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Cleaning a dolphin skull and mandible to enable assessment of an unusual mid-nineteenth century scrimshaw

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Abstract

A very dirty skull and mandible of a rough-toothed dolphin with two scrimshaw images engraved on its surfaces needed to be cleaned so that the artwork could be properly assessed. A suitable and effective method of cleaning the bones was required which would not damage the artwork and, in particular, would not adversely affect the pigment used in the scrimshaw. No method could be found in the published literature so an existing gentle technique for cleaning osteological museum specimens was tried. After tests on the specimen provided good results, a conservation grade non-ionic detergent was used: Synperonic A7 alcohol ethoxylate. Small areas of the bone surface were gently swabbed with very small amounts of a dilute solution of the detergent in distilled water, then swabbed again just with distilled water and dried immediately with paper towels. The cleaned scrimshaw proved interesting. It shows a sailor by a ship's wheel and a three-masted ship under sail, rigged with a 'main spencer' and was probably engraved between 1830 and 1860. Pictorial scrimshaw left on a complete bone such as a skull or a mandible is unusual.

Keywords: Dolphin; Skull; Mandible; Scrimshaw; Cleaning; Conservation

Introduction

Amongst the ca. 4,000,000 natural history specimens in the Cambridge University Museum of Zoology is an unusual example of the art of 'scrimshaw'. Two images, a sailor and a ship, were engraved on the skull and associated mandible of a 'rough-toothed dolphin' (*Steno bredanensis* [ex. *rostratus* Cuvier] (Lesson, 1828)). Museum records show that the specimen was donated by a Mr Peachey in 1872, giving a latest date for the collection of the specimen and for the artwork. As there was relatively little commercial interest in scrimshaw until around the mid 20th century, it is likely that the skull was presented as a specimen for taxonomic purposes, with the engraving considered irrelevant.

Now considered an important maritime folk art, 'scrimshaw' is the name given to the wide variety of incised, carved and variously decorated items mainly made during the 19th century and primarily by those engaged in the whaling industry (West & Credland, 1995). The name is also used for the creative activity itself. The most common scrimshaw materials were the marine mammal products derived from the various whaling industries. These were typically baleen (known as 'whalebone'), part of the keratinous feeding apparatus in the mouths of whales of the small sub-genus *Mysticeti* (baleen whales); jawbone ('panbone') of any of the great whales; and the large teeth of the sperm whale (*Physeter catodon* (Linnaeus, 1758)).

This is the only great whale in the large sub-genus of *Odontoceti* (toothed whales) which includes porpoises and dolphins. Their teeth are a form of ivory, as are the tusks of walrus and narwhal and scrimshaw could be worked on these materials as well as other products such as wood, horn and tortoiseshell.

For pictorial scrimshaw, images would be scribed into the surface of the baleen, bone or ivory with a sharp point or blade. To enhance the contrast on the bone or ivory a pigment, usually black, was worked into the grooves. 'Lamp-black' (soot and oil) was often used, or for black or brown baleen a mixture of chalk and oil (West & Credland, 1995). The bone of cetacean mandibles is unusual, being particularly dense and evenly textured so the jaws of larger species were sawn, turned or shaped and polished to make a wide variety of scrimshaw, from walking sticks to baskets, toys, games and jewellery. Although some small cetaceans such as porpoises, dolphins and pilot whales were caught by whalers from time to time primarily for their meat, known as 'sea beef', scrimshaw on whole cetacean skulls is rare. Even decorated mandibles, or those separated into two at the symphysis, are less common than scrimshawed sperm whale teeth. They are generally considered bizarre rather than beautiful and scrimshanders chose less challenging materials if possible.

This particular scrimshawed dolphin skull and mandible is unusual because the bones have not been separated and the artwork has not been cut away from the specimen but has been left '*in situ*'. Scrimshaw artwork is normally presented on blank panels of bone or on single teeth, devoid of the rest of their osteological context. This specimen has had nothing removed and the pieces of artwork remain in their original context on the skull and associated mandible. This is rare and of historical interest.

The specimen has two clear examples of scrimshaw decoration. One is located on the occipital bone of the posterodorsal aspect of the cranium, showing the starboard side of a three-masted, full-rigged ship under sail (Fig 1, bottom left). The other is towards the rear of the right mandible and depicts a sailor holding a ship's wheel (Fig 1, bottom right). Although both images have black pigment in their incised lines the former initially appeared less well defined and more crudely executed. However, it was difficult to examine the specimen as it was covered in dust, dirt and sooty particulates (Figs 1, 2, 3 & 4). In addition, there was evidence of an earlier attempt to clean the rear of the skull, apparently with water, but rather than removing the dirt this had just moved it around and made more of a mess, further obscuring the artwork (Fig 1, top left & bottom left).

Cleaning the specimen

It was clear that both the skull and mandible needed to be cleaned to preserve the specimen, and so that the scrimshaw could be studied and assessed. Therefore an appropriate conservation treatment was required that would remove the dirt without harming the bone surfaces or wash away the unidentified pigment used for the scrimshaw.

No conservation techniques for cleaning scrimshaw could be found in the published literature. However, from past experience and in discussion with colleagues it was judged that the most effective way of cleaning the bone to remove the unsightly deposits gently without mobilising the pigment (and thereby spreading it and/or removing it) would be to swab small areas of bone with cotton wool lightly dipped in an aqueous solution of Synperonic A7, followed by swabbing with cotton wool dipped in distilled water to remove the Synperonic A7 (cotton wool pads, balls or buds could be used) and gently dry-

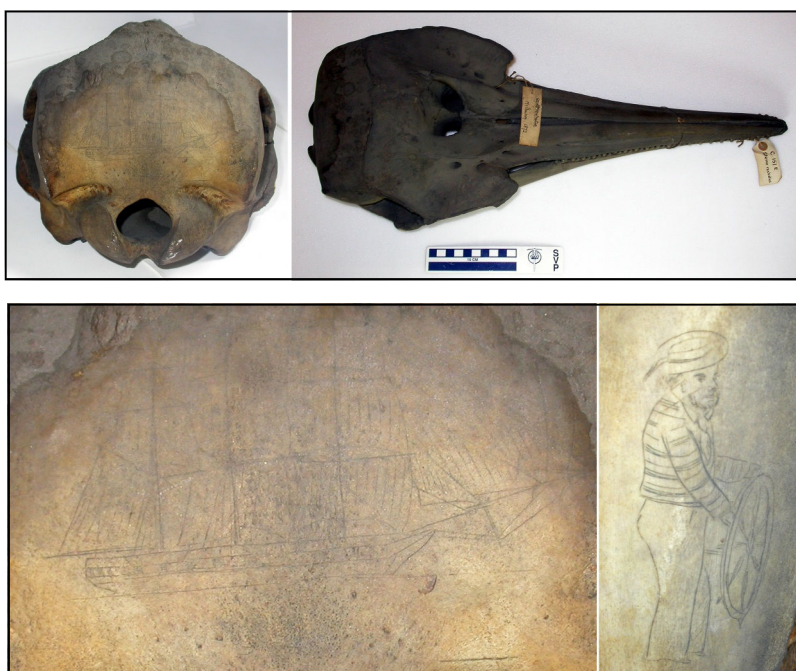


Fig. 1. Top Left: Posterior view of the skull, showing how an attempt made in the past to partially clean the rear of the skull with water was unsuccessful.

Top Right: Dorsal view of the articulated skull and mandible, showing the condition of the specimen was before cleaning (scale in cms).

Bottom Left: The scrimshaw artwork depicting the starboard side of a fully rigged ship under sail, on the occipital bone of the posterodorsal aspect of the cranium, before cleaning

Bottom Right: The scrimshaw artwork depicting a sailor at the wheel of a ship, on the proximal end of the right mandible, before cleaning (this photo has been rotated through 90° so that the figure is the right way up).



Fig. 2. The test area of the scrimshaw that was cleaned first (scale in cms).

ing the area immediately with a paper towel. Synperonic A7 is an alcohol ethoxylate that has recently replaced 'Synperonic N', a mild non-ionic detergent that had been widely used by conservators in museums for decades to clean osteological specimens and other material. It can be used as a detergent, wetting agent, non-ionic surfactant, and an emulsifying and dispersing agent (McCutcheons, 2003; Hackney, *et al.*, 1990).

Before this method was tried on the artwork, a small test area on an undecorated part of the mandible was cleaned. As this was found to be successful a small area of scrimshaw was very gently cleaned with this method (Fig 2). The artwork remained completely unchanged and there was no colour on the cotton wool swab other than from the surrounding dirt, therefore the pigment had not been mobilised and the technique was deemed to be a success. The rest of the specimen was subsequently gently cleaned with this method, patting each area of the bone gently with a paper towel to dry it immediately after cleaning so that the small amounts of water used had little chance to soak into the bone. This was to reduce the chances of



Fig. 3. Halfway through cleaning the rear of the skull (scale in cms).

the bone warping and/or splitting due to the sudden wetting and to reduce the chance of the pigment being affected. Fig 3 shows the process half way through cleaning the rear of the skull. The specimen is now noticeably cleaner and the scrimshaw artwork is clearer and more easily and effectively studied (Figs 4, 5, and 6).

Discussion

The dolphin

The conservation status, habits and distribution of the rough-toothed dolphin are poorly understood as this species inhabits deeper waters (>1km depth) off the continental shelves of the world. However, its range seems to be broad with reports from the Atlantic, Pacific and Indian oceans, typically in warm temperate, subtropical or tropical waters (West, *et al.*, 2011). Therefore little can be said about the specimen's likely geographical origins. However, once the specimen had been thoroughly cleaned the artwork could be assessed much more easily and accurately, enabling a relatively reliable date to be put to the artwork and the specimen itself, as well as facilitating other observations.



Fig. 4. The artwork depicting a sailor at the wheel of a ship, on the proximal end of the right mandible, after cleaning (far right, detail turned through 90° so the figure is the right way up).



Fig. 5. The occipital bone of the posterodorsal aspect of the cranium, after cleaning. The scrimshaw with the starboard profile of the ship clearly shows the main spencer, which is the (fore- and aft) gaff sail on the main lower mast. It is narrower than the similar spanker/driver on the mizzen (aftermost) mast.

The scrimshawed ship

On the occipital bone at the rear of the skull is the starboard profile (broadside) view of a three-masted ship under sail. The hull has either a single gun deck, or, more likely, a line of painted false 'gun ports', often called 'Nelson chequer', but there is nothing else to suggest a naval ship. She is flush-decked (with no raised quarterdeck, poop or fore-castle) and her deck has little or no sheer (an upward curve towards the bow and stern). Her bow has a curved forward extension and the stern appears to have galleries or windows on its quarters.

All three masts carry 'square' sails on yards. The fore- and main-masts each have, from bottom to top, a 'main' or 'course', a 'top-sail', a 'top-gallant' and a 'royal' sail. The mizzen (the aftermost mast, usually without a 'course') has no royal. The top-sails (second row up) are 'single', i.e. they have not been divided horizontally into upper and lower sections for ease of management. This became common on some merchant ships by the 1850s or 1860s, but not on whaling ships or naval vessels as both carried relatively large crews. She also carries the usual 'fore-and-aft' sails: i.e. in line with the keel. These are the headsails and the spanker/driver on the mizzenmast. An additional interesting feature is the main spencer: a gaff trysail resembling the spanker/driver at the stern, used as a staysail and set abaft (behind) the main mast. Like the other fore-and-aft sails, spencers could utilise wind unavailable to square sails. They were a transitional form between the older trapezoid staysails and the long-lasting triangular form, still found on large square-rigged vessels. Most of those now afloat are relatively modern sail-training ships. Spencers were advocated for British merchant vessels in 1824 (MacGregor, 1984: 28) and they appear on both British and American whalships scrimshawed by Frederick Myrick of Nantucket ca.1829 (West, 2000: pls 1; 4-7; 9-10). Although they remained in common use until ca. the 1860s, they are rarely found on scrimshaw. The lines down the sails, not always shown, indicate the canvas cloths which were stitched together to make the sails. However, the uneven nature of the medium (discussed below) would preclude much fine detail.

The scrimshawed figure

The sailor on the posterior of the right mandible is a stocky man with disproportionately short arms and legs, tiny feet and hands and a large head. His clothes are characteristic of a seafarer. He is wearing a canvas or straw hat (not tarred as it is light coloured), with a rather narrow brim and the crown encircled by a band with loose ends. Although the man's shape is vague, his features are well-defined. His shirt/jersey has both broad and narrow stripes and a scarf or kerchief is knotted at his collar. His light coloured trousers are fairly wide. The short vertical line from the waist probably indicates the right edge of a fall-front or flap opening with buttons on either side, the usual trouser fastening for many decades. He has shortish hair and an extensive, narrow, well-trimmed beard which, with the side burns (side whiskers), extends almost from ear to ear. This is possibly the best indication of a date for the image as nothing about his clothing is distinctive. Such whiskers are common on pictures of British sailors between ca. 1830 and the 1860s, though later some men also wore moustaches (Dickens 1957: pls. 18 & 19 & 1977: 18-20; Winton 1977: 54; 57; 66; 84; 120). Although obviously a helmsman, the disembodied ship's wheel would be very small for the vessel portrayed on the rear of the skull.

Whilst it is impossible to date most scrimshaw accurately, features of both images suggest a date between ca. 1830 and 1860.

Craftsmanship

Both ivory and bone are slightly plastic and distort when cut or scratched. Illumination of the surfaces with oblique light and magnification can show the tiny ridges and hollows made in the material by tools. Even minute grooves cast shadows and raised areas which have become polished by subsequent wear have reflective edges (West, 1989). Before engraving, scrimshaw materials were smoothed and polished. The simple hand tools and abrasive materials of times past produce quite different surface marks from the more efficient modern power tools and graded abrasives. Such surface characteristics can help to establish age and



Fig. 6. The articulated skull and mandible, after cleaning, with the artwork depicting a sailor at the wheel of a ship towards the rear of the right mandible.

authenticity. The small irregularities produced can also reveal the tools used to 'engrave' pictorial scrimshaw and, sometimes more importantly, how they were used. The usual tool was a fine blade and/or a point, not a professional graver/engraving tool. Their penetration of the material is different: a blade usually undercuts the medium and raises a small flange whereas a point shatters the edges of a groove to varying extent. Experienced scrimshaw artists developed a characteristic style which can, with practice, be recognisable. This has occasionally enabled the work of some individual artists, whether anonymous or not, to be identified.

Visible in several places on the surface of this specimen, especially on the mandible, are areas of short parallel lines one millimetre or so apart, made by the ridges of a coarse file or rasp. There are also the traces of scrapers, fairly heavy metal blades which are held at approximately 90° to the surface and drawn across it under pressure. This removes smaller irregular surface features. Scraper blades soon develop a characteristic profile of minute ridges and hollows which can be recognised on different parts of a surface on which they were used. Traces from rasps, coarse files and scrapers are characteristic of old scrimshaw.

The response of the two worked areas to smoothing is different. The outer surface of the mandible is relatively flat and as cetacean mandibles are composed mainly of dense bone, its newly exposed surface has remained smooth. The sailor is engraved with a blade, held at an acute angle to the surface at least in places, as a few of the edges of the cuts are still raised above the surface. However, the bone appears to have been harder than expected (or the knife blunt) as many of the lines, though extensive, are shallow with tiny raised edges. The deepest lines, e.g. those used to outline the legs and arms, appear double-cut i.e. two cuts

converging to remove a small 'V' of bone. His striped shirt is shown mainly by shallower cuts.

In contrast, the attempt to smooth the outer surface of the occipital bone has exposed a layer traversed by many pores and holes in a range of sizes. This layer, known as diploe, is a spongy bone layer between the outer and inner compact bone layers of the skull which houses a network of nerves and blood vessels (Adrian Friday, personal communication). In an attempt to smooth the surface, the scrimshaw artist inadvertently made the area more difficult to engrave. However, he has correspondingly adapted his technique by holding the blade almost vertically to make relatively deep cuts and sometimes double cuts, thus resulting in the lines of the image being as smooth as possible. Had he used slanting blade cuts (the most common method) to engrave the ship, the remains of the sectioned pores would have distorted the outline of the image even more. His lines are remarkably straight, as if a guide had been used, a device which would have been very useful for scrimshawing sailing vessels but which seems not to have been common.

It was very rare for scrimshaw artists to have had any form of training, although well into the 20th century many men (and women) became talented amateur artists. With scrimshaw, as elsewhere, experience was valuable and in this case the scrimshander was certainly proficient and adaptable as he dealt admirably with the particular difficulties of the skull. The scrimshaw images themselves have no great historical significance but as a whole the specimen is a very interesting find.

Conclusions

This paper documents for the first time (to our knowledge) a safe and effective method for cleaning osteological specimens exhibiting scrimshaw without damaging either the specimen or artwork, including the black pigment used in this case. Even extremely dirty bones covered in what were presumably, at least in part, 'sooty particulates' can be cleaned effectively and safely without damaging the scrimshaw artwork using minimal amounts of diluted Synperonic-A7 non-ionic detergent in distilled water. However, both care and time are required, and testing a small area first is essential as different sorts of pigments were used.

The cleaning facilitated the assessment of the scrimshaw artwork engraved upon the bone surface which enabled conclusions to be drawn as to the likely period of the scrimshaw and, by association, give an approximate likely date for the death and collection of the animal itself, in this case a rough-toothed dolphin. The level of the craftsmanship could also be assessed.

Whilst it is impossible to date most scrimshaw accurately, features of both images on this specimen suggest the artwork was executed between ca. 1830 and 1860, presumably not long after the animal was caught and de-fleshed. Due to the widespread distribution of this species and the lack of any information about the specimen prior to its donation to the museum, the geographical location of its capture is completely unknown.

From the quality of the scrimshaw and the difficulties encountered in working on this particular sort of specimen, especially the cranium, it was most probably executed by an experienced and competent scrimshaw artist. However, the skull appears to have been new to him as he inadvertently exposed the diploe layer. It was not unusual for the mandibles from smaller cetaceans to be used for scrimshaw, but it is unusual to find scrimshaw on a skull.

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The artwork on this particular dolphin skull and mandible is unusual not because of the skill with which it was executed but because the material is difficult to engrave well. In addition, scrimshaw artwork is normally presented on blank panels of bone or on single teeth, devoid of the rest of their osteological context. This specimen has had nothing removed and the two pieces of artwork remain in their original context on the skull and associated mandible. This is relatively rare and is of historical interest.

In the normal course of a whaling voyage it would have been unusual for a small toothed whale to have had its head removed, whether it was destined to provide meat alone or have its blubber used as well. However, from the mid-18th century there was an increasing interest in the natural world and especially in determining the relationships between organisms, and so in their classification: the natural order. Naturalists and scholars were and still are, keen to find new specimens. During the 19th century, museums were being built and natural history collections were growing. Whaling vessels were an excellent source of marine life and many whaling captains and the whaling surgeons who eventually sailed with them were interested in providing specimens. It is possible that the skull here discussed was 'commissioned' and offered as a dolphin specimen for anatomical study or to add to a collection. Perhaps one of the crew was an opportunist and took advantage of a new if awkward material to experiment with for his scrimshaw.

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