Odyssey Papers 11

A Note on Human Remains from the Shipwreck of HMS *Victory*, 1744

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During preparations to recover a bronze cannon for identification purposes from the shipwreck of HMS *Victory* (site 25C), lost in the western English Channel on 5 October 1744, a human skull and ribs were exposed around cannon C10. As the site survey continued, further surface deposits believed to be skeletal material were recorded around cannon C22 and C39.

The presence of these human remains was unexpected because of their rarity on wreck sites of all dates and forms not buried in anaerobic mud or clay. The discovery contributes an interesting layer of complexity and interpretative data to the site's formation. The human bones were photographed and then re-buried, and further fieldwork was restricted to contexts devoid of this sensitive material, pursuant to an agreement with the MOD and Royal Navy.

This report briefly summarizes the locations and extent of the human bones on site 25C's surface and presents comparative archaeological data to clarify the infrequency with which they are generally encountered on shipwrecks. Sources demonstrate that while small quantities of human bones can be expected on shipwrecks, especially in mud environments and on complex sites that trap and seal deposits, in general the image of shipwrecks as 'grave sites' is an inaccurate and misleading distortion of archaeological reality.

1. Human Bones on Site 25C

One of the objectives of the survey of site 25C in the western English Channel in October 2008 was to select a bronze 42-pounder cannon for recovery. This strategy was designed to confirm its dimensions and the nature and date of its royal arms, and thus to help identify the shipwreck definitively as remains of a first-rate Royal Navy Georgian warship. Only the most prestigious first-rates carried 42-pounders after the 1716 Naval Gun Establishment. This procedure, combined with a study of the 41 guns on the site's surface dated to between 1719 and 1734, and a geographical analysis of the wreck's location, has led to the conclusion that site 25C contains the long-sought shipwreck of Admiral Sir John Balchin's HMS *Victory*, lost in the English Channel on 5 October 1744 (cf. Cunningham Dobson and Kingsley, 2009).

Cannon C10 (Fig. 1) was judged to be a suitable candidate for recovery because it lay horizontally on the surface of the site and appeared to be relatively free of sediment cover and concretion. Most of the cannon are largely concealed or plunge into the sediments at acute angles. Situated just north of the site's center in grids M12-N14, this cannon was lying level on the seabed with the crest and dolphins facing upwards. It was 95% uncovered, which would have made the rigging of the *Odyssey Explorer*'s recovery straps a relatively straightforward process and would have caused minimum disturbance to any adjacent or underlying archaeological contexts.

During the removal of the upper loose layer of mobile sand around the bottom edge of cannon C10's westerly trunnion, human remains were encountered. What was later identified as a complete probable human rib bone was found lying on the surface adjacent to the westerly flank of the cascable, close to the cannon base ring (Fig. 2). The bone was yellow in color, while the exposed end was black. It did not appear to be *in situ* and had apparently been moved from its original resting place naturally or by human intervention.

As the ROV continued to investigate the context beneath and adjacent to the lower surface of the cannon at the cascable end, a smooth black oval object was uncovered between 5 and 30cm below the sediment (Fig. 2). On close inspection, the object proved to be the top of a human skull embedded in what appeared to be a black organic layer. Other than the absence of the mandible, no damage to the skull was apparent. The upper teeth retain their white color and all are apparently intact (Fig. 3).

To the right of the skull, parallel to the western side of cannon C10, between the base ring and the trunnion, further skeletal remains were observed. Blackened rib bones protruded vertically out of the sediment alongside what seemed to be additional components of the same skeleton articulated beneath the gun. More surface deposits of human remains were identified at the muzzle end of cannon C10 (Fig. 4).

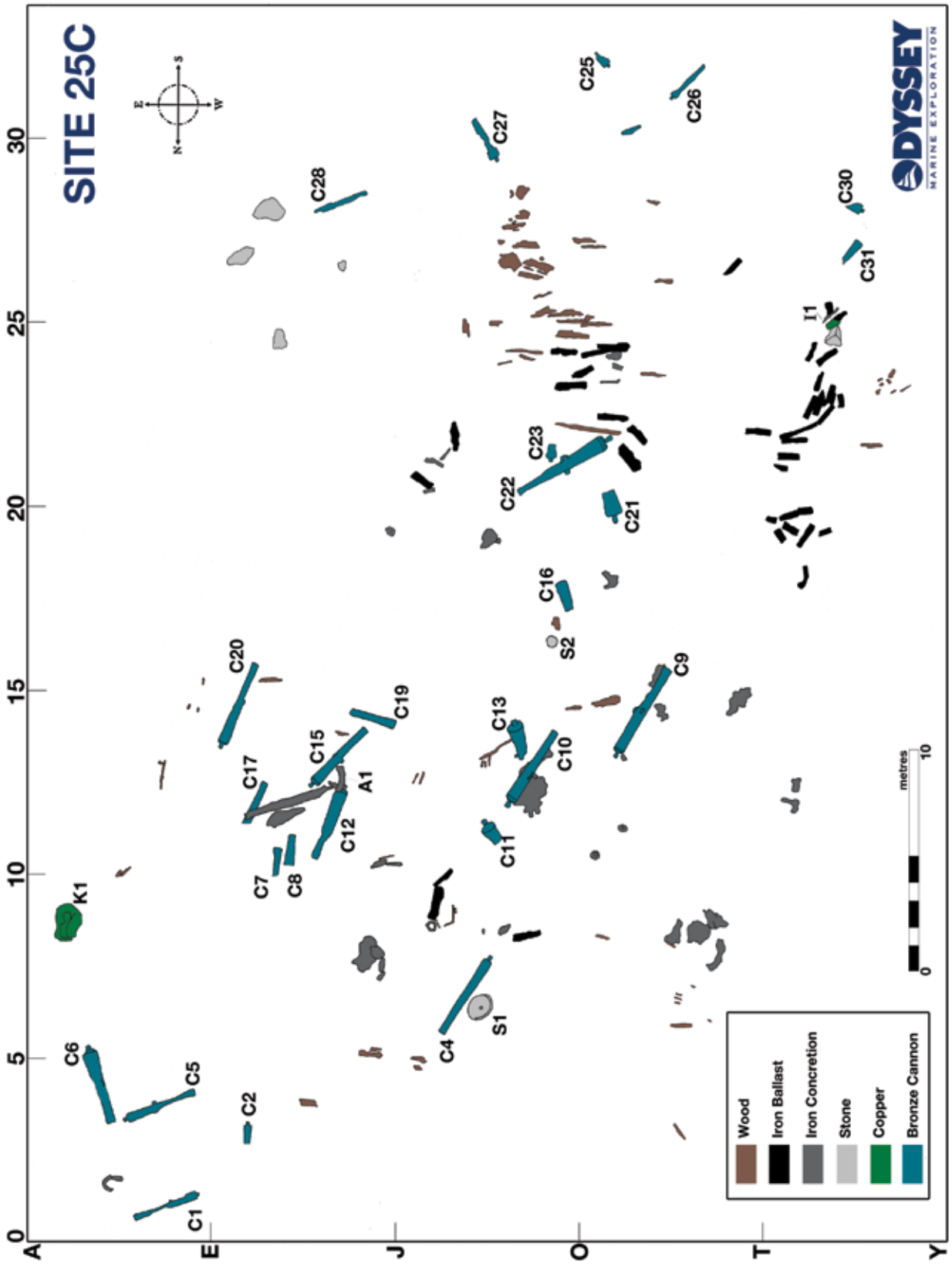

Fig. 1. Pre-disturbance plan of site 25C, HMS Victory.

Fig. 2. The exposure of a human skull and rib bones around the cascable end of cannon C10.

Fig. 3. Detail of the human skull associated with cannon C10.

Fig. 4. Surface deposits of human bone at the muzzle end of cannon C10.

Following the exposure of the skull, all operations were immediately halted. The skull was photographed and then placed back in its original position. Supplementary photographs and video were taken of the area surrounding the skull and cannon. ROV Zeus then re-buried the remains in their original positions. Later surveys confirmed that the skull remained covered and protected.

Additional surface deposits of probable human remains were subsequently discovered at the cascable end of cannon C22 (Fig. 5), whose trunnion diameter of 5.5cm suggests the gun is a 24-pounder, and at the muzzle end of C39, which is located outside the main wreck nucleus. Surface deposits were records between cannon C9 and C10 (Fig. 6).

Even though small-scale trial-trenching to the south of the wreck between the rudder and cannon C26 did not expose any further human remains, based on these discoveries the presence of other disarticulated and articulated human remains should be anticipated on site 25C. The presence of elements of a skeleton beneath cannon C10, a lower deck 42-pounder, seems to reflect the fate of a crew member who was pinned down by the gun as it was torn out of its station when HMS *Victory* sank violently.

2. Shipwrecks & Human Bone Preservation

The preservation of human bones on shipwreck sites is an undeveloped research area in underwater archaeology. Such assemblages are unusual on shipwrecks of all site-formation types and periods, despite the loss of life that often accompanied many maritime tragedies. As Arnaud *et al.* (1980: 53) emphasize, "In submarine archaeology, the discovery of human bone remains is a very rare event." For this reason, the subject receives no individual treatment within Robinson's classic *First Aid for Underwater Finds* (1998) or Pearson's *Conservation of Marine Archaeological Objects* (1988: 53-4), where the rarity of human bones compels the subject to be restricted to observations of carved animal bone.

This state of affairs results from the reality that the vast majority of shipwrecked sailors and crew members either managed to escape a foundering vessel or, after perishing in or near it, their bodies drifted free of the wreckage as water replaced any pockets of air below decks. Contemporary salvage or structural collapse over time can also release and scatter remains after the event (Mays,

Fig. 5. Surface deposits of possible human bone at the cascable end of cannon C22, with a wooden stanchion at right.

Fig. 6. Surface deposits of possible human bone located between cannon C9 and C10.

2008: 127). The majority of shipwreck sites where human remains have been preserved lie on shallow coastal shelves in temperate climatic zones. As the 90 human skeletons buried beneath hearths in the submerged Pre-pottery Neolithic C village of Atlit, Israel, demonstrate, only when bones are comprehensively and tightly sealed will large assemblages remain well preserved (Kingsley, 2008: 80).

Forensic studies demonstrate that in most marine environments a human corpse will be reduced to skeletal form in less than three weeks, although some degree of articulation may prevail for as long as 18 months. Following the loss of soft tissue, skeletal surfaces are abraded by current-driven sediments. Physical transport of the remains by currents may result in their impact with hard surfaces to cause additional breakage and dispersal. Biological activity involving boring, encrusting and scavenging further degrades bones, resulting in advanced deterioration within 12 years, even in cases of the most durable skeletal parts (Mays, 2008: 125).

As a result, the vast majority of human bones on shipwrecks are only preserved if and when a victim became trapped below decks, such as beneath cannon and cargo. This prevents dispersion until a sealing layer may be deposited to preserve bone within an anaerobic environment. Therefore, the degree of preservation will depend on how quickly the remains become sediment-inundated and whether such burial seals out oxygen – the main reason that mud and clay are superior to sand for this purpose (Mays, 2008: 125; Gregory, 1995: 65).

Limited skeletal remains typify wrecks located in sandy and hard mud environments, as opposed to fluid mud contexts like the *Mary Rose*, *Kronan* and *Vasa*, where human bones should be expected and are common (Mays, 2008: 127). The survival of soft tissue only survives in the most rare of warm or mineral-rich springs and cold, oxygen-depleted environments (Lenihan, 1987: 328), such as on the 17th-century *La Belle* shipwreck in Matagorda Bay, North America (Bruseth and Turner, 2005: 118-19).

Within these limits, the gross preservation of bones from marine shipwreck sites can be quite good, as exemplified in the rapidly buried contexts of the *Kronan*, *Vasa* and *Mary Rose*. Three incomplete skeletons have been recovered from two Mediterranean wrecks off southern France dated to the 10th centuries AD and were sufficiently well preserved to have facilitated examination of their calcium/phosphorus ratio, which was found to be nearly the same as in fresh samples (Arnaud *et al.*, 1980). In fact, bone preservation on some wreck sites has been sufficiently effective to permit mitochondrial DNA extraction and analysis, as in the case of two human bones found on the *Wanli*, a European merchant vessel wrecked in the 1630s in 43m off Dungun, Malaysia (Ariffin *et al.*, 2007: 30). The outstanding preservation of the mud-inundated *Mary Rose* skeletal assemblage enabled isotope tests to assess the diet and origin of her crew members (Bell *et al.*, 2009: 166).

Research into the deterioration of unburied animal bones in a seawater environment has been conducted in relation to the *Swan*, a Cromwellian shipwreck lost off western Scotland in 1653, where samples were studied in close proximity to the wreck. These were examined at regular intervals over a one-year period and correlated with physical, chemical and biological parameters measured during the experiment. When removed from the site after 52 weeks, the human bones exhibited widespread softening and the precipitation of phosphates, which negatively affected their structural stability. After drying, they "became extremely light, brittle, and chalky" (Gregory, 1995: 62-63). Results of the experiment concluded that biodeterioration is the most significant effect on bone in seawater. The process commences with attacks by bacteria and fungi, which leads to the establishment of macro flora and fauna (kelp, boring crustacea and mollusca) on the bone's surfaces. This, in turn, establishes pathways by which additional biological, chemical, and physical deterioration can occur (Gregory, 1995: 65).

Arguably the major obstacle to optimum preservation is not chemical reactions, however, but scrambling processes in the marine environment. These scatter and intermix human bones from shipwrecks, primarily through current transport.

3. Optimum Skeletal Preservation

The *Mary Rose* is often inappropriately heralded as a prime example of why shipwrecks should receive the status of a marine 'grave'. When Henry VIII's warship sank in 1545, only 30 of her 200 sailors, 185 soldiers and 30 gunners survived. The remains of 92 fairly complete skeletons have been recovered, accounting for no less than 43% of the entire crew. However, the environmental circumstances surrounding the ship's preservation are extraordinary, not typical. As the *Mary Rose* sank very rapidly, her anti-boarding netting covered all of the exposed decks, tragically trapping the crew inside. The four tides a day in the Solent swiftly inundated the vessel and her contents in deep silt, which engulfed the ship's exterior and interior. A hard shell seabed naturally deposited in the late 17th or early 18th century then sealed all the Tudor levels *in situ* (Stirland, 2005: 66, 76, 79). Without this unique combination of circumstances the ship's hull structure and skeletal assemblage would not have been so remarkably preserved.

A similar environmental scenario characterizes the 1,553 pieces of human bones from 25 individuals

excavated from the *Vasa*, wrecked in 1628. When King Gustavus Adolphus of Sweden's warship was lost on her maiden voyage, she foundered in sight of land and about half of her crew was able to swim to shore.[1] Well-preserved human bones were similarly recovered from the silty, mud-inundated wreck of *La Belle*, an expedition ship of Robert Cavelier, Sieur de La Salle, which grounded hard on the muddy bottom of Matagorda Bay in 1686, where it eventually collapsed inwards and was buried. One complete skeleton was found in the remains of an accommodation/store room, and elements of another in an aft cargo hold. Both are believed to be the remains of crewmen who died before the sinking, most likely of thirst. The skeleton found in the accommodation/store room still contained "almost the entire brain" within the skull (Bruseth and Turner, 2005: 115-18).

In addition to fluid mud environments, bones are also exceptionally well-preserved in the deep, icy waters of freshwater bodies such as Lake Superior, where skeletal remains and soft tissue have been effectively preserved on at least three modern wrecks: the package freighter *Kamloops*, where the entire crew of 22 died of drowning or hypothermia in December 1927 (Lenihan, 1987: 328); the bulk freighter *Emperor*, where 12 out of 33 were lost in 1947 (Lenihan, 1987: 185); and the bulk freighter *Edmund Fitzgerald*, where the entire crew of 29 perished in November 1975.[2] In all three cases, a process known as adipocere formation or saponification swiftly converted the soft tissues "into a soft waxy-type substance, frequently compared to soap" (Lenihan, 1987: 328). The *Fitzgerald* remains, which were located outside the hull, are much more degraded than those from the other vessels, where the bones were found inside.

4. Realities of Human Remains on Shipwrecks: Managing Expectations

Other shipwrecks where small numbers of human bones have been recorded provide a more balanced reflection of preservative parameters. When the Royal Navy frigate *Dartmouth* was wrecked off Scotland in 1690, all but six of the 130-man crew was drowned (Martin, 1978: 31). Yet the only human remains uncovered during the excavations were a few bones associated with one shoe found trapped under a cannon (Adnams, 1974: 271). Osteological investigations of more than 200 human bones excavated from HMS *Pandora*, which foundered off the north coast of Queensland on the Great Barrier Reef in 1791, identified just three of the 35 drowned crew members (Steptoe and Wood, 2002).[3] Some 60% of the bones of a lone male were recovered from a crew of 60 on the Cromwellian vessel the *Swan*. This male appeared to have been trapped below decks when the vessel sank off Duart Point, Scotland, in 1653.[4]

The rarity of human bones on both merchant vessels and Colonial-period warships is exemplified by the wreck of the *Orient*, which was blown up in action against England in 1798 off Aboukir Bay, Egypt, during the Battle of the Nile. Although only 60 of the *Orient*'s 1,040 crewmen survived the explosion, only a single mandible has been discovered during excavations, leading the research team to conclude that "Underwater archaeologists rarely find actual human remains – typically not even bone can withstand the salt water, marine life, and other destructive elements" (Foreman *et al.*, 1999: 54, 140, 204).

In what was the greatest loss of life in a single event during the War of 1812 between US forces and Britain on the American Great Lakes, 53 men from the combined crews were drowned in Lake Ontario during the capsizing of the *Hamilton* and *Scourge* (Cain, 1983: 111). Again, only the skeletal remains of a single individual have been identified during remotely-operated vehicle surveys of the site.[5]

5. Conclusions

The discovery of human remains on the surface and beneath light sediment cover on wreck site 25C was not anticipated. Odyssey has investigated hundreds of shipwrecks during the Atlas Project within the English Channel and this is the first occurrence of human remains. Their presence is the result of what seems to be the *Victory*'s rapid sinking, combined with the movements of the ship's crew below decks. One possible cause of death may have been a sailor being crushed beneath bronze cannon that had broken free of their gun stations. However, it is not impossible that these tragic souls simply drowned and that currents and trawler action relocated the bones, which became trapped and wedged in place alongside durable artifacts. The bones' exposure is the result of the dynamic mobile sediments and currents that constantly cover and uncover the site, working in tandem with scrambling caused by beam trawlers. By contrast, bones are unlikely to be preserved on sites characterized by solid sea bottoms (rock or hard substrata), where they are not sealed within anaerobic contexts.

Even though Odyssey Marine Exploration only expects to find on site 25C a very small percentage of the skeletal remains of the approximately 900-1,100 seamen, marines and volunteers who lost their lives on HMS *Victory* in 1744, the destruction and inadvertent snagging in nets of these human bones by intensive trawler activity

in the western English Channel is a very real and immediate threat. On the basis of the results of the current fieldwork, recovery of HMS *Victory*'s skeletal assemblage should be classified as rescue archaeology.

Recovery and study of site 25C's skeletal remains may provide crucial information on the following subjects:

- Demography
- Disease
- Genetics
- Diet
- Professional functions (repetitive strain disorders)
- Surgery practices
- Forensic taphonomy in deep waters

Ultimately, any human remains from the wreck of HMS *Victory* will contribute immensely to the understanding of daily life in the Georgian navy. Some 107 skeletons of a motley crew of Royal Navy pensioners have recently been excavated and studied at the site of the Royal Hospital at Greenwich. These veterans of Britain's wars with the Dutch, Americans, Spanish, the French Republic and Napoleon display a wide variety of pathological conditions from multiple fractures to rickets, tuberculosis, syphilis, scurvy, cancer, as well as amputations and craniotomies. The Royal Hospital assemblage dates between 1749 and 1856 (Boston *et al.*, 2008). HMS *Victory*'s skeletal assemblage will push back this chronology and thus expand our knowledge of life at sea in Georgian Britain.

However, first and foremost, any plans for the ultimate disposition of the remains of HMS *Victory*'s sailors is a question which must be left entirely up to the Royal Navy and the MOD, and perhaps the families of the deceased that can be located. Whichever approach is utilized, whether re-interment at sea, returning them to land for burial, or using them for scientific study, any actions must be conducted in a manner that appropriately respects the brave sailors and the lives that they lost for their country.

Notes

1. See: http://www.bruzelius.info/Nautica/Medicine/Wasa-skeletons.html.
2. See: http://www.shipwreckmuseum.com/fitz.phtml.
3. See also *HMS Pandora: Human Remains*: http://www.qm.qld.gov.au/ features/pandora/human.
4. Martin, C., 'Resurrecting the Swan: Archaeology of a Cromwellian Shipwreck, 1653', *History Scotland Magazine:* http://www.historyscotland.com/features/resurrecting theswan.html.
5. *Hamilton and Scourge Project*: http://www.hamilton-scourge.hamilton.ca/home.htm.

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