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A Cromwellian Warship wrecked off Duart Castle, Mull, Scotland, in 1653

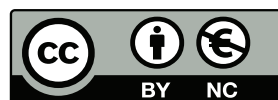
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Chapter 3

ARCHAEOLOGICAL INVESTIGATION

3.1 Site description and topographical survey

Duart Point touches the line of the Great Glen Fault, a geological divide which extends from a point south-west of Mull via Loch Linnhe, Loch Ness, and the Moray Firth to the Shetland Islands. It is the most seismically active fault-line in Britain, with 60 tremors recorded in the past 200 years, the strongest of which was in 1816 (Gillen 2003: 72–3). The site is adjacent to a volcanic caldera of great complexity (Emeleus 2005: 473), and Duart Point is characterised by earlier basaltic lavas which formed around the periphery of this caldera (Illus 51–2).

The wreck-site is sheltered by high ground from most directions. The south-west quarter is protected by the central mountains of Mull, some 6km distant and rising to 950m. Much of the north is screened by the lower and more distant hills of Morvern, while winds from the east are moderated by the mainland Highland massif, 20km away. The site's main exposure to wind comes from the narrow sea-loch corridors which extend to the north-west and north-east. To the north-east Loch Linnhe presents a 30km fetch of open water, but although strong winds from this direction can generate significant wave-movement down the loch, it is moderated by the island of Lismore, beyond which it tends to pile into steep and short configurations. When these partly dissipated waves encounter the complex tide-rips north of Duart they mingle in low-energy confusion before reaching Duart Point, and appear to have little effect at sea-bed level on the wreck-site. The 30km fetch which extends north-west up the Sound of Mull (Illus 51) behaves rather differently. Wind from this direction is funnelled by the hills on either side to generate longer and more regular wave-pulses with higher energy-potential, which is released when they break on Duart Point and around the shallow margins of Duart Bay (Illus 53).

Duart Bay is a sheltered anchorage in winds from the south-east to west, though it is exposed to the north-west and north-east quarters. For this reason the Maclean galleys were traditionally kept in the largely land-locked Loch Spelve on the south-east side of Mull, some 15km from Duart (Turner & Finlay 1971: 21; RCAHMS 1980: 120). Close to the castle,

however, a natural inlet with a beach at its head is still known as Port na Birlinn (galley harbour) and here no doubt the chief's personal vessel was drawn up when not in use (Illus 54).

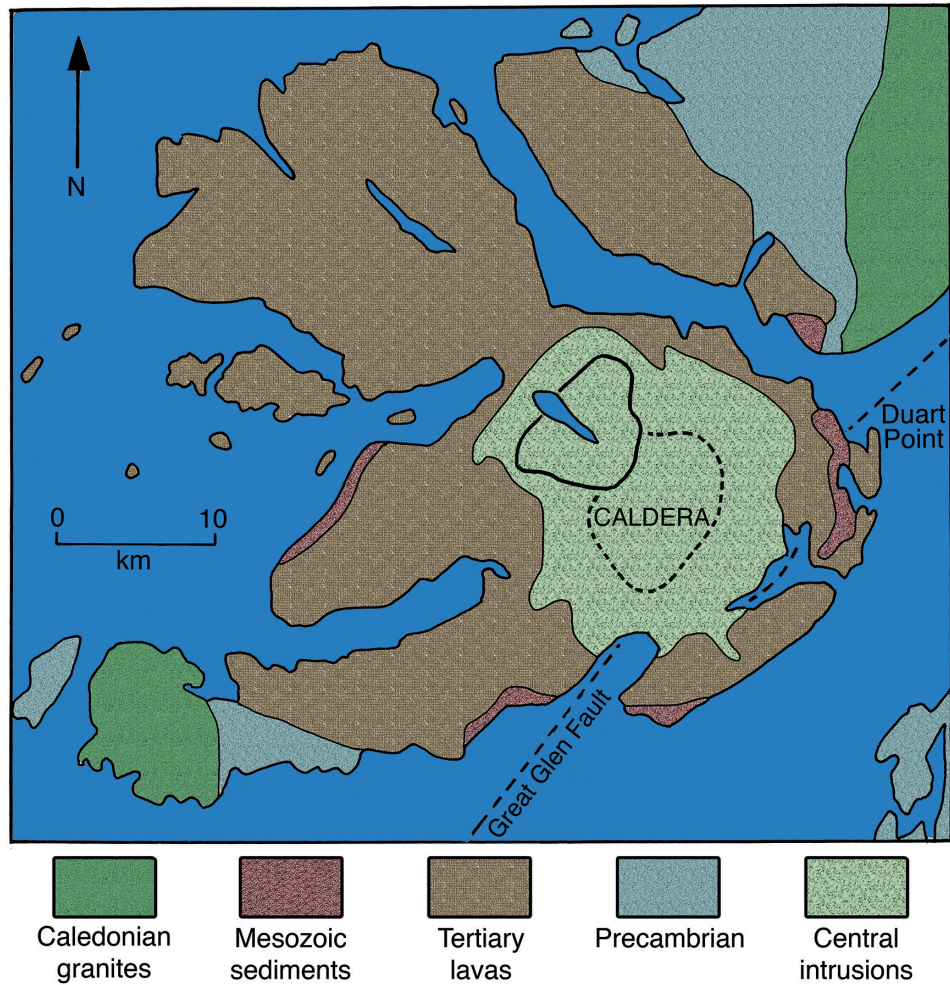
There is little water-movement around Duart Point during the flood tide, but throughout the ebb a strong current flows from north-west to south-east, reaching a surface speed of up to 2 knots during spring tides. This movement is evidently caused by the large volume of water which accumulates in Duart Bay as the tide rises, entering on a broad front from the north until high water is reached. During the ebb, however, some of the emptying water is deflected eastwards to flow in a clearly defined stream across Duart Point, eventually discharging into the confused waters where the Sound of Mull, Loch Linnhe, and the Firth of Lorn meet (*Admiralty Chart 2390* 1976). Just to the east of the Point, where the wreck lies, the inner run of the stream breaks off to eddy shorewards (Illus 55). When the ebb-current coincides with strong north-westerly winds a secondary effect is triggered. The pulses of waves which build up as they move unimpeded along the Sound break violently in the shallow fringes of Duart Bay, displacing large quantities of sand during the rising phase of the tidal cycle. Much of this material remains in suspension when water drains out of the bay on the ebb, to be carried with the stream which runs across Duart Point. Under such conditions the discoloured flow is clearly visible, its offshore edge sharply distinct against the clear water beyond (Illus 56). This phenomenon has had a significant effect on the wreck's site-formation characteristics, as explained below.

East of Duart Point a fissured rock-face slopes from the surface at an angle of $c 35^\circ$ to a sea-bed of gravel, sand, pebbles and shells among which the remains of the wreck lie at a depth of $c 7\text{m}$ below Mean Low Water Springs (Illus 57–8). There are some intrusive boulders and larger rocks, most of which were probably carried to the site by glacial action. The more substantial of these appear, from their relationship to archaeological deposits in their vicinities, to have been stable during the recent geomorphological past, and were probably in the same locations when the wreck took place. This was subsequently demonstrated by the way in which archaeological remains sometimes appear to have been



Illustration 51
The Sound of Mull and adjacent seaways (Edward Martin)

Illustration 52
The geology of Mull (Edward Martin, adapted from Gillen 2003: 157 & Emeleus 2005: 72)



ARCHAEOLOGICAL INVESTIGATION



Illustration 53

Duart Point and Bay from the east, photographed at low water. Note the Bay's wide and shallow sandy fringe with deep water beyond (DP 173096)

Illustration 54

Duart Point and Castle from the south, with the wreck-site arrowed. The sandy beach at the head of Port na Birlinn is at far left (DP 173100)





Illustration 55

View from the shore adjacent to the east end of the wreck, looking north-east. The strong easterly run of the tide is evident in line with the inflatable boat, with eddies curving from it towards the shore (DP 173709)

restrained or deflected by a rock, and are not trapped beneath it. This is particularly evident around the large boulders at Datums C and D (Excavation Plan). Various mechanisms may, however, have displaced smaller stones, while the semi-



Illustration 56

View from the top of the castle looking north-west across the wreck-site at mid ebb tide in a Force 7 north-westerly wind. The inshore run of silt-laden water, with its sharply defined seaward edge, is strikingly evident (DP 173703)

fluid sediments which characterise much of the site are clearly susceptible to rapid and significant removal, accumulation, and redistribution by water-movement.

Depth at low spring tides at the foot of the slope is *c* 6m, increasing to *c* 8m at the seaward extremities of the wreck. Thereafter the sea-bed slopes gently seawards across a relatively featureless bottom to reach the -10m contour 12m from the shore and the -50m contour some 200m further out. The tidal range at springs reaches 4m. There is a pronounced sediment drift eastwards along the base of the cliff, particularly towards the eastern end of the wreck. The general environment of the site, as indicated by its biological regimes, includes low-, mid-, and relatively high-energy zones as categorised by Erwin and Picton (1987) (Illus 58). These are conveniently defined by the distribution of *Laminaria* species, with *L digitata* dominating the high-energy zone, represented by the inshore rock-face, *L hyperborea* defining the mid-energy zone which covers the main wreck area, and *L saccharina* occupying the low-energy sedimentary zone which slopes gently to seaward. Where no algae are present, the latter zone is also readily defined by the habitat limits of creatures such as sea-pens (*Pennatula*) and the common scallop (*Pecten maximus*).

When first investigated in 1991–2 the visible remains comprised seven heavily concreted iron guns, a small iron anchor, various iron concretions and concretion complexes, two distinct mounds of stone ballast, and considerable quantities of wholly or partially exposed organic material, including elements of articulated structure lying between the two ballast-mounds and clearly continuing beneath them. Some abraded loose timbers, evidently recently displaced, lay scattered across and down-tide of the main wreck area.

It was presumed, and later confirmed by excavation, that the western ballast-mound defines the forward end of the wreck, while the eastern mound lies towards the stern. The latter extends some 5m along what proved to be the longitudinal axis of the ship, and measures *c* 4m athwartships. Its starboard (seaward) edge rises *c* 0.6m above the adjacent sea-bed, while on the port side it merges into a rising spur of drifted silt along the cliff-base, leaving its edge and height on this side uncertain. The western mound is more clearly defined, with a distinctly rounded forward edge. It measures 5m × 4m and rises 0.4m above the mean sea-bed level. Within the central hollow between the mounds a run of structure was partly exposed at the time of discovery, its axis defined by a much-abraded longitudinal member which proved to be the keelson. Associated with it are further structural components. Their starboard (seaward) ends are angled upwards, and plainly undergoing active erosion. These timbers include frames, outer planks, and ceiling planks.

A further group of timbers is exposed 3m to port. These comprise a closely spaced linear run of frames set at right-angles to the keelson, heeled towards the shore at about 15°. Their abraded upper ends are ground to flat conformity with

the sea-floor. They too are associated with ceiling and outer planking, and appear to follow the upwards curve of the bilge, where floor and futtock timbers overlap.

Two concreted iron guns lay on either side of the western ballast-mound, one beyond each of the port and starboard quarters (Guns 6 and 4). A small anchor also lay off the starboard side. There was a lack of ordnance around the midships area, where the main complement of a warship's armament would normally be located. Two guns lay atop the aft ballast-mound (Guns 2 and 3), with a further two (Guns 1 and 5) on its port side, one of them (Gun 5) partly buried in the drifted silts at the base of the cliff. A seventh piece (Gun 7) was located some 7m beyond the starboard edge of the wreck, where it had evidently been dropped during an early salvage attempt (John Dadd pers comm). This gun is either very small (the concretion measures only 1.25m long), or broken.

East of a line defined by Guns 1 and 2 the base of the cliff is penetrated by a broad, shallow gully which rises southwards towards the shore. Beyond the wreck area it is blocked by a tumble of large boulders. In the sediments around the mouth of this gully the main exposure of organic material was observed in 1992, and it is here that the eddying effect of the ebb-tidal current, noted above, is at its most pronounced. Further loose timbers and articulated panelling were recorded at the time, including a large curved piece which has since disappeared (Steve Liscoe pers comm). Just down-current a more stable sub-formation of timbers had been partially uncovered by the falling sea-bed levels. Some 10m north-east of the main wreck deposit another small and apparently isolated eroding organic deposit centred on **01.01** was noted.

3.2 Excavation

The phases of excavation are described progressively from the grid origin at its north-east corner (**000.000**) (Illus 59). The sequence of sub-units moves from the outlying deposits identified down-current of the main wreck area (lower left on the plan), and proceeds from the collapsed stern of the ship to the hull's forwardmost identified extremity beyond the western ballast-mound (far right). Descriptions of the archaeological deposits and their stratigraphical relationships with natural features follow the same sequence, and inform

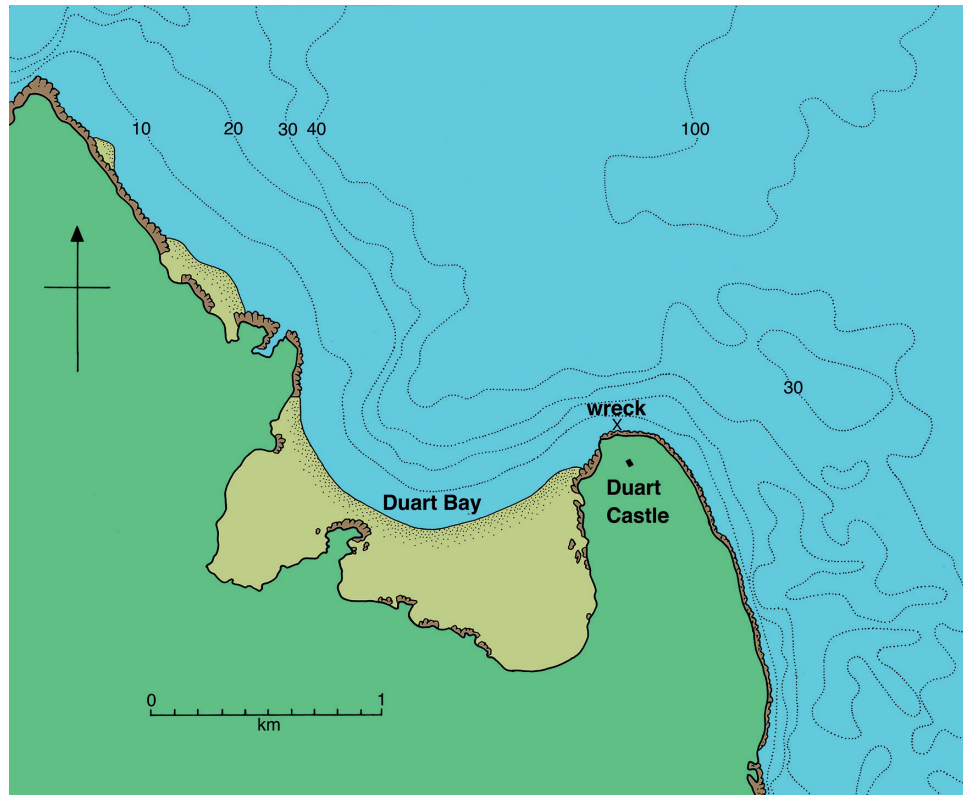


Illustration 57

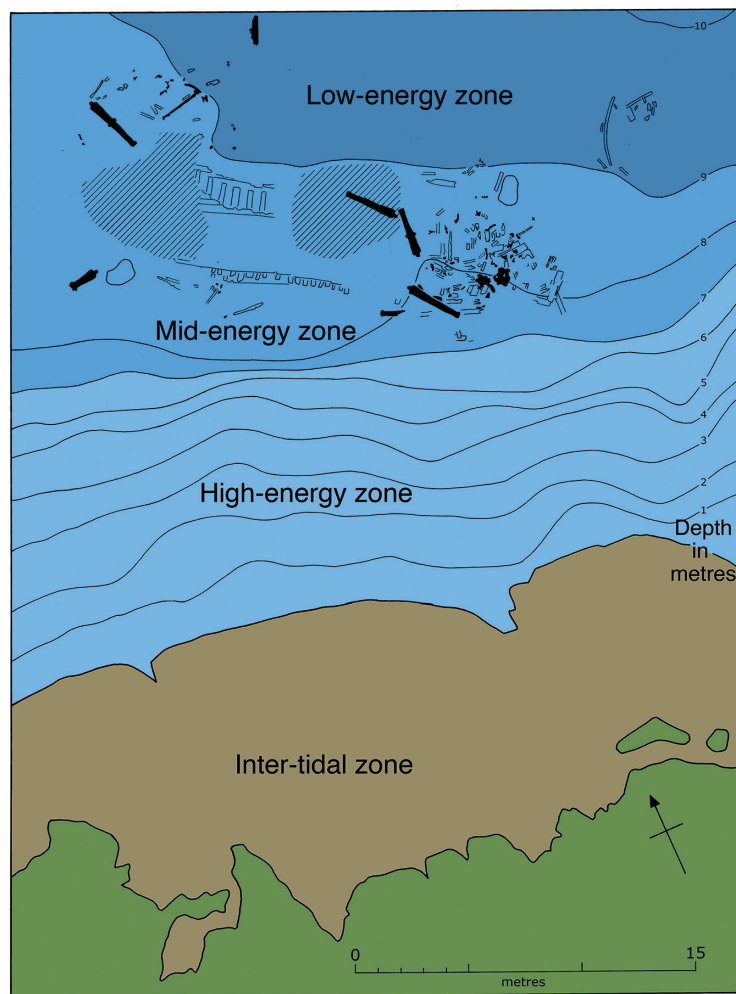
Duart Point and Bay. Depth contours in metres (Edward Martin, adapted from Admiralty Chart 2390, 1976)

the interpretation of site-formation processes developed in Chapter 4. For descriptive convenience the excavated areas are divided into eight sub-units, described sequentially below. Each sub-unit plan is reproduced at a scale of 1:40, with associated sections. A plan of all the identified frames and floor-timbers is also provided (Illus 60). Because a complete run of frames is obscured by the two ballast-mounds, they cannot be numbered in sequence. Accordingly each frame has been identified by the distance in metres from its centreline to the centreline of the Master-Frame ⊗, followed by the letters A for aft or F for forward. The final Excavation Plan at a larger scale can be found at the back of this volume.

Area 1: south-east sub-formation

During the site assessment by the Archaeological Diving Unit in 1992 recently exposed panelling and eroded timbers were noted some distance to the south-east of the main wreck complex. Excavation in 1996 revealed a small sub-formation of material which had evidently become detached from the stern at an early stage of the wrecking process (Illus 61). The deposit was dominated by a heavy oak timber, 3.5m long, running from **011.003** to **041.022**, which despite heavy abrasion on all its surfaces could be identified as an external transom-beam

A CROMWELLIAN WARSHIP WRECKED OFF DUART CASTLE, MULL, IN 1653

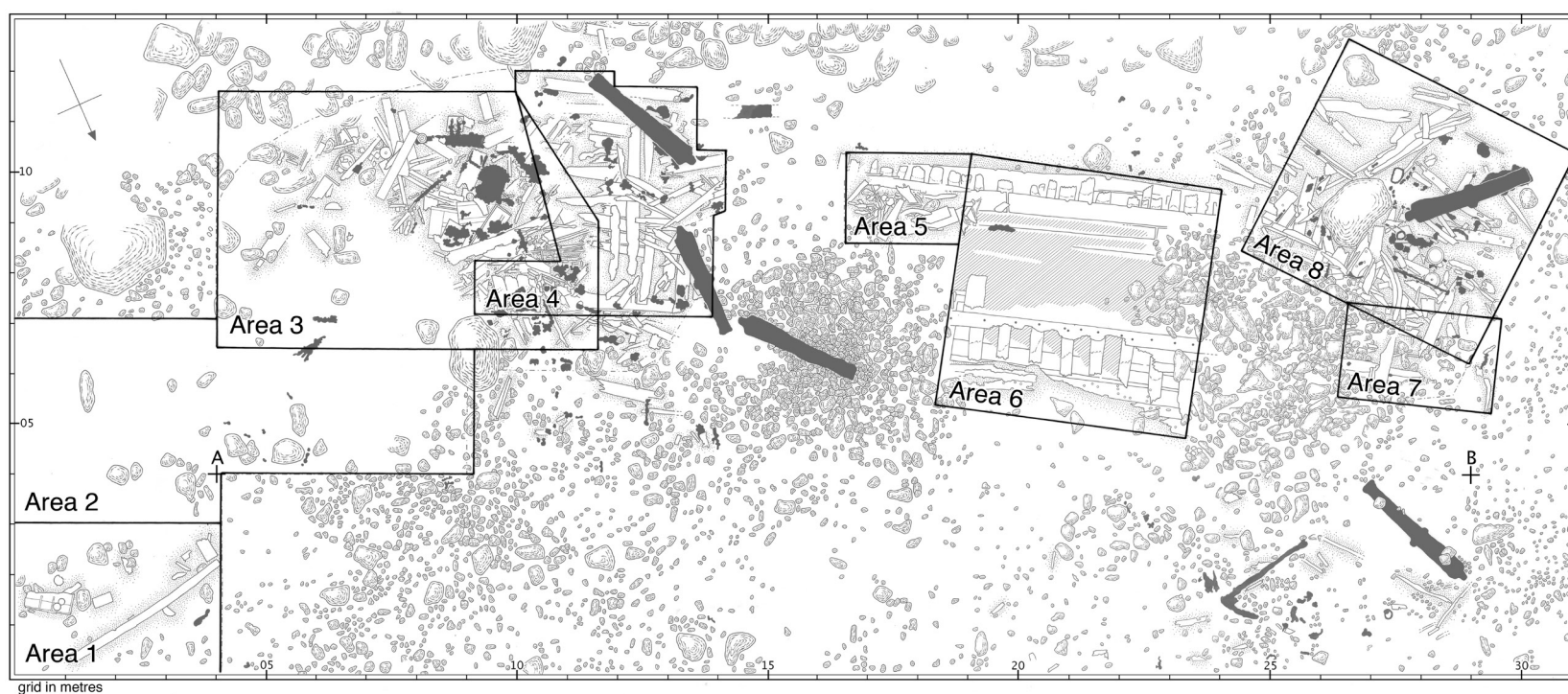


from the upper-stern structure ¹ (Illus 62). Traces of raised decoration were visible near its presumed starboard end, while the outer surface showed evidence, in the form of unabraded joint-faces with fastening-holes, of six uprights which had been attached along its length. A fragment of one of the oak uprights remained in place. The unabraded character of these faces contrasts with the degraded surfaces everywhere else on the timber, suggesting that the uprights had remained in place for some time after deposition, and may have become detached quite recently.

Associated with this object were other presumed structural timbers, all heavily abraded, and half a barrel-end which showed little evidence of abrasion. Adjacent to the transom-beam, between **002.015** and **012.014**, were the remains of a box-like structure ⁸⁸ with three compartments (Illus 63). At one end was the base of a mariner's compass. The box was identified as the rear part of a binnacle cabinet (see Chapter 8.1), in which two compasses and a central lamp or candle would have been housed. Although in its original state the binnacle cabinet would have been some 30cm deep to accommodate the gimballed compass-bowls in their compartmented housings, only 12cm now survives, quantifying the extent to which the front part, lying uppermost, had once intruded into and above

Illustration 58
A simplified representation of the wreck features visible on discovery and their relationship to the shore. Contours below Mean Low Water Springs are shown at 1m intervals. Blue tinting represents high-, medium-, and low-energy zones as indicated by the distribution of *Laminaria* species (Edward Martin)

Illustration 59
Numbered excavation areas



ARCHAEOLOGICAL INVESTIGATION

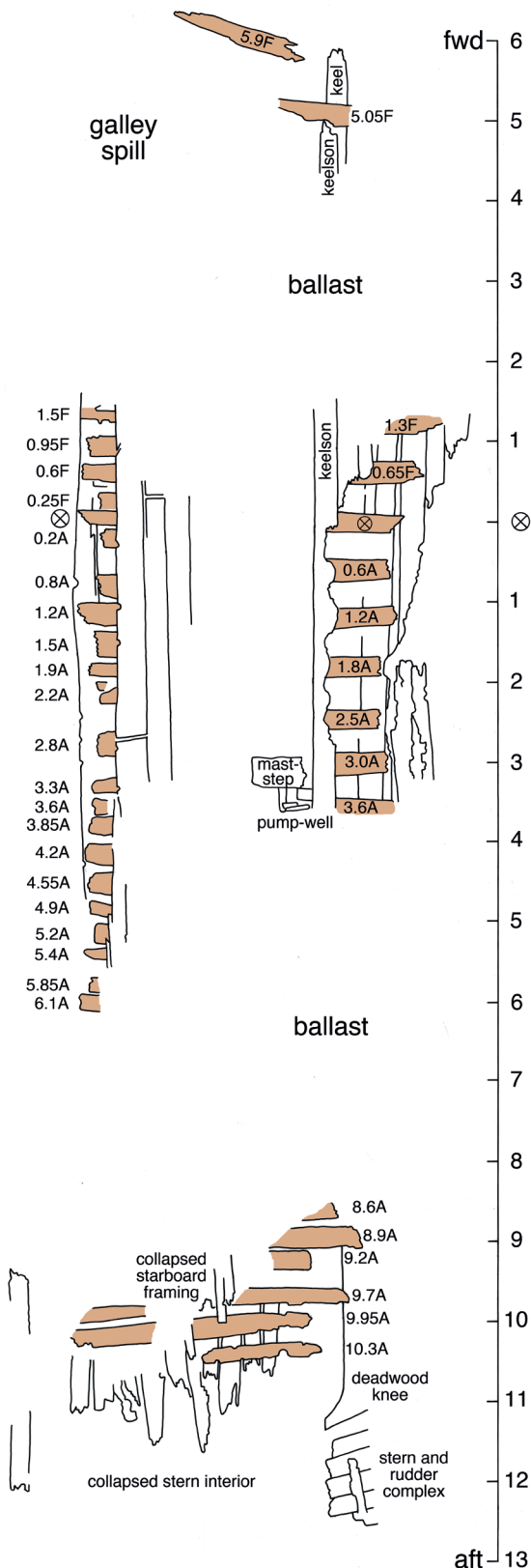


Illustration 60

Plan showing the surviving floor-timbers and frames (tinted). These are identified by their distances in metres forward (F) or aft (A) from the Master-Frame ⊗

the mobile-sediment zone, where it would have been lost to biological attack and abrasion.

The stratigraphy of the first 0.5m is presented in Illus 61. Seven layers can be recognised. Layer 1 at the sea-bed/water interface is composed of fine grey silt, with a few inclusions of small pebbles and shells. Its condition suggests that it is mobile from time to time in currents and surges. Layer 2 is also grey, and consists of a band of silt similar to Layer 1 but with more shells and small pebbles. Layer 3 is a thin spread of larger pebbles. Below it, Layer 4 is a band of fine grey silt similar to Layer 1, while Layer 5 resembles Layer 3 with a spread of larger pebbles. Layers 1 to 5 are penetrated by razor shells (*Ensis siliqua*), including a flourishing live population. Layers 6–8 follow a pattern similar to the upper sequence but without the live razor shells, and are presumably stable. It is not unreasonable to suppose that the fine silts represent transport and deposition during relatively mild storm events as discussed above, while the pebble layers derive from more robust sea-bed agitation during rare 'super-storms' such as the one on 13 September 1653.

The upper edges of both the binnacle and the transom-timber lay at the interface between Layers 1 and 2, while the interior of the binnacle-box appears to have attracted a filling of rather larger pebbles which may have helped to protect it. Though the surviving upper parts of the binnacle have suffered some biological and mechanical degradation, its lower parts are relatively well preserved, the rear planking showing clear tool-marks on its surface. It seems likely that the bottom of Layer 3 represents the sea-bed profile at the time of the wrecking, and that the material above (Layers 2 and 1) is composed of post-wreck sedimentation. This interpretation broadly reflects the interpretation of stratification in an open wooden chest [110], discussed below.

Area 2: between Area 1 and the main wreck complex

In 1997 excavation continued south-eastwards from Area 1 on an advancing front to determine whether a debris-field extended down-current from the main wreck deposits. No archaeological material was encountered, apart from a few small concretions. The relative sterility of this area indicated that the primary wreck formation along the base of the cliff was tightly contained and archaeologically coherent, a conclusion later borne out by excavation. It was from this area that the ADU made some of their surface recoveries (Steve Liscoe pers comm), but this may be material which had migrated down-current from the eroding main deposit.

Area 3: collapsed upper stern and aft interior

Area 3 incorporates the major organic deposit partially exposed by erosion in 1992, and subsequently systematically excavated in 1997 and 1999 to a depth of 0.5m (Illus 59, 64). As

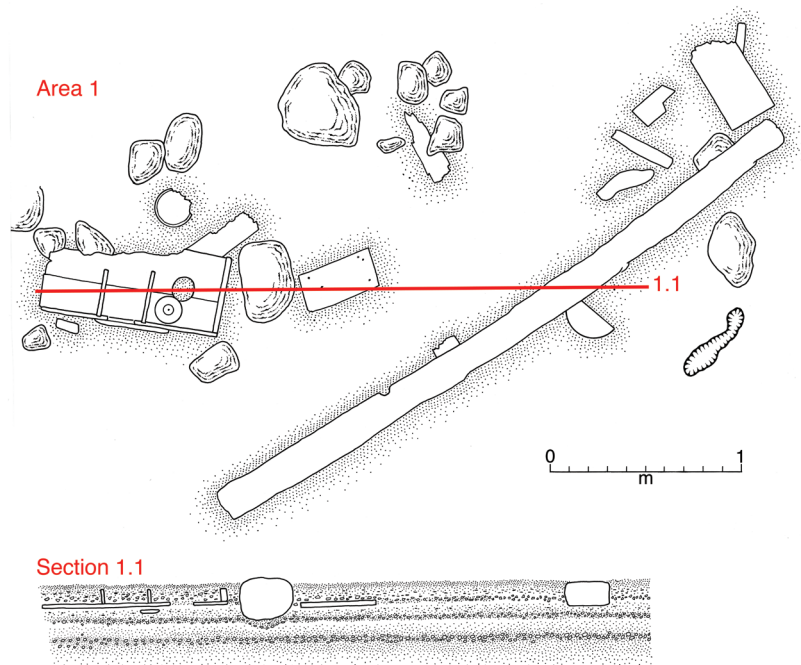


Illustration 61
Plan of Excavation Area 1 and Section 1.1



Illustration 62
Starboard end of the transom counter-timber [1] from Area 1. Note that in spite of the heavily abraded surface, relief decoration of a central boss and four smaller corner bosses remains visible. The end is slightly recessed, and shows a joint-face with an unabraded surface, revealing five nail-holes in a quincunx pattern (DP 173183)

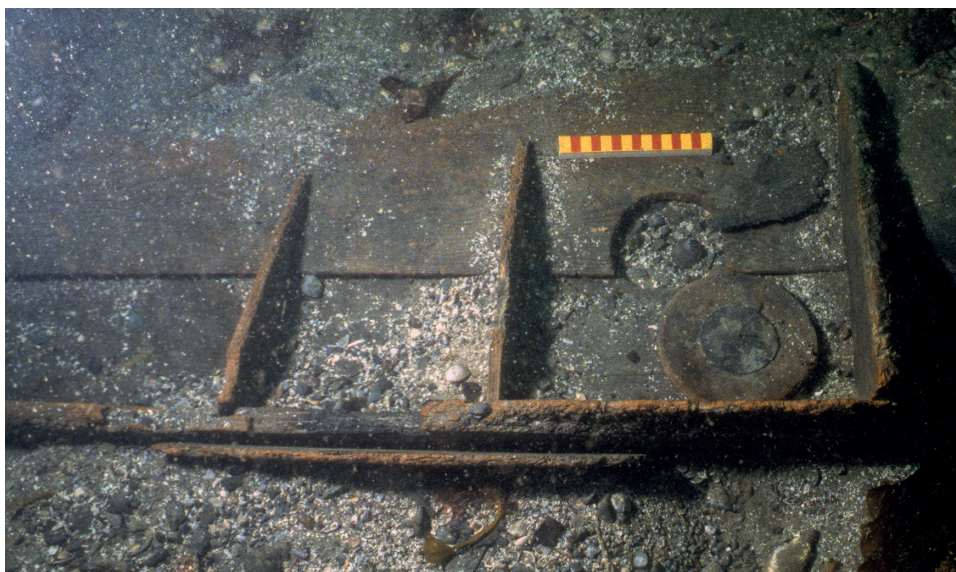


Illustration 63
The remains of the binnacle after excavation. Note the unabraded condition of the lower planks and the compass-base in the right-hand compartment, in contrast to the active biological and mechanical damage along the upper edges. Scale 15 centimetres (DP 174234)

excavation proceeded beyond Area 2, two concretions centred on **058.065** and **063.071** were encountered. Beyond these, at **055.087**, a wooden bowl [179] exposed by erosion was recovered during a winter monitoring visit in 1993. Close by, a substantially intact mariner's compass [91] was found beneath a partly disarticulated wooden structure at **060.095**, which did not appear to be another binnacle. The compass was in good condition. It was inverted, and the remains of its shattered glass face lay beneath it. The base of the instrument had evidently been pushed by water-pressure into the air-filled compass-bowl as it sank, causing it to crack inwards.

Just beyond this deposit, and running in a line from **060.110** to **095.074**, the clearly defined edge of the main organic deposit was encountered. This deposit consisted mainly of substantial and well-preserved timbers from the interior of the ship (Illus 65–7). It included edge-moulded pine planks (Illus 68) and associated turned decoration (Illus 69). A complex stratified deposit comprised a gun-port lid at **088.087** lying on top of a framed-and-panelled door [17] and a run of panelling [21] incorporating four articulated muntin-and-panel sections (Illus 70–2).

Although excavation was not continued below the level of the door, it was evident that more material lay further down, confirming that the deposit was over 0.5m deep and consisted of stratified material almost certainly derived from the interior of the stern cabin. Close by were two small framed-and-panelled cupboard doors [18–19] at **094.096** and **077.103** (Illus 73–4). Other features adjacent to the complex included an oval wooden port-surround (**091.095**) (Illus 75), part of a carved face [6] (**086.095**), and a notched timber [12] identified as a quarter-gallery roof-frame (**085.095**) (Illus 76).

At **093.087/098.094** the remains of a wooden chest [110] lay immediately on top of a run of framed panelling, and was itself partly overlain by a structural timber running from **087.083** to **107.090**. The bottom-board and one end of the chest survived almost intact, while one side was preserved to its original height at one end but had

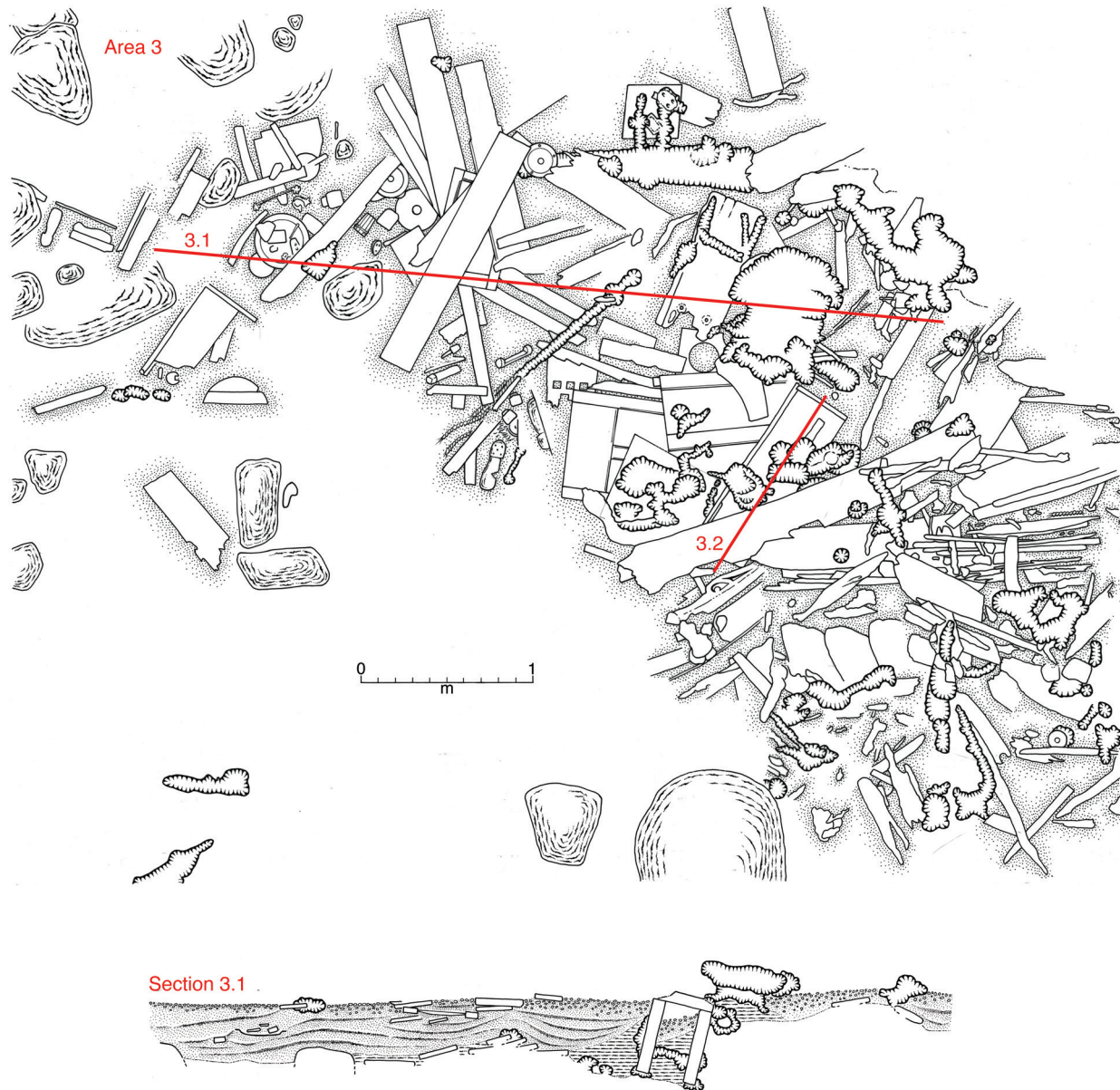


Illustration 64
Plan of Excavation Area 3 and Section 3.1. Section 3.2 is in Illus 78

been almost wholly reduced by abrasion towards the other (see Chapter 8.4) (Illus 77). There was no lid, and no trace of the second side, while only a fragment of the second end survives. In its original state the box would have measured $c 1.06\text{m} \times 0.37\text{m} \times 0.27\text{m}$ deep. Its internal stratigraphy is illustrated in Illus 78. The chest had either been almost empty when deposited, or perhaps had contained perishables of some kind. Lying on its largely intact bottom-plank were two concretions containing three pieces of cast-iron roundshot [86] (the only examples recovered from the site), three lead musket balls, and small pieces of wood and fibre. These

finds were associated with a layer of fine grey silt mixed with fragmented organic matter (Layer 3). Above it, and continuing almost to the top of the chest, was a homogeneous matrix of similar grey silt without organic inclusions (Layer 2). On the top surface of Layer 2 was a single musket ball. The top layer (Layer 1) was a semi-mobile cover of sand, pebbles, and shells characteristic of the natural sea-bed at this location. Its occasional movement will have been responsible for the erosion of the upper edges of the chest.

A small cast-iron gun [82] lay buried between 080.107 and 094.106 (Illus 79–80). Concreted to it, at 087.109, was an

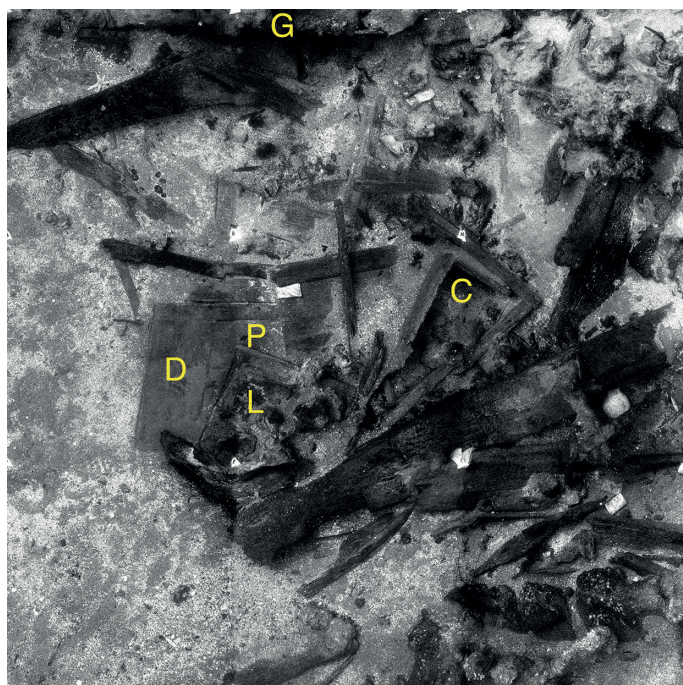


Illustration 65

Vertical mosaic showing the framed-and-panelled door [17] (D), gun-port lid (L), run of panelling [21] (P), open chest [110] (C) and Gun 8 [82] (G)

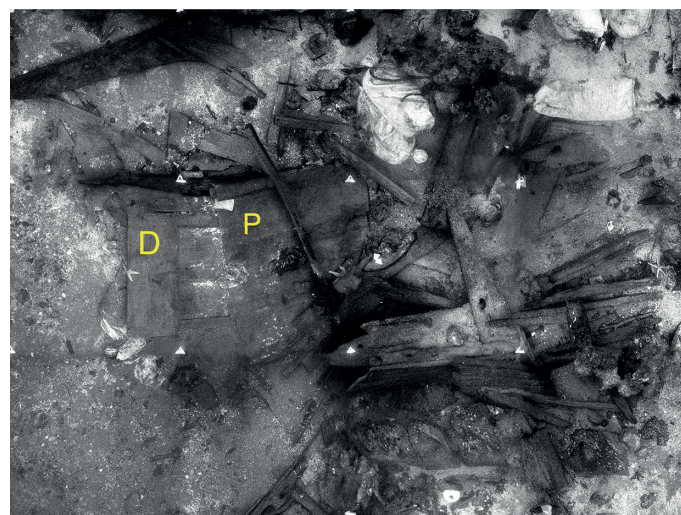


Illustration 66

Vertical mosaic showing door [17] (D) and panelling [21] (P) after removal of the gun-port lid and chest. 1m grid indicated by triangular targets

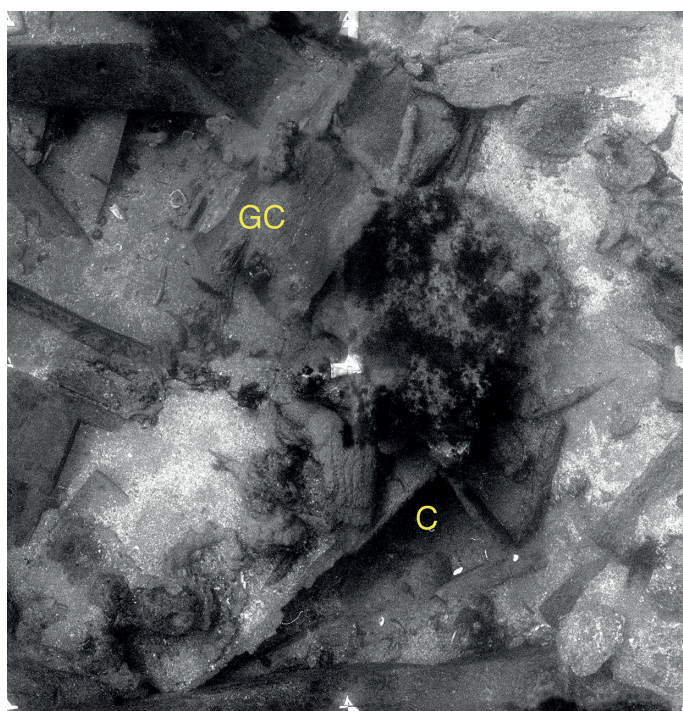


Illustration 67

Vertical mosaic showing detail of the inverted gun-carriage [83] (GC) and the open chest [110] (C)

iron-studded wooden lid with strap-hinges [38], identified as an oar-port lid (Illus 81). Concreted to the cover's ironwork was a wooden deadeye [65] and a square piece of window-glass surrounded by the lead comes by which it would have been joined to its neighbours. Other loose comes [16] were found close by. Adjacent to the gun, at **090.096/093.104**, lay its inverted carriage [83]. This area also contained several dislocated elements of the ship's external decorative carving and parts of the outer structure.

Among the collapsed stern deposit various loose artefacts were found (Illus 82–5). These included a wooden lantern-top, sheaves, leather shoes, pump-valves, a pewter plate, and a powder-cartridge box. This deposit also yielded high-status items including a pocket-watch [118], a gold-and-silver sword-hilt [107], and part of a high-quality pistol [104]. Most of the decorative carvings came from this area. Lead musket shot and human bones were also present in the silt (Illus 86).

Section 3.1 was recorded between **070.102** and **100.096** from the upper corner of the collapsed stern deposit across the inverted gun-carriage (Illus 64). The timbers lay horizontally within a stratigraphic matrix which consisted of a top layer of mobile sand, pebbles, and shells (Layer 1), beneath which grey silt was interleaved with darker discontinuous bands (Layer 2). It is surmised that the grey silts had accumulated within the wreck from suspended sediments brought in by the current, and that the darker bands derive from rotted seaweed deposited sequentially on the top surfaces of the sediments as they built up (cf the process postulated on the wreck of *La Trinidad Valencera*, Martin 1979: 26–7). Layer 2 was largely devoid of wreck-related material, apart from a small deposit

ARCHAEOLOGICAL INVESTIGATION

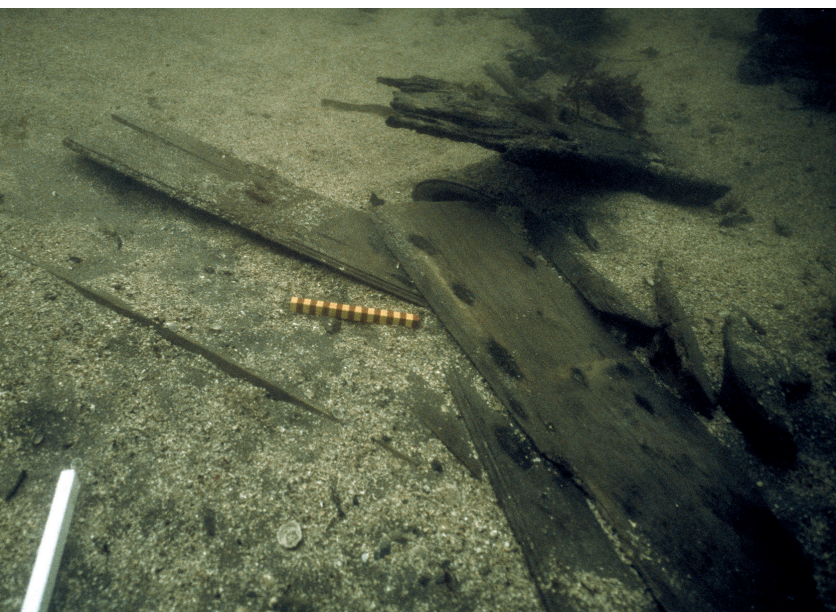


Illustration 68

Edge-moulded pine planking near the inshore end of Area 3. Note the relatively unbraded state of the lower timbers, in contrast to the highly degraded condition of the rising upper piece, which has clearly lain within earlier unstable levels. The plank in the foreground shows no evidence of degradation apart from the stains of corroded iron nails and, at its top left-hand edge and corner, infestation by barnacles. This pattern is continued by the mouldled-edged plank which extends towards the upper left, where the 'tide-mark' between infested and uninfested zones is very clear. The infestation, however, is relatively slight, and may reflect a recent short episode. The edge of a wooden lantern-top [200] can be seen towards top centre: this lies within the previously buried zone and is well preserved. Scale 20 centimetres (DP 173727)



Illustration 69

Pine planking in Area 3 showing a turned decorative piece in situ. Scale in centimetres (Steve Liscoe, DP 173695)



Illustration 70

Collapsed aft interior deposit associated with the framed-and-panelled door [17]. The door is overlain by a run of paneling [21] (top, just left of centre) which in turn is overlain by a gun-port lid partly obscured by concretions associated with its iron strap-hinges. On the left is a notched frame-timber [12] from a quarter-gallery roof. Scale 15 centimetres (DP 173890)

containing a pewter plate, a human jaw, and some wooden objects at **067.102**. Beneath it a further stratified level of substantial timbers was encountered (Layer 3). This cut into a thickly matted deposit of wreck-derived organic fragments (Layer 4), particularly around and within the inverted wooden gun-carriage.

Some material from the top of Layer 1 was evidently removed by erosion during the 1991–2 destabilisation episode, revealing previously buried organic deposits and precipitating the rescue intervention of September 1992. The unabraded condition of most of the items exposed at this time suggests that they had been buried shortly after deposition, though some timbers which protruded upwards showed evidence of later episodes of exposure and reburial towards their upper ends.

In summary, it appears that this deposit is derived from the collapsed upper-stern interior, together with elements of the decorated transom and associated structures including a quarter-gallery. Although individual components within the deposit appear disarticulated and confused, the complex as a whole demonstrates high levels of coherence, as indicated by the sharp line which defines its eastern boundary. This is



Illustration 71

The framed-and-panelled door complex after removal of the gun-port lid. Three segments of framed panelling [21] lie on its upper half. Scale 15 centimetres (DP 173139)



Illustration 72

The framed-and-panelled door [17] with the framed panelling above it removed. Scale 15 centimetres (DP 173893)



Illustration 73

Framed single-panel cupboard door [18] overlain by moulded-edged planks. Scale 15 centimetres (DP 173904)



Illustration 74

Framed two-panel cupboard door [19]. Scale 15 centimetres (DP 173908)

Illustration 75

Oval port, possibly one of the stern hawse-holes. Scale 15 centimetres (DP 173141)



Illustration 76

Quarter-gallery roof-frame [12]. The lower part of a carved moustachioed face is above it, and the bottom corner of the articulated run of framed panelling [21] lies to its right. At top right are the partially excavated remains of the drake gun-carriage [83] with its resident crab inside. Scale 15 centimetres (DP 174043)



best explained as reflecting the rake of the aft transom structure which, it may be presumed, remained in place long enough to restrain the contents of the collapsed interior while they became buried and stabilised within a matrix of deposited silt. The consequences of the subsequent break-up and dispersal of the transom may have included the transportation and deposition of the transom-beam and associated components to Area 1, as described above. Finally, the dislocated but tightly contained nature of the stern deposit as a whole is confirmed by the distribution of bones from a single human skeleton which, though scattered randomly within Area 3 and the adjacent Area 4, do not extend beyond them.

Area 4: lower stern structure and collapsed after-framing

Separate phases of excavation in 2000 and 2003 investigated the lower stern structure to the north and west of the collapsed aft interior to determine its relationship to other parts of the surviving hull-remains (Illus 87–8). Because this involved the removal of features associated with the analysis of Area 3, the two areas partly overlap, as shown in Illus 59. The lower structure consists of a complex of articulated oak timbers which can be identified as the fragmentary forward edge of the rudder, the sternpost, and two inner deadwood posts (Illus 89). The concreted remains of what are evidently the articulated lower gudgeon and pintle of the rudder assembly were still in place. Three upper layers of stratigraphy (Layers 1–3) can be recognised. They consist of alternating bands of stones and shells separated by deeper layers of grey silt, and presumably represent successive episodes of silting and stabilisation. Apart from fragmentary structural timbers and a few small concretions these levels did not contain organic debris or artefacts.

The rudder and sternpost complex had evidently been attached to a heavy oak timber angled upwards at its after end, from which it is now separated by a gap of 0.3m (Illus 90). This may be identified as a deadwood-knee, reinforcing the join between the keel and the sternpost. Excavation to a depth of 0.15m beneath the sternpost/



Illustration 77

The remains of a wooden chest [110] after excavation. It was filled with silts which had accumulated following its deposition. Scale 15 centimetres (DP 173925)

deadwood-knee assemblage failed to locate the top surface of the keel, from which it had evidently become detached. This level comprised a rich organic deposit (Layer 4) around and under the assemblage, containing well-preserved wooden artefacts (Illus 91) together with quantities of fish bones and some animal bones. Three pieces of a human cranium lay beside the rudder. Search for the keel was abandoned because further excavation would have intruded unjustifiably into stable archaeological horizons, but it almost certainly survives in situ at a lower level, since the orientation of the

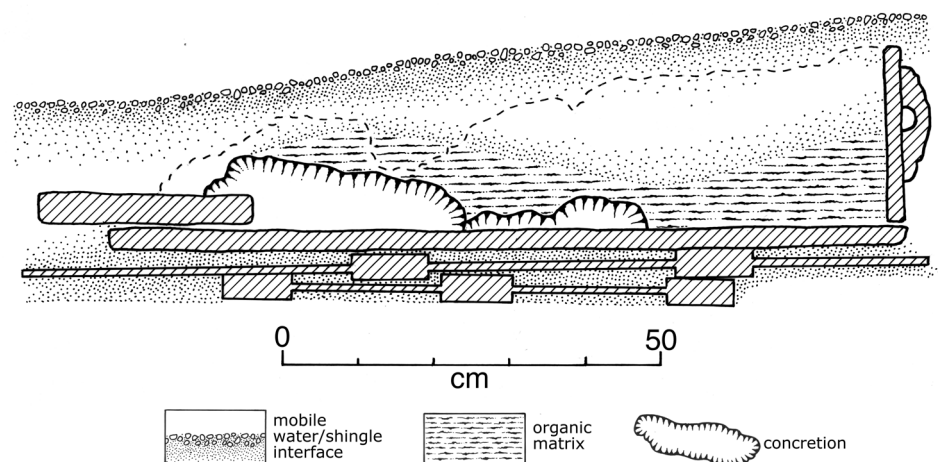


Illustration 78

Section 3.2, showing post-wrecking sedimentation within the chest [110]. The dotted line indicates the extent of the surviving side

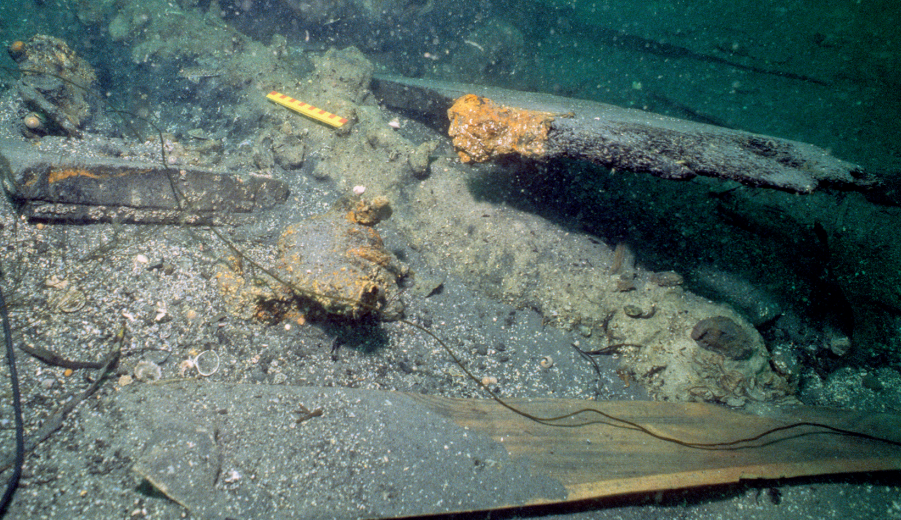


Illustration 79

The concretioned minion drake [82] during excavation (the 15cm scale lies along its top axis). Note that the slanting timber above it is eroded at its top end, which indicates the level to which it has previously been exposed, but lower down the lack of erosion confirms burial since deposition. The gun therefore lies within the zone of permanent burial, which partly explains its excellent preservation. The edge of the oar-port lid [38] is visible at centre left (DP 174275)



Illustration 82

A wooden lantern-top [200] (to left of 15cm scale) and hardwood sheave (to its right) among collapsed timbers of the upper stern complex. The slanting timber at upper right clearly shows the interface between stable and unstable deposits (DP 173931)



Illustration 80

The minion drake [82] after excavation. Scale 15 centimetres (DP 174277)

Illustration 81

A wooden oar-port lid [38] with iron strap-hinges concretioned to the side of the minion drake [82]. The surface of the gun runs along the bottom of the photograph. A wooden deadeye [65] is concretioned to the oar-port lid's upper right corner, while below the 15cm scale is a small square of glass surrounded by corroded lead, which can be identified as a quarry from the glazing of the stern-cabin windows (DP 173937)



Illustration 83

A shoe, wooden sheave and two pump-valves (far left) incorporated in the stratigraphy of the collapsed interior stern structure. Scale 15 centimetres (DP 174022)

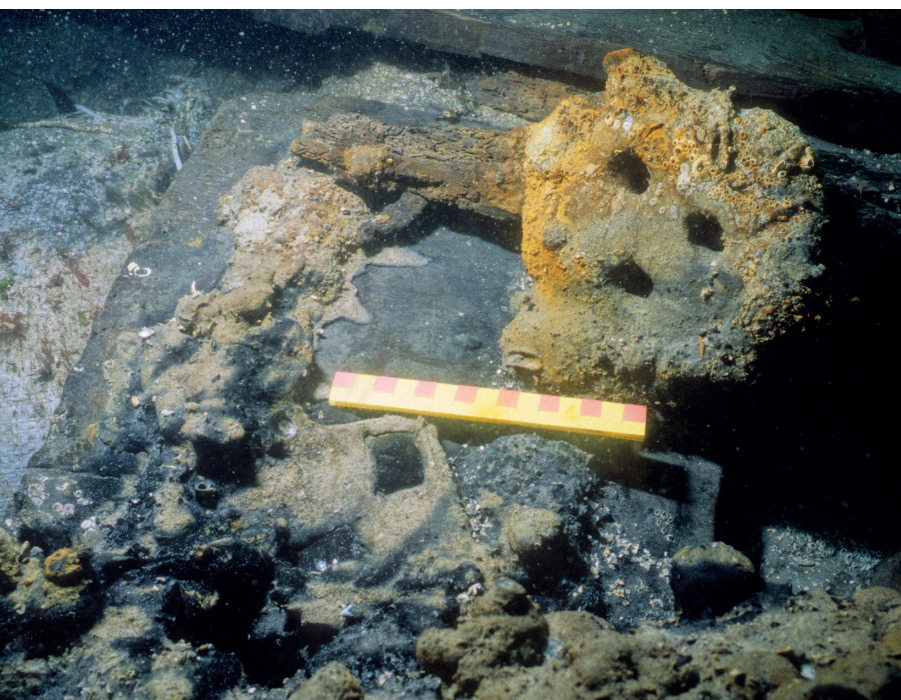


Illustration 84

Parcelled rope, sheave, and pump-valves. Scale 15 centimetres (DP 174021)





Illustration 85

Parcelled rope and a segment of a wooden gunpowder cartridge-box [84].
Scale in centimetres (Steve Liscoe, DP 173946)



Illustration 86

Deposit with lead musket shot, a turned panel decoration and a human finger-bone. The grey silt is typical of the drifted material common across the site.
Scale 15 centimetres (DP 174036)

stern assemblage closely aligns with the longitudinal axis of the keel and keelson at the midships and forward parts of the hull, described below (Areas 6 and 7). The forward end of the deadwood-knee continued under the eastern ballast-mound, beyond which it was not followed. It was noted, however, that a cushioning of heather had been placed between the timbers and ballast-stones in this area, and samples were recovered (Illus 92).

Excavation continued south-eastwards at right-angles to the sternpost/knee assemblage, following six partially

dislocated and abraded oak timbers which run at right-angles to the presumed keel-axis. These are evidently frames approaching the stern, and are numbered 8.6A, 8.9A, 9.2A, 9.7A, 9.95A and 10.3A (Illus 60). Their centreline spacings are approximately 0.3m (1ft). Their lie suggests they have fallen onto their sides and stabilised on the sediment slope at the foot of the rock-face. Frames 8.9A and 9.2A are associated with trapezoidal chocks or cross-pieces which, though now displaced (Illus 93–6), evidently coupled them to the

Illustration 87
Plan of Excavation Area 4

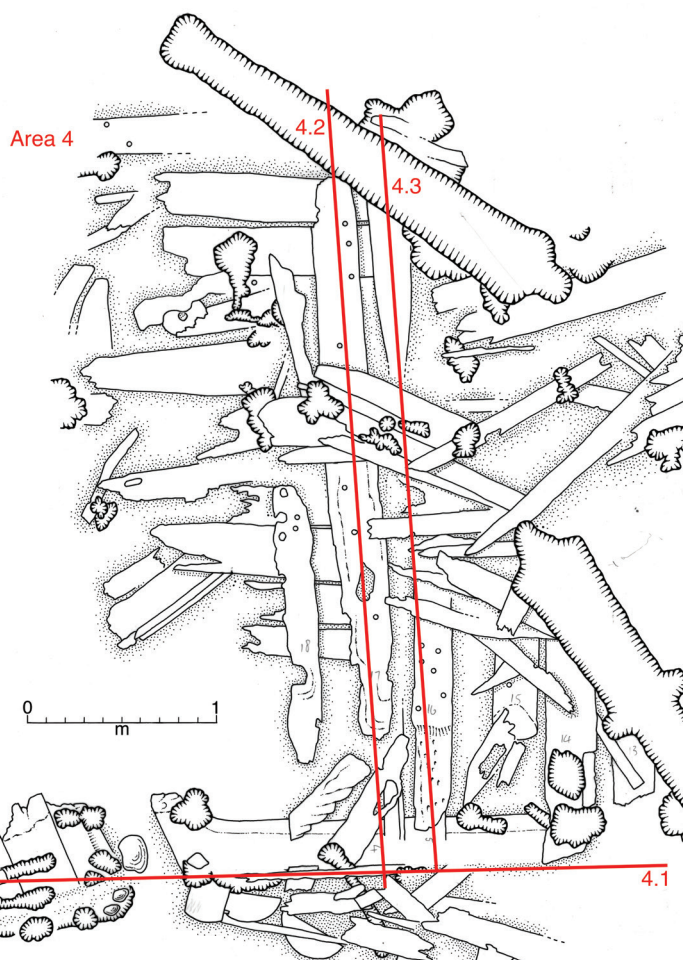
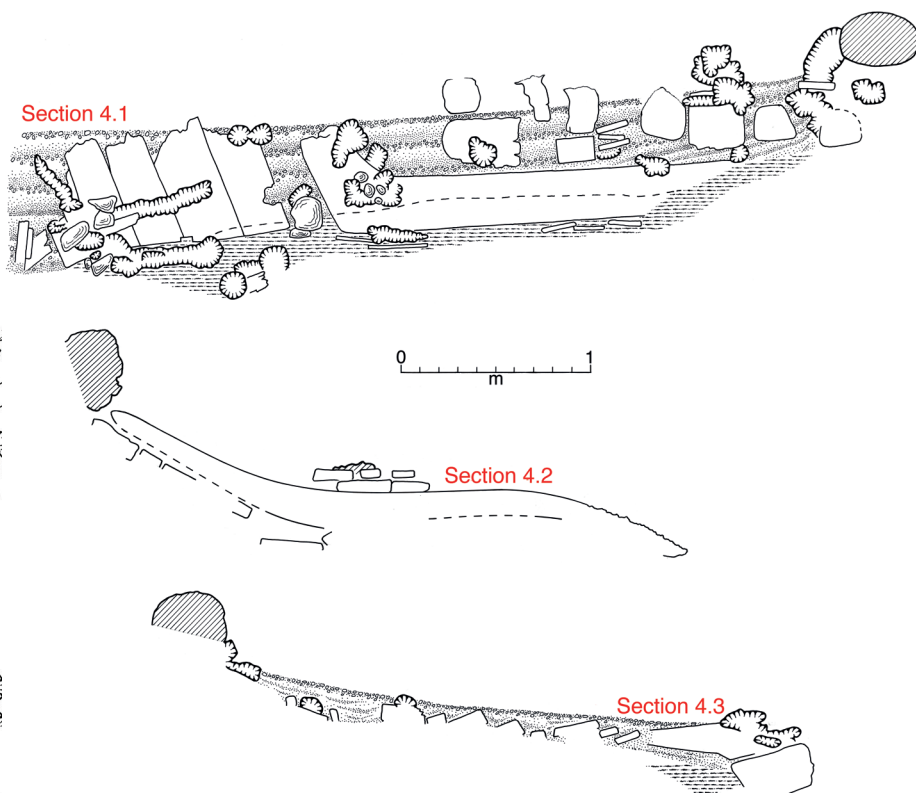


Illustration 88
Sections 4.1, 4.2 and 4.3



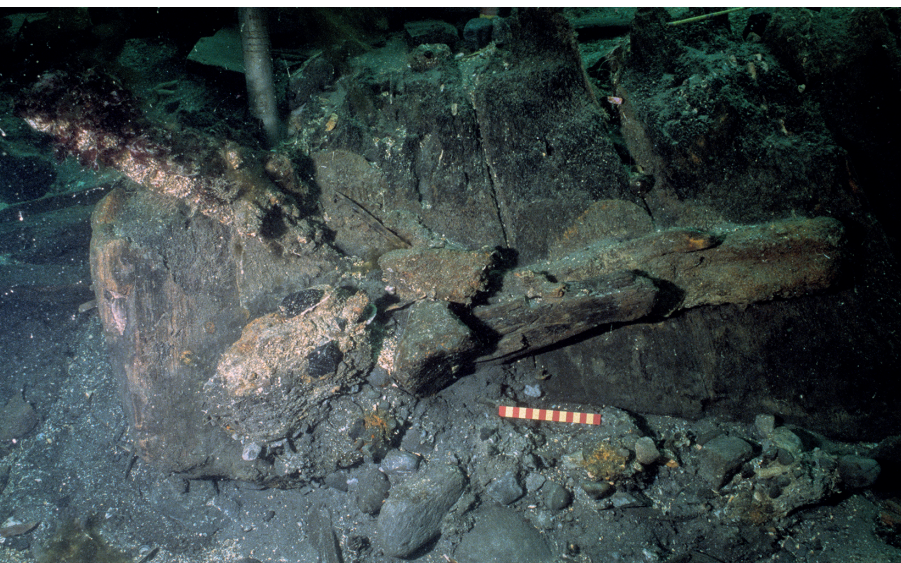


Illustration 89

Lower stern structural complex. The left-hand element is the bottom of the rudder's inboard timber, the upwardly bent iron concretion rising from it being a pintle strap. The next timber to the right is the foot of the sternpost, followed by two pieces of vertically set deadwood. The concretion joining these three timbers is the strap of the lower gudgeon. Scale 15 centimetres (DP 173804)

deadwood-knee, indicating that the frames were crutched; that is, their grain followed the angle required at this point between the rising port and starboard sides, and they must therefore have been grown timbers derived from a suitable part of the parent tree. Frame 9.95A extends 3m from its inboard to outboard end, and retains the outboard profile of the hull along this length, although details of its attachment to the deadwood structure have been lost to abrasion.

Two iron guns (Guns 1 and 2) have evidently helped to protect the upper parts of this structural complex and hold it in place. Some damaged and dislocated timbers on top of the frames are probably the remains of ceiling planking,



Illustration 90

Deadwood-knee. Scale 15 centimetres (DP 173822)



Illustration 91

Wooden butter-crock lid [189] and part of a cask-end [45] in the organic matrix beside the deadwood-knee. Scale 15 centimetres (DP 173942)

while beneath the frames a series of eight or nine planks, whose degraded and fragmentary nature makes an exact count uncertain, run parallel with the longitudinal axis of the hull. They are clearly part of the outer planking. Their heavily abraded aftermost ends extend beyond Frame 10.3A, suggesting that the port-side hull has broken along a line running from about 115.070 to 105.120. This reinforces the suggestion that the aft section of the ship, including the



Illustration 92

Heather dunnage associated with ballast towards the stern. Scale 5 centimetres (DP 173764)

transom and elements of the interior, broke away to collapse onto its side as a partially intact entity, creating a discrete organic deposit which encapsulated interior fittings, external carvings, and other elements connected with the stern. Scattered within the deposit, but not apparently extending outside it, was the major part of a single dislocated human skeleton (see Area 3 above).

Area 5: port bilge aft of the mainmast

Although the aft ballast-mound precluded excavation along the keel-axis forward of the stern complex described above, a trench was opened in 2001, inboard of the aftermost surviving frame-ends exposed on the port side just beyond the edge of the ballast, to determine the nature of the structure at this point (Illus 59 and 97). A run of frame-timbers was identified (Frames 3.6A to 6.1A). All terminated in abraded heads at sea-bed level, and some had lost substance to erosion lower down, but the best-preserved examples had sided dimensions averaging 0.2m, and moulded dimensions between 0.17m and 0.27m. The nine frames covered a run of 2.7m, giving an average room-and-space division of 0.6m (2ft). This compares with the 2ft spacing observed for the floor-timbers amidships (see below), and suggests that these timbers are alternately floors close to their outer ends, or 'rung-heads', and the lower ends of the associated first futtocks. In no instance were the timbers joined by transverse fastenings, which indicates that the ship was not built in a frame-first manner (see Chapter 5).

It was not practicable to excavate these frames more than a few centimetres below their abraded heads, so their angle of set could not accurately be determined. However an approximation of 50° from the vertical can be estimated which, allowing for the 15° tilt established for the ship forward of the twisted-out stern, suggests that the timbers in Area 5 angle upwards at some 35° from the lateral plane of the hull. This indicates that they follow the narrowing curve of the bilge as it runs aft.

Along with the frame-heads, a 1.6m run of 70mm (3in) outer planking was also exposed, together with pieces of abraded, but evidently slightly thinner, inner or ceiling planking. An attempt was made to follow the ceiling to the lower part of the bilge curve, although the presence of spill from the immediately adjacent ballast-mound precluded full excavation. Nevertheless, intact and unabraded timbers running parallel with the orientation of the ship were encountered at a depth of 0.5m below sea-bed level, suggesting that beneath the ballast the structure is coherent and well preserved.

As well as loose ballast-stones, the curve of the bilge was filled with a jumble of fragmented and dislocated wood, rope, and other artefacts. These included two stoneware jars (Illus 98), a pewter 'tappit hen', several heavily degraded silver coins, a wooden oil-box, and a tapered circular-sectioned wooden



Illustration 93

Detail of construction at Frame 9.7A (see Illus 60). The top face of the keelson (or possibly part of the deadwood) is seen running forwards from the lower right. Bolted to it is a chock with flared sides (identified by the 15cm scale lying on it). From this the upwards-curving port side of Frame 9.7A rises towards the left. Nothing remains of its starboard side, which because of the ship's heel would have been above the stable sediment zone. Whether this was a separate piece or a 'grown' timber whose grain structure matched the required shape is unknown (DP 173873)

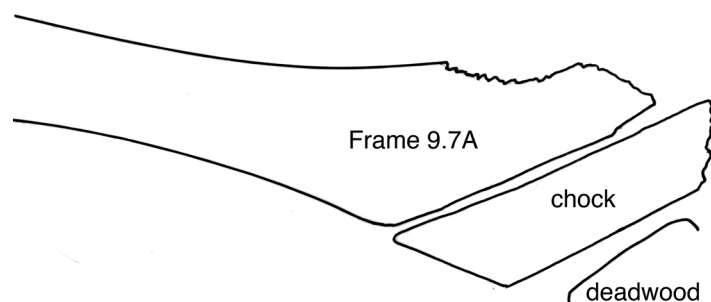


Illustration 94

Diagrammatic representation of chocked Frame 9.7A

A CROMWELLIAN WARSHIP WRECKED OFF DUART CASTLE, MULL, IN 1653



Illustration 95

Inboard ends of the aft port-side framing, looking to starboard. From the left they are Frames 8.9A (with concretions at the end), 9.2A, 9.7A, 9.95A and 10.3A. Part of Gun 2 is visible at lower left (DP 173818)

object measuring $0.9\text{m} \times 0.23\text{m} \times 0.1\text{m}$, which was left in situ. In contrast to the fragmented organic material the artefacts (apart from the corroded silver coins), were in unabraded and undamaged condition, and probably fell into the bilge from the collapsing upper parts of the ship some time after detritus from the initial wrecking process had accumulated there.



Illustration 96

The abraded and partly dislocated upper stern framing and planking, looking towards Gun 1 (top centre). The curvature of the framing is evident. Scale 15 centimetres (DP 173819)

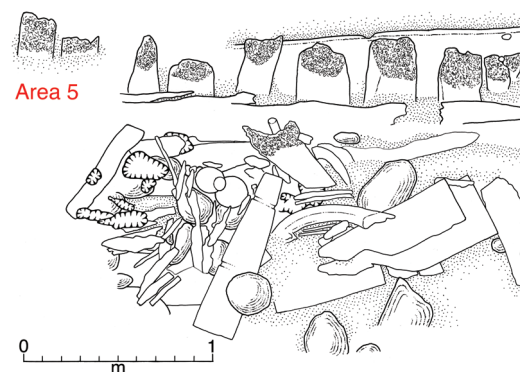


Illustration 97
Plan of Excavation Area 5

Area 6: lower midships hull

Much of the lower hull is held down by the two ballast-mounds, and where it is buried beneath them the surviving structure is probably well preserved. Between the mounds, however, the partially exposed timbers are in poor condition, having been subjected to periodic episodes of exposure and abrasion. The midships area, measuring some 5m on the longitudinal axis and 4m laterally, still retains most of its structural cohesion. This provided an opportunity to examine a key part of the hull in 2001 without significant excavation. As much of the structure as could be exposed without compromising its integrity was cleared by hand-fanning, so that the remains



Illustration 98

The deposit in Area 5, with two stoneware jars 129-30 exposed. Scale 15 centimetres (DP 174200)

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could be planned, and two partial cross-sections obtained (Illus 99–101).

Beneath the run of the keelson nine exposed floor-timbers were rebated into its underside. All are of oak. They show a constant moulded dimension of 0.25m (10in), and while the sided dimensions vary between 0.2 and 0.3m (8–12in) the frames are placed with their centrelines a constant 0.6m (2ft) apart. This ‘room-and-space’ dimension can be projected fore and aft to the extremities of the keel, which lie an estimated 18.3m (60ft) apart. The position of the master-frame is not on the mid-point of the keel but some way forward of that. On a ship of this type a position one-third aft of the keel’s forward extremity would be appropriate, and this indeed appears to be the broadest and flattest part of the Duart Point ship’s lower hull. On these criteria the third visible frame aft of the forward ballast-mound has been designated the Master-Frame ⊗.

The sections (Illus 99) were taken across Frame 3.0A and the Master-Frame ⊗, consistent with minimising disturbance to the articulated structure. The hull at both sections is heeled to port at an angle of $c 15^\circ$, so that most of the exposed starboard side has been removed by abrasion, but the buried port structure survives to the start of the rising curve at the bilge. In both sections the stratigraphy contained within the slight concavity of the lower hull’s profile is similar. The top level (Layer 1), as elsewhere on the site, is characterised by a semi-mobile cover of pebbles, shells, and sand. Beneath it (Layer 2) is a more stable level of greyish silt, interspersed with darker bands. Layer 3 is a distinctive layer of dark gravel containing water-worn sherds of pottery, which has been interpreted as a ballast component (see Chapter 6.1). It lies on top of another layer of ballasting material, Layer 4, made up of light clay, which in turn lies directly on the ship’s ceiling planking. Within the voids created by the frames and the inner and outer planking a thick viscous sludge of organic material (Layer 5) has accumulated. Analysis shows that this contains fragments of wood, fibre, leather, and bone, but no

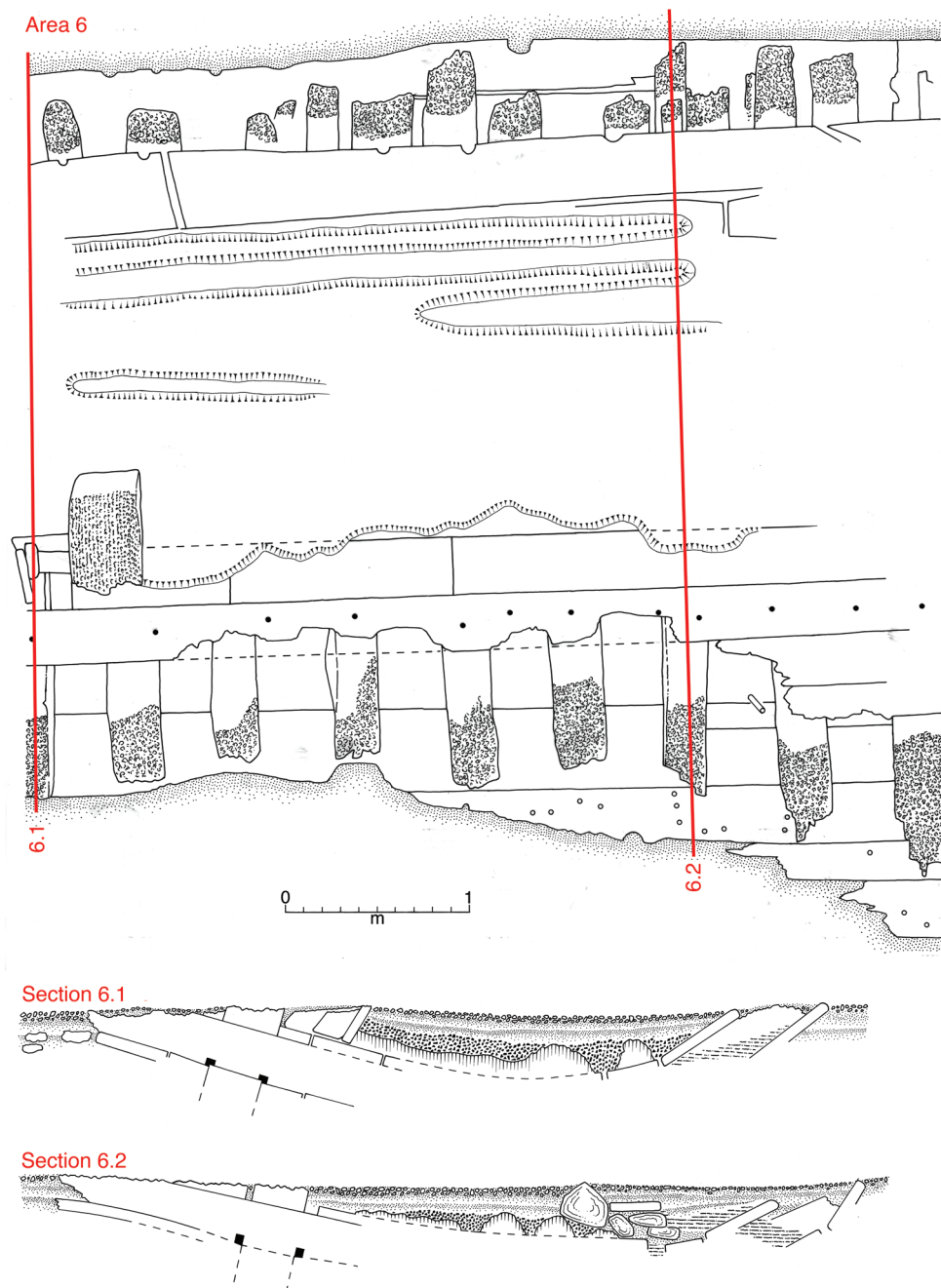


Illustration 99

Plan of Excavation Area 6 and Sections 6.1 and 6.2. Section 6.2 is aligned along the Master-Frame ⊗

animal or vegetable waste, and it is interpreted as detritus which accumulated in these gaps during the initial phases of the wrecking process, rather than rubbish associated with the drainage system of the ship (see Chapter 6.4). Similar material was also present in the inner bilge area of Section 2.

The longitudinal axis of the vessel is defined by the abraded keelson, visible between **181.071** and **237.065** and continuing beneath the ballast at each end (Illus 99–100). This much-



Illustration 100
Vertical mosaic of the central hull-structure

eroded component, which runs from stem to stern along the inner axis of the ship, across the frames and above the keel, is 0.3m (12in) wide. Because much of its upper substance has been lost its depth could not be ascertained. Like all other identified components of the hull it is of oak (*Quercus* sp). Along the 5m exposed length of keelson were 12 25mm (1in) diameter round iron bolts, now identified by their corrosion-stained holes, which clamped it to the keel and floor-timbers. The bolts are usually, though not always, positioned to engage with a floor-timber. In two instances bolts are doubled-up on single frames, and are perhaps later additions intended to tighten loose joints. The underside of the keelson is rebated with recesses 20mm ($\frac{3}{4}$ in) deep to accommodate the frames.

Only the top surface of the keel between Frames 3.0A and 3.6A could be examined. Like the keelson its moulded width is 0.3m (12in). It was not possible to ascertain its depth, but it is likely that it is the same as the moulded width, or perhaps slightly more (Lavery 1988: 15). The rather larger *Dartmouth* had a keel 13in (0.33m) square, to the underneath of which a false keel 8in (0.2m) deep had been added (Martin 1978: 42–4).

Along the outer port side of the surviving structure, between **190.100** and **240.096**, a run of 12 closely spaced squared timbers continue the line of nine frames described in Area 5. Their sided and moulded measurements range from 0.17 to 0.22m ($6\frac{3}{4}$ to $8\frac{3}{4}$ in) and 0.17 to 0.29m ($6\frac{3}{4}$ to $11\frac{1}{2}$ in) respectively (Illus 102). These timbers are angled some

55° from the vertical, and their top ends show an increasing upwards curve as they progress aft. Elements of outer and ceiling planking were present on either side. The rising curve clearly represents the turn of the bilge, where the relatively flat bottom of the hull bends upwards towards the ship's side. Here the outer ends of the floor-timbers overlap with the curving lower ends of the first futtocks, the points of contact of alternate pairs being staggered to avoid a single line of joints. Although some of the first futtocks appear to be missing – no doubt pulled out during the disintegration of the hull – enough remain to suggest that each floor-timber matched a rising futtock.

Directly beside the keelson on the port side, centred on Floor-Frames 3.0A and 3.6A at **188.074**, are the lower parts



Illustration 101
Detail of the central midships area showing (from bottom) fragmentary starboard-side planking, starboard-side floor-timbers, the abraded keelson, the port-side pump-sump and box (top left), and the abraded remnants of the transverse mainmast-step to its right. The yellow triangular targets are at 1m intervals (DP 173806)

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Illustration 102

From left: Frames 0.6A, Master-Frame ⊗ and 0.65F on the starboard side just aft of the forward ballast-mound (DP 173803)



Illustration 103

Oblique view of the central midships section. The abraded keelson is notched over the starboard-side floor-timbers, and the outer planking is visible between them. The yellow triangular targets are at 1m intervals (DP 173779)



Illustration 104

Oblique view of the pump-sump and mast-step complex looking to port. The abraded and shipworm-damaged surface of the keelson (across bottom of picture) and transverse mast-step (top right) are clear. Scale 15 centimetres (DP 173777)



Illustration 105

Starboard limber-hole in Frame 3.0A. The 15cm scale is resting on the top surface of the keel, the sharp edge and smooth surface of which is evident (DP 173778)

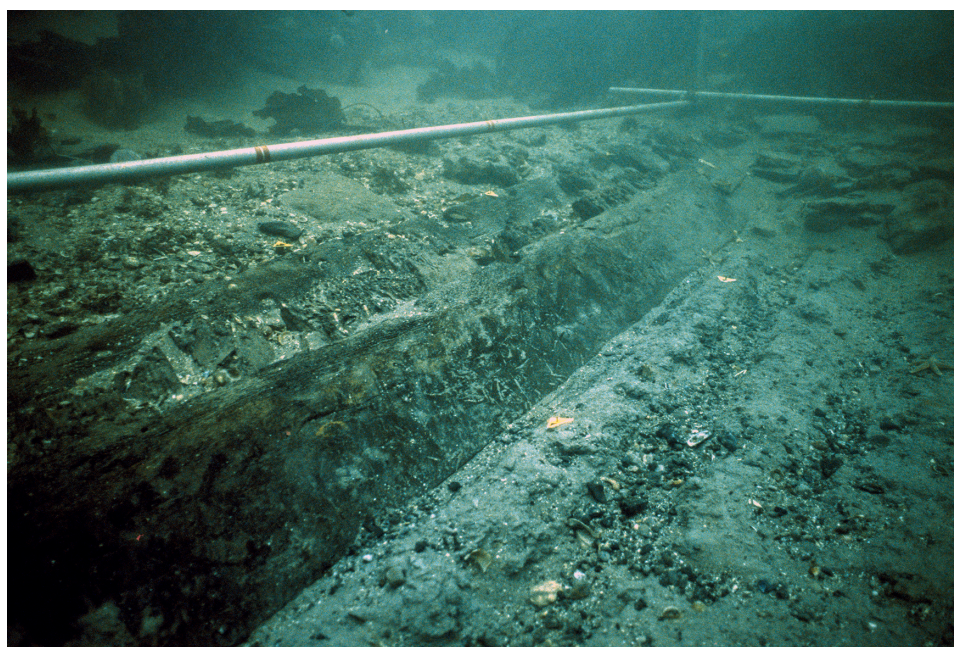


Illustration 106

The run of port midships timbers in Area 6 at the turn of the bilge, looking forwards. The inner plank is ceiling, with the outer planking beyond it on the left. The overlapping floor and first-futtock timbers are sandwiched between them. The clay and gravel ballast in the hold obscure the structure beneath. Targets set at 1m intervals (DP 173776)

of a pump-sump (Illus 103–4). It consists of an open box measuring $0.2\text{m} \times 0.3\text{m}$ ($8\text{in} \times 12\text{in}$) made up of short pieces of 50mm (2in) plank. A corresponding sump appears to have been provided on the starboard side. Though its components have been destroyed by erosion, a shallow rebate has been cut on the forward face of the adjacent frame (187.068), presumably to accommodate the side-planking of a box replicating the port-side one. As both sections show, 40mm ($1\frac{1}{2}\text{in}$) square holes have been cut through the bottoms of the frames on either side of the keelson (Illus 105). These are limber-holes, which allowed water to flow freely along the lower axis of the ship towards the pump-wells (Manwaring & Perrin 1922: 180). No trace was noted of the light limber-ropes normally threaded through the limber-holes so that blockages could be freed along the length of the framing (Manwaring & Perrin 1922: 180). The ship's pumping arrangements are discussed more fully in Chapter 6.3.

The run of ceiling planks along the port edge of the keelson is made up of shorter pieces than elsewhere in the inner hull (Illus 106), the one closest to the port-side pump-well being only 0.85m long. These are limber-boards (Falconer 1780: 177), designed for easy removal to clear out the waterways via the limber-holes. A similar run along the starboard side is indicated by a single surviving board at the edge of the forward ballast-mound.

At 191.076, lying transversely just forward of the pump-well on the port side of the keelson, is a much-abraded oak timber $0.4\text{m} \times 0.65\text{m}$ ($15\frac{3}{4} \times 25\frac{1}{2}\text{in}$). Its outboard end is chamfered at an angle of about 60° . It seems likely that before reduction by abrasion this timber was a much longer and thicker piece straddling the keelson but, because of its upwards set to starboard due to the 15° heel of the wreck, that side has

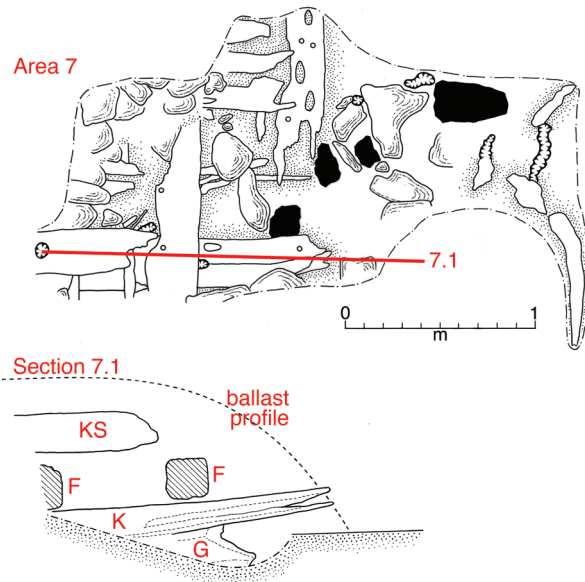


Illustration 107

Plan of Excavation Area 7 and Section 7.1. KS=keelson; F=frame; K=keel; G=gripe

been worn away. Assuming symmetry, the original length of the timber would have been $\approx 1.8\text{m}$ (6ft). The piece can confidently be identified as the surviving part of a transverse mainmast-step.

Area 7: lower forward structure

Notwithstanding a general policy not to disturb the ballast, it was felt that a small excavation at the forward edge of the western ballast-mound, aimed at locating any surviving elements of the ship's bow structure, would be justified in view of the information it might provide (Illus 107). In 2002 stones were accordingly removed (and subsequently replaced) from a $2\text{m} \times 2\text{m}$ area centred on **275.070**, on an axis subtended by the keelson along the midships part of the hull, described in Area 6. This revealed a complex of timbers which, although much abraded and partially displaced, could be identified as including the forward surviving ends of the keel and keelson (Illus 108–10). The keelson, which allowing for abrasion measures $\approx 0.3\text{m}$ (1ft) square where it emerges from the ballast, survives to **271.062**, up to which point it runs level with the axis of the ship. The keel, which is also $\approx 0.3\text{m}$ (1ft) square, extends $\approx 1\text{m}$ further forward, to **280.060**, by which point it begins to show an upward curve. This suggests that its forward end is at, or very close to, the point at which the lower part of the sternpost assembly would have been scarfed into it, although details of the jointing carpentry have been lost to abrasion. The distance from this point to the sternpost at the after end of the wreck is 18.4m (60ft 4in), and this figure

may be regarded as defining the length of the keel. Beneath the rising keel-end a much-abraded timber may be part of the gripe or forefoot of the lower bow.

A substantial timber passes between the keel and keelson at right-angles, crossing the keel at **272.060**. It has a shallow rebate on its underside where it would have straddled the keel, from which it is now slightly dislocated. This timber is $\approx 0.3\text{m}$ (1ft) square at its centre, but flares and curves slightly upwards on either side. The more fragmentary remains of a similar timber lie 0.6m further forward, and although its inboard end has been removed by abrasion it would originally have spanned the keel at **280.059**. These two pieces, separated by the 2ft 'room and space' dimension established for the floor-framing amidships, are probably the forwardmost frames of the main hull-structure (5.05F and 5.9F). Fragmentary pieces of outer and ceiling planking were present in the trench, together with several large pieces of coal. There were no other finds.

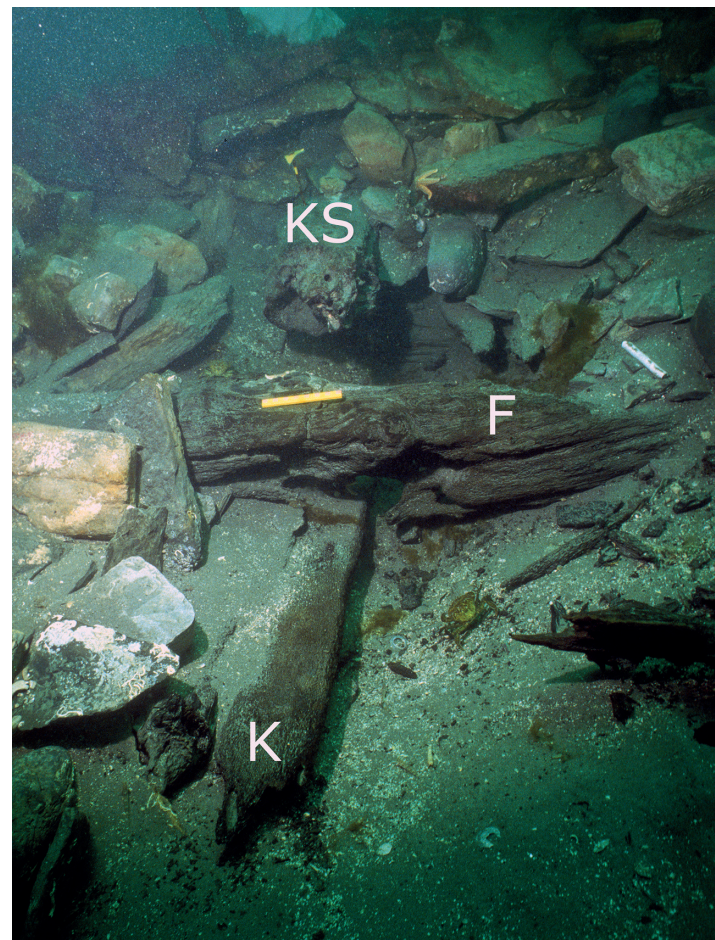


Illustration 108

Surviving forward structure, looking aft. K=keel; KS=keelson; F=frame. Packed stone ballast from the forward mound is in the background. Scale 15 centimetres (DP 173827)

A CROMWELLIAN WARSHIP WRECKED OFF DUART CASTLE, MULL, IN 1653

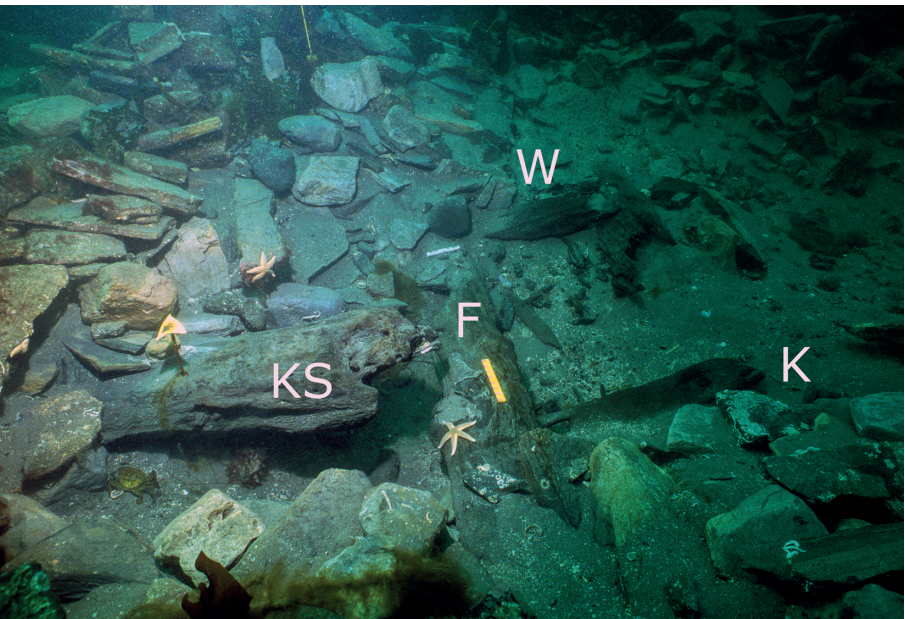


Illustration 109
Surviving forward structure, looking to port. KS=keelson; F=frame; W=wale; K=keel. Scale 15 centimetres (DP 173830)

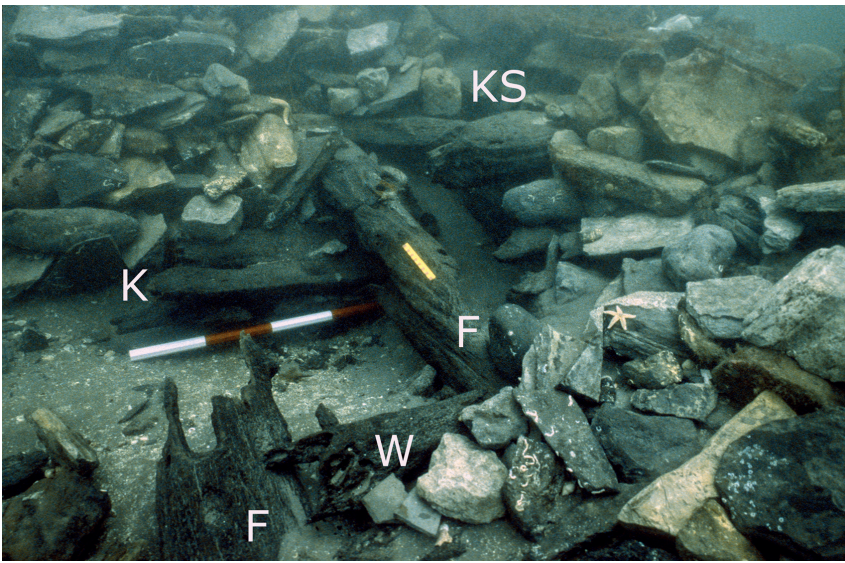


Illustration 110
Surviving forward structure, looking to starboard. F=frame; W=wale; K=keel; KS=keelson. Scales 1 metre and 15 centimetres (DP 173832)

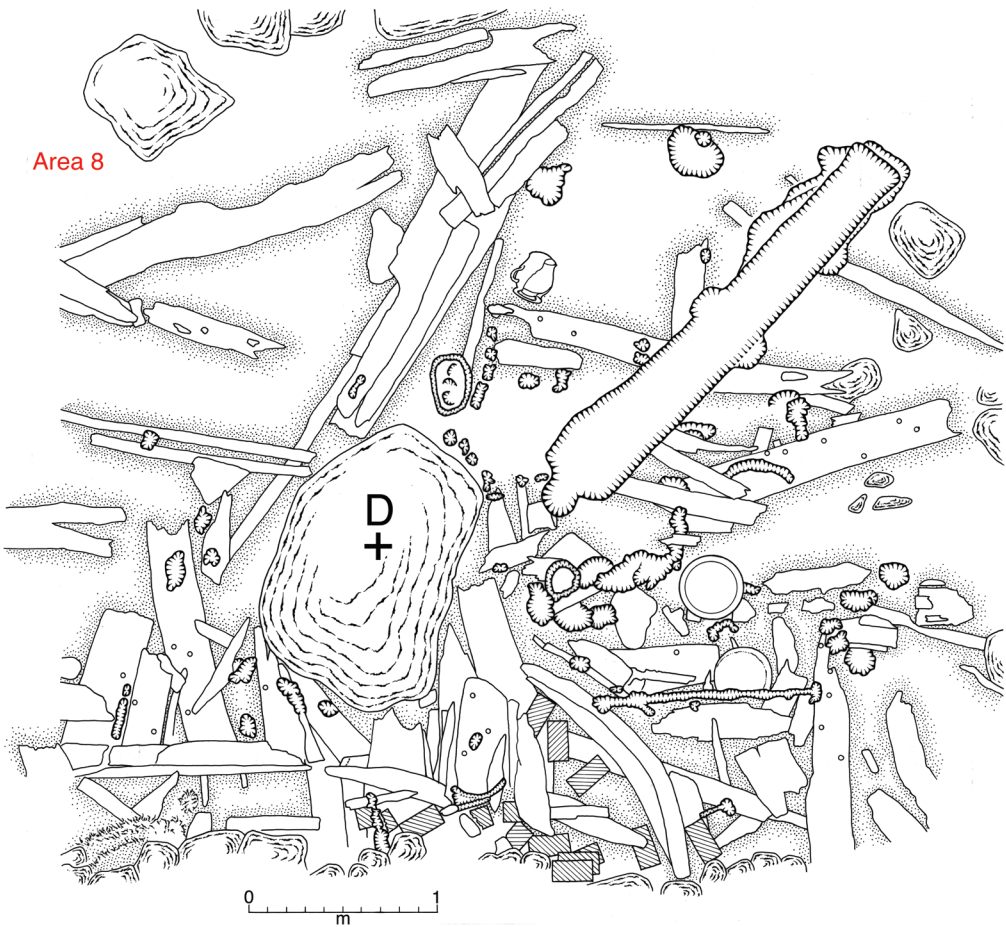


Illustration 111
Plan of Excavation Area 8



Illustration 112
Bricks, coal and collapsed timber debris in the galley deposit. Scale 15 centimetres (DP 173996)



Illustration 113
Pewter plate [\[124\]](#) and fragment of pottery (DP 173932)

Illustration 114
The two conjoined halves of a rotary hand-mill [\[62\]](#). Scale 15 centimetres

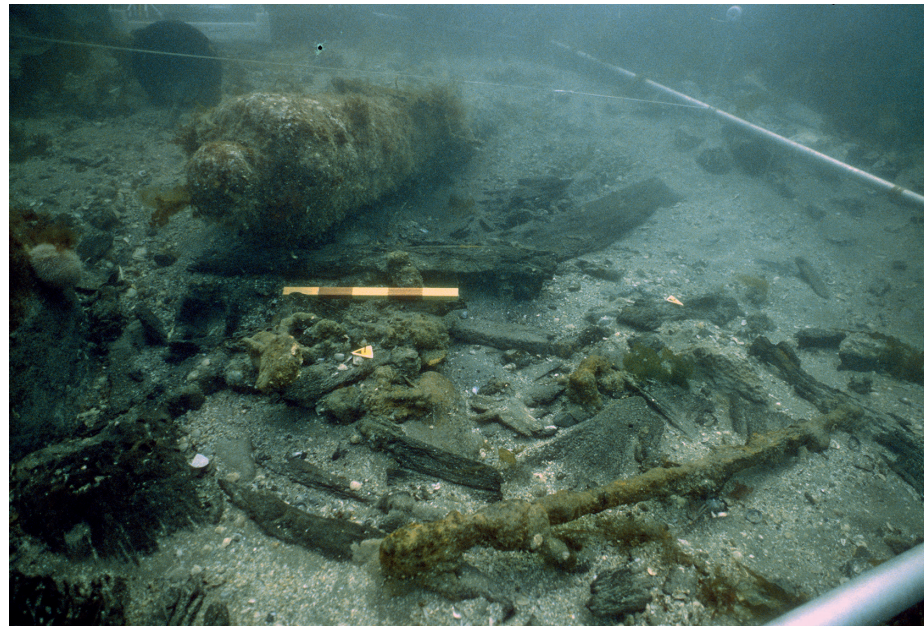
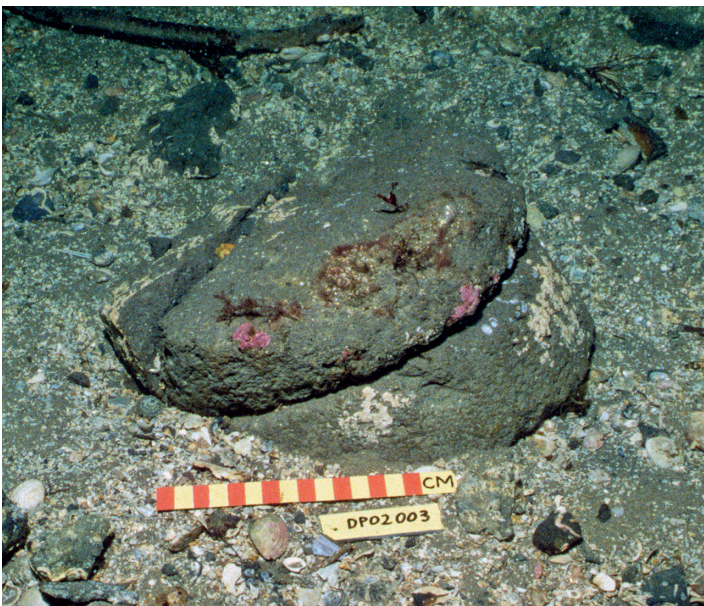


Illustration 115
Eroded debris from the forward collapse of the hull around Gun 6. The long concreted object in the foreground is probably a chain-plate for securing the shrouds. Scale 50 centimetres (DP 173837)

Area 8: collapsed forecastle and galley remains

To complete the investigation of the wreck it was decided in 2002 to excavate an area from a line just shorewards of Gun 6 to the edge of the western ballast-mound, a 4m x 5m rectangle, where it was anticipated that outfall from the collapse of the forward structure might have stabilised (Illus 111). The area is dominated by a large rock at Datum D, centred on **266.093**, which rises about 1m above the sea-bed. A complex of dislocated timbers clusters around, but not beneath, this rock, suggesting that it had been there at the time of the

Illustration 116
Eroded debris from the forward collapse of the hull around Gun 6 (top). Scale 15 centimetres (DP 173795)



wrecking and that the port bow quarter had been massively punctured by it, presumably when the ship settled to port. Some of the timbers continue under the ballast, where higher levels of preservation and cohesion may be expected. Among the dislocated timbers were items associated with the ship's galley, including bricks and tiles, coal, a ceramic butter-crock [137], a pewter plate [124], and the upper and lower stones of a

rotary hand-mill [62] (Illus 112–14). It was hereabouts that the copper-alloy kettle [61], believed to be the galley cooking-pot, was found in 1979 (John Dadd pers comm).

Excavation was extended northwards from Gun 6 (Illus 115–16) to reveal further dislocated structural elements with few associated finds apart from scattered concretions, one of which, at **276.100**, is probably a barrel-hoop.