I Introduction, Background and Site Description
On 20 November 1994 Hurricane Gordon produced massive waves that uncovered the inverted 42-foot bow section of a large wooden vessel and deposited it in the surf line at Croatan Beach about a quarter mile south of Rudee Inlet, Virginia Beach VA. The next day Croatan resident Linda May contacted the Life-Saving Museum of Virginia to report the wreck. Museum Director Fielding Tyler and Education Director Ann Dearman visited the site and photographed the remains. They also found a 47-foot-long probable keelson consisting of three one-foot-square timbers fastened together, as well as other disarticulated "odd" pieces washed ashore in the same general area. The keelson was located on the beach at the US Navy Fleet Combat Training Center.

On 9 December MAHS members George and Jill Montgomery visited the Life-Saving Museum and met Tyler, who described the wreck and showed them photographs taken by Dearman. The Montenegys took copies of the photos and newspaper reports to the December MAHS membership meeting where it was agreed that they would contact NOAA's John Broadwater (archaeologist in charge of the Monitor Project and working out of the Tidewater area) about the possibility of using MAHS volunteers to survey the wreck under his direction. Fortuitously, Broadwater is an advisor to both MAHS and the Life-Saving Museum.

At the time, the wreck lay keel-up in the surf line, and Tyler believed that the remains would be carried back to sea or buried in the sand. He contacted Virginia National Guard officials at the State Military Reservation, still known as Camp Pendleton. US Marine Corps Reservists volunteered to help move the wreck, but with only light equipment could not budge it. On 19 December Air National Guard civil engineers were able to right the wreck and move it with a Caterpillar tractor to a point higher up on the beach and to the southern tip of Rudee Inlet (see map). The odd pieces were moved to the Virginia National Guard State Military Reservation to keep them from possible pilfering, but the keelson section was washed back out to sea by a storm on 24 December.

Tyler then contacted Broadwater who visited the site on 21 December and made preliminary measurements. Meanwhile, Julie Pouliot, co-author of Shipwrecks on the Virginia Coast and the museum's Administrator and Registrar, put together a list of possible shipwrecks based on research into Life-Saving and Coast Guard records (the latter began in 1915). She laid out an area from the North Carolina border to the mouth of Chesapeake Bay and listed two dozen more likely wreck candidates as well as a number of other recorded wrecks in the area. MAHS Education Director Tom Berkey further annotated this list with size and origin information plus a few other candidates (see attached table). The overall list is based on tonnage (200 to 700) and the likely period of the wreck (1850-1910) assumed from its general appearance. It is recognized that there are many unrecorded wrecks which might also account for the remains.

Broadwater, when contacted by MAHS, agreed to serve as Project Archaeologist to oversee a survey and recording of the wreck site during the weekend of 21-22 January 1995. Overall direction was provided by the Life-Saving Museum of Virginia—the trustees of the wreck. George and Jill Montgomery were project managers, Tom Berkey coordinated the survey teams, Bill Utley the diagnostics, and Townie Burden the dive team. J “COZ” Cozzi from Texas A & M University directed the goniometer operations.

1The Life-Saving Museum is Virginia Beach's first museum. The former US Coast Guard Station focuses on the history of sea rescue in the area from breeches buoys to helicopters and has extensive shipwreck exhibits.
II Historical Background
The waters off the Virginia shore are a graveyard for countless ships that have been sunk by acts of war or nature during the past few hundred years. Many of the ships are known, but many others went down unseen and alone during the age of sail. From time to time, the same sort of storms that sank many of these ships wash up portions of their remains.

III The Survey
The objectives of the survey were as follows:

• Record the wreck’s dimensions
• Record and describe diagnostics such as tool marks, the fastener scheme, shipbuilder’s marks, graffiti, etc.
• Take wood samples for analysis
• Deploy a dive team to find and recover, if possible, the keelson that had washed back out to sea
• Examine disarticulated pieces found, describe them, and determine their relation (if any) to the bow section
• Identify the wreck, if possible
• Draft a Project Report.

Broadly speaking, the Project’s primary objective was to describe the wreck thoroughly, particularly any unique characteristics that might add to the knowledge of shipbuilding. We hoped there would be sufficient diagnostics that could allow characterizing the wreck by size, origin, date, and type, and which could be matched to the historical record to possibly identify the wreck.

A Recording the Hull  Berkey, Director of MAHS’ maritime archaeology courses, coordinated the survey team. The team laid a baseline atop the 3-timber keelson and triangulated positions of the forward remains of the 15 surviving frames and other significant hull parts. Although ceiling planks covered most of the frames, sufficient ceiling was missing to allow many of the frames to be plotted as they passed between the keel and the keelson. Part of the lower exterior hull was concealed in the sand, but many exterior planks above the sand line were plotted. Most of the hull aft of frame 15 (30 feet aft of the zero point on the baseline) was missing except the keelson and keel which ended at about 40 feet. The team left the hull intact. There were sufficient floor timbers and keel exposed to make measurements except under the forwardmost part of the hull.

The Virginia Air National Guard brought in four sets of prism range poles to establish datum points, one for each corner of the wreck, which Dave Kerr, Beth Johnson, and Mike Dougherty used to double-check the triangulated plots.

In addition to exterior and ceiling plank measurements made by the team, Cozzi measured frame curvature at frames 3, 5, 8, 11 and 15 with a "Coziometer"—an updated (digital electronic) version of the bevel gauge goniometer. Bill Rutkowski and Kerr also took curvature measurements with their own home-made goniometers fashioned to Cozzi’s design. Hera Konstantinou took extensive photographs and video tapes of the wreck and the procedures used to record the wreck, while Utley took a second set of slides concentrating on diagnostics. Additionally, two local TV stations covered the project and made their coverage the feature presentation of their evening newscasts, providing welcome publicity to the techniques of nautical archaeology.

B Recording Diagnostics  Jill Montgomery and Alison Shanck plotted one-to-one tracings of starboard hull interior and exterior planks on clear plastic sheeting with colored Sharpie pens. Plots were provided immediately to George Montgomery at the plotting table in a fire department mobile command unit at the scene, provided by the City of Virginia Beach. Ceiling planks were plotted from bow to frame 10, and exposed exterior planks from bow to frame 5, including location of trenails and the few metal fasteners. Numerous small nail holes, closely spaced but in no discernible pattern, indicated the hull had been copper- or Muntz metal-sheathed, probably several times. A few copper nails but no sheathing survived. Utley examined the hull for other diagnostics, recording scarf joints, mortises, the mast step and some possible shipwright marks and graffiti.

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2 A detailed description of these goniometers is contained in MAHSnews Vol & No 1, Jan/Feb 1995
C. Hull Pieces. At the end of the survey, Utley and Broadwater took wood samples from the keel, keelson, floor, ceiling and exterior planking for further examination. No spars or spar remnants survived.

D. Dive Team. Burden led a four-person dive team to search for the probable keelson that had washed back out to sea some weeks before. A number of storms had passed through the area since the keelson was last seen and, with insufficient landfalls to mark water entry, the dive search was called off. This piece as sketched by the preliminary observers is illustrated below. It was 47 feet long and consisted of three timbers each 14" wide and about 12" thick fashioned together with metal pins. Two of the timbers had flat scarf joints about 4 to 5 feet long. In all these features, the piece resembled the wreck's keelson. There was insufficient time to make more than rudimentary measurements before this piece was again washed out to sea. We judge, because of the similarities of this piece with the wreck and its appearance at the same time and nearby, that it is probably from the original wreck, and therefore the original keel/keelson was probably no less than 90 feet long.

**POSSIBLE KEELSON**

47 feet total length -- timbers 14" wide by 11" to 12" high

iron fasteners every 27" to 32"

<-------- 20 feet -------->

E. "Odd Pieces. Tyler led a group to the the State Military Reservation to examine about six large pieces of wreckage. One piece, a two-foot-long tree trunk with unusual saw cuts about 26 inches in diameter, was the right size for a foremast at midlength and partner (where it passes through the main deck) for a 700-ton 4-masted schooner. Four other pieces appeared to be three futtocks and a floor timber. The most interesting piece was about 5-feet long with ornamental grooving, numerous iron pins and two eye bolts 18-inches apart with copper sheathing in between, likely a caprail with a fitting for a Jacob's ladder. Tyler also found nearby and preserved a 6" by 12" piece of copper sheathing similar to those used to sheet the wooded ships. The only tie between these pieces and the Croatan wreck was that they had washed up in the same area during the same storm.

On 7 May 1995 one of the Virginia Maritime Science Museum trawl nets caught a common swivel arm anchor similar to a Trotman type of the following dimensions in 15 feet of water about 200 yards offshore from the location where the wreck had washed ashore:

- shank 43"
- stock 37"
- fluke 21" wide
- ring 5 1/4" diameter
- weight ±100 lbs

Trotman anchors were in use by the mid 19th Century, so it could relate to the Croatan wreck, but it is too small except for use as a possible kedge anchor. Without further information, we cannot associate it with the wreck.

IV Findings

A. Component Dimensions (Scantlings)

The wreck is the bow section of a wooden vessel characteristic of construction between 1850 and 1910. The 3-timbered keelson appears to have broken off at a mast step cut 6 inches deep into the top rider keelson (KN3) coincident with a keel scarf joint 40 feet from the bow. The keel, 15 frames, and the exterior and ceiling planks to a height of about 6 feet above the base of the keel survive. The widest remaining portion of the ship is 22 feet. (See centerfold for scale drawings.)

3 Sam Manning, noted illustrator of books dealing with wooden ships, kindly brought this to our attention. Among his more recent works is *The Schooner Bertha L. Downs* with Basil Greenhill, available from US Naval Institute Press 410 224-3378.
The keel is 12 inches wide and 16 3/4 inches thick at frame 15. Keelson timbers are untapered, about 13 1/2 inches wide and about 12 inches thick (KN1 11 1/8", KN2 12 1/2", KN3 11 7/8"). There is one flat scarf joint on keelson 1 beginning at 19 feet and ending at 23 1/2 feet. There are no scarf joints in the surviving portions of keelsons 2 or 3. The keel has a scarf joint beginning at 39 feet and ending at 44 feet. The aft keel timber of this scarf joint did not survive. There are five mortises cut into keelson 3. Four are about 3" wide x 12" long x 3" deep, beginning at 13 feet aft and at 6-foot intervals thereafter. These are likely seats for lower deck stanchions. The top rider keelson ends in a large unwarped rectangular mortise, probably a mast step, 8" wide x 6 1/2" deep x unknown" long (the aft end of the keelson was abraded). The garboard strake is 12 1/2" by 4 3/4", exterior planks average 3 1/8" by 14" and ceiling planks 3 1/4" by 12". Planks tapered in width toward the bow to accommodate hull narrowing and also narrowed in thickness toward the bow.

Frames 1 through 15 survive. They are all uncanted (square) double frames consisting of a floor timber aft attached to butted first futtocks forward. Arrangement appears regular, with all floor timbers being the aftmost sister of the pair, and first futtocks butting to the forward frame sister at about 5 feet from the keel. Frame interval is 22 inches for the first four frames and 28 inches thereafter.

B Diagnostics

Timbers and Planking

---The Keel has no shoe, no rabbet, and the scarf is not caulked.

---The Keelson has two riders but no sisters and no apparent deadwood. The scarf joint has no stop water. The uppermost keelson displays imprints in the forward four feet of four apron seats, as well as a tenon cut into the most forward portion (see illustration). The keelson also show circular saw markings of approximately 4-foot radius in the forward port area.

---Frames are paired and untapered with butt joints to first futtocks. Only the ends are pitted with worm holes.

---Planking. The garboard strake is uncaulked. Exterior strakes are carvel-planked. Ceiling planks extend to the keelson. The forward ends of bilge stringers and most ceiling planks are split sawn for about half their length, resembling wooden clothespins in longitudinal cross section, no doubt to facilitate bending the planks to fit increasing curvature toward the bow. No team members could recall having observed this precise feature in plankings on similar ships, but Cozzi noted that some futtocks had been fashioned in this manner on the Burlington Horse Ferry in Lake Champlain, excavated by MAHS advisor Kevin J Crisman of Texas A & M. In addition, Cozzi later received from Crisman a citation describing this method of bending large timbers in England as early as 1813. Nonetheless, this may be a distinctive diagnostic in ceiling planks and bilge stringers helping to narrow the provenance of the wreck. Planking is in good condition without worm holes.

Fasteners. Five kinds of fasteners are evident:

---Nail holes and a few surviving copper nails are indicative of copper or Muntz metal sheathing over the entire surviving outer hull. No sheathing remains. Nail patterns indicate that the hull had been covered more than once and therefore likely had a decade or more usage prior to foundering.

---Treenails are the fastener of choice. They are found in regular but inexact patterns (Approximately one per plank per frame) attaching both floor and ceiling planks to the frames as well as being rarely used to connect keelson timbers and frame timbers. Treenails are one inch in diameter, with longitudinal striations characteristic of die-cutting with an octagonal cross-section (see illustration), and all exposed ends are split with wedges aligned athwartships. Lengths depend upon application.

---4 The Repertory of Art, Manufacture, and Agriculture, Volume XXVIII, Second Series, London 1816. This journal of selected patents provides on pages 37-41 a description of a machine and methodology for making horizontal cuts in ship timbers to facilitate bending them into place. The article is entitled Improved Method of bending Timber for building large Ships of War by William Hooke of Woolwich.
Iron driftbolts are used to join keelson riders, sister frame members and frames to the keel. They are used sparingly elsewhere, apparently at points where extra strength was required, such as at the turn of the bilge. Iron driftbolts with roves (washers) are occasionally found, but clench rings and rivets are not evident.

Bronze driftbolts are less common, used in the ceiling and stringers at irregular intervals. A couple have collars, but most are now missing. The driftbolts are less than an inch in diameter, but are so eroded that exact measurement was not possible.

Other diagnostics. Utley found two distinctive markings on the interior port side, one on a frame and the other on the top rider keelson at 4' 11" on the centerline (see illustration).

There is no rabbet evident on the keel, as the garboard strake butts directly to the keel.

Limber holes are evident in the floor and first futtock timbers but there is no evidence of limber floss that might be used to ream the holes.

Two Chocks, both below keelson 1 on the center line fill the space between frames 13 and 14 and frames 9 and 10. There is a gap of two inches at the bottom of the chocks to allow water passage. The function of the chocks is unclear.

A wedge of unknown function was let into a mortise in keelson 1 on the starboard side between frames 7 and 8.

No artifacts or ballast remains survive.

C. Use of Ship Identification Aids

Length to Tonnage Ratio

In an attempt to size the ship, a number of wreck identification aids was consulted. The most useful relationship was found in the Record of American and Foreign Shipping⁵ which provides the formula:

\[
\text{length (main deck) \times breadth (widest) \times depth (hold) \times 0.0075 = tonnage}
\]

We will apply this formula to estimated Croatan wreck dimensions in Part V.

Other Identification Aids

We used an 1878 American source providing Rules for the Construction of Wooden Vessels⁶ that equated sizes of ship timbers, planks and fasteners to tonnage. We augmented this with Lloyd's Register for features surviving in the wreck but not cited in the American source. Further, we obtained after the survey an excellent guide on ship artifacts and measurements from the Underwater Archaeological Society of British Colombia that was most useful.⁷ We believe that the time period for these sources is optimal, that is, the most likely period of the Croatan wreck: the 1889 Lloyds used a table from 1871, and the Rules source of 1878 did not differ for characteristics we used from the same source updated to 1896. Further, these American and British publications differed little from each other. There is also a likelihood that any moderately-sized ocean-going vessel plying American waters in the latter part of the last century would comply with the general scantlings these publications assigned for its tonnage so that it could be certified and insured. The tables in these publications also included many other measurement equations for portions of our wreck which did not survive (beams, knees, clamps, etc.).

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⁶ Ibid
Views of the Croatan Wreck
21-22 January 1995

All drawings are to the same scale (1/4 inch to one foot or 1:48)
These drawings are based on measurements taken by Townie Burden, Mike Dougherty, Beth Johnson,
Dave Kerr, Jill Montgomery, Bill Rutkowski, Alison Shanck and Bill Utley under the supervision of
Tom Berkey (MAHS), J. “COZ” Cozzi (Texas A&M) and John Broadwater (NOAA)

Drawings by George Montgomery
The table below plots source dimensions against tonnage (from Rules unless annotated with "L" for Lloyds) for ship features that were available for our measurement. The heavily shaded individual boxes show the findings for the Croatan wreck. Measurements are in inches rounded to nearest tenth unless otherwise indicated and interpolated if the indicated tonnage was not provided:

<table>
<thead>
<tr>
<th>SHIP FEATURES</th>
<th>TONS 100</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keel</td>
<td>10x11</td>
<td>11x12</td>
<td>12x13</td>
<td>12x14</td>
<td>13x15</td>
<td>14x16</td>
<td>14x17</td>
<td>14x18</td>
<td>14.5x18</td>
</tr>
<tr>
<td>Scarf of keel (feet) L</td>
<td>4.25</td>
<td>4.75</td>
<td>5.2</td>
<td>5.5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Keelson and riders</td>
<td>10x11</td>
<td>11x22</td>
<td>12x24</td>
<td>12x28</td>
<td>13x30</td>
<td>14x32</td>
<td>14x36</td>
<td>15x38</td>
<td>15.5x40</td>
</tr>
<tr>
<td>Scarf of keelson with riders (feet) L</td>
<td>4.25</td>
<td>4.75</td>
<td>5.2</td>
<td>5.5</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6.3</td>
<td>6.3</td>
</tr>
<tr>
<td>Floor timbers</td>
<td>8x10</td>
<td>9x11</td>
<td>9x11</td>
<td>9.5x12</td>
<td>10x12.5</td>
<td>10.5x13</td>
<td>10.5x13.5</td>
<td>11x14</td>
<td>11x14</td>
</tr>
<tr>
<td>First futtocks sided &amp; molded sq'red L</td>
<td>6.5</td>
<td>7.8</td>
<td>9.3</td>
<td>10.5</td>
<td>12</td>
<td>12.3</td>
<td>12.5</td>
<td>12.8</td>
<td>13</td>
</tr>
<tr>
<td>Double floors sided &amp; molded sq'red L</td>
<td>6.5</td>
<td>7.8</td>
<td>9.3</td>
<td>10.5</td>
<td>12</td>
<td>12.3</td>
<td>12.5</td>
<td>12.8</td>
<td>13</td>
</tr>
<tr>
<td>Timber &amp; space (frame interval) L</td>
<td>19</td>
<td>21.5</td>
<td>24.5</td>
<td>27.3</td>
<td>30</td>
<td>30.5</td>
<td>31.3</td>
<td>31.8</td>
<td>32.5</td>
</tr>
<tr>
<td>Ceiling on flat of floor</td>
<td>2</td>
<td>2.5</td>
<td>3</td>
<td>3</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Planks - garboard to wales</td>
<td>2.5</td>
<td>3</td>
<td>3</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Keelson bolts (thru keel at floor) L</td>
<td>.8</td>
<td>.9</td>
<td>1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Bilge &amp; timber butt bolts L</td>
<td>.6</td>
<td>.7</td>
<td>.8</td>
<td>.8</td>
<td>.9</td>
<td>.9</td>
<td>.9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Hardwood treenails L</td>
<td>1</td>
<td>1.1</td>
<td>1.1</td>
<td>1.3</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
<td>1.4</td>
</tr>
</tbody>
</table>

V Conclusions and Recommendations
The primary purpose of the project was to describe the wreck. Ideally, the goal was to narrow the wreck as to size and perhaps to the type of the original ship and even, under the best circumstances, to name the vessel. Success in this endeavor would greatly enhance the value of the remains as a museum exhibit. Unfortunately the limited remains of the hull make it difficult to arrive at definitive conclusions. The shape of the remains indicates well that less than 1/10 of the original hull survives, perhaps a quarter of the length and a quarter of the height above keel. Yet it is hoped that the remains are sufficiently characteristic so that further research and comment from knowledgeable contributors can narrow the ship's origin to decade of construction and general location of the constructing shipyard, as well as its probable class, length and tonnage. Authoritatively naming the ship remains an ultimate but unlikely goal.

A Speculations on Ship Size

- **Planking Size.** At frame 15 exterior planks averaged 15" by 3 1/2" or equivalent to 400- to 800-ton ships, while ceiling planks averaged 13" by 3", more suitable for ships of 300 to 500 tons.
- **Fasteners.** Metal driftpins are consistent in size with a ship of 500 to 600 tons. Treenails at 1 inch diameter, however are more suitable for a 100-ton ship.
- **Timber Size.** These features all approximate one-foot in cross section, indicating a ship of moderate size, two- or three-masted, probably not larger. Sided and molded dimensions, if squared, (9"x12"=108") track nicely with 10 1/2 inch futtock or double floor size allotted to a ship of 400 tons.
- **Timber and Space** (or frame interval) is, after the first five frames, consistent in this forward portion of the wreck. It consists of frame pairs each 9 inches thick followed by a space of 10 inches for an interval of 28 inches, equating again to a ship of 400 tons.
- **Height.** Curvature of the 6-foot-high (from bottom of keel) bow section shown in the body plan cross sections indicates that only the lower bottom portion, well under the waterline, survives. By continuing this curvature in conformance with hulls of the period, we estimate that the draft would have been from 8-12 feet and freeboard another 10 feet, accounting for a height from keel to main deck of approximately 15 to 20 feet, and a depth of hold of about 10 to 15 feet.
•Length. About 40 feet remain with the keelson broken off at the first evident mast step. Based on the fact that this mast step appears to be well forward of the mast position of a typical single-masted ship it is likely that at least two and possibly three masts were installed. Comparing normal foremost placement, we then arrive at a minimum length of main deck of 120 feet—perhaps well over 150 feet if all masts reached the keelson. However, on some units of the same vintage (latter 19th C), only the mainmast reached the keelson. If such were the case on this wreck, the length on deck would be about 100 to 120 feet for a 3-master. The resultant difference in tonnage would be considerable. A length on deck of 110 feet equates to about 400 to 600 tons, and a length of 150 feet to over 1000 tons. Judging by timber and fastener size, we believe the former is much more likely.

•Width. At 22 feet, the widest extant cross section of hull shows no indication of lessening curvature. Not only would the hull widen considerably before any tumblehome, but it also ends well forward of maximum width. This appears to be a beamy ship. Beam is estimated at between 30-40 feet.

•Tonnage. Following the formula mentioned previously and taking mean dimension estimates, we calculate a rough tonnage of the original wreck as follows:

\[110' \text{ (length)} \times 35' \text{ (breadth)} \times 12.5' \text{ (height–depth of hold)} \times .0075 = 360 \text{ tons.}\]

B. Speculations on Place of Origin, Date and Type

The construction noted in the remaining part of the Coatan wreck is typical of an American merchant wooden sailing ship of the latter half of the 19th century. Diagnostics are insufficient and research not yet complete to pinpoint the decade or state of construction, nor to establish firmly the ship type, but we will hazard some guesses in Part D.

C. Wreck Location

A further consideration is the location where the wreck was found and the location where it foundered. Ocean storms can move wrecks many miles along the coast, particularly if they float once freed from the bottom. All in all however, the odds of a match favor ships lost near a reappearing wreck. The map from Pouliot’s book shows wrecks lost from the North Carolina border to the mouth of Chesapeake Bay based of Life Saving and Coast Guard records. Without much wood damage overall, it is unlikely that the Coatan wreck traversed the coast or lay uncovered on the bottom for any extensive period.

Wreck Locations off Virginia Beach (1874-1915—J Pouliot)

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8 Beached Shipwreck Dynamics by Leslie S Bright
D Conclusions and Recommendations

Based on the above information, we believe it is premature to try to identify this wreck. We elicit the assistance of our readership to help in this endeavor either through the use of the attached Delphi Survey or phoned, faxed or posted comments to MAHSNEWS. The lack of definitive diagnostic information does not keep us from hazarding a few preliminary guesses as to the wreck's identity. We believe that the Croatan wreck was:

- about 110 feet long (main deck), about 35 feet in beam, with a depth of hold of about 13 feet--based on the ship features table
- about 400 tons in capacity--based on the table and the above estimated dimensions
- a 3-masted schooner--based on size, beamy hull, the position of the mast step, and comments on a draft of this report from knowledgeable reviewers. This type was the most common American coaster of the period.
- built in America--based on construction methods and reviewers' comments
- covered with bottom sediment shortly after foundering and refloated and beached at Croatan for the first time since her original sinking--based on the excellent condition of the hull surface and and the location of worm holes only on the upper surfaces.

The above conclusions range from probable to highly speculative. Note particularly that the second and third conjectures are contingent upon the first. Nonetheless we will preliminarily propose a few candidates for the wreck's identity from the attached table:

- *Jennie Hall*--"right" size, type, and location
- *Agnes Barton*--"right" size and location
- *City of Philadelphia*--"right" size and hull shape

It is recognized that the wreck could have come from any number of unrecorded sinkings along the coast.

The Project Managers would appreciate commentary from readers of this Project Report. MAHSNEWS will publish appropriate remarks, and credited comments will be acknowledged in the final version of this Report. Experienced respondents are asked to use the attached Delphi Survey.

The Life-Saving Museum has assumed custody of the Croatan wreck. It is too large to be incorporated into regular museum exhibits, and it cannot be protected at Rudee Inlet. Perhaps a portion of the bow can be detached and moved to the museum grounds to serve as a teaching tool in shipbuilding techniques. The remainder might be of a size that could be moved to one of the local military installations for protection and later study. Readers with suggestions concerning appropriate methods of display, curation, or uses for the wreck are invited to contact the Life-Saving Museum of Virginia, PO Box 24, Virginia Beach VA 23458.

VI Acknowledgments

The following personnel were engaged in this project:

**Project Croatan Team Members:**
Fielding Tyler, Ann Dearman, Julie and Dick Pouliot from the Life-Saving Museum of Virginia
John Broadwater, Archaeologist (NOAA)
Tom Berkey, Townie Burden, Mike Dougherty, Beth Johnson, Dave Kerr, George and Jill Montgomery, Bill Rutkowski, Alison Shanck, and Bill Utley from MAHS.
Coz Cozzi and Hera Konstantinou from Texas A & M.

Berkey, Utley, Tyler, Julie Pouliot, Cozzi and Broadwater greatly assisted in reviewing and revising the report. Authors Donald Canney and Sam Manning provided valuable advice. Any errors remain the responsibility of the Project Managers.

**Others**
MAHS and the Life-Saving Museum of Virginia would like to thank the following for their assistance:
The Virginia Beach Fire Department and particularly Terri Lazar
The Air National Guard 203rd Civil Engineer Flight, especially Major Mike McCarthy and Master Sergeant Jeff Horrocks
The Virginia Army National Guard, State Military Reservation (Camp Pendleton)
The US Marine Corps Reserve (MACS-24)

Submitted to the Boards of MAHS and the Life-Saving Museum of Virginia by:

Jill and George Montgomery
Project Managers
Bibliography


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*Record of American and Foreign Shipping*, The American Shipmasters Association, New York, 1878 and 1896

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Delphi Survey

A Delphi Survey is one taken by the polling of experts in a given field in an attempt to obtain meaningful data from minimal information. It is usually used for forecasting, but there is no reason not to use it for the reverse, that is, looking backwards instead of forwards.

We solicit readers experienced in the study of wooden sailing ships who believe that the above report provides enough evidence to make an educated guess or other commentary regarding aspects of the original ship to fill out following table and send it to MAHSNEWS, 8421 Magruder Mill Ct, Bethesda, MD 20817

<table>
<thead>
<tr>
<th>length</th>
<th>breadth</th>
<th>depth (hold)</th>
<th>tonnage</th>
<th># masts</th>
<th>type</th>
<th>origin</th>
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</table>

Comments

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Best candidates for ship identity are:

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Name, Address and Phone

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Comments are on/off the record