

200 Years of Soot and Sweat

The History and Archeology of Vermont's Iron, Charcoal, and Lime Industries

Addendum A - Update to the 1992 Edition

2007

Victor R. Rolando

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NOTICE

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Figure A-1. *The Green Mountain Iron Company blast furnace at Forestdale the fall of 2005. View is from the northeast. Just ten years after its stabilization work the summer of 1995 (see page A-31), the ca1823 stack is holding up well. Compare with the Front Cover of the original 1992 edition showing the work arch fully collapsed. That arch today stands firm and tight except for a few 3- to 4-inch-long stalactites that hang from the ceiling of this and other archways, betraying water seepage into the structure. An iron gate fully guards the work arch from unauthorized exploration. Nature is slowly taking back the grounds; in summer, most of the stack is hidden by renewed tree growth. Rolando photo; November 2005.*

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Addendum A

Update to the 1992 Edition

Après “200 Years of Soot and Sweat”

Back in the late 1980s when the thought that “200 Years of Soot and Sweat” might become a reality, I wasn’t sure what that ‘reality’ would turn out to be. My biggest fear was not the loss of over \$45,000 invested in its publication, but what to do with the thousands of unsold copies rotting away in my basement. How long would it take to sell them all, - 10 years? 20 Years? The rest of my life? I was still working at GE Aerospace in Pittsfield, Mass., at the time and I tried not to visualize retirement being a nightmare of going door-to-door in remote corners of Vermont selling copies of the book out of the trunk of an old car. I had nothing to fear, as it turned out.

I decided that I would consider myself a successful publishing entrepreneur if I could sell the 2,000 copies within five years. And I almost did, 5 years, 6 months, and 23 days after the first copies arrived on September 23, 1992, to be exact. The last copy sold at an SIA Ironmasters Conference on May 16, 1998 at Falls Village, Conn. I came to the conference with my last 6 copies, stacked on a table along with that long-awaited sign - “Last Copies” - and by the end of lunchtime, they were all gone. Many disappointed prospective buyers preferred not buy their copies that morning so they wouldn’t have to carry copies all day. They came to me at the end on the day in disbelief that I had no more copies. “You *have* to have *one* more copy *somewhere*?” they pleaded, looking into empty boxes under the table hoping one would materialize from empty space. No such luck, I thought to myself, trying not to look too happy at their disappointment. *My* turn to gloat. But I’d lied to them because I did save some copies back home - for future grandchildren, future friends, maybe for some special request or event. I think I had maybe 20-25 copies squirreled away in a lone box back home in Vermont.

I had moved to Vermont the summer of 1991 after taking early retirement from GE the previous spring, so now I could become not only a Vermont resident but a Vermont author of a book about Vermont industrial archeology. I still have five copies, including my ratty old dog-eared “field copy” that I refer to almost daily, use in libraries or in the field, and used for editorial mark-up of corrections that appear elsewhere in this

Addendum. Where did all the rest end up?

I sold more copies to people outside Vermont than inside, which I thought curious. But then, living in Vermont I have learned that we are deluged with books on all sorts of Vermont subjects. If there’s an angle relating something in Vermont that’ll make some money, - cows, swimming holes, back-road antique dealers, covered bridges, etc., - somebody will find it, take pictures of it, write it up, and publish it. Not that it’s bad, but just the fact that bookshelves in stores, small or large, throughout Vermont, have no shortage of books on something about this beautiful state. Which translated into competition for my book against other smaller, less expensive books/booklets on subjects that more people can identify with than one with a looming, mysterious “stone tower” on the front cover.

Many book stores didn’t know what shelf category to place my book. Local history? Regional? Travel? I thought it would be in the archeology section of southern Vermont’s major bookstore, instead they put it in the “Vermontiana” section (later in “Travel”). In one book store I found it placed next to a similar-sized book about a love affair between a moose and a cow on a Shrewsbury farm (I bought a copy - I was smitten by the moose). I tried donating five copies to the state VPR station for giveaways for their annual fund-raising event but was told that their listeners liked only cookbooks. One bookstore owner said “*my* customers don’t read *this*” (whatever he thought “*this*” was). Some copies fell victim to stores changing hands (Burlington, Brattleboro, Cambridge, NY) with my unpaid copies being bought by the new owner who had a receipt showing the previous owners owned all the copies in the store. Then there were the others (I won’t mention them - you know who you are) who either never paid me for books or paid only after constant haggling over who paid what to who and when. Being a one-book publishing enterprise, I learned a lot about the book-selling business, mainly, that I often got lost in the shuffle when it came to being paid at all. And not being paid when I delivered the books, but long after they were sold and the book store was asking for more copies to sell, so then I had two orders of books to haggle about. One of southern Vermont’s biggest and finest still owes me for many books; but that was nearly

10 years ago and they have gone on to a bigger and more glitz-oriented market. But I had many enthusiastic book store owners: Book King in Rutland, Bennington Bookshop, The Vermont Bookshop in Middlebury, Dearleap in Bristol, Bear Pond Books and the Vermont Historical Society in Montpelier, and Chassman & Bem (the original owners) in Burlington.

When some people saw the \$32.95 price for the soft cover (\$39.95 for hard cover - that's another whole story), the comment was often that I was surely going to make a killing on this. Not so if one knew what the cost of editing and printing a single edition for a one-book business was in 1991. Maybe I should have printed 5,000 or 10,000 copies, which would have significantly reduced the unit price and allowed me into the national market - e.g., Barnes & Nobles. But then there would've been storage complications (10,000 copies = a space of 28 by 28 feet by 6 feet high - that is, floor to ceiling), and shipping, and accounting, and taxes (tax reporting for expendables is unlike anything I'd ever seen). The logistics of 10,000 copies was too daunting; I'm happy with what I did.

How much profit did I make? *Did* I make a profit? Did I break even? None of the above, but let's not go there. This was never a profit-making venture, much to the dismay of my ex, who always offered her marketing skills to the mix. Except that she had worked in a small-city bank and didn't fully appreciate the industrial archeology market as it pertained to a subject that few identified with, and in a sparsely populated state in the northeast corner of the nation.

On the profit side, I made many friends I'd never have met except for the book, which has value beyond cash. I was invited to speak to organizations that I could only have dreamed about before. And I started to discover that I was doing better selling books at personal presentations than the book store market, and kept that 40% the book store demanded (some wanted upwards of 45%). No matter that it cost more in gas and chow (and motels) to make most of the presentations than I took in with book sales, the books were getting out and "the word" was being spread. Mail orders came from people throughout the USA and in foreign countries - Canada, France, England, Belgium, Russia, and Australia. Neither Mr. R. Ian Jack of Australia nor I could figure what the exchange rate was for his order so I asked if he knew of any books on Australian ironworks. To my surprise, he was the author of a book on early Australian blast

furnaces (with all those unusual Australian names), so we did a book exchange, mine for his, and another book I'd never have known about - *Australia's Age of Iron: History and Archaeology* - joined my library.

Then things started getting scary. I was invited to inspect old furnace stacks and was asked for my "expert opinion" in doing restoration work (I avoid using the word "restoration" unless one wants to go back into the iron business). I got involved in this slowly and conservatively. My worst fear was making my mark in history as *the* person who was responsible for doing some irreparable damage to something historic. After looking for what I should call myself in this new arena, I copied from a good friend and called myself a "Research Consultant in Industrial Archeology," which I hoped was general enough to cover all bases, yet not tie me down to anything too very specific. And it seemed to work, and so far I don't think I've screwed anything up too seriously. If invitations to do return "engagements" and referrals from others is a gauge of success, maybe I'm doing okay. I've done consultant and archeology work at sites in New Jersey (Oxford Furnace), New York (Copake Furnace), New Hampshire (Franconia Furnace and Lisbon Charcoal Kiln), and Connecticut (Beckley, Lime Rock, and Mount Riga Furnaces and Sharon Lime Kiln), and consulted long-distance with a site in Oregon (Lake Oswego Furnace).

Did the book have any impact on IA in Vermont, as I had hoped? Yes, but not as much or in ways I had hoped. I think it did bring an awareness of this state's rich industrial heritage to light, beyond that described in the many local histories that have been published. I'm flattered that some of you out there refer to it as "the book." But I'm not sure it was the book itself, but the presentations I was asked to give as the result of the book that brought that awareness to the doorstep of people who were interested, like the Vermont loggers association, who I spoke to at their annual meeting in Killington a few years back. Loggers are in the front lines of those who will come face to face with piles of stones that might be more than they appear. Or local historical and conservation societies, where I emphasized the difference between what those various piles of stones could be. I like to think that maybe the stabilization work at the Forestdale furnace stack might not have happened except for "the book." And if that's all the book did, to possibly save one old, crumbling historic, industrial structure, then it was all worth it.

And speaking of impacts, back in the late 1980s when I was wondering how I was going to pull this whole collection of site survey reports and papers and photos together into one cohesive book, good friend David Starbuck steered me to Diane Post of “Post Scripts” in Maryland, who in turn introduced me to Joan Mentzer of the Smithsonian Institution in Washington, DC who did the complete edit of the manuscript. You didn’t see Joan’s name mentioned the title page verso because at the time there was some rule at the Smithsonian that employees couldn’t have their names mentioned in print for work similar to that which they did at work, or some such thingy (I hope I don’t get you fired, Joan). Joan also connected me to Debi Lynne of Maine who did the drawings in the book (e. g., the titled page sketch and the little thumbnail sketches at the top of each chapter heading). And finally to Norm MacGlothlin of Dover, Del., who supervised the printing.

One interesting cache of people who bought copies are those who used it as a “guidebook to interesting things to find in the woods.” People still proudly contact me to say they found this charcoal kiln or that lime kiln that some claimed at first I had in the wrong place. While searching for something in the book, one person instead found an unrecorded site. It was never my intent to make it a guide book, so I was a bit vague on some site descriptions so as to protect the more fragile ruins from overexposure to trampling and souvenir collecting.

And finally that eternal question, why an Addendum; why more sites and more data and more... “stuff”? “Why not?” I’d like to answer, but why really is because it was time to do this. Not last year or next year, but this year - 2007, the 15th year since the original book came out in 1992; this year is also the 31st anniversary of State Archeologist Giovanna Peebles’ tenure at the helm of State Archeology in Montpelier. But I also grow tired of seeing copies of the original edition for sale on Amazon or Ebay for ridiculous prices of \$250 to \$400. I hope this issue will knock the bottom out of that market and make copies available to those who can use the book for more than a collector’s item.

What am I working on these days? This Addendum, to be sure, but beyond that, I’ve given up searching out new sites of iron, charcoal making and lime burning in favor of just responding to continuing inquires and information on sites of yet-undocumented structures throughout the state. That, along with being editor of the past five issues of *The Journal of Vermont Archaeology* for the Vermont

Archaeology Society. And continuing in-depth research into the archeology of Vermont’s early glass industry, and in two sites here in southern Vermont that fascinate me: (1) the industrial impact of Henry Burden’s iron company on the towns of Bennington, Shaftsbury, Pownal, and Glastenbury; and (2), to answer the question of what exactly was going on at the Sherman Carbide Company’s ca1912-22 plant along the Deerfield in southwestern Whitingham? And so it goes.

Introduction to Addendum A

Many changes in the data presented in the 1992 edition of this book (hereinafter referred to as “the original edition”) have taken place. The purpose of this Addendum is, therefore, to provide new and updated information, and changes in status of sites previously documented in the original edition. These changes, along with errors identified in Addendum A, constitute a complete and comprehensive update to the original edition.

No changes have been made to the original text of Chapters 1 through 8; they appear in the CD as printed in the original edition, warts and all. A number of errors, however, have been found in the 1992 edition on the part of the writer, errors that were unintentionally introduced in the process of editing, correcting, and changing text and, errors that were uncovered in the course of further research into various aspects of the data. Purchasers soon started finding “Errata” slips inserted in the book as the errors were found and started accumulating. And it was originally planned to include a comprehensive errata page in the reprint of the 1992 edition, instead, it was seen more appropriate to include the errata information as a table in this Addendum (see Table A-1, page A-9).

The documentation and study of ironworks continues to be the major thrust of this book, although certain supporting processes - charcoal kilns and iron mines - also remain vital to the story. And because many lime kiln remains are similar to (and often confused with) charcoal kilns, their location and study continues to be a main feature of this book.

A new category of Vermont industrial archeology is introduced with this addendum - glass works (GW). Other categories always hover in the back of my mind as data is accumulated and folders fill with site information, but never quite make it into print (e. g. brick yards, blacksmith shops, an expanded chapter on foundries, etc.). Glass works have been added mainly because I had

always been interested in the industry and wondered if archeological remains of the sites existed. And I found the residue of the glass industry - those chunks of translucent colored glass - so fascinating. What is known of glassworks in Vermont depends on the site in question. It is not the intent to provide a complete story of the glass industry in Vermont, but merely to introduce it here for accountability purposes. In the meantime, read Max Petersen's *History of Vermont Glassmakers*.

All new sites located and documented since 1992 are included in this Addendum. Additionally, many others have been updated for various reasons, such as the furnace at Forest Dale, which was stabilized during the summer of 1995, or a ca1822 stack at Furnace Grove in Bennington, which suffered a major collapse in early 2007. Others have been re-identified as new information has been discovered, while yet others have been deleted for various reasons. Table A-2 lists sites added, updated, or re-identified. Text and illustrations following Table A-2 provide detailed information of the sites.; the Vermont State Archeologist is kept up-to-date.

Site identification numbers in the original edition of sites not found took the form of, for example, AD-IW12, translation: the 12th unlocated ironworks (IW) site in Addison (AD) County, and were assigned by the writer out of necessity and reflected no official state designation of any sort. And many of these sites still remain in that "unlocated" or "minimal evidence" category. But a significant number of them have since been reviewed by the State Archeologist and have been assigned new, official site identification numbers (e. g., AD-LK01, Boyce lime kiln site in Middlebury is now VT-AD-847). These newly identified sites and their former site numbers are also included in Table A-2 for accountability.

Data in this Addendum is presented as follows: Section A - Ironworks (IW); Section B - Charcoal Kilns (CK), Section C - Lime Kilns (LK), and Section D - Glass Works (GW). Within sections, counties are listed in alphabetical order.

No attempt was made to make this Addendum a "stand-alone" source of new and revised information. But while striving to avoid unnecessary duplication of tables and text that is already in the original 1992 edition, some referencing back to that edition had to be made to maintain context and continuity for sites discussed in this Addendum. Expect, therefore, some flipping between pages this Addendum and chapters in the original book to capture the essence of this new and/or revised data.

Acknowledgments

While many new people aided me in finding most of the sites reported in this Addendum, two good friends who helped immensely with the research and field work of the original 1992 edition passed away just a few years ago - Robert Edward "Bob" West, on April 20, 2005, and Mary Hard Bort, on February 28, 2006. Both were natives of Manchester, Vermont, and both were also the ramrods behind the successful revitalization of the Manchester Historical Society in the early 1980s.

Bob West's name appears throughout the 1992 edition (as it also does, but less so much, in the Addendum). He was a constant supporter of my work and I acknowledged his involvement with that by asking him to be one of my two co-contributors to the Preface of the original book.

Mary Bort was also involved in my work well before I realized it would become a book. If anybody knew what went on in Manchester history, it was Mary. Maybe not right away, she eventually found answers to almost all the questions I piled upon her. Wouldst that today's hard drives were as dependable as Mary's mind.

In addition to Bob and Mary, the following people (listed alphabetically) also provided direct help, data, field guidance, etc., in putting together much of what follows in this Addendum. I met some since 1992; others are from before: Collamer Abbott, Arthur Aldrich, Richard S. Allen, Priscilla Backman, Flo Beebe, Joanna Blaisdell, Christopher L. Borstel, Dee Bright Star, Anne Bugbee, Gail Buck, Pat and Charles "Pete" Brakeley, "Charlie" Brown, Bill Budde, Anne Bugbee, Ann and Duncan Campbell, Margaret and Donald Campbell, Paul Carnahan, Tom Carroll, Sheila Charles, Carla A. Cielo, Brian Coffey, Ed and Barbara Colvin, Johnathan Croft, William E Dailey III, Lewella B. Day, Arthur Dassatti, Scott Dillon, Bob Dion, Steve Donovan, the late John Dostel, Robert Faley, Eric Flanagan, Jamie Franklin, Larry Gobrecht, Joanna Gorman, Robert Haas, Joe Hall, Judy Harwood, Barb and Charlie Hine, Allen Hitchcock, Teddy Hopkins, Edith Hunter, Phil Jillson, Wayne Kachmar, Adam Kane, Madeline, Patrick, and Christian Kelly, Kate Kenny, Matt Kierstead, Ed Kirby, Gene Kosche, Susanna Kuo, David Lacy, John Leidy, Ruth Levin, Geanna Little, Ted Lylis, Nancy Otis, Dan Martin, Mary and the late William "Bill" Murphy, Ken Nickerson, Kevin Novak, Nancy Otis, Joseph Parks, Peter Patten, Peggy Peabody, the late Dr. James B. Petersen, David Potter, Callie Raspuzzi, Robert Rawls,

Russell Reay, Katie Reilly, Tyler Resch, Jack Rossen, Jen Russell, Steve Sharoun, David Skinas, Chris Slesar, Timothy C. Van Scoyoc, Peter Stott, Judy Stratton, Peter Thomas, Diane Wechter, Michael Werner, Bob Williams, Joanne Williamson, Virginia “Ginger” Wimberg, and some special thanks to some very special people:

Ronnie Little of Cambridge, Vt., who advised me on how to create pdf files, reduce graphic Mb’s, scan and store the original edition, and who put this whole thing together into a single, cohesive CD.

Good friend Giovanna Peebles has been the State Archeologist since 1976, and is a continuing inspiration in “getting the inventory forms right” the first time. Through thick and thin, she has been my most loyal supporter for recording what I find in the wilds (and downtowns) of this beautiful Green Mountain State. She gives a neat little slide-illustrated program around the state titled “Vermont’s Great Archeological Discoveries” but I believe *she* is Vermont’s Greatest Archeological Discovery (so to speak).

Former co-worker at GE Aerospace, Jack Trowill of Pittsfield, Mass., continues to contact me with leads on information and sources, in books or online, and keeps me up-to-date on IA sites of interest in his neck of the woods. To Jack goes credit for advising me of some early 19th-C photos available on-line, some of which proved valuable in the interpretation of one particular site in Whitingham, Vt. Thank you, Jack.

Christopher P. Rolando, my son and companion in many 1960s-1970s excursions into the woods to find blast furnace ruins in New York and New England; he is today President and CEO of a multi-million dollar (\$Mega?) communications and software business in

Arizona where he resides with wife, Jennifer, and kids Victoria, Nick, and Jake. Chris is my expert and final advisor on how to make this @\$%&#! computer do what I think I want it to do, and who duplicated the hundreds of CDs that are a part of this 2007 package. Whatta son!

Madeline Rolando, always supporting and encouraging me in my endeavors (although I don’t think she was ever really sure what it all meant); Mom passed away quietly Mother’s Day morning of 2006, a month short of her 94th birthday. God bless you, Mom; we all remember and miss you.

Correction of Errors in the Original 1992 Book

Table A-1. Errors, corrections, and minor changes to the 1992 Edition, lists errors of publishing or omission by the writer that have been found in the original edition. The scanned copy of the original 1992 edition included in this CD is not a corrected version. It is left to the reader to decide whether to make pen-and-ink changes to their copies or merely copy and insert this table into the front of their books.

Sites added, updated, re-identified, plus page index in this Addendum

Table A-2 (page A-11) lists sites added, updated, or re-identified in this Addendum. As the table title suggests, it lists everything new or changed since the original version.

There is no index for the Addendum; Table A-2 lists page numbers (“Page” column) for sites included in this Addendum.

Table A-1. Errors, corrections, and minor changes to the 1992 edition

Page ii, bottom, photo credit for front cover is Matthew Kierstead

Page vii, column 1, bottom line, correct “Art Phenning” to “Art Pfenning”
 -----, column 2, line 12, after “Robert Neville,” add “Grace E. Overly,”
 -----, line 25, after “Allen Hitchcock” add “Mrs. Ellen (Richard) Holland”
 -----, line 31, delete “Mrs. Mulholland (Cavendish)”

Page 27, column 1, line 33-34, change “Bennington, East Dorset, and West Haven.” to “Bennington, Troy, and West Haven.”

Page 87, column 1, line 8, change “November 8, 1973” to “November 8, 1793”
 -----, line 9, change “(Wilbur vol. 2 1928:28)” to “(Wilbur vol 2. 1928:53)”
 -----, line 18, change “of Chittenden.” to “of Chittenden County.”

Table A-1. Errors, corrections, and minor changes to the 1992 edition (continued)

Page 105, column 1, line 15, change “(Smith 1886:560)” to “(Smith 1886:500)”

Page 121, column 2, line 9, change “team” to “steam”

Page 123, column 2, line 17, change “five dogs, heavy iron rods, flat irons,” to “firedogs (andirons), flatirons,”

Page 125, figure 4-44 caption, change “1991” to “1990”

Page 134, column 2, line 20, change “destroyed evidence of” to “destroyed surface evidence of”

Page 145, figure 4.67, delete existing erroneous caption and replace with “Titled ‘North Bennington Iron Works’ and identified as an 1865 painting by I. Sackett of the Burden Iron Works (Resch 1975:91), current research has found it to be an 1868 drawing by C. E. Sackett, delineator, showing the Blair Iron & Coal Co. works at Bennington Furnace, Alleghany Township, Blair County, Pennsylvania (courtesy of Bennington Museum, Vt).”

Page 149, column 1, line 34, after “from softwood” add “(Egleston May 1879:377)”

Page 152, column 1, line 2, delete “after English coal miners of the same name.”
[Note: “colliers” predates coal mining]

Page 158, column 1, line 15, after “of other shapes” add “(Egleston May 1879:389)”
_____, column 2, line 31, after “Statistics of some typical conical kilns” add “(Egleston May 1879:396)”

Page 164, column 2, line 38, at end of sentence ending “fueled solely with charcoal.” add: “After 1840, anthracite-fueled blast furnaces became increasingly important and were only surpassed by coke-fueled ones later in the century (Schallenberg 1975:343).”

Page 167, column 1, lines 4-5, delete “(in early times there was often little difference between the two)”
_____, column 2, line 39, change “dating prehistoric” to “dating at prehistoric”

Page 172, column 1, line 30, change “CH-1 Pine Island” to “CH-CK01 Pine Island”

Page 188, column 2, line 6, change “three ruins west” to “three ruins east”

Page 213, column 2, line 1, change “1840:369)” to “1840:364)”

Page 234, column 1, line 44, change “dioxide” to “oxide”

Page 245, column 1, line 11, change “1984:148, 231)” to “1984:148, 221)”

Page 260, figure 8-35 caption, change “(courtesy Edith Hunter)” to “(Hunter 1984:6)”

Page 271, column 2, line 3 of “Breast wheel:” after “the overshot wheel.” add “Also called pitch-back wheel.”

Page 277, column 2, line 1 of “Turbine,” change “by impulse” to “by reaction”
_____, column 2, line 1 of “Windbox” change “(equalize)” to “(equalizer, also called accumulator box)”

Page 278, column 2, change entry “Boltum, R.” to “Bottum, Roswell”

Page 280, column 2, at entry for “Hunter, Edith F.” change “vol. 55, no. 8.” to “vol. 55, no. 8, Special Supplement.”

Table A-2. Sites added, updated, re-identified, plus page index

Notes: (a) page numbers below refer to Rolando:1992

(b) not all sites listed below are described in text

Site Number	Page	Site Name/Type*	Town	Site Status
<u>Addison County</u>				
VT-AD-299	A-14	East Middlebury Forge	Middlebury	new data (pp. 90-92)
VT-AD-318	A-49	Huntley Lime Kilns	Leicester	old photos
VT-AD-409	A-48	Bristol Lime Kiln	Bristol	old photo
VT-AD-741	A-47	Hamilton Hill LK	Bridport	new data
VT-AD-743	A-47	Daigneau Hill LK	Orwell	new data
VT-AD-847	A-47	Boyce LK	Middlebury	new data, (p. 249)
VT-AD-1138	A-16	Forestdale IW Disposal	Goshen	new entry
VT-AD-1348	A-16	Barker Forge**	Bristol	new data (p. 106)
VT-AD-1355	A-47	Marsh Farm LK	Hancock	new entry (pp. 174, 245)
VT-AD-1356	A-49	Long Point LK	Ferrisburg	new entry
VT-AD-1481	A-68	Vermont Glass Factory	Salisbury	new entry
-do-	A-68	Lake Dunmore Glass Co.	Salisbury	new entry
VT-AD-1491	A-70	Vermont Glass Factory	Middlebury	new entry
FS-101(AD)	A-16	Rathbone Blast Furnace	Vergennes	new entry
FS-102(AD)	A-17	Belding/Drake Furnace	Weybridge	was AD-IW04 (p. 100)
FS-105(AD)	**	Chaffee LK	Granville	was AD-LK03 (p. 245)
FS-106(AD)	**	Peake LK	Shoreham	was AD-LK04 (p. 247)
FS-107(AD)	**	Gibbs LK	New Haven	was AD-LK05 (p. 244)
AD-GW01	A-70	Otter Creek Glass Co.	Vergennes	new entry
<u>Bennington County</u>				
--	A-19	“Brief History of Burden & Sons in Southwestern Vermont”.		
VT-BE-10	A-17	Furnace Grove IA Dist.**	Bennington	new data (p. 134)
VT-BE-36	A-27	Burden Blast Furnace	Shaftsbury	new data (p. 143)
VT-BE-41	A-36	Mad Tom Upper CK	Peru	new data (p. 188)
VT-BE-47	A-36	West Fork CK	Glastenbury	new data (p. 195)
VT-BE-222	A-21	Burden Iron Mine Dist**.	Bennington	new entry
VT-BE-427	A-37	Miles CK**	Arlington	new data (p. 193)
VT-BE-441	A-26	Burden Iron Ore Mill	Bennington	new entry
VT-BE-442	A-30	Burden Limestone Quarry	Pownal	new entry
FS-10(BE)	**	Dorset Village Furnace	Dorset	was BE-IW04 (p. 139)
FS-11(BE)	A-30	North Village Furnace**	Manchester	new data; (p. 142)
FS-12(BE)	**	Woodford Furnace	Woodford	was BE-IW02 (p. 138)
FS-13(BE)	**	Whipple LK	Pownal	was BE-LK01 (p. 265)
FS-14(BE)	**	Dorset Mountain Rd LK	Dorset	was BE-LK02 (p. 262)
FS-15(BE)	**	Purdy Hill LK	Manchester	was BE-LK03 (p. 264)
FS-16(BE)	**	Hopper Brook LK	Manchester	was BE-LK04 (p. 264)
FS-17(BE)	**	Equinox Mountain LK	Manchester	was BE-LK05 (p. 264)
FS-20(BE)	**	Lawrence LK	Sunderland	was BE-LK08 (p. 264)
BE-IW08	A-30	Towsley Iron Mine	Pownal	new entry
BE-GW01	A-70	Manchester Glass Factory	Manchester	new entry

Table A-2. Sites added, updated, re-identified, plus page index (continued)

<u>Site Number</u>	<u>Page</u>	<u>Site Name/Type*</u>	<u>Town</u>	<u>Site Status</u>
<u>Caledonia County</u>				
VT-CA-99	A-38	I. N. Hall CK	Groton	new data (p. 172)
FS-9(CA)	**	Marl Pond LK	Sutton	was CA-LK01 (p. 230)
<u>Chittenden County</u>				
VT-CH-282	A-49	Weston Works LK	So. Burlington	new data (pp. 240-242)
VT-CH-284	A-49	Champlain Valley LK	Colchester	new data (pp. 240-242)
VT-CH-617	A-38	CCCH Project CK	Colchester	new entry
VT-CH-1023	A-71	Champlain Glass Co.	Burlington	new entry
CH-LK02	A-50	Law Island LK	Colchester	new entry
<u>Franklin County</u>				
FS-26(FR)	**	Fairfield Blast Furnace	Fairfield	was FR-IW02 (p. 82)
FS-27(FR)	**	Ferris LK	Swanton	was FR-LK01 (p. 235)
FR-LK02	A-50	Smith Lime Works	Georgia?	new entry
FR-LK03	A-51	Stilphen LK	St. Albans	new entry
<u>Grand Isle</u>				
VT-GI-67	A-51	Eagle Camp LK	South Hero	new entry
<u>Lamoille County</u>				
FS-26(LA)	**	Benjamin Thomas LK	Waterville	was LA-LK01 (p. 238)
FS-27(LA)	**	Tillotson LK	Waterville	was LA-LK02 (p. 239)
FS-28(LA)	**	Bradford LK	Johnson	was LA-LK04 (p. 239)
FS-29(LA)	**	Butler LK	Johnson	was LA-LK05 (p. 239)
FS-30(LA)	A-51	Balch LK	Johnson	new entry
<u>Orange County</u>				
FS-26(OR)	A-51	Eastman LK	Newbury	new entry
<u>Rutland County</u>				
VT-RU-41	A-31	Green Mountain. Iron Co.	Brandon	new data (p. 123)
VT-RU-57	A-35	Granger Blast Furnace	Pittsford	new data (p. 114-119)
VT-RU-78	A-39	Griffith/Old Job CK	Mount Tabor	new data (pp. 178-185)
VT-RU-291	A-52	Coons Den LK	Fair Haven	new entry
VT-RU-292	A-53	Day LK	Ira	new entry
VT-RU-293	A-35	Ruggles/Gray Foundry	Poultney	new entry
VT-RU-294	A-54	McConnell LK	Rutland	new entry
VT-RU-295	**	Conant Blast Furnace	Brandon	was VT-RU-217 (p. 120)
FS-53(RU)	**	Wallingford Furnace	Wallingford	was RU-IW03 (p. 107)
FS-54(RU)	**	VerMarCo LK	West Rutland	was RU-LK01 (p. 249)
FS-55(RU)	A-55	Fuller LK	Mount Holly	new data (p. 252)
FS-58(RU)	A-55	Jackson LK	West Rutland?	new entry
FS-59(RU)	A-55	Reynolds LK	Proctor	new entry

Table A-2. Sites added, updated, re-identified, plus page index (continued)

<u>Site Number</u>	<u>Page</u>	<u>Site Name/Type*</u>	<u>Town</u>	<u>Site Status</u>
<u>Rutland County (cont'd)</u>				
RU-GW01	A-72	Pittsford Glass Co.	Pittsford	new entry
<u>Washington County</u>				
VT-WA-167	A-45	So. Woodbury CK	Woodbury	new entry
WA-LK01	A-56	Foster LK	Calais	new entry
<u>Windham County</u>				
--	A-56	"Brief History of Vermont Lime and Sherman Carbide Companies"		
VT-WD-142	A-60	Rev. N. D. Sherman res.	Whitingham	new entry
VT-WD-143	A-60	N. A. Sherman residence	Whitingham	new entry.
VT-WD-144	A-60	Sherman Carbide District	Whitingham	new entry
VT-WD-148	A-62	Sherman silver/lead mine	Whitingham	new entry
VT-WD-149	A-62	Dist. #14 Schoolhouse	Whitingham	new entry
VT-WD-150	A-62	L. Shumway residence	Whitingham	new entry
VT-WD-151	A-62	Lead & Silver Mine, LK	Whitingham	new entry
VT-WD-152	A-63	Saw mill and dam	Whitingham	new entry
VT-WD-253	A-64	Goodell Farm LK**	Westminster	new data (p. 267)
VT-WD-270	A-64	Cooper-Ellis LK	Westminster	new entry
VT-WD-271	A-65	Pinnacle Assn. LK	Westminster	new entry
FS-16(WD)	**	Merrifield Road LK	Whitingham	was WD-LK01 (p. 269)
WD-GW01	A-72	Vernon Glass Co.	Vernon	new entry
<u>Windsor County</u>				
VT-WN-231	A-66	Black River Twins LK	Plymouth	new entry
VT-WN-232	A-66	CCC Road LK	Plymouth	new entry
VT-WN-233	A-67	Roadcut LK	Plymouth	new entry
VT-WN-234	A-67	Hillside LK	Plymouth	new entry
VT-WN-235	A-67	Peter Squire LK	Weathersfield	new entry
VT-WN-236	A-67	Abraham Smith LK	Weathersfield	new entry
FS-24(WN)	**	East Bethel LK	Bethel	was WN-LK02 (p. 252)
FS-25(WN)	**	South Woodstock LK	Woodstock	was WN-LK03 (p. 259)
FS-26(WN)	**	Shattuck Farm LK	Weston	was WN-LK04 (p. 252)
FS-27(WN)	**	Hutchins LK	Andover	was WN-LK05 (p. 258)
FS-28(WN)	**	North Andover LK	Andover	was WN-LK06 (p. 258)
FS-29(WN)	**	Adams LK	Ludlow	was WN-LK07 (p. 258)
FS-30(WN)	**	Knapp Road LK	Cavendish	was WN-LK08 (p. 259)

*Type legend: CK = Charcoal Kiln; GW = Glass Works; IW = Iron Works; LK = Lime Kiln

**Change to Site Name or Identification Number (included for accountability)

SECTION A - IRONWORKS

The study of ironworks continues. Some new sites were found and recorded: the Munson, Dean, and Gaige Forge, by Ted Lylis of Bristol; the North Village blast furnace site at Manchester Center, by the UVM CAP team (Kathleen Kenny and Charles Knight) located due to proposed highway construction work; and recording the Ruggles/Gray Foundry site at Poultney due to construction of a senior housing project on the site. Significant preservation and long over-due stabilization work was done at the Green Mountain Iron Company's blast furnace stack at Forest Dale in 1995 by the Division for Historic Preservation, owners of the historic property. Contract archeology in anticipation of bridge replacement at East Middlebury sparked archeology study in the affected parts of the 19th-C East Middlebury Forge complex by the Louis Berger Group of NJ (Christopher L. Borstel, Susan D. Grzybowski, Brad M. DuPlantis, and Tracy Neuman). New data is presented regarding the ca 1824 Rathbone Blast Furnace at Vergennes and the Belding/Drake Blast Furnace at Weybridge. The ca 1822-1850 Bennington Ironworks at Furnace Grove has been placed on the National Register of Historic Places; and a major thrust has been made into studying the impact of the Troy, NY - based Burden Ironworks presence in southwestern Vermont.

Addison County

East Middlebury Iron Works, VT-AD-299, Middlebury: The site of the East Middlebury Iron Works (ca 1831-1890) was initially recorded in 1985 (see Rolando 1992:90-92) and has changed little in appearance since.

Starting in the early 1990s, studies were made to evaluate the archeological resources in the vicinity of the Route 125 bridge over the Middlebury River at this site, with the eventual object of replacing the bridge, realigning the highway to reduce the sharp curves at each end of the bridge, and the construction of a temporary bridge during construction. The project was identified as Middlebury RS 0174(8) - Bridge No. 13 and it triggered a series of studies in 1993, 1999, and 2001. The results of these initial studies determined that the ironworks site (and other archeologically sensitive sites and features) would be impacted by the overall project and that a more detailed investigation of the ironworks site was

warranted. The Louis Berger Group, Inc., of East Orange, NJ, was contracted to do the Phase I and II investigations, which took place between April 22 and May 2, 2003. Only that area of the site directly impacted by the proposed construction was studied/excavated. What follows (and much of the previous) is abridged from the Louis Berger report (see Louis Berger 2005).

Field investigations involved excavating fifteen 50-by-50-centimeter (20-by-20-inch) and six 1-by-1-meter (3.3-by-3.3-foot) test pits, for a total excavated area of 105 square feet. Of this total, 94 square feet, or about 90% of the excavations, were devoted to investigating the ironworks site (the balance investigating potential prehistoric archeological resources elsewhere on the site). Subsurface investigations at the site covered about 0.4% of its 24,200 square-foot area. In addition to subsurface investigations, the Berger field team also conducted surface reconnaissance, mapping, and photographic documentation of the site and its surroundings. A few results of the field investigations are as follows:

The ironworks site measures a maximum of about 137 by 268 feet. The site is defined by the stone foundation remnants of a coal house and a forge building, a tailrace, stone piles that were possible hearth foundations, and slag piles. Artifacts occurring at the site included scatters and concentrations of slag and ore, nails and spikes from the ironworks buildings, and possible ferrous metal elements of the bloomery hearths.

The coal house measures about 28 by 48 feet and is located in the northwestern portion of the site. Both the northern and eastern foundations were visible on the surface while the portion of the southern foundation was identified during excavation. These foundations are the footprint of the "Coal Ho[use]" shown on the Beers 1871 map of East Middlebury. When the ironworks was operating, this building, located just beside the road, would have stored charcoal and ore.

The forge building measures about 65 by 130 feet and is located in the central portion of the site. Features identified within the approximate limits of the forge building during the investigations included the entire northern and a small section of the eastern foundations for the forge building, stone piles that were possible hearth locations, the waterwheel pit, hammer and anvil foundations, and tail race. The forge building was the place where the raw iron ore was heated in hearths and the impurities removed to produce wrought iron (see Rolando 1992:17-23 for description of the process). The

northern foundation measures 57½ feet long and varies from 4 inches high (western side) to nearly 5 feet high (eastern side). Both the eastern and northern foundations are of dry-laid stone blocks with some portions of the forge building foundation possibly having served as retaining walls for the historic and modern roads.

Two piles of stone and slag that are possible locations of the hearths are visible on the surface near the approximated limits of the forge building. The ironworks originally had two hearths and by 1866 a third hearth had been added, but its location could not be determined. It is believed, however, that the third hearth was placed close to the previous two hearths and the two stone piles might contain the foundations for all three hearths. The two piles measure 23 by 18 feet and 21½ by 36 feet and are both about 3 feet high. They consist of small to medium stone boulders with small amounts of slag, brick, and nails.

The waterwheel pit is located in the southwestern part of the forge building. The pit would have received the water discharge from the waterwheel buckets as the wheel turned. The pit is built of dry-laid river cobbles and opens at its western end into the tailrace. Although the current depth of the wheel pit is about 3 feet, it might have been deeper when the ironworks was in operation (probably due to accumulation of soil during floods and leaf and debris accumulation). The wheel pit is large enough for only one wheel although some historical documents refer to as many as three wheels.

Hammer and anvil foundations supported the water-powered triphammer and its associated anvil. These foundations are represented by two adjacent dry-laid cobble platforms located to the south of the wheel pit. The hammer foundation is the westernmost of the two foundations and measures 14 by 13 feet; the anvil foundation is to the east of the hammer foundation and measures 13½ by 13½ feet.

The tail race returned water discharge from the waterwheel pit back to the Middlebury River. It begins at the western end of the waterwheel pit and measures about 131 feet long, 5½ to 11 feet wide, and about 3 to 6½ feet deep. The southern wall of the first 59 feet of the race, starting at the waterwheel pit, is reinforced by a dry-laid stone wall; the remainder of the race is earthen wall.

A small foundation measuring about 12 by 8½ feet is located immediately northwest of the wheel pit and constructed of dry-laid stone boulders. Its top is about 20

inches below the top of the wheel pit foundation while its bottom is 12 inches above the bottom of the tail race. The function of this foundation could not be determined.

The presence of two slag piles (piles #1 and #2) on the works grounds provided grist for estimating the tonnage of iron produced at the site, the ratio of manufactured iron to slag, and whether all the slag produced as a result of all that iron manufacture was either still at the site, washed away by flood, intentionally hauled away, or is still somewhere on-site but not evident (e. g., under Route 125 alongside the site). The largest of these, pile #1, is an area of about 130 feet long by 27 feet wide and from 5 to 6 feet deep that trails downstream from the forge building between the tailrace and the river. It appears to be a slag dumping area that was created during the ironworks period of operations. The slag here is most evident along the river shore where it is eroding out of the embankment into the river. The second, slag pile #2, is located near the eastern edge of the site; a rounded mound measuring about 21½ by 42½ feet and about 3 feet high (due to its proximity to the two stone piles, slag pile #2 was initially thought to be the site of the “missing” third bloomery hearth). Based on their estimated volumes and assumed density, slag piles 1 and 2 contain about 1,130 and 80 short tons of slag, respectively.

The report also included a list of over 200 recovered artifacts, recorded and cataloged, ranging from bits of slag, charcoal, nails of many types, glass, iron ore, bricks, cans, and many pieces of unidentifiable metal and hardware.

The study indicates that the site is eligible for the National Register of Historic Places under the criterion that “have yielded, or may be likely to yield, information in...history” since the site contains a variety of structural remains, including building foundations, water power features, probable furnace foundations, and slag dumps. In addition, of all known bloomery sites in Vermont, the East Middlebury Iron Works is by far the best preserved (conclusion of both Berger and this writer). Based on Berger’s end-of-field communication of May 16, 2003, VTrans made substantial efforts to revise the design of the proposed bridge project to minimize its effects on the ironworks site. Under the design of July 2004, the project will avoid adverse effects to the coal house foundation by repositioning a drain, the temporary construction of a fence along the northern perimeter of the site will prevent inadvertent disturbances to the site during

construction, and the sensitivity of the site will be indicated on project plans.

Thank you to the following Louis Berger Group staff: Christopher Borstel, Senior Archeologist at the site, for allowing me to input to the field investigation process; and also to Susan Grzybowski, Office Business Manager and Assistant Director of Cultural Affairs; Brad DuPlantis, Archeologist I/GIS Technician/CADD Analyst; and Tracy Neumann, Architectural and Research Historian, for helping research, interpret, and preserve the site.

Forestdale Ironworks Disposal Site, VT-AD-1138, Goshen: During the course of repairing the blast furnace ruin at Forest Dale (VT-RU-41, page A-31) in July-September 1995, many truck loads of materials were taken from the site and dumped on private property (with the property owner's permission, who was seeking fill) in the town of Goshen, about 3 miles northeast. The material consisted of slag, stones, whole and partial pieces of red brick and fire brick, and granular residue of decayed brick and mortar. Truck capacity is not known, but measured capacity was about 360 cubic feet (6-foot wide by 15-foot long by 4-foot deep); an estimated five or six truckloads of materials (20 to 25 yards) were taken from the furnace site and dumped at the Goshen property.

Two full days were spent during October 1995 "excavating" the piles of debris, and many bricks and metal parts that came from the furnace were recorded. These artifacts were not otherwise known to have been a physical part of the furnace. Although many firebricks had previously been recorded at the furnace site, one new discovery - "Bayside Firebrick Boston" - was identified, adding new information regarding where parts of the furnace came from.

Returning for more excavating and recording on the third day, the pile was discovered to have been pushed into the nearby gully and leveled, ending any further recording. One has to wonder what future archeologists will be thinking when they uncover vast remains of a mid-19th-century blast furnace in far-off Goshen?

Exact site location and property owner is intentionally not identified, but is recorded on the Vermont Archeology Inventory.

Barker Forge, VT-AD-1348, Bristol: This site, formerly identified as AD-IW12 (Rolando 1992:106, Munson,

Dean and Gaige Forge), was finally located by Bristol resident Ted Lylis in 1999. It had been described as having been the seventh and final forge in Bristol. A dam and flume conveyed waterpower to the forge, located about 500 feet east of the New Haven River (Munsill 1979:112). The site kept its location a secret until Ted located it, about a 1,650 feet north of the intersection of Carlstrom and Lower Notch Roads.

Ted's research found that the forge was ultimately owned by Samuel Barker, of Barker Charcoal Kiln fame (see Rolando 1992:173, Barker Brook Charcoal Kiln, AD-467).

The area is in brutal shape, having been used as a dump for [who] knows how long. There is a distinct channel from Rounds Road to the field, bounded on the east and the west by rock and earth embankments until you enter the field when the eastern edge of the area is a rather steep bank. The western bank, running south, takes an abrupt turn to the east where the embankment becomes less pronounced but still obvious, especially from the road, and appears to be a breached dam. At just the point where the embankment turns east and forms the dam, I found a huge pile of slag. Other than that, I couldn't find any evidence of the forge. A lot of the land has been filled and I wonder if the forge materials were used as fill.

What appears to be the inlet channel runs right into Rounds Road and disappears, so I wonder if Rounds Road occupies the site of the channel where it intercepted the New Haven River. There is no sign of this channel on the other side of Lower Notch Road nor is there any evidence of a sluice under the road, which would have been necessary as the road was laid out in the mid-1700s. The outlet of the millpond, and this millpond must have been huge, is still in evidence and does go under the road.

The outlet seemed to have a branch feeding into it from a line a little west of the dam. The origin of this feeder is obliterated by fill which forms a private driveway, but the slag pile is roughly where these two channels join. (Lylis to Rolando, May 10, 1999)

Ted speculates that when the New Haven River was high enough, the channel was used as a source of water; when the river was low, water was stored in the millpond.

Rathbone Blast Furnace, FS-101(AD), Vergennes:

The existence of this site was only peripherally mentioned in the original edition (see Rolando 1992:97, top of 2nd column). New information resulted in deciding that there is a good probability of the site once having existed, although nothing remains there today to even hint of it.

In 1824, Vergennes business man Amos Barnum leased property on the northeast side of the falls to Alfred Rathbone, who built a blast furnace on it that same year (Rathbone's father, Wait, had built blast furnaces in Clarendon, VT-RU-97, and Tinmouth, VT-RU-77, some years before). Stoves and hollowware were cast by Alfred Rathbone, who also advertised tea kettles, spiders, andirons, and plow irons for sale (*Vermont Aurora* July 15, 1824; *National Standard* July 28, 1824). Soon after, Rathbone leased his furnace to Hector H. Crane (Smith 1886:677), but he ran afoul of the law about 1826 when he found himself "financially over-extended." His creditors had him jailed (he escaped briefly) and he lost his furnace in the ensuing court action. The site of Rathbone's furnace is approximated from the following passage, attributed to about 1826:

At the east end of the bridge and below it was another cloth-dressing establishment, owner and operated by Reuben Wheded, who was an active and enterprising business man. Below his shop was a saw-mill and then a gunsmith's shop, and lower down a blast furnace where A. T. Rathbone cast stoves and hollow ware (Smith 1886:680-81).

"The east end of the bridge and below it" is the area between the Otter Creek and MacDonough Drive. This is a steep downhill area that has experienced much industrial development since Rathbone's furnace occupied the site. The 1853 Wall and Forrest Map of Vergennes shows three unidentified buildings here. A sketch of the falls in the 1857 Walling map of Addison County shows the largest factory at the east end, where the 1871 Beers map shows a mill owned by Hayes, Fallardo, and Parker, which manufactured doors, blinds, moldings, sashes, and lumber. In 1880, Bartley, Fisher & Co. manufactured furniture in this mill (Smith 1886:695). A photo that predates 1882 (see Rolando 1992:98, figure 4-20) shows a considerable expansion of the buildings compared to that in the 1857 sketch. A post card of the falls "at the turn of the century" doesn't show

the factory.

The area was inspected in the 1980s and no blast furnace artifacts were found. Although the buildings that once stood here have long since gone, the area is littered with industrial reminders of their existence in the form of iron shafts, gears, large bolts and nuts, and various unidentified hardware, along with domestic trash that has also been dumped on the site. Remains of the former wharf is still visible.

The furnace site was probably not at the steep section of ground where the factory buildings stood, but rather farther downstream, for two reasons. First, because furnace operations required at least an acre of relatively flat land on which to construct the furnace and blast machinery, and still have room to cast in front of the furnace. Second, because the above quotation describes the furnace as being the fourth structure down from the bridge. Figuring about 100 feet per structure and abutting land, this places the furnace site either: (1) at or very near the flats at the bottom of the falls, which are today covered by sand from the many flood cycles that this area has experienced, or (2) under the nearby roadway, today's MacDonough Drive. Maps and old photos show a wharf here, which was most likely built with fill and by altering the land and burying whatever furnace remains had existed.

Belding/Drake Blast Furnace, FS-102(AD), Wey-

bridge: Formerly identified as AD-IW04 (Rolando 1992:100), this site is believed to be on the west side of the Otter Creek at the falls, which today is under the dam. On the east side of the dam is a hydroelectric power station owned by the Vermont Marble Company (Ver-MarCo) division of OMYA. Due to the large amount of water required to run modern turbines, the falls run full only in spring. No remnants of an ironworks (slag, etc.) have been found on either side of the falls/dam area and no attempt has been made to inspect the west shore. Since no development can be seen (via binoculars) on the west shore, on-site inspection might yet reveal ironworks evidence.

Bennington County**Furnace Grove Industrial Archeology District, VT-**

BE-10, Bennington; Formerly named the "Bennington Iron Company," this new name was assigned by the State Archeologist to correctly reflect the overall industrial

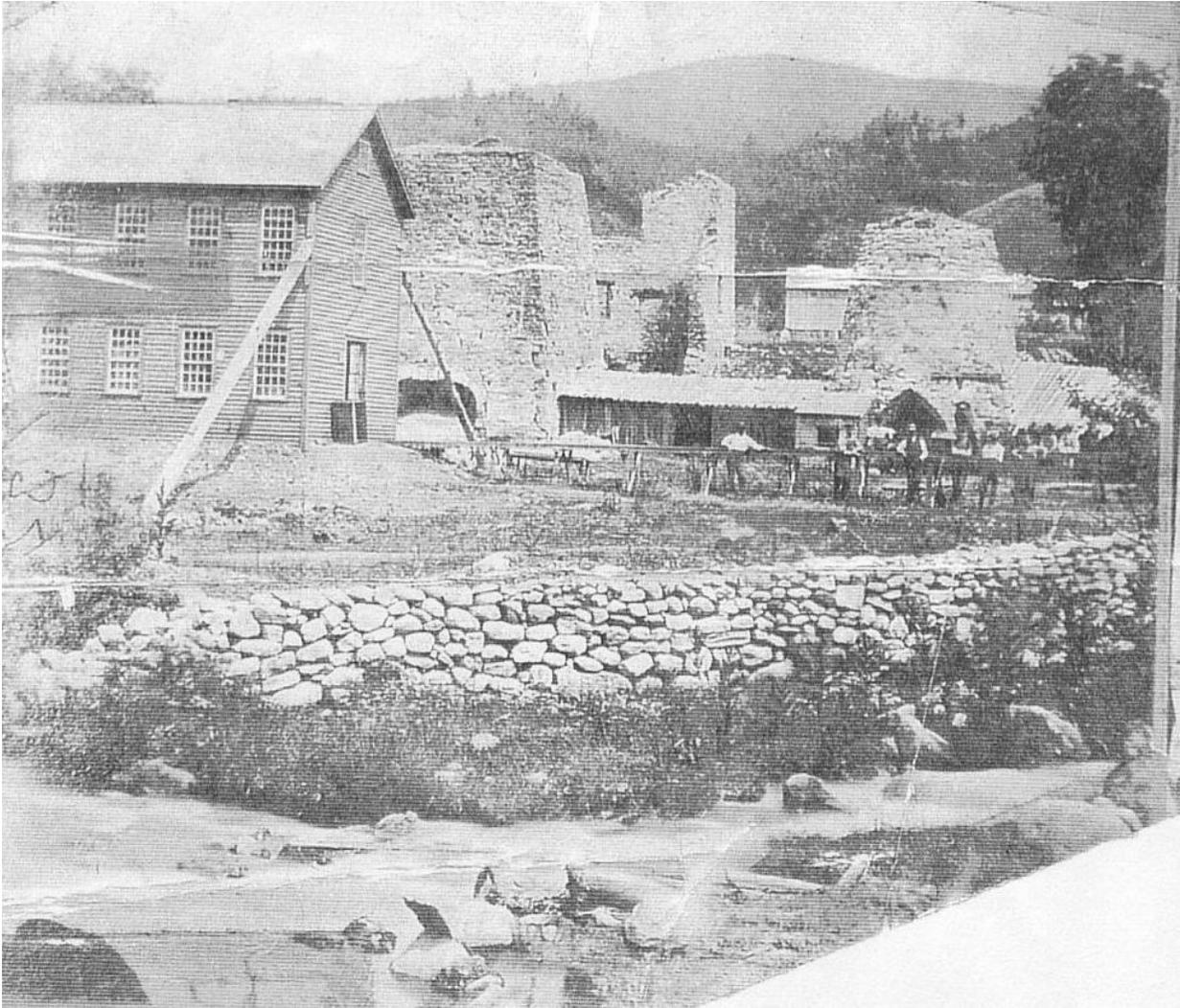


Figure A-2. An undated photo (early 1870s?) of the Bennington Iron Works after abandonment, but before construction of the Bennington and Glastenbury Railroad in 1872, unless that's a section of new railroad track on stilts running across the middle of the photo? The 1822 west stack is at left partially behind a wood building, and the ca1824 "pup" furnace stands to the right of center. Later photos showing the trolley running through the site show "the pup" completely collapsed (see Rolando 1992:136). Courtesy of Duncan Campbell, Furnace Grove.

nature of the historic district without applying individual site identification numbers to each specific site within the district. The following previously assigned site identification numbers (and names) are therefore deleted: VT-BE-11 (West Stack); FS-8(BE) (Sage and Olin Furnace; and FS-9(BE) ("the Pup") and are all combined under one site identification number, VT-BE-10, which was formerly identified as "East Stack." This new designation now includes sites of charcoal kilns, a bloomery

forge, nearby suspected iron ore pits, historic-period structures, and the formerly identified blast furnace stacks at the site. The charcoal kilns are shown in Rolando 1992:135, figure 4-52, to the left of center in the distant background as low, round structures (one with a column-supported roof); the bloomery forge is to the left (west) of the kilns and show three chimneys on the roof, indicating three bloomery hearths inside. Surface evidence of the kilns and forge have not been found.



Figure A-3. *The 1822 west stack of the Bennington Iron Works at Furnace Grove the morning of January 16, 2007, a few hours after collapse of the northeast corner.* Margaret Campbell photo.



Figure A-4. *A set of flat-iron binders in-situ exposed by the January 15 collapse of the northeast corner, showing the binders were used vertically, and not horizontally as previously thought.* Rolando photo, April 21, 2007.

On June 27, 1997, the site of the ca1822-1853 Bennington Iron Company complex took its place in the roll call of national history. That was the day that the Furnace Grove Historic District was accepted into the National Register of Historic Places. Mainly the result of Margaret Campbell's dedication to the goals of Historic Preservation and tremendous efforts while a student at the University of Vermont (UVM) Graduate Program in Historic Preservation Program, the 38-page report documents 24 contributing structures, including the two partially standing blast furnace ruins, objects, and sites (and only one non-contributing building). In addition to the detailed descriptions of each of the individual contributing resources, the Statement of Significance is a detailed inventory of the overall Furnace Grove site, reflecting in-depth research into the "before, during, and after" of the ironworks period of the grounds. A job well-done and a bonus to the community. The Campbell and Leach families, current owners of the property, are congratulated for their care of the property and preservation of the historical and archeological integrity of this great industrial district and their support for its elevation to the national Register.

About 10 PM, January 15, 2007, a major section of the west stack slid off to a roar that was heard inside the house behind it (Campbell to Rolando, Jan. 16, 2007). The last major collapse occurred in the early 1900s, also

at night, which woke the occupants of the same house to fears of an earthquake (Rolando 1992:135). That event affected the south face; this time the northeast corner was affected (figure A-3).

While inspecting what remained on April 21, 2007, a binder was seen among breakdown in the northeast corner of the stack (figure A-4). Finding this in-situ confirmed an earlier guess as to the use of a piece of hardware found in another part of the breakdown many years ago (see Rolando 1992:26, figure 2-13).

The archway in the east wall is now completely buried; the west archway is threatened by its keystone having shifted downward since last inspected a few years ago. What remains of the west and north walls is precarious.

A Brief History of Burden & Sons Industrial Activities in Southwestern Vermont

For over 75 years (ca.1863 to 1940), the Burden Iron Company, under its various names and corporate configurations, of Troy, NY, owned, leased, prospected, mined, or developed hundreds of acres of land in the towns of Bennington, Shaftsbury, and Pownal; possibly Glastenbury and Woodford in Vermont and in Hoosick, immediately across the state line from Bennington in New York State (figure A-5). Never one to be timid,

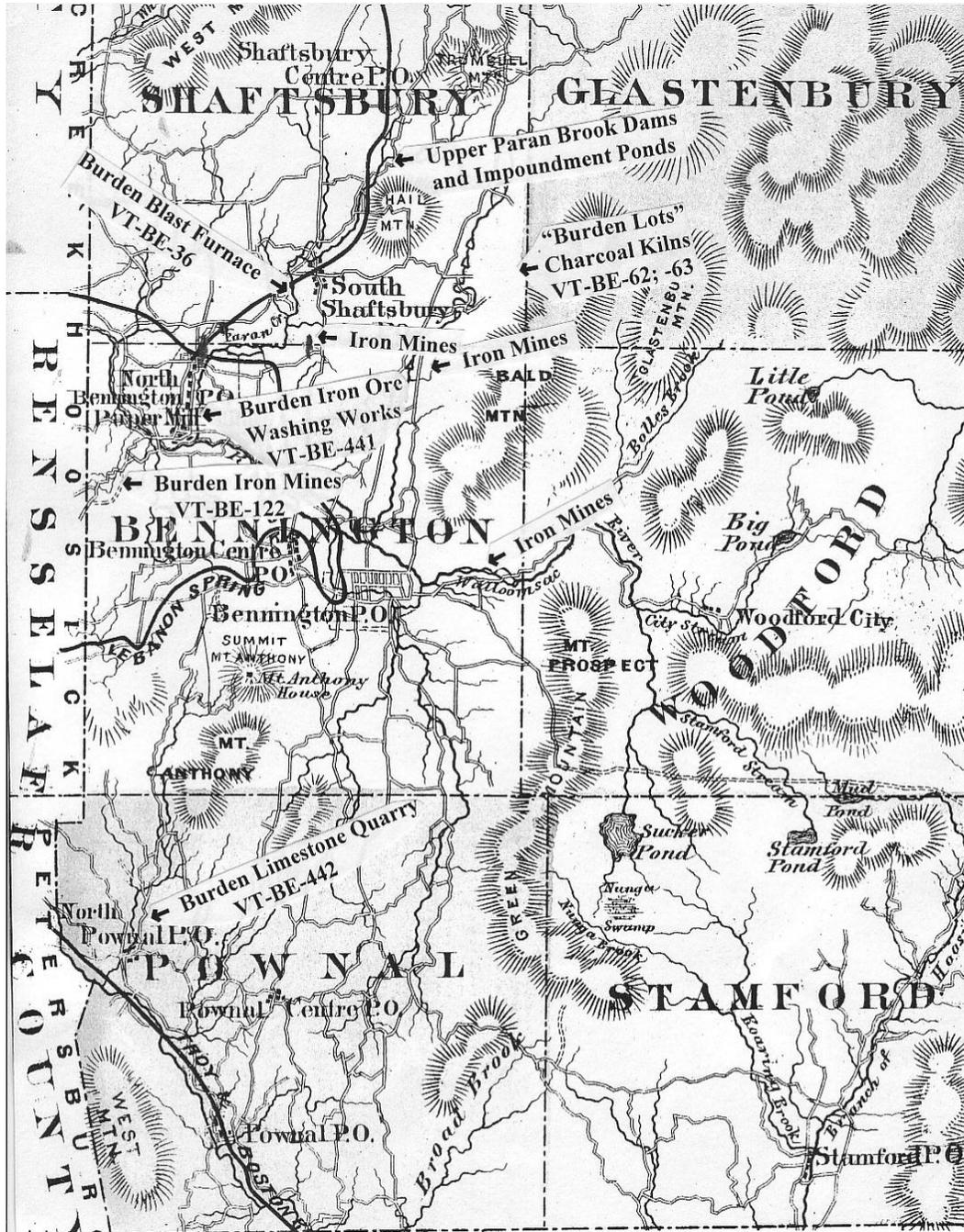


Figure A-5. Burden & Sons operations in southwestern Vermont, ca 1863 to 1940 and indicated on a section of the 1869 Beers map of Bennington County. Although there is no documentary data to support “upper Paran Brook Dams and Impoundment Ponds” were ever built by Burden, given the network of dams and lakes in the Wyantskill Creek that provided power to his iron mills at Troy, NY, during this same period, one has to wonder if he didn’t do the same in Vermont.

Burden's ventures into anything he did was large and nearly overwhelming, such as the many ca 1840s-1860s machines he invented that converted raw iron stock into railroad spikes or horseshoes at a rate that approached one per second. Or designing and building the single greatest waterwheel of the time in 1851 at Troy to power his ironworks along the Wynantskill - fully 60 feet high by 22 feet wide, its variously calculated 500 to 1,200 horsepower made it the most powerful wheel in the world. Burden's company exploited a huge tract of iron-rich land in western Bennington and bordering Hoosick, NY (VT-BE-222, following), hauled the ore (probably by ox-powered wagons) 2½ north and over the newly reinforced Henry covered bridge to his ore-washing plant along Paran Brook at what was then called Hinsdillville (VT-BE-441, page A-26), where the ore was washed, screened, and separated from non-ore material. It was then reloaded into large ore wagons for the 2½-mile haul to his blast furnace at South Shaftsbury (VT-BE-36, page A-27; also Rolando 1992:143-144).

Limestone for fluxing the furnace charge came from nearby quarries or as far away as his quarry in Pownal (VT-BE-442, page A-30). Charcoal for fueling his giant blast furnace stack, the highest-capacity of its type ever operated in Vermont, was either made at his on-site charcoal kilns or carefully drawn down Bald Mountain in eastern Shaftsbury from a half-dozen charcoal kilns that operated some 1,500 feet above the valley floor (see Rolando 1992:192-193, VT-BE-62, -63). The resulting heavy bars of pig iron were shipped via railroad, conveniently close to this ironworks at Shaftsbury, 38 winding railroad miles over two separate railroad company tracks via North Hoosick, Eagle Bridge, and Valley Falls, finally to his hungry furnaces in South Troy, NY. Henry Burden and Sons didn't hesitate when challenged, as his "invasion" of Vermont testifies.

Following the demise of the Burden Iron Company in 1940, the records of the company were given to the Manuscripts and History Section of the New York State Library in Albany, NY. In 2002, these records, totaling 155 packages and 33 boxes of ledgers, payrolls, day books, furnace records, sales records, etc., were transferred to the Rensselaer County Historical Society at Troy, NY, where they are available for research.

About a year after that historic transfer, Flo Beebe, who works in the Shaftsbury Town Office, spent much time the fall of 2003 recording every mention of Burden, the iron company, the furnace, etc, that appeared in town

deeds and records, resulting in a document consisting of 42 pages of longhand-transcribed data and notes and 11 photo-copied pages of deeds, - an invaluable document by an inspired and hard-working person. Thank you, Flo.

The above Shaftsbury data and that at the Rensselaer County Historical Society will provide much useful valuable information regarding Burden's operation in southwestern Vermont (future work).

The site descriptions that follow detail Burden's impact on southwestern Vermont, what remains of his industrial exploits here, and how they all hang together:

Burden & Sons Iron Mining Discontiguous District, VT-BE-222, Bennington (below).

Burden & Sons Iron Ore Washing Mill, VT-BE-441, Bennington (page A-26).

Burden & Sons Blast Furnace, VT-BE-36, Shaftsbury (page A-27).

Burden & Sons Lime Stone quarry, VT-BE-442, Pownal (page A-30).

Burden's Charcoal Kilns, VT-BE-62, and -63 Shaftsbury and Glastenbury (Rolando 1992:192-193)

Burden & Sons Iron Mining Discontiguous District, VT-BE-222, Bennington: This was initially identified FS-4(BE), Burden Iron Company, in September 1979 by Dr. Peter A Thomas and UVM CAP archeology crew as part of initial overall surveys of the area in anticipation of construction of the "Bennington Bypass" - today's I-279 (Thomas et al. 1979:205-07; see also Rolando 1992:69). More recently in the early 1990s, with more intense design of the highway path through the 19th-century "mine field," archeology work identified proposed impacted sites as VT-BE-222, and -223. On June 25, 2007, the State Archeologist agreed that the whole overall Burden iron mining area and all the former site identification numbers should be combined under one site number, VT-BE-222, and one name, the Burden Iron Mining Discontiguous District - "Discontiguous" because the overall mining area was bisected in the mid-1990s by the so-called Bennington Bypass, or the Western Leg of what today is I-279, which opened to traffic October 8, 2004.

Most of this general area was owned by the Burden Iron Company (which became Henry Burden & Sons in 1864) from the 1860s to 1940 for mining iron. Various tracts of the former mining property are today owned either privately or by the State of Vermont. Since Burden

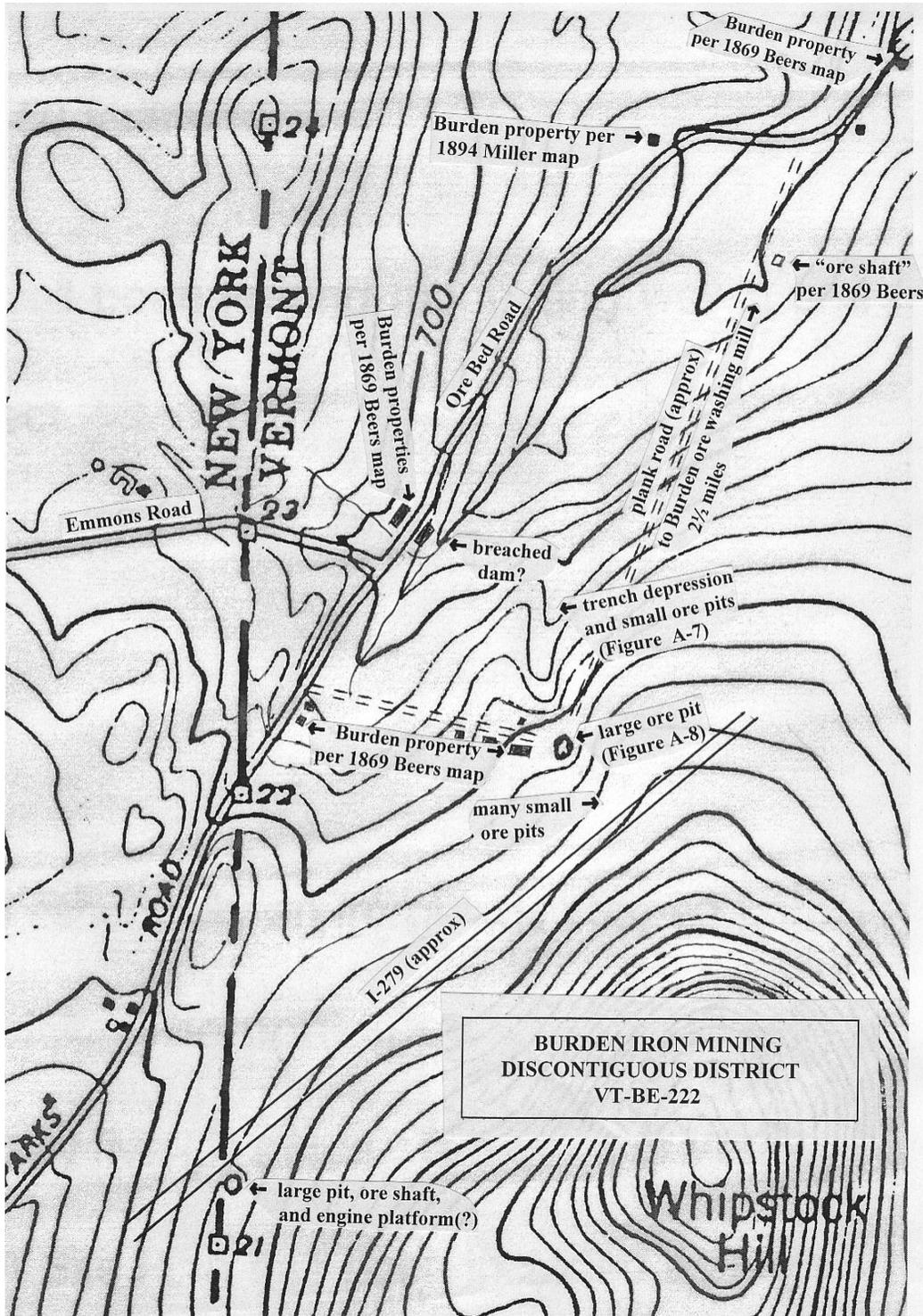


Figure A-6. The overall Burden Iron Mining Discontiguous District, VT-BE-222, four miles due east of downtown Bennington. Some of the major surface features that indicate Burden activities in the District are indicated, based on various archival sources (as indicated) and 2002-03 walkover surveys. Other features and potential subsurface resources are possible. USGS Hoosick Falls, NY-VT, 1943.

owned mining properties on both sides of the Vt-NY State line in this vicinity, on-going field work and study is still being done along the west side of Ore Bed Road and the east side of I-279 in both Vermont and New York State.

Iron mining and/or prospecting is well-documented to have taken place east of Ore Bed Road in Bennington where many visible surface remains exist. Another significant mining area straddles the NY-Vt boundary a few hundred yards south of I-279. Other mines, neither documented nor located, might yet exist in the vicinity.

References to early iron deposits and working the ore in the Ore Bed Road area are contained in deeds that describe “The Ore Bed Farm” in 1807, and two years later, in conveying part of the property, provisions made for exploitation of iron ores and minerals and stating that “*another ore bed* [Rolando italics] had been discovered late in 1803” (Werner 1995:13). These deposits probably provided ore for furnaces operating as early as 1793 in eastern Bennington (Rolando 1992:133-138); the 1835 Hinsdill map of Bennington shows the presence of these deposits. The map also shows an east-west road, historically referred to as the “old road,” just north of Whipstock Hill (“Whip Stalk Hill” per the map) that connected today’s Ore Bed Road on the west with Vail Road on the east. The road detours slightly north around the ore deposit, possibly indicating that by 1835 the deposit was being worked - thus the detour. As the road is otherwise fairly straight, it can be assumed that at an earlier time the road ran more directly between Ore Bed Road and Vail Road. The map also indicates a building on the road, 42 rods (about 700 feet) east of Ore Bed Road, and possibly having some connection with iron mining. Some 21 years later, the road still connected Ore Bed Road to Vail Road and still detoured north around the ore pit; the building at 42 rods is no longer shown.

Confusion exists as to exactly when Burden commenced iron mining and smelting operations in Vermont. One reference states this occurred in 1864 with the purchase of property east of Ore Bed Road (Werner 1995:20). But his blast furnace in South Shaftsbury is reported by another reference as producing 163 tons of iron in 1863, the year before (Neilson 1866:216-130). Was Burden getting his iron ore elsewhere, or he had leased some other local ore-producing property while the furnace was being built? Blast furnaces had been operating in the eastern part of Bennington from the 1790s to 1853 (VT-BE-10, -64) and

might have been drawing some of their ore from the Whipstock Hill area, but are known to have also drawn ore from deposits adjacent to the furnaces (Rolando 1992:133-138).

By 1869, Burden’s ironworks were firmly entrenched in Vermont, with extensive mining north of Whipstock Hill adjacent Ore Bed Road, an ore washing and processing facility just north along Paran Brook in Hinsdallville (various spellings), and what was then the largest-capacity blast furnace in Vermont along Paran Brook in South Shaftsbury (Beers 1869:20, 22; Rolando 1992:143-145). He was getting charcoal to fuel the blast furnace from kilns operating on property he owned in Shaftsbury (Rolando 1992:192-193), and was possibly obtaining limestone, used as flux for the furnace, from his quarry in North Pownal (Beers 1869:28).

Iron ore was hauled by wagon, probably oxen-powered, about 2½ miles north to his ore-washing mill at Paper Mill Village, either up Ore Bed Road or short-cut across to the road along a plank road directly from the mines. At the Walloomsac River, the 1840 Henry Covered Bridge was reinforced to carry this extra weight by tripling the lattices, a technique also used by railroads at the time. It added to the strength of the bridge but also added to its dead weight. The bridge became known locally as “Ore Bed Bridge” and served well until it was replaced in 1989 (Barna 1996:35-36).

The 1869 map of Bennington shows a number of buildings associated with the Burden operations. By the time Beers map was published in 1869, the company name had changed (1864) from Burden Iron Company to H. Burden & Sons, reflecting a partnership between the elder Henry Burden and his sons William F., James A., and Isaiah T. Burden. Thus, “H. Burden & Sons” in indicated in places on the Beers map along the east-west “old road” as well as along Ore Bed Road - 8 buildings altogether. Only a blacksmith shop (“B.S.S.”) is identified as to function of the buildings. The map also shows that the old road ends at a major ore pit and is marked “81” rods, or about 1,336 feet east of Ore Bed Road. Reason for this is probably due to exploitation and enlargement of the ore pit, which physically encroached into the old road and made it no longer useful as an east-west connection between Ore Bed Road and Vail Road.

The 1869 map also shows a new road circling the major ore pit and extending northward to intersect with Ore Bed Road about a mile to the north. It has been referred to as “a plank highway” (Walbridge 1937:7), or



Figure A-7. This trench, 600 feet long, 300 feet wide, and 25 feet deep, was excavated by Burden probably to intercept a rich ore bed 100 yards away (figure A-8, below) that had become too deep to work. Thomas et al., 1979:205; Werner 1995:41, photo 26.



Figure A-8. An ominous pool of dank, dark water fills this historic iron ore pit, 1,800 feet east of Ore Bed Road. About 100 feet in diameter, of unknown depth with steep, slippery sides, it had been mined since the early 1800s. It probably became too difficult to work, thus Burden's "trench" (figure A-7, above) to intercept this ore pit from the north. Werner 1995:32, photo 16.

“a plank road” (Werner 1995:46). As this road ran north through a sometimes wetland, it was probably reinforced with planks to give extra support under heavy wagon loads of ore carried northward to the ore washing mill. Midway between the major ore pit and the juncture with Ore Bed road is an “Ore Shaft,” which might have been the early stage of what was expanded and became the large open-cast excavation north of the major ore pit. The new plank road probably expedited hauling iron ore to Burden’s ore processing facility in Hinsdillville, about 2½ miles north of the ore pit (see VT-BE-441, page A-26), rather than hauling it back out to Ore Bed Road, thence northward (Burden was very conservative when it came to spending). Other yet-undocumented ore pit and shafts might yet exist, such as one near the north end of the plank road on private property.

After Henry Burden died in 1871, the company came under direct ownership of his two sons, James A. and I. Townsend. The end of the Civil War reduced the demand for iron which, in turn, sharpened competition in the iron trade. The company began utilizing a higher quality iron ore from the Adirondacks of New York and leased their blast furnace at Shaftsbury to George Swett, a Troy, NY stove maker. But within a few years, during the national economic slump of the 1870s, the furnace ceased operations altogether. Swett ended his connection with the blast furnace in 1877. H. Burden & Sons, which had continued buying ore lots and opening new shafts near Ore Bed Road at least as recently as 1873, reversed course and sold its ore washing facility in 1879, thus signaling the start of the demise of iron mining activity in the area. A few years later, 1881, the company made a major realignment and became the Burden Iron Company with James A. Burden, President; I. Townsend Burden, Vice President; and J. I. Arts, General Manager (Allen 1973:96-97). The 1894 Miller map of Bennington shows some buildings still owned by the Burden Iron Company (“B. I. C.”), but neither iron mines nor deposits are any longer identified.

Although history points to a major decline in Burden’s interest in southwestern Vermont after the early 1880s, an out-of-state “heavy company” was reported to have purchased 50 acres of iron mining lands in northeastern Pownal in 1899 (Towsley Farm Iron Mine, page A-30).

With the end of mining at Ore Bed Road in the 1870s, some of the adjacent land was employed for agricultural production although most of the mining properties were

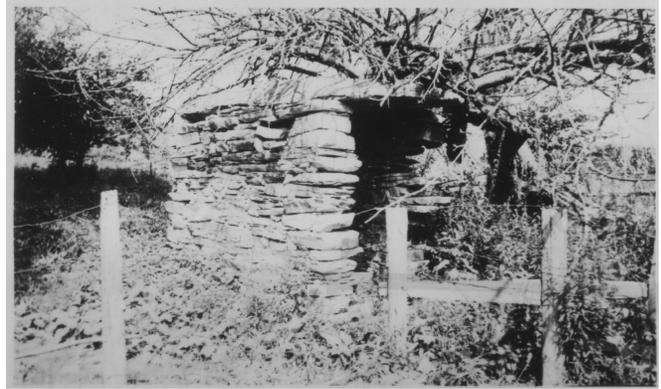


Figure A-9. *Is this Burden’s dynamite bunker or just someone’s old, quaint garden toolshed? Now only a scatter of debris, this small stone building once stood on the west side of Ore Bed Road opposite Burden’s mining area. Courtesy of the late John Dostal, who led me here in 2003 and knew where ‘all the good stuff’ was.*

rendered inappropriate for cultivation. The last of the Burden land holdings in Bennington, some 450 acres, were liquidated in 1940, and were sold to Mr. and Mrs. Ferdinand L. Mayer in 1942, who in turn acquired in more land around Whipstock Hill until they had amassed over 800 acres. This in turn was sold in 1988 to a New Jersey realty company (Werner 1995:260).

The mining area east of Ore Bed Road was initially explored by this writer on May 21, 1992, for the purpose of determining if any iron smelting was done at the mining site; no evidence was found (see VT-BE-36, page A-27). In the process, however, a number of circular pits, remains of foundations, and a section of the old, abandoned east-west road were inspected (Werner 1995:11; Rolando May 12, 1992).

Interest returned in the Burden mining area east of Ore bed Road resumed in 2003 when the property owner, William E. Dailey, Inc., requested a walkover surface survey for the purposes of identifying archeologically sensitive area in anticipation of logging (Rolando 2003). Due to the dense overgrowth, however, ground-level visibility was almost impossible in most areas, necessitating some brush clearing. For about 1,000 feet, the old cross-road was bounded on both sides by low rows of large disarticulated stones. No remains of any buildings indicated along the road in the Beers 1869 map were found, although they might still exist hidden in the

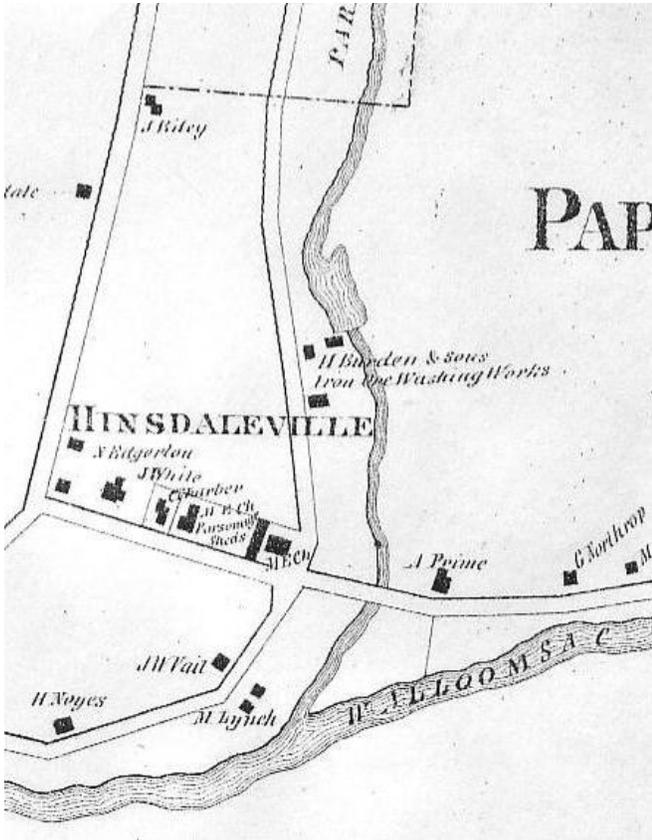


Figure A-10. Burden & Son's Iron Ore Washing Mill, along Paran Brook in Hinsdallville. The site is now occupied by buildings of the Bennington County Industrial Corp. (Beers Bennington 1869:25)

heavy brush or destroyed by later reforestation. Two foundation holes were found along the east side of Ore Bed Road immediately south of the abandoned "old road" in a stand of reforested evergreens.

About 1,000 feet east of Ore Bed Road, some hints of building foundations (not reported by Werner) are found along the north side of the old road, which appears to end in a grassy opening. Two possible cellar holes indicated in figure 75 of Thomas et. al, 1975, the south side of the old road could not be found. About 100 feet beyond, a cluster of what appear to be shallow ore pits, varying from 8 to 12 feet deep were encountered, and a few minutes walk beyond was the bypass (I-279) construction zone. As the foliage was so dense, the sound of bypass construction was used for orientation. What appeared to be possible roads or paths leading off in various directions were followed for short distances. One, prob-

ably just east of the major circular ore pit, was followed to near the southern edge of the trench excavation, whose northern opening could be seen through the dense foliage. A major section of the Dailey/Pinkham property between Ore Bed Road and I-279 was logged sometime in 2005 with unknown consequences to archeologically sensitive resources in that area. Requests to Dailey/Pinkham dating back to 2006 for permission to reinspect the logged area have gone unanswered.

Not part of the 2003 William E. Dailey, Inc., survey, but explored the year before with some Vermont Agency of Transportation (VAOT) folk, is a major mining excavation about one-half mile due south at NY-Vt State line marker monument #21 (Werner 1994:Plan 3 drawing). The north-south state line actually runs diagonally across this excavation, which is about 100 feet long (north-south) by 25-35 feet wide and 15-20 feet deep; the state line monument is located near the southwest corner of the excavation. Near the northwest corner, but maybe a dozen feet inside NY State (Hoosick, NY) is an approximately 12-foot square caved-in vertical mine shaft. A dozen feet north of the shaft opening is about a 30-foot-wide by 60-foot-long concrete and brick platform. One-inch diameter vertical iron rods protrude a few inches high every few feet apart along the sides of this low platform, which could have been the base for a steam engine that powered a cable windlass that operated a shaft elevator. Many baseball-size pieces of iron ore are scattered about the general excavation area with a slight concentration near the southwest corner of the excavation. About 300 yards to the west in Hoosick NY is the huge Dailey/Pinkham Company limestone quarry, and about 200 feet northwest is I-279, the western leg of the Bennington Bypass, running diagonally NE-SW. At this writing, the Vermont part of this mine, including the whole large tract of land on which it resides on the southwest slope of Whipstock Hill, is being transferred from VAOT to the Vermont Agency of Natural Resources (ANR). A comprehensive walkover inspection of this whole, interesting "discontiguous" mining area, in New York and Vermont, has not been done by this writer (future work).

Burden & Sons Iron Ore Washing Mill, VT-BE-441, Bennington: The Beers 1869 map of North Bennington identifies "H. Burden & Sons Iron Ore Washing Works" at buildings immediately downstream of a dammed pond in Paran Creek (at what was erroneously identified as

“Hinsdaleville”) and is today within the corporate limits of the village of North Bennington (Beers *Bennington* 1869:25). The three parcels that comprise this property were acquired by the company in 1865, along with “rights to dam Paran Creek and create a mill pond” (Werner 1995:20). This was excellent location for the ore-washing plant, midway between his iron mines (VT-BE-222) 2½ miles to the south and his blast furnace (VT-BE-36) 2½ miles to the northeast at South Shaftsbury, and situated at a reliable source of waterpower.

Washing meant more than running water through the ore and separating it from clay and dirt. It also involved grinding and possibly magnetically separating the iron-rich ore from non-iron particles, thus reducing wasteful transportation and more efficient smelting.

With the end of the Civil War and loss of his biggest customer for horseshoes, Burden leased the furnace at Shaftsbury and ore washing mill to Troy stove manufacturer, George Swett, who operated both until the Business Panic of 1873 (Levin 1978:50). Neither operated again after that date, although Swett continued ownership of the works until 1877. On August 23, 1879, the ore washing works were purchased by the H. C. White Company, manufacturer of stereoscopes. In 1887, fire destroyed all the buildings (Walbridge 1937:56-57). Whether H. C. White used any of the former Burden buildings before the 1887 fire, or built anew, is not known.

Previous to Burden building his ore washing mill, the site might have been used for a cotton mill. Burden might have built a new dam, since the cotton mill was abandoned in 1837 and its remains were washed away in an 1852 flood (Walbridge 1937:56). But when the H. C. White Company rebuilt after the 1887 fire, nothing is mentioned of the fate of Burden’s dam. An undated dam (ca. 1900 per the town’s 1996 Historic Site & Structures Survey Report) now sits close to where Burden’s dam stood. But a slight ripple across the width of the stream can sometimes be seen about 25 feet downstream of the present dam during periods of low water flow, hinting at the possible base to a previous dam (Burden’s?). The overall site of Burden’s ore washing buildings is today occupied by Bennington County Industrial Corporation buildings.

Burden & Sons Blast Furnace, VT-BE-36, Shaftsbury: It was thought that a great “find” had been made back in 1991 when Figure 8-16 in *The Shires of*

Bennington, a painting titled “North Bennington Iron Works” and “done in 1865 by an I. Sackett” (Resch 1975:91) was discovered “in fact” to be of the Burden Furnace at South Shaftsbury. And so sure of that, it was published as such in the original edition (Rolando 1992:145, figure 4-67). Because of the North Bennington title, it had always been assumed to depict a blast furnace at Burden’s mining area off Ore Bed Road in western Bennington along the Vermont-New York State line and not far from North Bennington village. But when a field check was done on May 21, 1992 for evidence of ironworks, nothing was found to indicate a blast furnace ever operated here - no evidence of the railroad, no slag or charcoal, no massive ironworks foundations. It was also discovered that the painting had been used in the initial 1979 archeology study of the area for the Bennington Bypass (Thomas et al., 1979: 205). So what was this a painting of - what are we looking at?

It was an intriguing painting because it looked familiar, like it had been seen elsewhere. But it wasn’t until it was compared to the Beers 1869 map of South Shaftsbury that the layout of the ironworks in both the painting and map appeared to match perfectly, even to the houses and railroad uphill in the far background although the topography at the furnace site was flat. It was assumed that the uphill background depicted in the painting was an artist’s convention to show distant features closer than they actually were. And that’s how the “discovery” was explained to the “applause” of fellow archeologists and Bennington Museum staff.

Fast-forward to 2005, while organizing a paper to be presented to the Bennington Historical Society at the Bennington Museum, - the Sackett painting came back like a bad dream as old ground was revisited and the great 1992 “discovery” started to unravel. Specific details not seen (or ignored?) in the painting didn’t match the site, such as the placement of the engine house. And all the steam-emitting chimneys on the engine house in the Sackett painting meant that the engine house was obviously steam-driven, so why does the Beers map indicate a “Bellows House” - a giveaway for a water-powered device, alongside a canal that ran parallel to Paran Creek. And upon closer inspection, the number of houses in the background didn’t match those that ever existed along that background road (today’s Route 67) at South Shaftsbury. Then more discrepancies appeared; and so it was decided it was time to visit the Bennington Museum and look at the original painting itself.

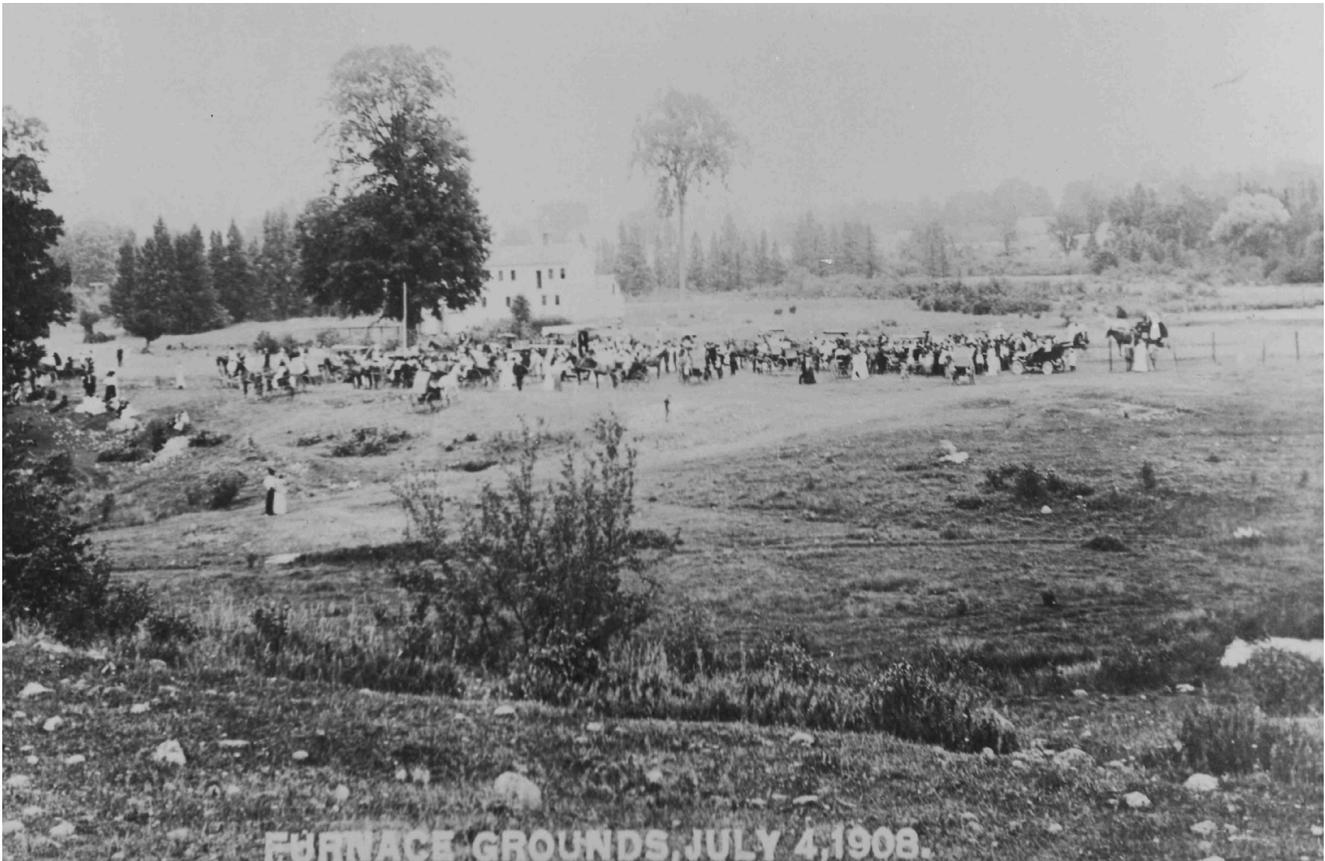


Figure A-11. Northwestern view of the furnace grounds at South Shaftsbury, from near the end of Holliday Dive. When the works were dismantled is unknown. It occurred sometime between when this photo was taken in 1908, and the 31 years since 1877 when George Swett, who had leased it from Burden right after the end of the Civil War, closed it. After Henry Burden passed away in 1871, his son, James Burden, who succeeded him and had overseen the ironworks at Shaftsbury, probably stripped the abandoned works of everything salvageable for reuse or scrap and leveled the grounds. Courtesy of Bob Williams and Shaftsbury Historical Society.

The first surprise was that it wasn't a painting at all, but a large-format, 23-inch-wide by 17-inch-high black-and-white drawing. And it wasn't titled "North Bennington Iron Works," but inscribed on a rock (invisible in *The Shires'* photo) was "Bennington Furnace, C. E. Sackett, del., Sept 1868." It had nothing at all to do with a "North Bennington. Iron Works" nor "I. Sackett" nor "1865." And surely, the drawing looked nothing like the ca 1822-1853 Bennington Iron Works complex (VT-BE-10) out along the Woodford Road. And by now it was starting to look like it wasn't the Burden Furnace at South Shaftsbury either. So what exactly was this a drawing of?

How many places are named "Bennington" in the United States? In addition to the obvious one here in

Vermont, there are places named Bennington in next-door New York and New Hampshire, - are there others? With nothing more high-tech than a *Rand McNally* road atlas (2005), communities named "Bennington" were found in 15 states other than Vermont (Bennington, Idaho, is 5 miles *north* of Montpelier, Idaho). What is the possibility that one of them might have had a blast furnace at one time? Which one? The most obvious place to start was Bennington, Pennsylvania, - the state that is home to so many blast furnaces, past and present.

The Village of Bennington Furnace is on an 1873 map of the Alleghany Township in Blair County, in western Pennsylvania, about 7 miles west of Altoona, the county seat (Nichols 1873:11). Next, the topography of the area

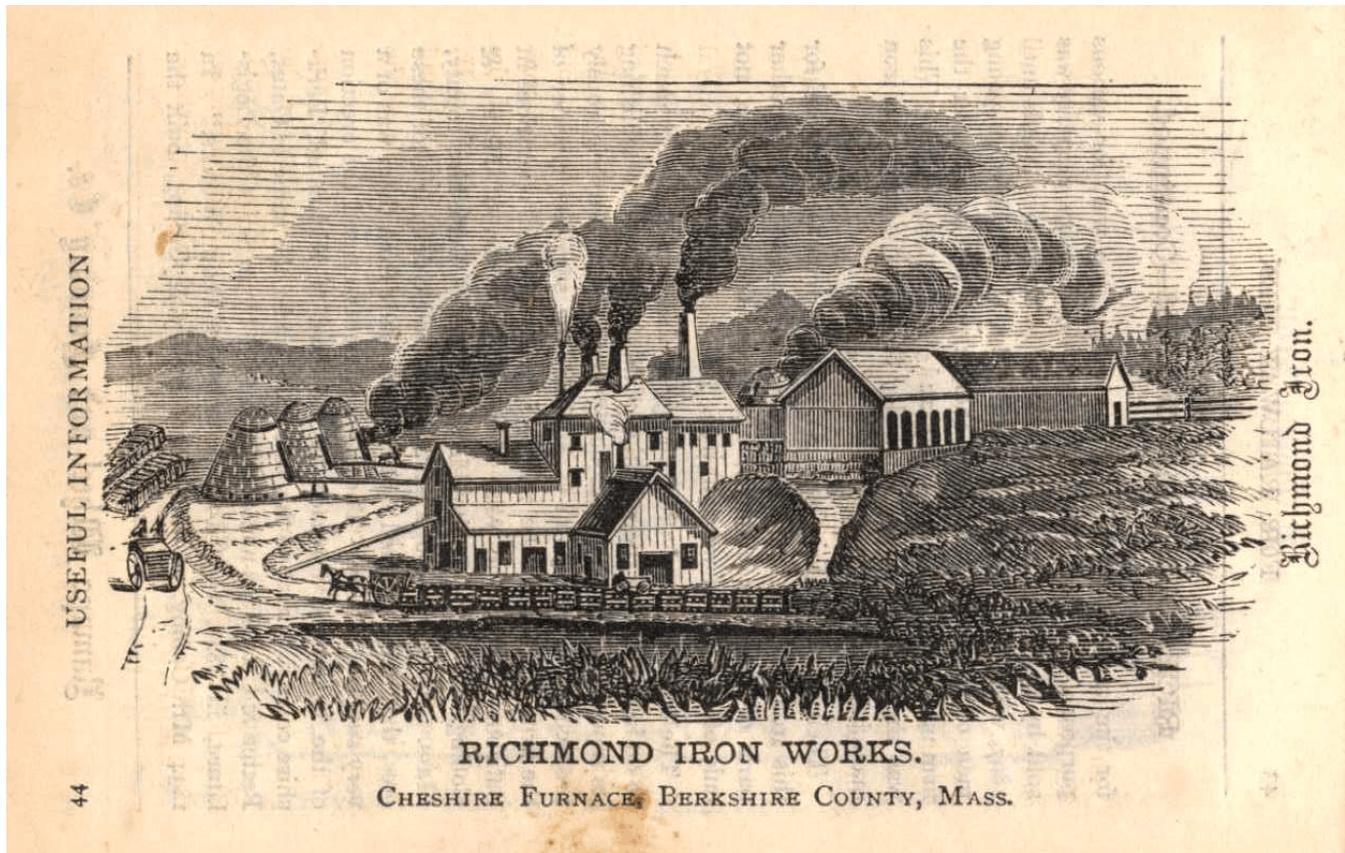


Figure A-12. *There is no known image of Burden's blast furnace at Shaftsbury, but this undated, ca1860s woodcut of the Richmond Iron Works (1848-1911) at Cheshire, Mass., is similar in many respects to how Burden's might have appeared. Imagine standing just downhill from the end of Holliday drive at the edge of Paran Brook (as in figure A-11 previous page) in the 1860s-1870s and this is what you might have seen: the blast furnace in the tall, center building with the pair of side-by-side chimneys (exhaust from the furnace), three charcoal kilns at far left, a stone dam holding the furnace pond off to the right, and smoke - lots of black smoke, from the furnace and charcoal kilns. The only change to the scene: reverse the locations of the casting shed with the roof-top monitor (at center, foreground) and the engine house (at left of center with the short chimney). Rolando collection; unknown source.*

of Bennington Furnace (today's Tunnelhill) found on an on-line USGS quadrangle (*USGS Cresson, Pa. 1977*) matched that shown in the Sackett drawing. An email to the Blair County Historical Society at Altoona with a copy of the Sackett drawing attached drew an immediate response that they knew of a blast furnace in nearby Alleghany Township but had never seen the Sackett drawing - it was all news to them. Included in their response was a photo of Bennington Furnace taken contemporary with the Sackett drawing from a different perspective but showing enough to identify it as the same site as that drawn by Sackett. They also wrote that

Charles Sackett was a school director in Alleghany in 1864 (Van Scoyoc to Rolando, 2006).

Back at the Bennington Museum, it was learned that the Sackett drawing was purchased "with museum funds, probably circa 1946." (Raspuzzi to Rolando, January 11, 2006). Speculation is that somebody saw it for sale someplace in the northeast, contacted the Bennington Museum due to the drawing title, and the museum purchased it since the town has a long history of ironworks. Hopefully, the drawing will someday be deaccessioned and shipped off to its rightful home at Blair County, Pennsylvania.

The former Burden Ironworks property at Shaftsbury has gone through a succession of owners, mainly Eagle Square, the Stanley Works, Goldstone Development of Greenwich, Ct., and most recently a mannequin factory (Bernstein Displays) whose co-owners live locally and in Long Island, NY. The latter were contacted a few years ago regarding possibility of allowing some minor exploratory archeology for the furnace foundation - still waiting for an answer. Other sections of the former furnace grounds are also owned by local residents.

Burden & Sons Lime Stone Quarry, VT-BE-442, Pownal: Although this site sounds more like it should be listed in the “lime kiln” category, it is included here because of its association with the Burden ironworks operations in Shaftsbury.

The quarry is about 100 yards uphill and southeast of the North Pownal Lime Co. Lime Kiln site (see Rolando 1992:265, BE-LK01) and identified on the 1869 Beers map of Pownal as “Lime Stone Quarry, Burden & Sons.” Having built a blast furnace at Shaftsbury in 1863, Burden could have been searching for a source of high-quality limestone for flux for his new furnace, however there is no reference in any local history that he actually exploited the quarry. The quarry is within ¼-mile of a railroad, simplifying getting the stone to his furnace at Shaftsbury (and his other furnaces at Troy, NY?). Whipple undoubtedly also drew from the quarry for his nearby kiln. The quarry eventually expanded to a major excavation, now quite visible behind buildings along the northeast corner of the intersection of Lime Kiln Road and Vermont Route 346 in North Pownal. Whatever work Burden did at the quarry has probably long since been eaten away by later quarrying (but who knows?).

Towsley Farm Iron Mine, BE-IW08, Pownal: On July 1889, the *Bennington Banner* reported that a Troy newspaper had information that an iron mine in Pownal had been purchased by a “heavy company” in New York.

The ore bed at Pownal that was purchased by Russell P. Hoyt of New Jersey is supposed to cover forty to fifty acres and is about three and one-half miles south of Bennington. The ore has been analyzed and is said to be equal to the best car wheel iron in the country. Twenty-two years ago the Burden firm of Troy talked about buying this deposit, but found it would cost heavily to take the ore by team to Bennington. The

new company proposes to build a railroad to Bennington to transport the freight. A large brook has its head on this farm, about fifty rods away, on a high hill. So that a fall of 150 feet could be got to the furnace (Day Papers, reel “O” page 34).

There is no record of any actual mining taken place (Parks 1977:91). This might have been at or near what later became the Strohmaier farm on Middle Road.

North Village Blast Furnace, FS-11(BE), Manchester: This site was BE-IW05 in the original edition (Rolando 1992:142). Much study and speculation continued after the original edition was published about the whereabouts (if at all?) of the location of the ca 1829 blast furnace that operated at Manchester Center, but called the North Village at the time of the furnace. Bits of slag found in the bottom of a drained mill dam at “Malfunction Junction” in 1981 pointed to a furnace at or near the north shore of the brook; however, that was mere wishful guessing. And that’s where things sat regarding the elusive furnace site until the spring of 2006.

On March 16, 2006, an article in the *Bennington Banner* described federal funds being available for a proposed roundabout at the junction. An immediate email was sent to VAOT Archeologist Duncan Wilkie about the elusive blast furnace site somewhere in that vicinity. The response was that the project had been “cleared” back on June 4, 2003, but he would look into it, and he did.

There was no physical proof that the site would be impacted by the proposed roundabout (except all the unexplained slag at the bottom of the mill pond), but then, since the location of the site was unknown, neither was there proof that it *wouldn't* be impacted. The concern was for just a little more work done to better assure that the site wouldn't be destroyed, or find out later that it was too late to do anything further about this.

In the end, a renewed search by UVM CAP personnel pin-pointed exactly where the furnace site is. Deed research disclosed the sequence of property ownerships, its relationship to a nearby marble mill, and finally that the blast furnace’s footprint was “several hundred feet to the east.” Document research found that “the large Furnace/Forge property” was clearly located on the east side of the Clark-Colburn Tannery lot and outside of the project’s “Area of Potential Effects” (Kenny and Knight 2006:2, 5).

And exactly where is that? As it happens, “that” is at a curious embankment immediately behind the Sirloin Saloon and borders on the western edge of the restaurant parking lot. Pieces of old brick, bits of iron, and ‘slaggy-looking’ materials have been seen eroding out of this embankment the past 20 years. Remains of a former mill canal can still be seen here, leading toward the restaurant from the stream. Follow the direction of the former canal southward and it lines up perfectly with a storm sewer grate across the highway in the McDonald’s parking lot, eventually to emerge as a small seasonal brook behind that restaurant. Remnants of Manchester’s glory days of industrial prowess, then known as Factory Point, still exist, hidden in plain sight under the streets and parking lots of Manchester Center.

And what of the slag at the bottom of the mill pond, *upstream* of the furnace site? The present bridge at Malfunction Junction is the third in a succession of bridges here, starting with a wooden bridge that was replaced by an iron bridge in 1884, and in turn replaced by the present marble bridge in 1912, and widened in 1942 (Bigelow and Otis 1961:20-22). Each time the bridge approaches were heightened and widened, part of the materials used could have been earthen material from a nearby abandoned industrial area, maybe from the old, nearby furnace site? Which could explain how slag came from downstream to end up upstream?

Rutland County

Green Mountain Iron Company, VT-RU-41, Brandon: Significant deterioration of the stack reported in the 1992 edition continued sporadically. Although the archways had been reinforced with heavy timbers and a roof built on top, brickwork was falling inside the stack, as evidenced by more bricks seen accumulating inside all the archways. But things were about to change for the better.

The long-awaited stabilization of the blast furnace ruin at the Forestdale Ironworks State Historic Site in Brandon, Vermont, was accomplished during the summer of 1995. The work was done by a crew of stone masons from Middletown, Conn. (Joseph Mazzotta & Sons), under contract by the State of Vermont. The 10-acre furnace property is owned by the Vermont Division for Historic Preservation. Three to five masons worked 10-hour shifts at the site from Mondays through Thursday; the site was visited Tuesdays, Thursdays, and

Saturdays, as time permitted, to monitor progress, take photos, and identify, record and/or collect various artifacts as they appeared (see Rolando 1992:123-128 for pre-1992 background history of this site).

Stabilization work commenced mid-July 1995, with particular attention paid to rebuilding the severely damaged north wall and its collapsed casting arch. The first order of work, therefore, was to carefully move the timber supports in the casting arch, which stood directly on the breakdown, to rest on heavy steel beams set depth- and cross-wise inside the archway, above where the top of the rebuilt archway would eventually be. With the wood supporting beams no longer resting on the breakdown, the archway could be cleared out. By August 3, the floor area of the casting arch was finally cleared. The other three archways, meanwhile, were cleared of breakdown, rebuilt or pointed as needed, and their temporary support timbers removed.

It was exciting to see inside the casting arch, which had been buried under tons of stone for over 40 years. We now have some idea of what the fore-hearth looked like. There are pairs of rusted iron rods sticking up from the floor that miraculously survived the crush of heavy stones (one is slightly bent over). One pair of 1-square-inch-thick rods looks like they might have supported a heavy cross-piece, maybe to control the hearth tap? Other similar-size rods of unknown function also stick up from the floor near the side archway walls. A long, channel-shaped iron casting, about 4- by 4-inches wide and deep, possibly a trough for molten iron or slag, lays in the floor running outward from the hearth. Future archeology work should answer many questions we’ve had about the furnace. To protect the integrity of features found on and in the floor from damage, a double carpeting of fiber fabric was laid down on August 8. This was covered with a layer of loose debris, allowing work to progress on the upper portions of the archway without adversely affecting the floor below.

Through the large hole in the bosh made in 1990 when the piece fell out, workers were able to access the inside of the stack and repair large cracks in the fire brick lining. Material that had fallen from above since 1990 filled the hearth to the top of the bosh, providing a convenient floor for the workers. But someone noticed something hanging out over the edge inside the top of the stack (the top of the furnace is roofed so it’s dark up there). A climb to the top up a 40-foot ladder revealed one of the two large, heavy cast-iron rings had cracked or



Figure A-13. *The condition of the front of the furnace (casting arch side) on March 16, 1995. Timber supports had been installed in all four archways and a roof atop the stack sometime the fall of 1990. This action slowed, but didn't completely stop the deterioration of the stack, as 'new' stones and bricks were seen accumulating in archways. Rolando photo.*



Figure A-14. *First order of action was erecting this iron scaffold to aid in stabilizing the fragile structure while work progressed on July 26, 1995. Note the vertical timbers now rest on inner iron beams, leaving the breakdown free for removal. Work proceeded with cementing the walls "in place" so nothing shifted as timbers were removed. Rolando photo.*



Figure A-15. *The casting arch cleared of breakdown, work commences on rebuilding the arches in this August 8, 1995 photo. The large hole in the stack lining was first noticed May 16, 1990, which prompted the timber supports. Now cleared, certain hardware becomes visible on the casting floor, such as an iron trough (right of center) for guiding the molten iron from hearth to molds. The fore-hearth wall in the rear shows some serious damage. Rolando photo.*



Figure A-16. *As the front wall neared completion, the opening above the work arch grew smaller, in this September 12, 1995 photo. The next day the job was completed - in pouring rain. Note that the large steel I-beam scaffold was replaced by light-weight units, and the supporting timbers remained inside while stones were mortared around them. All other archways were stabilized and pointed, and the casting arch keystone was firmly in place. Rolando photo.*

separated, and a loose end of this casting plus a huge 4-foot stone were both hanging precariously over the edge, directly over the heads of those who had only moments before been pointing up the lining below. To repair this, a wood scaffold was quickly built up the inside of the stack, resting on the inside breakdown. After the casting was repaired, the scaffold was removed and the bosh debris was shoveled out through the hole. Remarkably, no one was hurt by stones and debris that sporadically fell (or were discarded) from the stack.

Crawling into the stack through the hole in the side of the bosh just before it was patched, but after the interior had been cleaned out and carefully sliding about eight feet down the steep walls, and then standing on the floor of the hearth was a great experience. With the aid of a flashlight, the distance between the inside ends of the east-west blast (tuyere) nozzles was found to be 29½ inches (all three nozzles were still in place). It was hard to believe that this huge stone and brick structure, in the end, resulted in this small, cramped, dark space where four to five tons of molten iron once collected. There was neither time nor permission to dig a few inches farther down to see if the hearth stone was still intact.

Early in the work, a huge dump truck arrived and was filled with 30+ yards of debris and breakdown that had been cleared from the arches. With no close, detailed inspection of the debris, it was whisked away and dumped 1,000 feet up the side of a mountain some 5 miles away in someone's back yard in Goshen, to be used for fill (see Forestdale Ironworks Disposal Site, VT-AD-1138, page A-16).

Many iron castings of unknown use were also found in the breakdown as it was cleared from the archways. Some were pieces of a large iron pipe (sections of the blast pipe?), pieces of something structural (part of the two iron rings around the bosh?), and pieces of what appeared to be waste iron. There were also two iron wedges, possibly used to shim stones in the furnace walls. More bricks of varying dimensions were also found and measured in these small piles, hinting that much data was probably carried away in that 30-yard load.

During one of the final days of work, while the masons were cleaning up the area of debris, two long bent, rusted, approximately 1-inch diameter wrought iron rods were found in the brush a few dozen feet from the stack. The longer measured 20 feet 11 inches, the shorter was 5 feet 11 inches, and both were threaded on each end.

The work boss said they were found inside the stack when it was cleaned out just prior to patching the large hole in the lining. Thinking immediately of the furnace-top ovens and inspecting the photo of the stack taken about 1900, what appeared to be ends of binders that went through the length and width of the oven could be seen. By calculating the width of the oven from the photo (20 feet 3 inches) and then measuring the actual length of the longer rod minus the threaded ends (about 1½ inches each end), the 5-inch difference between the estimate and actual length of the rod was determined close enough to accept this having been one of the oven binders. Assuming the shorter rod also a binder, for the oven's width, and subtracting the 2 inches of thread from each of its ends, we now know that within about an inch each way, the oven was about 5 feet 7 inches wide by 20 feet 11 inches long. And knowing that, using archival photos of the stack showing the ovens, extrapolate the oven height to be near 13 feet 11 inches. Add another 10 feet 4 inches for the chimney and the original furnace was probably very close to 62 feet high, from base of hearth to top of chimney, calculated by adding the following::

10 feet 4 inch chimney height (above).

13 feet 11 inch oven height (above).

33 feet 3 inch widest inside part of bosh to top of the shaft (Starbuck 1989, J. A. R. drawing attachment).

4 feet 8 inch widest inside part of bosh to bottom of hearth (on-site measurement by Rolando, 9-6-1995; photo #96J14).

Amazing what information can come from the alert, chance discovery (and salvage) of a seemingly inconsequential piece of 'scrap' metal.

A number of other objects integral to the operation of the furnace were also recorded. The three cast iron tuyeres each measured 12 inches long and have a 7-inch-diameter opening that reduces to 4 inches at the inside end (times 3 = a lot of air being pumped into the furnace). Two 1-inch diameter holes on the outside face (rear) of each tuyere marks where pairs of pipes were connected to provide circulating cooling water that kept the nozzles from melting from the heat of smelting. Sections of 4-inch diameter iron pipe that supplied the cooling water to the nozzles are visible in walls between the tuyere archways. But the larger pipes that provided the warm-air blast to the tuyeres never appeared; they are most likely still buried in the floors of the tuyere arch-

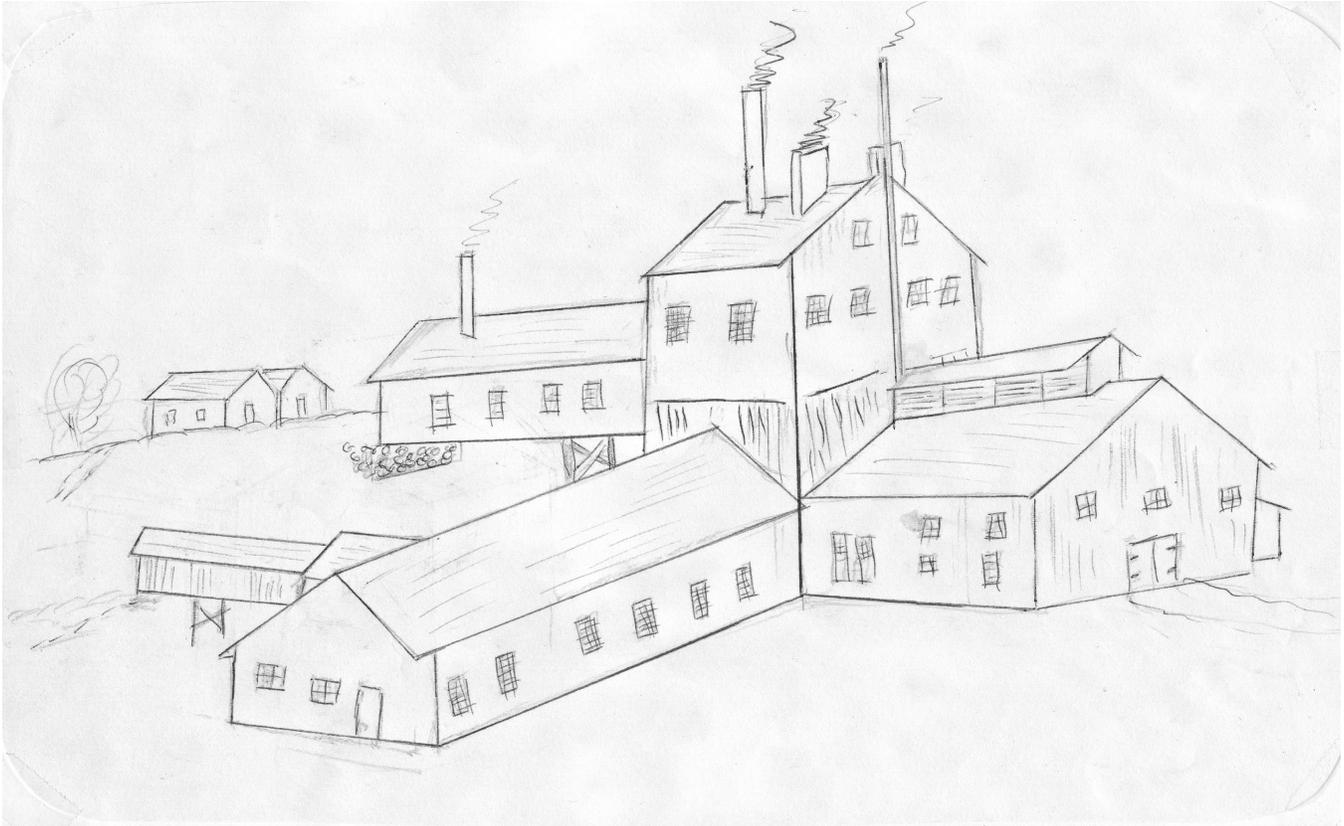


Figure A-17. Conjectured view of how the Green Mountain Iron Company might have appeared when in operation in the 1850s-1860s, based on photographs, drawings, and descriptions of other contemporary ironworks. View is looking southwest. The furnace stack is inside the tall Stack House, the central building with the two chimneys from the regenerative ovens and the main furnace exhaust chimney behind them. Small vertical sections of the furnace walls might or might not have been visible, depending on how well it was insulated by its thick stone walls and rubble fill. The Casting Shed is to the right, with roof-top ventilating monitors. The tall, skinny chimney at the inside end of the shed ventilated the work arch (also known as the casting arch). The waterwheel and blast engines were in the long Bellows House, at left, foreground, with a small bridge behind to convey the head race (water supply) to the waterwheel. The main Charging House is behind the Stack House, to receive charges of iron ore, charcoal, and limestone from Storage Buildings on the upper area. Rolando (very) rough drawing.

ways. Unfortunately, the two heavy cast iron rings that were seen at various points around the bosh wall were not measured. They became exposed only a short time and were unexpectedly covered by new brick the day before I planned to measure them, but good photos of them were taken when it was.

As the work drew to a close, an attempt was made to photograph the final stone being mortared into place above the rebuilt casting arch, but an afternoon rain washed out the event, and I couldn't make it up to Forest Dale the next day, September 15.

Artifacts recovered on-site as well as those from the Goshen disposal site (VT-AD-1138) were identified, documented, and bagged or tagged, and then delivered to the custody of the Division where they are stored on-site in the gated and locked main work arch of the furnace stack for possible future use in a display at the planned interpretive center in Forest Dale.

Altogether, this writer took 99 B&W photos and 290 color slides of the work in progress, of interpretive artifacts found on site and at the Goshen disposal site, and during later analysis of artifacts.

The immediate furnace grounds were landscaped and seeded, hay was scattered about to encourage regrowth, and nature has slowly reclaimed the site (see figure A-1, page A-2). Quiet has returned. The state expects that an interpretation center might eventually be built, but in the meantime, the site is considered “mothballed,” that is, the site is still accessible to those who wish to walk in (gates prevent vehicular access).

It was a popular destination for annual “Vermont Archeology Month” tours until 2003, but with limited parking and so much “wear and tear” on trails that might be compromising the grounds’ archeological integrity, at the request of the Division for Historic Preservation, scheduled organized tours were reduced to once every few years. Regardless, the site is periodically checked, trash is collected, and photos taken to record changes.

Granger Furnace, VT-RU-57, Pittsford: When Simeon Granger rebuilt the former Israel Keith furnace in 1827, there is no indication whether he rebuilt atop the site of Keith’s 1791 furnace or elsewhere, leaving doubt as to exactly where Keith’s furnace stood. After review of archival data and intensive walkover surveys of Furnace Brook, up- and down-stream of the Granger Furnace site (and deed information from the property owner and others), it is concluded that Keith’s furnace was built either directly at, or very near to, Simeon Granger’s existing 1827 stack. For this reason, the FS-52(RU) field site designation for the Keith Furnace is retired, and all historical information relating to Keith now applies to the Granger Site. (The “RU-IW10” designation for Keith Furnace in Rolando 1992:114 was upgraded to FS-52(RU) by the state archeologist per Rolando letter to Peebles, Dec. 9, 1993.)

All this number-changing process might not make sense to some of you, but Giovanna and I agree that identification numbers-tracking is an important process of leaving ‘paper trails’ so future researchers will know, in this case for example, that RU-IW10, FS-52(RU), and VT-RU-57, all relate to the same exact site (the last number being the current (final?) site identification).

Ruggles/Gray Foundry, VT-RU-293, Poultney: Although this site is somewhat out of the mainstream survey of blast furnaces and bloomery forges, it is included here because it was researched as part of development at the site in 1994-1995 (Autumn Leaves Senior Citizen Housing Project). See Rolando 1992:37,

figure 2-36, showing molten iron being cast into molds at the foundry in 1956.

The Ruggles Foundry is shown in the 1869 Beers map of Poultney village, south of Furnace Street in the southeast corner of the village. The office of “M. M. Ruggles” and what were probably other associated buildings are shown on the north side of Furnace Street. A later source describes the operations:

The manufacturing business of greatest antiquity in Poultney is the widely known Ruggles foundry. The land on which the foundry building now stands was purchased by John Stanley from Jeremiah Adams soon after the flood of 1811, which bared the rocks in the river in this place, and developed the water-power here. Suitable buildings being soon erected on this site, Mr. Stanley commenced manufacturing shearing machines, and operate also a carding and cloth-dressing factory here. After a few years he relinquished the manufacturing of shearing-machines to his sons Henry and Myron N. Henry Stanley afterwards succeeded the firm, and in 1828 added the foundry business. In 1829 a fire destroyed everything but the foundry, which thereupon received the entire attention of Mr. Stanley. It became in a short time a stove manufactory of wide reputation. Henry J. Ruggles purchased the property in 1844, and continued the business until the time of his death in May, 1869. From that time to 1878 his sons, Horace M. and Henry, owned and managed the concern. No stoves are made here now, the principal product of the foundry being machinery of all kinds. Slate sawing and planing machines, which were made here soon after 1850, are still a specialty. Mr. Ruggles has recently added steam power to the foundry. He employs from twenty-five to thirty men (Smith and Rann 1886:790-791).

The foundry was reorganized at the turn of the century, becoming the Gray Foundry. A good description of this era of the foundry operations is available in article by Richard S. Allen in which the foundry claimed to be the third oldest in the nation (Allen 1957:2-9).

The USGS Poultney topo (dated 1954) shows the Gray foundry building at the southwestern corner of Furnace Street and Bridge Street (Route 30 south). Exact date the Gray Foundry closed is unknown at this writing but it was still advertising in the 1964 *Vermont Year Book*.

Both the Ruggles Foundry and the later Gray foundry contributed not only to the local economy but were a vital part of the early industrial development of Poultney. Cast iron stoves made at the Ruggles Foundry found markets throughout the nation. Some of the stoves may still be seen at antique store and museums, but also in homes and stores, still doing what they were made for. The heavy industrial products made by the Gray Foundry were central to the exploitation of local slate deposits in the form of state-of-the-art, rugged, stone-extraction and processing machinery.

SECTION B - CHARCOAL KILNS

As was explained to the 13 students at the 2005 and 2007 “Relics and Ruins” program at Mount Tabor, “charcoal was the fuel that made the industrial revolution possible.” And it was also the fuel that resulted in some new discoveries in Vermont. Logging operations resulted in preservation activity at a charcoal site in Peru, and four new charcoal making sites were discovered: at Glastenbury across the brook from an already recorded site, at Arlington on the eastern slopes of Red Mountain; at Groton along the abandoned right-of-way of the Montpelier & Wells River Railroad; and at Woodbury near the base of a cliff.

Bennington County

Mad Tom Upper Charcoal Kilns, VT-BE-41, Peru: Threatened by the prospect of logging activity in the vicinity of this site, a unique piece of industrial hardware was rescued on September 20, 1996 (Rolando 1996:7). Rescuers were U. S. Forest Service Archeologist David Lacy, Bob West, and myself. The site, which contains the collapsed remains of five brick-type 19th-century charcoal kilns, is about 2,200 feet up the side of a mountain and is identified VT-BE-41 on the State Archeological Inventory.

The site was first recorded in 1983 after being led to it by Bob West of nearby Manchester. The rescued hardware is an iron, top-loading kiln cover, which lay flat atop one of the charcoal kilns at the site, closing its top loading hole. The cover is about five feet in diameter, and has four handles and four 2- by 4-inch vent holes. The usual method of draft on kiln covers was to lay bricks flat across the openings. Although a dozen top



Figure A-18. *Forest Service Archeologist David Lacy (l.) and Bob West (r.) carry the fragile kiln cover rescued from VT-RU-41 charcoal kiln site in Peru into the US Forest Service’s Work Station shed at Mount Tabor for safekeeping. Rolando photo.*

loading covers have been found associated with charcoal kiln remains in Vermont, this cover is unique because the vent holes were controlled by little cast iron doors that slid between pairs of recessed mounting plates welded to the cover. Of the four vent holes, only one has its small sliding door still in place (see Rolando 1992:188, figure 6-16, for a closeup of this door and vent).

After Lacy drove as close to the site as possible (the final half-mile was down a long-abandoned, rutted, and overgrown woods road), we carried the heavy, brittle cover to the pickup through the remaining hundred yards of dense undergrowth. The rescued cover is now out of harm’s way at a Forest Service work station shed in nearby Mount Tabor (see figure A-18).

West Fork Charcoal Kilns, VT-BE-47, Glastenbury: When the remains of these five charcoal kilns were found up the West Fork of Bolles Brook the end of a hot and buggy day in June 1982, it was the final discovery of a long day that had resulted in locating and recording two other charcoal kilns sites at VT-BE-37 and -46. So no wonder after finding this new five-kiln site up the West Fork that we decided “that was that” and headed for home as soon as photos had been taken, measurements made, and data recorded. We never thought of checking what might lay directly across the brook from the site.

Sometime between 1992 and 1995, while checking

charcoal kiln remains at VT-BE-47, up the west fork of Bolles Brook, a charcoal kiln top loading door was spotted on the south shore of the brook. The brook being shallow enough at the time, it was easily crossed and the cover inspected. It lay semi-propped up against a low embankment within maybe a dozen feet from the brook. Curious why a kiln cover be on this side of the brook, the area was inspected and the remains of five more charcoal kilns were discovered, making a total of ten kilns for the site, separated by the brook.

The west spur of the Bennington & Glastenbury Railroad ran up this south side, part of the turn-around trackage from “the forks,” about 1,000 feet downstream. It’s unfortunate the south side of the brook wasn’t checked back in 1992, especially considering the railroad’s presence on that side.

The kilns are relatively equally spaced, generally in an east-west line, close to the steep hill behind them, about a dozen feet above the brook, and about opposite the five on the north side of the brook. One of the kiln sites toward the western end display what appears to be burnt brick. If there was an bridge connecting the two sites, evidence of it long since washed away.

Miles Charcoal Kilns, VT-BE-427, Arlington: Purpose for initially inspecting the east slopes of Red Mountain in 1989 was the possibility of finding a lime kiln there, which is identified on an early 20th-century annotated USGS topographical map owned by Nancy Otis of Manchester. The site appeared to be about a half-mile up Fisher Road on the east slope of the mountain.

The vicinity was inspected on July 3, 1989 in company with Bob West. Except for the Otis map, no surface evidence of a lime kiln was ever found, but a circular stone-lined cistern was found a few dozen feet off the south side of the trail. At the bottom of the cistern was a circular, iron, top door of a charcoal kiln, typical of those seen at other charcoal kiln sites in Vermont. The door was jammed so tightly it could not be pulled free for closer inspection. Further exploration of the immediate area disclosed what appeared to be the base of a brick chimney and a possible foundation. A large number of limestone outcrops and some small caves are immediately uphill. No evidence of burned lime was found in the heavy underbrush.

In 2000, Ken Nickerson of Arlington, avid outdoorsman and biology teacher at Arlington High School, accompanied me into the stone-lined cistern and chimney

base area (and, eventually the charcoal kiln site farther uphill) and described the site as a cabin built by a recluse by name of Baumgardt who settled here during or just after the World War I era. Bricks marked “Lemieux,” an early 20th-century Bennington brickyard, were found associated with the chimney base.

Since a significant limestone outcrop was identified and on the basis of the Otis map showing a lime kiln here, the site was written up in 1994, identified as Fisher Road Lime Kiln, and submitted to the VAI files, which identified it as FS-19(BE). Further research continued regarding possible charcoal kilns on Red Mountain, as a result of finding the kiln door in the cistern.

Soon after, an essay written by Fred Brush, of the Arlington (Vt.) Senior High titled “Arlington Industries” (dated both “circa 1935” and “June 1933”) describing charcoal kilns on Red Mountain, was found at the Canfield Library’s Russell Collection:

In Benedict Hollow there were about five kilns; three in the upper clearing and two in the center clearing. John Smith operated some of them for a year and sold to Gene McIntyre who also after a year sold to Frederick Miles. Mr. Miles owned several others, and with Swanton Campbell as foreman, employed over thirty men. These men lived in cabins almost exclusively, with the exception of one or two frame houses. Miles moved to property above Mrs. Fisher’s, where her pine woods are now growing and set up several more kilns. A chute a half mile long was built from the kilns to the mountains in the form of a cog rail, which with a drum at the top conducted two cars alternately to the furnace. Huge loads were carried by these cars probably to the extent of 350 bushels. Several pairs of horses towed the loads not carried by the railway (Brush ca1933:8-9).

“A chute . . . built from the kiln to the mountains” infers a track going farther uphill from the kilns, which doesn’t make sense in the context of the next sentence stating that “huge loads carried by these cars . . . to the extent of 35 bushels” - 35 bushels is approximately the amount of charcoal discharged for a single kiln. But why would the cars be carrying charcoal uphill from the kilns? (Remnants of charcoal kilns in Benedict Hollow mentioned above were located in 1991; see Rolando 1992:193, BE-191.)

Frederick Miles (1815-1896), who lived in Twin

Lakes, Ct., was owner of the Copake ironworks, which operated at what is today part of the Taconic State Park at Copake Falls, NY. He had purchased the ironworks from John Beckley in 1862:

Frederick Miles was active in Connecticut politics and while operating the Copake works, he served four years in the state legislature and two years in Congress. Miles did not reside in Copake as the family maintained a Connecticut home on Twin Lakes, just over the mountain due east of Copake. His sons, William A. Miles and Frederick Plumb Miles, appear to have been involved in the day-to-day operations. William maintained a small home not far from the current office building. Miles and his sons made substantial improvements to the ironworks over time including a new 32-foot high furnace in 1872, a brick blowing engine house, and a narrow-gauge. works railroad. It is clear that most of the surviving buildings and structures represent improvements made by Miles. The furnace produced varying amounts of pig iron according to trade journal reports with the highest annual capacity of 7,500 tons reported in 1896. But the charcoal iron industry was in decline during the last two decades of the 19th century and only held on because of a demand for high-quality railroad car wheel iron that furnaces of the Litchfield district had become famous for. With the deaths of Frederick Miles in 1896 and his son Frederick Plumb Miles in 1897, the ironworks was leased to the Salisbury Carbonate Iron Company, which operated other furnaces in the district (Gobrecht: 2000:ii-1).

Several hikes were made into the area during 1993-97. Then one day in 1998 while inspecting an area about a half-mile uphill from the stone-lined cistern, remains of two side-by-side charcoal kilns were found. Two more might possibly exist, each bracketing the definite two; however, archeology work would be needed to confirm the total number.

The site is at about 1,000-foot elevation and about 200 feet south of the uphill trail that starts near the uphill end of Fisher road. The trail first circles south before starting a rather steep and straight uphill climb. The straight section of this trail might be the remains of the cable-car system described by Brush. The kiln remains are tucked into a slight uphill embankment, with a road circling around to the top on the southerly side. Other woods

roads extend south and northward from the site and might have been whence wood was transported down to the kilns.

Diameters of the kilns was difficult to determine as bricks were strewn widely about; however, they appear to be the usual ca. 28-foot diameter variety. No hardware was seen. Much charcoal is strewn about, especially downhill of the site. The kilns front on a wide, flat area, most likely used for managing the kilns and discharging charcoal. Uphill of the site is a straight cut into the ground but the “trail” soon peters out. Despite personal efforts and that of a local guide from Sunderland who insisted he recently saw them (1998), no evidence of cable drums, cabling, steam engines, or a saw mill were found. More extensive inspection of the area might yet reveal these.

Caledonia County

I. N. Hall Charcoal Kiln, VT-CA-99, Groton: Formerly identified as CA-CK01, this site wasn't located until contacted by Arthur Aldrich of Montpelier at the 2003 History Expo at Tunbridge. Mr. Aldrich provided me with a photo (see figure A-19) and enough information that I was able to locate the site.

In 1876, Thomas R. Hall, along with his father, started a charcoal business under the name I. N. Hall & Son (Child 1887:196). Albert S. Clark of Groton also made charcoal for the company. Mr. Aldrich provided the following: “New Sidings were built [in the 1870s] to serve four charcoal kilns near Groton. The kilns were owned by Isaac and T. B. Hall, and Augustus Barnes. T. B. Hall also owned a sawmill from which he shipped large quantities of lumber over the Montpelier & Wells River Railroad.” (Curry 1977:20-32).

The charcoal kiln site was found the summer of 2003 on the south side of the former railroad bed about 1,800 feet east of the US Route 302 and Vt Route 232 intersection. This section of the former railroad right-of-way is named Coal Kiln Road. Surface evidence of the kiln's former existence is a small quantity of charred-end charcoal kiln brick and bits of hardened pitch, usually associated with charcoal kiln remains.

Chittenden County

Charcoal Mounds, VT-CH-617, Colchester: This site was located in 1993 by UVM Consulting Archaeology



Figure A-19. *The I. N. Hall charcoal kilns along a railroad siding (barely visible in the foreground vegetation) of the M&WRR in Groton. Photo taken in 1920 by Benjamin Haywood, Civil Engineer employed by the M&W. Four kilns stood here; only three are visible in this photo, looking northwest (back to railroad and Wells River). Note loading ramp above the kilns in upper left. What appear to be a series of white bricks about 6 to 7 courses from ground level and girdling the kiln are probably remnants of whitewash residue from sealing the vent holes. Courtesy of Arthur Aldrich; thank you to all Haywood's relatives that could be contacted for permission to use.*

Program personnel as part of the Phase 1 Archaeological Site Identification Survey for the revised alignment of the western section of the Chittenden County Circumferential Highway (Sheehan & Thomas 1993). The site is about 1,200 feet easterly off Mallets Bay Avenue, and about a like distance northeast of Pine Island, where charcoal mounds were found in the late 1960s (see Rolando 1992:172, CH-CK01 Pine Island). Although identified as “charcoal kilns,” their description “...appears as two depressions surrounded by circular mounds, with a shallow ditch around the outside.” (Sheehan and Thomas 1993:83), better describes a charcoal mound site. Surface charcoal was found under organic accumulation, and “coring revealed a very

compact surface under the charcoal layer in the depressions” is also indicative of a mound-type process. Charcoal making here was probably related to that done at nearby Pine Island and for possibly the same reasons - to provide charcoal for Ira Allen's ca1794 forge and anchor shop at Colchester (see Rolando 1992:86, CH-IW01, Ira Allen Forge).

Rutland County

Griffith/Old Job Village, VT-RU-78, Mount Tabor: During the two weeks of August 1-12, 2005, the sooty, 19th-century industrial logging village of Griffith high up in the mountains of Mount Tabor was visited by thirteen



Figure A-20. *Excavating the south-most pair of pits, S1 (l.) and S2 (r.) at the Relics and Ruins program at Old Job in 2005. Many enthusiastic hands and trowels made quick work of getting to the bottom of things. Debra Baasch photo.*

Rutland County Middle School students. They studied the current rodent residents of the abandoned village, its trees and fish, and dug into a former bank barn site, a schoolhouse, and...a charcoal kiln. Old Silas would have been proud. The children, entering grades 5 thru 9, participated in a two-week program called “Relics and Ruins” (R&R), which utilized art, archeology, science, and historical research to investigate the village area.

Relics & Ruins is presented as a partnership of the Green Mountain National Forest, the Vermont Archaeological Society, and the Hayes Foundation. Program Director is Debra Baasch, coordinator for gifted, talented, and enrichment education in the Rutland South Supervisory Union. Archeologists are David Lacy of the



Figure A-21. *Disposition of the two pairs of pits, about three squares apart along the kiln wall. Pits S1 and S2 are at the top; N1 and N2 at bottom. The string connecting the two pair was used for calculating the center point of the kiln. David Lacy photo.*

U.S. Forest Service, Rutland; Sheila Charles, archeology consultant, Nashua, NH; and Victor R. Rolando, archeology volunteer, Bennington. Steve Halford of Wallingford was creative structures instructor at Rutland High School until he retired in 2006 and helps R&R students produce reproductions of period artifacts; Brad Frohloff is Otter Valley High science teacher who helps R&R students design and conduct wildlife studies with a particular focus on the Mount Tabor area.

In 2005, the archeology concentrated in excavating a section of a barn foundation not too far from the Griffith saw mill complex, the site of a Griffith-era schoolhouse that later became a hunting camp, and two wall sections of one of the eight charcoal kiln ruins, located a few



Figure A-22. Pit S1 (inside) excavated to the floor of the kiln, which is coated with a thick layer of brick-hard pitch. Half of the pitch coating was removed to reveal what might be foundation stones under the wall. Note vent hole at middle-right. David Lacy photo.



Figure A-23. Pit S2 (outside) excavated to what was ground level during the operating period, showing possible continuation of foundation stones along the outside of the wall. Wall condition was worse outside, possibly for lack of pitch coating. David Lacy photo.

hundred feet to the west of the mill.

Surface evidence of the charcoal kiln was about a 50-foot diameter area strewn with red brick, small bits of charcoal, and black pitch. The site was overgrown and the first thing was to clear the brush from the site. With the general area of the kiln ruin uncovered and cleared, sections of the wall took shape and a datum point could be surveyed, measured, and 1-meter squares laid out with nails and tape. The students assisted in all stages of site preparation.

Two pairs of 1-meter-square pits were dug, each pair on opposite sides of the kiln wall, with the pairs about 14 feet apart along the curved wall (figure A-21). The following description concentrates on the south-most pair of pits; the “inner” (inside the wall) pit S1, and the “outer” (outside the wall) pit S2.

Excavation consisted mainly of uncovering and lifting out bricks in all manner of condition - whole, almost whole, quarter- and half-bricks, and many, many brick chips. Many roots were found interwoven between the bricks. The dirt was saturated with charcoal dust and everybody digging and lobbing bricks quickly became covered with the black, grimy stuff. It wasn't the type archeology the kids expected, but nobody complained and the sooty bricks came quickly out of the pits.

Bricks varied in exact dimensions but were generally

8½ inches long by 3¾ inches wide by 2¼ inches thick. None of the bricks found contained brick marks - trade names that identify maker and can sometimes be used to ‘date’ the brick. Maybe less than 10% of the brick had frogs - rectangular shallow depressions on the larger, flat side of the brick. Various reasons are given as purpose of frogs: to provide better grip for the mortar, to reduce weight of the brick so it can be handled better by the masons, to reduce raw materials in brick making, etc. (Gurke 1987:112). But why mix of type bricks, unless maybe one type was used at times when wall repair was needed? As the kiln heated and cooled during the process of making charcoal, the walls expanded and contracted, opening cracks in the mortar and allowing air inside the kiln that can't be controlled the same as that which entered through the vents (see Rolando 1992:149-156 for explanation of charcoal kiln venting). The outsides of kiln walls were periodically brushed with a heavy coating of white wash and mortar to seal holes and cracks. When this was not enough to keep the walls tight, major repair was in order and either sections of walls were repaired with new brick, or the entire kiln was razed to ground level and rebuilt. In the process, either new or sound, reusable bricks from the kiln wall were probably used, thus a possible explanation for a mix of brick types.



Figure A-24. *Silas Griffith's office at Danby Station, ca 1880s-1890s. Three of the four charcoal kilns that operated here are visible in the background to the left, where a hopper of charcoal is being loaded into a waiting railroad car. Rolando collection.*

Figure A-25. *The road up the Big Branch to Griffith in the 1880s-1890s in the days before FR 10. The depth of the wagon wheel tracks tells it all. This section looks to be well down the mountain, just above Mount Tabor village. Rolando collection.*



Figure A-26. *Looking more like a scene from “Dante’s Inferno,” this was Griffith village at its peak, taken from the deck of a building at the south end of the village. The row of eight charcoal kilns are at left and the saw mill invisible in the haze of smoke to the far right. Rolando collection.*



Figure A-27. *The sawmill complex, taken from the top of one of the charcoal kilns, looking eastward. Houses are barely visible through the haze of smoke at the north side of the village. On the reverse side of all four photos on these two pages is printed “W. H. Stillman, Troy NY” and written in longhand is “Compliments of S. L. Griffith.” Rolando collection.*



Figure A-28. *This photo looks like Griffith except for the building on the rise behind the kilns (there is no evidence of this at Old Job) and the kilns don't appear to be in-line. The photo was found by Kate Kinney of UVM CAP and the name on the back reads "Published by B. C. Kinney, Castleton, Vt." Maybe someone recognizes it?*

As the excavations proceeded, quite by chance, a vent hole in the brick wall was encountered in pit S1, the "inside" pit, six layers of brick down from the surface. The thickness of the wall measured at the top (the year 2005 surface level) was about 15 inches. Because the brick layers at ground level were not tightly mortared together, but were disarticulated due to weathering and other surface disturbances, the wall thickness was better measured through the vent hole. That measurement, where the bricks were tightly mortared, found the kiln wall to be exactly 13 inches thick.

The hard-pitch floor of the kiln was reached 18 inches down in pit S1, inside the kiln wall. Here it was noticed

that the pitch, a residue of the charring process, coated and saturated not only the floor but had formed upward along the bottom sides of the adjoining wall such that where floor met wall, the pitch lapped upward against the wall and the corner was rounded rather than square. This is probably true all around the edge of where kiln floor meets kiln wall. The pitch started building up about 10 inches horizontally from the wall and sloped in concave fashion upward against the wall to cover two layers of brick. The lapping pitch in one-half of the floor area of the pit was excavated to expose the meeting of the wall and floor; the other half left as is (figure A-22). At the junctures of the wall and floor, flat stones were

found laying lengthwise outward from the walls on the kiln floor. Whether this was the bottom of the floor, the top of the floor, the inside-half of a stone foundation wall that supported the brick wall above, or something else was not determined. Excavations did not continue below the level of the pitch floor.

Excavating pit S2 outside the wall, resulted in exposing the outside end of the same vent hole as found in the inside pit. This excavation reached the original, operating surface ground level at the depth of 22 inches, some 4 inches below the inside floor level. Flat stones, similar in size and deployment to those uncovered inside the bottom of the wall were also encountered along the outside of the wall (figure A-23). This begged the question whether the inside and outside stones were, in fact, long *continuous* stones that extend from about a foot outside the wall, under the brick wall, and extend about a foot inside the kiln? Given the weight of the vertical brick wall and vaulted roof above the foundation, it would make more sense to have long flat stones supporting the weight of all 36,000 bricks plus hardware: reinforcement rings, top loading door ring, discharge doors, etc., - nearly 100 tons supported by the foundation. (The cordwood inside the kiln rested directly on the kiln floor, not the foundation.) No attempt was made to remove or “wiggle in place” any of these stones; no excavation was made below the original ground surface at the bottom of the pit. At the end of the dig the pits were lined with plastic sheet and backfilled.

Pit S1 was re-excavated during part of the 2007 R&R session and it is hoped that in time the entire kiln floor plus a few feet outward around the entire outside wall can be excavated to fully expose the remains for study.

A major question is what foundation lays under this structure. Drawings of brick-type charcoal kilns in plan and cross-section view show a relatively small foundation under the walls, the foundation appearing to be 2 feet wide by 2 feet deep (see Rolando 1992:155, figure 5-10). Based on measurement of the irregular walls and trigonometric calculations, the kiln excavated was estimated to be about 32 feet in diameter. A 2-foot-deep foundation for an approximately 32-foot diameter by 18-foot high charcoal kiln would seem to be somewhat shallow, given the nature of Vermont winters and frost depths. The stones found at the bottom of the two excavated pits (and *apparently* under the brick walls

- we don't know this for sure) on opposite sides of the kiln wall were found to be close to 36 inches long, measured from their outer edge (edges away from the wall). If that is the top of a foundation wall, it seems to be a more substantial foundation than shown in previously referenced figure 5-10 (Rolando 1992:155). How deep does this foundation go? What's under that?

When we fully uncover one of these sites and get real ‘down and dirty’ into the pitch- and charcoal-saturated innards of a kiln foundation, we should know more about how they were constructed.

Washington County

South Woodbury Charcoal Kiln, VT-WA-167, Woodbury: After Priscella Backman guided me to the Little Pond lime kiln in June 1996 (WA-LK01, page A-56), she led me to another site about 3 miles to the northeast where a round, standing stone structure had been found. Unfortunately, I left my camera and maps back at my pickup but was carrying a measuring tape and writing pad.

It looked like a collapsed charcoal kiln and it lay near the base of a high escarpment. The USGS Plainfield 15' topo map indicates a 100-foot-high cliff at this point. The site is about 1¼ miles east of South Woodbury (or about an ⅛-inch north of an east-west line that connects the 1,604- and 1,685-foot elevations of two small prominences that are identified on the topo map). The feature measured about 30 feet outside diameter (28½ feet inside diameter) and about 28½ inches deep inside the walls. No bricks were found; no vent holes were apparent; it was nearing the end of a long, tiring day, I was tired, alone in unfamiliar territory (Priscilla had already started back), and a long way from my pickup.

Single-unit charcoal kilns are not common, but maybe others were in the vicinity. The trail could have been an old “coal road” along which fuel was carried to any of few known (but not found) ironworks that were in this general area, e. g., CA-IW01, Joes Brook Forge at West Danville, about 12 road miles to the east (Rolando 1992:79), or more likely, WA-IW01, Davis Forge at East Calais, less than half the distance (Rolando 1992:87). Or maybe any of the many blacksmith shops that operated in this area of Caledonia and Washington Counties over a hundred years ago.



Figure A-29. *The Marsh Farm lime kiln (VT-AD-1355), about a half-mile up the eastern slope of a mountain about a mile southwest of Route 100 and 125 intersection at Hancock village. This photo was taken by hiker-explorer Steve Donovan of Springfield, Vt., in December 2003, while snowshoeing in the area.*

SECTION C - LIME KILNS

By far the most activity was in the discovery and recording of lime kiln remains - 24 in all. Clues to most of these came from the result of the book being read and connections being made between this and suspicious stone walls in the woods.

One major lime burning operation, along facing sides of the Winooski River near St Michael's College came to a devastating end with its demolition in 2003-2004: the Weston Like Works in South Burlington and the huge Champlain Valley Lime Company complex on the Colchester side. An historic lime kiln that defined a part of the town ("the Lime Kiln District") of Newbury couldn't be found and is feared lost forever (although

study will continue for that site).

But the most intriguing site is that at what was once the village of Sherman, a stop on the HT&W RR along the Deerfield River in southwestern Whitingham - the Sherman Carbide Company works. There, also, study continues. Thankfully, some things *never* end.

Addison County

Note: Sites VT-AD-741 and -743 (immediately following) were located in 1993 by Jack Rosen, Archeologist for the US Dept of Agriculture Soil Conservation Service (SCS), while working on a special project called "Archeology on the Farm." It was administered by the Vermont State Archeologist's office and funded by the

US Environmental Protection Agency through the Lake Champlain Basin Program.

The writer has not visited these two sites; their exact locations and owners' names are intentionally not mentioned.

Hamilton Hill Lime Kiln, VT-AD-741, Bridport: When this kiln ruin was located by Jack Rosen, he reported that "there are several features of different sizes spread through-out the area. The owners dug out the largest.... The smaller features appear to be intact." The site is on private property uphill and east of Hemenway Road, which runs parallel to Route 22A about a mile east of Bridport village.

Daigneau Hill Lime Kiln, VT-AD-743, Orwell: Also located and recorded in 1993 by Jack Rosen, this lime kiln ruin is on private property, about 1,800 feet east of Orwell Station Road and a mile northeast of Orwell village. A stone quarry and a possible stone chamber are also in the vicinity.

Boyce Lime Kiln, VT-AD-847, Middlebury: Information about this site came from a lime kiln indication on the 1857 Walling map of Addison County, about two miles east of Middlebury Village on the south side of today's Quarry Road. The site appeared to be about 500 feet west of Muddy Brook and diagonally southwest across the road and Muddy Brook from the E. Y. Boyce house. The 1871 Beers map of Middlebury doesn't show the kiln but does show the Boyce and also the Vermont Marble Quarry just northwest, on the north side of the road, possibly having had some connection with the kiln.

A drive-by inspection of the site, was made in September 1991 and resulted in seeing nothing looking like a lime kiln in the field beside the highway. But in August 1993, another drive-by inspection with the aid of binoculars resulted in spotting what appeared the kiln ruin on the south side of the highway, east of Muddy brook at the wooded edge of a pasture, just where the 1857 map indicated it to be.

The Boyce house is a brick house and in 1994 was the residence of Eric Flanagan, who knew about the lime kiln but couldn't add any new information about it. He gave me permission to inspect the field anytime I wanted. To get to the ruin, a barbed wire (electric?) fence must be negotiated, then cross a pasture inhabited by cattle. To avoid the cattle, best approach would be to

come in from the east and cross the brook at the ruin. But rain was falling the day of the inspection, Muddy Brook was living up to its name, and the muddy pasture didn't look all that inviting. Direct on-site inspection was left for another day.

In 1994, at the invitation of the late Bill Murphy, who knew Pat and Charles (Pete) Brakeley, owners of the property that bordered the pasture on the west, I was finally able to do a walkover inspection of the grounds. To my complete surprise, no lime kiln remains were anywhere to be found, so I have no idea what it was I saw in the field in 1993 that I thought were remains of a lime kiln. Along the fence line between the Brakeley house and the pasture is a north-south limestone ledge outcrop, about 8 to 10 feet high, into which are small quarry excavations. This could possibly be the source of stone for building the kiln and also burning for lime.

The site was identified as AD-LK01 in the original edition (Rolando 1992:245) because it couldn't be found. As the property is a pasture, no development or ground disturbance is visible, and there is good archival data as to its existence in 1857, after review by the State Archeologist on 2002, an official site identification number was assigned.

Marsh Farm Lime Kiln, VT-AD-1355, Hancock: Initial indication of something industrial in this vicinity was provided in October 1984 by a former USFS Ranger of the Middlebury District Office. He said that what appeared to be remains of charcoal kilns existed up the side of the mountain, west of Route 100 and "a bit south" of the Route 125 intersection in the vicinity of two small brooks. He had no further specific information regarding the site except to warn me that an "extremely uncooperative resident" lived along a mountain road just south of the kiln area.

The area of interest was inspected in company with Bob West the afternoon of May 13, 1989. Assuming the Forest Ranger's "two small brooks" were those shown on the USGS topo opposite the bridge over the White River, just south of the mills, we parked behind a one of the mill buildings and hiked up the mountainside searching for whatever we could find that looked like a charcoal kiln ruin. What appeared to be cellar holes were found plus some suspicious black dirt but no positive charcoal identification was made. Being toward the end of a long day doing field work elsewhere, we spent hardly an hour on the now-shaded side of the mountain before we left,



Figure A-30. *The Bristol lime kiln as it probably looked about 1900 (see Rolando 1992:242-43, VT-RU-409); view is to the north toward Route 17.* Courtesy of Ted Lylis and the Bristol Historical Society.

with all good intentions of returning to continue the search at some later date.

In the course of doing archival research about the lime burning industry in Vermont, references were later found that identified this site as a possible lime burning area:

Half a mile south of the village of Hancock there is a bed of limestone, of large extent. It is not a dolomite, though it contains a little magnesia. It is composed of carbonate of lime 90.3, carbonate of magnesia 6.9, oxyd of iron a trace, silica 2.8 (Hitchcock et al., 1861:357).

Limestone was burned for lime many years ago at a locality on the west side of the White River, or more properly the western branch of White River. The locality is near the Rochester town line (Perkins 1931-32:233).

In Hancock, the southeastern township of Addison County, dolomite has been burned for lime on the west side of the White River valley near the Rochester town line, which is also that of Windsor County. The locality is about 750 feet above the river, nearly due west of the bridge over it, on the D. G. Marsh farm (Dale 1915:19-20).

The 1871 Beers map of Hancock identified “G. E.

Marsh” at the end of a road at about the 1,600- to 1,700-foot elevation. Adding Dale’s “750 feet above the river” to the river’s 880-foot elevation at the bridge makes the elevation of the lime kiln at about 1,630 feet. Somewhere along the 1,600- to 1,700-foot elevation band west of the river and in the vicinity of the Marsh farm might be the lime kiln remains, except that the Beers map also identifies a “Lime Ledge” just northwest of the bridge. A map attached to page 9 of Dale’s report indicates a dolomite quarry location at Hancock near the juncture of the Addison/Windsor County boundary and the White River, although this location might not have been meant to be as much precise as representative.

That’s where things stood until an email message was received in December 2003 from both Giovanna Peebles, and a hiker, Steve Donovan of Springfield, Vt. Donovan had found “something” at the approximate site of the elusive kiln. From photos taken by Donovan, the “something” was confirmed as being a lime kiln ruin (figure A-29, page A-46).

On Thursday morning, May 13, 2004, in company with US Forest Service Archeologist David Lacy, and Eric Bowman of the USFS Rochester office, the kiln ruin was located, studied, mapped, and photographed. Firebrick and red brick were found in the front archway; however, few brick marks were readable. The one marked firebrick with partial letters (“EL & K”) cannot be matched with any known mark (Graves 1996). From the size and configuration of the kiln, plus the presence of firebrick, the kiln operated into the 1880s period; an early operating/construction date is difficult to ascertain. A good deal of thanks goes to Steve Donovan for not only finding this site, but taking the time to contact the state archeologist’ office about it.

The kiln structure is approximately 11 feet high (measured at SE corner), 22 feet across the front (at about 3 feet above ground and also across the upper, rear of the kiln), and 16 feet deep (measured at the top of the north wall). The draw arch measured about 4 feet high by 30 inches wide, overall, and 3 feet high inside by about two feet deep (to internal breakdown). The arch is off-center to the left (south) by about a foot. Inside diameter of the charge hole as measured at the top is 6 feet, somewhat small considering the outer dimensions of the kiln. Except for the brick draw arch, no other bricks were found associated with the kiln.

About 25 feet in front of the kiln is a stone wall, varying from 3 to 4 feet high, which probably afforded a



Figure A-31. *Misidentified “Pittsford iron works,” these are definitely mid-19th-C lime kilns and maybe the two 1861 kilns of the Brandon Lime Co.* Courtesy of the Vermont Historical Society.

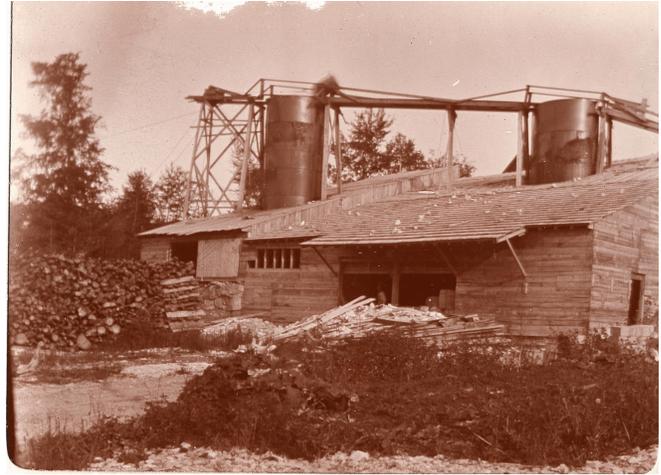


Figure A-32. *Misidentified “sawmill,” these also are lime kilns and might be the Huntley kilns that replaced the two at the left. Compare with Rolando 1992:246, figure 8-24.* Courtesy of the Vermont Historical Society.

platform to load an animal-drawn wagon with burned lime from the kiln via wheelbarrows. No evidence of the quarry source was found.

The site is on the property of Chesapeake Wood Products, Inc., headquartered at Chesapeake, Va. The Hancock mill has been closed for some time per local information. A supervisory-level plant employee who we met while coming out of the site (and who said that he had been told the kiln made potash) said that the mill had no development plans for the site as far as he knew.

Long Point Lime Kiln, VT-AD-1356, Ferrisburg: This kiln was brought to my attention by John Leidy, who phoned me on day in 1998 and described its location. We met and inspected the site a few weeks later.

Long Point is a narrow, quarter-mile long peninsula along Lake Champlain just south of Town Farm Bay, about three road miles west of North Ferrisburg (at the lake end of Long Point Road). The Beers 1871 map of Ferrisburg identifies it as “Camp Grove” and also indicates “Black Marble Quarry” about 1,000 feet south, between the point and Lewis Creek. Long Point today is dotted with many summer cottages; access is restricted.

In the side yard of a cottage was the kiln, looking for all the world like somebody’s tool shed - and it was. The kiln’s inside height is about 6 feet high with an internal diameter of about 12 feet. Estimated wall thickness was

28 to 30 inches; the wall is laid up with unmortared stone and is topped by a six-sided, pyramid-shaped, 5½ feet high, shingled wood roof (a real neat job). The inside is used by the owner for storing garden tools, paint, hardware, etc., and is wired for light (talk about adaptive re-use). Interior access was gained by an unlocked wood door framed into a 43-inch-wide opening where the draw arch probably was.

The owners could not be found for any history of the kiln, so nothing further is known about operation dates, original ownership, etc.

Stone for constructing the kiln could have come from any of the exposed ledges that dot the vicinity, or from any of the fractured shore ledge. Stone for burning might have come from the marble quarry mentioned by Beers, above. Reason for a lime kiln here could be for proximity to the nearby quarry, access to lake boat cargo transportation, and proximity to the railroad at Ferrisburg Station, about a mile away.

Chittenden County

Weston Lime Works, VT-CH-282, South Burlington, and Champlain Valley Lime Company, VT-CH-284, Colchester: This area, along Lime Kiln Road about a quarter-mile south of Route 15, lies on both sides of the Winooski River in South Burlington and Colchester. It



Figure A-33. A “left eye” 1870s stereoscopic photo of lime kilns on the Colchester side of the Lime Kiln Bridge. Photo is by A. F. Styles of Burlington, probably taken from the rise at the southwest corner of Lime Kiln Road and Route 15. These kilns operated until the early 1920s. Courtesy of Gary Irish, Jericho, Vt.

became a major lime manufacturing area after the end of the War of 1812 with the building of lime kilns at the south end of Lime Kiln Bridge (the South Burlington side; VT-CH-282). In the early 1920s the operations were modernized with the construction of a new, poured-concrete building to hold the three huge, high-capacity lime kilns which went into operation in 1926 (VT-CH-284). With the end of a US Government contract for agricultural lime in 1971, the works closed, thus ending over 150 years of lime manufacture at this site..

In 1989, an assessment of the site of the Champlain Valley Lime Company site determined it to be eligible for National Register of Historic Places although preservation of the site would be complex. And from subsurface testing there existed potential for cultural resources associated with earlier, 19th-century phases of lime production at this location (figure A-33) (Berger Inc. 1989:29-32). But before anything could be done to advance the National Register application the site was

stripped by its owner for scrap metal, leaving only piles of brick, scraps of broken metal and glass, and the solid concrete foundation of the kiln building, thus ending any national recognition for the site (Russell 2003:8). Soon thereafter, plans were afoot for a major residential development on the former Weston Lime Works property on the South Burlington side.

During the fall of 2003, as part of upgrade to the Lime Kiln Bridge, the huge limestone quarries below the bridge were drained by four pumps. Several automobiles plus quarry excavating equipment were discovered at the bottom along with the tunnel that had been built under the road to connected the two quarries (Russell 2003:9). The east quarry has since been backfilled with material from the Fletcher Allen Hospital expansion program, and the poured concrete kiln foundation has been razed.

Law Island Lime Kiln, CH-LK02, Colchester: Law Island is a small, 5-acre island in Lake Champlain, managed cooperatively by the Town of Colchester and Vermont Forest, Parks, and Recreation. It is named for John Law, early settler (d. 1840) and leader in the Town of Colchester.

In 1994, a “stone beehive” type structure was discovered on the island which might be a lime kiln (Orsoi to Peebles, ca. November 1994). As the season was already late there would be no attempt to inspect the island that year but would be called back the next year when we would be boated out to the island for a return inspection (Rolando to Peebles, December 2, 1994). The return call was never received.

Due to the proximity of Law Island to Marble Island in Mallets Bay and limestone features in the general Colchester-Mallets Bay area, it was surmised that this, too, was a lime kiln ruin (see Rolando 1992:239, Bates lime kiln, FS-118(CH), and Stave Point lime kiln, CH-LK01). A recent report on historic resources of Law Island, however, mentions no lime kiln or “beehive feature.” (Colman 2007). Possible future work, if the island is accessible.

Franklin County

Smith Lime Works, FR-LK02, Georgia: In the course of describing a geologic fault along St. Albans Bay, former State Geologist Perkins mentioned this lime works near “the mouth of the ravine at St. Albans Bay” (Perkins 1916:209). The only ravine of note was found just south

of the St. Albans - Georgia town line (Mill Brook); along the nearby shore is "Lime Rock Point," today populated with lake shore homes. No evidence of a lime kiln was found; nobody queried had heard or seen anything. A previous geology report mentioned seven lime kiln companies in the state but the Smith Lime Works wasn't among them (Perkins 1910:349). Archival and field work continues on locating another elusive kiln operation.

Stilpen Lime Kiln, FR-LK03, St. Albans: A lime kiln is mentioned in the town history as being east off Kellogg Road on property belonging to the Stilpen family (Armstrong, et al., 1877:2); the 1871 Beers Map of St. Albans also shows the residence of C. Stilpen adjacent a Lime Quarry. The quarry was located the summer of 2000, but no evidence of a lime kiln could be found. This also is still a "work in progress."

Grand Isle County

Eagle Camp Lime Kiln, VT-GI-67, South Hero: Information of the existence of this kiln was provided by Herman "Charlie" Brown of South Hero, who told me about it in October 2006. First field check of the site was made on May 2, 2007, with a followup site check on June 4, 2007, both in company with Charlie.

Eagle Camp is a membership corporation with cabins and homes situated on a relatively large tract of land bordering West Shore Road at Rockwell Bay, Lake Champlain and Eagle Camp Road on the north. George William Perry (1846-1928), Vermont State Geologist from 1886 to 1898, was a Universalist minister and founder of Eagle Camp. Surface remains of an outdoor religious service area complete with remains of rustic wood benches and a mortared-stone pulpit was seen at a fork in the trail on the way to the kiln site.

The vicinity of the kiln ruin is light woodland with walking/horse riding trails. One such trail generally runs NNE-SSW about a dozen feet easterly of the kiln site. The kiln was built into a slight ridge that generally runs north-south in the area (the trail is atop the "ridge"). The ruin consists of collapsed exterior and interior walls but with enough remaining standing to see the general shape and appearance of the structure. Although much of the front wall stands, the draw arch is buried under breakdown, which spreads outward apron-like from the middle of the wall. This front wall measured 3 feet high by 14½ feet wide. The interior of the kiln is generally round and

measured 10 ft 7½ in. diameter; the outside diameter measured 18 feet. Inside depth is roughly 3 feet, so that the inside bottom is the same level as the bottom of the front wall but about 4 feet above the surrounding ground level. Walls appear to be vertical and dry laid limestone (calcite). No worked quarry or ledge was observed in the immediate vicinity during explorations of the area although small limestone outcrops appear in the vicinity. The topography is generally level in this area and the slight ridge here might have been the reason for locating the kiln here - so as to provide convenient access to the top of the kiln for charging. A flat area of ground is immediately adjacent the ruin to the south, which might have had some functional relationship to the operation of the kiln, or may merely be a topographical feature.

The kiln appears to have been a typical mid- to late-19th-C farmer's lime kiln that provided lime for local agricultural needs. As such, it would have been of the mixed feed type, using local cordwood for fuel. These type kilns usually were abandoned about the 1850s-1860s with the arrival of railroads and local commencement of commercial manufacture of lime, which made lime available of more reliable quality for less cost that could be made by individual farmers.

Lamoille County

Balch Lime Kiln, FS-30(LA), Johnson: In describing a limestone bed in Johnson, it was mentioned that the rock was "burnt for lime, and an excavation has been made in it fifteen feet wide and two rods long. The rock adjacent contains many seams of carbonate of lime" (Hitchcock et. al. 1861:558). The bed is described as "two or three miles north of Johnson Village . . . upon the land of Robert Balch." In the vicinity is a 100-foot long cave. The 1859 Walling map of Lamoille County shows Robert Balch living about 3½ miles northwest of Johnson village, in the same general vicinity, and about 2 miles south of the FS-28(LA) and FS-29(LA) lime kiln sites.

This site awaits field work to confirm location and potential archeological remains.

Orange County

Eastman Lime Kiln, FS-26(OR), Newbury: Initial clue to this lime kiln came from a place-name on the USGS Woodsville VT-NH 15' topo (1935), of "Limekiln

School” in west-central part of the town of Newbury. The schoolhouse symbol is not indicated on the USGS Groton 7.5-minute topo map (1973) but the building indication might be that of the former schoolhouse. It is on the east side of Swamp Road, which parallels Scott Brook, about 1½ miles north of Newbury Center. Comparison with the 1961 Doll *Geologic Map of Vermont* shows the site area to be nearly on the border of two types of Waits River limestone.

Along the west side of the town, from Ryegate line south, lies a deep valley, shut in on the west by the massive Topsham hills, and on the east by Jefferson hill, and the heights west of the Center, and Long Pond.... The soil along the valley is of limestone formation, deep and productive. The farms which cling to the hills on the west, are among the best in town, and the locality is noted for its orchards, and its excellent pasturage (Wells 1902:269).

This part of the town, once called the Nourse neighborhood, and often, District 12, is more generally designated as the “Lime Kiln”.... In 1807, District No. 12 was established, and a schoolhouse was afterward built on the Nourse farm, near the small cemetery there. Later a schoolhouse was erected near Isaac Eastman’s which was remodeled in 1889, at an expense of about \$800, and is used also for religious meetings.

Sometime near 1829, John Botten began the manufacture of lime, which was carried on later by Charles George, who did a large business until 1836 or ‘37, when he sold out to Isaac Eastman, who continued the work about twenty years, until competition from lime brought by railroad ruined the business, as the new quality was whiter. Mr. Eastman made in some years about 3,000 bushels of lime, which was used in all the region, and walls plastered with it sixty years ago are still firm (Wells 1902:269-270).

Wells’ book also contains a photo “in the Lime Kiln Neighborhood” although no lime kiln can be seen in it, and on page 238ff is a map showing the layout of the town’s school districts. Nothing could be found in the book that gave specific location of the kiln for which the school district was named.

Following many phone calls and letters that more or less confirmed what I already knew, but cast no new light

on exactly where this site is, a visit to Newbury was made on June 25, 2007. A few stops, conversations with cooperative folks, but still no evidence of the site. The “Limekiln Cemetery” was found, however, on Swift Road (Lyme Kiln Road on an on-line map), so the kiln was there somewhere, if at all anymore. Too bad this neat Newbury place-name has slipped from visibility and local knowledge. Maybe someday....

Rutland County

Coons Den Lime Kiln, VT-RU-291, Fair Haven: Information about this site initially came from Peter Patten of Fair Haven, who found what appeared to be a lime kiln ruin “well off the road and south of Glen Lake.” But a few attempts made in 1992 to coordinate a hike into the area with Mr. Patten were unsuccessful. Then in 1993, then State Lands Forester Russell Reay (Pittsford office) said that he also knew of a kiln-type feature in the general area of Coons Den Mountain, that matched the general area described by Peter Patten. Reay assumed it to be a charcoal kiln and said that the best approach into the area of the ruin might be from the Route 22A side in Fair Haven via a state forest road. Coons Den is near the western boundary of the state forest property.

The kiln was visited June 12, 1994 with Bob West and Reay. It was built into the side of a low hill such that the back (west) side was level with the hill and the front (east) wall was up to six feet high. The ruin’s outside walls were made of a mix of slate and round stones. The ruin’s NE, NW, and SW corners were in good enough condition to determine that the outside dimensions were 14 by 14 feet square. The north wall was in best condition, The east wall, which probably contained the working arch, was completely collapsed, slumped outward and downhill toward the road. The inside was oval-shaped, measuring 66 inches across by about 10 feet long. Breakdown filled the inside almost to the top of the ruin. Since the front is collapsed, there is no way to determine the exact “front” of the inside area. There was no evidence of burning on the inside wall and no burned lime was found inside or outside the ruin, leading to speculation that the kiln might not have ever been put into operation. Remains of a stone wall were found about 10 feet south of the south wall.

The site is at a point two straight-line miles east of Route 22A and a half-mile south of the Benson town line

(or, about 1,800 feet southwest of 947-foot Coons Den peak; kiln elevation is about 750 feet). Woods roads go into the area, but directions are best left unwritten as the closest driveable point left nearly a half-mile of bushwhacking in heavy trees and underbrush to find it.

Day Lime Kiln, VT-RU-292, Ira: This kiln came to my attention in late 1992, thanks to David Potter of West Rutland:

I wish to mention a lime kiln that worked for many years in Ira, Vt., that doesn't appear in your text. This was the A. E. & L. W. Day operation, listed in the Rutland County Child's Gazetteer and Directory [of] 1881. It states there the business burned 2000 lbs of lime per annum.

I knew the daughter of one of the Day's, she died a few years ago at the age of 100+ yrs. She related that as a young girl she fed many boarders that worked at her father's operation. Also she talked of the many horse teams required to move the stone and product. The grand-daughter of the Day's is still in residence at the home place and could furnish you with details of the operation. The kiln still is present. The business records may still be there (Potter to Rolando, 1992).

The 1869 Beers map of Ira shows no quarry or kiln at this location but does identify "A. E. & L. W. Day" at the site of the farm.

Child's 1881 Gazetteer of Rutland County states in the history of Ira "Limestone is found in some parts of the town, from which is made a very good quality of lime. The lime-kiln of A. E. & S. W. Day [sic], located on road 9, manufactures about 2,000 barrels per annum" (Child 1881:145; on page 350, A. E. and L. W. Day are identified as Arden E. and Leonard W. Day).

The 1886 History of Rutland County states that "The only industry of any importance [in Ira] is the lime kiln of A. E. & S. W. Day, which was started about fifteen years ago" (Smith and Rann 1886:634). This would make the starting date of the kiln about 1871. The quarry was described in 1914 as follows:

The Day quarry is 3¼ miles south-southwest of West Rutland, 1¼ miles southeast of the top of Mount Herrick, in the Taconic Range, on the 1,300-foot level, in the town of Ira, Rutland County. The quarry is reported as having been in operation in Revolutionary



Figure A-34. *Fragile remains of the ca1871 Day lime kiln at Ira, as it was in 1995. View is from the east with oval fireplace seen at bottom center. Rolando photo.*

[War] times. Operator in 1900, D. D. Day of Ira (Dale 1914:141).

Exactly when the kiln ceased operation is unknown. It was listed in *New England Business Directory* of 1920 ("D. D. Day & Sons," page 478), but not in the 1926 issue. A 1924 geology report about the quarry does mention the kiln, but only with regard to the quarry's proximity to it (Gordon 1924:143-44). In his 1924 list of lime kilns in Vermont, G. H. Perkins didn't mention the Day kiln at all (Perkins, 1924:351).

The kiln was visited June 13, 1994, in company with Bob West. The Day Farm is about 1,000 feet northwest of the Cross and West Roads junction in Ira; permission was needed (and granted) to explore.

The kiln was an iron shell type, with seven bands of riveted iron plates from bottom to top, maybe 14 feet high. The bottom band is reinforced by two round, iron binders that girdle the stack. The bottom two bands have four small iron attachments that stick out from the iron bands about 3 inches and appear to be possible venting devices. Each has what appears to be a curved handle atop them. The approximately 7-foot diameter iron shell rests on a round, 19-inch thick concrete base reinforced with an iron band - and that on a square stone base.

Into the tops of the north and south stone bases are fire-arches (fireplace openings), recessed about 3 feet into the walls. Each is a flattened-oval opening made of brick laid endwise. A column of brick laid flat up the middle divides the opening into two smaller openings, similar to fire arches seen at the lime kiln ruins at New Haven (VT-AD-355; see also Rolando 1992:220, figure 7-14). At the base of the east wall is the draw arch where burned lime was removed. The archway is recessed into the wall at ground level, about 5 feet wide at the bottom and 20 inches high. The outside arch is made of two courses of red brick laid endwise; the vertical wall inside is made of firebrick laid lengthwise across the face. Inside the base is an iron frame on which at one time probably supported the missing iron door. The inside of this iron frame doorway is choked with pieces of decayed stone and brick. Remains of stone foundation walls extended northward and southward from the base of the kiln.

The low hill behind the kiln is covered with broken stone, which look like the remains of a collapsed stone building. At the top of the hill and level with the top of the kiln is a stone ramp that probably supported tracks to allow a small "skip car" loaded with limestone to roll to the top of the kiln. Just over the top of this hill is a large quarry, the size of which could not be determined due to the amount of foliage. The immediate depth appeared in the order of 12 to 15 feet.

McConnell Lime Kiln, VT-RU-294, Rutland Town:

The first known kiln in this area was operated by John McConnell near the southeast corner of town as early as 1808. Remnants of the operation can still be seen off the east side of Cold River Road across from the present Buck homestead. Three of his account books, spanning the years 1811 to 1839, are housed at the Vermont Historical Society (Hance 1991:520-21).

The 1854 Scott and 1869 Beers maps of Rutland

placed the site just north of the Rutland-Clarendon town line along Cold River Road and indicated "J. McConnell" on the west side of the road; there is no indication of the lime kiln.

Field inspection of the area was made in November 1994, to determine if any identifiable surface remains of the lime kiln exist. The former McConnell house was found just inside the Rutland town line, north of Clarendon, on the west side of Cold River Road. Mrs Buck, who lived there, said that yes, the lime kiln could still be seen, it was a round hole in the ground that as a child she hid in the hole to get out of cold winds, and that the Buck family had purchased the house from the McConnell family nearly 100 years ago. She said that none of the Buck family operated the kiln. Her daughter, Gail Buck, gave me directions to the kiln, which was found about a half-mile hike up a trail on the east side of Cold Spring Road

The ruin was found about 33 feet north of the trail, built into the downhill slope of a nearby knoll that is about 100 feet to the northeast (elev. 920 feet). The ruin is characterized by a round stone wall built into the downward slope of a nearby knoll. About 180° of its wall exists, mostly the downward side of the kiln. One section of wall measured 53 inches above the inside floor, which contains breakdown from collapsed walls.

The wall was generally 33 inches thick, lain up with rough stone that were placed wide end to the inside or outside face of the wall. The narrow ends of the stones were set to the interior of the wall. No sign of mortaring was found. Stones were generally 6- by 6-inch face by 12-inch deep into the wall. Some were vary large stones; small stones were used for chinking small openings. The inside of the wall appeared to contain dirt and small stones.

The front opening of the kiln faced downhill, to the west. The opening was not visible due to the amount of breakdown; however, a small animal borrow into the base of the wall probably extended into the buried opening. Many bits of burned lime were in evidence at and near the base of the wall where the opening is supposed to have been.

The inside wall was thinly coated with a white substance, most likely residue of burned lime. Otherwise, no parching or glazing could be found on the inside walls.

Quarries from which stone might have been drawn for burning lay about a hundred feet east and southeast.

Fuller Lime Kiln, FS-55(RU), Mount Holly: This site was previously identified as RU-LK02 in the original edition (Rolando 1992:252). It still hasn't been found, for sure, although what looked like a possible kiln was inspected alongside Route 155 just north of the county line. Unfortunately, development in the form of a new house and driveway has severely damaged the kiln-like structure. Regardless, in reviewing the information, the State Archeologist assigned this site an official identification number.

Jackson Lime Kiln, FS-58(RU), Pittsford-West Rutland area: Information regarding the site initially came from the following source:

In July 1839 Timothy Dimick advertised that he had four hundred bushels of lime just burned at Jackson's lime kiln in Whipple Hollow. In 1841 Hitchcock and Morgan were selling three hundred bushels at the site (Hance 1991:521).

The USGS Proctor topo (1940) indicates "Whipple Hollow" in a north-south valley in southwestern Pittsford and northern West Rutland and drained by the Castleton River. In the geology map of western Vermont, a belt of marble and dolomite beds are shown immediately south of the town line in West Rutland (Dale 1914:1).

The 1869 Beers map of Pittsford indicates "A. S. Whipple" north of Sargents Pond and "L. Sargent" just south of the pond, but neither the Pittsford nor Rutland maps show a Jackson name in the vicinity. The David Jackson farm was both in Pittsford and [West] Rutland (Caverly 1872:396).

David, the eldest son [of David Jackson of Spencer, Mass.], bought fifty acres of land, a part of the right of George Robbins, Dec. 5, 1786. This land was bounded south on the north line of Rutland, and he also purchased a lot within the township of Rutland, adjoining his Pittsford lot on the north, and built a house a few rods south of the town line, married Persis, daughter of Benjamin Whipple of Rutland, and resided some years within the limits of that township. He enlisted in the army in the war of 1812-1814 and died on the road as he was returning home from Plattsburgh (Caverly 1872:219-220).

Hiram Jackson, son of Daniel . . . located in Whipple

Hollow on land now [1872] owned by Leonard Sargent. The house he occupied stood some rods northeast of Graton Jackson's. He removed to Pennsylvania about the year 1840 (Caverly 1872:372).

Which "Jackson" owned the lime kiln is unknown. David Jackson, father of the family, died in Spencer, Mass., but his six sons lived fully or partly in the hollow from the 1780s to about the 1860s. The Daniel Jackson farm was still referred to as such in 1863 (Caverly 1872:474), lending possibility to Daniel being the kiln operator..

The lime kiln must have been in the hollow area from about a few hundred yards south of the town line to as far north as what used to be Sargents Pond (indicated as a bog on the USGS topo). Lack of development in the hollow that topographically dead ends about 3 miles to the north, might indicate that the remains of Jackson's lime kiln might yet exist.

Reynolds Lime Kiln, FS-95(RU), Proctor: Information about this site initially came from the following:

Isaac C. Reynolds announced in June 1840 that he had lime for sale at his kiln two miles north of Mill Village (Center Rutland). Most likely, this property was located on the old East Proctor Road (Hance 1991:521).

The 1869 Beers map of Rutland identifies "I. C. Reynolds" in District No. 9, on the west side of the road to Sutherland Falls, diagonally northwest across the road from quarries identified as "Clement & Sons" and "Green Mountain Marble Company." A geology map of West Rutland also identifies two marble quarries in the vicinity, one just southeast of the Otter Creek bridge east of the railroad tracks, and the other, Riverside Quarry, north of the bridge and west of the tracks (but no mention of a lime kiln). Riverside quarry is in marble while the other is in dolomite (Dale 1914:22).

Inspection of the USGS Proctor topo (1940) shows the area to be along Route 3 at bench mark 598, about 2 miles south of Proctor. Small ponds shown east and north of the bridge might be quarries. The topo doesn't indicate highway improvements done since then, widening the road in many places and possibly disturbing or destroying the site of the lime kiln.

Washington County

Foster Lime Kiln, WA-LK01, Calais: Long time East Calais resident Priscella Backman contacted the State Archeologist in 1995 regarding a lime kiln that her great, great grandfather George Foster built in 1845 and worked in the 1840s 1850s at Little Pond, about 1½ miles NNE of East Calais. His journal showed he was in the lime business as early as 1839. She wrote that when she was little, her father took her to look for some sign of the old kiln, and they found it near the upper (north) end of the pond. (Backman to Peebles, September 28, 1995).

In June 1996, the site was visited along with seven or eight people, led by Priscella Backman. After a short, quarter-mile hike through the woods, we found a small concentration of stones that we were told was the kiln. Having seen so many lime kilns in various parts of Vermont, I saw nothing here that convinced me this was the remains of a lime kiln (although I could be wrong).

The record in Foster's journal of digging marl and fulling and drawing the kiln, and a few references to being "at the Little pond" don't appear to be tied to either specifically. Regardless, the marl digging and the lime burning appear to be in the same vicinity, so a lime kiln was (is?) no doubt somewhere in the area of Little Pond.

Being inherently stable due to their low, squat design, most lime kilns survive many decades after being abandoned. But at the Little Pond site where we were led there were too few stones, little flat working area, no visible quarry or source of stone to burn, and no sign of any burned lime that should have been strewn about during the years of burning. And the site was only a few feet from the water's edge, which was not where a kiln would have been built, on damp ground that would have drained away the heat. No road in or out was apparent. Status of this site is "Needs more field work."

Windham County

A Brief History of The Vermont Lime and the Sherman Carbide Companies at Whitingham

Introduction

This site was literally stumbled into the fall of 1990 while checking out a possible lime kiln ruin that co-worker, Robert Dion at GE Aerospace, Pittsfield, Mass., had told me about. And that ruin was found (see Rolando

1992:270, WD-126), but much more was found. The overall site is an industrial archeologist's find of a life-time - a confusing assortment seemingly meaningless foundations, stone walls, and scatter of bricks - all of which at first defied interpretation. If there was ever a tangled mess of complex processes and layers of time against a backdrop of wilderness, this was it.

The site is located along a narrow, level strip of land that once lay astride the Hoosac Tunnel and Wilmington (HT&W) Railroad, on the east shore of the Deerfield River, about a mile north of the Vermont-Massachusetts state line. Before the Sherman Dam was built in 1926, the Deerfield ran through a deep gorge here; today it's a lake - Sherman Reservoir - some 100 feet above its former river height.

Early history of Lime Hollow

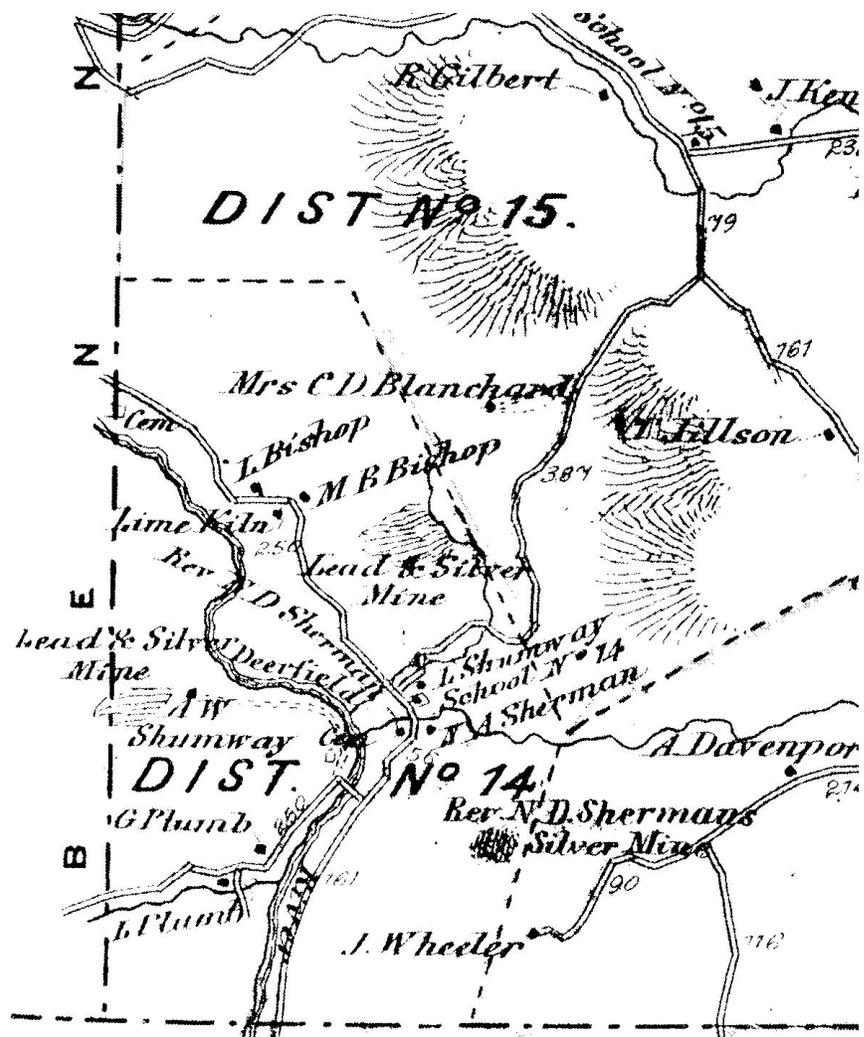
"Lime Hollow" describes an area south of Readsboro village that extends into southwestern Whitingham in Windham County. It is on the east side of the Deerfield River, which becomes the Sherman Reservoir at about the Harriman Power Plant (located at the town/county boundary). Lime Hollow, therefore, straddles two towns in two counties.

Lime burning started at Lime Hollow as early as 1820 when someone found good, burnable limestone nearby and roasted it for agricultural use. By 1830 there were as many as nine kilns operating in Whitingham; three being in the Lime Hollow section of town (Jillson 1894:46).

The 1856 Harwood map of Bennington County shows a fourth lime kiln, operated by Amaden & Son, also operating about the same time in the Readsboro part of Lime Hollow (see Rolando 1992:265, BE-FS7). Names associated with the lime industry in Whitingham were Bishop (Beers *Windham* 1869:36), John Parsons and Benjamin Battles (Jillson 1894:46), and Rev. Nathan Drury Sherman (Glover et al., 1994).

On November 6, 1867, the Whitingham Lead and Silver Mining Company was chartered by the General Assembly. Corporate members were M. B. Bishop, W. H. Follett and A. H. Tucker of Readsboro, and Parley Starr, H. N. Hix, and Shubael Atherton of Whitingham. Most were businessmen in either town. The charter authorized the company to explore "for lead, silver and other ores and minerals, and for working, smelting and vending the same." (*Acts* 1867:184-186). The Vermont General Assembly issued 66 charters for new business that year (a possible result of the end of the Civil War?).

Figure A-35. The southwestern corner of Whitingham and the already industrialized “Lime Hollow” area as it appeared in 1869. All the major players and their mining ventures are indicated. Beers Windham 1869:36.



In 1869, the Rev. N. D. Sherman was operating a lime kiln and working a nearby quarry that was identified on the Beers map as “Rev. N. D. Sherman’s Silver Mine” (figure A-35). The same map identifies a “Lead & Silver Mine” just to the north of Sherman’s near the name “M. B. Bishop” and another on the west side of the Deerfield River associated with the name “A. W. Shumway.” The recently chartered Whitingham Lead and Silver Mining Company does not appear on the map.

By 1894, “no startling results have been developed during the 20 years of [the Whitingham Lead and Silver Mining Company’s] existence” (Jillson 1894:47). During that time the HT&W had been built and a small village that grew around the lime kilns and saw mills became a railroad stop called “Shermans.” The US Government took notice and opened a small post office, probably at

the railroad station, which served the Sherman family and their neighbors until it closed in 1902 (Swift 1977: 514). With the railroad, the village of Sherman and Lime Hollow, made a significant stride toward industrialization, but by the turn of the century the “silver boom” petered out, just as interest turned to a less glamorous mineral - Sherman Marble.

The Vermont Lime and Sherman Carbide Companies

In a 1984 paper about “Old Readsboro and Whitingham,” 7th-grade student Charlotte Lefebvre wrote “I am expecting to receive a map and a copy of an original letter head from the Vermont Lime Company dated December 2, 1907 which I will add to this report.” This gives the first, early date for this new company. The 1910 issue of the *New England Business Directory* (page 425)

mentioned “Vermont Lime Company, Readsboro” in the “lime business” category (the previous available issue, 1902, mentioned lime being made only at Ira and Colchester, not Whitingham or Readsboro).

What is this new lime company? Was it at Shermans? Do any of the structural remains of the Sherman Carbide Company date back to the Vermont Lime era?

Sometime after 1910, the Sherman Carbide Company appears to have replaced the Vermont Lime Company:

From the small drylaid fieldstone lime kilns operated by the local farmers, the Shumways, Shermans, and Bishops, arose the Sherman Carbide Company. The carbide works were built in the early twentieth century before World War I. The high quality Sherman Marble was then used to make calcium carbide, essential for the fixation [conversion] of acetylene and nitrogen. In 1895, chemical engineers in Germany made cyanamid from limestone, coke, and nitrogen. Cyanamid was the essential ingredient in the production of high explosives.

The Sherman Carbide Company operated for a brief time and was purchased by the International Nitrogen Company of Wilmington, Delaware. The chemical plant was dismantled sometime before the land was sold in 1924 to New England Power. It is possible that the Sherman Carbide Company, or International Nitrogen, was manufacturing high explosives at Sherman. The village may have played an important role in the arms buildup prior to World War I. (Glover et al., 1994:60-61).

World War I ends; Demise of the Industry

By 1920, World War I was over and all was quiet at the carbide plant (figure A-36). So it is no surprise that the 1926 Business Directory issue makes no mention of the Sherman Carbide Company or anything related to the lime/carbide business in Readsboro or Whitingham. That was also the year construction started on the 110-foot high dam and hydroelectric power station (Sherman Station) at Rowe, Massachusetts, some 1½ miles south of the carbide plant. The nearby Deerfield River gorge was slowly flooded, the HT&W moved some of its tracks (and bridges), and the Sherman Reservoir was born.

For nearly 20 years (up to 1924), it had been the custom for the Department of Geology and Geography of Oberlin College, in Oberlin, Ohio, to offer a field course in geology as an organic part of the Oberlin summer

session (Hubbard 1924:261-262). The students registering for this course numbered from six to twelve, and the work was carried out on three summers in south-central Vermont. In 1924, the class numbered nine from three colleges: Oberlin and Otterbein in Oberlin, and DePauw in Indiana, and they went into camp about the center of an area that covered most of the towns of Readsboro and Whitingham. Class leader was Professor George D. Hubbard of Oberlin, who had conducted geological projects for several seasons previous. South-central Vermont had been chosen in spite of its distance from Ohio because it had not already been worked and because it had a wide range of geology ‘problems’ within a small area. And although he didn’t give construction-in-progress for the Harriman Reservoir dam that resulted in many fresh rock cuts as one of the reasons for choosing to study this area, he did comment how these “greatly aided the geologic work.” From a coarse, hand drawn map of the geologic features in the study area, Hubbard and his students appear to have set up camp (tents) in Readsboro, on a knoll overlooking the Deerfield River to the south, about a half mile east-north-east of the center of the village (Hubbard 1924:282ff, Geologic map), near “the Whitney pasture land.”

Hubbard spent much of his report discussing many facets of the geology of the Readsboro-Whitingham area. Of the Sherman area, he described it as being home to some of the oldest metamorphic rock - marble - to which is given the name of the town [sic] where it was most extensively exposed and worked - Sherman marble.

Another notable occurrence of marble has been extensively worked at Sherman on the railroad, a little over two miles downstream from Readsboro. Railroad construction necessitated a cut of considerable extent in the marble, and a few years ago a large plant was put up to make carbide of calcium from the marble. The quarry opened shows a fine section of the marble dipping eastward into the hill. And southward for nearly one-half mile a ridge of marble can be traced rising as a small hill in the side of the valley.... (Hubbard 1924:270)

This area of marble continues northward more than a half mile from the old carbide plant and the railroad cut. Some of the distance the marble is covered with waste, but northward under the power line it can be seen almost continuously for several hundred feet. Again on the west side of the river a few hundred feet



Figure A-36. *The Sherman Carbide Company complex at it appeared sometime before being razed, but possibly after closing (ca1920?). View is looking east from across the Deerfield River before it was flooded. Note one of the two concrete water storage towers at upper right, a building containing three furnaces (three arches) at lower right, and a large, long supply of raw stone in the center, which was drawn from the quarry that is behind the hill off-photo to right. www.alpenwald.com/earlyreadsboro, “Lime Kiln Across River.”*

upstream from Sherman Bridge are small outcrops which were opened commercially long ago (Hubbard 1924:271).

The 1856 McClellan and Beers 1869 maps of Whitingham both show a bridge crossing the Deerfield River at about Sherman, but the 1899 USGS Wilmington topo doesn't. What “bridge” Hubbard addressed above as “Sherman Bridge” is unknown.

At Sherman, graphite is common particularly in the lower layers exposed. Crystals as large as peas occur, but more frequently they are mere specks to the size of pin heads. Much of the graphite is in bunches, but some is in more or less continuous layers, making the rock gray and streaked. Samples could be taken having 10 to 15% graphite. Most of it is foliated or flaky, some shows a radiate pattern. Graphite is not so common higher up in the Sherman outcrops, but occurs nearly all through the rock. In other places it is also sparing. At camp, on the Whitney farm one-half mile east of Readsboro, many small crystals were seen. (Hubbard 1924:273-274).

Hubbard also mentioned finding tremolite, actinolite, mica (muscovite), and pyrite in the Sherman marble near the old carbide plant.

Some very showy specimens [of tremolite and actinolite] collected near the upper contacts, also near the railroad near Sherman.... The crystals are long, prismatic, often very slender and range in color from white through delicate tints of aquamarine to green and even dark green (Hubbard 1924:274-275).

In summing up, under the heading of “Economic Resources,” Hubbard states:

In spite of a good deal of interest, not to say mild excitement over possible wealth in metallic ores in the Readsboro region, it seems necessary to state that the place has no promise of importance in this direction. Gold and silver so ardently sought at time by men are not to be found here in workable quantities. Traces of the former have been found, fake assays have made disturbing returns, but the stern fact remains that more money had already been put into the gold and silver

mining business of this little region that has ever been taken out or is liable to be taken out, no matter how much may yet be invested.... The chief values with geologic connections are soils, water, and water power, building and road materials, gravels, and sands. (Hubbard 1924:339-340).

The marble at Sherman has been shown by actual use to be valuable for the manufacture of calcium carbide. During the early part of the war [World War I] a plant for its manufacture was constructed at Sherman at a large cost. A very excellent product was made for six or eight years, but about a year ago the plant shut down and now it is being dismantled. There seems to be no local reason why the process should not be successfully carried forward. But the place is some distance from a coal supply and out on a stub railroad expensive to operate and these things are handicaps. On the other hand the plant is far enough from industrial centers to have little or no detrimental contacts with the large labor problem. Further, the product is claimed to be very superior. The marble is abundant and very easily gotten from quarry to plant. The geologic and geographic conditions may be considered very satisfactory (Hubbard 1924:342).

Sherman Revisited

For two months the summer of 1993, Public Archaeology Laboratory, Inc. (PAL, Inc) of Pawtucket, RI, conducted an archaeology survey (Phase IA) for eight hydroelectric developments along the Deerfield River in Vermont and Massachusetts (see Glover et al., 1994). This survey was done to assist the New England Power Company in meeting Federal Energy Regulatory Commission requirements for the relicensing of the Deerfield River Hydroelectric Projects (FERC L.P. No. 2323).

One of the eight development areas in the survey was the Sherman Development, which included both sides of the Sherman Reservoir, from the Harriman Power Plant south to Sherman Dam in Rowe, Mass. So-called "spot checks" - walkover surveys of particular areas within the developments - were done to visually check for known or yet undiscovered cultural features. The spot check area in the Sherman Development extended along the east shore of the reservoir from the Harriman Power Plant 2¼ miles south to Wheeler Brook.

A number of sites and remains were found in the spot check area. Historic-period sites included two "lead and silver" mines, three lime kilns, three homesteads, a

schoolhouse, and what PAL, Inc., described as "the colossal ruins of a late industrial period carbide works" (Glover et al. 1994:94).

The Bishop lime kiln, not found by this writer in 1990, was also not found by PAL, Inc. (see Rolando 1992:269, WD-FS14). It was thought in 1990 that it might have been in the vicinity of a gravel pit and destroyed due to construction of the HT&WRR, the accompanying road, or both, but that subsurface remains might yet exist. PAL, Inc, generally agreed with this finding, adding that the graveling operation, which was probably associated with the construction of the Harriman and/or Sherman developments, impacted these sites (Glover et al., 1994:96).

PAL, Inc., also verified a lime kiln ruin that was found and recorded in 1990 (Glover et al., 1994:96; Rolando 1992:270, VT-WD-126).

Additional sites located and recorded in the spot check area are as follows (in sequence by site identification number). All except the carbide plant and the saw mill and dam are indicated on the Beers 1869 map of Whitingham in District 14 (figure A-35, page A-57).

Rev. N. D. Sherman residence, VT-WD-142: Rev. N. D. (Nathan Drury) Sherman was born 1818 in Savoy, Mass., arrived at Whitingham from there in 1840, settled on a farm and commenced preaching at the Universalist Church in 1855 (Child 1884:304; Sherman 1991:1931). His residence is shown on the 1869 Beers map of Whitingham on the opposite (south) side of a small Deerfield River tributary from the District 14 School house (figure A-35). Remains consist of a drylaid fieldstone foundation with good to excellent physical integrity (Glover et al., 1994:117).

N. A. Sherman residence, VT-WD-143: N. A. (Nathan Albert) Sherman was Rev. N. D. Sherman's son. He was born 1842 at Savoy, Mass., (Sherman 1991:1933) and his residence is shown on the 1869 Beers map of Whitingham across the road from Rev. N. D. Sherman (figure A-35). In the PAL, Inc., site plan, however, it is shown within a few dozen feet of the main Sherman Carbide complex and about 125 feet up the road from the VT-WD-126 lime kiln(?). Surface remains are described as good to excellent (Glover et al., 1994:117).

Sherman Carbide Company, VT-WD-144: Remains of this complex are spread over about a 350-foot (east-west)

Figure A-37. *Fragile ruins of a stacked group of four heavy duty, industrial refractory ovens manufactured by the Missouri Firebrick Co. of St. Louis, located in near the center of the old Sherman Carbide complex. Quiet reminders of more sooty and hectic days, today they provide shelter for wildlife. Watercolored photo by Matthew A. Kierstead (1999); Rolando collection.*



by 875-foot (north-south) area, bordering the HT&WRR right-of-way, about a half-mile north of the Vt.-Mass. state line. In its site plan, PAL, Inc., identifies 20 structures/remains at the site (Glover et al., 1994:99, Figure 6-8). Someone with an intimate knowledge of early 20th-century carbide manufacture might better describe their uses. There appears to be a material flow from quarry, to furnaces, to railroad siding, but the many other buildings with specialized ovens (figure A-37) that beg other purposes for their existence. Some walls are poured concrete, others, possibly from the earlier Vermont Lime Company era, are mortared stone. One stone wall adjacent a building identified as “furnaces” is 13 feet high.

Three buildings on the plan have the word “furnace” associated with them. One is at the southwest corner of the site, adjacent the railroad right-of-way, showing what appears to be three furnaces. And three granite archways can still be seen here. But what it gong on? Three “furnace fire boxes” are indicated in the building immediately to the north. Four furnaces are indicated at

yet another building, just to the northeast. Just north of this is a building foundation with a pile of fire brick.

A pair of 16-foot square by about 20-foot high, concrete water towers set atop two hills overlooking the south end of the complex, possibly providing a large, ready volume of water in case of fire down below. At the north end of the complex is an unfinished structure, of poured concrete and steel reinforcement rods sticking out the tops of unfinished columns. Some say it was to be a hotel or rooming house for workers, and this could be given its being a couple hundred feet away from the industrial center of the complex.

A 12-foot long by 6-foot wide iron frame identified by PAL, Inc., as a railroad trestle lays on the ground near the former HT&W right-of-way. It looks wide enough to accommodate the original 3-foot gauge, but not nearly as strong for the standard 4-foot 8½ -inch gauge (and the associated larger engines and cars) that it converted to in 1912-1913. Might the abandoned trestle be a vestige of that earlier gauge, possibly discarded when a heavy duty stone-arch bridge was built a few hundred feet to the

north? Or maybe when the tracks had to be moved to higher ground when the Sherman Dam was built?

The site begs for a detailed analysis with measured drawings of each structure accompanied by archeological excavations into the foundations to better understand what went on there.

A few easily assessable, loose firebricks with various brick marks and sizes, were recorded by the writer in 1992 (brick dimensions are Length by Width by Height):

- “NABCo” (North American Brick Co?), 8 x 3³/₈ x 2¹/₄.
- “M.D. Valentine & Bro, Woodbridge, N.J.” 9 x 4¹/₄//2¹/₂ x 2¹/₄ (narrow-end brick for lining a round furnace).
- “CERVIS” (Garfield Fire Clay Co., Penn.), ???-1927
- “I. E. Co.” (unk mfg), 8⁷/₈ x 4¹/₂ x 2¹/₂
- “Ostrander, Troy NY, Special M[F]R” 8⁵/₈ x 4¹/₂ x 2¹/₂
- “(no mark)” 9 x 4³/₈ x 2¹/₄
- “????6294, Missouri F. B. Co., St Louis” large, oval shaped refractory oven (see figure A-37)

Rev. N. D. Sherman Silver Mine/Lime Kiln, VT-WD-148: The Rev. N. D. Sherman mine is an obvious feature identified on the 1869 Beers map of Whitingham. It stands out in large bold lettering (indicating he was an early subscriber for a copy of the Atlas). The mine was located about 1,200 feet southeast of his residence.

Whereas the two other mines in the vicinity are identified as “lead & silver” mines, Sherman’s is a silver mine only (figure A-35). Many have doubted a presence of silver in Lime Hollow going back to geologist Edward Hitchcock, who reported that “we have never been able to learn the precise locality of even one workable mine of silver” (Hitchcock et al., 1861:53-54). Vermont State Geologist George H. Perkins later reported:

Vermont has never, so far as I can ascertain, produced any silver until within a few years ago. It has been obtained in small quantity from the chalcopryite and pyrrhotite which are mainly worked for copper. The total amount of silver produced in 1906 was 1,323 ounces, worth \$886 (Perkins 1908:57)

PAL, Inc., offers a more plausible explanation:

Several scenarios are possible concerning the reported lead and silver mines in the Sherman and Readsboro area. Either the Bishops, Shermans, and Shumways

incorrectly identified the crystalline graphite in the foliation as galena (lead ore, which contains small amounts of silver), and reported it as such; or small pockets of the ore are actually present in the foliation and were correctly identified. Interestingly, an assay of the Sherman Marble from five outcrops in 1959 failed to identify the presence of galena (Skehan 1961:55-56). This may indicate either that the assay samples were too small to pick out traces of galena, that galena was never part of the formation, or that galena is not located in the Sherman marble, but in some other metamorphic rock (Glover et al., 1994:57-58).

District 14 School, VT-WD-149: School District 14 was in the extreme southwest corner of the town of Whitingham and was near the junction of the two main roadways of the district - one from Readsboro to Massachusetts, and the other from the hills of the east, dropping down the steep incline to the Deerfield River valley. It was not uncommon to find district school houses at or near road junctions for the convenience of students, some of whom had long distances to walk between home and school. The steep road still appeared on the 1899 Wilmington, Vt., topo, but by the 1950s, was described as having “been abandoned so long that it is all grown up to brush” (Graves 1975:84).

Date of the school’s construction is unknown, but it appears on the 1856 McClellan map of Whitingham as “S.H.” between the Shumway and Sherman residences. As early 1782, the Vermont legislature mandated that towns be divided into school districts, each with its own one-room school. That ended in 1890 when centralized school districts replaced the multitude of small districts.

Remains of the school were described by PAL, Inc., as having a drylaid granite foundation with a later cement steps added.

L. Shumway residence, VT-WD-150: This residence was immediately behind the District 14 school house (figure A-35). This might have been Lewis Shumway, who was born in Whitingham in 1821 and died there in 1877. The foundation is described as being of drylaid fieldstone walls.

Lead & Silver Mine and Lime Kiln, VT-WD-151: This mineral area is shown on the 1869 Beers map of Whitingham about 1,100 feet due north (and into the woods) of the District 14 schoolhouse site (figure A-35).



Figure A-38. The caption at lower-right reads “On the H.T.&W.R.R., Lime Kilns Readsboro Vt.” (Note: plural “Kilns”). That these kilns were ever in Readsboro is highly questionable. In addition to interviews with native and long time residents of Readsboro, many inspections of possible locations for this 1880s-1930s-type lime kiln have been made in and around the village area in proximity to the former HT&W tracks without identifying its location. Might this be a transitional kiln of the elusive ca 1905-1915(?) Vermont Lime Company at Lime Hollow, predecessor to the Sherman Carbide Company? www.alpenwald.com/earlyreadsboro, “Lime Kiln interior.”

No name (or lime kiln) is associated with it on the map, but it isn’t too far (700 ft?) from the M. B. Bishop residence, which is shown with a lime kiln across the road from it.

Visual surface remains consists of outcrops and ledges of gneiss and granite, a drylaid 41- by 33-foot foundation of cut and uncut stone, and a drylaid 20- by 20-foot square by about 7- to 8-foot high lime kiln.

Saw Mill and Breached Dam, VT-WD-152: This is an

undocumented site of a saw mill and breached dam, about 500 feet northeast of the District 14 school house. It consists of the remains of one drylaid fieldstone foundation wall and a breached drylaid dam. PAL, Inc., suggests it “may have contributed to the lime “boom” during the 1830s.”

Writer’s observation: Clark Jillson of Whitingham, author of *Green Leaves from Whitingham, Vermont* (1894), which still is the authoritative history of the

town, wrote that “about 1830 there were as many as 9 kilns in full operation, 3 being at Lime Hollow” (Jillson 1894:46). It is assumed he is addressing the 3 kilns in the Whitingham end of Lime Hollow. He didn’t specifically identify the three lime kilns (it is assumed he didn’t include the ca1856 Amaden & Son kiln since it was in the Readsboro end of the hollow) or how many (which ones?) were still operating in 1894. But he wrote (on the same page) that the industry flourished from 1820 to 1840 “when the wood began to be scarce and it became necessary to abandon the business.” And since his book was published in 1894, lime burning activities after that date at the carbide works were not part of his accounting for numbers of kilns.

So where am I going with this? Just that the sole lime kiln identified on the 1869 Beers map of Whitingham in District 14 is that associated with the Bishops, the only one in the Whitingham area of Lime Hollow that both PAL, Inc., and this writer didn’t find. Yet, three kilns *were* found. Jillson had to have known of the Bishop kiln since it was so obviously indicated on the Beers map. So, were there three or four lime kilns operating in Whitingham’s section of the hollow? Or, maybe that third kiln, at VT-WD-151 (the other two at VT-WD-126 and -148), is in fact, the elusive Bishop lime kiln? So maybe in fact the Bishop lime kiln was found after all? ...Matt?

NOTE: The next three lime kiln sites, VT-WD-253, -270, and -271, were recorded thanks to local historian Robert Haas of Westminster West, who guided me to all three sites on a warm, sunny/buggy May 30, 2007, day. The three sites are within a half-degree of a 3½-mile straight line between the south- and north-most ruin (N7° to 8°E), and range from 1,100 to 1,200 feet in elevation, which probably says something of the geology of Windmill Mountain and why the kilns were built where they were.

Goodell Farm Lime Kiln, VT-WD-253, Westminster: This site (formerly WD-LK03; Rolando1992:267) is the south-most of the three Westminster lime kilns. It is located about 1,800 straight-line yards WSW of Westminster West village, just north of a washed-out dam that held back a former ice pond (Haas to Rolando, May 30, 2007). Standing at this site is the remains of an 1830s-1840s era farmer’s intermittent type lime kiln that

was operated by Alvan Goodell, who owned a farm just downhill along West Road (Scott 1948). The site is about 1,200 feet elevation.

The kiln, about 90% intact and in exceptional condition, was built of dry laid stone quarried from local ledges. Its front wall rises 9 feet and extends up to 33 feet across the narrow north-south depression between two rock outcrop ledges. The intact draw arch measured 3 feet high by 16 inches wide, and is capped by a substantial lintel stone (figure A-39).

The inside shaft is oval, its diameter measured about 7 feet wide by 8 feet long with the long axis in line with the draw arch. Depth from the top to breakdown inside the back wall is about 5½ feet, which calculates to about 3½ feet of breakdown inside the shaft, hinting at a higher front wall and shaft at one time. Curiously, the top of the shaft appears level with the top of the front wall, as if the top portion of the structure had been sheared level at one time (not likely). The ground on either side and behind the shaft drops off a few feet around the kiln.

A quick search of ledges in the immediate vicinity revealed no rich limestone or calcite that would have been burned for lime. No worked quarry was found, but many outcrops of large schist-appearing stone is in evidence within about a 30- to 4-foot radius of the site, which might answer where stone came from to burn in the kiln. In a description of another lime kiln in the area (see VT-WD-271, following), “Limy schist forms much of the bedrock in this local area.... That rock is in essence an impure metamorphosed limestone, the limestone having originally been a sedimentary rock consisting of the consolidated skeletons of marine invertebrates long ago deposited on the ocean floor. The limestone-containing schist was quarried, broken into small pieces, and then loaded into the kiln together with locally harvested wood fuel below it.” (Windmill Assn. 2006:8).

The good surviving condition of this kiln structure bears continuing testimony to Herbert W. Congden’s oft-quoted “...early Vermonters built well.”

Cooper-Ellis Lime Kiln, VT-WD-270, Westminster: This lime kiln is on the property of maple syrup manufacturer Frasier Cooper-Ellis, which is up a gated, private road westward off Bemis Hill Road at the intersection of Arnof Way, about 3 straight-line miles north of Westminster West village. The kiln ruin was found about a quarter-mile up the right (uphill) side of this narrow, twisting woods road, at about 1,100 feet

Figure A-39. Robert Hass of Westminster West, standing next to the Goodell lime kiln ruin's draw arch on May 30, 2007. This ruin is in particularly good condition for having survived 175 years. Rolando photo.



elevation. The ruin sets about 25 feet off and slightly uphill from the road and was well hidden by foliage. Initial appearance of the kiln is that of a partially collapsed stone wall, but closer inspection reveals a circular, 8-foot diameter chamber, about 7½ feet high behind a large dying tree trunk. The front wall of the kiln is collapsed with no visual evidence of the draw arch (the usual weak point in these old kilns). The shaft of the kiln was built into the higher ground behind it. A search for the quarry was not made; no history of the kiln is known. Condition of the kiln is best described as “fragile.”

Pinnacle Association Lime Kiln, VT-WD-271, Westminster: What should have been the easiest “find” of the day, this kiln site turned out the longest and most frustrating to locate (if only we had parked another 100 feet down the road). The ruin is Station #4 (about 1,150 feet elevation) on the Windmill Hill Pinnacle Association’s Dunn Nature Trail (Windmill Assn. 2006:8), and is north-most of the three known Westminster lime kilns. Trail head is 1522 Bemis Hill Road, in the extreme northwest corner of Westminster. Here is a tiny parking area and kiosk with maps and information on the trail system, about 1½ miles west of Westminster West Road. The ruin is about a quarter-mile hike down the trail.

The front wall of the kiln has collapsed atop the draw arch and stones from the wall are scattered downward

from the structure, leaving the shaft open for inspection from the trail. The round shaft measured 9½ feet in diameter and the back wall of the shaft rose 11 feet above the interior breakdown. The kiln’s bottom is probably another 3 to 4 feet under the breakdown. Two unmarked red bricks were found adjacent to the front wall, measuring 7¼ inches long by 3½ inches wide by 1⅞ inches thick. Purpose of the bricks is unknown, unless used to better seal the iron venting door for the draw arch against the rough stone exterior. Original owner/operator and history of the kiln are unknown. What remains is fragile, at best, but fortunately is preserved and protected by the Pinnacle Association, as are the many nearby stone walls and cairns.

Windsor County

Note: Credit for finding the first four lime kiln ruins, VT-WN-231, -232, -233, and -234, following, goes to Joanne Williamson, teacher of grades 4 through 6 at the Plymouth Elementary School. On May 18, 1995, we led her classes on all day tour of lime kilns in the vicinity as part of Vermont Archeology Week (now “Vermont Archeology Month” and held during September). She had previously found the kiln ruins as a result of finding other kiln ruins mentioned in “the book.” The kilns were recorded a month later, assisted by Bob West.



Figure A-40. The “West Twin” of the Black River Twin Lime Kilns in Plymouth. Note small draw arch compared to its twin at right. Rolando photo.



Figure A-41. The “East Twin” of the Black River Twin Lime Kilns in Plymouth. A heavy lintel stone has helped keep this ruin intact. Rolando photo.

Black River Twins Lime Kilns, VT-WN-231, Plymouth: This pair of kiln ruins is located east of Route 100, about a half-mile north of the Plymouth Elementary School and 200 feet north of a highway pull-off on the west side of the highway.

The western-most of the two kiln ruins is only 20 to 30 feet east off the edge of Route 100, at the edge of the forest. Care must be taken exploring here lest one accidentally fall into the 8-foot diameter by 6½-foot deep hole of the ruin. The front of the kiln faces to the east, toward the Black River, and measured about 15 feet 5 inches across the bottom (figure A-40). The draw arch measured 29 inches wide by 32 inches high. A 4-foot high front wall section, of which the draw arch is part, is slumping forward and away from the main kiln structure and might collapse in a few years if not supported and stabilized. The overall ruin measured about 9½ feet high at its highest point. The ruin is made of rough cut and random laid stone. The draw arch is open through to the interior; it measured about 6 foot deep and is stone lined. No firebrick was seen anywhere in association with the ruin. A flat ground area lays directly in front of (east) the ruin where the eastern edge shows burned lime eroding out. This was obviously the loading area for the burned lime.

The eastern-most of the two kiln ruins is about 125 feet to the east, on the east side of Black River (figure A-41). This kiln ruin faces west, looking almost directly back at the western-most kiln ruin. It is in more disturbed

condition than the other ruin, an old logging road having been built up the side of the hill behind the ruin and plowed into the top of it. The interior is fully filled so that what remains is only the front (west) wall of the kiln and portions of the side (north and south) walls. The draw arch measured 24 inches wide by 45 inches high. Its full depth cannot be measured due to breakdown choking the inside, about two feet in. The ruin measured about 18 feet across the bottom and rises to exactly 11 feet at its highest point. It is made of rough cut and random laid stone. No firebrick was in evidence.

These kiln ruins are most likely those shown on Scott’s 1859 geology map of Plymouth, which is the only place that two kilns are shown on opposite sides of Black River between Woodward Reservoir and Unionville (today’s Plymouth Union).

CCC Road Lime Kiln, VT-WN-232, Plymouth: The ruin is located about 150 feet north of the intersection of CCC Road and Route 100. CCC Road is the locally accepted name for this road, which is the first road leading west from Route 100 about a quarter-mile south of Woodward Reservoir.

The ruin is low, circular rise, about 8 feet inside diameter by about 3 feet deep in the middle. Pieces of burned lime are eroding out of the top of the kilns embankment. The kilns draw arch is not visible. About 100 feet to the northwest, up a slight rising draw, is what appears to be a limestone quarry that probably provided

stone for burning in the kiln. About 50 feet to the northeast of the kiln ruin is what at first glance appears to be another kiln ruin but turned out to be loose rocks piled atop a ledge outcrop. What appears to be an old road runs somewhat between the ruin and the adjacent hillside but peters out near the rock pile.

Except that it appears to have operated in the early- to mid-19th century, nothing further is known about this kiln. It doesn't appear in the 1859 geology map of Plymouth. No firebrick was in evidence.

Roadcut Lime Kiln, VT-WN-233, Plymouth: The kiln ruin is about 20 feet west of Route 100, on the opposite side of the highway from the southwest end of Woodward Reservoir. The kiln ruin is obvious from the highway due to the approximately 8-foot-wide by 4-foot-high mound of white burned lime residue. It is just inside the woods at the top of the mound of white lime.

The ruin consists of an approximately 6-foot diameter feature whose perimeter edges rise only inches above the center portion of the feature. Burned, white lime erodes easily from the northern edge of this raised perimeter. Little else remains on the surface to define the kiln ruin. The kiln is not indicated on the Beers 1869 or the 1859 geology maps of Plymouth.

It was appropriately named "Roadcut Lime Kiln" by the 4th, 5th, and 6th-grade class from Plymouth Elementary School the day of the May 18th tour.

Hillside Lime Kiln, VT-WN-234, Plymouth: This kiln ruin is about 300 feet east of Route 100 at a point that is about 1,000 feet south of the Plymouth-Bridgewater town line and about 600 feet south of VT-WN-185, Reservoir Brook Lime Kiln (Rolando 1992:253). The kiln is about 30 feet east of Reservoir Brook and visible from it.

It measured about 6 feet 10 inches high at its highest and 18½ feet across at the bottom. The center draw arch measured 80 inches wide at the bottom, 48 inches wide near the top, and 36 inches high at center. The draw arch is part of a distinct 29-inch deep front wall section that rises from about a foot high at the right-front corner (southwest corner) and gradually slopes upward, reaching the top of the ruin about over the draw arch, where it is 46 inches above the ground and 55 inches from the south wall. No firebrick was in evidence.

The ruin is built into the hill behind it such that the top, front point of the kiln is about 10½ feet from the

back. The interior is generally caved-in and measures about 5 feet in diameter at the bottom. An approximately 48-inch wide section of inside standing wall that stands at the front-side exhibits a glazed surface. A number of small trees were growing out of the walls.

A woods road leads 100 feet uphill behind the ruin from the south to a limestone quarry, which might have been the source of stone for burning. No work marks were visible on the quarry walls.

The ruin appears similar in construction to that farther north along the same side of the brook (VT-WN-185, Reservoir Brook Lime Kiln), but especially similar to both Black River Twin Lime Kiln ruins (VT-WN-231) about ½ mile north of the Plymouth Elementary School.

The ruin does not appear on the Beers 1869 nor the Scott 1859 geology maps of Plymouth. It was appropriately named "Hillside Lime Kiln" by the Plymouth Elementary School students the day of the May 18th tour.

Peter Squire Lime Kiln, VT-WN-235, Weathersfield: This kiln ruin came to my attention as part of a Vermont Archeology Week tour of lime kilns in the Weathersfield area on May 11, 1995. The site is a few hundred yards south off Route 131, up a private (and gated) dirt road owned by the Cersosimo Lumber Company (of Brattleboro) for access to their gravel pit farther up the road (the road is not indicated on the USGS topo map). The imposing kiln ruin is slightly uphill and on the west side of the access road, and in good condition with all four external and its round internal walls generally intact.

According to local history authority Edith F. Hunter, then president of the Weathersfield Historical Society, the kiln was owned by Peter Squire (1789-1867) and is considered the oldest of the many kilns in Weathersfield. John Squire, Peter's father, brought the family to Weathersfield in 1799. A house identified as "P. Squire" is indicated on the 1869 Beers map of Weathersfield on the north side of today's Route 131, approximately across from the Cersosimo access road gate.

Abraham Smith Lime Kiln, VT-WN-236, Weathersfield: This kiln was initially discovered sometime just previous to 1995 by Virginia (Ginger) Wimberg, teacher at the local Middle School, after having become curious about a "pile of stones" off Little

Ascutney Road, which skirts the south edge of Little Ascutney Mountain. As part of an Annual Vermont Archaeology Week event (May 11, 1995), I led a tour of local lime kiln remains and in the process, we visited this one and confirmed her suspicions that the feature was an old lime kiln, one of many already known to exist in the town and vicinity.

The kiln ruin was very identifiable once the brush was cleared away, exhibiting many lime kiln features, such as the fore wall, draw arch, and approx. 8-foot-diameter depression at the top where upper opening of the kilns internal throat would have been, before it partially caved in and also had become a local domestic dump site. A month later, the site became the focus of a general “green-up” by locals and historical society members led by Edith Hunter, the local historical authority, from whom most of the information for this report was provided.

It is not known who built or operated the kiln, or the time period of activity, but from its general appearance, size, and location, it appears to be a usual farmers kiln, and probably dates to the early to mid-19th-century. Since records indicate that Abraham Smith (1754-1812) as owner in 1798 of the property which is the site of the kiln ruin, it is given the name “the Abraham Smith lime kiln” by the Weathersfield Historical Society. As 1798 seems much too early for this kiln, however, there *might* not be any actual connection between Smith and the kiln.

SECTION D - GLASS WORKS

Glass Works is a new subject field being introduced to the overall scope of Industrial Archeology in Vermont. Since there are sufficient published materials available to those who wish to pursue an in-depth study of the science and practice of glass making, that will not be repeated here. See Richard Carter Barret, L. Diana Carlisle, Warren McLaughlin, and Max P. Petersen in the References Cited at the end of this Addendum. There are also archival data and artifacts of the glass industry at The Sheldon Museum in Middlebury and the Bennington Museum, Bennington. The focus of the glass works that follow, therefore, is to describe under what circumstances and in what period of time they operated, where they are located, what surface remains exist, and what potential exists for subsurface archeological remains.

Addison County

Vermont Glass Factory/Lake Dunmore Glass Company, VT-AD-1481, Salisbury: This is the site of two of Vermont’s four major historic glass manufacturers: the earlier Vermont Glass Factory and the later Lake Dunmore Glass Company.

The Vermont Glass Factory was the earliest glass factory to be chartered and organized in Vermont. Chartered on November 3, 1810 (*Acts and Laws* 1810:131-133). The original investors were Troy, NY, businessmen and although the charter didn’t mention any town, Epaphras Jones, who recently had arrived in Salisbury from Connecticut and owned vast tracts of property at Lake Dunmore, was the person of influence who steered the investors to his lands along the northwest shore of the lake. A second charter in 1811 “reviving” the first charter made Salisbury the official home of the company (*Acts and Laws* 1811:113-114). Construction of the glass works started immediately with the works opening for business the fall of 1813 (Petersen 2001:38). In 1813, by an act of the Legislature, the Vermont Glass Factory was given “the exclusive right of manufacturing glass in the state” for a term of eight years (*Acts and Laws* 1813:171-172).

Hints of what might have stood at the works are depicted in a deed at the Sheldon Museum and also on company money (script), both shown in Max Petersen’s book (Petersen 2001:23, 25). The factory glass house was built entirely of wood, surprising (but not uncommon) given the nature of the furnaces and the high temperatures, up to 2,000°F, needed to make glass. According to Petersen, Salisbury town records show that an on-site brickyard made bricks from which the two main furnaces, and smaller auxiliary furnaces and chimney were made. The two main furnaces were designed to have 10 crucibles each to be served by one glass blower each (Petersen 2001:24). Main product was window pane, but bottles, bowls, and decorative pieces were also made (Petersen 2001:39). A higher-than-expected amount of iron in the local sand, however, caused a greenish tinge in what should have been completely transparent window glass.

The works consisted of a saw mill to cut the huge amount of wood needed for fueling the furnaces, plus a large 100- by 60-foot main building (in addition to the furnace house), 12 houses, a tavern, and storage area.

In 1814, the works bought some land along the Middlebury River in East Middlebury, five miles to the north, and built a smaller glass work there (see VT-AD-1491, page A-70),

Business at the glass works peaked the summer /fall of 1814, but on March 27, 1815, fire, that bugaboo of wooden industrial buildings, struck at the Lake Dunmore works. The main factory building and all buildings attached were consumed but the furnaces, their foundations, drying ovens, and calcining ovens were not damaged (Petersen 2001:51). Sales had already begun to slip badly, however, and some investors were ready to jump ship, so it is no surprise the company was closed on August 30, 1817, when its chief supporter, Epaphras Jones resigned from the company (Petersen 2001:55).

Since the deed drawing depicts the works buildings back slightly from the shores of the lake, Petersen speculates that the factory buildings stood on the site of the present (2001) Sunset Lodge on the lake's West Shore Road; others say it sat along the shore line of the former Camp Dunmore for Boys property, and yet others say it's under water because the lake is now higher than it was 200 years ago (Petersen 2001:24).

Interest revived in the old idle glass works about 15 years later, this time by an all-Vermont group of investors, who were chartered on November 3, 1832, as the Lake Dunmore Glass Company (*Acts and Laws* 1832:96-99). The new company bought up the old Vermont Glass Factory property and were soon hiring glassmakers from the struggling Champlain Glass Company at Burlington, which had suffered a disastrous fire the year before (see VT-CH-1023, Champlain Glass Company, page A-71). They were in full production the next February (Petersen 2001:84).

The new glass works was in full production early in 1833, producing window glass as did its predecessor, but with a difference - thinner and with a light blue hue. Petersen says this could be the result of changing sand supply, importing it from Pittsford, which had less iron than that found locally at Lake Dunmore. (Petersen 2001:90).

A new furnace was built in 1839 and in 1840, both the Champlain and Lake Dunmore glass factories hit their highest value of total goods produced - \$55,000 (Petersen 2001:91). But from there on it was downhill for the works as financial problems continued to hound the investors and costs for fuel, wages, and raw materials continued to rise. Stiff competition and faltering manage-



Figure A-42. *About a 2-inch diameter piece of rough waste glass from the vicinity of the Lake Dunmore glass-making site. Rolando photo.*

ment caused staff reductions that led to the works shutting down in 1842, bringing an end to glass making on the shore of Lake Dunmore (Petersen 2001:93).

In 1852 the property was purchased by Edward D. Barber of Middlebury, beginning the history of the resort hotels. The Dunmore Hotel was built adjacent to the glass factory and used houses built by the glass works for its employees as cottages (Rucker 1998:1). The hotel burned in 1906. Camp Dumore followed at the site, including a camp building (without foundation) built on, or adjacent to, the glassworks site. Keewaydin Camps bought the property around 1990 and most of the old buildings were demolished.

The site was originally recorded by Donna Jerry of the Division for Historic Preservation on June 22, 1978 as FS-37(AD); it was updated by Steve Nelson, January 22, 1981, and reidentified FS-49(AD). The site is located about 1½ miles northeast of Salisbury village, on the west side of Lake Dunmore, just southwest of the intersection of West Shore Road and Sumac Lane.

When last visited by this writer in November 2006, much glass slag ("frit") could be seen along the shoreline (figure A-42). While there that chilly fall day, contractors were digging a deep hole about 100 feet north of the bay to improve a waste line, but no glass/brick/industrial-related artifacts made an appearance. Considering that most of the area has not been severely developed, and that which has, isn't dense or possibly not immediate to

the overall site of the glass works, potential is still excellent that significant subsurface remains might yet exist. As Max Petersen said, “The actual site may never be located without an archaeological exploration of the area” (Petersen 2001:26).

Vermont Glass Factory, VT-AD-1491, East Middlebury: The following description of the glass works at East Middlebury is quoted directly:

Epaphras Jones, who had previously, in the name of the Vermont Glass Factory Company, erected a large establishment for the manufacture of window glass at Lake Dunmore, in Salisbury, wishing to extend his operations, in the year 1812, erected in East Middlebury, a little west of Farr’s hotel, a large, circular brick building for the manufacture of glass ware. He also built two dwelling houses for the accommodation of his workmen, and another building for a store and office. This establishment encouraged the hope that the place, with its valuable water power, would soon become a place of extensive business. This hope induced Mr. Foot to build the large tavern house above mentioned. In this he opened and, for several years, continued a house of public entertainment, which is now occupied by Royal D. Farr. But Jones’ establishment, because he did not succeed well in the manufacture of glass, or for other reasons, broke up, and the brilliant prospects which it had induced, vanished with it. The anticipated growth of the place was checked, but not wholly stopped by the disaster. Mr Foot erected and repaired his work above mentioned, and rebuilt his grist mill, and died in 1849 at the age of 84 years (Swift 1859:226).

Because Swift’s history of Middlebury was published in 1859, he must have done his research into local history in the 1850s, just preceding the publication date. Walling’s 1857 Addison County map is therefore a good reference to find his place-names for where the 1812 glassworks stood, since it depicts the location of the R. D. Farr hotel on the north side of the main east-west road just west of the Route 125 bridge over the Middlebury River. In the 1871 Beers map, the hotel is identified as “R. D. Farr, Glen House” and appears to be today’s Waybury Inn. The Addison County historic architectural survey lists the building as being built in 1810 (Johnson 1988:134).

Swift’s “a little west of Farr’s hotel” might place the location of “the large, circular brick building for the manufacture of glass ware” about where a local resident said was a former brick yard, from the accumulation of bricks there. This is about 200 feet west of the Waybury Inn in open ground north across Route 125 (Main Street), a few dozen feet diagonally NW of the former Episcopal Church at 450 Main Street. Petersen doesn’t pinpoint the site of the glass furnace. Could the accumulation of brick be the remains of the glass furnace? More recent information has the glass works diagonally southeast of 450 Main Street, nearer the river, which better agrees with the vicinity where another resident of Main Street found a piece of glass “slag.”

Field and archival research continues to exactly pinpoint the location of the glass works.

Otter Creek Glass Company, AD-GW01, Vergennes: This company was chartered November 6, 1834 by the State Legislature, with Jahaziel Sherman, Villee Lawrence, Samuel P. Strong, William H. White, Horace Onion, Enoch D. Woodbridge, and Rodman Sherman named as the initial corporate members, who were authorized to manufacture glass at the City of Vergennes. (*Acts and Laws* 1834:68-69). Most of these men were already successful businessmen of Vergennes, involved in shipbuilding, manufacturing, banking, etc. There is no evidence that the company ever actually made any glass.

Bennington County

Manchester Glass Factory, BE-GW01, Manchester: Henry Hodges, Lyman Harrington, Josiah Burton, Walter I. Shepard, Horatio Walker, Azel Morse, and Joseph Hix were chartered November 10, 1835, to manufacture glass under the name of the Manchester Glass Factory (*Acts and Laws* 1835:120-121). Glass water pipes appear to have been made in Barnumville, about a mile north of the Center. “Some of the pipe has been dug up and samples are available.” (Bigelow & Otis 1961:151).

This may have been the “glass water pipes” that Art Johnson of Manchester dug up in the ruins of old buildings on the Taylor Farm on Johnny Cake Street in 1946, where Earl Taylor had heard that glass had been blown, per notes by the late Mary Bort, Manchester historian. Mary also noted that the 1929 *Manchester Journal* published a plea for information about the glass factory in 1929 (Judy Harwood to Rolando, August 20,

2007). Any connection between the 1929 article and Johnson's 1946 discovery is not clear. Transparent glass pipes on display at the Bennington Museum are attributed to the Manchester Glass Factory (figure A-43).

Chittenden County

Champlain Glass Company, VT-CH-1023, Burlington: This site was originally recorded in January 1978 by Donna Jerry of the Division for Historic Preservation. It was initially assigned the site identification of FS-165(CH) but later (1981?) became VT-CH-1023, probably because there was sufficient cause to believe that subsurface remains existed.

The Champlain Glass Company was incorporated October 27, 1827 by Joseph T. Barrett, John Peck, Lewis Allen, John S. Foster, and James Dean. The company was authorized to

“construct a wharf, and use the same, and may erect thereon, store-houses, and other necessary buildings, at the foot of Pearl street [sic], or at such other place in Burlington-bay, near the site of the works of said company, as they shall find convenient, and may construct said wharf of the width of fifty feet, and may extend the same into the waters of lake Champlain, so far as may be necessary to obtain the depth of thirteen feet, at low water....said company be and they, hereby, are, authorized to construct a carriage road and rail-way from said wharf, a convenient distance up the bank, at or near the works of said company, and may provide said rail-way with proper cars and wagons and machines and engines, convenient for use thereof.” (*Acts and Laws 1827:78-80*).

The act further provided for the governance of the corporation but in section 9 of the charter, specifically denied banking privileges, a reaction, perhaps, to the fact that the bank bills issued by the then defunct Vermont Glass Factory of Lake Dunmore had become worthless. (Carlisle 2000:134).

John S. Foster, one of the incorporators, had previously acquired a block of four 5-acre lots in the vicinity of Pearl and Champlain Streets the spring of 1827. Next month he sold a block of three lots. In May, he rented tenements standing on the lands called the Cantonment, owned by the U.S., generally known as the Officer's Barracks, at the northern end of the old military camp in



Figure A-43. *Glass tubes on display at the Bennington Museum attributed to the Manchester Glass Factory.* Rolando photo.

the vicinity of Battery Park. Also leased for five years was water lot No. 70 at foot of Pearl Street, giving the company access to the lake and site for a wharf.

After incorporation in October 1827, the company purchased the block of lots and the property was identified for first time as the site of the glass factory. Ammi B. Young's 1830 map shows cluster of about six good-size buildings in a city block bordered by between Water and Champlain Streets labeled "Glass Works." A large octagonal building is shown on the map, probably containing the main furnace, with an open yard fronting on the lake. Across the street smaller buildings - maybe homes of workers. Although a large wharf and railroad at the foot of Pearl Street was planned, they were never built.

The company was ready for business in October 1827. Products included window glass; possibly other glass objects (bottles?). The company closed in 1850 due to many economic factors, including dearness of wood for fuel and downward trend on import tariff on glass. No surface evidence of the actual glass factory works, furnace, or related buildings remain today. (Carlisle 2000:133-161).

Based on map dimensions, the octagon-shaped glass furnace building on the 1830 map is about 81 feet in diameter and the center of this building is close to 90 feet from the middle of Peru Street, to the north. How does this translate to what's on the ground here now? Is the

area dense with buildings and open areas covered over with concrete streets, sidewalks, or paved parking lots?

The city block in Burlington bordered by North Champlain Street and Park Street (east and west) and Sherman Street and Monroe Street (north and south) was checked on July 18, 2007 and found to be a residential neighborhood. Fortunately, therefore, there is much open, unpaved space between, in front of, and behind the houses that line narrow Sherman Street. Since Peru Street continued westward through the block bounded by North Champlain Street on the east and Park Street on the west at the time of the glassworks, per the 1830 map, and the glassworks furnace, also per that map, bordered close to Peru Street. This made the area on the north side of Sherman Street of particular interest. And based on observations made in heavy rain that morning, sufficient space was discovered to exist behind 78 and 80 Sherman Street and the property bordering diagonally northwest on the east side of Park Street to conclude that the site of almost all of the furnace building has not been built upon of paved over.

Rutland County

Pittsford Glass Company, RU GW01, Pittsford: The Pittsford Glass Company was chartered November 6, 1834 (same day and year that the Otter Creek Glass Company of Vergennes was chartered; coincidence, or some connection?). Shareholders of the Pittsford company were Simeon Granger, Chapman Hitchcock, Elijah Brown, Lyman Granger, Amos Hitchcock, Chester Granger, and Edward J. Granger (*Acts and Laws* 1834: 70-71).

No glass works has been found to have been built or operated in the town, but that a good quality sand for glass making was available in town can be inferred from the Lake Dunmore Glass Company's importing sand from Pittsford for its works during 1833-1842 (Petersen 2001:90). Given the dates of the startup of the Lake Dunmore Glass Company (1833) and chartering the Pittsford Glass Company (1834), one has to wonder if one had anything to do with the other? Or could the principals of the Pittsford Glass Company (most of whom were also connected with the ironworks in town and knew they had good glass sand) just be hedging their interest in a locally available resource for any possible future consideration?

Windham County

Vernon Glass Company/Vernon Glass Manufacturing Co., WD-GW01, Vernon: Ebenezer Howe, Jr., Charles J. Walker, and Joel Pratt were chartered to organize the Vernon Glass Company on November 5, 1845 for the "purpose of mining, raising, and working minerals, and manufacturing glass, in the town of Vernon, county of Windham." (*Acts and Laws* 1845:60-61). Three years later, another charter was approved for John Hart, Jarvis F. Burrows, and William Newkirk "to incorporate The Vernon Glass Manufacturing Company for the purpose of mining, raising, and working minerals and manufacturing glass. November 10." (*Acts and Laws* 1851:118-119). Burrows and Hunt were notables in Vernon.

There is no historical evidence that glass was made in Vernon during the life of the two charters. In northwest part of Vernon, however, "glass sandstone abounds; large quantities of which have been carried to Warwick, Mass., and Keene, NH" (Washburn 1885:276). Since nearby Keene, had a history of glass manufacture from 1814 to 1853, might the Vernon glass companies have been organized strictly for the purpose of mining and transporting raw materials that went into the manufacture of glass at Keene (or elsewhere)?

REFERENCES CITED

- Acts & Laws Passed by the Legislature of The State of Vermont*, 1810, 1811, 1813, 1827, 1832, 1834, 1835, 1845, 1851, 1867.
- Allen, Richard Sanders, "Furnaces, Forges and Foundries." *Vermont Life*. Winter 1956-57, pp. 2-9.
- _____, "Chronological Notes, Troy's Iron and Steel Companies." *Report of the Mohawk-Hudson Area Survey*, Robert M. Vogel, ed., Smithsonian Institution Press, 1973, pp. 96-97.
- Armstrong, Margaret B., Pamela J. Caldwell, and Dorothy S. Steele. *St. Albans Through the Years, 1763-1963, A Bicentennial History*. St. Albans Historical Society, Inc., 1977.
- Backman, Priscilla, Calais lime kiln letters and ledger data to Rolando, 1995.
- Barna, Ed, *Covered Bridges of Vermont*. Woodstock, Countryman Press, 1996.
- Barret, Richard Carter, "Making of Vermont Glass." *Vermont Life*. Spring 1965, pp. 10-13.

- Beebe, Flo, "Burden-related data from Shaftsbury deed files." Shaftsbury Town Office, Shaftsbury, Fall 2002.
- Beers, F. W., *Atlas of Addison County, Vermont*, New York, F. W. Beers and Co., 1871.
- _____, *Atlas of Bennington County, Vermont*, New York, F. W. Beers, A. D. Ellis, and G. G. Soule, 1869.
- _____, *Atlas of Franklin and Grand Isle Counties, Vermont*, New York, F. W. Beers and Co., 1871
- _____, *Atlas of Rutland County, Vermont*, New York, F. W. Beers, A. D. Ellis, and G. G. Soule, 1869.
- _____, *Atlas of Windham County, Vermont*, New York, F. W. Beers, A. D. Ellis, and G. G. Soule, 1869.
- _____, *Atlas of Windsor County, Vermont*, New York, F. W. Beers, A. D. Ellis, and G. G. Soule, 1869.
- Berger Associates, Inc., *National Register Assessment for the Champlain Valley Lime Company, Colchester, Chittenden County, Vermont*. East Orange, NJ, The Cultural Resource Group, November 1989.
- Bigelow, Edwin L., and Nancy H. Otis, *Manchester, Vermont*, The Town of Manchester, 1961.
- Bort, Mary, notes from *Manchester Journal* articles, on file at the Manchester Historical Society, Manchester.
- Brush, Fred, "Arlington Industries." "Arlington Memorial Senior High, Senior Essay (Russell Collection, Canfield Library, Arlington), ca1933.
- Burden Iron Company, "Burden Iron Company Records, 1818-1835." Rensselaer County Historical Society files, Troy, NY.
- Campbell, Margaret, "Furnace Grove Historic District." Bennington, June 27, 1997.
- Carlisle, L. Diana, "Manufacturing Enterprise." *Vermont History*, vol. 68, nos. 3 & 4, Summer/Fall, 2000, pp. 133-161.
- Caverly, [Abiel Moore], *History of the Town of Pittsford, Vermont*, Rutland, Tuttle and Company, 1872.
- Child, Hamilton, *Gazetteer and Business Directory of Bennington County, Vt., for 1880-81*, Syracuse, NY, Journal Office, 1880.
- _____, *Gazetteer of Caledonia and Essex Counties, Vermont., 1764-1887*, Syracuse, NY, Journal Office, 1887.
- _____, *Gazetteer and Business Directory of Rutland County, Vermont for 1881-82*. Syracuse, NY, Journal Office, 1881.
- _____, *Gazetteer and Business Directory of Windham County, Vermont, 1784-1884*, Syracuse, NY, The Journal Office, 1884.
- Colman, Devin A., "Documentation of Historic Resources on Law Island, Colchester, Chittenden County, Vermont." Burlington, prepared for the Lake Champlain Committee, March 23, 2007.
- Curry, Bruce P., "History of the Montpelier & Wells River and Barre & Chelsea Railroads." *B&M Bulletin*, no. 1, Winter 1976-1977, pp. 20-32.
- Dale, T. Nelson, "Commercial Marbles of Western Vermont." *Report of the State Geologist on the Mineral Industries and Geology of Vermont 1913-1914*, George H. Perkins, ed., Burlington, Free Press Printing, 1914, pp. 1-160.
- _____, *The Calcite Marble and Dolomite of Eastern Vermont*, Washington, Government Printing Office, USGS Bulletin 589, 1915.
- Day, Henry Clay, "Day Papers: Historical Writings and Material." ca1873-1919, Bennington Museum Collection.
- Doll, Charles G., Wallace M. Cady, James B. Thompson, Jr., and Marland P. Billings, *Centennial Geologic Map of Vermont*, State of Vermont Geological Survey, Waterbury, 1961.
- "Early Readsboro." <http://www.alpenwaldvillage.com/earlyreadsboro/ThumbnailFrame.htm>, accessed July 2, 2007.
- Glover, Suzanne, Paul Russo, Amy McFeeters, Maureen Cavanaugh, *Supplemental Report, Phase 1A Cultural Resources Survey for the Relicensing of Eight Hydroelectric Developments along the Deerfield River Valley in Vermont and Massachusetts, FERC L.P. No. 2323*, Volume 1, (for the New England Power Company), Pawtucket, RI, Public Archaeology Laboratory, Inc, October 1993; revised January 1994.
- Gobrecht, Larry, *The Copake Iron Works at Taconic State Park: Historic Overview and Inventory of Associated Resources*. Peebles Island, NY, NYS Office of Parks, Recreation, and Historic Preservation, March 28, 2000.
- Gordon, Clarence E., "Studies in the Geology of Western Vermont." *Report of the State Geologist on the Mineral Industries and Geology of Vermont 1923-1924*. George H. Perkins, ed., Burlington, Free Press Printing, 1924, pp. 1-259.
- Graves, Jim, comp., "Brick Brands of the United States." International Brick Collectors Assn., March 29, 1996.
- Gurcke, Karl, *Bricks and Brickmaking: A Handbook for*

- Historical Archaeology*, Moscow, ID., The University of Idaho Press, 1987.
- Hance, Dawn D., *The History of Rutland, Vermont, 1761-1861*, Rutland Historical Society, Academy Books, 1991.
- Hinsdill, Joseph N., [Map of] *Bennington, Vermont*, Hill and Company, Bennington, 1825.
- Historic Sites & Structures Survey*, North Bennington, recorded by Melissa Cotton, May 1996.
- Hitchcock, Edward, Edward Hitchcock, Jr., Charles Hitchcock, and Albert Hager, *Report on the Geology of Vermont*, vol.2, Claremont, N.H., Claremont Manufacturing Company, 1861.
- Hubbard, George D., "Geology of a Small Tract in South Central Vermont." George H. Perkins, ed., *Report of the State Geologist on the Mineral Industries and Geology of Vermont, 1923-1924*. Burlington, Free Press Printing Co., 1924.
- Jillson, Clark, *Green Leaves From Whitingham*, Worcester, Mass., by the author, 1894.
- Johnson, Curtis B., *The Historic Architecture of Addison County*, Montpelier, Division for Historic Preservation, 1988.
- Kenny, Kathleen and Charles Knight, *Supplemental Archaeological Resources Assessment for the Proposed Manchester STP 0137(17) Project, Manchester, Bennington County, Vermont*, Report No. 456, for Dr. Duncan Wilkie, Archaeology Officer, VTRANS, May 1, 2006.
- Lefebvre, Charlotte, "Old Readsboro and Whitingham." 7th-grade paper, Readsboro, October 18, 1984.
- Levin, Ruth, *Ordinary Heroes: The Story of Shaftsbury*, Shaftsbury Historical Society, Inc., 1978.
- Louis Berger Group, Inc., *Phase I/II Archaeological and Historical Investigations, East Middlebury Iron Works (VT-AD-299), Middlebury RS 0174(8), Vermont Route 125, Bridge 13, Village of East Middlebury, Addison County, Vermont*. Prepared for the Vermont Agency of Transportation, Montpelier, by Louis Berger, Inc., East Orange, NJ, 2005.
- McLaughlin, Warren, "Glass Making in the Champlain Valley and Northern New York." *Vermont Quarterly*, Vermont Historical Society, New Series, vol 14, no. 1, January 1946, pp. 5-17.
- Miller, D. L., *Map of Bennington, Bennington County, Vermont*, D. L. Miller and Company, New York, 1894.
- Munsill, Harvey, *The Early History of Bristol, Vermont*. Book Committee, Bristol Historical Commission, [1979].
- National Standard*. July 28, 1824.
- Neilson, William G., *Charcoal Blast Furnaces, Rolling Mills, Forges and Steel Works of New England in 1866*, American Iron and Steel Association, [1866].
- New England Business Directory and Gazetteer*, Boston, Mass., Sampson, Murdock, & Co., 1902, 1910, 1920, 1926.
- Nichols, Beach, *Atlas of Blair and Huntingdon Counties Pennsylvania*. A. Pomeroy & Co., Philadelphia, 1873.
- Parks, Joseph, *Pownal: A Vermont Town 200 Years and More*, Pownal Bicentennial Committee, 1977.
- Perkins, George H., ed., *Report of the State Geologist on the Mineral Industries and Geology of Vermont 1907-1908*. Burlington, Free Press Printers, 1908.
- _____, *Report of the State Geologist on the Mineral Industries and Geology of Vermont, 1911-1912*. Burlington, Free Press Printing Co, 1911.
- _____, *Report of the State Geologist on the Mineral Industries and Geology of Vermont, 1915-1916*. Burlington, Free Press Printing Co, 1916.
- _____, *Report of the State Geologist on the Mineral Industries and Geology of Vermont, 1923-1924*, Burlington, Free Press Printing Co., 1924.
- _____, *Report of the State Geologist on the Mineral Industries and Geology of Vermont 1931-1932*. Burlington, Free Press Printing, [1933].
- Petersen, Max P., *A History of Vermont Glassmaking*. Middlebury, Dunmore House, 2001.
- Potter, David E., "An Informal History of Chippenhook and Vicinity." *Clarendon, Vermont: 1761-1976*, Rutland, Academy Books, 1982, pp. 100-116.
- Resch, Tyler, ed., *The Shires of Bennington: A Sampler of Green Mountain Heritage*, Bennington, The Bennington Museum, 1975.
- Rice, E., and C. E. Harwood, *Map of Bennington County, Vermont*, New York, C. B. Peckham, 1856.
- Rolando, Victor R., "County Historian Report on the Burden Iron Company Upper Works." Graduate term paper, The College of Saint Rose, Albany, NY, 1975.
- _____, *200 Years of Soot and Sweat. The History and Archeology of Vermont's Iron, Charcoal, and Lime Industries*. Vermont Archaeological Society, Burlington, 1992.
- _____, "Field Trip Report, Survey of Vermont IA Sites. Field inspection of Burden mines area." May 21, 1992.
- _____, "Unique IA Artifact Salvaged from

- Green Mountain National Forest." *SIA-New England Chapters Newsletter*, David Starbuck, ed., 16/2, 1996.
- _____, "Results of Walkover Survey of Williams E. Dailey, Inc., Property East of Ore Bed Road, Town of Bennington, Vermont." October 24, 2003.
- Rucker, Nancy, "Glassmaking on Lake Dunmore." *The Sheldon Museum News & Notes*, Vol. III, No. 3, Summer 1998, page 1.
- Russell, Jeannine, "The Champlain Valley Lime Company: The Rise and Fall of the Lime Industry in Northern Vermont." *Vermont Archaeological Society Newsletter*, No. 93, May, 2003, pp. 8-9.
- Scott, C. A., J. W. Stickney, & J. A. Pollard, *A. Map of the Town of Plymouth*, 1859.
- Scott, Elizabeth (Goodell), "Great Grandfather, Alan Goodell." November 25, 1948.
- Scott, James D., Isaac W. Moore, and Owen McLeray, *Scott's Map of Rutland County, Vermont*. Philadelphia. C. Chase Jr., James D. Scott, Isaac W. Moore, and Owen McLeray, 1854.
- Sheehan, Nora, and Peter A. Thomas, *Phase I Archaeological Site Identification Survey for the Revised Alignment, Western Section, Chittenden County Circumferential Highway*, Consulting Archaeology Program, UVM, October 1993.
- Sherman, John H., *Sherman Directory*, Vol 3, Gateway Press, Inc., Baltimore, Md, 1991.
- Skehan, James Wilson, *The Green Mountain Anticlinorium in the Vicinity of Wilmington and Woodford, Vermont*, Montpelier, Vermont Development Department, Bulletin No. 17, 1961.
- Smith, Henry P., *History of Addison County, Vermont*. Syracuse, NY, D. Mason, 1886.
- Smith, Henry P., and William S. Rann, *History of Rutland County, Vermont*. Syracuse, NY, D. Mason, 1886.
- Starbuck, David, "Forestdale ironworks recording project on May 26-29, 1989 (preliminary report), to John Dumville, DHP." June 20, 1989.
- Swift, Esther Munroe, *Vermont Place-Names*, Brattleboro, Stephen Greene Press, 1977.
- Swift, Samuel, *History of the Town of Middlebury*, A. H. Copeland, 1859.
- Thomas, Peter A., Gina Campoli, and Prudence Doherty *An Initial Study of the Prehistoric and Historic Archaeological Sensitivity of the Bennington Area. The Pownal-Bennington Highway Project: F019-1(4), F019-1(5), F012-1 [Phase IA]*. University of Vermont, Department of Anthropology, Report #22, 1979.
- Van Scoyoc, Timothy C., Acting Director/Curator, Blair County Historical Society, PA, email to Rolando, January 12, 2006.
- Vermont Aurora*. July 15, 1824
- Vermont Year Book*, Chester, The National Survey, 1964.
- Walbridge, Herbert Stebbins, *The History and Development of North Bennington, Vermont. 1937*.
- Wall and Forrest, *Map of Vergennes*, 1853.
- Walling, H. F., *Map of Addison County, Vermont*, New York, Wm. E. Baker and Co., 1857.
- _____, *Map of the Counties of Orleans, Lamoille and Essex, Vermont*, New York, Loomis and Way, 1859.
- Washburn, Artemas Henry W., and Lucinda Wright Baily Washburn, *The History of the Town of Vernon*, Ludlow, Miss. A. M. Hemenway, 1855.
- Wells, Frederick P., *History of Newbury, Vermont*. St. Johnsbury, The Caledonian Company, 1902.
- Werner Archaeological Consulting, *Bennington-Hoosick DPI 0146(1), Bennington Bypass, Vermont Route 9, Study Area B, Burden Mine Area (VT-BE-222): Phase IA Report*, Albany, May 5, 1995 updated version.
- _____, *NYS Department of Transportation PIN 1306.60.201, Bennington Bypass, New York Route 7, New York Portion of Bennington Bypass Status report and Update, Reconnaissance Survey*, prepared for Transportation Sections, Clough, Harbour and Associates, Albany, NY, August 1994.
- Windmill Hill Pinnacle Association, *Dunn Nature Trail: A self-guided natural-history tour through a northern hardwood forest*, Westminster West, Vt., 2006.
- Young, Ammi B., Plan of Burlington Village, 1830, on file at UVM Special Collections, Bailey-Howe Library, Burlington.