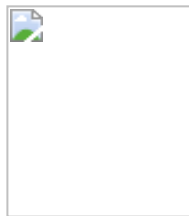


# The Granite State Geologist



## Newsletter of the New Hampshire Geological Society

Suite 133 \* 26 South Main Street \* Concord, NH 03301  
 Number 8 \* April 1994

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### Charles H. Hitchcock and the Geological Survey of New Hampshire (part 2)

*Laura and Guy Waterman*

*Editor's Note: The following is excerpted (with permission of the authors) from Forest and Crag by Laura and Guy Waterman, a definitive 888 page History of Hiking, Trail Blazing, and Adventure in the Northeast Mountains published in 1989 by the Appalachian Mountain Club, 5 Joy Street, Boston, MA 02108*

Although the White Mountains had become a popular vacation center by 1868, it will be recalled that relatively few peaks were climbed regularly. Thirteen years earlier a White Mountain writer had observed,

As yet, there are many deep glens and wild crags in all this mighty pile of mountains, where the explorer had never left the print of his feet upon the moss.

It was to these deep glens and wild crags that the New Hampshire geological survey turned.

In the fall of 1868 Hitchcock drew up his plans and selected his two principal assistants: George L. Vose of Paris, Maine, and Joshua H. Huntington of Norwich, Connecticut. To round out the staff he relied chiefly on Dartmouth students during the summers; Hitchcock seems to have employed the survey work as a teaching device, with almost one-fourth of the class of 1871, for example, working on the survey.

For most of the summer of 1869 Vose was assigned to concentrate on the White Mountains and thereby "to furnish the most accurate map of the mountains ever drawn." Vose knew his subject well from childhood hiking trips going back to 1838 and from extensive summer excursions during the 1860s. In 1869 Vose was mostly in the Sandwich Range, where he climbed Chocorua, Passaconaway, and Whiteface, making detailed observations from their summits. In September Vose determined to ascend Carrigain, figuring its location "almost exactly in the centre of the vast group of White and Franconia mountains" would offer a matchless panorama for topographical observations. With George F. Morse of Portland, Maine, an accomplished artist who specialized in accurate sketches and summit panoramas, and a Bartlett, New Hampshire, man named John C. Cobb for a guide, Vose approached the mountain from the Sawyer River valley. The key to Carrigain's southeastern approach is Signal Ridge, a striking knife-edge (by New England standards) that leads off from the principal summit a few hundred feet below the top and runs nearly level toward the southeast at 4,000 feet, with impressive sweeping slopes that drop sharply off both sides for more than 1,000 feet. The eastern and steeper side of this knife-edge is supported by steep buttresses into which are etched exceptionally steep watercourses. The present trail starts up the first of these brooks and then slabs gently over to the ridge; Vose's party took a higher and steeper brookbed. This in turn forks again, and here they took the more southerly fork, naming its precipitous ledgy course Cobb's Stairs in honor of their local guide. On the first day they climbed for two hours partway up the "magnificent slope," at first in the stream, then beside it,

stumbling now into some hidden chamber beneath the moss, now lifting ourselves up by the friendly branches of spruce and pine [sic], now sinking exhausted into the soft green bed beneath

our feet, now winding around some fallen tree, still up, up, up we go, panting and straining, with every muscle called into play and every drop of blood in vigorous motion.

After spending the night at an improvised camp on this steep mountainside, they pushed on in the morning, taking only compass and notebooks, battling scrub conifers, until

one more lusty pull, and a rough scramble through the bushes and over the rocks, and we stand upon a narrow ridge, for which the great green carpet of forest spread out like a map beneath.

To their disappointment, clouds had closed in and their views were at first so limited, so that they sat down and made a fire and for several hours waited out the bad weather. They did not realize until they had begun to descend that they had not been on the summit, since clouds hung in tight around the summit cone (a not uncommon occurrence).

For reasons that are not recorded, Vose's tenure with the Hitchcock survey was brief. No account of his activities in 1870 survives, the map he was to furnish was apparently never made, and he soon resigned. Huntington remained then as the principal assistant.

The focus of the Hitchcock survey in the summer of 1870 was a thorough investigation of the Presidential Range in the widest possible sense of the term--the entire 30-by-15-mile area bounded by the Israel's, Moose, Peabody, Ellis, and Saco rivers. Hitchcock and Huntington headed the field trips, with Dr. Nathan Barrows and Edward Hitchcock, Jr., Charles's brother, and six Dartmouth seniors as assistants. The party stocked up on supplies and then took to the woods to live in "extempore camps" for long periods. While no new ascents were recorded, the survey team combed all the subsidiary ridges and valleys, "one after another, till all had been explored." It is a great loss that no detailed field notes remain telling of their explorations from day to day, but they are known to have repeated King's ascent of his ravine on Mount Adams and to have spent considerable time in the large Dry River basin and its various offshoots. The numerous steeper slopes of the range were not avoided; as an illustration, Hitchcock and his assistants scrambled around on the Webster cliffs that form the east wall of Crawford Notch. Hikers keeping to the well-groomed trails today but gazing out over the huge slopes of tangled forest can appreciate the kind of travel that Hitchcock and his assistants undertook throughout the range day after day.

The following summer the survey turned attention to the area west of Crawford Notch. If the major peaks of the Presidentials had been well known, those of the Pemigewasset were scarcely even named. This immense north country mirkwood had been traversed at least twice, and fishermen were conversant with the East Branch and its main tributaries, but knowledge of the mountains was limited to the ranges that form the western (Franconia) and eastern (Willey Range) borders, plus Carrigain to the south. That left an area of 10 miles square that was virtually unknown. You could have taken Manhattan Island from the Battery to George Washington Bridge and laid it east-west between Mounts Liberty and Nancy and its tallest buildings of today would have sunk out of sight of any road of that era, behind the encompassing mountain ridges. The high range of peaks in the interior--later given the names of North and South Twin, Guyot, and the Bonds--may never have been climbed at all. Though the immense forests of the Pemigewasset were later thoroughly logged over and lumber camps and railroads sprang up all over, that period was still twenty years in the future. When Hitchcock's men entered the "Pemi," it was the largest area of major mountains yet unexplored in the White Mountains.

Hitchcock and Huntington, along with eleven Dartmouth students, formed the 1871 party. An important member of the group was Warren Upham, then an undergraduate but a keen participant on some of the more arduous undertakings and one who retained his enthusiasm for the hills after graduation, becoming active in the Appalachian Mountain Club upon its formation later that decade. This group began a one-month sojourn in those woods on June 17, 1871.

Our houses were hastily extemporized sheds; our beds a few boughs of ferns placed upon boards; our food consisted of stale crackers and preserved meats, save a rare taste of trout and berries gathered in climbing mountains, and the luxury of an occasional basket of provisions sent by kind friends at the Profile House; and we were our own servants.

During that month and subsequent, more limited expeditions that summer, the Pemigewasset explorations included traverses of the Twins-Bonds range, Garfield Ridge, and Willey Range. Carrigain was reached by Upham from the north, probably a second ascent (after Guyot's of 1857). Among the other peaks climbed, which may represent first ascents, were South Twin and possibly North, by Hitchcock and one Dartmouth student; Guyot and Bond, by Upham and another student; and Garfield (then Haystack), by C. H. Conant, C. W. Hoitt, and Jonathan Smith. Hitchcock's forces also discovered two remarkable flumes cut deeply into the side of Mount Willard and did a roped descent to the Devil's Den, that dark cave just below the top of Willard's precipitous south face. In 1871, working west of Franconia Notch, they discovered Kinsman Pond and made possible first ascents of the twin peaks of the Kinsmans.

Hitchcock began submitting annual reports in 1869 and 1870, the major results appearing as *The Geology of New Hampshire* in 1874. Most of the survey's mountain exploration was done in 1870 and 1871. Coming during the period of transition between the bridle path era of the 1850s and the explosion of pedestrian hiking and trail building after 1875, it could not have been better timed to play a key role in pointing the way for that second generation of recreational climbers. (An important phase of the Hitchcock survey was the winter ascent and occupation of first Moosilauke (1869-70) and then Washington itself (1870-71). This was the arena in which J. H. Huntington most shone.)

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## Observations on the Current State Geology Program

*Eugene L. Boudette, State Geologist*

### The Mission

The New Hampshire Geological Survey (NHGS) is an operating unit, directed by the State Geologist, of the Department of Environmental Services (DES) established in 1987. The state geologic program was formerly directed by the Office of State Geologist in Durham, a service provided for more than 50 years by the University of New Hampshire under contract with the state until July, 1991. Prior to 1987, the state geology program was coordinated by the Department of Resources and Economic Development or its precursor agencies.

NHGS is obligated by statute to transfer information "concerning the geologic character of the state and its implications for both economic and scientific work in conjunction with all existing and future environmental factors relating to the geology of the state." Thus, NHGS primarily supports the activities of DES and other state agencies as well. NHGS is also committed to: (1) geologic response to public inquiries; (2) expansion of the geologic data base of the state through research dependent on both appropriated and sponsored funds; (3) management of the preparation and distribution of state geologic publications; and (4) general liaison with other states, the federal government, other countries, and geologic professional associations.

Program activities of the NHGS are conducted by the State Geologist, the only full-time position, augmented by part-time scientists and students from the academic or private sector who continue a program of geologic mapping in the state. Mapping has been the most important element of the program in the past.

### Some Recent History

In July 1991 a classified state position for the State Geologist on the staff of the Commissioner was established by DES initiative. The State Geologist was allowed to remain in facilities generously provided by the University. The State Geologist was placed on furlough in December 1991, related to reductions in state expenditures in response to the decay of the economy. The state geologic program remained inactive until July 1992 when it was restored and NHGS relocated from the University to state facilities in Concord.

### Geology of Surficial Deposits

NHGS had maintained a cooperative research program (COGEOMAP/STATEMAP) with the U. S. Geological Survey (USGS) since 1984. The intent of this program has been to map the surficial deposits of the state at 1:24,000 scale and ultimately produce a new state map at 1:100,000 scale, as well as topical reports. NHGS was unable to participate in the program and support continued field work in 1992 because of the administrative recess and lack of research funding. The USGS, however, returned one geologist to the field in 1992 to continue mapping, and one NHGS mapper completed a tile (1:24,000 scale quadrangle) voluntarily.

Mapping support became available for the 1993 field season and five NHGS contract mappers were funded to complete the compilation of as many tiles by July 1994. This work will bring the total number of tiles published or compiled to 37 (of 213). Enough tiles have been completed in the southeast to permit compilation of the Lowell and Gloucester 30' x 60' quadrangles (1:100,000 scale) by the USGS in 1994.

### **Bedrock Geology**

Final revisions of the new bedrock map of New Hampshire (1:250,000 scale) were completed in 1992 and the map was placed in digital file for publication processing by the USGS. Federal or independently funded field research on bedrock, including mapping, by members of the USGS or academic community continues mainly in the White Mountains and northern New Hampshire.

### **Resource Geology**

Sand and gravel, quarried aggregates, and dimension stone are the most valuable mineral commodities produced in the state. The production of minor clay and gem minerals is also reported. The New England Governor's Conference (NEGC) published a final report in 1992 summarizing the demand outlook through 2010 titled "Construction aggregates demand in the New England states," a study made possible through funding provided by the U. S. Department of Interior, Minerals Management Service (MMS). This study was guided by a committee of the State Geologists of New England. A parallel, continued study of the "supply side" of aggregates resources, under the same auspices, was completed in 1993 in cooperation with the USGS. NHGS compiled three (non-conventional) quadrangles under an extended cooperative agreement through NEGC using funds from MMS. This work combined with that of the other states is the basis for completion of an onshore analysis of the sand and gravel resources to be published by NEGC by the end of 1993. The volume of the resource unavailable for extraction because of land use restriction is calculated in the study. A third study is planned in 1994 to incorporate the results of the "supply and demand" statements "to draw conclusions on the regional construction aggregate outlook and forecast whether offshore supplies will be needed to meet future demand" according to MMS.

Studies of the nature of deposits on the inner ocean shelf sponsored by MMS funding were continued through 1993. This work was performed by the Jackson Estuarine Laboratory of the University of New Hampshire. Recent emphasis has been placed upon seismic reflection and sonar side-scan work.

### **Other Recent Publication Activity**

Three titles showing surficial deposits in the seacoast region were released by NHGS as part of its COGEOMAP commitment, one in full-color and the others in open-file format. A COGEOMAP-related contiguous MI-Series map of two mosaicked titles was published by the USGS. Four manuscripts dealing with radon, earthquakes, gold, and arsenic in the state were prepared and transmitted to DES for publication and distribution in information circular format. About 40 additional publications on the geology of New Hampshire were indexed by the GeoRef data file of the American Geological Institute. These were not directly related to the NHGS program.

### **Availability of State Publications**

Geologic reports and maps published by the State of New Hampshire are available as directed by a publication circular titled "Geological Publications" distributed free by:

Public Information & Permitting Unit  
NH Department of Environmental Services  
State Office Park East  
PO Box 95  
Concord, NH 03302-0095  
(603) 271-2975

The circular is updated periodically, and informal lists of interim publications as well as miscellaneous information are maintained by the State Geologist. These lists are free upon request and include: (1) published titles of surficial deposits; (2) open-file release titles of surficial deposits; (3) open-file release titles of wetlands and peat; and (4) available 1:62500 scale maps of surficial deposits. The state-published Bibliography and Index of New Hampshire Geology is available as a contribution to research and reference. The volume is GeoRef-based and current through June, 1989. Copies are available "over-the-counter" for \$10.00 each from the DES Public Information & Permitting Unit or from the Department of Earth Sciences at UNH, or by mail-order for \$13.00 first copy, \$11.40 each additional (postage-paid) from the DES Public Information & Permitting Unit. Make checks payable to "Treasurer--State of New Hampshire."

The new state bedrock map had progressed to the technical review stage as of Summer, 1993, but its publication date is presently unknown. Upon release, the map will be available in "hard-copy" and on CD-ROM.

(9/15/93)

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## Another Available Publication

Copies of Rocks & Minerals Magazine, Volume 65, Number 4, July/August 1990, a special issue devoted to New Hampshire, are still available. Featured articles include:

- Minerals of the Conway and Mount Osceola Granites of New Hampshire
- Minerals of New Hampshire: A Checklist
- Gemstones of New Hampshire
- The Geology of New Hampshire, the Granite State
- New Hampshire Collections and Displays
- Fossils of New Hampshire: An Overview
- Who's Who in Mineral Names
- Fluorite Deposits in Westmoreland, New Hampshire
- New Hampshire Gem and Mineral Clubs
- Pegmatitic and Mirolitic Cavity Minerals of North Sugarloaf Mountain, Bethlehem, New Hampshire
- Pseudomalachite: New Find at Palermo No. 1 Pegmatite, New Hampshire
- Mines and Minerals of North Groton, New Hampshire.

Copies can be purchased by mail or "over the counter" for \$6.50 from:

Department of Earth Sciences  
121 James Hall  
University of New Hampshire  
Durham, NH 03824-3589  
(603) 862-1718

Make checks payable to the "University of New Hampshire."

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## Maine Events

Professional confernece on "Lessons Learned in the Remediation of Petroleum-Contaminated Sites in Maine," April 28th, 8 am to 6 pm, at the Augusta Civic Center, Cushnoc Auditorium. The registration fee, including lunch and proceedings, is \$65 per person (before April 8, \$75 until April 21, \$40 student registration). Send registration& payment to:

Jerry Haynes, PE  
Consulting Engineers of Maine  
One Allagash Drive  
Oakland, ME 04963-1127

Spring meeting of the Geological Society of Maine (GSM), featuring student presentations, at Bates College, Lewiston, on Friday, April 8. For more information contact Dyk Eusden at (207) 786-6152.

GSM short course on "Remote Sensing for Geologists," April 15 at the University of Southern Maine, Gorham. For more information contact Steve Pinette at (207) 287-3901.

Fifth Annual Maine Mineral Symposium at the Senator Inn and Conference Center in Augusta (Western Ave off I-95), May 6-8. Registration for the entire weekend is only \$8.00. For more information contact Robert Hinkley at (207) 657-3732.

## Summer Field Trip Plans!

Carl Koteff of the U.S. Geological Survey has graciously accepted the Society's request to lead the Summer 1994 Field Trip. His Topic will be: "Late-Glacial Marine Invasion of Coastal Central New England: Eastern New Hampshire-Southwestern Maine." This trip is based on a portion of a three-day field trip hosted by the Maine Geological Survey and the USGS during the Geological Society of America's 1993 Annual Meeting last October. Carl will be providing us with a thought provoking tour of ice contact and post-glacial marine transgression deposits. The trip is scheduled for Saturday, August 6, 1994. Due to safety considerations and logistics, we have set aside an alternate day for a family outing event, to be announced. For more information, please contact Greg Kirby at (603) 271-3624.

## NHGS Treasurer's Report

For the period January 1, 1994 through the Ides of March, 1994

Starting Balance - January 1, 1994		2518.56
Income		
	Dues	250.00
	Meeting Fees	830.00
	Interest Income	7.88
Total		1087.88
Expenses		
	Meeting Expenses	776.75
	Postage	46.98
	Insurance	227.00
	Professional Services (Tax Prep)	150.00
	Bank Fees	11.95
Total		985.68
Ending Balance, March 15, 1994		2620.76
Bank Account Balances, March 15, 1994		
	Savings Account, First NH Bank	2218.23

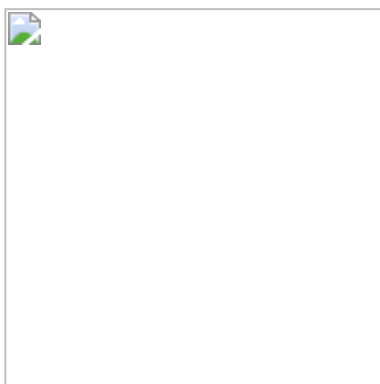
Checking Account, First NH Bank	402.53
Total Balance Forward	2620.76

Respectfully submitted,  
*Dorothy Richter, Treasurer*

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## NHGS News and Events

The Spring Meeting of the New Hampshire Geological Society will be held Thursday, April 14, 1994 (Cash Bar @ 6, Dinner @ 7), at the Sheraton Tara Hotel in Nashua (Exit 1 off Route 3). Chris Covell of GEI Consultants has been selected as guest speaker. His topic will be "Predicting Contaminant Transport in Bedrock with Very Low Frequency (VLF) Geophysical Techniques." Chris will present applications of VLF geophysics to groundwater investigations, and will demonstrate its use in locating bedrock wells. The cost for the buffet dinner will be \$16.00 for members, and \$17.00 for non-members. For further information please contact Greg Kirby at (603) 271-3624.



Carl Koteff will be leading our summer Field Trip this year, on August 6--see story inside. Other important dates to make note of: Membership Renewals will be sent out in June (see the 1994 Membership Directory mailed with this issue of The Granite State Geologist); the 1994 Annual Meeting will be October 13. Future Meetings are scheduled for January 12, April 13, June 8 (tentative), and October 12 (second Thursday of the appropriate month), field trip August 5 or 12, 1995.

Also this Spring, those glacier enthusiasts in the Friends of the Pleistocene (FOP) will be hosting their annual field trip in Pennsylvania, May 21 and 22, at Bloomsburg University in Hazleton. For more information Contact Dwayne Braun at (717) 389-4139 or FAX (717) 389-2094

The Nashua Mineral Club will be hosting their annual mineral show during the weekend of April 23 and 24, 1994. The show will be held at the Holiday Inn in Nashua. Admission to the show is \$2.00. For further information contact: Don Ryder at (603) 465-2706.

The deadline for publication in The Granite State Geologist is usually about 5 weeks before our scheduled quarterly meetings. Of course, you don't have to wait until the deadline to submit an article! Send submissions anytime to: Tim Allen, Geology Dept., Mailstop 2001, Keene State College, Keene, NH 03435-2001, telephone: (603) 358-2571, FAX: (603) 358-2257, internet: tallen@keene.edu.

Electronic Submissions are encouraged, on either PC or Mac disks. Save your file as plain ASCII TEXT, and send a hard-copy too (just in case).

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[tallen@keene.edu](mailto:tallen@keene.edu)