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

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Chapter 2

THE SHIPWRECK OFF DUART POINT

2.1 Discovery and project development

The wreck-site lies just off a prominent headland which commands the south-east end of the Sound of Mull, off the west coast of Scotland, latitude 56° 27'.440 north; longitude 05° 39'.386 west; NGR NM 7475 3550 (Illus 3–4). The castle of Duart (from the Gaelic *Dubh Ard* – Black Height) stands on a crag at the seaward end of the peninsula (Illus 15). Since the mid 14th century it has been the seat of the Chiefs of Clan Maclean, though they forfeited it with their lands in 1692 to the Earl of Argyll. In 1911 the ruin was bought back and restored by the 26th Chief, Colonel Sir Fitzroy Maclean, and once again it is the centre of the clan and home of the present chief and his family (RCAHMS 1980: 191–200).

In February 1979 John Dadd, a naval diving instructor whose duties had brought him to the area, discovered the wreck of an armed wooden ship at a depth of *c* 10m just to the east of Duart Point (Illus 16–17). The visible remains comprised a number of concreted iron guns, a small anchor, and two distinctive piles of stones which he correctly identified

Illustration 16
Duart Castle and Point with the wreck-site indicated by an arrow (DP 173099)

as ballast. A few recoveries, including a Frechen stoneware flagon of mid 17th-century date, were made during this and subsequent short visits, but Mr Dadd was unable to undertake serious work on the site and the wreck lay undisturbed for several years (John Dadd pers comm). In 1991, anxious that

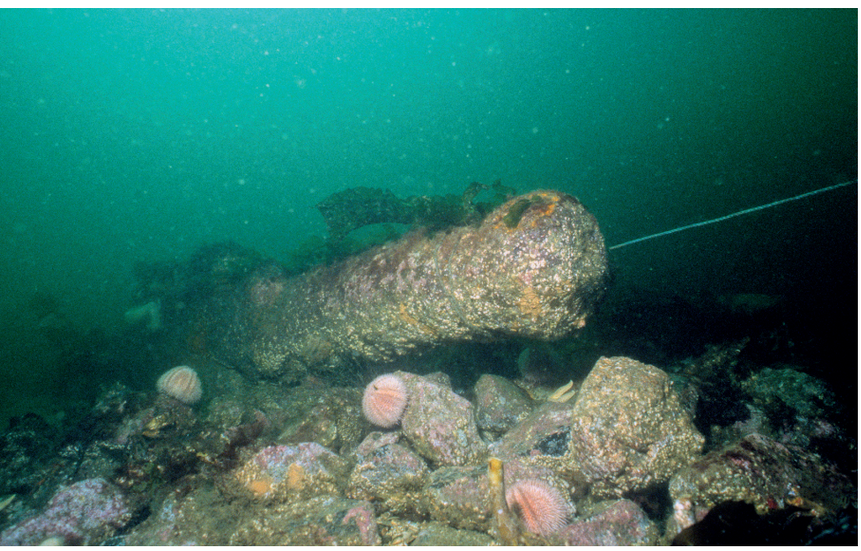

Illustration 17
One of the cast-iron guns (Gun 3) lying prominently on a pile of ballast-stones. This drew John Dadd's attention to the wreck (DP 173689)

the wreck should be investigated further, but concerned lest it be discovered accidentally by others and perhaps treated inappropriately, he reported his find to the Archaeological Diving Unit (ADU), then based at St Andrews University. This specialist team of archaeologists with commercial diving qualifications and technical support had been established in 1986 to assist UK governmental agencies responsible for the regulation and management of historic shipwrecks, which in Scottish territorial waters fell under the remit of Historic Scotland (now Historic Environment Scotland).

At Historic Scotland's request the ADU visited the site in June 1991, accompanied by John Dadd (Illus 18). The presence of a historic shipwreck was confirmed, and further

Illustration 18
The Archaeological Diving Unit's research vessel *Xanadu* anchored over the site in 1991 (DP 174724)

observations suggested a 17th-century date. Exposed wooden panelling was noted at the eastern end of the wreck, at a location which can be identified as approximately **05.08** on the subsequently imposed grid-system (Steve Liscoe pers comm). Although active erosion was clearly a problem, the site's discovery was not public knowledge and no immediate steps were taken to designate it under the Protection of Wrecks Act (1973). At the time Historic Scotland had only recently assumed responsibility for administering the Act in Scottish territorial waters, and it was felt that the Duart Point site would provide an opportunity to develop appropriate procedures for dealing with historic shipwrecks in an objective and unhurried way.

However the Sound of Mull is one of the most popular diving locations in the UK and the presence of the ADU off Duart Point had not gone unnoticed. Shortly after the team

left, the site was visited by unknown divers and significant disturbance occurred, during which it is probable that artefacts were removed (Steve Liscoe pers comm). The existence of the wreck then became known to a group from the Dumfries and Galloway branch of the Scottish Sub-Aqua Club who were staying at the nearby Lochaline Dive Centre. They visited the wreck (quite legally, since at this point it was not protected) and recovered a significant number of artefacts, including pieces of carved decoration, a badly corroded hoard of silver coins, a grindstone, several wooden objects, and the brass lock-plate of a Scottish snaphaunce pistol. These recoveries appear to have involved disturbance to parts of the site. The finds confirmed the earlier conclusion of a mid 17th-century date, and the material was delivered to National Museums Scotland, to which the Club subsequently surrendered its rights as salvors by arrangement with the Receiver of Wreck (five objects had initially been deposited with Dumfries Museum, but were transferred to join the rest of the collection).

In the opinion of the ADU's Director, Martin Dean, the actively eroding areas of sea-bed from which the finds had been recovered required urgent intervention if more items were not to be degraded or lost. A crisis response by Historic Scotland provided resources for a rescue operation by the ADU, and when a general survey of the site had been completed exposed objects were photographed in situ, extracted, recovered and taken to the conservation laboratories of National Museums Scotland in Edinburgh. The operation was carried out between 11 and 27 June 1992 with the support of the Dumfries and Galloway Club, assisted by students and staff from the Scottish Institute of Maritime Studies at the University of St Andrews and conservators from the National Museums. The recovered material is now in the ownership of National Museums Scotland, together with all subsequent finds from the wreck.

Early surveys of the wreck

No measured surveys from reliable datums were conducted on the wreck before the ADU's survey of 1992, but impressionistic sketches (as defined in Bowens 2009: 116–17) were conducted from memory by John Dadd during his 1991 visit, by the Dumfries and Galloway Club following their visit, and by Steve Liscoe of the ADU after his first dive on the site in 1991. While the data they record cannot directly be integrated with subsequent measured plans, comparison with the latter allows many of the features observed to be located in general terms. When this can be done with reasonable confidence the features have been given an appropriate four-figure grid reference within the system later established for the wreck as a whole, though these should be regarded as approximate probabilities rather than precise certainties. The three early surveys are summarised below. Full information and illustrations of the finds can be found in the relevant chapters.

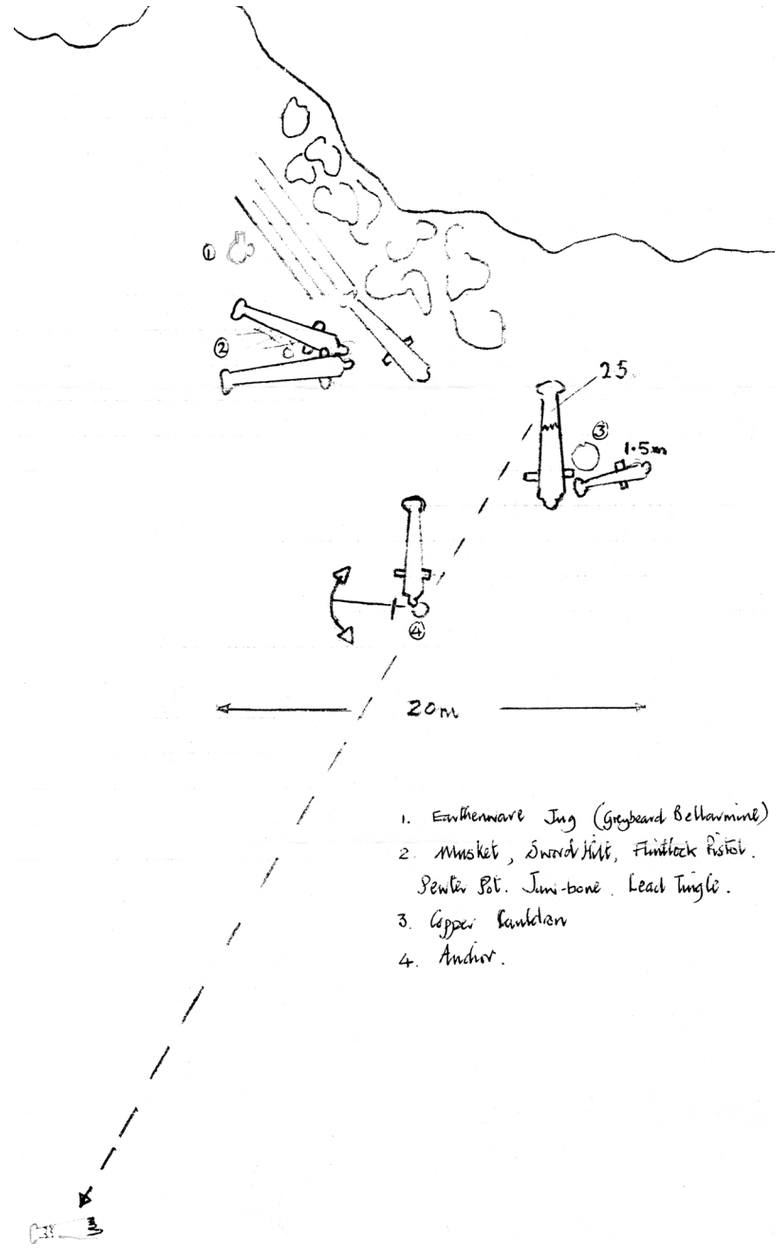

Illustration 19
Sketch-plan of the wreck-site by John Dadd, drawn in 1991 recalling what was visible on his first visit in 1979 (ADU Collection BD 161/1)

John Dadd (1991)

No orientation or scale is given, but the extent of the observed remains – 20m – is broadly accurate (Illus 19). The plan clearly shows the line of the cliff-face, and the tumble of boulders along its foot. The mouth of the gully running in towards the shore is also recognised. Parallel runs of timber are indicated in an area which can be identified as the collapsed stern complex, and adjacent to it the location of a Frechen stoneware flagon is

noted, and site-grid references can be estimated based on this information (**08.10**). Six guns are recorded. One, next to the tumbled stones at the base of the cliff, is clearly Gun 1 of the later survey (**12.10**). There is no indication of the adjacent Gun 5, which may well have been buried at the time of the visit. Guns 2 and 3 are clearly identifiable, centred on **14.07**, though the orientation shown is different from that observed today. Gun 3 may have been turned to its present axis to investigate the adjacent deposit, recorded on the plan as including a musket, a sword-hilt, a pistol, a pewter flagon, a human bone and a lead tingle. Gun 4 (**28.02**) is clearly identified by its proximity to the anchor, while Gun 6 lies beyond it, at **28.09**. It is shown with its muzzle apparently broken, though when excavated in 2000 the gun was found to be intact. Beside Gun 6 the location of a copper kettle is indicated. Almost abutting Gun 6 a much smaller gun is shown, its length of 1.5m being marked beside it. This gun is no longer at this location.

A dotted arrow runs from the end of Gun 6 to what is clearly depicted as the broken end of a gun. The number 25 at the start of the arrow clearly records the distance involved, and in this approximate direction, though only 15m and not 25m away, there is a gun-shaped concretion 1.2m long (Gun 7). The swell of its breech is evident, and it is certainly not a broken-off muzzle end. It may with some confidence be identified as the missing small gun identified in John Dadd's plan and it was this piece, not the muzzle of Gun 6, that he shifted in 1979.

Dumfries and Galloway branch, Scottish Sub-Aqua Club

This plan (Illus 20) was completed by club members following their independent discovery of the wreck in 1991. There are two versions, one in manuscript form and the other enhanced by computer. The latter is initialled DJS and dated 1.5.92. The computer version is symbolic, and all the guns and the anchor are aligned either horizontally or vertically, whereas in the freehand sketch their positions are closer to actuality. The northerly orientation is broadly correct, and the extent of the site observed during the visit is recorded as 25m × 8m.

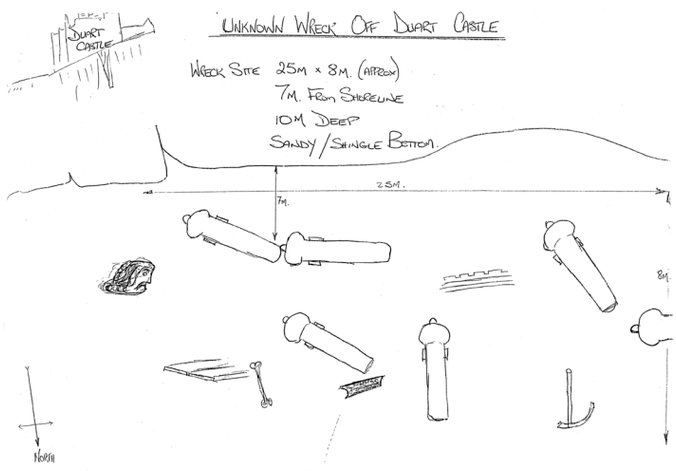

Illustration 20
Sketch-plan of the wreck-site by members of the Dumfries and Galloway branch of the Scottish Sub-Aqua Club, 1992 (ADU Collection BD 161/2)

The cliff-base is shown, with Guns 1 and 5 identifiable. Gun 5 appears to have been completely uncovered. It does not appear in John Dadd's survey, its breech end is covered in the ADU's survey, and it has been almost completely buried since the pre-intrusion survey of 1993 until the time of writing (2016). Guns 2 and 3 are identifiable, though their relative positions are questionable, while Guns 4 and 6 are likewise skewed somewhat from their actual positions. The anchor is recorded, as is the run of exposed frame-ends and planking along the port midships side of the wreck. An object which looks like the bottom part of the carved badge of the Heir Apparent is shown on both plans, close to the muzzle of Gun 2.

A number of finds are noted on the computer-generated plan. These include the warrior's head carving, a hoard of silver coins together with a touchstone, musket ball, and wooden board (a bone and planking are also indicated on the drawing), and a note to the effect that an excavation to a depth of 24 inches was conducted along the run of exposed frame-timbers and planking. It is likely that the majority of small finds recovered by the Club in 1992 came from this excavation.

Archaeological Diving Unit

This plan (Illus 21) is signed by S Liscoe and dated 21 September 1992. Though noted as being 'not to scale', a metre scale and north-pointer are provided, and comparison with the subsequent measured survey shows it to be reasonably accurate and spatially sound – an exemplar for preliminary sketch-plans of this type. It is based on Liscoe's 1991 sketch-plan, but with the ADU's site datums (A–R) added later.

This is the first plan which clearly identifies the nature and extent of the two ballast-mounds, the axis of the wreck as defined by the orientation of the keelson, and the extent of the recently exposed collapsed upper-stern complex. Timber features which were subsequently excavated and identified include the lower-stern complex and the full extent of the port-side bilge framing. A deposit of major timbers, however, possibly associated with the transom stern, was unfortunately swept away by the current before a detailed record could be made. The environmental topography of the site is also reliably recorded. A detail sketch by Steve Liscoe also indicates the locations of the pocket-watch, the lion's head bracket and three silver coins.

During the ADU's visit in June 1992 18 datum-points were established across the site and tied in to a baseline on shore. The latter survey was conducted by plane-tabling with reference to the castle to construct a baseline A–B on the shore adjacent to the wreck-site, and these in turn were linked to

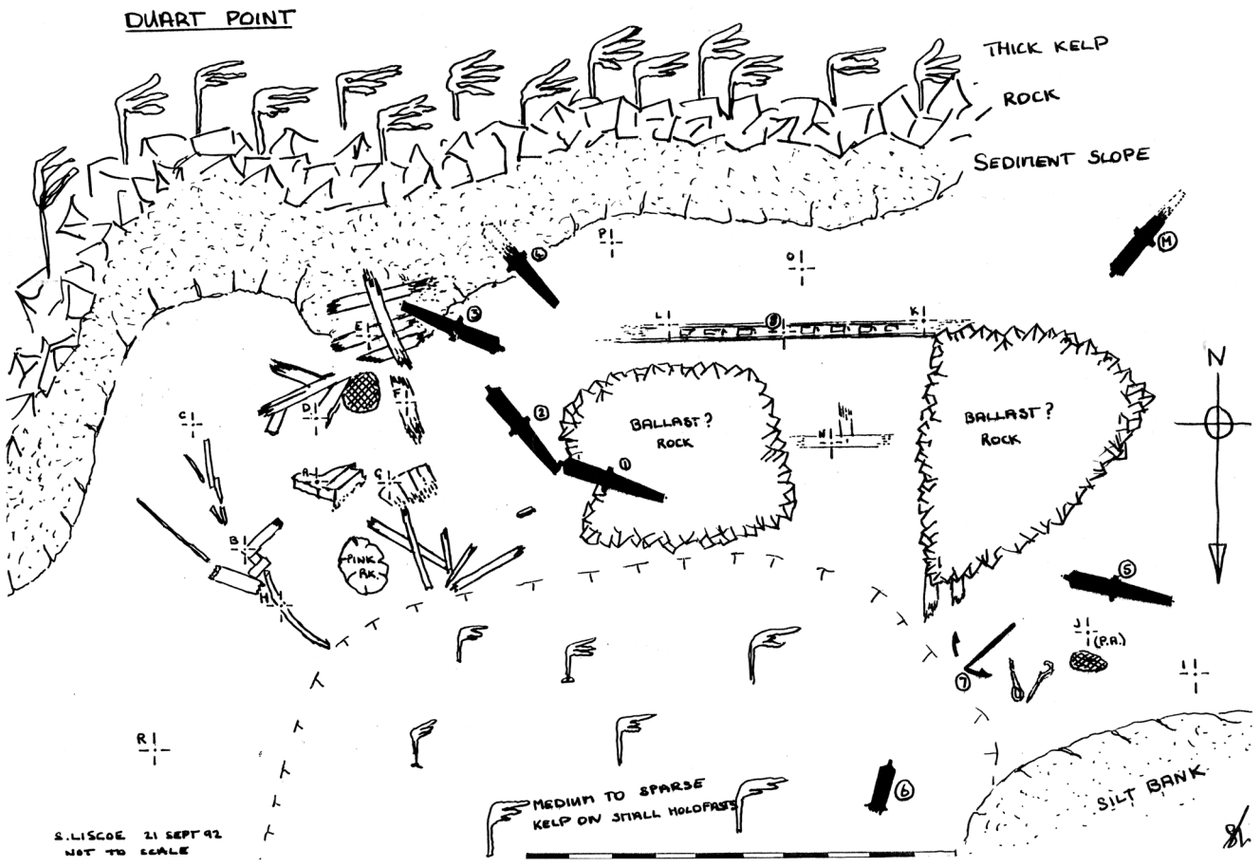

Illustration 21
Sketch-plan of the wreck-site by Steve Liscoe of the Archaeological Diving Unit, made after his first dive in 1991, revised after the addition of datum-points in 1992 (SC 1316316)

seabed datums via vertically stretched buoyed lines (1:200 plane-table survey by Mark Lawrence, 25 June 1992, HES Canmore site 80637). This plan was supplemented by a survey of the seabed datums and referenced findspots, subsequently plotted in plan form by Steve Liscoe (1:50 Duart Point datum distribution, 6 January 1993 and 1:10 Duart Point wreck-site – eastern area distribution, 8 February 1993, HES Canmore site 80637). These data have been integrated with the subsequent site-grid so that the key finds recovered by the ADU can be assigned grid references.

Project development

Following the site's designation under the Protection of Wrecks Act (1973) (Designation Order No 3, 1992, which came into force on 15 May), and the ADU's rescue operation, the future of the wreck was uncertain, since no resources or trained personnel were available in Scotland to continue surveying and monitoring the site, or to take whatever further action might be necessary to stabilise and protect it. After consultation with interested parties, including National Museums Scotland, which undertook to take into possession and conserve any further material that might be recovered, Colin Martin of St Andrews University was granted a licence by Historic Scotland to assess the site's characteristics and archaeological potential, and determine what might be done to restore its former stability. Over the winter of 1992–3 several visits were made under his direction by a team from the Scottish Institute of Maritime Studies, with members of the ADU assisting in a personal capacity. The visits were supported by members of the Dumfries and Galloway Club, who provided boats, divers, and other resources. Travel and subsistence costs were met by Historic Scotland.

Further active erosion was noted, especially in a sediment-filled gully which slopes up towards the shore at the eastern end of the site. Here a small but complex deposit had been exposed, consisting of rope, a wooden block, components of wooden pumps, a shoe, barrel-staves and well-preserved elements of wooden panelling with applied decoration (Illus 22). This was recorded before gravel aggregate, lowered by bag

Illustration 22
Freshly exposed artefacts observed and recorded during a monitoring visit in the winter of 1992–3. They include a leather shoe, pieces of rope, a wooden sheave, two lower pump-valves, and part of a cartridge-box. Scale in centimetres (Steve Liscoe, DP 173698)

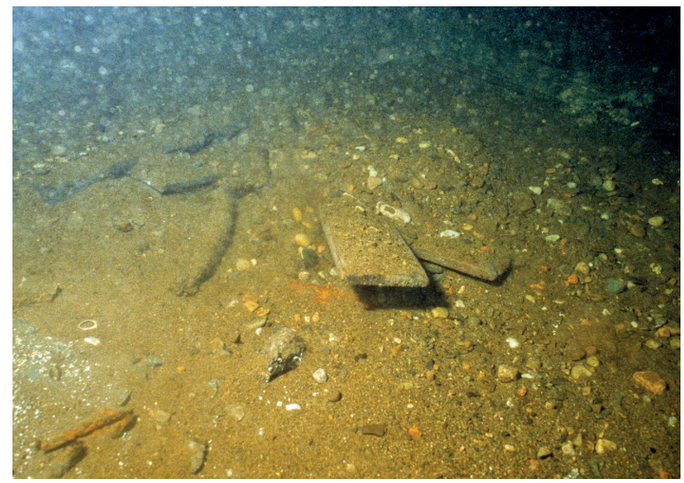

Illustration 23
The exposed deposit shown in Illus 22 in the process of reburial with fresh gravel. When this area was excavated nine years later all the items were in good condition, and remained in their original locations (DP 173696)

from the surface, was spread over the eroded area to replicate as closely as possible the original sea-bed configuration (Illus 23).

After a successful fund-raising campaign to develop the project, a Field Research Unit affiliated to the University of St Andrews was established in early 1993. This was operationally self-contained, with a Land Rover, compressors, diving gear, an inflatable boat, and a full suite of archaeological equipment including still and video cameras. A semi-permanent base was established close to Duart Castle, with caravans providing accommodation and archaeological facilities, including a drawing office and darkroom. An adjacent marquee housed a small workshop and equipment-store. In the first instance self-contained underwater breathing apparatus (SCUBA) was used, consisting of twin 10-litre compressed-air cylinders with a 3-litre cylinder and separate regulator in reserve. This equipment supported individual dives of up to 2 hours; less if heavy work was involved. Diving took place either from the rocks adjacent to the site or from a moored inflatable boat, following commercial-diving protocols laid down by the Health and Safety Executive. Because a current flows across the site at up to 2 knots during the ebb tide but is generally slack during the flood, diving operations were restricted to the shifting six-hour window between Low and High Water.

The SCUBA system was not ideal because of the unproductive and heavy work of handling and charging cylinders on a daily basis, while the equipment was awkward under water and did not always allow the full bottom-times permitted by decompression schedules for such shallow water. In 1994 it was replaced by a surface-supply system, in which a low-pressure compressor on shore fed air directly to two divers via floating air-lines. This was combined with the use of full-face masks and a through-water communications system which allowed the surface supervisor and divers to speak freely to one another. Although primarily a safety measure this greatly facilitated the archaeological work. To enhance the safety and efficiency of the shore operation (the possibility of falling on the slippery rocks was judged to be the greatest risk factor on this site) concrete platforms were built to accommodate the compressors and a supervisor's hut, while steps and ledges were provided to improve diver access to and from the water, and generally make movement across the rocks easier and less hazardous. Two wooden gantries, on which garden-hose rollers were hung, kept the air-lines from chafing and made them easier for the tenders to handle. An independent high-pressure reserve cylinder was coupled into the air-line system, and the divers carried 3-litre SCUBA cylinders and regulators as a back-up. Radio contact was maintained with the local coastguard, and an emergency evacuation plan was in place to convey decompression casualties by boat to the recompression facility at the Scottish Association of Marine Science Research Laboratory at Dunstaffnage, 15km distant.

Between 1993 and 2003 a total of 64 weeks' diving took place on the site, during which 1,645 diver-hours were logged.

The seasons from 1993 to 1996 were devoted to survey, assessment, and site consolidation. Four diving archaeologists were employed, working in pairs in two consecutive shifts. Each pair when not diving acted as tenders to the other, while a commercially qualified supervisor had overall charge of the operation from a communications hut on shore. During the survey phase 25 weeks were spent on site, and 823 hours of underwater work were completed.

In 1997 the excavation phase began, and the diving team was reduced to two, with a supervisor and two tenders supporting them from the shore (Illus 24–5). The field-base was moved to Lochaline, where a house was obtained, and the daily trip was made either by ferry and road or by inflatable boat, distance to the site by sea being 12km. The decision to reduce the number of divers was taken because a single daily dive, with two archaeologists working in adjacent areas, normally yielded enough data and finds to require the remainder of each day for the processing of results. The house provided better facilities for these tasks. To have worked a second diving shift would have doubled the data-recovery rate and unacceptably reduced the time available for processing. Between 1997 and 2001 excavation took place each summer except 1998. Twenty-eight weeks of underwater work were completed, during which 459 diving hours were logged. Two further seasons totalling 11 weeks were completed in 2002 and 2003. SCUBA replaced the surface-demand system for the two last seasons. The reasons were twofold. In 2002 a two-week season was sponsored by Chanel 4's *Wreck Detectives* programme and our diving regime had to be adjusted to accommodate their presenter's needs, while the last season, in 2003, required the greater flexibility of SCUBA to finalise archaeological work on the site and secure its long-term protective consolidation. By this time, moreover, the surface-demand equipment was in need of major maintenance or replacement, which in the closing stages of the project was not financially justifiable. During the two final seasons three divers completed a total of 363 hours under water.

2.2 Date and identity of the wreck

It is appropriate at this point to summarise evidence for the date and probable identity of the wreck. An approximate mid 17th-century date had been determined by an assessment of the associated archaeological material, on the assumption that it represents a closed and uncontaminated group (no evidence has been found to suggest otherwise). Detailed analyses of the relevant objects are presented in the descriptive catalogues of finds, and at this stage only the diagnostic significance of selected artefacts is considered. The latest identifiable coin is a crown of Charles I 229 minted at Exeter in 1645–6. Of the ceramic evidence, clay pipes 145–60 are the most sensitive indicators of date, and the group of 14 bowls typologically suggests an English origin and a date-range of *c* 1640–60. Five of the six stamped heel-marks contain the letters NW within a heart. Although these initials have not been linked with a named pipemaker, the distribution of pipes thus marked occurs almost exclusively in the vicinity of Newcastle. A search of the literature has revealed only four recorded occurrences outside Newcastle; at St Andrews, Kirkwall, Belfast, and now from the Duart Point wreck. Newcastle was a major supply base for Cromwellian operations in Scotland between 1650 and 1653, and it is reasonable to see these 'outlier' NW pipes as indicators of troop-movements at this time.

Corroborative evidence of a mid 17th-century date is provided by a concreted pocket-watch 118, which Three Dimensional Computed Tomography X-ray scanning has revealed was made by Nicholas Higginson of Westminster (Troalen et al 2010), who was admitted to the Clockmakers' Company in 1646 – confirmation of the *terminus post quem* provided by the Exeter coin.

The clay pipes suggest that the ship had a strong English association, for these are ephemeral objects and none is likely to have been in its owner's possession for long before being broken or discarded. It is noteworthy that no Scottish or Dutch pipes, both common in Scotland at this period and recognisable by their distinctive forms and marks (Martin 1987), can be identified in the group. That the weight-standard in use aboard the vessel was the English avoirdupois pound of 454g is indicated by the find of three lead balance-pan weights 209–11 which conform to this standard and are stamped with control-marks which bear the royal monogram of Charles I

Illustration 24
The shore base, with the boat moored over the wreck. From left, the supervisor's hut, the air-hose gantries leading from the surface-supply compressor, and the high-pressure SCUBA compressor (partly visible with green cover in the foreground) (DP 173470)

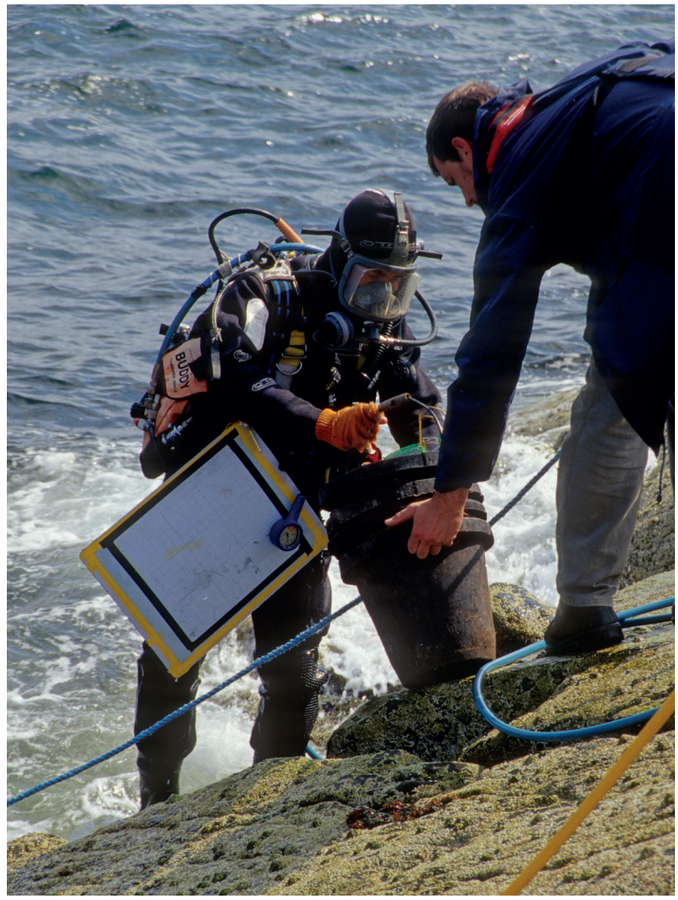

Illustration 25
An archaeologist with excavation tools and drawing-board about to enter the water, assisted by his tender (DP 173580)

together with the symbols of the Guildhall and the Plumbers' Company in London. This weight-unit is distinct from the contemporary Scottish pound of 496g. However, a Scottish association of some kind is suggested by three pewter liquid measures [119–21] which conform to the Scots pint of 1.7 litres, or parts thereof. This measure is unrelated to the English standard pint of 0.57 litres. Scottish connections are also indicated by the lock-plate of a snaphaunce pistol [104] with the initials of the Edinburgh maker George Turner (fl 1639–61), and a Hebridean *crogan* pot [144].

Carvings from the vessel's stern decoration demonstrate an association with the English or Scottish crown (during the 17th century the two kingdoms were ruled by the same monarch, but had separate parliaments). The dates suggested by the archaeological evidence (*c* 1640–60) cover the reigns of Charles I (1625–49) and Charles II (1650–85). However, the presence of the badge of the heir apparent [8] indicates that the parent arms were those of Charles I, since his son, Charles II, had no legitimate male children (his brother, who succeeded him as James II, was heir presumptive, so was never entitled to use the ostrich feathers and coronet badge).

Further indications of the ship's history and associations come from an analysis of non-artefactual material associated with the wreck. Studies of animal and fish bones suggest that the vessel had been provisioned largely, if not exclusively, from the resources of the area in which she was wrecked, a possibility reinforced by the find among debris from the galley of a hand-mill [62]. Flour was not normally ground at sea, but carried in processed form, usually as bread or biscuit. The hand-mill implies an intention to obtain grain from the local countryside, a practice commonly adopted by campaigning armies. This in turn suggests that the ship was lost around harvest-time, in late summer or early autumn.

Geological analysis of the ballast suggests that the ship had operated along the length of Scotland's western seaboard prior to her loss. The eastern ballast-mound is composed of Dalradian stones from the south-west Highlands, while the western mound, though more varied in composition, includes Lewisian gneiss from the extreme north-west tip of mainland Scotland or the northern part of Lewis. Sources of the clay-and-gravel lining which provided a bed of ballast in the central hold are less easy to identify, but the clay probably comes from Ayrshire or the Clyde, while the gravel is typical of deposits around the Inner Hebrides.

The archaeological evidence thus combines to indicate that, some time between 1646 and *c* 1660, a small armed ship which appears to have had associations with the English and/or Scottish crowns was wrecked on Duart Point, probably at harvest-time in late August or September. The Newcastle pipes suggest that she may have been involved in operations connected with Oliver Cromwell's invasion and occupation of Scotland, though her main source of provisions appears to have been local. The geological footprint of the ballast suggests that the ship's movements prior to her wrecking extended from south-west Scotland to the northern Hebrides.

An investigation of historical sources for this region and period reveals only one episode which fits the criteria summarised above (for more detail and fuller referencing see Chapter 1). This was an expedition sent by Cromwell to the Western Isles in August 1653 in response to a Royalist revolt led by the Earl of Glencairn, whose supporters included the Macleans of Duart. It was commanded by Colonel Ralph Cobbett. Three ships, including the merchantmen *Speedwell* of Lynn and *Martha and Margaret* of Ipswich, sailed from Leith via Kirkwall, Stornoway, Skye, and Eilean Donan (on the mainland opposite Skye) to Dunollie Castle, on the mainland close to Mull. At some point earlier, possibly at Stornoway, they had rendezvoused with three ships from the Cromwellian naval base at Ayr. These included a collier, the frigate *Wren*, and a small warship called *Swan*, captained by Edward Tarleton. On their way north the ships from Ayr had called at Castle Sween in Knapdale to collect artillery. The combined force

then sailed to Duart Bay, where it offloaded 1,000 troops with artillery and mortars to besiege Duart Castle. The Macleans, however, had decamped, and the castle was taken without a shot being fired.

On 13 September the anchored ships were hit by a violent storm and three were wrecked. They included the two East Anglian supply vessels which had come from Leith, and the small warship *Swan* from Ayr. The remaining ships, which had lost their masts, were taken south under jury-rig for repair. Cobbett and his men crossed to the mainland in boats and eventually reached Dumbarton.

Which of the three ships is represented by the wreck off Duart Point is best determined by a consideration of the ballast. *Speedwell* and *Martha and Margaret* were East Anglian merchant ships which came to Leith before sailing to Kirkwall in Orkney, Stornoway in Lewis, Skye, Eilean Donan, Dunstaffnage and finally Duart. This itinerary would have allowed them to take on ballast containing Lewisian gneiss at Stornoway, but it is difficult to see how they could have obtained the distinctive Dalradian rocks from the south-west Highlands which characterise the wreck's western ballast-mound. A much stronger case can be made for the third vessel, the small warship *Swan*, which came from Ayr and touched at Castle Sween in Knapdale before heading north to rendezvous with the ships from Leith. The ballast footprint fits convincingly – clay from Ayrshire or the Clyde, stone from south-west Argyll, and stone from Lewis. It may also be noted that the royal Stewart iconography associated with the wreck would be quite inappropriate to a workaday pair of conscripted East Anglian freighters, which leaves only *Swan*.

Mystery surrounds this ship and her origins. Initially it was thought that the wreck at Duart was probably the well-documented pinnace *Swan*, built for Charles I in 1641 and captured by Parliament off Dublin in 1645 (Eames 1961; Martin 1995). However it is now clear that the 1641 *Swan* survived beyond 1653, so another candidate must be sought. The only documentation reliably associated with the Duart *Swan*, apart from the account of her wrecking, concerns a 'frigot' of that name which had been purchased for the State earlier in 1653. In June she was at Liverpool, where she was supplied with 'provisions, sails, waist-cloths and colours, tallow and oars' (TNA SP18/55/21 f38r). That this ship appears to have had auxiliary oar power further supports her identification with the Duart Point wreck, which has produced a probable oar-port lid 38 and a disposition of artillery which suggests that the midships part of the main deck was occupied by rowing banks (see Chapter 5.6).

But there is no mention in contemporary English naval lists of a *Swan* other than the 1641 pinnace. However in 1644–5 the Marquess of Argyll, then the principal magnate in the west of Scotland, had three ships operating in the area, one of which was called *Swan*, commanded by James Brown (Campbell 2002: 217). Nothing is known of the vessel beyond this single reference, but the marquess was much embroiled in the confused politics of the time, and though his loyalties shifted from crown to kirk and finally to Parliament during the complex ramifications of the Civil War period in Scotland, by 1649 he was once again a nominal Royalist and assisted at Charles II's Scottish coronation in 1650. If this wreck is indeed Argyll's *Swan*, following her transfer to the Commonwealth (to which by 1653 the marquess had shifted his allegiance), her close association with the west of Scotland, evidenced by the ballast footprint, is explained.

That the Duart wreck is one of the three ships lost in the 1653 incident seems beyond serious question; that she was a small oared warship called *Swan* is highly likely, and that this *Swan* was a private warship once owned by the Marquess of Argyll is a strong probability. These suggestions remain hypothetical, set in descending order of certainty, and in the absence of more definitive evidence the site is best referred to neutrally as 'the Duart Point wreck'. Ruling theory is a dangerous strait-jacket in which to place perceived shipwreck identifications if a measure of doubt remains (cf Rodgers et al 2005).

2.3 Site management and project design

Site management

As explained above, the project's priority in 1993 was to stabilise erosion on the wreck, and this was achieved by placing a single layer of flat-weave polyester bags filled with gravel over the areas where the exposure of archaeological material had been observed (Illus 26–7). The bags were loosely filled with 20mm gravel, which it was felt would be less susceptible to transport by water-movement should the containers split or degrade. The loose fill ensured that the bag shapes would adapt to sea-bed irregularities, lock well together, and present a soft pliable interface against any archaeological material with which they might come into contact. Fifty-bag batches were transported to the site by inflatable boat and dropped in pre-selected dumps adjacent to the wreck but clear of archaeologically sensitive areas. They were moved around the site by divers who, having removed their fins, carried one in each hand and, thus weighted, could walk upright to where the bags were required, guided by a pre-laid line. Once each pair of bags had been set in position the diver, free of the weight, could lie horizontally and pull himself back along the line to the dump for another load. During the preliminary consolidation of the site 500 bags were laid, covering a total area of some 60m^2.

It is probable that the recent erosion on the site was triggered by diver disturbance and the removal of kelp to reveal the wreck's features for recording (for a full explanation of this effect see Chapter 3.1). The clearing of overlying plant-growth prior to the investigation of a site has been normal practice in underwater archaeology, as it is on land, and the consequences of such a procedure at Duart were not

Illustration 26
Sandbags filled with gravel being delivered to the site (Edward Martin, DP 174780)

anticipated either by the original finder John Dadd in 1979, by the Archaeological Diving Unit in 1991, by the Dumfries and Galloway Club in 1992, or by ourselves in 1993. However, it was soon realised that although water-movement across the site during the ebb tide is strong enough to displace sediments, it can only do so if the flow is in direct contact with the sea-floor. Under normal conditions it is not. The mature forest of large-fronded shallow-water *Laminaria* species which normally covers the site provides a boundary layer which reduces water-movement beneath it to negligible levels (Illus 28). Only when the *Laminaria* is removed can moving water make contact with the sea-floor at velocities sufficient to displace sediments. Sandbagging negates this effect, while the bags provide surfaces on which fresh *Laminaria* growth can establish itself and reach maturity, thus re-creating the protective boundary layer. Once this balance is achieved the bags become redundant and can be left to disintegrate, leaving the stable gravel to consolidate naturally.

The ease with which bags can be moved and adjusted allowed a controlled investigation of the site by uncovering small areas of previously sandbagged sea-bed as required, replacing them when work – whether survey or excavation – was complete. From 1993 to 2003 the wreck-site was managed in this way, allowing a research agenda to be built on the rescue imperative. In 2003, after a final season of intrusive investigation, a further 500 bags were laid, and at the time of writing (2016) the site appears to be almost entirely stable, once again protected by a thick cover of mature *Laminaria*.

In parallel with the protective measures to ensure site stability, a survey of the exposed archaeological remains and associated sea-bed topography was conducted as a basis for assessing the condition of the wreck and investigating the dynamics of the site-formation processes involved. This included a contouring of the site at 0.1m intervals. When the survey had been completed in 1996 it was decided, in consultation with Historic Scotland, that areas already destabilised by previous interference and erosion should be

Illustration 27
Sandbags freshly laid over an exposed organic deposit (DP 174786)

Illustration 28
Shallow-water algae cover most of the site, damping water-movement at sea-bed level to minimal velocities. This species, *Laminaria digitata*, covers the shallower and environmentally most dynamic parts of the wreck (DP 173716)

excavated to a depth of not more than 0.5m, to ensure that the disturbed top sediments were removed prior to sandbagging. It was also agreed that the area between the ballast-mounds, where degraded elements of structure were already partially exposed, should be cleaned for recording before protective consolidation. Since these investigations were likely to yield significant information about the structure and internal layout of the ship, some discretion to conduct additional limited excavation was allowed so that aspects of the vessel's characteristics and configuration could be examined. It was decided, however, not to compromise the integrity of the wreck by removing any of the stone ballast which had been responsible for pinning down and preserving much of the vessel's lower structure, other than limited sampling of this material for analysis and the excavation of a small trench to determine the forward extent of the keel. It is likely that most of the structure which survives beneath the ballast is coherently articulated and well-preserved, and under minimal threat.

Project design

The aims of the project were: to survey the wreck and secure it for long-term preservation in situ, and to conduct such limited invasive work as necessary to rescue threatened material and to understand the site-formation processes that have conditioned the site's present state. This information will inform decisions concerning the wreck's future management. Where possible, the work of assessment, consolidation, and stabilisation should be combined with a research agenda designed to determine the ship's dimensions, structural characteristics, and internal layout, and to recover a representative sample of artefactual and environmental material for analysis, study, dissemination, archiving, curation, display, education and public benefit.

2.4. Survey and excavation techniques

Most of the site lies on a relatively level sea-bed between the –8 and –9m contours measured at Mean Low Water Springs, which allowed a web of triangulated datum-points to be established across the site from a 25m primary baseline A–B, following the general axis of the wreck but slightly to seaward of it, so avoiding the main archaeological areas (Illus 29). Its terminals were fixed by steel post-holders securely driven into the sea-bed, containing short wooden posts topped by pins for anchoring tapes. Secondary points were created either with steel pitons hammered into the rock or with short lengths of aluminium scaffold-pole driven into the sea-bed with a fence-post rammer (Illus 30). 5m and 3m square grid-frames of aluminium scaffold-poles with adjustable legs at the corners were assembled on shore for transport to the site (Illus 31), where they were positioned and levelled as required with reference to a primary depth-datum C located on top of a prominent rock adjacent to the main wreck area.

Within the grids, 1m drawing-frames double-strung at 0.2m intervals with thin elastic lines were positioned by means of bungee-tautened cross-tapes and a simple plumbing device (Illus 32–4). The 1m grid could also be used in conjunction with a tape datum-line to provide reference for an archaeologist hovering above it (Illus 35). Grid-frames were set sufficiently close to one another to allow an archaeologist working in one to remain in visual contact with a colleague in the other, thus providing mutual safety cover on the 'buddy' principle without compromising work output. Each grid-block was recorded to a scale of 1:10 on drafting-film taped to non-floating boards, using replaceable-point plastic pencils secured to the board with thin line (Illus 36).

The initial survey of the wreck and its associated topography covered an area of 35m × 17m, or 595m^2, and took two seasons – 1994 and 1995 – to complete. To ensure the objectivity of what was recorded each feature measuring 5cm or more, including stones, was drawn to scale. Thus, for example, although the two ballast-mounds appear as discrete entities on the finished plan, they are defined not by arbitrarily determined boundary lines drawn around them but as visually identifiable concentrations of large similarly sized stones (cf Barker 1977: 110).

In 1996 contours at 10cm intervals were superimposed on the two-dimensional survey. Trials aimed at determining the best method of doing this had been conducted during the previous season. These included a simple barometric device calibrated against a constant sea-bed datum to accommodate tidal changes (Martin 1983: 43), physical depth-measurements taken in flat-calm conditions from a tape attached to a surface buoy and time-co-ordinated with readings taken from a calibrated tide-gauge on the surface (Illus 37), and finally a digital depth-gauge constantly checked against the primary depth-datum C (Illus 38). Surprisingly, the last technique proved to be the simplest and most accurate. Readings were taken at 1m intervals along tape-lines set parallel with the site-datum A–B. Each series of readings was prefaced by a calibration reading at the primary depth-datum, which lay above the level of any of the contour points. The gauge, which recorded metric depths nominally to one decimal point, was then placed directly on the position to be recorded, and slowly raised up a short vertical scale until the decimal point moved to the next figure. The height at which the changeover occurred was added to the recorded depth, and the reading adjusted against a reading obtained by the same method at the primary depth-datum. It had been anticipated that the results would be accurate enough to permit the plotting of contours at 25cm intervals, but in the event a finer resolution was possible, and 10cm contouring was achieved across the site. Independent checks confirmed the general reliability of

Illustration 29
A network of datum-points being established over the site by tape triangulation from a primary baseline

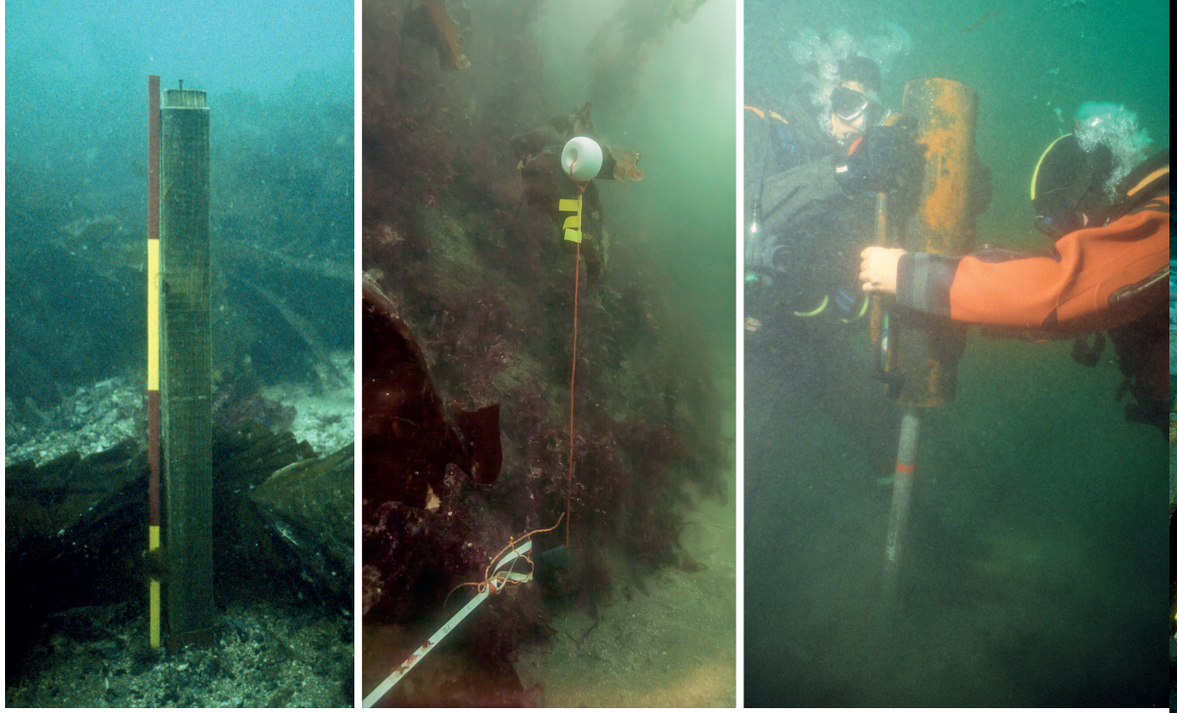

Illustration 30
Left: datum-post in position on site. Note the nail for securing the ends of measuring tapes. Centre: piton fixed near the base of the cliff, with identifying float (Edward Martin). Right: fence-post rammer being used to drive an aluminium scaffold-pole into sand as a temporary datum (DP 174362)

Illustration 31
Assembled 5m grid of aluminium scaffold-poles being secured to an inflatable boat for transport to the site (DP 174380)

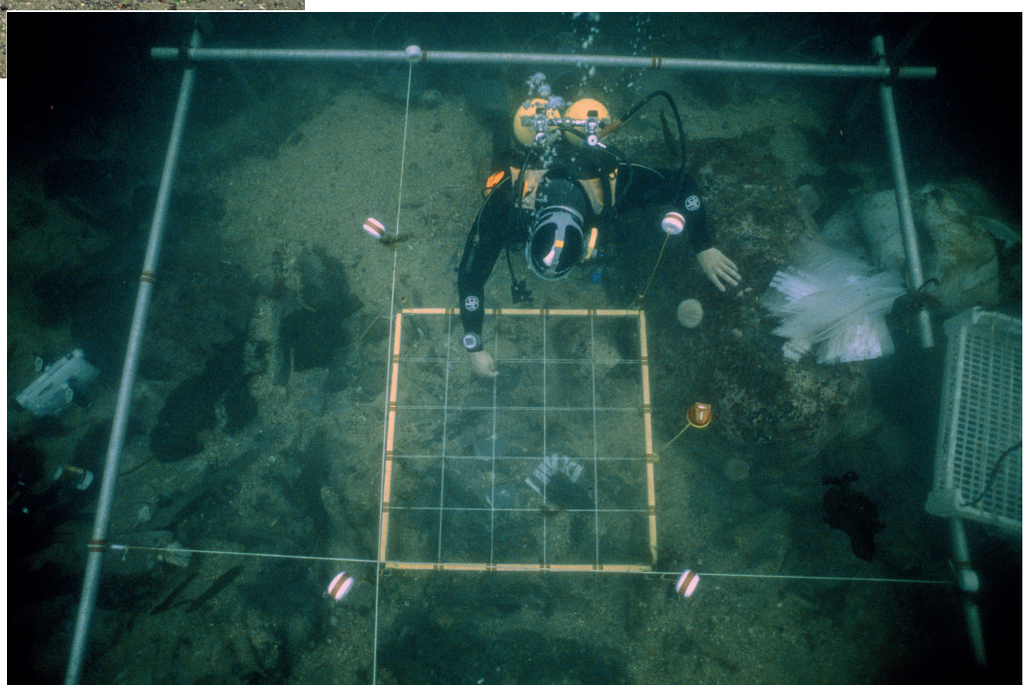

Illustration 32
A 3m grid deployed on the site. Note the stretched bungee datum-lines which have been used to position the 1m drawing-frame (DP 174402)

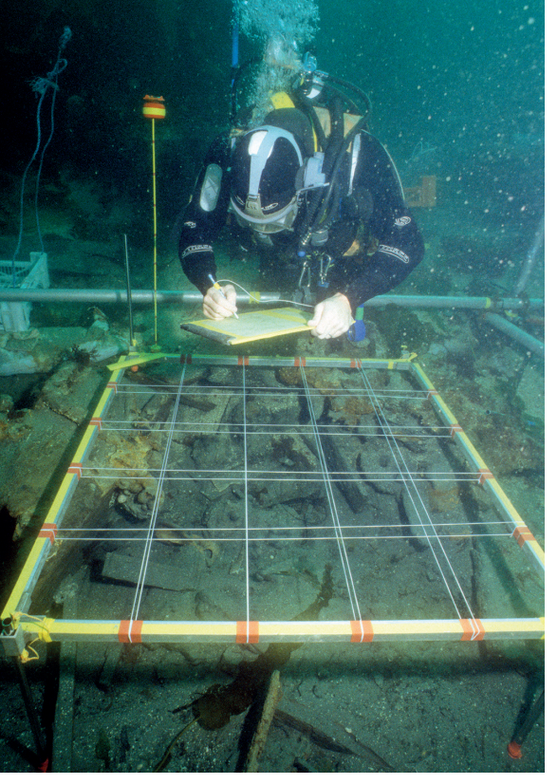

Illustration 33
A 1m drawing-frame, double-strung at 0.2m intervals, positioned and levelled with reference to a grid (DP 174407)

Illustration 34
The underwater equivalent of a plumb-bob is a scaled rod with a weighted bottom and a buoyant top which stands vertically in still water. A two-way spirit-level at the top allows it to be adjusted for accuracy (DP 174391)

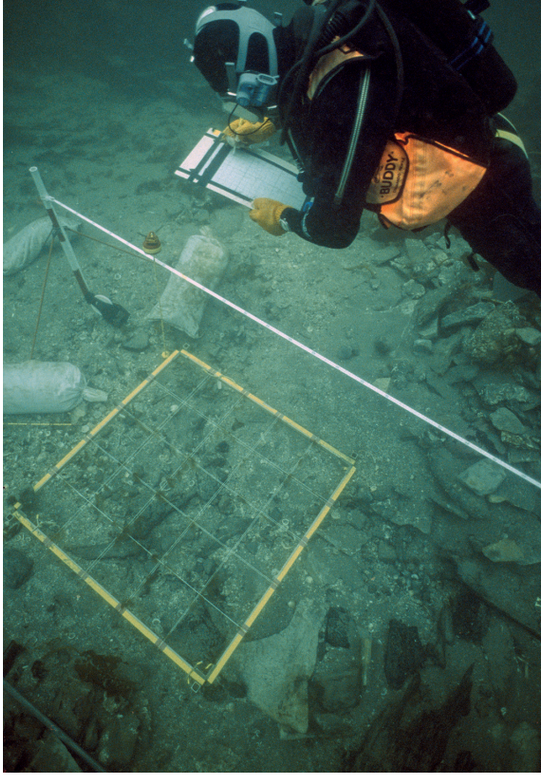

Illustration 35
Recording using a 1m drawing-frame positioned against a tape datum-line. A diver's ability to hover directly above the frame is a bonus of working under water (DP 174425)

Illustration 36
Most primary recording was done at a scale of 1:10 on drafting-film secured to a negatively buoyant board with electrical tape

Illustration 37
The tide-gauge established at the shore/water interface adjacent to the wreck. Its foot is placed at the lowest identified tide level and it rises to a height of 4.5m, covering the full tidal range (DP 174404)

Illustration 38
Recording accurate depths during a contour survey of the site, using a digital depth-gauge (DP 174515)

Illustration 39
Topographical survey of the wreck-site before excavation. Depths below the local site datum, which approximates with Mean Low Water Springs, are shown in red at 0.1m intervals. The primary horizontal datums, from which all subsequent survey has been derived, are indicated as A and B. Vertical datums C and D are also shown

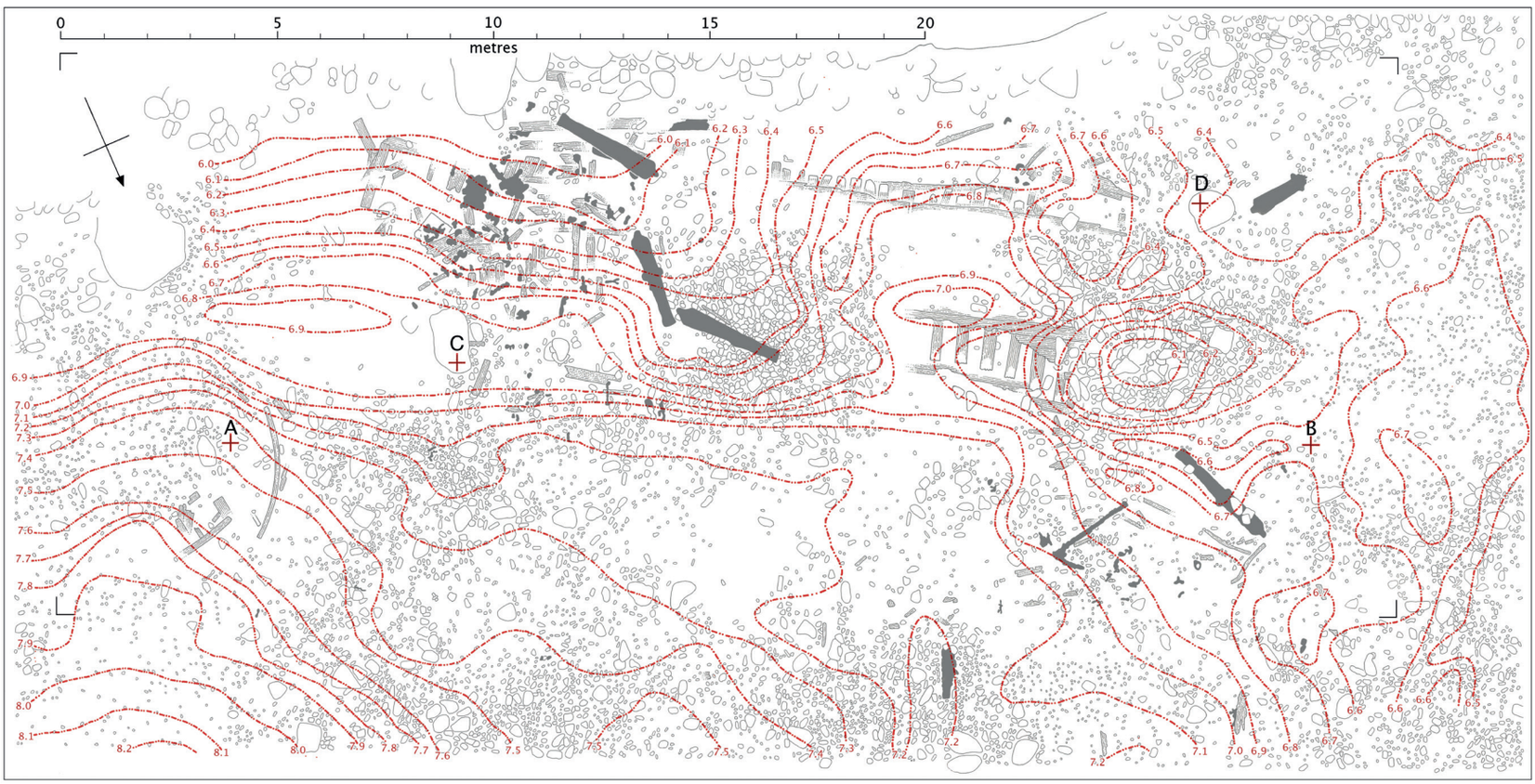

Illustration 40
A photographer recording exposed wreckage (DP 174513)

Illustration 41
A bipod photo-tower was used to record vertical mosaics. Note the run of triangular yellow targets set out at 1m intervals with reference to the site-grid (DP 174466)

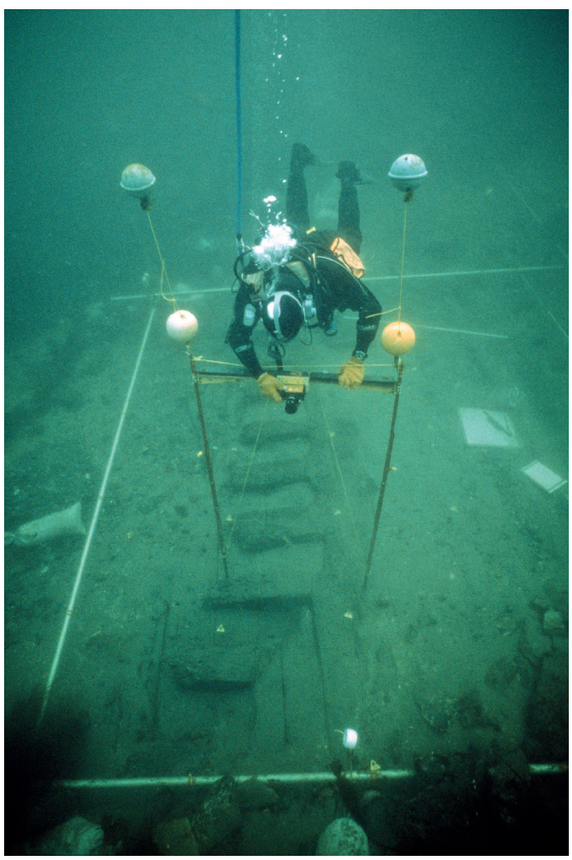

Illustration 42
Levelling the bipod photo-tower by means of a two-way spirit-level (DP 173135)

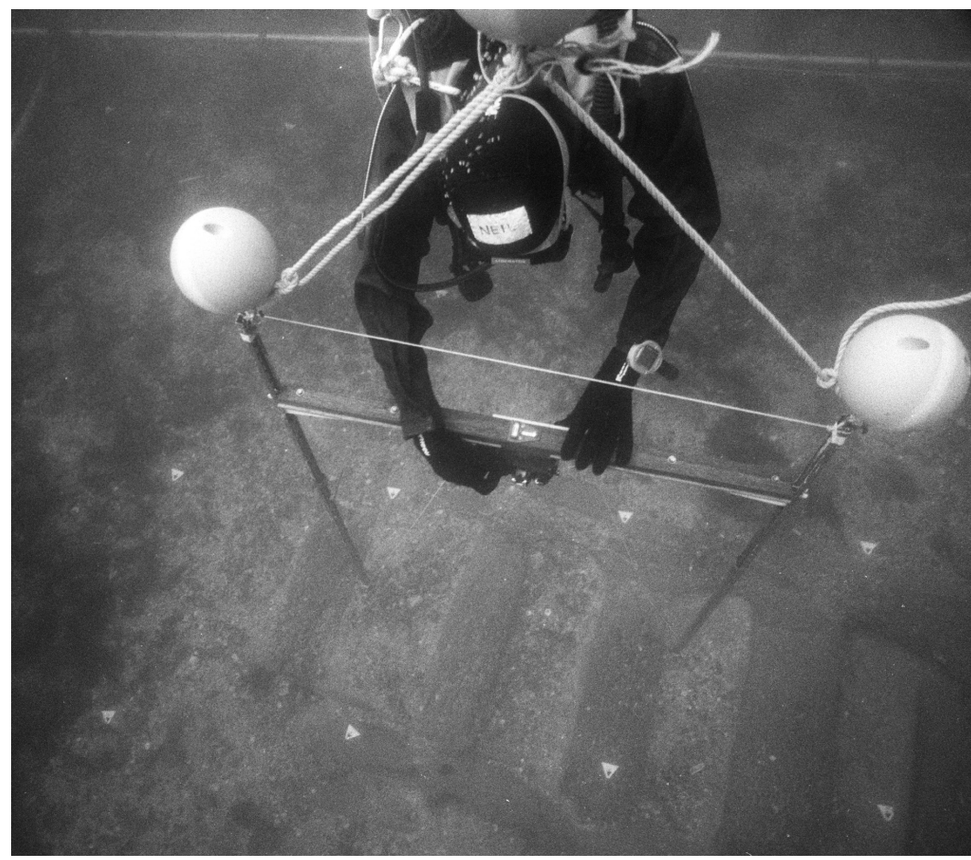

Illustration 43
The hand-fanning technique of area excavation (DP 174477)

waggling of the fingers is equivalent to a sensitively applied trowel or brush for delicate work. Water is an excellent sorting medium, and with practice hand-excavation under water can be conducted to at least as high a standard as can be achieved on land (Barker 1977: 92–5).

The down-side is that it is difficult, and sometimes impossible, to expose and clean discrete areas for leisurely recording. For one thing the angle of repose of the excavated sediment (typically 45° in loose sand) militates against creating vertical sections. For another, intrusion into the sea-floor creates an environmental imbalance which nature strives to reverse. Loose weed and silt are apt to gather in trench-bottoms between dives. Suspended sediment will fall constantly on features cleaned for recording or photography. Stable deposits, once

the method, and the result conveys the actuality of the sea-bed configuration with remarkable subtlety (Illus 39).

Photographs were taken at all stages of the work, to record features, artefacts in situ, and general activities on the site (Illus 40). Nikonos V cameras were used under water, with 35mm, 28mm, 20mm and 15mm lenses, flash and close-up attachments as required. Attempts to produce mosaics from free-swimming runs of vertical photographs were of limited success, so a free-standing photo-tower was developed which allowed accurate control of height, positioning, and verticality (Illus 41–2). The photographs were subsequently rectified and joined in Photoshop (Martin & Martin 2002). A video record of operations above and below the water was made throughout the project.

Although the same principles of archaeological excavation on land can and should be followed under water (Bass 1966), there are some practical differences in applying them. On many sea-beds, including that at Duart Point, loose material at the sediment/water interface is generally in a semi-fluid state. Surface-levels are therefore prone to disturbance by water-movement, whether of natural or anthropogenic origin. However this characteristic can be exploited by the excavator, using a hand-fanning technique to displace the sedimentary matrix (Illus 43). Applied vigorously, this is akin to using a shovel to shift spoil on a terrestrial site, while a gentle

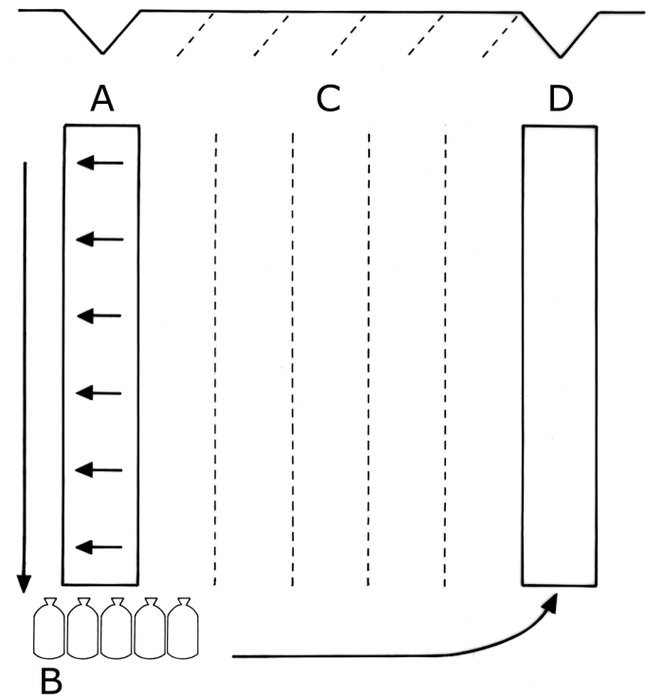

Illustration 44
Diagram explaining the 'advancing front' method of area excavation. Arrows indicate the transport of spoil. (A) is the initial trench; (B) the spoil from it; (C) the faces in which stratigraphy can be recorded; (D) the final trench, which can be filled with the bagged spoil (B)

Illustration 45
Tray containing items for finds management, including bags of lead pellets for securing delicate objects during retrieval, bandages, photographic scales and targets, various sizes of polythene bags for finds, and stretched bungee lines for securing bagged finds with clothes-pegs. The archaeologist is detaching a uniquely numbered label for insertion with a find (DP 174494)

uncovered, often become unstable. Spoil can build up and inhibit excavation, and even if dumped some way distant may still be prone to unpredictable redistribution. Finally storms, or unforeseen events such as yachts anchoring or fishing tackle dragging across sensitive areas, may seriously disorganise or damage an underwater archaeological site, especially when areas are exposed during excavation.

Most of these difficulties can be mitigated by appropriate procedures and good management. Spoil can be dealt with by removing it to a safe place by hand-shovel and bucket, or bagged and stacked in temporary dumps (at Duart this was a convenient way of filling sandbags for stabilisation purposes). Area excavation is only practical when a large coherent feature

Illustration 46
A fragile leather shoe immediately after excavation. Scale 15 centimetres

such as an element of hull-structure or a substantial deposit of compacted wreck-material is to be uncovered. A revetment wall of sandbags can be used to stabilise the edges of the opened area, and help to keep out weed and silt. Another approach, suitable for excavating loose deposits containing

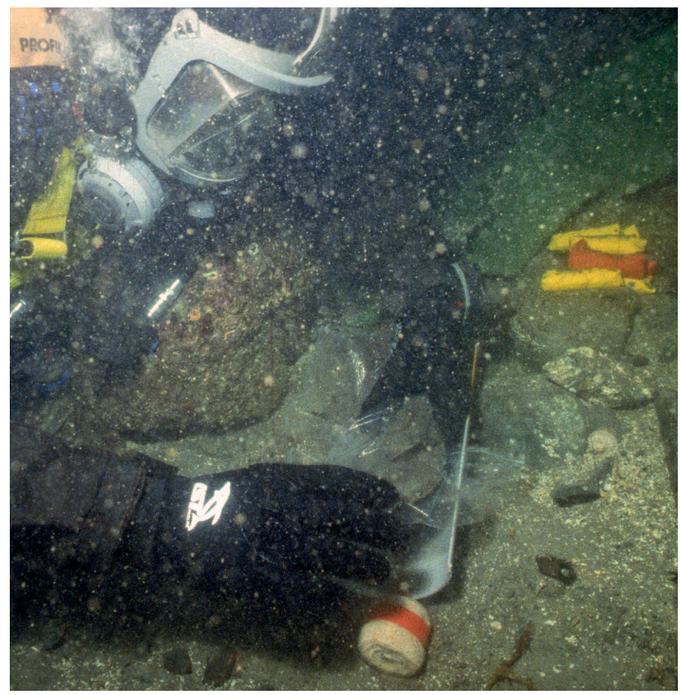

Illustration 47
The shoe, now in a polythene bag, is placed into a short length of plastic guttering before being secured with a bandage. The rolled bandage, with a lead weight at its inner end to ballast it and an easily detached wrapping of electrical tape, is placed close to hand (DP 174486)

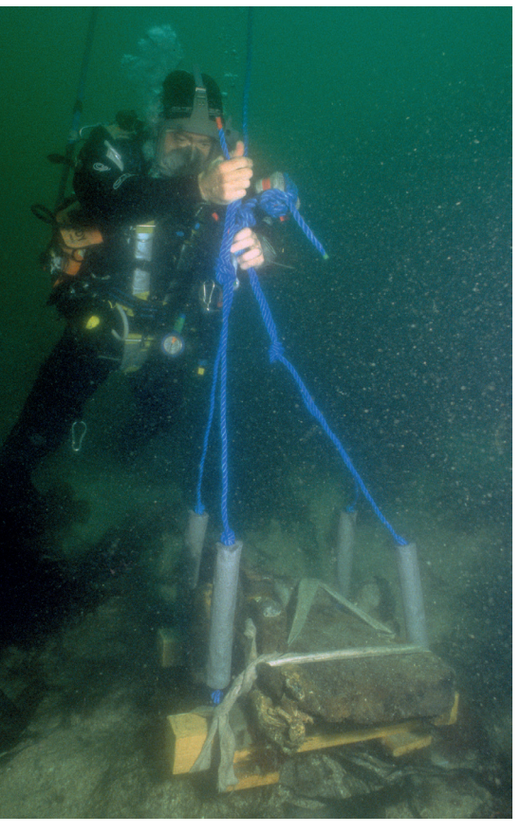

Illustration 48
Part of the wooden gun-carriage 83, secured to a supporting former with bandages, is prepared for lifting. The rope strops are surrounded by expanded polystyrene tubing to avoid damage to the wood (DP 174580)

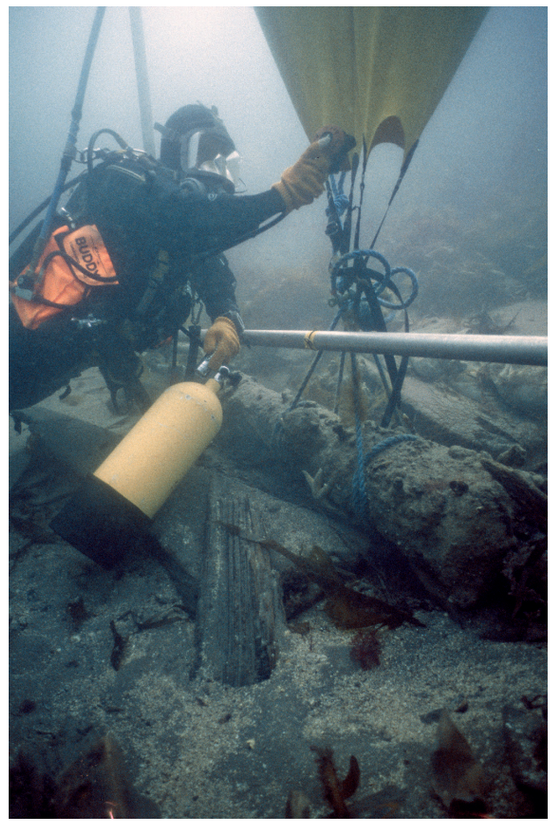

Illustration 49
Raising the concreted iron gun 82 by means of an air-bag, inflated from a high-pressure cylinder (DP 174543)

Illustration 50
The iron gun 82, its concretion removed, in the hands of conservators at National Museums Scotland (DP 174570)

scattered archaeological features, is to cut a trench across one end of the proposed excavation area to the depth required. The amount of spoil to be removed will depend on the angle of repose. Material from the initial trench is bagged and set aside. The trench is then taken forward on an advancing front, its face presenting a running section which provides stratigraphic reference for features located within it. When the end of the excavated block is reached a trench of the same dimensions as that created at the beginning will remain, and this can be filled with the bagged spoil, leaving the sea-bed in the same configuration as before, much as a garden plot is dug in a series of spits (Illus 44).

Spoil can also be removed by suction devices such as a water-dredge or air-lift (Martin 1983: 50–2), but the outfall is difficult to predict or control, and after some experiments with a dredge at Duart Point it was decided that the hand techniques described above were better suited to the requirements of this site.

Finds-management under water requires simple and well-organised routines. The system used at Duart Point involved a plastic baker's tray, ballasted with lead to ensure negative buoyancy. It was strung with stretched bungee cords to which bagged finds were attached with plastic clothes-pegs, and provided with strops to ensure a level lift to the surface. Swatches of self-sealing polythene bags of various sizes were secured to the tray with cable-ties so that individual bags could be torn off as required. Lead tags faced with plastic insulating tape on which unique finds identification-numbers were written were strung on a length of line so they could be accessed sequentially. For robust finds, the tags were inserted directly into the bag; while for delicate items the tape bearing the number was peeled off the lead backing and inserted on its own. A swatch of drafting-film notelets was provided for recording information for inclusion with the bagged finds (Illus 45).

These procedures were adequate for a majority of finds, but on occasion large or delicate items required individually tailored approaches. Objects such as leather shoes were undercut for the insertion of a supporting plastic sheet or

piece of guttering pre-cut to size, to which they were secured with bandages before removal and placement into suitably sized containers (Illus 46–7). Larger items, such as a wooden gun-carriage and a complete framed-and-panelled door, were placed on pre-constructed wooden stretchers ballasted with lead, to which they were secured with crepe bandages (Illus 48). Foam cushioning was provided at points of contact. Heavy lifts, such as the cast-iron gun raised for further study, were accomplished with the aid of air-bags and flat webbing strops (Illus 49).

Finds were processed and documented before being stored wet or dry, as appropriate, prior to transport to the National Museums' conservation facility in Edinburgh (Illus 50). Where their condition allowed they were drawn and photographed before conservation, so that subsequent dimensional or other changes could be recorded.