(c)(6) organization, as it is not currently tax exempt. This will be an item for detailed discussion at the next Board meeting.

Our next Board of Directors meeting will be held on Thursday, March 16, 2017, at AECOM offices in Manchester. All members are welcome to attend our meetings. Please let a Board member know if you would like to attend or if there is an item of interest that you would like added to the agenda.

DATES TO REMEMBER

January 12, 2017 – GSNH Winter Dinner Meeting – Ancient Wyoming: A scientific and educational journey through the geological past of Wyoming Speaker: Dr. William Clyde, UNH Professor of Earth Sciences – Makris Lobster and Steak House, Concord, NH.

<http://www.gsnh.org/> Reservations by January 6.

August 26-27, 2017 – 54th Annual Capital Mineral Club Gem, Mineral, Fossil & Jewelry Show; Everett Arena, Concord, NH http://www.capitalmineralclub.org/54th_annual.php.

September 19 to October 1, 2017 - Bates College will be hosting **NEIGC 2017** out of Bethel, Maine. Dyk Eusden is planning on having many field trips in nearby northern NH.

November 12-15, 2017 - Mount Washington Observatory Regional Climate Science Colloquium – Bringing together climate scientists and related educators to assess the status of climate science investigations and education. Keep an eye out.

LEGISLATIVE REVIEW

Tom Fargo is reviewing proposed legislation for the 2017 session. Legislative Service Requests (LSRs or proposed Bills) from House members are to be submitted by noon on January 6th. Over 800 LSRs have been submitted to date, most are now listed by title only. About 150 LSRs have been referred to committees and are now bills.

MINERS FIND GIANT \$170-MILLION JADE STONE IN BURMA - Found by Lee Wilder

MINING.com Editor | Oct. 17, 2016, 8:50 AM



Miners in Burma -or Myanmar- were looking for rare gems when they discovered something unexpected: A 4.3-metres high, 5.8-metres long, and 210-tonnes heavy jade stone, which is worth some \$170 million.

The giant rock appeared in the northern Kachin state, at a site operated by the Yadanar Taungtan Company in a joint-venture with the Ministry of Mining. The boulder will be sent off to China to be carved into jewelry and sculptures. The Southeast Asian country's +\$31 billion jade industry ([See also http://www.mining.com/myanmars-31bn-secretive-jade-industry-keeps-fuelling-rights-abuses/](http://www.mining.com/myanmars-31bn-secretive-jade-industry-keeps-fuelling-rights-abuses/)) is the source of nearly all of the world's finest greenstone and it's a magnet for foreign capital, with China being its number one buyer.

Nearly half Burma's GDP comes from jade mining. "It is a present for the fate for our citizens, the government and our party as it was discovered in the time of our government. It's a very good sign for us," local politician U Tint Soe is quoted saying by *The Independent*. Despite the current optimistic atmosphere, jade mining has a dark history in the area. According to *Global Witness*, the industry has been operated under secretive "standards" by networks of military elites, drug lords, and crooked companies and it has been fuelling armed conflict and land expropriation. The poorly regulated nature of jade production in Burma is also the cause of numerous deadly accidents, most of which go unreported.

<http://www.mining.com/miners-find-giant-170-million-jade-stone-in-burma/>

GSNH T-shirt Order Form



	Number of shirts	Price each	Total
GSNH Small t-shirt		\$ 18.00	
GSNH Medium t-shirt		\$ 18.00	
GSNH Large t-shirt		\$ 18.00	
GSNH Extra Large t-shirt		\$ 18.00	
Shipping & handling costs			Subtotal
	One shirt	\$4	Shipping & handling
	Two shirts	\$7	Total

Ship to: Name

Street Address

City, State, Zip Code

Phone # (In case of questions about your order)

Please make checks payable to "GSNH" and mail with this completed order form to:

GSNH
 P.O. Box 401
 Concord, NH 03302



BRINGING SOAPSTONE BACK TO NEW HAMPSHIRE - January 8, 2013

The origins of soapstone in the state in Francestown is the site of one of the first quarries in NH. As the Fuller Family tells is, in 1808 Daniel Fuller discovered that the rocky land he owned was worth more than he could have imagined. One day while out mending a fence he dropped his newly sharpened axe, to his surprise the axe was not harmed and had sliced through the ledge below. The undesirable



rocky land he had bought cheap was laden with the highest quality soapstone in New Hampshire.

Fuller, who was on the verge of bankruptcy, began to work the quarry immediately. Within the year he had paid of his debts and went on to become a rich man. The soapstone in his quarry was known as the best available and sold at considerably higher prices than any other soapstone.

Soapstone was extremely popular for stoves, hearthstones, sinks and even pencils for slates. In frigid New England it was especially enjoyed as warming stones for cold fingers and toes. The quick heating time and long heat retention properties of these warming stones made carriage travel, cold

beds and long sermons far more pleasant. Ox teams carried loads of stone the six day trip to Boston where it was sold for \$36/ton.

The Francestown Quarry was operational until 1912 when an explosion occurred during the quarrying process; the ensuing fire burned two adjacent farms to the ground. The operation shut down and was never reopened. Since then soapstone supplies in New Hampshire and neighboring Vermont have been almost entirely exhausted. With the supply gone the popularity of soapstone dwindled – ushering in the ‘Granite Years’.

Brazil has since emerged as the global leader in soapstone – with the highest quality and most consistent supply. Knowing the history of soapstone in New Hampshire, we see our stone as traveling a long way to be perfectly at home.

<http://jewettfarms.com/bringing-soapstone-back-to-new-hampshire/>

RAFFLE WINNERS WERE...

There were three prizes at our dinner meeting in October. Winners were: 1st prize: Gene Simmons; 2nd prize: Don Cederquist; and 3rd prize: Dick Lane.

1st – fossil fern leaf imprint

2nd – cluster of clear quartz crystals

3rd – grandchild’s mineral kit

THE NH GEOLOGICAL SURVEY GROUND WATER LEVEL NETWORK SUMMARY

Submitted by Lee Wilder of the NHGS

September 2016 - NH Groundwater level measurements were collected by the NH Geological Survey staff and volunteers from September 26, 2016 – September 30, 2016.

The statewide September 2016 average groundwater level for **wells in the overburden** (in soils on top of the bedrock) showed a decrease of -0.34 feet from August 2016. When compared with September 2015, the statewide average groundwater level for September 2016, in these wells, decreased -0.58 feet. It should be noted that 17 out of 20 of the September 2016 water levels for the overburden wells were down compared to August 2016. When compared to September 2015, 19 out of the 20 overburden wells were down for September 2016.

The September 2016 average groundwater level in the new **bedrock wells** showed a decrease of -0.91 feet, when compared with August 2016. When compared with September 2015, the bedrock wells showed a decrease of -0.81 feet for September 2016. The September 2016 levels in 9 out of the 10 bedrock wells were down compared to August 2016. When compared to September 2015, 8 out of the 10 bedrock wells were down for September 2016.

October 2016 - NH Groundwater level measurements were collected by the NH Geological Survey staff and volunteers from October 24, 2016 – October 31, 2016.

The statewide October 2016 average groundwater level for **wells in the overburden** (in soils on top of the bedrock) showed an increase of +0.02 feet from September 2016. When compared with October 2015, the statewide average groundwater level for October 2016, in these wells, decreased -1.00 feet. It should be noted that 13 out of 19 of the September 2016 water levels for the overburden wells were up compared to September 2016. When compared to October 2015, 16 out of the 19 overburden wells were down for October 2016.

The October 2016 average groundwater level in the new **bedrock wells** showed an increase of +0.07 feet, when compared with September 2016. When compared with October 2015, the bedrock wells showed a decrease of -1.40 feet for October 2016. The October 2016 levels in 5 out of the 11 bedrock wells were down compared to September 2016. When compared to October 2015, 11 out of the 11 bedrock wells were down for October 2016.

November 2016 - Monthly manual measurements and monthly data logger data continue to be taken by the NHGS and its volunteers. NH Groundwater level measurements were collected from November 23, 2016 – December 2, 2016.

The statewide November 2016 average groundwater level for **wells in the overburden** (in soils on top of the bedrock) showed an increase of +0.14 feet from October 2016. When compared with November 2015, the statewide average groundwater level for November 2016, in these wells, decreased -1.07 feet. It should be noted that for November 2016, 10 out of the 19 overburden wells were up compared to October 2016. When compared to November 2015, 3 out of the 19 overburden wells were up for November 2016.

The November 2016 average groundwater levels in the **bedrock wells** showed an increase of +2.06 feet, when compared with October 2016. When compared with November 2015, the bedrock wells showed an increase of +0.01 feet for November 2016. The November 2016 levels in 10 out of the 11 bedrock wells were up compared to October 2016. When compared to November 2015, only 4 out of the 11 bedrock wells were up for November 2016.

The data for all of the wells in the NH Groundwater Level Network are shared with and posted on the USGS website at: <http://groundwaterwatch.usgs.gov/statemap.asp?sc=33&sa=NH>

EXPLOSIONS? EARTHQUAKES? FROM EMAILS SENT TO GSNH NOVEMBER 24, 2016

Hi, my name is Nicole ___ from Candia, NH. Last night Nov.23th around 11:49pm I heard an explosion that rattled my house. It woke all my neighbors and they came out of their houses to see what had happened. I called 911 to have the police investigate. The police drove around and found nothing. Was this a type of Earthquake? If so, is my house safe? It's happened a lot this past year. We have had a 4 other explosions in this past year that have been unexplained.

This is the 2nd one that has rattled my house. We had another one again last Friday 11-18-16 around 12:30pm. Then my neighbor said we had one the week before in the afternoon. I didn't hear that one because I was at work. They sound like propane tanks exploding. Some sound close some sound farther away. Should I be worried?

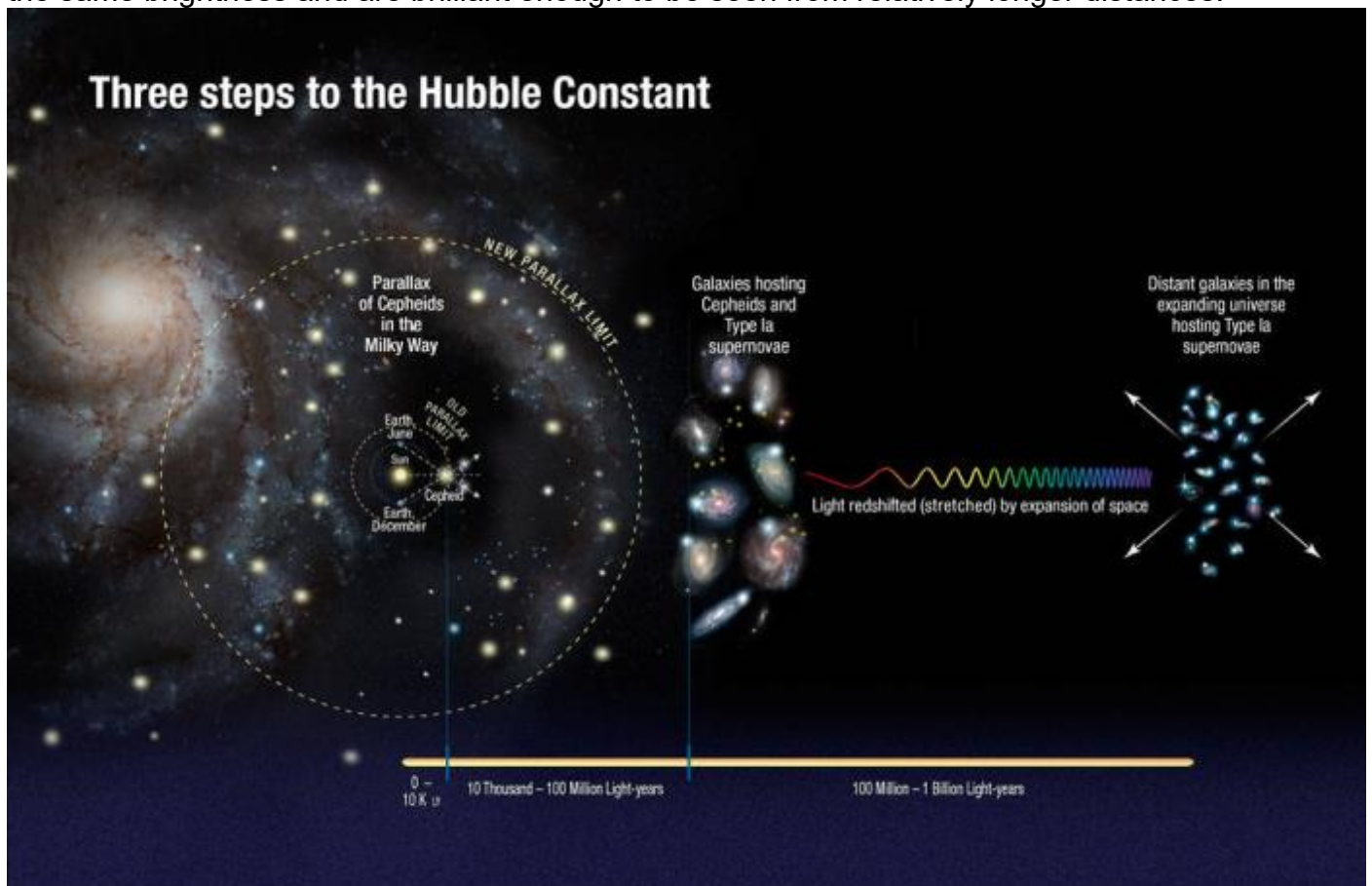
NASA'S HUBBLE FINDS UNIVERSE IS EXPANDING FASTER THAN EXPECTED

Astronomers using NASA's Hubble Space Telescope have discovered that the universe is expanding 5 percent to 9 percent faster than expected.

"This surprising finding may be an important clue to understanding those mysterious parts of the universe that make up 95 percent of everything and don't emit light, such as dark energy, dark matter and dark radiation," said study leader and Nobel Laureate Adam Riess of the Space Telescope Science Institute and Johns Hopkins University, both in Baltimore, Maryland.

Riess' team made the discovery by refining the universe's current expansion rate to unprecedented accuracy, reducing the uncertainty to only 2.4 percent. The team made the refinements by developing innovative techniques that improved the precision of distance measurements to faraway galaxies.

The team looked for galaxies containing both Cepheid stars and Type Ia supernovae. Cepheid stars pulsate at rates that correspond to their true brightness, which can be compared with their apparent brightness as seen from Earth to accurately determine their distance. Type Ia supernovae, another commonly used cosmic yardstick, are exploding stars that flare with the same brightness and are brilliant enough to be seen from relatively longer distances.



This illustration shows the three steps astronomers used to measure the universe's expansion rate to an unprecedented accuracy, reducing the total uncertainty to 2.4 percent. Credits: NASA, ESA, A. Feild (STScI), and A. Riess (STScI/JHU) <https://www.nasa.gov/image-feature/goddard/2016/three-steps-to-measuring-the-hubble-constant>

By measuring about 2,400 Cepheid stars in 19 galaxies and comparing the observed brightness of both types of stars, they accurately measured their true brightness and calculated distances to roughly 300 Type Ia supernovae in far-flung galaxies.

The team compared those distances with the expansion of space as measured by the stretching of light from receding galaxies. They used these two values to calculate how fast the universe expands with time, or the Hubble constant.

The improved Hubble constant value 45.5 miles per second per megaparsec. (A megaparsec equals 3.26 million light-years.) The new value means the distance between cosmic objects will double in another 9.8 billion years.

This refined calibration presents a puzzle, however, because it does not quite match the expansion rate predicted for the universe from its trajectory seen shortly after the Big Bang. Measurements of the afterglow from the Big Bang by NASA's [Wilkinson Microwave Anisotropy Probe](#) (WMAP) and the European Space Agency's [Planck satellite mission](#) yield predictions which are 5 percent and 9 percent smaller for the Hubble constant, respectively.

"If we know the initial amounts of stuff in the universe, such as dark energy and dark matter, and we have the physics correct, then you can go from a measurement at the time shortly after the big bang and use that understanding to predict how fast the universe should be expanding today," said Riess. "However, if this discrepancy holds up, it appears we may not have the right understanding, and it changes how big the Hubble constant should be today."

There are a few possible explanations for the universe's excessive speed. One possibility is that dark energy, already known to be accelerating the universe, may be shoving galaxies away from each other with even greater — or growing — strength.

Another idea is that the cosmos contained a new subatomic particle in its early history that traveled close to the speed of light. Such speedy particles are collectively referred to as "dark radiation" and include previously known particles like neutrinos. More energy from additional dark radiation could be throwing off the best efforts to predict today's expansion rate from its post-Big Bang trajectory.

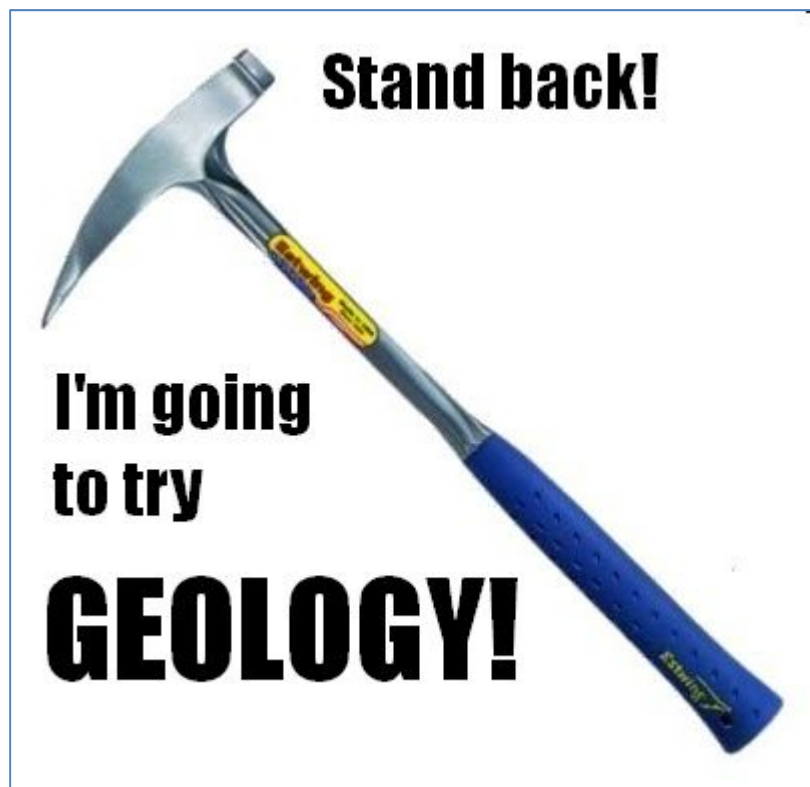
The boost in acceleration could also mean that dark matter possesses some weird, unexpected characteristics. Dark matter is the backbone of the universe upon which galaxies built themselves up into the large-scale structures seen today.

And finally, the speedier universe may be telling astronomers that Einstein's theory of gravity is incomplete.

The Hubble observations were made with Hubble's sharp-eyed Wide Field Camera 3, which works to refine the accuracy of the Hubble constant to a precision that allows for a better understanding of the universe's behavior.

The SH0ES team is still using Hubble to reduce the uncertainty in the Hubble constant even more, with a goal to reach an accuracy of 1 percent. Before Hubble was launched in 1990, the estimates of the Hubble constant varied by a factor of two. The SH0ES team has reduced the uncertainty in the Hubble constant value by 76 percent since beginning its quest in 2005.

The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. NASA's Goddard Space Flight Center in Greenbelt, Maryland, manages the telescope. The Space Telescope Science Institute in Baltimore, Maryland, conducts Hubble science operations. The Institute is operated for NASA by the Association of Universities for Research in Astronomy in Washington, D.C.



SAVE THE DATE!



CLIMATE SCIENCE COLLOQUIUM

Omni Mount Washington Resort
November 12-15, 2017

Bringing together climate scientists and related educators from a variety of research disciplines and educational settings to assess the status of climate science investigations and education in northeastern North America.

MWOCLIMATE.ORG

THE HILLTOWN SLIDE – 1936 : RECALLING THE KILLER SLIDE OF MARCH 1936

by Tom Eastman - March 28, 2009 -

<http://www.bartletthistory.org/bartletthistory/hilltownslide1936.html>

BARTLETT — Spring floods are nothing new, but the one that hit the North Country in March 1936 wreaked more havoc than usual and ended up killing West Side Road resident Eugene Hill in the area of Bartlett known as Hilltown.

Local historian Dan Noel, who has been battling cancer, recently forwarded The Conway Daily Sun a telling of the tragic tale by an eyewitness who traveled to the devastated site after the slide that

caused Hill's death the morning of March 12, 1936. He believes the eyewitness account may have been written by the late Buster Parker, of Bartlett.

Other information was gleaned by looking at microfilm of the March 12 and March 19 editions of the now defunct Reporter newspaper of North Conway in the Henney History Room of the Conway Public Library, as well as interviewing Brian Hill of Lower Bartlett, nephew of Eugene Hill, a watchmaker who lived alone when the fatal disaster struck.

On a gloriously sunny first day of spring on Friday afternoon, March 20, West Side Road resident and town father Chet Lucy took time out from his maple sugaring operation to show a reporter exactly where the slide happened farther north up the road 73 years ago in the Hilltown enclave of Hill family members.

“My father [Arthur O. Lucy], was involved in the story, as he was part of the rescue effort,” said the still winter-bearded Lucy, a former Conway selectman whose family Conway roots go back some 250 years. “I was born in 1926, so I was 9 years old at the time, and it was quite a thing.”

Showing debris cleared from Humphrey Ledge Road near Eugene Hill house



We drove north past the Lady Blanche House, around a bend in the road, and down to the flat area below Pitman's Arch to a section across from the Saco River and the home of Chuck Kalil the heart of the former Hilltown area. To our left on the west side of the road were two houses, a barn and a trellis at the base of a cliff.

“Just like the Willey Slide that you know about [in Crawford Notch in August 1826], the slide came down over there and divided, leaving the Colson house standing where that white house is now,” said Lucy, who, like Noel, is a lover and keeper of local history.

The river flooded the road but it was the slide that came into Eugene Hill's house and killed him, according to accounts from that era.



“The road used to be lower than it is now. The state built it higher,” said Lucy, wearing his wool green and black plaid spring-chores jacket.

The following account of the slide was reported in the Thursday, March 19, 1936 issue of *The Reporter*, a week after the March 12 disaster: “Though flood damage in northern Carroll County has been light compared with that in other parts of New England, this locality was mentioned in headlines and broadcasts through the tragic death of Eugene Hill and the dramatic rescue of several survivors of the slides at Hilltown, on the West Side Road from North Conway to Bartlett.

The Eugene Hill house – after avalanche. Humphrey Ledge Rd., Bartlett, N.H.

“Last Thursday morning at about 8 o'clock, slides of snow and ice crashed against the northwest corner of the home of Eugene Hill, ripping out the corner of the house and burying its owner, who lived there alone, under several feet of ice and debris. A similar slide tore out a part of the lower floor of the second house to the north, belonging to Nathan Hill, carrying Mrs. Sarah Seavey, 83, Mr. Hill's housekeeper, across the road and burying her up to the armpits in snow, ice and wreckage.”

The Reporter account verified Chet Lucy's recollection that the slide divided around one of the homes, just as the August 1826 slide in Crawford Notch had divided around the Willey homesite in that famous White Mountain disaster:

“As freakish as most disasters,” noted the Reporter, “the house between the two, occupied by Webster Colson, was undamaged. Mr. Colson, together with his wife, son and daughter, at once started for Bartlett for help, and reached there after considerable difficulty, due to parts of the road that were submerged. Rescue parties finally started for the scene of the disaster. the first truck was from Main Street Garage, North Conway, and included Henry Thompson, Myron Hanson, Dr. McDonald, a selectman from Bartlett, and others. James Waldron, forestry superintendent of the Saco River CCC Camp at Glen, was in Bartlett at the time, and followed close behind with two trucks and his crew of about 20 boys. The North Conway truck was unable to reach Hilltown, but the two higher CCC trucks, after considerable difficulty, were able to reach the scene of the disaster where they found Mrs. Walker, daughter of Mrs. Seavey, trying to extricate her with a small coal shovel.

Seavey was removed from the wreckage and, after receiving temporary treatment from Dr. G. Harold Shedd (of ski bone doctor fame when skiing took hold in the region), and two nurses from Memorial Hospital (Gladys Carter and Doris Haley), she was taken by stretcher and boat to the home of Arthur Lucy, along with Nathan Hill and Mrs. Walker, who were uninjured.”

The following day, Sarah Seavey was taken to Memorial Hospital as a precaution. Nathan Hill, meanwhile, 94, was returned to the Lucy's home for two weeks until the waters subsided.

Dan Noel, who first brought the tale of the disaster to the Sun's attention, provided a copy of a letter written by an unidentified first-hand witness and participant of the rescue effort. “I came across the letter the other day. I don't recall how I came across it to begin with, but I thought it made for an interesting story that you might want to use,” said Noel, a lifelong collector of White Mountain history and professional photographer whose clients in the past included Yield House and Cranmore Mountain.

Arriving at the scene on foot after much difficulty driving on West Side Road in the flood waters, the witness gave the following account: “We immediately went to the residence of Gene Hill where we found the house completely filled with ice clear to the rafters. We all started digging in the ice and we first found the arm of Gene which held the stove poker, evidently had just filled the stove when it happened. We dug the body out of the ice.”

The eyewitness went on to say that Hill was a jeweler, and that they found watches strewn across the area. “As each one was tagged,” he wrote, “they were put in a pail and taken to Fred Hanscom, town clerk of Bartlett.”

The Reporter added a paragraph or two, adding to the mystery of whatever happened to Eugene Hill's belongings: “Mr. Hill, a watchmaker by trade, had been partially crippled for the past 20 years, and had lived alone since the death of his mother a few years ago. Soon after the disaster, several watches and other articles of jewelry, were recovered from the ruins. Relatives, however, voiced their suspicions that he also had a box containing money and this was finally found on Saturday after considerable search by Harold Hill of Kearsarge and turned over to Bartlett officials for safekeeping.”

On their departure, the party encountered Dr. Shedd, Ms. Carter and Ms. Haley. “Both nurses [were] carried across the brook by Walter Lock of Glen, and Dr. Shedd was in the process of being carried across on Walter's back. Walter accidentally stubbed his toe and, both got a ‘Yankee Dunking.’ When we arrived back to the Rocky Branch Bridge and crossed it, the bridge dropped into the stream at once [behind the rescuers, Dr. Shedd and nurses Carter and Haley]. The following day the road was [plowed] out by the Bartlett town tractor.”

Meanwhile, according to Henry Hatch, who was another rescuer, “Arthur Lucy took Ellsworth Russell and Cedric Colbath with him from Conway Supply Co. R.F. Harmon was also in the party who went to Hill Town [sic] and I believe were the ones or part of the crew that dug Mr. Hill out of the debris. I believe they took Eugene Hill out by canoe to the road at Lady Blanche House and then by various means, got to Conway and back by East Side Road to Furber Funeral Home.

The funeral home was operated by Arthur Furber, and was located behind what most recently was D.J.'s Bedding and Outlet and which for a number of years served as Brothers II, across from the Up Country .

Chester Lucy remembers that part of the tale. He said his father, Arthur O. Lucy, co-founder in 1933 of Conway Supply, and others transported the body by rowboat and then truck to Smith-Allard Farm on

the West Side. There, they met Furber, who transported the body across the river on the bridge and to the funeral home.

"My father told my mother Irene to call Arthur he didn't have to say his last name [Furber]; she knew who he was talking about and let him know that they were coming by canoe. Arthur didn't catch on exactly what she was talking about at first, so my father said, 'Just tell him we're coming and to meet us at the railroad bridge!' Eventually she got Arthur to understand that my father was bringing some cargo ... a body!" said Lucy this week.

Nathan Hill, meanwhile, couldn't go back to his home during the high waters, so he spent two weeks with the Lucy family in their home, a house that was lost to fire in 1942.

"In Conway Village," wrote Janet Hounsell in her book, "Conway, New Hampshire 1785-1997," "The main damage was loss of water. Friday and Saturday [after the Thursday flood] there was no mail in or out, and residents of Oak Street left home for higher ground. Thursday night, houses near the Saco River Bridge were evacuated. Cellars were flooded and Thursday the water pipes where they cross the Swift River ruptured, so the village was without water except for rainwater."

Hounsell added further information on Arthur Lucy's role. "When Arthur Lucy, of the Conway Supply Co., learned there'd been an avalanche at Humphrey's Ledge, he took three millworkers and started off to help with the rescue work. By auto, boat and snowshoes the crew reached the spot. They worked until the body of the victim was located. Lucy brought the remains by boat and toboggan to Conway."

The Reporter's March 19, 1936 account said that due to the high rains, "The East Branch Bridge in Intervale (today's Route 16A in the days before what is today's Route 16 was built) was menaced by high water, the West Side Road was impassable and the flood caused a washout in a fill near the Lady Blanche House and in spite of temporary repairs, it subsequently washed out completely.

"The Lady Blanche house is isolated. There is now no means of getting to Bartlett. The village of Conway is now practically surrounded by water, and various low spots are flooded, including the athletic field and the ground in front of the B&M station."

Another flood hit the following week just as The Reporter was going to press on March 19, 1936 proving that spring and floods are constant companions in the valley of the Saco.

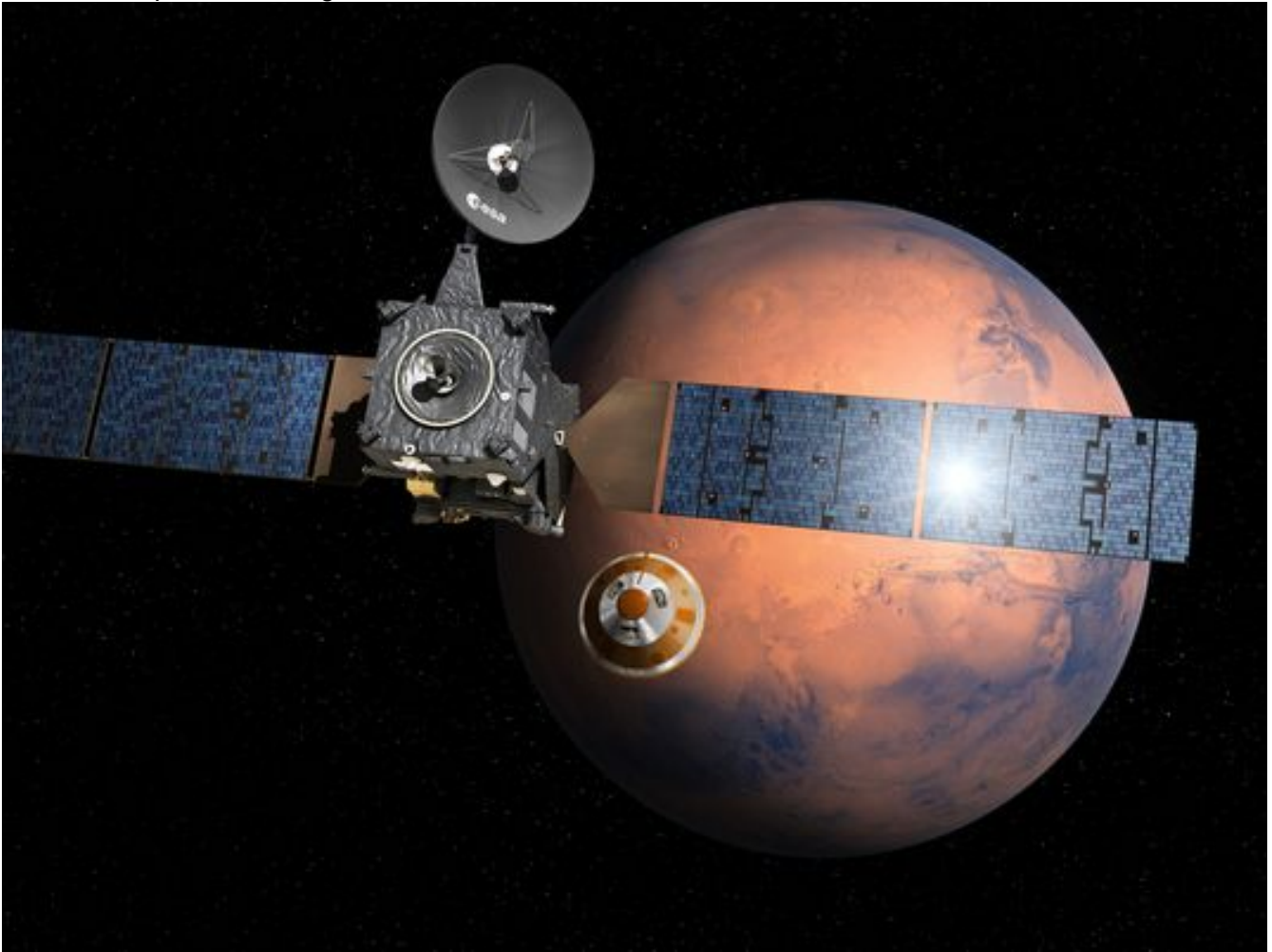


This photo was the destruction of the bridge on West Side Road in the floods of 1937. You might recognize this spot in the vicinity of today's Schatner Strawberry Farm

EUROPEAN SPACECRAFT GOES SILENT RIGHT BEFORE DIFFICULT MARS LANDING

Traci Watson, Special for USA TODAY 5:50 p.m. EDT October 19, 2016

Europe's Schiaparelli lander, scheduled to settle into Mars Wednesday, went silent a minute or so before its expected landing time. USA TODAY



Artist's impression provided by the European Space Agency, ESA, depicting the separation of the ExoMars 2016 entry, descent and landing demonstrator module, named Schiaparelli, center, from the Trace Gas Orbiter, TGO, left, and heading for Mars. Schiaparelli is set to enter the martian atmosphere on Oct. 19, 2016 while TGO will enter orbit around Mars. The probe will take images of Mars and conduct scientific measurements on the surface, but its main purpose is to test technology for a future European Mars rover. (Photo: AP)

Mars may have claimed another victim. Europe's Schiaparelli lander, scheduled to settle into the Martian dust at 10:48 am ET Wednesday, fell silent only a minute or so before its scheduled landing time. It's too early to declare game over, but officials with the European Space Agency acknowledged the failure of both an Earth-based telescope and a Mars-orbiting spacecraft to detect signals from Schiaparelli is worrisome.

"It's clear that these are not good signs," said Paolo Ferri, the space agency's head of mission operations. "But we will need more information."

Ferri said engineers will work around the clock to analyze data from Europe's Trace Gas Orbiter, which swung into orbit around Mars on Wednesday and may hold a cache of information transmitted from Schiaparelli, a stationary research base aimed primarily at testing landing technologies. Officials hope NASA's Mars Reconnaissance Orbiter will have some intelligence to offer, too.

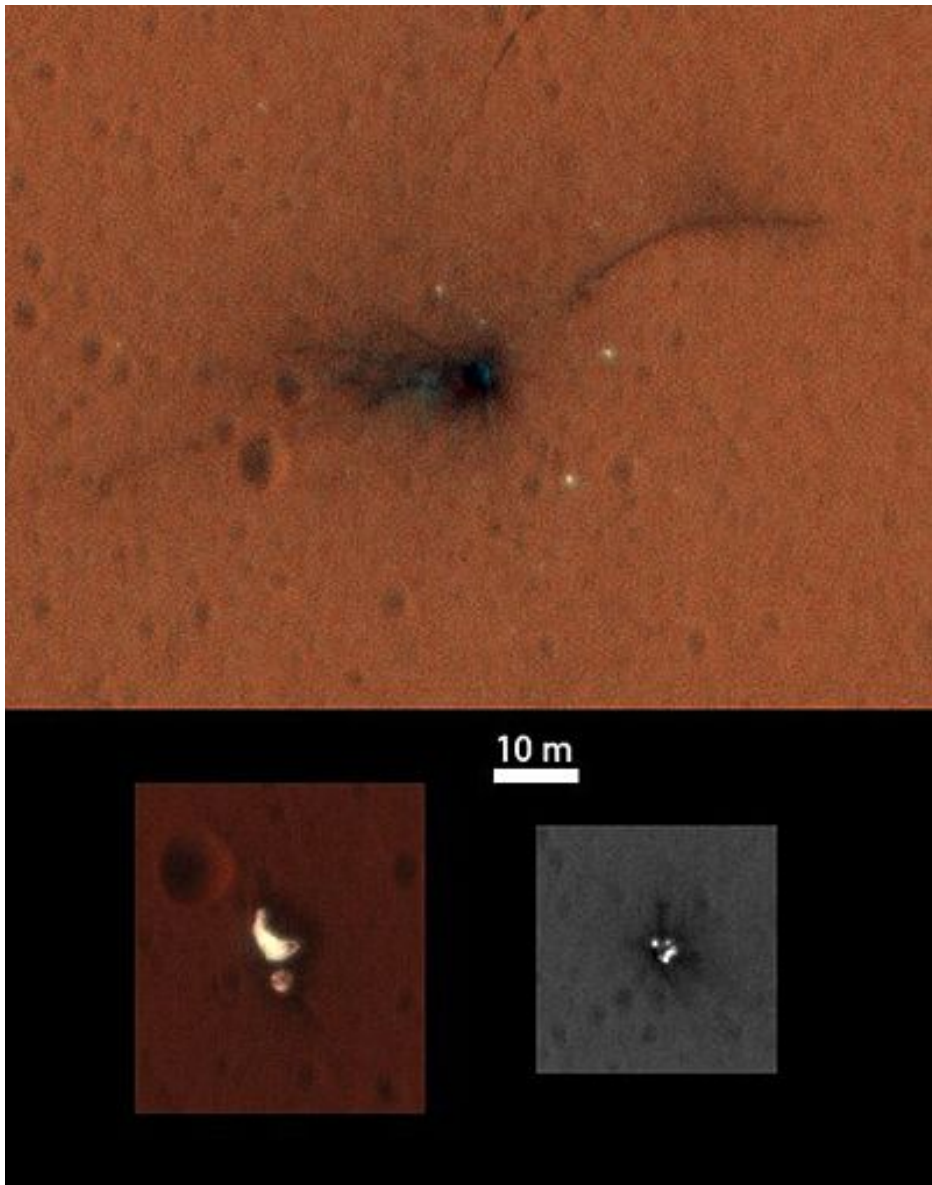
Unless engineers establish the craft is alive and well, Schiaparelli will join a long list of landers that fell victim to Mars' dangerous charms. Over the past three decades, roughly half of all Mars missions, which includes both landers and orbiters, have failed. Vehicles that dared to aim for Martian soil have burned up in the atmosphere, smashed into the surface or missed the planet entirely. The list of spacecraft that arrived safely on the Martian surface numbers only seven.

For much of Wednesday, it looked like Schiaparelli would make it eight. As the lander descended toward the Red Planet, a giant telescope in India picked up signals suggesting Schiaparelli abruptly reduced its speed, an expected response to the opening of its parachute. Later signals established the parachute ripped away from the craft as intended, revealing nine thrusters that were supposed to slow the craft even further.

But then the Indian telescope lost the signal, as did Europe's Mars Express spacecraft.

Not all was lost, though. Mission personnel were jubilant over the Trace Gas Orbiter's successful arrival into Martian orbit. The orbiter, which launched with Schiaparelli in tow in March, will sniff out gases such as methane that may have been generated by living things.

The orbiter also offers scientists hope for squeezing information out of Schiaparelli if it is not recovered. The lander was supposed to collect unprecedented data on the Martian atmosphere during its descent and beam it to its sidekick in orbit, and there's a "very good chance" it did just that, said Colin Wilson of the University of Oxford, a scientist involved with Schiaparelli.



On the other hand, the Schiaparelli instrument that Wilson personally oversaw wasn't scheduled to collect data until the lander was safely on the Martian surface, a now-iffy scenario. This would not be Wilson's first disappointment: he planned to collect data from the same kind of instrument on Britain's Beagle 2 Mars lander, which landed on Mars in 2003 but failed to make contact with Earth.

"It's like getting slapped twice," Wilson said. "But we have an orbiter that's gone into orbit around Mars ... and it's going to last for years," whereas the lander was intended to survive only a few days.

Schiaparelli was designed to test technologies for a much larger roving laboratory scheduled for launch in 2020. Its disappearance puts the timing and design of that mission in doubt.

"Mars for many reasons is a very difficult target," said Olivier Witasse of the European Space Agency. "Success or failure, we have to continue and learn from that."

HiRISE November 1, 2016 observations of the crash site, detailing what is believed to be the main spacecraft's impact location, the lower heat shield, and upper heat shield and parachute. With this second observation, it is noted that wind seems to have shifted the parachute, and some of bright spots around the crash zone were confirmed to be from material not image noise or momentary reflections. <http://www.jpl.nasa.gov/spaceimages/details.php?id=PIA21132>
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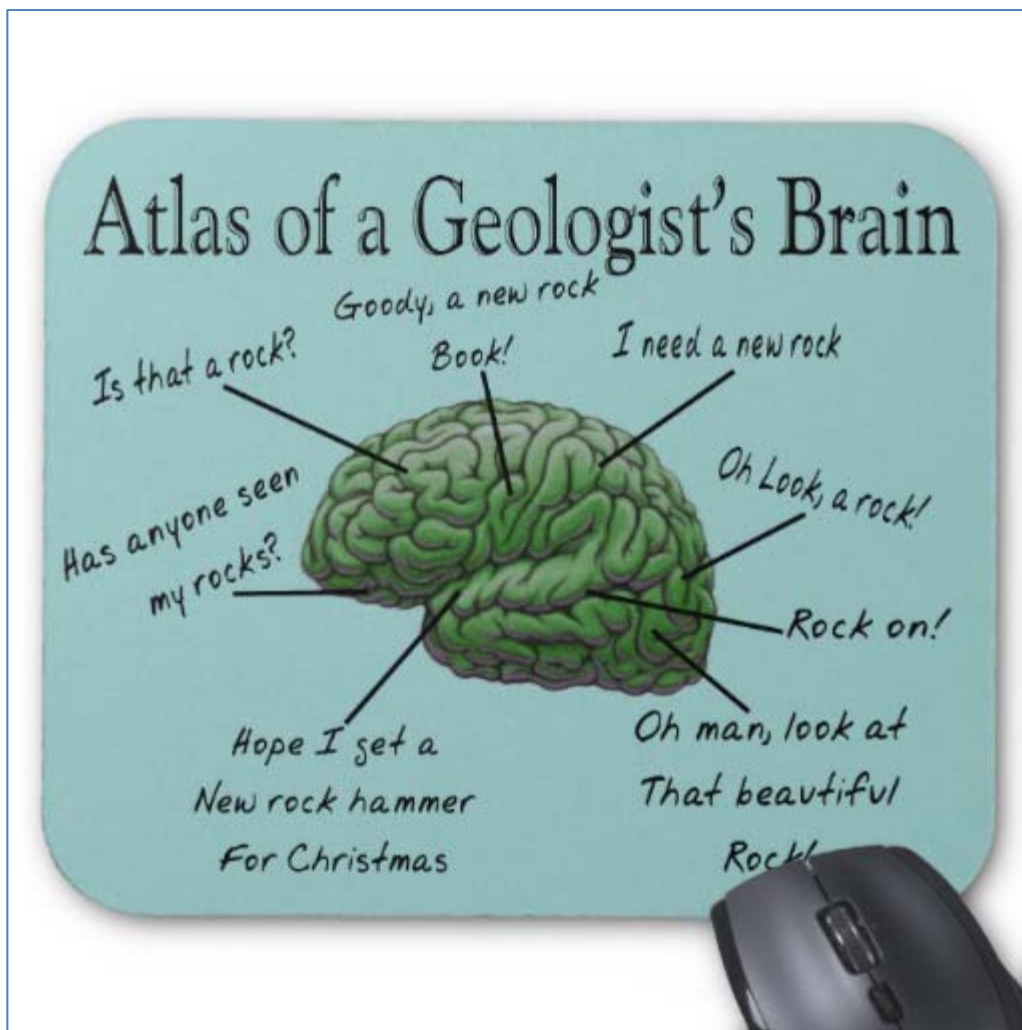
ELECTION RESULTS FOR GSNH BOARD OF DIRECTORS, 2017-18 – From Thor Smith

In an exciting and congenial race, we had clear winners at the GSNH October election for the 2017-18 term of the Board of Directors. With 38 votes cast, all nominees won their respective offices with a majority (generally all) of the votes cast. Thank you to all of the GSNH members who voted at the October dinner meeting. The GSNH Board of Directors for 2017-2018 consists of the following members:

President:	Wayne Ives
Society Vice President:	Doug Allen
Council Vice President:	Thomas Fargo
Treasurer:	Bill Abrahams-Dematte
Secretary:	Shane Csiki
Members-at-Large:	Abby Fopiano, Thor Smith, Sharon Lewandowski

Please welcome our new members to the Board: Shane Csiki, Sharon Lewandowski, and Tom Fargo (who served a partial term for 2015-16 and is now newly elected).

Shane came to New Hampshire following studies in Geography at the University of Illinois, and is presently a fluvial geomorphologist at the NH Geological Survey. Sharon studied geology at Bowling Green State University in Ohio and, having returned to her native New Hampshire, now works at AECOM in Manchester. Tom studied geology at SUNY Fredonia, SUNY Buffalo, and UNH, has served in the NH House of Representatives, and is presently employed at NHDES. Short biographies of all candidates were published in the September GSNH Newsletter (Issue No. 94).



MINING MANIA IN GRAFTON WEST - Blog by Larry Coffin President of the Bradford Historical Society, Sunday, May 29, 2011 http://larrycoffin.blogspot.com/2011_05_01_archive.html

As printed in the Journal Opinion, May 25, 2011: "What stores the bowels of the mountains contain, time must unfold; all searches for subterranean treasures have hitherto proved fruitless. ...But from the specimens which have appeared, there can be no doubt of the existence of mineral and fossil treasures, the search of which, future generations will find employment."

This observation about New Hampshire was written by British writer William Winterbotham in 1795. He based it on the earlier writings of New Hampshire's Jeremy Belknap. This column details some of the mineral treasures found in neighboring towns in Grafton County. It also examines some of what Belknap called, "the disappointments [and] air of mystery" of some local mining and quarrying enterprises.

Probably the earliest use of stone by the settlers of the area was fieldstones for foundations and stone walls. The source was nearby pastures and woodlands. These practical uses also removed them as an obstacle to farming.

Soapstone, also known as cottonstone was one of the earliest commercially quarried minerals in the area. Easy to carve even with woodworking tools, this stone had many uses including gravestones, water pipes and stoves. One of the largest quarries was located two miles north of Orford village on Cottonstone Mountain. In 1825, Samuel Robinson, in his Catalogue of American Minerals, described it as "one of the finest localities of steatite [soapstone] in the United States." Two additional quarries were located in the village of Orfordville and north of Briar Hill in North Haverhill. Bittinger's History of Haverhill states that attempts to bring the latter to market, "proved a financial failure."



Employees of the Pike Manufacturing Company are shown hauling stone from the Haverhill quarry. Horses, such as "Old Phoebe," were relied upon to lighten the work load.

Limestone was used in the smelting of iron, for plastering or whitewashing walls and for agricultural use. It was found in a number of area towns. Limestone was found in Haverhill in 1837 and two kilns were built near Black Mountain for the burning of limestone, a process essential for its use. In his 1842

survey of the geology of New Hampshire, Charles Thomas Jackson wrote the “inexhaustible beds of limestone” in Haverhill, Lisbon and Lyme were of “incalculable importance” to the economy of the state.



One of the earliest commercially quarried minerals in the area was limestone. Shown is the restored lime kiln, one of two built near Black Mountain in Haverhill for the purpose of burning limestone, a process essential to its use.

Given the quantities of limestone and wood for the kilns, New Hampshire lime easily replaced more expensive lime from other states. The Haverhill Lime Company operated kilns from 1864 until about 1888. Jackson mentions that one of the several limestone quarries operating in Lisbon in 1844 was over 60 ft deep and 300 ft long. While they appeared to have closed by the late 1880s, they were for a time, “quite an industry.”

It is for good cause that New Hampshire is known as “the Granite State.” Granite is its most common mineral. At one time or another, granite has been quarried in many local towns. From the earliest years, granite was used for fence posts, foundations, doorsteps and millstones. At first, the source was surface boulders, with quarrying beginning in New England about 1800. By then, granite was being used for buildings and monuments, uses that continue today.

The history of local granite operations, as well as other mines and quarries, is detailed in Katharine Blaisdell’s *Over the River and Through the Years*, Book Four.

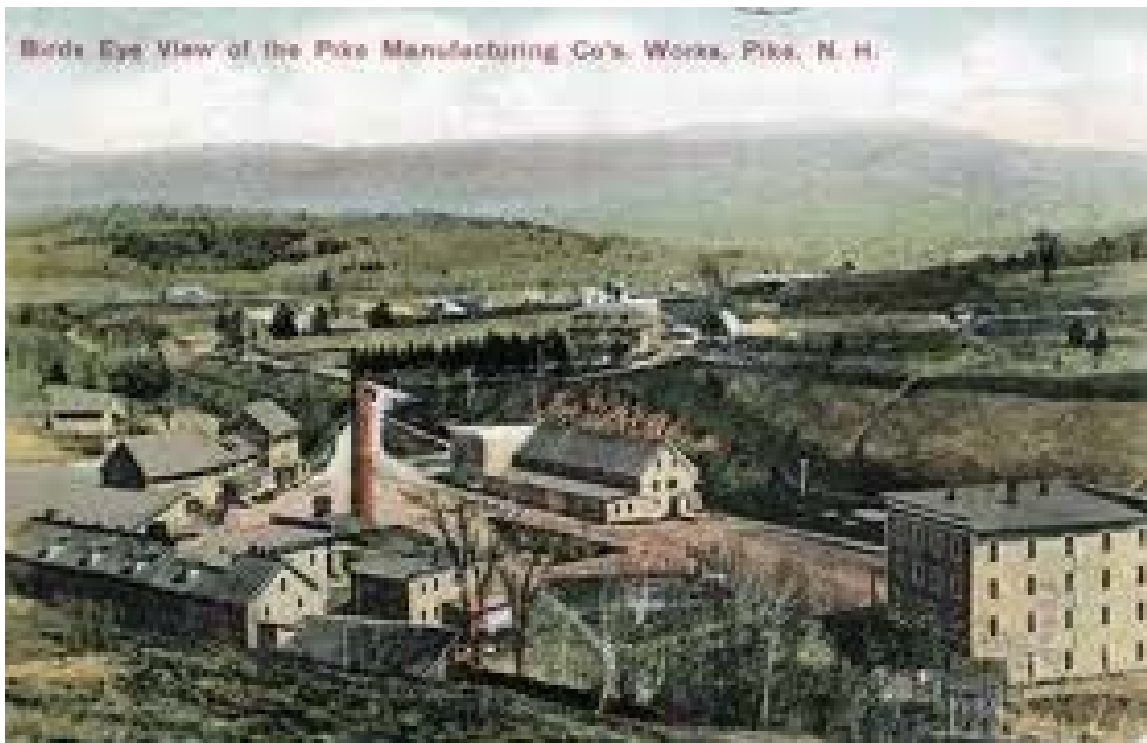
She writes that there was quarrying of granite at the Catamount Ridge south of Haverhill Corner which began in the 1780’s. In 1844, C. T. Jackson observed that good quality granite existed there “abundantly” and was “extensively quarried.” A number of companies were established both at Catamount Ridge and Briar Hill in North Haverhill. One company featured pink granite from the latter. The granite from these locations was used in the construction of a number of local buildings.

In 1893, *Stone* magazine predicted that the granite industry in the Haverhill area would “develop into a great business in time.” However, competition from other states, including Vermont, ended that hope. By about 1900, the quarries, and the cutting sheds that serviced them, had ceased operation.

At Piermont’s Black Hill, granite was quarried for almost the same length of time. It was described as “a variety not found elsewhere in New Hampshire.” In 1890, the Black Hill Granite Company was incorporated to expand the existing operation with three quarries. While the granite took a beautiful polish, “it could not be quarried in large enough blocks free of imperfections to make the business profitable.” Prior to its demise, there was a plan to build a railroad to transport the granite to Bradford’s railroad connection.

Sythestones or whetstones were also quarried in Piermont and Haverhill, an industry that remained vibrant for over a century. Both towns had deposits of mica schist, a fine-grained stone hard enough to sharpen any steel. Robert Fillion of Haverhill describes the history of the industry in that town, beginning as early as 1820. Locally, it probably had its origins in the need of a farmer to sharpen an ax or scythe. He may have picked up a stone, found it served his purpose and a local industry was born.

A number of individuals including Isaac Pike of Haverhill and later Charles Dodge and W. H. Gannett of Piermont were involved in grinding whetstones, but it was Pike’s son Alonzo who transformed the industry. The A. F. Pike Company, incorporated in 1883, became the Pike Manufacturing Company. Using stone from its quarries in Haverhill, Lisbon and Piermont, it became the world’s largest manufacturer of natural whetstones. From its company town at Pike Station, it shipped products to domestic and foreign markets. The market for natural whetstones declined after 1920 and the company was bought out in 1932 and operations were moved to Littleton



Pike Manufacturing Company works at Pike Station supplied natural whetstones to a worldwide market. In 1932, the company was bought out and the operation was moved to Littleton.

Several types of slate have been quarried in the local area. In his 1870 report on the geology of the state, Charles Henry Hitchcock describes the considerable amount of clay slate that had recently been located along the Connecticut River. The slate found in Littleton was suitable for roofing and marbleizing and other “practical purposes.” He mentions that “excellent specimens” indicated the presence of slate in Piermont and south into Hanover and Lebanon. While the southern locations proved commercially successful, I could find no evidence of a quarry in Piermont at that time.

While clay slate was found along the Connecticut, mica slate was quarried on the hillsides. At its best, mica can be mined in “books” and processed in sheets that are semi-transparent and capable of withstanding high temperatures. It was often used in place of glass, when that was unavailable or not suitable, as in stoves or oil lamps. The discovery of vast quantities of this mineral overseas in the 19th century discouraged local operations.

The most important site for open pit mica mining was at the Ruggles Mine at Glass Mountain in Grafton, NH, where mica was discovered in 1803. As late as 1906, they were supplying mica for the Mica Crystal Works grinding plant in Warren. During World War II, the Woodward mica quarry was in operation south of Orford village. According to a 1953 U.S. Geological Survey, the quarry produced a “fine grain quartz-mica” from a pit that was 140 ft. long, 25 ft. wide and up to 40 ft. deep.

Iron ore was mined in several area towns. One of the most productive mines was at Cross or Iron Ore Hill near the Piermont-Warren town line. In 1844, it was reported that immense quantity of, “specular and magnetic iron of superior quality” was found there and over 100 tons had been transported to a Vermont smelting furnace. In 1861, it was described as one of the richest ores in the nation. It was suggested that the availability of local firewood and limestone would make this a very profitable location, but apparently this did not materialize. The 1886 Grafton County gazetteer makes no mention of any iron mining in Piermont. There were prospects for iron at Holt’s Hill in Lyme also, but no active mining. The 1844 report mentioned two “nefarious swindling” proposals that lost money for investors.

One of the most interesting stories of a hoax involving mining mania is related in Little’s History of Warren. A group of 19th century tourists from New York were visiting Mt. Moosilauke. “There they fell in with a spiritualist who went into a fit, and looking with shut eyes toward Sentinel mountain saw fourteen different mines upon that green wooded eminence...the oracle was believed, a company was organized

and they actually worked a year and a half at the spot indicated.” The minerals found did not pay and the investors lost thousands of dollars.

But at Ore Hill in western Warren deposits of copper, lead, silver and zinc deposits were found. Attempt to mine these began in the 1830's and continued until 1959. Some attempts in the 1860s resulted in short term success, to the point of creating an active village of miners. Most, however, were thwarted by high processing and shipping costs, failure to find sufficient resources and fire.

The best local example of mining mania was caused by the discovery of gold in Lisbon in 1864. Within a year, three companies had been formed with interests in Lyman, Lisbon, Bath and Monroe. The area was given the name “Ammonoosuc Gold Field.” By 1877, one company had shipped 500 tons of ore to crushing mills in the area. Hitchcock reported that the best part of the Lyman vein produced about \$18 of gold per ton of rock.

He predicted that these mines would only be profitable with luck and the expenditure of considerable capital. Luck was not on the side of the prospectors and the gold produced was less than mining and processing costs. The whole business was based on speculation and mine salting was common. Some were fooled by gold lookalikes. Doubt led to decline and even an attempt to reestablish the mine in Lyman in the early 1900's failed. With that, the dreams of a “new Eldorado” vanished.

In addition to these commercial enterprises, the minerals of the area attracted “mineralogical tourists.” From the first half of the 19th century to the present, these “rock hounds”, cold-chisel and hammer in hand, have scoured the area for cabinet specimens. In 1844, James Dana listed the minerals to be found in area towns. They included in Haverhill: garnet and natural arsenic; Lyme: kyanite and black tourmaline, and Warren: quartz and tremolite.

New Hampshire is still described as “an excellent location for the amateur mineral field collector,” and recreational gold panning is popular on several local streams and rivers, including the Wild Ammonoosuc. Many of the abandoned mines and quarries mentioned above are sites for those seeking specimens.

Few companies other than gravel, sand and crushed rock remains from the various local enterprises mentioned in this column. Many of the abandoned quarries and piles of tailings from those mining operations are overgrown and forgotten, except as they pollute neighboring streams.

That is not to say that the hills that hosted these mines and quarries no longer have treasures to offer. Abandoned mining roads have become hiking trails. Mountain sides offer sites for recreation and forestry operations. Seasons are heralded by their changing colors. And for those of us who have grown up in their shadows, they provide the reassurance of having a horizon against which you can rest your eyes.

MEET DR. SUZETTE KIMBALL, DIRECTOR OF THE USGS

Prior to becoming the Director, Dr. Kimball was the USGS Deputy Director. In 2008, she became the Associate Director for Geology, and prior to that was the Director of the USGS Eastern Region, starting in 2004. She joined the USGS as Eastern Regional Executive for Biology. In that position, she built many partnerships, helped shape programs, and led the establishment of the USGS Florida Integrated Science Center. She came to the USGS from the National Park Service in Atlanta, where she was Associate Regional Director.

She entered the National Park Service as a research coordinator in the Global Climate Change Program, became Southeast Regional Chief Scientist, and then Associate Regional Director. She was assistant professor of environmental sciences at the University of Virginia, co-director of the Center for Coastal Management and Policy and marine scientist at the Virginia Institute of Marine Science, and managed coastal morphology and barrier island studies in the U.S. Army Corps of Engineers.

She has authored numerous publications on barrier island dynamics, coastal ecosystem science, coastal zone management and policy, and natural resource exploration, evaluation, and management. She has received the Presidential Rank Award and the Secretary of the Interior's Meritorious Service Award. Dr. Kimball has a doctorate in environmental sciences with a specialty in coastal processes from the University of Virginia, a master's in geology and geophysics from Ball State University, and a bachelor's in English and geology from the College of William & Mary.

<https://www.usgs.gov/staff-profiles/suzette-kimball>



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Make checks payable to "Geological Society of New Hampshire." Note that GSNH dues are not deductible as a charitable contribution, but may be deductible as a business expense. Please return this completed application form with any necessary corrections and a check for the appropriate dues to the GSNH at the address above. The Society's membership year runs from January 1 to December 31.

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