

# The Bridger



The Vermont Covered Bridge Society Newsletter - Spring 2001

## THE RACE IS ON: CAMBRIDGE JUNCTION/POLAND BRIDGE STABILIZATION UNDERWAY

by Bill McKone

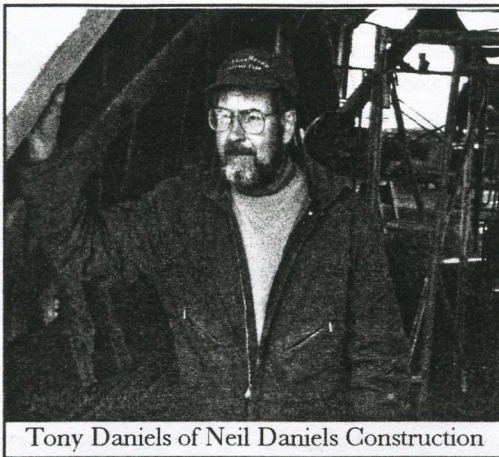
**Cambridge, Vt. March 7** - Stabilization work is progressing on the Cambridge Junction bridge near Jeffersonville with the goal of raising the 113-year old Burr arch bridge several feet before the ice goes out on the Lamoille River. Ice damage in recent years caused the plans for repair of the bridge to be a two-phase operation, with this first phase to be completed by the end of March. The more substantial repair work, which will restore the bridge to use by light vehicular traffic, may not be completed until 2002. The bid package for that final phase must be complete and advertised before September 30th, or the funding may be lost.

The current work is being 100 percent funded by the \$1 million earmarked for this bridge as part of Senator Jeffords' National Historic Covered Bridge Program. This first phase is expected to require about \$200,000 of this amount. The Stabilization portion of the project was designed by VTrans Engineer John Weaver (an active member of the VCBS). The contract was awarded to Neil H. Daniels Construction of Ascutney, Vt.

Three A-frames made up of twelve-by-twelve hemlock timbers with a metal plate joining the apex of the legs to a horizontal member have been installed to protect the bridge from further racking when it is raised. The existing runners on the bridge were removed to reduce the weight of the structure by about eight thousand pounds and the upper chords are being reinforced by three-by-ten planks lagged in on both the inside and outside. The bottom chords are to be stabilized by installing four runs of channel irons and one-inch rods on the top and bottom of the inside and outside of the chord. These will be tightened to 1300 pounds of torque to give longitudinal strength to this part of the bridge.

Once the stabilization of the bridge structure is complete, the process of raising it the specified three feet will begin. Excavation of the abutments down to a stable surface will allow placement of very thin "pancake jacks" which can raise the ends of the bridge in six-inch increments, allowing placement of timbers and repeating the operation as necessary. Access to the bridge after the first phase is completed will be a five-foot wide ramp with handrails.

For a continuing update on the status of the bridge, go to web site [www.vermontbridges.com](http://www.vermontbridges.com)



Tony Daniels of Neil Daniels Construction

### VCBS 2ND ANNUAL DIRECTOR'S MEETING CONDUCTED BY E-MAIL

The Annual Directors Meeting was held February 20 and no one traveled further than his or her PC keyboard or fax machine.

The first VCBS Directors meeting was held April 13, 2000, at the Highlander Motel near Jeffersonville. One attendee traveled from Rome, New York while others drove from the Montpelier and Brandon areas. One member attended by phone. And, yes, it had snowed.

Because of this season's weather, and distances to be traveled, Joe Nelson, VCBS President, proposed that we hold our Annual Directors Meeting in two parts; much of the Society's business by email/fax, the balance to be done during the coming warm season.

The timing of the meeting was meant to begin the planning of activities for the balance of the year. The meeting proposal was sent out February 2 suggesting the email format with an invitation for the participants to contribute to the agenda. The format was approved by vote and the final agenda was e-mailed and faxed on February 20.

Among items addressed was the VCBS Member/Bridge-watch handbook that is under construction. The purpose of the handbook is to familiarize members of the VCBS with the society's organization and activities. A large portion of the booklet is devoted to organizing Bridge-watch Areas and VCBS activities, like safaris, picnics, and covered bridge work parties.

(Directors continued on page 3)

### VCBS COVERED BRIDGE PRESERVATION POLICY COMMITTEE HOLDS KICK-OFF MEETING

by Joe Nelson

**Brandon, Vt. Jan. 20, 2000.** - When in August, 2000 members of the VCBS were invited to attend a symposium held by the Vermont Agency of Transportation Covered Bridge Committee, the VCBS contingent was asked what the organization's covered bridge preservation policy was. In August, 2000, the VCBS did not have a formal policy.

With the purpose of drafting a covered bridge preservation policy for the VCBS a committee was formed to meet in Brandon, Vermont on January 20, 2001 for a kick-off meeting. The committee was selected from the VCBS membership, the selection based on the candidate's experience in building or repairing covered bridges, or on the candidate's experience in advocating historic preservation.

The attendee - participants were: Ed Barna, writer and VCBS Founding Director; Neil Daniels, Owner, Neil Daniels Construction of Ascutney, Vt., and VCBS Bridge-watch chairman for Weathersfield; Jan Lewandoski, owner of Restoration and Traditional Building, and VCBS member; Irene O'Dell, VCBS member; Phil Pierce, owner Phillip C. Pierce, P. E., consulting engineering for covered bridges and VCBS member; Doug Porter, Restoration Consultant and VCBS Director; John Weaver, VTrans P.E. and VCBS Bridge-watch Coordinator; Richard Wilson, NYCBS President and VCBS Advisory Director; and David Wright, NSPCB President and VCBS Advisory Director. The meeting was moderated by Joe Nelson and recorded by Ruth Nelson, VCBS President and VCBS Secretary. Guest Richard Baker, of Brandon's Neighborhood Connections, spoke of his personal experience with Brandon's negotiations with VTrans concerning the Sanderson Covered Bridge (story to appear later).

A draft covered bridge preservation policy was provided to each participant prior to the meeting to provide speaking points. Each participant spoke to the draft, presenting their views on each point. The meeting was recorded on cassette tape, which was transcribed and (Preservation continued on 2)



## RUTLAND NATIVE RETURNS AS VIRGINIA PHOTOGRAPHER

By Richard E. St.Peter

**February 8, 2001** - I live in Newport News, Virginia but to borrow a line from Tony Bennett, I left my heart in Rutland, Vermont. You see, I am a native Vermonter that still keeps part of Vermont in my everyday life. That part of Vermont are the covered bridges.

I have been living away from Vermont since 1966 but each year I try to visit the state at least once. After June 1985 my visits insured that from then on Vermont would be part of my Virginia lifestyle. I decided to decorate my new home with my own photographs. Since I am a professional photographer, I wanted the photographs to be of Vermont but I had not yet decided what Vermont scenes I was looking for. I started looking around at scenic locations that would make for good photographs. Then my mother made the suggestion that began my quest. She said: "How about photographing covered bridges?"

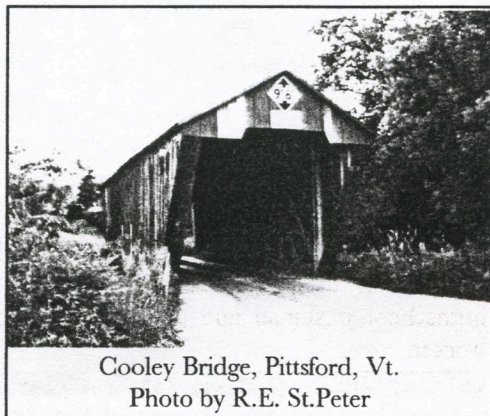
Armed with my 35mm camera, my parents and I went to photograph my first covered bridge, Gorham in Proctor. My father said that was his bridge because he used to live in Proctor and travel through it. I had not seen the bridge before. So I photographed the Gorham, then the Cooley. We continued on to Route 7 north and photographed the Hammond on the truck road off Rt 7. That was the end of that trip but not the end of my journey to photograph the rest of the 118 covered bridges.

When we returned to Rutland, I went to the visitors center on Main St. to get a copy of the Vermont Covered Bridge map, published by the Department of Highways and the State of Vermont. I also picked up a state map that has a symbol for covered bridges on it showing where the bridges are located. Then I started studying the maps, planning my next trip back to Vermont so I could photograph more covered bridges.

I noticed the covered bridge map identified 84 public bridges, 24 private bridges, 4 railroad, 3 historic and 4 Vt-NH bridges along the Connecticut River, a total of 118 that I started researching. I decided to disregard the private bridges because I assumed I couldn't get close enough to get a good shot of the bridge. I also wasn't really interested in the railroad or historic bridges and was concerned that the Vt-NH bridges were not "pure" Vermont bridges. However, I have photographed one railroad bridge and all four VT-NH bridges. Ironically, I was awarded a Blue Ribbon in the Virginia Professional Photographers Association (VPPA) annual print competition for my

photograph of the NH-VT view of the Cornish-Windsor Bridge.

The last thing I did before I ended my first covered bridge photo trip was visit stores that sold post cards, books or other covered bridge information. I also purchased Herbert Congdon's Covered Bridge book, which has been very helpful.



Cooley Bridge, Pittsford, Vt.

Photo by R.E. St.Peter

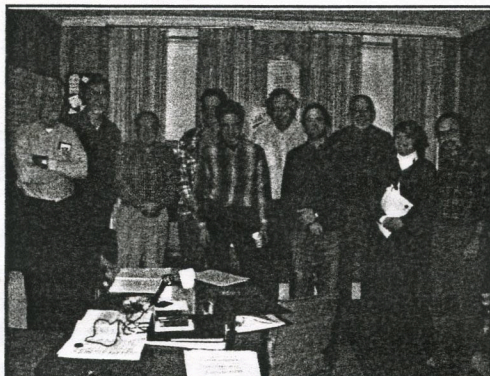
Unfortunately, all good things must end. I returned to Virginia and spent my spare time until my 1985 Labor Day weekend trip studying maps and planning my next trip to Vermont. I wanted to photograph all 118 bridges.

A final step toward my covered bridge endeavor was to purchase 118 8" x 10" frames so that each photograph would have an identical frame and I would not have to change the frame style in the middle of my framing.

Now I was ready to make another trip. That next trip would be in September 1985.



**Preservation** (continued from page 1) sent to each meeting participant for additional comment and for the next step in developing the preservation policy: A new policy will be drafted from the transcripts and submitted to the committee again. Copies of the transcript are available upon request: apply to VCBS Secretary Ruth Nelson, [jcnelson@together.net](mailto:jcnelson@together.net) or 802.899-2093.



Left to right: N.Daniels, P.Pierce, J.Weaver D.Wright, J.Lewandoski, E.Barna, D.Porter, J.Nelson, I.O'Dell, R.Baker

The talking points:

1) *The value of an historic covered bridge lays in the workmanship, methods and joinery of the original builders and the timber from Vermont's old forests used in the construction. This historic integrity needs to be preserved.*

2) *To preserve historic integrity when a covered bridge is repaired, the joinery used by the original craftsman should be duplicated and the timber used in the repair should be of the same species as the original. Native timber should be used in covered bridge restoration, other timber to be used as last resort.*

3) *Covered bridges should remain in service with historic integrity intact. To achieve this the bridge needs to be maintained on a regular basis to keep deterioration from occurring to avoid large-scale repairs that could compromise historic integrity.*

In addition to regular maintenance, the bridge should be inspected twice annually: once prior to spring, and once prior to winter with remedial action taken in preparation for the season.

4) *When a covered bridge has deteriorated to the point that it must be repaired or restored, the restoration contract needs to be explicit that if the bridge is found to be beyond restoring to full use to convey motor traffic, it must not be destroyed by replacing all or a significant portion of the original truss, but instead left intact, bypassed or removed from its site.*

The bridge, retired on site, can be repaired to safely support foot or cycle traffic while maintaining its historical integrity.

If the retired covered bridge is removed from its site, it should be repaired to prevent further deterioration, preserving its historical integrity, and maintained as a visitor's center or placed in a park or museum.

It would be optional to replace the removed bridge with a replica or with a modern bridge.

5) *To keep historic integrity:* Native timber should be used in covered bridge restoration, other timber to be used as last resort. To permit the use of native timber in bridge structures, there needs to be an effort by the timber industry to test, characterize, and certify native timber; namely spruce, hemlock, pine, and oak.

A non-destructive test protocol needs to be developed to be used on a covered bridge prior to writing the contract for repair or restoration to ascertain the true condition of its components, this to avoid discovering the structure to be in such a state as only complete replacement of a significant percentage of the truss is required to restore it to full use, resulting in the loss of historic integrity.

6) *To make maintenance of historic covered bridges effective:* A way to enforce vehicle (Preservation concluded on page 3)



## Preservation (continued from Page 2)

weight restrictions needs to be developed; a way to enforce vehicle dimension restrictions needs to be developed; partnerships between towns, the Vermont Historic Bridge Program, and the VCBS must be promoted.

7) *To pursue its policies the VCBS and its members will:* Organize area chapters (Bridge Watch Areas) for the purpose of establishing a working relationship with the local municipal governments, historical societies and Chambers of Commerce to promote and achieve bridge maintenance and tourism, and to guard against vandalism; Educate the public on the value of Vermont's historic bridges; Promote tourism; Work with the VAOT Historic Bridge Program.



## Directors (continued from page 1)

A preliminary edition of the handbook is planned to be ready for review by the board of directors in the spring of 2001. Working copies are to be ready to support the society's efforts to organize Bridge-watch areas this summer.

A campaign to organize additional Bridge-watch Areas is in a preliminary stage. A visitation with several VCBS members who have volunteered to participate in the Bridge-watch program is in planning. The effort will be led by Bridge-watch coordinator John Weaver, supported by Joe Nelson.

VCBS members interested in joining the handbook committee or the Bridge-watch organization effort can contact Joe Nelson by email: [jcnelson@together.net](mailto:jcnelson@together.net) or at 2 Sugar Hill Road, Underhill, VT 05489, or 802.899.2093. Members already involved in Bridge-watch activities are especially welcome.

Bill McKone reported on the Covered Bridge signage project: Signage for the state highways has made some progress in gaining the support of various private and state organizations. It still requires an effort to put together a specific program in sufficient detail to allow written endorsement from key players who can cause the funds, estimated at about \$15,000, to be allocated by the state in order to get directional signs up on the state highways. Such funding would be in the next fiscal year which begins in July 2001. This does not address additional directional signs needed on town roads to bring folks to the bridge itself, as the need for these signs would have to be "sold" to the individual towns on a case-by-case basis, McKone said.

Other business reported on included that of finding an insurance policy to cover liability for the organization. Bill McKone is conducting the search.

VCBS members can obtain a complete copy of the Directors Meeting proceedings by contacting Secretary Ruth Nelson.



## RENEWAL DRAWING YIELDS FOUR WINNERS!

Last November, as an incentive to renew early, slips for a drawing were sent out to all 142 VCBS members along with the minutes of the All Member Business Meeting held in Montpelier November 11. Of the 142 recipients, 43 participated in the fun by returning their slips to meet the Valentines Day deadline.

To perform the drawing, Ruth Nelson, VCBS Secretary, was asked to find someone, not unlike the unbiased Blind Justice, to draw four slips from a punch bowl. She found this paragon in the person of Theresa Aube, highschool freshman and daughter of a co-worker.



Teresa Aube draws slip number one

In addition to drawing the four slips, a drawing was done to decide which item would go with the first, second, third and fourth slip.

Four items were donated for the drawing. The first slip was for a copy of *Spanning Time: Vermont's Covered Bridges*, by Joseph C. Nelson; The second slip was for a copy of *The Covered Bridges of Vermont*, by Ed Barna; the third, a First Edition numbered digital print of an oil painting of the Poland Covered Bridge by artist Eric Tobin, and the fourth for a First Edition numbered digital print of a watercolor of the North Troy Covered Bridge by engineer/artist John Weaver.

The first slip was sent in by Gordon O'Reilly of Norwell, MA.

The second slip; Howard Rogers of Taylors, SC.

The third; Doug Ward of Richmond, VA.

And the fourth; Dan Castellini of Cincinnati, OH.

Watch your mail, folks. While our mail troll-person is not quick, he is inevitable.



## DATE SET FOR NEW YORK'S HAMDEN COVERED BRIDGE CELEBRATION

The Hamden Community and Historical Association and its residents of the Town of Hamden, NY, along with Delaware County officials, cordially invite all covered bridge enthusiasts to attend the dedication of the newly restored Hamden Covered Bridge on Saturday, July 28, 2001. Be sure to mark your calendars so as not to forget to attend this historic event. More information will follow as plans are finalized.

### To VCBS Members:

Many of you have multiple memberships in covered bridge societies, so you may already be aware of the festivities planned for the Hamden Covered Bridge this coming summer.

If you would like to participate in this event or represent the VCBS, please let me know. I have answered the attached letter expressing interest. Contact Joe Nelson at [jcnelson@together.net](mailto:jcnelson@together.net) or write to VCBS Secretary, P.O. Box 267, Jericho, VT 05465.

The Vermont Covered Bridge Society  
PO Box 267

Jericho, VT 05465-0267

Dear Mr. Nelson:

*New Yorker's are proud of their heritage!* Historic properties are tangible links with our past, and help provide us with a sense of identity and stability. The Hamden Covered Bridge in Delaware County is one of Delaware County's historic properties.

The residents of the Town of Hamden, as well as Delaware County officials, are very pleased to inform you that in honor of the restoration of the Hamden Covered Bridge, they will be hosting a dedication on Saturday, July 28, 2001. Although this event is still in the planning stages, I write today to invite The Vermont Covered Bridge Society to join in the festivities by promoting covered bridges, your organization, and by selling covered bridge memorabilia. If you would like to participate, more detailed information will be sent as we progress with our plans.

Currently we only have a date selected for the event, but would appreciate if you might put an announcement in your next newsletter, and possibly on your web site. I hope you will accept our invitation to be part of the Hamden Covered Bridge dedication. . . .

Thanks for your splendid help.  
Wayne E. Marshfield, Supervisor [Town of Hamden, RD 1, Box 165, Hamden, NY 13782  
Phone (607) 746-6660, Fax (607) 746-2405]  
(Hamden continued on page 4)



**Hamden** (continued from page 3)

Editor's note: Our web site [www.vermontbridges.com](http://www.vermontbridges.com) has been covering, from start to finish, the renovation of the Hamden Covered Bridge publishing photos and stories donated by Phil Pierce, Bob and Trish Kane, Dick Wilson, and others. ♦

### **RANDALL COVERED BRIDGE INCLUDED IN LYNDON HISTORICAL SOCIETY FUND-RAISER**

By Virginia Downs, VCBS member.

Lyndon Historical society members have mounted a \$50,000 fund-raising campaign this year to restore four historic landmarks, among them the Randall Covered Bridge. The bridge is critically in need of abutment work as well as roof alignment and roof restoration. The amount needed for the restoration is \$15,000.

If you took part in the V.C.B.S.'s September gathering in Lyndon, you will recall that this town has the distinction of being the "Covered Bridge Capitol" of Vermont's Northeast Kingdom.

If you would like contribute toward the restoration of the bridge, donations, which are tax-deductible, should be sent to: Lyndon Heritage Fund, P.O. Box 85, Lyndon Center, UT 05850.

Special attention should be made that your contribution is intended for the covered bridge renovation. ♦

### **VCBS TREASURER ON LEAVE**

Due to illness, Treasurer Shirley Hill is temporarily on the sidelines. Until she is back on her feet, VCBS Secretary Ruth Nelson is wearing her hat. Until further notice, mail to the treasurer should go to P.O. Box 267, Jericho, VT 05465.

We wish you well, Shirley. Hurry back. ♦

### **VCBS COVERED BRIDGE MUSEUM PLANS ON HOLD**

By Bill McKone

VCBS was notified by the state of Vermont mid-February that the proposed museum project was not approved by funding under the DOT Transportation Enhancement program. This major source of funding was the only viable option at this point, but other sources will be sought and the project kept on the "back burner." The owner of the property being considered has been notified and his comments requested on going forward with the museum. ♦

### **COVERED BRIDGE TOUR PLANNED IN MONTGOMERY**

On August 4th, the Jay Peak Area Association is planning a covered bridge tour by hay wagon in Montgomery. The time would be 10 a.m. - 6 p.m. We would like to know if your association would like to set up and informational table during this event.

We want to make this event as interesting and successful as possible, a true "covered bridge event." We hope you will join us for this first of what we hope to be an annual event. Our marketing meeting is on March 21st, and would like to be able to give a positive response to the group. Jim McKimm, Marketing Chairman, Jay Peak Area Association, PO Box 177, Troy, VT 05868 (802) 744-9991, <[riverbnd@sover.net](mailto:riverbnd@sover.net)>

(VCBS Members who want to participate in this event, please contact VCBS Secretary Ruth Nelson at P.O. Box 267, Jericho, VT 05465 or at [jcnelson@together.net](mailto:jcnelson@together.net)) ♦

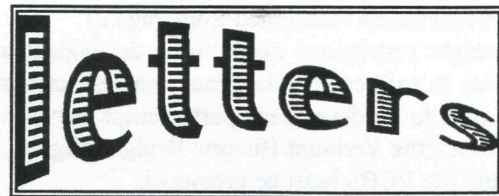
### **NEW HAMPSHIRE COVERED BRIDGE BOOK**

We thought some of you might be interested in the following information that was passed on to us by a friend, Nelson Lawry from New Hampshire

The book is published by the NHDOT *New Hampshire Covered Bridges: A Link with Our Past*, has been reprinted, and with a few small revisions to reflect the differences in 2001 v.s. 1994, is available at \$15.00, plus \$3.95 for shipping, from: Bureau of Budget & Finance, NH Department of Transportation, P.O. Box 483, Concord, NH 03302-0483

Says Nelson Lawry: "I purchased one and its color photo reproduction is first-rate. Thus the book price is incredibly cheap if one considers just the photos alone!"

Bob and Trish Kane



January 17, 2001

Response to Charles W. Elflein

Dear Mr. Elflein

Probably there could have been an alternative to cutting up the Paper Mill Bridge and hauling it to the dump, and, if there was an alternative, it is up to people like you, interested and concerned, to make sure that this does not happen again. "When I found out . . ." When did you find out? Keep a closer eye on these things, and you won't have to lock the door after the horse is gone.

The replacement of the trusses and the floor of the Fuller Bridge in Montgomery is referred to as dirty deed #2." This is my work you are talking about here, and I do welcome your criticism, no matter what part of the flatlands you are from. As my father did, I will stand behind all of my work all of my days.

The bridge would be prettier if the trunnels had square heads on them, but that is not up to the people doing the actual construction. The decision to replace all of the trusses was made only after careful consideration, and with the consent of the historical preservation people. We built the bridge for the people who lived with the old one, and they seemed to be pretty happy with it.

One thing that is hard to evaluate in a standing bridge is the condition of the pegs. Hardwoods seem to rot quicker than softwoods, a great number of the trunnels we removed from the old bridge were little more than worm-eaten mush. Wood does seem to have a definite life span.

We take pride knowing that loaded gravel trucks are using the bridge. We built this bridge with our strength, and send it forward in time with the hope that it will come to be as precious to the generations that will use it as its predecessor was to generations gone by.

The best hope these bridges have is if people like you and me work hand in hand to care for the old and design the new. The last time I visited the bridge there was a smashed pumpkin on the deck—the kids like it—that's a good sign.

Sincerely, Roland Blais

#### **Advertising rates in The Bridger**

\$7.00 per column inch  
\$15.00 per quarter page  
\$25.00 per half page  
\$45.00 per full page

Advertisers contact Joe Nelson, 2 Sugar Hill Rd., Underhill, VT 05489 or [jcnelson@together.net](mailto:jcnelson@together.net)

#### **Newsletter deadlines**

Summer Issue - May 31  
Fall Issue - August 31  
Winter Issue - November 30  
Spring Issue - February 28



## LETTER FROM THE PRESIDENT

Here we are, coming into the spring of 2001, and a lot is happening in the covered bridge world. The race is on as the work goes forward to stabilize the troubled Cambridge Junction Covered Bridge and raise it out of reach of the expected high water and ice that comes with spring thaw.

Jan Lewandoski and his team are building a new covered bridge in North Hartland Vermont to replace the now failing concrete and steel span that replaced a covered bridge lost in the hurricane of 1938. Here is a chance to see some of the best of the covered bridge builders ply their trade.

In Pittsford, the Gorham Bridge has been closed for repairs and the organization of a Bridge-watch area there must be put on the front burner.

In Thetford, the renovation of the Union Village Covered Bridge is to begin this summer.

On the negative side, Sylvain Raymond of Sylvain @ atawalk.com reports that the 504 foot long Howe Truss bridge at Rexton, New-Brunswick (55-05-08) was destroyed by fire in the early morning of February 25, 2001.

In Johnson, Vt., the Power House Covered Bridge has collapsed into the Gihon River under snow-load.

In Brandon the Sanderson Covered Bridge is slated for renovation and if the Town Selectboard decides to restore it to 20 ton capacity another valuable part of our past may become just another replica.

In Williamsville, The Williamsville Covered Bridge is to be moved to allow the construction of a replica in its place. Please, if anyone planning to be in that area while events unfold, keep us informed.

There are plenty of events to be involved with coming up. Check out some of the happenings reported on elsewhere in this newsletter:

Bill McKone, Bridge-watch chairman for the Lamoille area will be planning an All-member meeting and covered bridge safari to take place this June. A date will be forthcoming and final plans will be shared by letter to the membership. We are hoping that another VCBS Bridge-watch area will organize a similar get-together for the fall-foliage time-of-year.

On August 4th, the Jay Peak Area Association is planning a covered bridge tour by hay wagon in Montgomery.

In Lyndon, the historical society has mounted fund-raising campaign this year to restore historic landmarks, among them the

Randall Covered Bridge, the bridge being in critical need of abutment work and roof restoration.

In New York, the Hamden Bridge restoration is complete and the celebration is slated for Saturday, July 28. Also, the Copeland Covered Bridge in Edinburg is nearly complete and worth a visit.

To help with restoration projects like that in Lyndon, the VCBS needs to organize a fund raising committee to plan, design and construct covered bridge theme articles for sale; covered bridge digital print limited editions, shoulder patches, cards, calendars, and stationery. Any generated income would be used for non-profit covered bridge preservation activities, newsletters, educational literature, community outreach, and Adopt-a-bridge maintenance costs. Anyone interested in design, crafts, carpentry, mat cutting, or leadership, please contact me.

Yours in bridging, Joe Nelson

### VCBS Officers

- Ed Barna, Founding Director & Vice Pres.,  
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## Bridge Talk

### Extending the life of Bridges

by Jan Lewandoski

More than one thousand wood truss highway bridges, mostly 19th century in origin, continue to carry vehicular traffic in North America. The repair and strengthening of these bridges is made challenging by the need to carry increased highway loads and satisfy modern engineering criteria while retaining the historic form and, in the majority of cases, the original structural system of the bridge. Solutions, worked out on a case by case basis, between contractors, engineers, and State Historic Preservation Officers have ranged from restoration of the original structural system, to improving the strength of the bridge by methods compatible with its historic form, to augmenting or by-passing the historic structural system by means of steel girders or additional piers.

Introduction: During the second half of the 18th century and the first years of the 19th a number of substantial wooden truss bridges, with single spans exceeding 150 feet were constructed both in Europe and North America. Notable among them were the Schaffhausen Bridge (1758) in Switzerland, Timothy Palmer's trussed arch across the Merrimac in Massachusetts (1794), and Louis Wernwag's 340 foot (104 m.) Colossus in Philadelphia (1812). In spite of their success, these bridge designs were little imitated, perhaps due to their complexity and consequent expense. Rather, there emerged between 1804 and 1840 four patented trusses named for their American designers: the Burr Arch (1804), the Town Lattice (1821), the Long Truss (1834), and the Howe Truss (1840), which established models which dominated North American wooden bridge building until the mid 20th century. Bridges using one of these four trusses account for approximately 80% of the surviving spans longer than 60 feet in North America today. The other 20% use a wide variety of apparently successful, but less popular, trusses, such as the Paddleford, McCallum or Pratt. Wooden bridges 60 feet and shorter are usually of king or queenpost truss type, designs that probably originated in the roof systems of the public buildings of antiquity.

Approximately 20,000 wooden truss bridges were built in the U.S. and Canada between 1794 and 1958. After 1820 the majority were "covered bridges". i.e. roofed (Bridge Talk continued on page 6)



**Bridge Talk** (continued from page 5)

and sided, to protect the woodwork from weather. At least 1100 are still in use for vehicular traffic on public highways today.

While four truss types, along with the king and queenpost, dominated design, they were built by a multitude of builders over a vast geographical area, with consequent variation in detail and scale. A Burr truss might have a pair of arches clasping a single line of posts, as in the Village Bridge in Waitsfield, Vermont, or pairs of posts clasping an arch. Some Burrs and Long trusses were double barreled, i.e. a tall third truss, rising to the height of the ridge of the roof, divided the two lanes of traffic, as at the Schoharie Creek crossing in North Blenheim, New York. Town Lattice trusses were typically 14 ft. 6 in. tall (4.45 m.) and built up out of 6 layers of 3 inch (7.6 cm.) plank, but the 100 foot span double lattice railroad bridge at Wolcott, Vermont (1908) has trusses 25 feet tall (7.6 m.) and 12 lamina thick. Towns, Longs and Howes were all

occasionally assisted by arches. The design of these bridges became very refined. Sophisticated systems for varying the size of posts and braces to reflect loading conditions at different points in a span were developed for the Long trusses at Guilford, Maine and North Blenheim, New York by builders lacking the capacity to analyze unit stresses (Quantitative engineering analysis of wooden trusses was only just being developed in the 1850's by Herman Haupt in his *General Theory of Bridge Construction* and Squire Whipple in *A Work on Bridge Building*).

Length of span was experimented with widely in 19th century wooden bridges. The Columbia Bridge across the Susquehanna River in Pennsylvania was 5690 feet (1735 m.) long and supported by 28 piers for an average span of 196 feet (60 m.). Theodore Burr's McCall's Ferry Bridge, also across the Susquehanna, was a single span of 360 feet. It was unfortunately destroyed by ice in 1815, when only 2 years old. While the average clear span of the

surviving wooden bridges in North America is slightly under 100 ft. (30.5 m.), there are some notable exceptions. The double barreled Long Truss with arch at North Blenheim, New York, built by Nicholas Powers in 1854, has a single span of 228 ft. (69.5 m.) and currently has 1 in. (2.5 cm.) of positive camber. The Cornish-Windsor Bridge, a Town Timber Lattice built in 1866 across the Connecticut River between Vermont and New Hampshire has two spans, each 204 ft. (62 m.) in the clear, and carries a traffic volume of 2500 vehicles per day.

**To be continued**

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