

## Two historical weapon fragments as an aid to estimating the longevity and movements of bowhead whales

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**Abstract** The age of bowhead whales captured by Native Alaskan hunters in the Bering, Chukchi and Beaufort Seas has been estimated via chemical analyses of the eye lenses, and other techniques. The racemization-age estimates indicate that bowhead whales (*Balaena mysticetus*) have a life-span of more than a century. Stone and ivory weapon fragments recovered from bowhead whales hunted in Wainwright and Barrow (Alaska) in 1981, 1992, 1993 and 1997, provided rough but independent assessments of the whales’ longevity; however, their date of manufacture was unknown. Adding further confirmation of these age estimates, this note describes bomb lance fragments recovered recently (2007) and about 30 years ago (1980) from bowhead whales harvested by Eskimo hunters that were “dateable” and likely manufactured between 1879 and 1885.

**Keywords** Bowhead whale · Age estimation · Whaling technology · Whaling history · Yankee whaling

In the nineteenth century commercial whale hunters in the Bering-Chukchi-Beaufort seas fishery knew that struck-but-lost bowhead whales did not necessarily die and were capable of carrying whaling equipment for many years. For example, in 1890 a toggle-headed whaling iron recovered from a bowhead in the Bering Sea by the crew of the steam bark *Beluga* of San Francisco bore the ownership mark of

the ship *Montezuma* of New London, Connecticut (Dall 1899, p. 136). The last cruise of the *Montezuma* in the Bering-Chukchi-Beaufort fishery was 1853 (Bockstoce et al. 1987). The iron was therefore carried by the whale for 37 years. Another iron, sold in 1881 to Captain Calvin Leighton Hooper of the US Revenue Cutter *Thomas Corwin* by the Eskimos of Cape Espenberg, on the north coast of the Seward Peninsula, had the maker’s mark of Thomas Scorrar, a shipsmith who manufactured whalecraft in London in the second quarter of the nineteenth century (Credland 2007 personal communication). “This weapon was taken by the Eskimo on the shore of Kotzebue Sound in the fall of 1880”, wrote the naturalist and ethnographer Edward William Nelson, who was aboard the *Corwin*. “This harpoon was shown to every whaling captain we met during the summer, and, without exception, they were emphatic in the statement that no such iron was ever used by any vessel in this part of the Arctic Ocean, but that it was a common pattern with the English whalers on the Greenland coast. As each whaler has a private mark on his irons, which all other whalers working in the same region know, there is no doubt that the captains were right, and that the iron in question had been brought from Greenland in the body of the whale” (Nelson 1887). Captain Hooper added, “As there are no English whalers in this part of the Arctic Ocean, and none of the American whalers use English irons, it is probable that this whale was struck by some English whaler on the Atlantic side, and escaping, had afterwards found his way to the Pacific by either the northeast or northwest passage” (Hooper 1884).

In the twentieth century, native whalers also recovered historical whaling equipment from bowheads. In May 1981 a walrus ivory harpoon head with a metal end blade was found in a whale captured by hunters from Wainwright, Alaska, and a triangular metal blade was also discovered in

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a blubber cache at Wainwright from a whale that was captured in 1992 or 1993. A slate end blade was found in a whale at Barrow in 1992, and two stone points (slate and jade) were discovered by hunters in a whale at Wainwright in 1993 (George et al. 1999). Noongwook et al. (2007) report the finding of an ivory harpoon head in a bowhead on St Lawrence Island around 1939. Native shore whalers in the Bering Strait region and northern Alaska used their traditional whale hunting tools until the latter half of the nineteenth century and only began widely to adopt manufactured whalecraft in the latter 1880s. These stone artifacts are thought to have originated (and likely been used) prior to that date (Philo et al. 1993; George et al. 1999, 2004; Weintraub 1996). Similarly, George et al. (1999) and Rosa et al. (2004) used an aspartic acid racemization ageing technique (on the nucleus of the eye lens) which indicated that bowheads may routinely live in excess of 100 years—a finding which remains somewhat controversial and requires further testing.

Although Eskimo hunters have recovered bomb-lance fragments from a few bowheads within the last two decades (Philo et al. 1993), these fragments appeared to be modern weapon fragments that were the result of relatively current harvest attempts. The recent discovery of a bomb lance fragment from the right scapula of a large bowhead whale (Number 07B8, 14.9 m, male) at Barrow, Alaska, on 16 May 2007 (Fig. 1) is the *first case* in which it is possible to date the embedded artifact and thus added further confirmation of the bowhead's longevity.

Bomb lances were introduced aboard whaleships in the early 1850s and soon became widely employed in the

Bering-Chukchi-Beaufort fishery because they allowed the whalers to kill a bowhead before it escaped into the protection of pack ice. A bomb lance was a small metal cylinder that was, in the early years, fired from a heavy shoulder gun. The bomb lance was filled with gunpowder and fitted with a time-delay fuse that allowed it to explode a few seconds later inside the whale. By 1865 the darting gun, which also fired a bomb lance, was introduced into the fishery. A darting gun was mounted at the end of a harpoon shaft, alongside the toggle iron. When the toggle iron had penetrated far enough into a whale to gain a good hold, a parallel-mounted trigger rod hit the whale's skin and fired the gun, which shot the bomb lance into the whale (Bockstoce 1986).

The bomb lance fragment that was retrieved at Barrow in 2007 is a composite artifact comprising three finely machined brass pieces: the point of the bomb lance, a brass "hammer" or ignition weight, and a screw-in housing which separated the point and the ignition weight from the body of the bomb lance. The body of the bomb lance, which contained the explosive charge, was not recovered.

This fragment was compared to bomb lances in the collection of the New Bedford Whaling Museum, and it was a model patented in 1879 by Ebenezer Pierce. Thomas G. Lytle wrote: "Ebenezer Pierce of New Bedford invented an improved bomb lance with an improved method of igniting the fuse. He used a small metal weight suspended on a light wood pin over a percussion cap on a nipple at the end of the fuse tube. When the gun was discharged, the inertia of the weight was sufficient to break the wood pin and allow the weight to strike the percussion cap, detonating it. The fire from the cap ignited the fuse. Because the mechanism was entirely within the bomb lance, the fuse was protected from damage caused by the elements" (Lytle 1984). Most important for this study, Pierce's patent of 1879 was an improvement in that it incorporated "a detachable cover that allowed access to the fuse (Fig. 1). When the end of the fuse was cut off, immediately before use, a fresh surface was obtained, helping to insure proper ignition" (Lytle 1984). Pierce modified his patent in 1885, rendering the 1879 patent obsolete. This fragment's firing mechanism does not resemble the new (1885) patent, which, among other modifications, included two vent ports in the weapon's head to allow the escape of gasses which were released when the ignition weight struck the percussion cap (Fig. 2). The 1879 patent model—the one that was recovered in 2007—lacked these ports. Without the vent ports, when the percussion cap was ignited, it released hot gasses which could have been forced directly into the body of the bomb lance, thus igniting the explosive instantly, rather than a few seconds later, as it was designed to do if the fuse had burned into the chamber as planned. In such a case the bomb lance would have exploded immediately in the shoul-



**Fig. 1** Assembled bomb lance fragment (from whale 07B8 captured at Barrow, AK, in May, 2007) shown with a complete and quite similar Ebenezer Pierce 1885 patent bomb lance (New Bedford Whaling Museum accession number 1988.10). The bomb fragment is an example of model made according to a patent issued to Ebenezer Pierce in 1879 (photo unavailable). That model became obsolete in 1885, when Pierce received a patent for an improved ignition apparatus, which included small holes or gas vents (which cannot be seen in this photograph) in the bomb's head to allow the ignition gases to escape



der gun or darting gun, severely injuring the harpooner, not the whale. Such an important improvement in bomb lance technology would, of course, have been adopted very quickly by the whalers, rendering the 1879 model obsolete. This consequently gives us confidence that this bomb fragment was almost certainly *not* manufactured after 1885.

There are other clues to the bomb lance's use. At the tip of the fragment six small indentations or notches have been filed into one of the point's four ridges (Fig. 2). These indentations are most likely an ownership mark of a native whaling captain. When a photograph was shown to hunters in Gambell, Diomedes, and Shishmaref (Alaska), without exception they commented that the six filed uneven/home-made notches were Native-made and that they probably represented the number of whales that this native whaling captain had previously caught (G. Sheffield, personal communication 2007). Because the body of the bomb lance was not recovered, it is impossible to determine whether it was used from a shoulder gun, hence would have been fitted with four stabilizing fins, or whether it was fired from a darting gun, in which case it would not have had fins.

It is more difficult to determine when the bomb lance was used. Native whale hunters were quite conservative in their use of non-traditional equipment in the whale hunt, and it was not until after commercial shore stations were established in the region that foreign equipment was incorporated into the natives' whaling tool kit. Commercial shore whaling began in 1884 at Point Barrow and in 1887 at Point Hope, and the natives took a few years after that to adopt Yankee whalecraft. Bomb lances were expensive; hence it is unlikely that native whaling captains would have purchased more than one or two at a time, and they probably would not have replenished their stock until they had completely—or nearly—expended their supply. A particular inventory of bomb lances was ordinarily used quickly, and new inventions were also adopted quickly. Therefore it

seems very likely that this bomb lance was fired within a few years before or after about 1890.

Nonetheless, the possibility that the bomb lance was stored for a length of time, either by the commercial whaler who brought it to the region or by the Native whaler who eventually used it or both, is a possibility. Some Native whale hunters at Barrow have old darting and shoulder guns that they are proud of and which have sentimental value, but they recognize them as antiques. In Little Diomedes, a hunter had two old darting gun bombs dating to early 1880s that are mounted on the wall of his home in 2007 which he recognizes as antiques and does not use them for whale hunting—even though one remains loaded with powder and ready for use (G. Sheffield, personal communication 2007). When asked about the likelihood of old weapons being used several decades later, a senior whaling captain (Barrow, Alaska), replied that while he has occasionally used parts of exploded bombs from previous strikes, he recognizes very old equipment as antique and not suitable for hunting. Furthermore, he felt the degree of healing around the wound, from which this bomb lance fragment was removed from whale 07B8, suggests this whale was quite old. Based on our observations and conversations with whalers, we feel that the bomb was probably used soon after manufacture in the nineteenth century.

As we conducted our examination of the fragment that was recovered in 2007, JCG located another bomb lance fragment that had been discovered in a whale that was harvested on 4 May 1980 (designated whale 80G1; female 15.7 m) at Gambell, St Lawrence Island, Alaska (Fig. 3). The hunters found no identity marks on the bomb. The significance of the fragment, in terms of longevity, from whale 80G1 was largely overlooked until the discovery of the recent fragment. At the time it was found, that fact that the whale had survived a strike was the most noteworthy aspect of the recovery because very few similar cases were known



**Fig. 2** Disassembled bomb lance fragment from whale 07B8. The three pieces of the bomb fragment are 1 the bomb lances' head, with the six-grooved ownership mark (see lower left *inset*) and the hole for anchoring the firing weight, 2 the firing weight (or "hammer"), and 3 the piece that connected the head of the bomb lance to its body, and through which the fuse was led. When the bomb lance was fired, the

inertia of the firing weight broke it free, forcing it to strike a percussion cap, which would ignite the fuse. The fuse then burned back through a tube in the connecting piece and ignited the black powder explosive in the bomb's body a few seconds later. The bomb lance's body tube was not found





**Fig. 3** Disassembled bomb lance fragment from whale 80G1, captured at Gambell, AK, in 1980. This is also a piece of a bomb lance made according to Pierce's 1879 patent as it lacks the gas vents in the head as in the 1885 patent. More of the fuse tube has survived and can be seen in this photograph

for bowheads. Upon reexamination, we found that it was also a fragment of a model patented by Ebenezer Pierce in 1879.

Together, these two bomb fragment recoveries support the longevity estimates for bowhead whales made using other methods, and demonstrate the importance of maintaining good museum archives and collections.

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## References

- Bockstoce JR (1986) Whales, ice and men. The history of whaling in the Western Arctic. University of Washington Press, Seattle
- Bockstoce JR, Batchelder CF, Rex E, Sleeman GS (1987) A list of whaling cruises to the northern Bering Sea, the Chukchi Sea, and the Beaufort Sea, 1848–1921. Typescript, New Bedford Whaling Museum, New Bedford
- Credland A (2007) Personal communication to Bockstoce JR, 8 June 2007. Arthur Credland, Keeper of Maritime History, Hull Maritime Museum, Hull HU1 3DX, UK
- Dall WH (1899) How long a whale may carry a harpoon. *Natl Geogr Mag* 10(4):136–137
- George JC, Bada J, Zeh J, Scott L, Brown SE, O'Hara T, Suydam R (1999) Age and growth estimates of bowhead whales (*Balaena mysticetus*) via aspartic acid racemization. *Can J Zool* 77:571–580
- George JC, Follmann E, Zeh J, Suydam R, Sousa M, Tarpley R, Koski B (2004) Inferences from bowhead whale corpora data, age estimates, length at sexual maturity and ovulation rates. Presented to the Scientific Committee of the International Whaling Commission, Paper SC/56/BRG8
- Hooper CL (1884) Report of the cruise of the US Revenue Steamer Thomas Corwin in the Arctic Ocean, 1881. Government Printing Office, Washington DC
- Lytle TG (1984) Harpoons and other whalecraft. Old Dartmouth Historical Society, New Bedford,
- Nelson EW (1887) Report upon natural history collections made in Alaska between the years 1877 and 1881. In: Kenshaw HW (ed) Arctic series of publications issued in connection with the Signal Service. No. III, US Army, Government Printing Office, Washington DC
- Noongwook G, Native Village of Savoonga, Native Village of Gambell, Huntington HP, George JC (2007) Traditional knowledge of the bowhead whale (*Balaena mysticetus*) around St Lawrence Island, Alaska, *Arctic* 60(1):47–54
- Philo LM, Shotts EB Jr, George JC (1993) Morbidity and mortality. In: Burns JJ, Montague JJ, Cowles CJ (eds) The bowhead whale. Allen Press, Lawrence pp 275–307
- Rosa C, George JC, Zeh J, O'Hara T, Botta O, Bada J (2004) Update on age estimation of bowhead whales using aspartic acid racemization. Paper SC/56/BRG6 presented to the 56th Scientific Committee of the International Whaling Commission, Sorrento, June 2004
- Sheffield G (2007) Personal communication to George C, Alaska Department of Fish and Game, Fairbanks, 99723
- Weintraub B (1996) Harpoon blades point to long-lived whales; Geographica section. National Geographic Society, Washington DC