

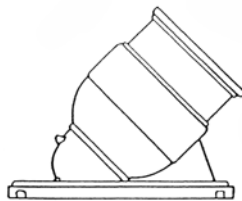
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# Contents

The recent discovery of three shipwrecks with bronze ordnance Sveti Pavao, Brečine and Vis Harbour (Croatia) <i>Igor Mihajlović, Igor Miholjek and Jurica Bezak</i>	5
The guns of Gun Rocks: what can photogrammetry reveal? <i>Peta Knott and John McCarthy</i>	24
The <i>San Juan/Parissona grossa</i> – 1581. The identification of a wreck found off Sciacca, Sicily, through archaeology and archives <i>Renato Gianni Ridella, Ruth Brown, Marco Milanese and Kay Smith</i>	36
The Quex Park 12-pounder <i>Frank L Fox</i>	67
Guns from the Narrow Seas: New discoveries <i>Sean A Kingsley</i>	82

# Guns from the Narrow Seas: New discoveries

*Sean A Kingsley*

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## Introduction

The history of the Narrow Seas is synonymous with security. The shores of the English Channel are studded with ruined Roman, Saxon and medieval lighthouses and forts that kept a watchful eye over mercantile and naval traffic that supported empire and statehood. The offshore profile is no different. In the Atlas Shipwreck Survey Project, conducted across the Western Approaches and western English Channel between 2005 and 2011, guns proved to be the defining archaeological characteristic of wooden wreck sites. Since incursion and invasion from the south have long been a constant threat to the British Isles, the southern shores have borne the brunt of the threat from Julius Caesar, the Norman Conquest, and waves of Gallic and Spanish armadas and privateers. World War I and II German U-boats (Niestlé 2011; Cunningham Dobson 2014) and masses of depth-charged steel wrecks conspicuously reflect the centrality of these waters to the defense of the realm.

The conspicuous nature of cannon wrecks is partly a disproportionate reflection of the capacity for the merciless marine environment to pound and erode cargo ships transporting organic and delicate consignments, including ceramics. By contrast, in marine site formations guns both facilitate detection on side-scan sonar and magnetometer remote sensing technology and their weight and durability function as sealing layers to trap contexts underlying wreckage. In the harsh tidal and pounding wave regime of the deep Narrow Seas, guns more than pottery serve as marine archaeological calling cards.

The Atlas Shipwreck Survey Project conducted by Odyssey Marine Exploration primarily outside UK territorial waters is the most extensive deep-sea archaeological survey conducted worldwide. Approximately 270 wrecks were recorded across an area of 5,405 square nautical miles down to depths of 190 m. Odyssey's offshore prospection deployed the 7 ton Remotely-Operated Vehicle (ROV) Zeus, re-tooled for archaeological operations, including surveying, recording, sifting sediments through a filtration system installed at the rear of the ROV, and delicate artefact recovery using a pressure-based limpet suction system. This was a diver-free project in dangerous waters.

Sites detected date between the early 17<sup>th</sup> century and the modern era. The lost ships of early date tantalizingly described in historical accounts—35 sites from before 1600 and 170 sites dating between 1600 and 1700 off Cornwall, Devon, Dorset, and the Scilly Isles out to the 30-mile boundary alone (Larn and Larn 1995) — and often preserved in shallows, (*cf* Rule & Monaghan 1993; Adams & Black 2004) seem not to have survived centuries of pounding waves, depth-charging and bottom trawling impacts in deeper waters unless they remain deeply buried under sediments.

Five of the most significant wooden wrecks discovered during this project were associated with guns: an armed merchantman, possibly Portuguese, from c. 1640–50, bearing a consignment of Portuguese tin-glazed pottery and a pewter domestic assemblage was found, although with no remaining hull (Site



orientation extending northeast to southwest. A short project was initiated in May 2011 to obtain information about the shipwreck's character, date and identity.

A thin and mobile veneer of gravelly sand, stone and shell 10–15 cm thick mostly covered the wreckage on a flat seabed. Despite the shallow stratigraphy, a significant domestic assemblage and remnant of the cargo was preserved. The most conspicuous finds, apart from the guns, was a pewter assemblage, including two plain broad rim plates, two porringers, and an unusual desk writing set equipped with three ink compartments and two tubular quill holders. A small cylindrical sounding lead was identified along with two styles of log slates used to keep the daily record of the vessel's speed, course, and other information before transference into a permanent logbook.

A ceramic assemblage of 56 sherds derived from 34 different ceramic vessels was recovered, weighing in all 2.6 kg. The majority consisted of blue-on-white Portuguese faience, whose lustrous surfaces with fresh unchipped edges are indicative of a small consignment or remnant of a scattered cargo. Portuguese faience is rare on shipwrecks globally, having been documented on three other wrecks dated later than Site 30E: the Portuguese galleon *Sacramento*, wrecked off Brazil in 1668; the Portuguese warship *Santo António de Tanná*, at Fort Jesus, Mombasa, Kenya in 1697; and the *Ponta do Leme Velho* at Sal Island, Cape Verde (Pernambucano de Mello 1979: 221–2; Sassoon 1981; Gomes *et al* 2015). No comparable wares have been identified off the coast of the United Kingdom and Ireland.

As a closed assemblage, the wreck's Portuguese faience contain products of this ceramic tradition's First Cycle and the Transition Period (Monteiro 1994). Parallel wares in Portuguese collections reveal a probable

date of c. 1640–50 for the armed merchantman's sinking at Site 30E. This style of faience was produced in Lisbon and seems to be associated exclusively with Portuguese trade, evidence that strongly indicates that this ship was *en route* from Portugal to England when she sank. In these decades, Portugal was at war with both Spain and Holland, excluding both nations as trade partners, but had forged strong mercantile alliances with England after securing independence from Hapsburg Spain in 1640. On land, Portuguese faience has been recorded at 87 coastal sites in England and Ireland (Casimiro 2011: 33).

The absence of registered touchmarks on the pewter wares, as required by guild regulations, including the Worshipful Company of Pewterers based in the City of London by the turn of the 17<sup>th</sup> century (Herschel 1929), again seems to exclude an English identity for the site 30E vessel or its merchants. The wreck's unmarked broad-rimmed pewter plates have close affinities with the São Julião da Barra underwater finds made in the same riverine area as the Portuguese East Indiaman *Nossa Senhora dos Mártires* (Castro 2000).

In light of the shallow sediment cover and almost non-existent hull remains (other than the rudder) and bottom fishing impacts, an unexpected discovery beneath the waves was an intact gunport lid measuring 45 cm x 62.5 cm wide and about 13 cm thick (figure 2). It is constructed of two unequal lengths of flat planking. The upper one is 17.5 cm wide, and the lower one is 27.5 cm wide. Attached to the upper surface is an elongated U-shaped concretion, 37.5 cm long, which served as a cable attachment to open the gunport lid from above. Nine small sections of concretion denote the positions of iron nails that originally fixed a second underlying layer of wood running perpendicular to the upper two planks. Two V-shaped bolts, also concreted, originally hinged the gunport lid



Figure 2. A wooden gunport lid with a bolted hinge on Site 30E. Base of a Portuguese faience dish at left.

to the hull.

The ordnance comprises 18 large concreted iron cannon and two swivel guns. The main cluster is orientated mainly in a north-east/southwest direction, which corresponds to the conjectured keel line. The 2011 survey determined that gun C2 had disappeared to trawler dragging since being initially recorded in 2010. To the southeast of C1, two additional guns had been dragged up to 130 m from the northern wreck perimeter (figure 1). Evidence of trawl damage on the submerged ordnance was unmistakable. A total of 16 of the 18 large guns (89%) display one or more of three different types of impacts: deep trawl scars, freshly knocked-off concretions, and broken gun sections, such as trunnions (figure 3).

In the hope of addressing questions of ordnance types and gun nationality, the trawler-dragged outlier gun C13 was selected for recovery (figure 4). The gun is tentatively identified as a single reinforce 8 ft Saker Ordinary of about 18-19 cwt and 3.5 calibre, cast in England (pers comm Rudi Roth, 17 September 2011). Scallop dredges have again battered the cannon and trawl



Figure 3. Iron gun on Site 30E, its chase and muzzle heavily scarred and its concretion broken off by fishing trawlers or scallop dredges.

damage extends along the gun's left-hand side. The muzzle is further damaged (figure 5) and both trunnion ends are broken. Sections of iron have been knocked off the front of the muzzle, and two deep vertical scars are present immediately behind the left side of the muzzle. Additionally, deep diagonal scars cross one-another midway along the left side of the chase. No crest or maker's marks are visible. The fuse remained in place within the touchhole.

The breech loading iron swivel gun C19 was also recovered (figure 6) – one of two identical pieces of ordnance present at Site 30E. The gun proved to be extremely well preserved with an unusual curved tiller, the breech still in place with a wedge that also retained remains of twine for pulling out the wedge. The yoke and spike survive and 3 reinforce rings overlie the chase. No maker's mark is present (figure 7).

Gun C19 is a type of swivel common-





Figure 4. Gun C13 from Site 30E, a possible English saker ordinary iron gun before and after the removal of concretion (length 2.43 metres, SHA-A-11-0015-OE).

ly known as a 'hail shot piece' designed to fire case shot. Such ordnance seems to have originated in the Low Countries, since most examples that have been recorded were constructed in the measurement units of Malines, Burgundy or Brussels. This form of ordnance was infamously renowned in the 17<sup>th</sup> century by the macabre term 'murderer', as attested in Robert Norton's *The Gunner* of 1628. Comparable ordnance was not commonly used by the navy, but East India Company records demonstrate that it was prevalent in merchant shipping (Smith 1995: 109–110). Most English and Dutch ships in

1620 were chiefly armed with large guns, but often included four or six murderers as part of their armament.

While the 'murderer' swivel gun is relatively common in European artillery collections, it is surprisingly uncommon on shipwrecks worldwide. Examples have been recorded alongside a cosmopolitan set of bronze Dutch Admiralty cannon, bronze Spanish pieces, and two antique English iron cannon on the Dutch East Indiaman *Mauritius* lost in the Gulf of Guinea in 1609 (L'Hour et al 1989: 102); off Cornwall on the Rill Cove



Figure 5. Detail of the trawl-impacted muzzle of iron cannon C13.



Figure 6. Swivel gun C19 *in situ* on Site 30E.



Figure 7. Breach loaded iron swivel gun C19 after the removal of concretion, Site 30E (Length: 74 cm, inv. SHA-A-11-0011-OE)..

shipwreck dated by coins to approximately 1616 (Simpson et al 1977: 165); and an identical swivel gun was found a mile west of the main hull nucleus of the Spanish *Tierra Firme* fleet vessel *Atocha*, lost in the Florida Keys in 1622 (Lyon 1989: appendix H). On all other examples the tiller is straight rather than curved back into a U-shape as on Site 30E.

In summary, Site 30E preserves the scattered wreck of an armed merchant vessel lost c. 1640–50, seemingly of Portuguese origin and equipped with a minimum of 18 large saker ordinary guns and two ‘murderer’ swivel guns. The former may be English, the latter possibly manufactured in the Low Countries, a combination that would not be unusual given the unashamedly mercantile nature of European armed merchantmen of the period. The size of an intact rudder north of the cannon points towards the loss of a large merchant vessel, potentially with a 500-ton capacity. It is the earliest wreck located by Odyssey Marine Exploration in the Atlas research zone.

### The First-Rate *Victory* (Site 25C)

The loss of the First-Rate flagship the *Victory* was one of Britain’s greatest naval losses and ensuing maritime mysteries about where she foundered (Kingsley 2015a). *Victory* was a three-deck warship with a gun deck length of 174 feet and a burden of 1,920 tons (Win-

field 2007: 4). Launched in 1737, the flagship largely patrolled the Narrow Seas, escorting outward-bound merchant convoys beyond the corsair-infested home waters, under the command of Admiral Sir John Norris, and in her last voyage under Admiral Sir John Balchen. *Victory* was lost on 4 October 1744 in the western English Channel returning from liberating a victuals convoy down the River Tagus and attempting to attack the Brest naval fleet (Cunningham Dobson & Kingsley 2010: 266–272).

The warship’s wreck was discovered by Odyssey Marine Exploration in April 2008 at an average depth of 72 m, 80 km southeast of Plymouth and 100 km west of the Channel Isles, where the Admiralty and subsequent historians were convinced she sank (Cunningham Dobson and Kingsley 2010). Site 25C has been subjected to four years of non-disturbance surveys and monitoring, culminating in 2012 with an extensive non-disturbance archaeological, environmental and remote-sensing survey using multibeam and Sub-Bottom Imaging (Prave et al 2013; Seiffert et al 2013; Cunningham Dobson et al 2014). The Ministry of Defence granted the wreck’s ownership to the Maritime Heritage Foundation in January 2012.

In terms of technology and naval history, the *Victory* occupies a unique position in British maritime history and archaeology. She



Figure 8. Photomosaic of Area E on Site 25C showing bronze guns *in situ* (2012)..

represents the end of the line as the last English warship equipped with a set of all-brass guns (figure 8), including 42-pounders, custom-cast at the Woolwich Brass Foundry by master founder Andrew Schalch. Thereafter, iron guns replaced the already highly diminished use of these high prestige tools of naval warfare (Lavery 1987: 87; Caruana 1997: 42–43, 48–49, 51). Dark accusations that engulfed the Admiralty after the warship's loss included a widely adopted belief that the number, size, and weight of her cannon were unsuitable for her scantlings. The concern extended to other warships and was upheld as an argument for reform by Sir John Norris for the *Victory* in 1740, by Admiral John Balchen for the *Princess Amelia* in 1734, and by Admiral Edward Vernon for the 80-gun *Boyne* and *Victory* (Kingsley 2015b). In June 1744, Vernon cautioned the Admiralty that 'the apparent reason those upper batteries was not heavier was that the beams were so slight that the decks would not bear a heavier battery. And therefore the ships you mention,

or any ships, would soon be crippled, if the strength of the deck be not the first consideration of what battery of guns it can support' (The National Archives, Kew, ADM 1/578).

The *Victory's* central wreck mound has a maximum elevation of 50 cm above the seabed. The continuous site boundaries cover an area of 60 m north/south and 42 m east/west. The discontinuous site boundaries extend across a total area 84 m north/south from anchor A2 to the rudder, and 305 m east/west from cannon C32 to C47. The bow lies to the northeast and the stern to the southwest, defined by the 9.4 m-long preserved remains of the rudder (figure 9). The site is bounded to the east by a long sand-wave, stable since 2008, but that may have concealed the wreck site in relatively recent history. This would explain why the site was never registered as a fisherman's hang.

Amongst very limited assemblages of wood and bronze sheave blocks, a glass wine bottle, parts of copper kettles, two grinding-stones, and concreted rectangular iron

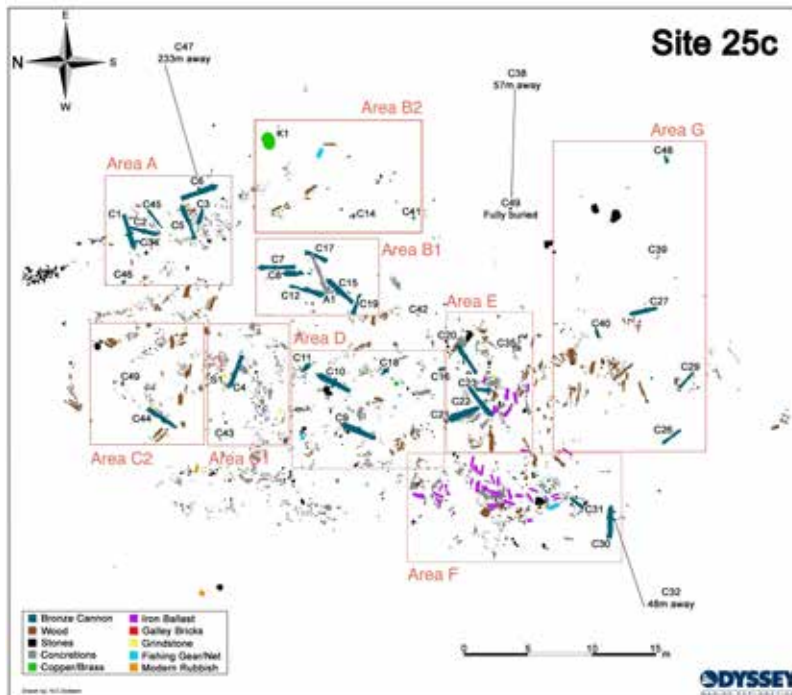


Figure 9. Site 25c plan with designated areas (2012).

ballast blocks (and no potsherds), the presence of 50 bronze guns is by far the most characteristic feature of the wreck's surface. The warship is believed to have sunk without having jettisoned any guns, having been armed with:

- Lower deck: 28 x 42-pounders
- Middle deck: 28 x 24-pounders
- Upper deck: 28 x 12-pounders
- Quarterdeck: 12 x 6-pounders
- Forecastle: 4 x 6-pounders

Examples of each calibre have been documented *in situ*, while 12-pounder (C28) and 42-pounder (C33) guns were recovered by Odyssey in 2008 (figure 10). Gun C13, looted in 2011, was identified by Nico Brinck as a 24-pounder.

Profiling using PanGeo Sub-Bottom Imager equipment enabled the submerged seabed to be digitally thin-sliced horizontally to create 10 cm-deep 3D image lay-

ers. Hard objects composed of any medium such as metal, wood, or stone appeared as bright anomalies. The survey revealed amorphous anomalies, but also 60 large elongated anomalies down to burial depths of 80 cm (figure 11). These have been identified, at least in part, as buried bronze cannon based on direct geospatial correlations between linear anomalies and known surface guns. All of these targets were recorded to the south and mostly east of the wreck mound, confirming a former hypothesis that after sinking the *Victory* collapsed to starboard, her decks and cannon folding over her eastern remains. No wreckage is present west of the iron ballast deposit in Area F that corresponds to the position of the keel line (figure 9).

Site 25C has been heavily impacted in recent decades. Evidence of long-term impacts is primarily evident from the guns' surface condition, six classes of which have been





Figure 10. 12-pounder gun C28 and 42-pounder C33 from the *Victory* after recovery but before conservation (2008).

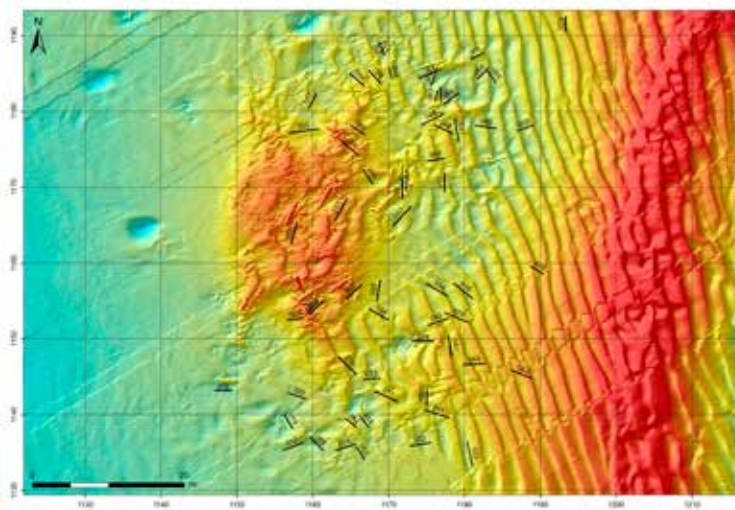


Figure 11. Plan of linear anomalies on Site 25C, partly buried guns, identified using Sub-Bottom Imaging technology.

documented (Kingsley et al 2012). In their natural *in situ* state, the cannon surfaces are entirely covered with a consistent thickness of concretion and inhabited by sea grass and biological matter (Class A impact; figure 12). The majority of the guns' current conditions display linear scratches cut through the encrustation shell or very minor patches of dis-

placed concretion (Class B) through to large sections of exposed bronze surfaces, where the encrustation has been knocked off and abraded (Class C). Class D impacts exhibit a distinct bipartite pattern, whereby the underside physically interacting with sediments remains covered with concretion, but the upper surface exposed to the water column



Figure 12. Gun C31 in Area F, Site 25C, with continuous concretion cover and inhabited by marine life (Class A impact).



Figure 13. Dragged gun C27 in Area G, Site 25C. Extensive concretion broken off the upper surfaces (Class D impact)..



Figure 14. Gun C32, Site 25C, dragged 48 m offsite to the southwest. Almost all its concretion cover has been impacted and stripped off (Class E impact).

and trawler gear is almost entirely stripped of concreted veneer (figure 13). In many instances, the exposed bronze surface faces downwards into the seabed, an unnatural pattern indicative of dragging and inversion. Some guns are almost completely devoid of concretion and biofouling, frequently associated with extensively abraded upper surfaces intercut with linear scratches (Class E). Finally, in Area G to the site's south, gun

muzzles have been completely severed vertically (Class F) and the broken component is no longer visible on-site. Guns dragged off-site, such as C32 found 48 m southwest of the central wreck mound with almost all its concretions stripped off (figure 14), point to common bottom fishing impacts.

Between 2008 and 2012, guns in all seven archaeological zones (Areas A-G) were impacted (Kingsley *et al* 2012) Cannon C47

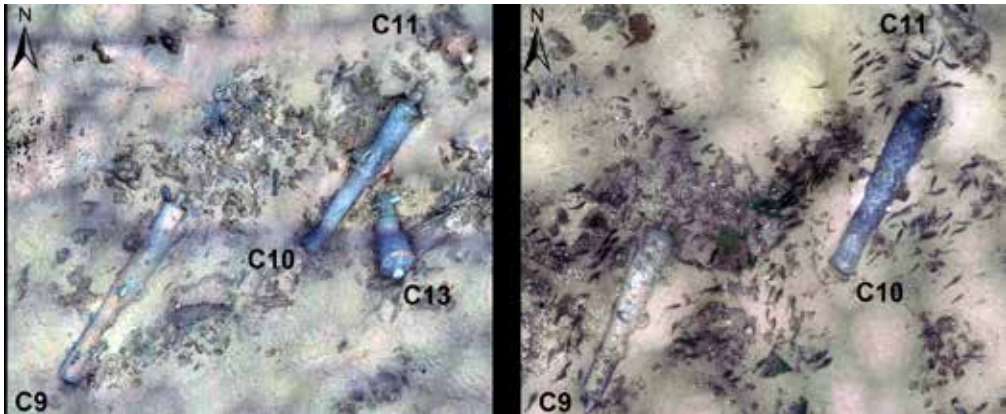


Figure 15. Photomosaic sections of Area D, Site 25C, with gun C13 present in 2008 (left) but illegally salvaged by October 2011 (right).



Figure 16. 24-pounder bronze cannon C13 illicitly salvaged from the *Victory* in 2011, inscribed 'Schalch' and '1723'.



Figure 17. Detail of the royal arms on the first reinforce of 24-pounder C13.



Figure 18. Base ring of 24-pounder C13 reading 'FECIT 1723'.

was documented as having been dragged 233 m from the north-eastern wreck edge. In Area C1, gun C4 was flipped and rotated. C13 disappeared from Area D and subsequently turned up as salvage in Holland (figures 15–18). Documentation by Nico Brinck identified the gun as a King George II 24-pounder, inscribed along the vent hole with the name ‘Schalch’ and ‘1723’. The rope wad, powder bag, wooden tampion and 14.2 cm-diameter shot were found *in situ* within the chamber. The dimensions were otherwise recorded as 303.5 cm long with a muzzle swell of 36.5 cm and bore of 14.8 cm, trunnion diameter of 14.5 cm and a base ring diameter of 49.7 cm.

The *Victory*’s visible gun calibres have been recorded underwater (and on land for C13), and casting dates of ‘1723’, ‘1726’ and ‘1734’ registered (figure 18). Four crest varieties have been documented. Those attributable to the reign of King George I (r. 1714–27) include the royal arms framed by two classical elaborate swirling branches, intercut by a tripartite scroll motif midway (Crest Style 1; figure 17); a less complex single leaved branch variety, sickle shaped, with a concave lower curve (Crest Style 2); and foliate branches with a rounded summit composed of two branches and an indented concave lower stem (Crest Style 3). In the arms of King George II (r. 1727–60), no branches surround the arms (Crest Style 4). The available evidence currently reveals that the *Victory*’s guns were cast in at least four batches, which dovetails with historical testimony that in 1722 Andrew Schalch started a 12-year project to cast 100 brass guns to 1715 regulations for the *Victory* (Trollope 2011: 56).

The *Victory*’s importance in the history of naval ordnance can be summarised as the last Royal Navy First-Rate warship in British history to be armed with a single batch of brass cannon when lost, rather than a geographically and chronologically diverse collection

of English and foreign antiques. The wreck’s assemblage is by far the most complete collection of English cannon cast by any founder at Moorgate, Woolwich, or anywhere else in existence. It is the largest surviving collection of cannon produced by the master founder Andrew Schalch at the Royal Brass Foundry, Woolwich. Now discovered, the *Victory* is the only wreck site of a First-Rate Royal Navy warship with an intact collection of cannon known in the world.

### **A cargo of Bacon solid guns (Site 10Ef)**

The wreck of a small wooden merchant vessel (Site 10Ef) discovered by Odyssey at a depth of 81 m in the western English Channel was subjected to a 10-day survey programme in July 2011. A tightly clustered set of 21 concreted iron cannon covering an area of 11.6 x 7.7 m overlay and surrounded a flattened lower section of wooden hull, which was visible across an area of 7.5 x 2.8 m. A small anchor denoted the site’s eastern perimeter (figure 19).

The ship settled on a north/south axis with a 2.6 m-long exposed section of the keelson identified. The site displays no diagnostic evidence for the positions of the bow and stern. A possible concreted rudder gudgeon recorded at the northern end of the keelson may denote the position of the rudder and stern to the north. Parts of 19 floor timbers overlay the keelson preserved to a maximum length of 1.3 m. No pottery, glass, galley bricks or cannonballs were present. Artefacts were restricted to a pewter plate, two lead scuppers and two hull patch repair tangles. Fishing net and lines were snagged around and under five cannon and strewn across the seabed. Every gun exhibited trawl damage ranging from gouges and scars to recently stripped concretion layers along exposed surfaces (figure 20).



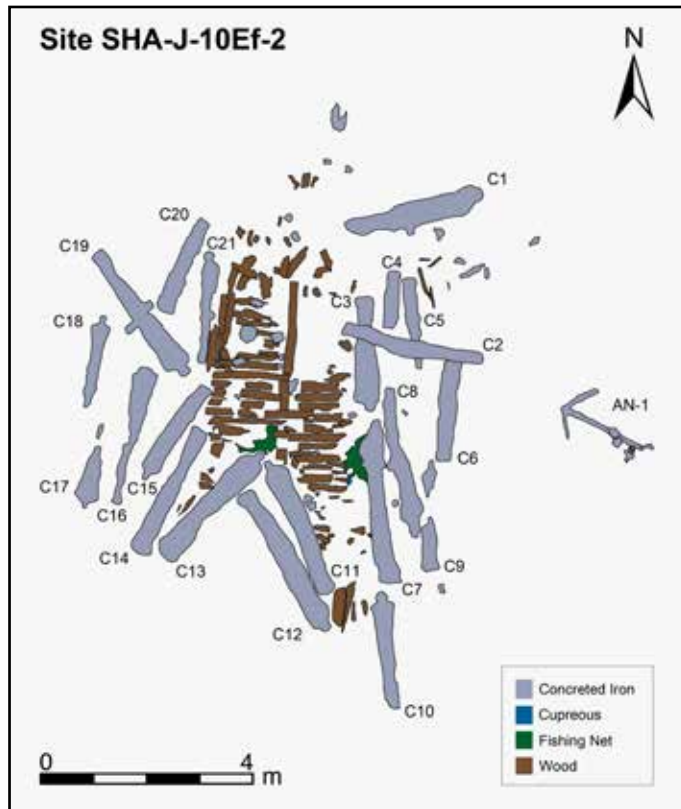


Figure 19. Plan of Site 10Ef, a cargo of Bacon Solid iron guns.

The guns were originally stowed parallel to one another, longitudinally following the keel line (figure 20). Ten guns are positioned east of the keelson and nine on its western flank. Two cannon (C11 and C12) seem to have been stowed directly across the keel. East of the keelson the gun stowage displays no obvious orientation: five cannon muzzles face north, three south, while two have spun onto an east and west axis. To the west, by contrast, a clear pattern was observed whereby guns were stowed adjacent to one another lengthways, muzzle to cascable. The same structure applies to C11 and C12 overlying the keel line. As measured *in situ* underwater, the guns range in total length (button to mouth) from to 2.31-3.36 m and seemingly include a mix of guns ranging from

9-32-pounders. This assemblage of 21 iron cannon is therefore identifiable as a recently manufactured consignment of ordnance undergoing transport on a small merchant vessel to its client when the ship sank. This theory is supported by the presence of cloth fragments adhering to the surface of the second reinforce, recorded on one recovered gun, where wrapped fabric protected the royal arm's cypher (figure 25).

The available evidence, as measured underwater, estimates the ordnance to comprise the following calibres (pers comm Charles Trollope, 6 August 14).

- 4 x 9-pounders of 7 ft
- 2 x 9-pounders of 8.5 ft
- 5 x 12-pounders of 7.5 ft
- 1 x 12-pounders of 9 ft

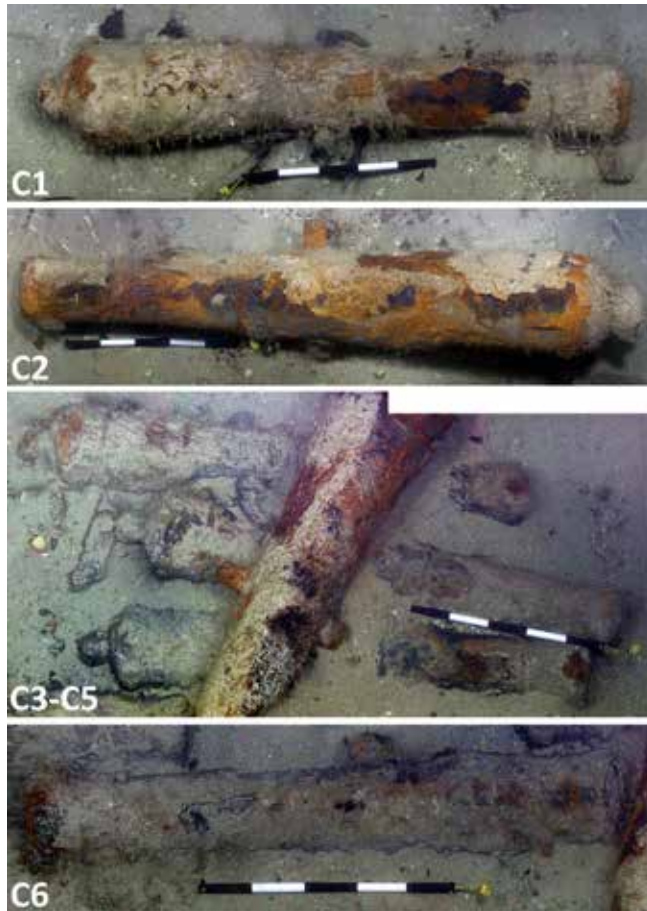


Figure 20. Guns C1–C6 *in situ*, Site 10Ef.

- 5 x 18-pounders of 9 ft
- 3 x 24-pounders of 9.5 ft
- 1 x 32-pounders of 9.5 ft

In its totality, the material culture of site 10Ef betrayed little chronological evidence beyond a broad 18<sup>th</sup>-century profile. In order to try and secure enhanced data, cannon C18 was recovered. It revealed no markings on the trunnions, but the 'GR3' royal arms of King George III (r. 1760–1820) were found on the second reinforce. A further inscription, 'BACON SOLID', was cast along the base ring (figures 21–24). Cannon C18 roughly equates to a 12-pounder of 7.5 ft, the second most common Bacon gun type manufactured, and

has the following dimensions: 2.32 m from base ring to mouth and a 21 cm-long cascabel, with first reinforce at 66 cm and second reinforce at 44.5 cm; a 87.5 cm chase, a 33 cm-long muzzle; and a bore diameter of 12 cm and circumference at the vent of 1.37 m (approx. 43.6 cm diameter).

The bore measurement does not precisely fit any recognizable gun calibre. A 12-pounder required both a trunnion and bore diameter of 11.76 cm. C18's bore measures exactly 12 cm. Meanwhile, the circumference at the vent of 9-pounders was 4.2 ft and 4.63 ft for 12-pounders (pers. comm. Charles Trollope, 8 August 2014). C18's circumference at



Figure 21. Cannon C18 from Site 10Ef after the removal of concrete.



Figure 22. Cannon C18 from Site 10Ef after the removal of concrete.



Figure 23. Detail of a 'GR3' (King George III) cypher on the first reinforce of gun C18 from Site 10Ef.



Figure 24. 'BACON SOLID' moulded along the base ring of gun C18, Site 10Ef.



Figure 25. Detail of woven cloth wrapped over gun C18's first reinforce to protect the surface during shipment.

the vent measures 4.49 ft, midway between these two sizes. It is possible that C18 may represent a 12-pounder bored too high, as occurred in March 1779 for a batch of 22 Bacon and Crawshay 9-pounders, which had to be bored up into 12-pounders for the East India Company (The National Archives, Kew, WO 47/93/259).

The Site 10Ef assemblage is the only certain example of a newly manufactured cargo of British cannon found off the United Kingdom. The royal crest is probably indicative of a British naval client. The lack of a broad arrow or proof mark confirms that the collection was newly cast and not yet accepted by the Crown. The consignment is attributable to Anthony Bacon, the renowned industrialist and Board of Ordnance contractor, who specialized in gun production between 1774 and 1783, a period that coincided with increased demand during the American Revolutionary War of 1775–83. After being manufactured at 'Bacon's Mineral Kingdom' at Merthyr Tydfil, South Wales, under a Board of Ordnance commission, the cannon cargo would have been shipped from Cannon Wharf on the east bank of the river below the Town Quay, Cardiff, to be proofed at Woolwich when disaster struck (Chappell 1939: 55).

The technology of Bacon's solid-bored guns has been described in detail (Namier 1929; Braid 1986). Up to the early 18th century, cannon were cast using a core built up with iron wire and clay over an iron spindle inserted into the barrel mould. Off-centred bores were a common complaint of the vertical core-cast method, which was now eliminated (Jackson & De Beer 1973: 71, 73). Henceforth the guns were cast in one solid piece without a core and in the new style of Maritz cannon-boring mill adopted by John Wilkinson, the boring drill was horizontal and the gun body was rotated while the drill remained stationary. This guaranteed the concentricity of the bore and its perfect straightness.

The date of the Site 10Ef Bacon Solid cargo can be reconstructed with a high degree of probability. At the widest chronological parameters, it ranges from April 1774, when Bacon delivered his first Board of Ordnance commission to Woolwich, to September 1782, when he signed his ironworks over to Francis Homfray and retreated from gunfounding at the end of the American War (The National Archives, Kew, WO 47/100/295). The cargo also demonstrably pre-dates 1780, when the Board ordered foundry marks to be placed on the trunnions to verify that gun batches were cast in a single furnace (Edwards 1991: 538). There are no such marks on the Site 10Ef trunnions.

The inscription offers a further indication of date. Before December 1780 guns were inscribed 'BACON SOLID' along the base ring, as at Site 10Ef, but thereafter the Board of Ordnance instructed the gun founder, to place "their Names upon some other part of their Guns the present being in the way of the Sight" (The National Archives, Kew, WO 47/96/959) and the main inscription was relocated along the chase (Brown 1988: 106, table 1). The wrecked cannon may therefore



be dated between 1774 and 1780.

The history of Anthony Bacon from trading tobacco in his early career with a young George Washington to his association with gunfounding is especially rich. Bacon was a shrewd businessman and it was no coincidence that his sidestep from fulfilling government provisions of slaves, coal, and beef into ordnance coincided with increased demand during the American Revolutionary War (Buchet 2013: 109). The industrialist would have paid close attention to problems of naval gun supply in the mid-1770s, when Scottish Carron Company guns burst and failed proof. At the end of June 1773, based on tests conducted by the Verbruggen's at the Royal Brass Foundry in Woolwich, the Board of Ordnance froze the use of all Carron ordnance in storage and recalled those installed in the fleet for exchange (Jackson & De Beer 1973: 50; Butler 1981: 24, 27–28). The military's iron gun industry was in crisis.

As it turned out, Bacon's timing and connections were impeccable. As a Member of Parliament for Aylesbury, Buckinghamshire, from January 1764, he enjoyed powerful and privileged connections, particularly with the secretary to the Treasury. Bacon was one of 15 designated merchants, 11 of whom sat in Parliament, who supplied 48,000 troops during the war with America (Edwards 1991: 526).

On 29 August 1765, along with William Brownrigg, he had leased 4,000 acres of mineral property on the Cyfarthfa Estate in Merthyr Tydfil, Wales, for 99 years at £100 per annum (Gross 2001: xiii). In 1773 Bacon partnered with John Wilkinson, the second-generation iron founder based at the New Willey Ironworks at Broseley, Shropshire, who became known as the real revolutionary of the technological shift to solid-bored iron cannon in Britain (Greuter 1991). Unfortunately, Wilkinson would go on to see his patent

rejected because it would have been "prejudicial to His Majesty's Subjects but very detrimental to the publick Service" (The National Archives, Kew, WO 47/85/88). Bacon did, however, stand at the head of a highly proficient team of engineers and managers who fulfilled his government contracts, and none more so than the initial kickstart given to his business by Wilkinson.

The Verbruggen family of gunfounders at the Royal Brass Foundry endorsed the qualities of the bored-out guns that Bacon sent to the Board of Ordnance, and their expert report circulated on 25 April 1774 concluded that, "casting Guns Solid in the manner of Mr. Bacon's is infinitely better than in the ordinary Way, because it makes the Ordnance more compact and consequently more durable than cast upon a Newel Bar" (The National Archives, Kew, WO 47/83/240). The reference to "compact" refers to the added benefit that casting guns solid reduces the danger of blowholes in the bore and facilitated accuracy using the rigid horizontal boring machine (Pink 1991: 43). Even more significantly for Bacon's legacy, by 3 May 1775 the Board of Ordnance resolved not to order any more guns "but what are cast out of the solid" (The National Archives, Kew, WO 47/85/345). All suppliers were expected to follow Bacon's pattern and between 1774 and 1783 a minimum of 2,103 Bacon & Co. iron guns bored solid were manufactured and received at Woolwich to be proved.<sup>1</sup>

Irrespective of his great successes and centrality to Britain's industrial revolution in ordnance, almost no physical evidence of Anthony Bacon's life's work survives. Precious few guns are preserved worldwide beyond two 6-pounders located next to Chatham Dockyards at the back of the Medway Council building along Gun Wharf. None of the industrialist's correspondence exists. No portrait has captured the likeness of the man who

strode the corridors of power in Britain. Site 10Ef in the western English Channel reflects a little-known episode of great historical importance that evolved amongst the labyrinth of flames turning out iron cannon in South Wales in the 1770s.

### Conclusion

The waters surrounding the United Kingdom hold an important, but finite, thin-slice of the maritime history of the British Isles. None more so than the southern waters, where the vast majority of Protected Wrecks associated with guns are located from the Third-Rate, 70-gun *Stirling Castle* (1703) in the Goodwin Sands to the east, to the Tearing Ledge site off the Isles of Scilly, which was probably the Third-Rate, 70-gun *Eagle*, sunk in 1707 (Cant 2013: ix). The offshore waters have long remained *mare incognita*, inaccessible to science.

The deep-sea Atlas Shipwreck Survey Project of the Western Approaches and western English Channel has demonstrated that rather than a new data set frozen in time and space, the seas located outside UK territorial waters are in fact heavily impacted, more so than inshore. The extent of depth-charging intended to prevent World War II and Cold War submarines hiding from enemy sonar detection in the shadows of wrecks was extensive, but remains unquantified. The impacts of bottom fishing on underwater cultural heritage are uncontrolled in offshore waters, thereby inadvertently stripping shipwreck surfaces. Since 1970, an estimated minimum of 200 cannon may have been caught in the nets of North Sea fishermen based in Holland (Kingsley 2015c: 66–67). Some 20 bronze cannon alone have been snagged from the iconic 73-gun Dutch flagship *Eendracht*, sunk in the North Sea during the Battle of Lowest-

oft in 1665 (Brinck 2008). On sites such as the mid-17th-century Bordeaux corsair, *Marquise de Tourny*, in the western Channel, no stratigraphy or pottery survive beyond surface scatters of durable iron ballast and 25 cannon, the latter recently subjected to unauthorised salvage (Cunningham Dobson 2011; Brinck 2015).

One of Atlas Shipwreck Project's most significant wrecks, an English merchant vessel trading with West Africa and transporting elephant tusks, copper manilla barter bracelets of c. 1670–90, and associated with 48 iron guns as both ordnance and ballast, has been extremely heavily impacted by trawlers and scallop dredges (Site 35F) (Cunningham Dobson & Kingsley 2011). World War I and II guns continue to come up in fishing nets. Both Site 30E, the *Victory* and the Bacon Solid cargo wreck have been subjected to demonstrable fishing impacts and, in the case of the First-Rate warship, illicit salvage. Despite the legal requirement of the UK's Marine and Coastal Access Act (2009) to ensure proactive sustainability of the historic environment beyond territorial waters, in practice the impacts as documented above remain uncontrolled to date.

One of the Atlas Shipwreck surveys nevertheless indicate the potential of the study zone for ordnance research. Site 30E's murderers are a rare presence in British waters and Site 10Ef's small cargo of Bacon Solid guns are unique within the global marine archaeological record. The 100 lost brass guns of the *Victory* are in every sense the *pièce de résistance* of both these offshore discoveries and British ordnance studies. Discovered in 2008, and designated for contextual recording, recovery and museum display, at present they remain locked in political red tape at the bottom of the western English Channel.

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## Notes

- 1 Tabulated from Bill Books for 1774–9 (WO 51 series), Proof Books for 1779–80, and Board of Ordnance Minutes for 1782–3 in The National Archives, Kew.

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