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*The Goody Bag - January 1991*

South Carolina Institute of Archaeology and Anthropology--University of South Carolina

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BARGE GRAVEYARD IN THE WACCAMAW

Three Conway river divers, Don Stewart, Tom Hunt and Hampton Shuping, recently discovered a concentration of four barge wrecks in the Waccamaw River near Georgetown. Institute staff visited the site with them in December. Due to time constraints and chilly diving conditions (water temperature was in the low 50 degrees - brrr!) we only managed to document the structural features of one of the wrecks. With some guidance from the Institute these experienced black water divers have decided to make this section of the river a recreational project area for 1991. They intend to make observations about the local underwater environment and to map and record the barges, a dock structure and any associated artifacts. Divers who are interested in assisting in this project should contact Hampton Shuping at (H) 248-1223 or (W) 248-9121.

It is likely that these sites are associated with the three nineteenth century rice plantations in the vicinity: Richmond Hill, Laurel Hill and Waccamaw. An excellent book about life on these plantations is Richmond Hill Plantation 1810-1868 by James L. Michie, published in 1990. The Waccamaw River was the main deep water artery of transportation from the plantations to the developing settlement of Georgetown and the ocean. Despite simplistic box-like shapes, barges display structural variations in the carpentry of planking joints, fastenings, side logs, gunwales, keelsons and thwarts. By documenting many different types of barges we hope to gain some insight into the reasons for these variations. Were similar barges made by the same local carpenter, were they associated with a particular time period, or were they built that way to carry a particular type of cargo more easily? These questions can only be answered somewhat accurately once we have recorded many different barge types and have reports of artifacts found in context on barges, or else some indication that these watercraft belonged to a particular plantation or were associated with certain industrial or agricultural activities. The divers' report on the barges near Wachesaw Landing has therefore already contributed an important portion of information to our knowledge of South Carolina's watercraft. These sites also have the potential for an interesting summer project.
SCIAA has finished our proposed revisions to the South Carolina Underwater Antiquities Act. A copy of it is now in bill form. Myself and my staff have spent many months working on it, discussing it with other agencies (both in our state and in other states), with legal counsel, with the state Attorney General's Office, and with many of the state's divers, addressing and incorporating many of your ideas and concerns in this draft.

Why have we decided to change the law? Our heritage, as evidenced in the cultural remains found beneath the waters of the state, is vanishing at an increasingly alarming rate. Natural erosion, commercial development and other commercial interests all hasten the destruction of these non-renewable, finite resources. Our job as underwater archaeologists for the South Carolina Institute of Archaeology and Anthropology is to protect, preserve and promote awareness in our submerged heritage for future generations. The law is one of the means by which we do this.

Concepts of management of submerged cultural resources have advanced in this country during the fourteen years since the South Carolina Underwater Antiquities Act was first enacted. However, the law has remained essentially unchanged since 1976, as have inherent problems within the law.

The following points illustrate both the need for the proposed Act and specific ways in which the proposed Act is an improvement over the present Act.

The present law contains inconsistencies, poorly or undefined terms, sections open to very broad interpretation, and statements regarding the State's jurisdiction with regard to cultural resources which are in conflict with Territorial Sea limits defined in the Geneva Convention and by the federal government. The proposed Act both addresses and clarifies these problems.

The proposed Act aligns South Carolina's legislation with progressive legislation recently enacted by other states, like Maryland, and with federal legislation (Abandoned Shipwreck Act of 1987 [Public Law 100-298]) which mandates states to responsibly manage their underwater cultural resources (specifically historic shipwrecks) and to pass legislation of the type here proposed. A long term benefit of this alignment process will be that all states will eventually have similar legislation providing similar and consistent management of their underwater cultural resources that will meet minimum professional guidelines of the federal government.

The proposed Act addresses legitimate public concerns about looting and other misuse of submerged cultural and paleontological resources. Examples of public concerns include: the exclusive use of submerged archaeological and paleontological sites by a few for commercial gain to the detriment of those wanting to enjoy the recreational nature of those sites, the removal of South Carolina's heritage (artifacts and fossils) from the state and the recovery of submerged cultural and paleontological resources for profit by systematic and wholesale stripping of areas rich in cultural and paleontological materials. Examples of all of these concerns have occurred during the three years I have held this position and are continuing to occur at an increasingly alarming rate. Another matter of public concern is the degree of participation and influence the public has in the licensing and regulatory process. To address this issue, the proposed Act provides for public hearings on license applications. These have already been started and have met with good public response.

The proposed Act removes specific licensing fees from the law itself, unlike the present Act, and provides for the Institute to prescribe and establish fees in an amount to defray the cost of administering the Act. All fees and monies received from you are used in our pursuit to protect, preserve and promote awareness of our submerged heritage for future generations. Specifically, it is allowing us to establish and maintain an educational program for the training of interested members of the public in identifying, recording and reporting cultural finds recovered under the law. The return to you is already being shown in our annual field school (see Goodybag, Volume One, No. 1), our archaeology manual and video for sport divers and, of course, this newsletter. Also, better reporting on your part will allow archaeologists and paleontologists to better and more accurately assess and inventory these resources by site visits again, supported by revenue from your fees.

The proposed Act removes prejudicial and arbitrary "value judgement" statements from the present Act. The proposed Act clarifies and allows a wider range of diving activities on submerged archaeological historic properties and submerged paleontological properties over which the State has jurisdiction, which do not require a license from the Institute, provided those activities do not adversely affect those properties, other persons or violate regulations and provisions of federal, state or local law. For example, the right to recreational use of the wrecks and submerged archaeological sites is guaranteed in the proposed law, as is the use of remote sensing equipment like magnetometers and metal detectors.

The Act provides a means to protect grave sites and human remains found in archaeological sites underwater.

The proposed Act better ensures that site excavation, done for commercial motives, will be carried out to archaeological professionally accepted standards by requiring:

i) that a professional archaeologist be on the licensee's staff,

ii) that the licensee pay for a state archaeologist and/or a state paleontologist to monitor all work conducted under the license, and

iii) that the licensee provide the State with some form of financial assurance adequate to guarantee that the State will be able to complete the work in the event that the terms of the license should be broken. This provision is designed to foster responsibility on the part of the Institute and the licensee that...
professional standards of archaeological work are accomplished under a license granted by the Institute. If the licensee does not fulfill the terms of the license, or destroys the resources on the site, the performance bond will be used to fund completion of the work to archaeologically accepted standards of preservation.

The proposed Act redefines the State's jurisdiction as beginning at mean high water level, rather than the current mean low water level. This will then take in the many shipwreck sites on beaches and under dunes (several wrecks were exposed by Hurricane Hugo when the dunes were washed away, uncovering the structures) as well as sites eroding out of river banks, dunes and beach terraces.

Taken as a whole, the proposed Act will provide for more responsible management of South Carolina's submerged archaeological historic properties and submerged paleontological properties than is provided for in the present law. It will also ensure public rights to recreational use of the resources and will provide for education of the public.

We need your input and support for this bill. Copies of this proposed legislation are being sent to every dive shop and many dive charter groups in South Carolina. If your local dive club is also interested in receiving a copy please contact our administrative specialist, Jamie Browne (803 777-8170). Please take the time to drop in to your local facility and have a look through it. Then send your written comments and/or proposed changes - before February 28, 1991 - to either myself or Lynn Harris at the South Carolina Institute of Archaeology and Anthropology. Remember, the State's submerged heritage belongs to each and every one of you and the responsible management of that heritage is a responsibility we all share. Give us your thoughts!

Carolina Watercraft
by Mark M. Newell

THE BUILT-UP DUGOUT

A "built-up" dugout is actually somewhat more than the name implies. Sitting in the water, this type of craft probably looked much like a conventionally built ship hull - a Brown's Ferry Vessel for example. What defines this craft as a distinct type is its center hull construction - the use of a single dugout log instead of the keel, floor timber and keelson assembly of traditional European shipbuilding.

As we saw in the column on dugouts - last issue - this early indigenous craft was "Europeanized" by colonists who changed its shape and added features which included splash boards on the gunwhales. In a later column on barges you'll see how this same technique was used on the great "chine-log" barges common to rice plantations. Whether or not the addition of splash boards to these early hull forms led to the development of the built-up dugout is not yet known - but it seems a reasonable hypothesis.

The remains of a built-up dugout have yet to be recorded in South Carolina - so needless to say, very little is known about these early craft. We know they existed from archival accounts in which their construction is described but little else is known about the actual construction and origins of this type of craft.

My working hypothesis (the idea I'm going with until I find one and learn differently!) is that the built-up dugout represents the next evolutionary step in the Europeanization of the indigenous dugout canoe. Early plantations - which were already using the dugout hull and had large lumber available - first expanded the canoe by adding substantially larger strakes to the gunwhale (Fig. 1).

![Figure 1: Conjectural sketch of local dugout expansion based on expanded chine log barges documented in the field](image1)

I believe the next refinement may have been the changing of the dugout hull profile (Fig. 2) in order to insert stronger frames instead of knees. This would allow for significant expansion of the beam of the vessel and the addition of more than one strake to build up the waterline. According to early accounts, these craft could then carry 50 to 90 barrels of rice.

![Figure 2: How the basic dugout hull may have been adapted to create a ship-type hull](image2)

It is believed that the early craft called periguas or pettiaguas were of this hull type - and that the name carried over to more conventionally built hulls later in the eighteenth century. During this period the demand for greater capacity increased, outgrowing the largest available logs (approx. 40 feet). This was probably one of the factors contributing to the greater use of keel and keelson assemblies in coasting vessels of the late eighteenth and early nineteenth centuries.

In 1983 Steve Beckham and I dived on what we now believe may be a built-up dugout in the Waccamaw River near Wachesaw Plantation. Ham Shuping is currently trying to relocate this wreck. If he is successful we may be able to complete our first documentation in the field. If you think you may have seen a vessel of this type - please let us know by calling Lynn Harris or myself at (803) 734-0567.
Smith, Henry A.M.  

This three volume series is a compilation of the articles of Henry A.M. Smith which have appeared in the South Carolina Historical (and Geneological) Magazine over the years.

The first volume of this three volume series is titled *The Baronies of South Carolina.* Using old plats, records of grants, deeds, warrants and wills, Smith has recreated valuable maps showing locations of the early baronies of South Carolina. These maps also show locations of early canals and bridges.

The second volume is titled *Cities and Towns of Early South Carolina.* Contains maps showing locations of early towns, ferries and bridges along the entire coast.

The third volume is titled *Rivers and Regions of Early South Carolina.* Contains maps showing locations of early plantations, ferry and other landings, causeways, millworks, and bridges on the Ashley and Cooper rivers. The text traces property ownership of islands and lands adjacent to rivers including the sites of ferries, millworks and some shipyards.

Each volume is filled with maps and land plats showing the kinds of places where divers are likely to find treasures, at least treasures in the historical sense: old bottles, ceramics, clay pipes, etc. — the remnants of the human activity which took place along our rivers and creeks.

Yet, simply finding these sites and rummaging around for artifacts is only a part what artifact collecting is about. Anyone can find an old pewter spoon, for instance, look it up in a book and find who made it, when and where it was made, and, if lucky, its relative monetary value. Yet, this is only part of an artifact’s story. In addition to its monetary value there is also its historical value. If the spoon was found near a certain plantation wouldn’t it be nice to know if it was from this plantation, who owned or first purchased the spoon, whether it was part of a set or purchased individually, even what its value was at the time? H.A.M. Smith’s books won’t tell you all this, but they are a great place to start. With the information Smith provides on land ownership, one can then go to the library in Charleston, look up old probate court records available in the South Carolina Room, and perhaps find that spoon listed in the inventories of one of the owners. Now instead of having just an “old spoon,” you have a piece of history, something that tells a story about the past and the people who inhabited it.

An invaluable addition to any library if perhaps a bit too pricey at more than $100 for the three volumes.

Fleetwood, Rusty  

A valuable introduction to boat and ship building in South Carolina. Discusses the history of South Carolina in terms of the vessels used by the early explorers, colonists, Indians, planters, shipping merchants, harbor pilots, commercial fishermen and yachtsmen, as well as the vessels used during various naval actions.

Anyone interested in the maritime history of South Carolina should begin their study with this book.
Fossils from the extinct Glyptodont (glip-to-don) are a rare find for divers. This is one of the strangest creatures of the Pleistocene epoch. Glyptodonts were animals with shells like turtles but were related to armadillos and the Giant Ground Sloth. Some were about the size of a Volkswagen “beettle” weighing about a half-ton. They were plant eaters using their small trunk-like nose to gather plants in damp, marshy environments.

Fossil fragments of the glyptodont’s shell are found occasionally. The shell fragments are called scutes. They consist of five six-sided small bony plates fused into a single rosette-like pattern. The entire shell probably weighed more than a thousand pounds. This heavy shell made the animal slow moving yet worked well as armor against predators. Fossil teeth of the glyptodont are even rarer to find in South Carolina. The teeth are columnar shaped with three lobes giving the appearance of a carved tooth.

Glyptodonts lived in the southeastern and south central United States. South Carolina was probably this animal’s most northern range. They spread into North America from South America during the warm periods of the Pleistocene. Habitat change and a cooler climate caused the extinction of the glyptodont as the Pleistocene epoch ended. Their inability to move quickly to new areas with acceptable habitats also contributed to their early extinction. Modern relatives of the glyptodont are found in Central and South America and portions of North America. One relative of the glyptodont, the nine-banded armadillo, may soon become a more common sight in South Carolina.

Come see a full scale model of the glyptodont at the South Carolina State Museum. Two shell scutes are also on display. These are the only fossils the museum has of the glyptodont.

Any help you might be able to give us in collecting evidence of this animal from South Carolina would add significantly to the knowledge of the glyptodont. For more information contact:

Michael Ray, Curator of Natural History, at the South Carolina State Museum. Call 803-737-4943 or write to P.O. Box 100107, Columbia, SC 29202-3107.
Labelling Artifacts - Cameron Sebastian: Cameron has recovered several artifacts from the wreck of the General Sherman and would like some advice about a labelling system.

Answer: The basic information that any label should contain is the name of the wreck or site, artifact number, provenience on the site (where on the site did you find that particular artifact) and date when the item was recovered. To avoid having a long label you might make up a coding system. For example: SH1BW8/90. SH1 - for the first artifact you collected on the Sherman, BW - in the bow area, 8/90 - in August 1990. The next artifact you recover would be SH2BW8/90. Giving each artifact in your collection a number will serve as a reference system so that you can keep a more detailed information catalog of your finds in a notebook or dive log.

The best way to physically label an artifact is to make a plastic tag with dymo tape. Do not write on the artifact. You can purchase the tape and a dymo tape lettering instrument from most office supply stores. Labels should not be attached to artifacts with wire or metal of any kind. This could start a destructive reactive process if there is any metal at all in the artifact. The best things to use are self-locking plastic ties available from automotive, electronic and hardware stores. Make a small hole in your label and thread the tie through it. Attach the other end to the artifact wherever it is convenient.

Glassware Identification - J.R. Smith: Mr. Smith brought his find to the Institute to be identified. He found it in the Cooper River, upriver from Bushy Park Landing.

Answer: It is an eighteenth century decanter neck. Decorative decanters were popular throughout the 1700's as serving containers for liquor. This particular neck with ring applications was part of a decanter design used from 1780 to 1800.

Canoe - Mike Yianopoulos: Mr. Yianopoulos enclosed a map with his hobby diver report showing the location of a dugout canoe. He wrote: "It is located near the mouth of Bailey Creek. Approximately seven feet of the canoe is protruding from the bank, and it is two feet in width. It is in rather soft mud, and should be easy to excavate, if this is what you have in mind."

Answer: Two SCIAA staff members will be visiting the site with Mr. Yianopoulos towards the end of January. Like most other preliminary site assessments, this will not entail recovering the vessel. Instead we will photograph it, make observations and take measurements of dimensions. This information, plus the map that he sent, will enable us to record the site in the official state underwater site files. The next issue of the Goody Bag will include a follow-up report on this canoe expedition.

Cemetery - Stuart White: Stuart, a hobby diver and history student who attended the Annual SCIAA Underwater Archaeology Field school in 1990, found and recorded a historic nineteenth century cemetery. Although this site was not underwater, Stuart very effectively used archaeological techniques taught in the underwater fieldschool to map the site! We were very impressed and would like to publically congratulate Stuart on his commendable efforts. Keith Derting, Head of our State Information Management Division, claims that this is one of the best site reports he has ever received! The cemetery is located in a forested area on the second dirt road after the Ivanhoe Bridge heading toward Green Pond on Highway 303. We received both topography and highway maps showing the site location. Stuart also drew a sketch map showing trailers, dirt roads, bridges and the exact mileage from these various features. The position of each of the grave stones was established by setting up a baseline and using triangulation. Each grave stone was given an arbitrary number used as a reference for describing graves and epitaph data. To supplement this archaeological information, we also received background historical research on the families buried in this cemetery. Much of this information was obtained from census records and wills. Of particular interest to Stuart is the Postell family, whose presence in South Carolina dates back to the seventeenth century. He will continue to do further research on Peter Postell. Stuart's excellent report has not only added to South Carolina's local history, but will also serve as an important source of information which will enable us preserve this valuable site. Good work!

Bottle - Frank Slaughter: In November Frank Slaughter dove in the Waccamaw River on an old store site. His dry suit flooded in 52 degree water! Finds from this site included a few interesting nineteenth century liquor and medicine bottles: "one 1890's Brown Flask liquor Bottle 6 1/2 [inches] tall — one 1890-1900 square medicine Bottle embossed with "New Life Baltimore" 4" tall — one quantized Bottle - late 1800's with square recessed label."

Stuart Pabst, curator of the Horry County Museum in Conway, is very knowledgeable about the history of the Waccamaw River and bottles. If you ever find an interesting bottle or site in the river he would be a good contact. A useful reference for glassware identification is American Bottles and Flasks and their Ancestry by Helen McKearin and Kenneth M. Wilson, published in 1978 by Crown Publishers Inc., NY.
CONWAY UNDERWATER DISCOVERY CONFERENCE

By Lynn Harris

On November 3 and 4, 1990 a conference for sport divers on underwater discovery of fossils and artifacts was held by the Horry County Museum in Conway. Stuart Pabst, curator of the museum, excelled in his organizational efforts and the conference was a great success. Although the conference was not as well attended as anticipated (after all it was great diving weather that weekend!), an enthusiastic crowd generated some lively discussions and ideas about the sport divers' role in South Carolina underwater archaeology.

One of the primary concerns was that the hobby diver monthly reporting forms were simply too vague - divers did not really know what sort of information the state wanted.

Hobby diver monthly reporting forms will be amended by March 31, 1991. We will also be switching to quarterly reports.

So be prepared to receive new and improved forms listing more specific categories of information. Hopefully this will mean less paperwork for you, but we will be expecting higher quality information about your finds.

Two interesting topics were addressed by conference participants during the general floor discussion. Firstly, are artifacts found in a dynamic tidal riverine environment likely to yield useful archaeological information considering that the material is no longer in situ (not in the original location where it was deposited)? In many instances underwater archaeologists in Florida, North Carolina and South Carolina have found in situ material in rivers despite strong currents and tidal conditions. Artifacts, including objects like coins or buttons, can be partially buried and protected in muddy river banks in their original location until a river channel changes course. Even artifacts or fossils that are washed

along a riverbed seldom travel very far and can usually give us some indication that there is a site in proximity. For example, this is evident in the high concentrations of historical material found by divers near plantation sites (like those along the east branch of the Cooper River) or dock structures. This gives us information about the general distribution of sites in South Carolina. Your hobby reports, if they are specific enough, allow us to plot the locations of your finds onto a local topography map and then transfer this data to a master map of underwater sites in the state. The more reports we receive from these catalogs are still in existence and, if historical documents are available, the written information serves to supplement the material evidence and vice versa. We find out from literature what sort of bottles were being made during a certain time period, but not necessarily how they were made (e.g. observations of various types of mold seams, lips, rims, decorative techniques, or even flaws caused by the manufacturing process), who used these bottles, when and where. What exactly did it contain? Many sealed medicine bottles, containing Dr. De Witt's Liver, Blood & Kidney Cure, were found on the SS Lawrence site. The contents of these bottles will be analyzed by the USC chemistry department this year and should yield some interesting results. The mixture smells suspiciously alcoholic!

Towards the end of the conference weekend we decided that another such event should be planned for November 1991. Next time there will be less talks and a day or two long diving project. Ideally we (SCIAA) would also like to hear more talks from divers about their collections or their favorite dive sites. Stuart Pabst's excellent talk on hobby diving in the Waccamaw River / history of the Pee Dee area and Hampton Shuping's "A sport diver's perspective of the hobby diver's program" are exactly the sort thing we want to hear. Visual aids like slides of your finds, historical pictures of the area or watercraft, conservation treatments (before and after pictures), maps showing the area or underwater site drawings should also be included. There will also be a display area for exhibits and literature. So please keep interesting topics for this conference in mind during your hobby diving expeditions this year. Contact Stuart Pabst (803 248-6489) or Lynn Harris (803 777-8170) if you have any ideas about a presentation either as an individual or representative of a dive club, store or charter group. We were really excited by the interest, knowledge and enthusi-
(Conference continued)
as much about underwater archaeology demonstrated by sport
divers at this conference and hope that this might be an annual
occasion for us to get together and dive into local history!

CONSERVATION CORNER
By
Dr. Jonathan M. Leader
S.C.I.A.A. Conservator

This is the first in a series of articles designed to aid Licensed
Sport Divers in conserving recovered artifacts. Questions and specific
problems faced by the South Carolina sport diving community are
highlighted and, hopefully, answered. To this end, please telephone or
mail your conservation questions to me at the Institute. You may be
our next featured article! Please be sure to include your current Sport
Diver’s License Number, as access to a professional conservator is just
one of the many benefits of membership in the State program.

Effective conservation is not as easy as many “old salts”
think. “Recipe book” approaches are often outdated, physically
dangerous and fail to protect the artifact. Each artifact is unique in its
physical makeup, depositional history, conservation requirements
and final deposition (e.g., mantle place or museum). All these factors must
be taken into account before an effective conservation regimen can be
implemented. Nonetheless, there are broad areas of treatment that can
be matched to specific classes of artifacts (e.g., iron, non-ferrous
metals, woods, glass), and this column will present this basic informa-
tion to give all of us in the Licensed Sport Diving community a solid
foundation from which to grow. All that has been said, let’s get to
our first case.


David called the other day and talked with Lynn Harris about the
care, cleaning and conservation of some glass bottles that he and
a friend had recovered and might display at a local museum. WAY TO
GO DAVE! I am always pleased when the informed public gets
involved with their local museums and displays artifacts legally
collected and reported through South Carolina’s programs. The
following discussion of glass does get a little involved, but hang in
there!

Glass: Structure and Chemical Deterioration

Glass is unique in that it is not a solid, but a super-cooled
liquid. Those of us that live in older homes are reminded of this every
time we look out an original window and see the “flow” lines caused
by sagging glass. Silica and boric oxides usually make up the structure
of glass and are acidic. Aluminum, calcium, copper, lead, manganese
and zinc oxides are also found in glass depending on the time period,
color, technique and place of manufacture. The materials are primarily
basic and are not tightly bonded to the acid network allowing them to
be somewhat mobile. This mobility of some of the basic particles has
been linked to glass deterioration, but the actual mechanism is not yet
fully understood.

In a marine environment, sodium and potassium ions may
move to the surface of the glass and react with the seawater to form
hydroxides. This is especially true if the quantity of aluminum,
calcium and magnesium ions in the glass are insufficient to “hold”
these other ions within the structure. The resulting hydroxides enter
the glass, interact with the silica and form the flaking, multi-hued
deteriorated glass with which we are all familiar. Pressure, tempera-
ture, length of exposure and environmental acidity are all critical
factors in determining the extent of deterioration. Whenever possible,
the artifact collector should make note of these factors for the conser-
vator. Glass recovered from marine environments often continues to
degrade after removal from the sea, which makes conservation of all
such glass mandatory.

Glass: Cleaning and Conservation

Marine glass is almost never found in a clean condition.
Concretions, stains and softer biotic growths or slimes are common.
The actual treatment for these situations depends on the accurate iden-
tification of the organisms or materials involved and on the assessment
of the condition of the artifact. Glass artifacts that are
deteriorated require complex and careful procedures. It is best not to
attempt their conservation yourself, but to contact a competent profes-
Sional instead. This includes the reconstruction of fragmented glass
artifacts that will not be discussed in this article. Assuming that the
glass artifact is intact and only lightly deteriorated the following
procedures can be used.

Marine concretions found on the surface can often be re-
moved by the careful use of a scalpel. It is important that the glass
artifact soak for several days or weeks in distilled water, changed every
other day, prior to attempting to remove the concretions. The actual
length of time that the artifact soaks in distilled water depends on the
quantity and size of the concretions. Gentle prying at the edge of a con-
cretion determines if the artifact has soaked enough. Force should not
be necessary for the removal of a well soaked concretion. In addition,
soaking the artifact removes salts that can cause damage to glass if they
are allowed to recrystallize under the surface “scales” during drying. It
is usually a good practice to soak all glass artifacts. A plastic five
gallon pail will usually provide sufficient room for soaking glass
artifacts. Never use metal, ceramic or other hard surfaced containers,
as they are likely to accidentally damage the glass.

If the marine concretions are numerous and dense, they may
be removed by soaking the artifact in a 10% solution by volume of hydrochlo-
ric acid in distilled water. Never add water to concen-
trated acids, always add the acid to the water. Failure to follow this
step can result in severe harm. A 10% solution by volume requires
careful measuring of the materials. Hobby stores, local chemical
apparatus stores and a variety of catalog vendors (e.g., Fisher Sci-
entific, Atlanta, Georgia, or Baxter Scientific, Stone Mountain, Georgia)
all carry graduated beakers and pyrex laboratory containers for meas-
uring and mixing chemicals. Invest a little money to buy the best, its
not only safer but in the long run cheaper. The stores will often also
carry the chemicals you will need. Try to buy the smallest quantity of
chemicals to get the job done, you should never hoard chemicals. An
ideal 10% solution equals 9 parts water to 1 part of the other chemical,
in this case acid. If you were to use an 100 milliliter (ml) graduated
beaker, 10 milliliters (ml) of acid would be added to 90 milliliters (ml)
of distilled water. If you need to make larger quantities double the
amounts (e.g., 20 ml acid in 180 ml distilled water). Be sure to fully
immerse the artifact in the acid-water solution, and add more solution
after the “fizzing” stops until all the concretion is removed. This bath
will also remove metal ions that may have caused “stains.” All acid
baths require careful monitoring, protective safety gear (i.e., rubber gloves, eye goggles, face shields and acid resistant aprons),
adequate ventilation and proper disposal of depleted solutions.
Serious injury can occur from improper handling and disposal. A
common laboratory adage is, "if in doubt, do without." If you are
unsure of a procedure or cannot safely comply with its procedural
requirements do not do it. You should request assistance from a
professional.

Marine concretions may remain after the above treatment if
the glass has deteriorated sufficiently for serious layersing to occur.
Gentle acid cleaning for prolonged periods using either a 1% solution
by volume of hydrochloric acid and distilled water, a 5% by weight
solution of the disodium salt of ethylene diamine tetraacetic acid
(EDTA) in distilled water, or a 10% solution by weight of sodium hex-
amicetaphosphate in distilled water will often rectify the problem. As
before, careful measuring is the key, buy or otherwise gain access to
an accurate laboratory scale. The same stores already listed will have
this item and most likely the chemicals as well (or be able to order
them). A 1 or 5% solution by weight is similar to the 10% solution by
volume, except that the weights of the materials are the concern.
Measure the weight of your distilled water necessary to cover the
artifact and determine the corresponding number of grams necessary
to equal the desired percentage for the solution (100 grams of water
requires 1 gram of chemical or 5 grams of chemical to make a 1% or
5% solution respectively). All the safety precautions listed above
apply to the use of these solutions as well.

If stains remain after the cleaning by mechanical and chemi-
cal means already discussed, a prolonged soak in a 10 or 20 volume
concentration of hydrogen peroxide will usually work. The hydrogen
peroxide works by bleaching the stain, making it less noticeable.
These volume concentrations are commercially available from phar-
maceutical and chemical suppliers.

After all the concretions, stains and slimes have been re-
moved, the glass must be soaked again in distilled water for several
days to remove traces of the chemicals. Make sure that you change the
baths every other day. You will know that you have removed the
chemicals when the pH of the distilled water equals the pH of the artifact
bath after it has been used to soak the artifact for 24 hours. A multi-
indicating litmus paper, available from the above mentioned suppliers,
is an inexpensive means of determining this point.

The final step of the process is the consolidation of the glass
surface. If the glass has no chatoyancy (the rainbow like hue of
hydrated glass) after slow drying, you will probably not need to con-
solidate the surface of the glass. Although, you will need to carefully
monitor the glass for later problems. It is usually a very good idea to
have a series of slides or color photographs that clearly show what the
artifact looked like prior to conservation and immediately after it.
These act as aids in determining stability later on.

If the surface is chatoyant, has definite flaking or visible
lamellae (thin or thick layers of glass that follow contours but do not
seem to be connected to each other), then you will need to consolidate
the surface. Two different chemical consolidants have been used for
this purpose, polyvinyl acetate (PVA) and Acraloid/Paraloid B-72.
PVA should not be used today as it tends to contract when drying,
which may cause fractures, and yellows with age. In addition, under
no circumstances should Elmer’s Glue (a proprietary form of PVA) be
used to coat glass artifacts as it adds irreversibility to the disadvantages
already listed.

Acraloid/Paraloid B-72 is a form of ethyl methacrylate
copolymer and is presently the most common surface consolidant used
for glass artifacts. It is usually applied in the form of a 5 - 20% solution
by volume in toluene, depending on the specific needs of the artifact.
A 5% solution is the most common form. It is not possible to buy
Acraloid/Paraloid B-72 as a stock solution, requiring the mixing of a
batch prior to use. Try not to make more than a liter at the time, as it
is not safe to store due to toluene’s flammability. Acraloid/Paraloid
B72 can only be purchased from conservation specialty suppliers (e.g.,
Conservation Materials, LTD., Sparks, Nevada). Application of the
solution may be done by brush or immersion and drip drying. Ade-
quate ventilation and protective clothing are essential, as toluene is
both toxic and flammable. The use of toluene resistant gloves is
mandatory as the liquid passes instantly through skin and attacks the
fatty tissues below. It may be necessary to use a vapor respira-
tor. As before, if in doubt, contact a conservation professional
for assistance.

Glass protected by Acraloid/Paraloid B-72 should not be stored
or displayed in direct sunlight, as it is possible to cause premature
aging and yellowing of the protective film after 1200 hours of
direct exposure. As a rule of thumb, no artifact should be displayed in
strong direct sunlight. Aged films may be removed by careful and
prolonged soaking in toluene baths, after which a new coat may be
reapplied.

Glass: Conclusions

Glass artifacts are the most common artifact recovered by
Licensed Sport Divers. If they are cared for and conserved the glass
will provide many years of viewing and educational pleasure. There
is no such thing as a "recipe book" of conservation techniques: proper
conservation techniques must be tailored to the specific concerns and
history of each individual artifact. Many of the conservation tech-
niques used require specific training and safety precautions and should
be left to the skill or guidance of professional conservators.

Conclusion

David Elkins’ question concerning the conservation of glass
was a great opportunity to start this column in the Goody Bag.
Although many of the techniques require care and training, they can be
safely done by Licensed Sport Divers with the appropriate guidance.
Conservation workshops specifically designed to provide safe training
in the techniques discussed in the “Conservation Corner” are planned
for the near future. I look forward to receiving the next issue’s question
from you. So, stay informed and stay current, there’s more to being a
South Carolina Licensed Sport Diver than meets the eye!

SPORT DIVER PROGRAM

MOVES TO CHARLESTON

The Sport Diver Archaeology Management Program
(SDAMP) will be moving to Charleston in early May this year.
The program will be moving from the main SCIAA office in
Columbia to the SCIAA field office on the NSS Savannah at
Patriots Point. This move has been requested by many hobby
divers. The new location will make the program more accessible
to the state’s diving community. Most reported sites are also
close to the coast, so it will enable us to respond more effectively
to your calls. Hobby license applications and quarterly reports
will then be processed by this office. The address will be:
SCIAA Underwater Archaeology Field Office, 40 Patriots Point
Rd., Mount Pleasant, Charleston, SC 29464 (803) 881-8536
First Ever European Paleolithic tool found in SC

A small flaked pebble found in the Santee Canal during underwater excavations in 1989 has been tentatively identified as a European Lower Paleolithic chopper core. Dating to the Clactonian culture the tool may be as much as 250,000 years old. "We have positively identified the raw material - chert - as coming from a region near France," said Mark Newell, who conducted the investigation into the unusual find. "It was most likely transported from European in the ballast of a ship - which may have been 'mined' by a canal boat for ballast." A canal boat did blow up in the canal in 1824 - the kind of accident which could deposit such an artifact in the canal.

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Page 6: Decanter-Lynn Harris, Bottle- Frank Slaughter
Page 8: Flasks- Computer graphics, Bottles- Lynn Harris
Cover Page: Chopper Core - Mark Newell