



Friends of the Office of State Archaeology

FOSA

P. O. Box 380845
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MEMBER NEWSLETTER • SPRING 2002

PRESIDENT'S LETTER

One of the nice things about serving on the FOSA board is that there is usually lots of backup support from other board members and State Archaeologist Nick Bellantoni. I need not spend much time here telling you about our successful and promising winter, since Nick and VP Ken Beatrice have done most of it for me in their articles elsewhere in this newsletter. Read their accounts of our exciting annual meeting, and of the possibility — if we keep our fingers crossed — that OSA will actually get an archaeology wing under Governor Rowland's proposed extension of the UCONN 2000 initiative.

If the initiative passes, FOSA will be able to make a stronger case for the use of building permit fees to staff OSA on a full-time professional basis. The argument is simply: what's the good of a nice new archaeology wing if there's no staff to run it? Working with board member Chris Noble and our legislative supporter Rep. Larry Cafero (R-Norwalk), we hope to have a bill ready for the next legislative session which will earmark a very small percentage addition to building permit fees to fund the OSA office. Later this year, we expect to be urging you to pester your legislators about this great way of finally funding the office without a state budget adjustment.

We are also beginning to plan an early Fall event which may become an annual mainstay of the FOSA calendar: a Volunteers Recognition Day including a picnic and hopefully a visit to one or more Connecticut archaeological sites. This event will let the entire membership praise our stalwart field and office volunteers, meet each other, and maybe see an unfamiliar but interesting site. Details will appear before the end of summer.

Mike Raber

NEWS FROM THE STATE ARCHAEOLOGIST

We would like tell you about some exciting news! As you may have heard, on February 13, Governor Rowland announced 21st Century UConn, an initiative to extend and

expand the UConn 2000 program. He has proposed an eleven-year program that adds \$1.3 billion to continue the infrastructure improvements at the University of Connecticut's main campus at Storrs, the five regional campuses, and the School of Law along with support for medical and dental programs at the Health Center in Farmington.

The exciting news is that the Connecticut State Museum of Natural History and the Office of State Archaeology are included in this initiative along with many other worthy projects. Should legislation be passed this session for 21st Century UConn, this bonding proposal allots \$4.9 million toward renovations for the museum and a new archaeology wing. The archaeology wing will provide for state-of-the-art curation space for the anthropological collections, as well as laboratory and office space for OSA.

With your support, our future looks very bright.

As many of you know from attending South Carolina State Archaeologist Jon Leader's presentation on the CSS Hunley project at FOSA/ASC joint meeting, our office will be working closely with Jon in attempting to resolve the mystery of Ezra Chamberlin's identification tag found on-board the Confederate submarine. What is intriguing about the ID tag, is that Ezra was with the 7th Connecticut Regiment, Company K, and, he lived in Killingly, CT. It is very exciting to have this surprising Connecticut connection with an important national Civil War story. We will keep FOSA members posted as the project develops.

Although they keep reminding us that we are in an economic recession, OSA has reviewed a record number of development projects within the last year. Fortunately, through the efforts of **State Representative Larry Cafero** (R-Norwalk), OSA received \$15,000 for operating expenses for this fiscal year. While short of being able to hire full-time staff, these funds are important in obtaining equipment and student assistance with the office. We are grateful to all of you that support OSA efforts.

Nicholas Bellantoni

ANNUAL MEETING REPORT 2002

The FOSA Annual Meeting was held on January 27, 2002 at the High School in Glastonbury, Connecticut. The meeting was conducted in two parts, the Board of Directors meeting and the annual guest speaker. The speaker was Dr. Jonathan Leader, State Archaeologist of South Carolina. The presentation was entitled "C.S.S. H.L. Hunley: Discovery, Recovery, and Conservation of a Confederate Submarine."

BOARD MEETING

President Mike Raber called the meeting to order at 1:00PM and gave a brief history of FOSA. He emphasized our main focus this coming year was to obtain a budget for Nick's office. OSA has received a small amount of funding from UCONN for a second year with thanks to Representative Larry Cafero. At present, a committee is working on a direct approach for funding through permit fees through the Connecticut State Legislature.

There was a brief report on FOSA's work with Glastonbury middle school students who have participated in supervised field and laboratory work for the past three years. Last fall the work was at Glastonbury's Academy School, with the previous two sessions held at the Morgan site in Rocky Hill. Archaeology is a part of the Glastonbury Social Studies Department's curriculum. To date, approximately 260 students have participated in the field and assisted in cataloging the artifacts found.

Vice President Ken Beatrice gave a summary of 2001 volunteer efforts for the OSA, including 1,067 person-hours spent at three Prehistoric and ten Historic sites throughout the State. At the Office, 838 person-hours were logged conducting laboratory work, cataloging artifacts, and maintaining and organizing the library. The total for the year 2001 was 1,905 person-hours. FOSA would like to thank all the members of historical, conservation, and school groups that gave assistance. The Arthur Basto Archaeological Society has given their support for Nick's field work and has always been recognized and appreciated.

The Treasurer's Report by Dreda Hendsey and the Secretary's Report by Mae Johnson were given and accepted by the Board of Directors.

An announcement was made by Bonnie Beatrice that the Society of Ethnobiology Conference would be held in March at the University of Connecticut. Volunteers were needed for various tasks and tour guides for the Mashantucket Museum, the Greenhouse and Herbarium on campus.

Election of officers was as follows: Mike Raber - President, Ken Beatrice - Vice President, June Cooke - Treasurer, and Bonnie Beatrice - Secretary. Welcome new Board members Roger Thompson, Paul Scannell and James Trocchi.

The Directors meeting was adjourned at 1:25 P.M.

GUEST SPEAKER

Cosponsored by the Archaeological Society of Connecticut

Dr. Nicholas Bellantoni introduced the guest speaker, Dr. Jonathan Leader, State Archaeologist of South Carolina. Dr. Leader presented a video and slide presentation detailing how the C.S.S. H.L. Hunley was located, recovered and preserved, in a remarkable combination of marine archaeology and engineering. The submarine sank in 1864 in Charleston, SC after torpedoing the U.S.S. Housatonic. Archaeologists and conservationists have excavated the Hunley's artifacts and human remains in a special-purpose conservation facility.

Among the many artifacts recovered was a gold coin dated 1860, carried by the Hunley captain, Lieutenant George Dixon. A keepsake from his fiancée, the coin was dented by a bullet during the battle of Shiloh, saving him from injury.

Another recovered artifact has created a lot of interest here in Connecticut, especially in the Killingly area: a Union soldier's identification tag belonging to Ezra Chamberlain, a Connecticut volunteer. The question is, "Why was a Union soldier's identification tag found aboard the Hunley?" Chamberlain's fate is now a mystery, but Drs. Bellantoni and Leader will collaborate on investigations to answer this puzzling question.

It was estimated that approximately 387 people were in attendance for this event. Nick Bellantoni said this was the largest attendance for any state archaeological gathering he had ever seen in Connecticut. A hard act to follow, but we're working on it.

FOSA thanks the Glastonbury School System and Dr. Jacqueline Jacoby for arranging the use of the High School for our meeting.

Ken Beatrice



Mike Raber – FOSA President, Dan Cruson – ASC President, Jon Leader, Nick Bellantoni

ETHNOBIOLOGY CONFERENCE

The 25th annual meeting for the Society of Ethnobiology was a great success!! Over the course of three days there were 45 presenters with topics ranging from medicinal plants to archaeobotany in the Northeast. Friday morning, one entire session led by Dr. Kevin McBride addressed northeast ethnobotany. Presenters included familiar names like Jason Mancini, Brian Jones and Margaret Ordonez who shared with us their current research interests. Other topics included artistic expressions by native peoples, which was the main theme of this year's conference.

Our keynote speakers were Nancy J. Turner from the University of Victoria in British Columbia and Gary P. Nahan from Northern Arizona University. Their presentations encompassed the topics of native handcrafting as a viable economic alternative for native peoples. Additionally, their presentations addressed the sustainable harvesting of native plants for handcrafting to ensure that plants will remain for the use of future generations.

Our gracious MC of the conference was our very own Dr. Nick Bellantoni who did a fabulous job!! Our sincere thanks to him and to all of our volunteers from FOSA and ABAS, especially Bonnie & Ken Beatrice, Paul & Andrea Scannell and Bill Schultz!!

Luci Fernandes

BELOW GROUND

With over twenty field projects already on the list so far, it appears we will have a mighty busy season this year. Sites run the gauntlet from prehistoric to historic to industrial to burials - a real potpourri this year to say the least. Towns involved are Old Lyme, East Hartford, Glastonbury, Manchester, Scotland, Newington, Berlin, Torrington, Goshen, Enfield, Lebanon, Coventry, Rocky Hill, Guilford, Putnam, Wolcott, Killingly, East Hampton, and Milford. We also hope to get back to the sunken ship in the Connecticut River if water conditions allow it.

Top priority will be given those sites that are most threatened by development. There are also several instances where we will coordinate with local historical societies and assist them in a one-day dig. All in all, things are shaping up to an interesting and eventful field season. Hope to see YOU there!

Dave Cooke

A FAMOUS FORGE

Mike Raber

Early in 2001, FOSA member Walt Landgraf was instrumental in starting a research project at the site of a forge in Killingworth associated with a colonial steelworks and famous metallurgical experiment. Working with Yale University historical metallurgist Prof. Robert Gordon, FOSA President Mike Raber, and Frances Kemmish, Walt helped arrange for cooperation and assistance from the Connecticut Water Company, which owns the site. So far, the project has involved background research, detailed surface survey of part of the site, and a short report, all completed between Spring and Fall 2001.

Killingworth minister and entrepreneur Jared Eliot (1685-1763) was an early investor in Connecticut's Salisbury high-grade iron-ore industry beginning in 1734. Pig and cast iron from this region eventually replaced much of the smelted bog-iron ore used at bloomery forges in the state's lowlands. By 1744, Jared's son Aaron (1718-1785) became involved in the earliest Connecticut attempts to convert bar iron into the steel needed for tool edges, working at a furnace in Simsbury perhaps begun as early as 1728. Aaron Eliot made steel by the cementation process. He bought bars of iron and packed them along with charcoal powder into sandstone chests placed over a firebox in a dome-shaped stone furnace. His artisans heated the chests to a bright red heat for a week or more with a wood fire. Carbon from the charcoal packed in the chests diffused into the iron, converting it to steel. Some of this carbon reacted with slag inclusions that were always present in bar iron to release carbon dioxide gas. Because the gas formed blisters on the surfaces of the bars, the product was known as blister steel.

Aaron Eliot built a similar furnace for converting iron to steel sometime before 1755 on Jared's Killingworth property on Pipe Stave Hill. High phosphorous content in locally-available bog ore made steel of low quality, and in 1761 Aaron added a finery forge to convert pig iron, which he would have to buy from distant sources, to bar iron. The Eliots, and other colonial ironmakers, already knew that black sand left behind by running water in brooks and streams, and on beaches, had enough iron content to have some potential as ore. In need of a ready source of pig iron, Jared and Aaron collected enough local black beach sand (possibly at Hammonasset) to fill their saddle bags in January of 1762, and their finer — stimulated by a bottle of rum to overcome his qualms about the endeavor— made about 52 pounds of iron using a bloomery process. Subsequent conversion of part of this iron to steel produced a satisfactory product, from which they made a knife blade which Jared sent to the Society for the Encouragement of Arts, Manufactures, and Commerce in London. The society promptly voted Jared its gold medal, which arrived in 1763 shortly after Jared's death.

Jared and Aaron had difficulty finding enough iron sand for further trials. They mixed what they did find with bog ore, and made useful, but not particularly good metal. News of the sand iron experiment spread rapidly, and reports of other locations where iron sand could be collected arrived in Killingworth. Jared sent several of his sons to investigate these, and betook himself to New Haven to make experiments with the use of permanent magnets to separate the richest grains from the ore. The Eliots accumulated enough iron sand to make a number of additional sand-iron blooms, which they used for further demonstrations of the suitability of this iron for steelmaking, but there is no documentary evidence of how long Aaron may have continued to use sand ore. He was able to continue making steel through the American Revolution, but probably had to purchase pig iron given the inadequate supply of the sand ore. After his death in 1785, the steelworks ceased operations but the forge was used by others at least briefly, perhaps as an ordinary bloomery smelting locally-available bog ore. The site may have been converted to gristmill use in the early 19th century.

The basic equipment needed at an 18th century finery or bloomery forge included a hearth where burning charcoal fuel provided the heat needed for fining pig iron or smelting ore, a power-driven pair of bellows to supply an air blast to the hearth, and a power-driven helve hammer. The helve was a massive, slow-acting hammer used to expel slag and consolidate the sponge iron produced in the hearth. Typically, separate waterwheels provided power for the bellows and the hammer, requiring a waterpower privilege including a dam, races or flumes running water to the wheels, and tailraces discharging water to the stream or river below the forge. The Eliot iron works site is located on the Menunketesuck River off Ironworks Road in Killingworth. The forge was on the east side of the river, marked today by two large piles of slag. There is no road access on the east bank, and the forge must have been reached by a bridge from the end of the approach road on the west side. The earth and stone dam abutments survive, with large pieces of slag which appear to have been thrown on the upstream face and crest of the dam from time to time to protect it against wind-driven waves in the forge pond or erosion by flood-stage water. The western end of the dam is now missing. It was probably constructed of wood planks placed over a foundation of stones, and served as the spillway. The bridge to the forge probably crossed this section of the dam.

Abundant black earth with charcoal fragments on the west side of the river, on a section of level ground supported by a massive stone retaining wall, marks the site of the charcoal storage area to which fuel was delivered by wagons traversing a branch of the road that descends Pipe Stave Hill from the west. Remains of the steel furnace have not been found yet. While a steel cementation furnace contained a massive amount of stonework, it might have attracted later people looking for stone to re-use, including perhaps those who built some early 20th century cottages erected on the

west side of the river. Since the steel furnace did not need mechanical power from a waterwheel, it might have been placed elsewhere on the property, in a location convenient for the delivery of wood, which was required in large quantities.

Slag is the principal artifact remaining at the Eliot site today. No metals, hammer parts, or furnace remains are present above ground. This absence of artifacts other than slag is typical of other forge sites in Connecticut. Salvagers or, later, scavengers, usually removed metal and machinery for scrap once a forge stopped operating, and forge hearth structures do not survive well in locations susceptible to flood damage. Archaeologists elsewhere often find the anvil base, a massive wooden block, and traces of hearth foundations when they excavate forge sites. No bloomery or finery forge site in Connecticut has as yet been excavated.

The slag at a forge site can yield evidence about the metallurgical processes used and the quantity of iron made. At the Eliot site only surface finds have been examined so far, and these are probably representative of the later period of forge operation. Excavation of the slag piles might yield information on evolution of the metallurgical techniques used during the lifetime of the forge. Prof. Gordon's work included looking at the size, shape, and surface texture of slag samples to estimate the associated metalmaking processes, along with mineralogical and chemical analyses of interior slag structure from thin sections cut with a diamond saw. Intact slag samples were interpreted as having solidified in the bloomery or finery hearth of the forge, which appears to have been about 12x14 inches in plan. Most of the remaining slag consists of broken plate-like pieces that can be identified from their surface markings as slag tapped from the hearth during smelting or fining. Others are small pieces apparently removed from the hearth during or after completion of a fining or smelting run. The specimens examined in the laboratory include examples of all these types of slag. Of the five samples on which mineralogical analysis was done, four were found to have resulted from bloom smelting of bog ore, and one from fining of pig iron. This distribution may represent the later stages of operation of the forge since all the samples are surface finds. The forge may have been run as an ordinary bloomery smelting bog ore in its later years, perhaps after Aaron Eliot's steelmaking venture was abandoned.

Because of the setting of the forge on a side of the river lacking direct road access, it is unlikely that any slag was hauled away from the site after its abandonment for use as road metal or fill. The total quantity of metal made can be estimated from the amount of slag remaining on the site. Based on transit survey, the contours of the two slag piles were used to compute pile volume totaling at least 4330 cubic feet. In bloom smelting the volume of slag made is approximately equal to the volume of metal made. Based on an estimated 50% porosity within the piles, the slag volume corresponded to production of 530 tons of iron over the

lifetime of the forge assuming only bloomery smelting was practiced. From the typical 80-pound bloom suggested by the deduced size of the hearth, the number of blooms made would then have been 13,300. If production continued from 1761 to 1785 (the year of Aaron's death), these blooms could have been made with the forge operating half of each year at the rate of three blooms per day— which matches the usual experience with bloom smelting. The amount of slag made in fining is somewhat smaller than in bloom smelting. If future sampling and analysis shows that a significant part of the slag pile is fining slag, an upward revision of the production estimate will be needed.

In future research, samples collected from top to bottom of the slag piles might reveal the time sequence of changes in technique used at the forge. Among the samples examined so far, none can be identified as resulting from smelting sand ore. This material may be at the bottom of the piles. If the sand ore never materialized as an adequate source of iron for steelmaking, the quantity of such slag would be small. Using mechanical equipment, an archaeological excavation at the site might also locate surviving traces of the forge equipment. Search of the property for any remains of the steel furnace would also be worthwhile. No remains of a steel cementation furnace have been found in the United States, even though we know that at least two or three others were operated in Connecticut, and many more in Pennsylvania. The Eliot site remains significant today because of its association with a leading colonial family, and as a place that holds material evidence of the colonial understanding and practice of metallurgical technology.

CHANGE OF ADDRESS

Friends of the Office of State Archaeology has a new postal address. All mail, including new memberships, renewals, donations and correspondence must now be sent to:

*FOSA
P. O. Box 380845
East Hartford, CT 06138-0845*

Be sure to let us know if you have moved or changed your phone or email address. Changes may be emailed to DKelle2358@aol.com.

WELCOME NEW MEMBERS

Thomas Atkinson, Andrea Beaudette, Judy Friday, Richard Friswell, Susan Galgano, Collin Harty and Leanne Kennedy, Mr. & Mrs. Harold Manstan, David Nolf, James F. Poetzinger, Jack Rajotte, Glen Reem.

KEN'S OFFICE REPORT

This winter has been very productive. Approximately 838 volunteer man-hours were logged for the year 2001 conducting laboratory work, cataloging artifacts and

maintaining and organizing the library. A new "African American" section was added to the OSA library. This collection of books and other written materials was obtained through a grant from the Connecticut Historical Commission.

The artifact cataloging from several of last year's dig sites has been completed. The cataloging of two collections that were given to OSA, the Andrew Kowalsky Collection and the Red Bank Collection, are still ongoing. These are both very large collections containing thousands of artifacts that must be identified and cataloged.

Also in progress is the remodeling of the new Laboratory and Artifact Storage area located in Building #1. New shelves were purchased and installed to receive already processed artifacts. A laboratory space is being prepared for the curation of artifacts and to conduct soil flotation evaluations.

This coming season will be very busy with some unusual excavation sites.

Ken Beatrice

2002 MEETING SCHEDULE

April 27, 2002

Archaeological Society of Connecticut, Annual Spring Meeting. Theme: *Maritime Adaptation and Underwater Archaeology*. Essex Town Hall, Essex, CT. Information: Dan Cruson, (203) 426-6021 or danielcmson@earthlink.net.

NYSAA Annual Meeting is April 26 - 28, 2002 in Norwich, NY. Program: <http://www.siftings.com/nysaa.html>

SPA Annual Meeting is April 26 - 28, 2002 in Greensburg, PA. Program: <http://www.siftings.com/spamreg.html>

ESAF Annual Meeting is November 7 -10, 2002 in Mt. Laurel, NJ. :<http://www.siftings.com/esafmt.html>

MAAC Annual Meeting will be in Virginia Beach, VA in March 2003. The call for papers will be sent in late summer.

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