Coming Events

March 25, 2000 **Ghost Ships Festival,** 1-9 pm, Centennial Hall, Milwaukee Public Library. Sponsored by the Great Lakes Shipwreck Research Foundation. Contact GLSRF, P.O. Box 070887, Milwaukee, WI, 53207.

March 25, 2000 **Wisconsin Underwater Archeology Association Spring Meeting,** 10 am to noon, Milwaukee Public Library. Contact Jeff Gray.

May 13-21, 2000 **Wisconsin Historic Preservation Week,** various activities and programs throughout the state. Check the National Trust for Historic Preservation's Preservation Week website at www.nthp.org/main/preservationweek/preservation_week.htm

Wisconsin Underwater Archeological Association

P.O. Box 6081

Madison, WI 53716

Wisconsin Underwater Archeology Association

For those interested in the study and preservation of Wisconsin's underwater history and cultural resources.

Wisconsin's
UNDERWATER HERITAGE

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Wisconsin Underwater Archeology Association

Recovery, Analysis and Conservation of a Prehistoric Canoe

by Andrew Jalbert

Wisconsin has more than 700 shipwrecks in its waters and dozens of industrial ports such as Bayfield, Green Bay and Milwaukee on its shores. Indeed Wisconsin's maritime history profoundly shaped the state we live in today.

Oldest watercraft in Wisconsin

However, Wisconsin also boasts a rich maritime prehistory. People have inhabited the state for approximately 10,000 years. Furthermore, Wisconsin's 14,000 inland bodies of water, two Great Lakes and numerous rivers increase the likelihood of existing prehistoric sites and artifacts. This is evident as more and more prehistoric maritime sites are discovered.

1996 Recovery, Lake Mary, Wisconsin

Recently, the oldest recorded watercraft in the state was recovered from Lake Mary in Kenosha County, dating nearly 2,000 years old. The discovery of this artifact broadens the perceived scope of Wisconsin's maritime past. Clearly, our maritime history is not only anchored to ship sailors, lumber mills and the ore trade, but to hunter-gatherers, stone tools and mound builders as well.

As is the case with many archeological sites, the burnt white oak canoe was initially discovered by accident, and not by an archeologist. Prop wash from a pontoon boat uncovered a section of the canoe in 1996. Thankfully, the finders contacted Dan Joyce of the Kenosha Public Museum who in turn contacted the underwater archeologist at the State Historical Society of Wisconsin. The SHSW team identified the piece as either the canoe's bow or stern and recovered two additional fragments from the silt. All three fragments were transported to Madison for documentation, analysis and conservation.

Radiocarbon Age Determination

Determining the age of artifacts is a crucial facet of archeology. When dealing with historic sites such as homesteads, mines, lumber camps or shipwrecks, documents can usually be referenced to help determine the age of the site. Journals, captain's logs and even newspaper articles will often detail specific dates such as when a particular ship sank or when a building burnt. Historic artifacts associated with these sites can also often times be easily dated through old catalogs, etc.

Dating prehistoric sites however is a bit more complicated. Archeologists cannot

continued on page 4

Fall Meeting Brings Elections Of New Officers And A Trip Down The Milwaukee River.

Schooner Denis Sullivan *under construction, photo by Steve Wagner*

The Wisconsin Underwater Archeology Association held its 1999 fall meeting in Milwaukee on October 16th. The day began with a morning business meeting at the Milwaukee Public Library. Not only were officers and directors elected for the conventional two year term, but several new positions were created and filled. The new officers are:

Jeff Gray - president

Andy Jalbert - vice-president

Russel Leitz - secretary

Tom Villand - treasurer

Richard Boyd - director

Robert Korth - director

Janet Defnet - director

Brian Filkins - webmaster

Danny Aerts - newsletter editor

Cathy Klecker - activities and project coordinator.

With these new positions and representatives from around the state, WUAA will be better able to plan future events and projects throughout Wisconsin. Remember, you don't have to be an officer to get involved, so if you are interested in working on a particular project or program, please contact an officer.

Various members gave reports on summer activities, including the following;

Jeff Gray gave an update on the State Historical Society's underwater archeology program. Two moorings were placed on the *Frank O'Connor* off Bailey's Harbor, while the anchors for moorings were set on the *Hetty Taylor* and *Seleh Chamberlain* off Sheboygan. Jeff also discussed future plans for additional moorings.

Fil Ronca discussed the completion of the *Christina Nielson* project this

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In addition to publishing this newsletter, the Association also holds semiannual meetings and provides support to members' research and publication projects. Annual membership dues are $15. For membership information, contact the secretary or write to the address below.

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Luncheon cruise on the Edelweiss
photo by Steve Wagner

summer. Five people spent a total of five days diving in Bailey's Harbor. The drawings are being finished in Madison.

Fil also mentioned the work done at Bullhead Point in conjunction with East Carolina University. A report on this project was given in the September issue of *Wisconsin's Underwater Heritage*.

Andy Jalbert mentioned that the Wisconsin Archeological Society would like to see some interaction between our two groups (see the notice on page 8). In particular their editor would like to see some underwater related articles for their journal.

The Association for Great Lakes Maritime History had their annual meeting at Sturgeon Bay this Fall. WUAA members sponsored dives at the Leathem and Smith Quarry (a past project that WUAA had carried out) where interested participants dove on the two wrecks at the site.

It appears that the Spring Meeting of the Association will be held in Milwaukee. Brendon Baillod discussed the Ghost Ships Festival to be held in Milwaukee on March 25th, 2000. This Great Lakes shipwreck conference is sponsored by the Great Lakes Shipwreck Research Foundation, which has invited WUAA to hold our business meeting in the morning. Members could then attend the program in the afternoon. More details will be in our next newsletter (see flyer).

After the conclusion of the business meeting, thirty three members ventured down to Milwaukee's waterfront to board the luxury dining yacht *Edelweiss*. The luncheon cruise consisted of a two hour trip on the Milwaukee River and the port of Milwaukee area. While dining, people enjoyed a narration by Jim Landwehr (from the Wisconsin Marine Historical Society) detailing, from a historical perspective, what we were seeing.

To complete the day, we had the opportunity to take a trip to the nearby Wisconsin Lake Schooner Education Association's grounds. Members toured the visitors center and shipyard. We look forward to the launching of the *Denis Sullivan*, and the possibility of having a meeting aboard.

Prehistoric Canoe *continued from page 1*

reference a catalog or newspaper article when working with an artifact that is a thousand years old. Consequently, the science of dating prehistoric materials has become very important to archeologists attempting to reconstruct cultural prehistory.

Several methods of dating have been developed to determine the age of prehistoric sites. These methods include numerous techniques from geological and geochemical age determination, to faunal remain association, to the aspartic acid dating of bones. The most frequently used method to determine the age of organic substances is 14C dating, also called radiocarbon dating.

Through photosynthesis, atmospheric carbon enters the chemistry of plants, which in turn are consumed by animals. At the time of an organism's death, carbon is no longer taken in but instead starts to radioactively decay. By measuring the remaining carbon in the organism (which still emits trace elements of radiation) the time elapsed since death can be determined. This difference between the original amount of carbon present and the current amount of carbon can be calculated, and by knowing the radioactive disintegration rate (known as a half-life) a material age can be assigned. Carbon has a half-life of approximately 5730 years +/- 40 years.

A sample from the canoe was sent to a lab in Florida to be radiocarbon dated. The resulting date was 1,850 years old +/- 60 years. This places the canoe temporally in the Woodland Indian stage. This stage is primarily defined by a people who produced pottery, built earthen burial mounds, and cultivated plants. The Lake Mary Canoe has been identified as the oldest documented watercraft in the state.

Conservation

Conservation is the scientific process used to preserve and restore archeological materials. The basic theory behind the conservation of waterlogged wood is the removal of excess water while simultaneously replacing it with a synthetic material that stabilizes and strengthens the cell structure. One material used to perform this conservation is polyethylene glycol, or simply PEG. Fragments of the Lake Mary Canoe will ultimately be conserved by PEG treatment. For more conservation information, see Filippo Ronca's article on Conservation starting on page 6, in this issue of *Underwater Heritage*.

1999 Recovery, Lake Mary, Wisconsin

In October of 1999, the SHSW sent another team of divers to search for additional pieces of the Lake Mary canoe. Jeff Gray, Filippo Ronca and the author met Dan Joyce of the Kenosha Public Museum at the site. Although the water temperature was in the low 40's, the surface was calm and the air temperature was in the 50's.

Recovering the canoe proved to be somewhat difficult due to its inundation by the silt. A preliminary swimover and visual inspection of the lake bottom was performed in the area where the section was discovered in 1996. This simple inspection however produced no evidence of any additional pieces. Probe rods were then employed to feel beneath the silt layer for any debris within the same survey area. This too was problematic due to the large amount of debris unassociated with the canoe, including rocks, bottles and lumber. Once encountered, these all had to be verified by touch (rocks for instance could be easily identified) or they had to be removed from the silt and visually identified.

The canoe was eventually located directly adjacent to the boat dock beneath approximately five feet of silt. Divers had to pull themselves beneath the silt, either by holding on to the pier pilings or the probe rods. Pieces were then gently removed by fanning, digging or slowly rocking the fragments back and forth until they came free. Great care was taken not to fracture any of the wood. Visibility was absolute zero and divers worked exclusively by feel. Once removed from the water, the canoe fragments were given to Dan Joyce who immediately submerged them in large bins filled with fresh water so the wood would hold its cell structure until it could be properly conserved. More than 20 pieces of the canoe were recovered ranging in size from a few inches to nearly two feet. All of the pieces were transported to Madison where they will be documented, analyzed and conserved.

Although these types of finds are quite rare in the state, the discovery of the Lake Mary Canoe reminds us that Wisconsin's waterways have been utilized for thousands of years. Considering the importance of the water prehistorically as a resource base for humans, it seems very likely that more of these sites exist and hopefully, in time a more detailed prehistoric maritime record can be constructed. ■

Books Available from the State Historical Society

Survey of Submerged Cultural Resources in Northern Door County: 1988 Field Season Report (1989), by David J. Cooper. Price $10.00.

This report examines the history and archaeology of eight shipwrecks in northern Door County, as well as a maritime historical overview of the region. 74 pages, 28 figures, paperbound.

By Fire, Storm, and Ice: Underwater Archeological Investigations in the Apostle Islands (1991), edited by David J. Cooper. ISBN 0-87020-290-1. Price $20.00.

The history and archeology of several shipwrecks located in the Apostle Islands are investigated, along with a maritime historical overview of the region. The work features [pull out/fold out] site plans of the ship wrecks, underwater and historical photographs and maps. 170 pages, 36 figures, paperbound.

Report on Phase I Marine Magnetometer Survey in Death's Door Passage, Door County, Wisconsin, 1989 (1990), by David J. Cooper and Bradley A. Rodgers. Price $8.00. Paperbound.

Davidson's Goliaths: Underwater Archeological Investigations of the Steamer Frank O'Connor and the Schooner-Barge Pretoria (1995), by David J. Cooper and John O. Jensen. ISBN 0-87020-281-2. Price $15.00.

James Davidson built some of the largest wooden ships ever built. This report explores Davidson, his shipyard, and the history and archeology of two of his ships that now rest in Wisconsin's waters. 81 pages, 20 figures, paperbound.

Lac du Flambeau

The *Wisconsin Underwater Archeology Association's* work assisting in the search for the remains of a fur trading post on the Lac du Flambeau reservation was recognized in the Summer 1999 issue of *Common Ground* magazine. (This project was reported in the September 1997 issue of *Wisconsin's Underwater Heritage*.) The *Common Ground* article, by Cynthia Stiles, discusses the entire Lac du Flambeau tribal historic preservation program.

The Wisconsin Lake Schooner Project shipyard
photo by Steve Wagner

Conservation at the SHSW Lab

by Filippo Ronca

The purpose of this article is to give a brief introduction to conservation and the role it plays in underwater archeology. Included will be an update on some of the State Historical Society of Wisconsin's (SHSW) conservation projects, and an example of one of them.

When an artifact from a shipwreck is displayed in a museum, there is a tremendous amount of effort that goes into the exhibition of that object. Through the combined areas of archeology, conservation, interpretation and exhibition, artifacts can covey a great deal of information to historians and the public. Measures must be taken to protect artifacts. By definition, conservation is the scientific process of preserving and restoring archeological materials. While conservation is an integral part of underwater archeology, it is often an area that has not received much attention. Archeologists display great care in the collection and documentation of information, and this care must also extended in the handling of an artifact. Artifacts contribute towards the overall understanding of our maritime past and need to be treated with care in order that they may be studied both in the present and in the future.

Conservation includes a number of stages such as documentation, analysis, cleaning and stabilization of an artifact. There are a number of different specific treatments available for the conservator to use, depending on the type of artifact, such as wood, iron or ceramics, etc. Whichever methods are undertaken, the goal of the conservator is to treat the artifact so that it may last over time. This goal applies to the artifact that will be displayed in a museum or one that is kept in a storage facility for future study. The type of treatment selected by the conservator depends upon several factors. These factors include safety, simplicity, reversibility and the ultimate destination of the artifact. If not conserved properly, an artifact may look aesthetically pleasing for awhile, but may degrade over time.

As stated previously in the article, conservation is used to preserve and restore archeological material. It is utilized first to stabilize and then to prevent any additional loss or decay of an artifact. Often this decay is increased when an artifact is exposed to different environments, for example, land to water or water to air. Along with the treatments, detailed records are kept, outlining which treatments were used as well as drawings and/or photographs. This information is then put into a database for future reference.

Artifacts discovered in the cold fresh waters of Wisconsin are often found in excellent condition, where the process of an artifact's degradation is often slowed. However, once an artifact is brought to the surface it is exposed to a radically different environment. This often accelerates the decaying or degrading process.

Over the years, the SHSW has conserved a variety of artifacts from underwater sites. The majority of artifacts that have been treated at the conservation lab have been composed of either wood or iron. Conservation work in these two areas involves the stopping of the corrosion process, as well as the stabilizing of waterlogged objects. In this issue of *Underwater Heritage*, starting on page 1, Andy Jalbert describes the recent discovery of a dugout canoe, one of Wisconsin's earliest watercraft. Another prehistoric canoe was also recently found in Wisconsin. This article will provide a brief description of the process of conserving such artifacts.

These canoes were discovered in a submerged environment and thus were waterlogged. These artifacts were actually in excellent condition upon discovery, however, once removed from the water they are at risk of degradation. When water logged pieces are dried out too rapidly, they are likely shrink and split. This is due to the cellular composition of wood. Cellulose is a complex carbohydrate that makes up most of the cell wall and is responsible for wood's strength. When wood becomes waterlogged its cells become saturated with water. Their level of saturation depends upon several factors including type of wood, and how long the wood has been in the water, as well as salinity and the amount of oxygen in the water. As wood dries, if the moisture in the cells escapes too rapidly, the cell walls will collapse. This causes wood to warp, shrink and split.

Through conservation, we try to minimize this type of degradation by replacing the moisture in the cells with another type of material. There are several different methods for the treatment of wood at the conservator's disposal. These methods are dependent on the amount of cellulose left in the wood and the moisture content in the wood. Conservation of wood is accomplished by either impregnating the wood, or bulking the wood with an agent or a combination of the two procedures. Bulking is the replacement of water within the cell walls with an inert substance. Impregnation is when there is no longer any cellulose left in the cell wall and therefore all interstitial and cellular cavities will be filled with a substance that will harden when cooled.

The agent that was used for the treatment of the canoes was the synthetic material polyethylene glycol (PEG). There are different types of PEG depending on their molecular weight. It was decided to use PEG 540, which was suitable to both impregnate and bulk the wood. The canoes were then placed in a cattle trough where they were kept submerged in the PEG solution. Over time, the water in the cells was gradually replaced with this synthetic material. This was a slow process and after nearly two years of being submerged in this synthetic material it was ascertained that the majority of moisture in the cells was sufficiently replaced with the PEG. The canoes were removed from the tank. Once again, rapid drying could pose a problem for the canoes. Therefore the canoes were placed in a humidity chamber in order to slow the drying process and gradually expose the canoes to ambient air. Grains of sand and weeds found in the numerous crevasses of the canoe need to be mechanically removed. Once this process is complete the canoes will be placed on display.

While conservation can be a very time consuming and costly process that requires great patience, it is, however, a necessity in order to prevent the artifact from any future degradation.

The State Historical Society of Wisconsin (SHSW) has operated a modest conservation lab to stabilize artifacts from around the state. If not treated, an artifact will eventually decay and therefore it and its information will be lost forever. However, the best way to preserve Wisconsin's maritime heritage is to leave the artifacts in place. In addition, by preserving artifacts in place, they remain in context of the site.

For Further Reading:

The Encyclopedia of Underwater and Maritime Archeology, James P. Delgado, Editor, Yale University Press, New Haven and London, 1997.

WUAA Members Give Conservation Lab a Facelift

This past year has brought some exciting changes to the State Historical Society Wisconsin's (SHSW) conservation lab. The SHSW has decided to expand upon our existing facilities in order to better accommodate the need to conserve artifacts. Through the combined efforts of several WUAA members and SHSW staff, the existing facilities have been greatly improved over the past months. While several areas needed to be addressed, ventilation and space were the two main areas of concern.

With the assistance of Leroy Klecker (father of WUAA member Cathy Klecker), a new ventilation system was installed in the lab. The new, more efficient exhaust fan now provides much better air circulation throughout the work space. Ventilation is critical to the comfort and safety of those working on artifacts in a conservation lab due to fumes and chemicals. The SHSW would like to thank Leroy for his expertise, labor and materials that made this project possible.

Space is the most limiting factor in the lab, and a large portion of the recent efforts concentrated on maximizing the lab's limited space. Thanks to the efforts of WUAA members Tom Villand and Hank Whipple major gains were made in this area. Existing counters and sinks were removed and replaced, while shelving was added to provide even more space for storage. In addition, the improved lighting will greatly enhance the work space. Now that the major aspects of the renovation of the lab are nearly complete, the new and improved conservation facility will enhance the SHSW's ability to conserve artifacts from submerged and terrestrial sites for future generations.

Tom Villand helping out at the conservation lab

Extinction of Freshwater Creatures Forecast

The first estimate of extinction rates of North America's freshwater animals, published in the October issue of *Conservation Biology*, has found they are the most endangered species group on the continent. The Canadian study, by Anthony Ricciardi of Dalhousie University in Halifax and Joseph Rasmussen of McGill University in Montreal, warns that the U.S. could lose most of its freshwater species in the next century if steps are not taken to protect them.

Relatively little media attention has been given to freshwater species, the authors say, but these animals are in at least as much danger as land species. Since 1900, at least 123 freshwater animal species have been recorded as extinct in North America. Common freshwater species, from snails to fish to amphibians, are dying out five times faster than land species, and three times faster than coastal marine mammals, the researchers found.

Freshwater amphibians are hard hit. The disappearance of the golden toad and other amphibians in Costa Rica has been attributed to climatic changes. Many losses have been recorded in national parks and nature reserves, indicating pervasive threats even in protected areas. In Australia, Panama and the US, about 20 frog species have been decimated by a previously unknown fungus. Deformities are also widespread, caused by pollutants such as pesticides and other factors.

To get a picture of how rapidly species extinction is accelerating, the Canadian researchers compared current extinction rates with those from the fossil record. They calculate that the background rate of extinction for freshwater fish species is about one species every three million years.

The modern extinction rate in North America, the study says, is about one extinction every 2600 years - about 1,000 times higher than the background rate. Ricciardi and Rasmussen predict that many species considered at risk will disappear within the next century. At risk species account for 49 percent of the 262 remaining mussel species, 33 percent of the 336 crayfish species, 26 percent of the 243 amphibian species, and 21 percent of the 1,021 fish species.

Non-native species pose a serious threat to indigenous freshwater animals. European zebra mussels are outcompeting native mussels in North American lakes and rivers. Sea lampreys invade lakes and attach themselves to native fish, killing them. Even sport fish transplanted from one lake to another can take over an ecosystem, driving less aggressive native fish toward extinction.

Dams that obstruct river flow are also threats. Of 5.2 million kilometers (3.2 million miles) of stream habitat in the lower 48 states, less than two percent, or about 100,000 kilometers, is pristine enough to be federally protected, Ricciardi and Rasmussen say. Excess sediment, toxic contaminants and organic pollutants from agriculture threaten most U.S. waterways. Only 40 rivers longer than 200 kilometers (125 miles) remain free flowing in the lower 48 states. Ricciardi and Rasmussen note that hundreds of U.S. dams are coming up for federal relicensing soon, providing an opportunity to reestablish natural flows in many rivers.

The Wisconsin Archeological Society

Those of you who wish to broaden your knowledge of archeology in the state may be interested in becoming a member of the Wisconsin Archeological Society (WAS). The organization was established in 1903 to help preserve and document both historic and prehistoric cultural resources in the state. Members are entitled to several benefits including *The Wisconsin Archeologist* journal, copies of *Wisconsin Archeology News* newsletter, announcements of monthly meetings and lectures, discounts on WAS merchandise and back issues of The Wisconsin Archeologist.

For more information, contact Brian Nicholls at the Wisconsin Archeological Society, P.O. Box 1292, Milwaukee, WI 53201 or visit their website at http://www.uwm.edu/org/WAS/

Ghost Ships Festival

A new annual conference for Great Lakes historians, researchers, divers and underwater archeologists will be held at the Milwaukee Public Library's Centennial Hall on Saturday, March 25th, 2000.

Called the Ghost Ships Festival, the event will feature films, seminars and presentations by divers, historians, archeologists, researchers and wreckhunters from around the Great Lakes region.

Tickets for this event will be $20 each and proceeds will be used to fund the preservation of Great Lakes wrecks. The Ghost Ships Festival is hosted by the Great Lakes Shipwreck Research Foundation, Inc., a non profit organization. For more information, go to the Ghost Ships Festival website at:

www.ghost-ships.org

Please register early, as no tickets will be sold at the door. Ticket information can be obtained by emailing us at:

tickets@ghost-ships.org