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Aconite Poison Whaling in Asia and America
An Aleutian Transfer to the New World

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ACONITE POISON WHALING IN ASIA AND AMERICA AN ALEUTIAN TRANSFER TO THE NEW WORLD

BY ROBERT F. HEIZER

INTRODUCTION

In this paper I propose to discuss a subject which on its own merits deserves specific treatment, and in addition has the value of presenting new evidence bearing on the important problem of the interchange of culture between Asia and America via the Aleutian Island chain. This latter aspect will be considered in the final section of the work.¹

Whaling is of general occurrence on the east Asiatic littoral from East Cape at Bering Strait at least as far south as Japan. It is commonly considered a general feature of Eskimo culture, though some groups, by reason of continental cultural orientation or environmental restrictions, do not indulge in it. It occurs from Point Barrow southward in Bering Sea and eastward to Greenland. Whaling spilled over in the east to the New England coast of Maine. Among the so-called Pacific Eskimo (Aleut, Kaniagmiut or Koniag) whaling was a very important subsistence feature. Its southward extension was the west coast of Vancouver Island and the coast of northwestern Washington from Cape Flattery as far south as the Quinault River. The intervening stretch north of the Nootka to the Kenai Peninsula is commonly thought of as an area of non-whaling; the suspicion, for which there is some evidence, of the former existence of whaling in this coastal and offshore-island area of maritime peoples raises a separate problem which I prefer to leave for future consideration.

On the Pacific littoral of northeast Asia there is a small, restricted area where whaling was accomplished by the relatively simple procedure of throwing a lance into the whale, the stone point of which was detachable and smeared with deadly aconite poison. The area is that of the Kurile Islands and the Kamchatkan coast. The Koryak to the north and Japanese to the south employed different methods.

¹ I wish to acknowledge my indebtedness to Dr. Ronald L. Olson for the original stimulus leading to my treatment of this problem.

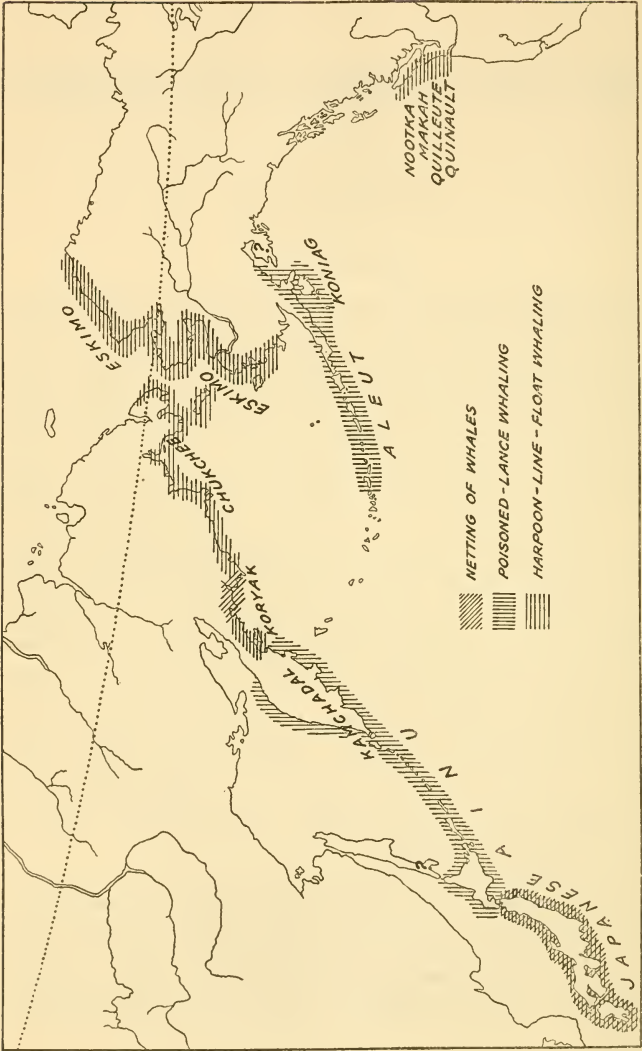


FIGURE 56.—Whaling methods in the North Pacific and Bering Sea.

KAMCHATKA PENINSULA-KURILE ISLANDS

Steller (1774, pp. 98, 103, ftn. (a)) has left the best description of Kamchadal whaling:²

Whales are also taken in the neighborhood of Kamtschatka in the number of ways which I shall cite here, however inconceivable such seem and are astonishing in view of [the size of] these great sea animals. Around *Lopatka*³ and the Kurile Islands the inhabitants travel into the sea in baidars,⁴ seek places at which these are accustomed to sleep; as many animals as they meet, so many do they shoot with poisoned arrows, whereby they suddenly puff out [become animated?], storm and rage frightfully and go (down) into [sound] the sea, and it happens now and then, that one or more, at times even none of them, are cast upon the shore. When the Kuriles obtain a whale,⁵ no one begins to cut it up until all are assembled; first shamanizing takes place, each one puts on his best clothes, and carries home his portion, after this one yurt entertains the other. Before and after the entertainment they give their dance, and otherwise delight themselves in all sorts of ways, which will be treated in what follows.

As soon as a whale comes to the land in Kamchatka, they fasten it with a thin line to a little stick stuck in the sand, and believe certainly on this account, that neither the spirits nor the sea nor *Gamuti*, or spirits of the land, can any longer have any claim to it.

Further descriptions of the Kamchadal whale fishery are passing references,⁶ or are seemingly traceable to Steller's original account.

Whaling in the Kurile Islands between Yezo and the Kamchatka peninsula is recorded, but not described adequately. Krashennikov says (1764, p. 138; see also Steller, 1774, p. 98) the "Kuriles [kill whales] by throwing poison darts into them." The same author⁷ notes that the southern Kurilians (i. e., Ainu) feed on whale's fat. Shelekhoff (1812, vol. 1, p. 128) states that the Japanese receive whale oil from the Matmai Kuriltze.⁸ Kishinouye⁹ figures an engraved bone with a whale hunt (?) pictured on it. It represents a whale harpooned from a boat bearing eight men (fig. 57, a). A small

² The accounts of Asiatic whaling by Tooke (1801, vol. 3, pp. 18-20) and Krashennikov (1764, pp. 138-139) are similar to Steller's fuller description, which I offer here in translation from the German edition.

³ Cape Lopatka, the southernmost tip of the Kamchatka Peninsula.

⁴ This word ordinarily refers to skin-covered boats; here it means wooden boats with dugout hulls and built-up side planks (cf. Torii, 1919, pp. 178-183).

⁵ Presumably this refers to the moment when the whale, previously attacked, has come ashore as already described by Steller.

⁶ Steller, 1774, pp. 100, 103, ftn. (a); Krashennikov, 1764, p. 141. Von Langsdorff (1813, p. 262) and Petroff (1884, p. 146) deny Kamchadal whaling. By Von Langsdorff's time the practice may have been forgotten.

⁷ Krashennikov, 1764, p. 39. La Pérouse, 1799, pp. 59-60, 75. Drift whales cast ashore on Etorup are mentioned in *Neue Beschreibung*, 1782, p. 134.

⁸ The Kurile Islands, except the two northernmost opposite Cape Lopatka, were occupied by Ainu. These two northern islands, Paramushir and Shumshiri, were inhabited by Kamchadal. There are a few slight indications that others of the Kurile Islands may have been occupied by Kamchadal, or, at any rate, strongly culturally influenced from Kamchatka.

⁹ Kishinouye, 1911, p. 365. Tsuchiya (1937, p. 11) says this bone has been examined by Tsuboi, who thinks it is late and represents the sperm-whale fishery of medieval or modern times. Tsuchiya is unimpressed; apparently feels Tsuboi's opinion may not be correct.

boat-shaped figure just above the whale is unexplained. Von Siebold, in reproducing an account of 1643, says that whales are caught on Yezo,¹⁰ and again, that whales are seldom caught by the Ainu.¹¹ The same account mentions poisoned arrows but does not state that poison was employed in the capture of whales. The Ainu are apparently familiar with whales to the extent that they have 19 names for them (Von Siebold, 1859, p. 148; 1897, vol. 2, p. 260). La Pérouse¹² says the Ainu trade with the Japanese in whale oil. "This fish is caught only on the southern coast of the island [Sakhalin]." I grant that these citations are inconclusive evidence to offer as proof of Kurilian Ainu whaling, but I feel that they may be tentatively interpreted as such.

JAPAN

As regards the origin of Japanese whaling, I can offer nothing. It suffices for present purposes, then, to note that the method is not like that employed in the Kamchatka-Kurile region to the north, but rather with iron harpoons and heavy nets (pls. 20-22).

Kempfer¹³ (or Kaempfer, Kimpfer) says:

Of all the animal productions of the Japanese seas, I know none of so extensive an use, for rich and poor, as the Kudsiri, or whale. It is caught frequently about Japan, but particularly in the Sea Khumano, which washes the southern coasts of the great island Nipon, as also about the islands Tsussima and Goto, and upon the coasts of Omura and Nomo. The common way of catching them is with darts, or harping irons, as they do in the Greenland fishery, but the Japanese boats seem to be fitter for this purpose than ours, being small, narrow, tapering to a sharp point at one end with 5 oars, or 10 men each, who row them with incredible swiftness. About 1680, a rich fisherman in the province Omura, whose name was Gitaijo, found out a new way of catching whales with nets made of strong ropes about 2 inches thick. This method was afterwards followed with good success by a countryman in the islands of Gotho, whose name was Iwonomo. They say, that as soon as the whale finds his head entangled in a net he cannot, without great difficulty, swim further, and may be very easily killed with harpoon irons after the common manner. The reason why this new method, which seemed to bid very fair for success, hath not been universally received is because it requires a great and much more expensive set of proper tackle than common fishermen can afford.

Fraser (1937), in a preliminary paper, refers to a Japanese book¹⁴ on whaling of 1790. The Dutch (e. g., Vries in 1643) may possibly have introduced whaling into Japan, judging not only from the

¹⁰ Von Siebold, 1859, p. 100. See Charlevoix, 1736, vol. 6, pp. 37-38.

¹¹ Von Siebold, 1859, pp. 147-148. The Ainu legend of how two men killed a whale between Alaid and Paramushiri may possibly reflect a memory of whaling (Torii, 1919, p. 265). See also Lantis, 1938 a, p. 449.

¹² La Pérouse, 1799, vol. 3, p. 239. The Ainu live on the southern half of Sakhalin; the Gilyak inhabit the northern portion.

¹³ Kempfer, 1811, pp. 705-706. A similar account is given by Charlevoix, 1736, vol. 8, pp. 98-102.

¹⁴ This seems to be the same book republished in abstract by Mobius (1893, pp. 1053-1072). He claims the book was published in 1829. Fraser says the author is Yamada Yosei; Mobius attributes it to Koyamada of Yezo.

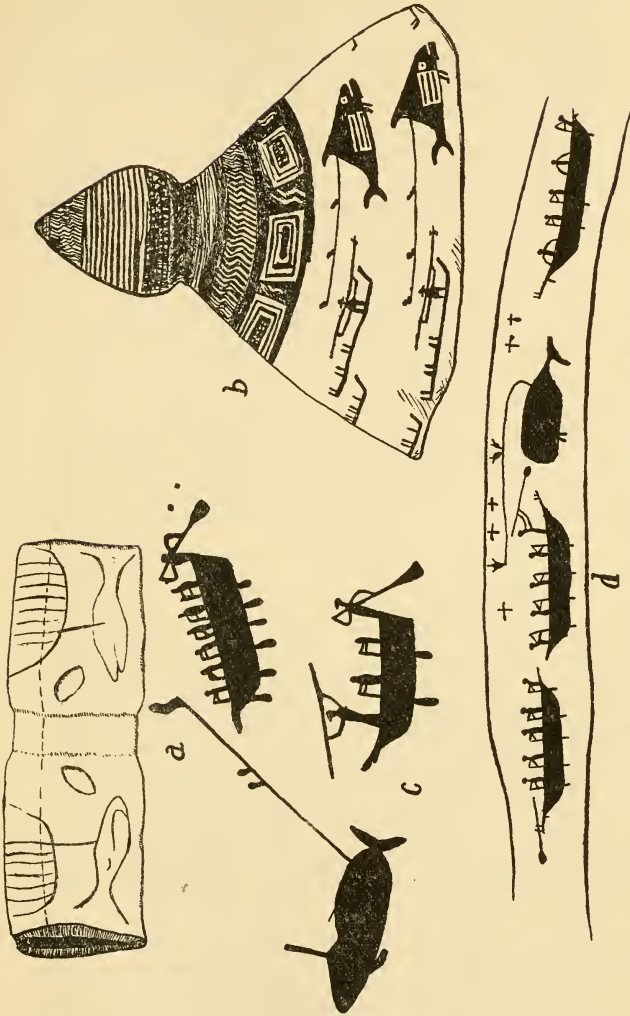


FIGURE 57.—Whaling scenes as represented by native artists.

a, Whale hunt etched on bone tube, Ainu (?), Sakhalin Island (Kishinouye, 1911, fig. 105, pl. 37). b, Whale hunt represented on a basketry hat, Nootka, Vancouver Island (British Museum Handbook, 1925, fig. 254). (For other Nootka hats with whaling scenes, see Willoughby, 1903, pl. 1, and Bushnell, 1928, pls. 1-5.) c, Whale hunt painted on walrus skin, Chukchi (Hoffman, 1897, pl. 81, figs. 6, 7). d, Whale hunt carved on ivory staff, Eskimo (British Museum Handbook, 1925, fig. 248).

method of capture but the use of windlasses, etc., and oil rendering.¹⁵ Fraser reproduces a picture showing 7 boats with 10 rowers each and a harpooner who stands in the bow holding the heavy harpoon upright, resting on the upper flat part of the leg, which is bent at the knee. The whale is entangled in rope nets, which played an important part in its capture. Harpoons, lances, and knives were used in their dispatch. Tsuchiya (1937, p. 17) says:

. . . the fishing next in importance to the Kujukiri sardine industry, was whale hunting off the coasts of the western and southern provinces . . . Whale hunting had been carried on since the Civil Wars [from the middle of the Muromachi Period dated at 1500-1600]¹⁶ off Kii, Ise, Mikawa, and Tosa provinces and northern Kyushu. At first harpoons were used, but from the Kammon era (1661-73) onwards they were superseded by nets. Whaling was carried out chiefly by wealthy people such as Gidayu Fukazawa, of Omura, in Hizen province.

An incidental description of the Japanese whale fishery in 1870 reiterates the essential details of the description of Kempfer and the illustrations of 1790 referred to above and reproduced at the end of this paper.¹⁷ Adam's (1870, pp. 312-13) description is as follows:

The day after our arrival there was great excitement in the village. All Kino-O-Sima was out of doors. A whale was reported in the offing. There was much noise and shouting. A dozen boats were quickly launched, and started off in wild pursuit. Long, gaily painted, sharp-prowed boats, propelled by four powerful sculls, each worked by two men standing, darted through the water. A smart hand was placed in the bows in charge of the harpoon; while others, eager but

¹⁵ Fraser, 1937, pl. 2. Cf. with the illustrations in Dow (1925, pl. 44, p. 119) of the early Greenland whale fishery of the Dutch and English, which was patterned after Basque whaling (for which see Markham, 1881). Steller (1774, p. 103) says that whaling around Japan was carried on "in the European manner." Tsuchiya (1937, pls. 24, 25) reproduces two incredibly detailed Japanese whaling scenes (Tokugawa Period) from the same source as Fraser. Plate 24 shows the dispatch with lances of the already harpooned whale entangled in the net. In both plates are shown interesting figures in distinctive dress, the individuals in the whaling boats in dark robes and the half-naked men in dark loin-cloths and beating drums (?). There is a suspicion of ceremonial or esoteric practices connected with whaling. Note also (pl. 24) the standards in the bows of the boats. The harpoons and windlasses look European. The harpooned whale (pl. 25) has in him a number of harpoon-irons which are attached to lines held by men in the boats. I have characterized Japanese whaling on the map as by the netting technique; harpoons were apparently used before 1680, but as to which were aboriginal, the line-and-float type, or merely, like Europeans, with a line attached (as shown by Tsuchiya, pl. 24), I cannot say.

¹⁶ Japan was first visited by the Portuguese in 1543 (von Siebold, 1897, vol. 2, p. 235); the Dutch soon followed (see Hagenaar, 1786, pp. 38-39). Early European whaling in the area north of Japan is intimated by several early authors, who refer to whales found with European whaling irons sticking in them. These may be whales bearing old harpoons gotten in the North Atlantic or Spitzbergen whale-fishery. (See Steller, 1774, pp. 102-103; Charlevoix, 1736, vol. 6, pp. 52-53, 398; con Kotzebue, 1821, vol. 3, p. 267.)

¹⁷ Kempfer's stay in Japan was from 1690-92; the source used by Mobius, Fraser, and Tsuchiya dates from around 1800 (1790 or 1829?). A careful study of east Asiatic mammal netting and a comparison of Japanese-Kamchadal-Koryak-Chukchee "whale-cult" would probably yield interesting results. For example, the Japanese use nets, make noise, and shriek when the whale has been harpooned, and the inhabitants on shore beat drums and make cries of rejoicing (see Mobius, 1893, pp. 1055, 1057, 1060) as do the Kamchadal, Koryak, and Chukchee. Although Buddhist priests and prayers enter whaling (Mobius, 1893, p. 1060), there is a strong suspicion of an older stratum of esoteric accompaniments to whaling.

still, squatted on the huge black nets coiled up in the boat. The boats soon approached, and quickly surrounded the whale [see pl. 22], which they wounded repeatedly with their lances and harpoons; and, when he was exhausted from loss of blood, enclosed him in their strong nets and hauled him ashore.

It is not my intention to discuss Japanese whaling here, since some of the literature¹⁸ is not available to me. I cannot forebear indicating, however, that Kempfer says the practice of using nets for whales was "found out" in 1680. Since the practice of netting sea mammals (e. g., Gilyak, sea lions;¹⁹ Olutorski Koryak, whale) is apparently quite widespread on the east Asiatic coast, it may be that the Japanese heard of this more northern method, which is described below, and imitated it. I present this as a problem whose solution remains to be accomplished.

KORYAK

These people live north of the Kamchatka peninsula and exhibit two distinct methods of capturing whale. The first, that of netting whales, is described for the Elutori²⁰ in some detail by Steller:²¹

The Elutori have another way of catching whales: They make nets of walrus hide, which they previously hang for a long time in the smoke, so that they become as hard as a rock. These hides they then cut into pieces and straps, and from them weave very large and thick nets. Each strap is as thick as a strong man's arm; they set these nets within the Elutorsk bay against the mouth of the bay, and secure one end of it [the net], with many large, fixed stones; if the whales go either in or out, they entangle themselves to death by the tail in the nets in a short time; thereupon the Elutores go to them with Baidars [umiak], make him fast with straps and tow (buxieren) him onto the shore; however, before they row away with him, they shamanize over him in their baidars; during the time that they are rowing to the land, the young girls, women, and children, and, in general, young and old, stand on the bank, sing, cry out, dance and jump about, and congratulate their menfolk on the booty. When the whale is landed they all put on their best clothes and ornaments, bring a carved wooden whale two feet long, set up a new Balagan [pile storehouse], set the wooden whale underneath it with continual shamanizing, kindle a lamp, appoint a caretaker (Watcher) for it, who must pay attention that the lamp, from Spring on into the Fall, as long as the hunt lasts, may not go out, at which time they go in a body, cut the whale into pieces, and prepare it as their most important (principal) food for the entire year as follows: the meat, which does not permit long preservation, being very tough and coarse, is consumed first; that which cannot be immediately consumed is hung up in the air and dried, the hide is separated from the blubber, scraped and smoke-dried, then beaten and made supple, and used for shoe soles. . . .

¹⁸ E. g., the references cited by Steensby (1917, fn. 2, p. 154) and Tsuchiya (1937, pp. 183-184).

¹⁹ Hawes, 1904, p. 256. See also Steensby, 1917, pp. 154-155, for an interesting discussion of the practice in Asia and America of netting sea mammals.

²⁰ A southern Koryak group living on Olutorsk Bay. Jochelson calls them Alutor. Petroff (1884, p. 146) said the Olutorsky were called "strangers" by their Koryak neighbors.

²¹ Steller, 1774, pp. 98-99. Tooke (1801, vol. 3, pp. 18-20) and Krashenninikov (1764, p. 138) give accounts of Olutores whale netting, obviously derived from Steller's fuller description of the same.

When the Elutores bring out anew the whale nets, they have the biggest festival of the whole year. They begin the ceremony with great and lengthy shamanizing, in a large subterranean yurt, slaughter dogs and beat the magic drums at the same time; at which time they make a very big container of Tollunsha or brew of divers roots, berries, fish and whale oil put together, set this in front of the *Schupan*²² or draft hole (Zugloch), bring the wooden whale, accompanied by frightful uproar and [by] Shamans into the yurt, and close all the openings so that it becomes totally dark. All at once when (as soon as) the Shamans have conjured the wooden whale away, they make an outcry that the whale has escaped to the sea, whereupon young and old run out of the yurt to accompany it. The Shamans thereupon show the footsteps [traces] of it which look similar to the track of a mouse in the *Tollunsha* over which it has marched away, when it ran off to the *Schupan*.²³ If one asks them concerning the reason for this ceremony they answer only, that their fathers also did it this way and found it good and satisfactory.

The difference between Olutores (Olutorsky, Elutori) whale netting, and that of the Japanese described by Kempfer and pictured by Fraser, is that the former set the nets in the bay mouth while the latter used them at sea. The stimulus for the use of nets in the capture of these largest sea mammals may have come from the Japanese knowledge that people to the north did catch whales with them.

Jochelson (1905-8, pt. 2, pp. 550-552) has described the method of whale capture of the Koryak thus: The whaling crew in the boat nears the whale, the harpooner throws a toggle-type harpoon. The whale sounds, carrying the line, and when he breaches, is struck again. Finally, when he is tired and worn out, he is dispatched with lances with flaked stone heads. When dead, he is towed to shore.

CHUKCHEE

Here are the whalers, par excellence, of the northeast Asiatic coast. Steller (1774, p. 101) has an excellent account of Chukchee whaling:

The Tschukschi, who catch whales in great quantity, from the mouth of the Anadyr River down to the farthest cape [C. Navarin?] approach nearest the European method of capture. They row in very large baidars [umiak] made of wood with seal hides stretched over, 8, 10, and more men strong, also 2 to 3 vessels at the same time into the sea; when they see a whale, they row vigorously up to it, and thrust a large *Nosok* [harpoon] of iron or bone into him, which then separates from the shaft, and fixes itself crosswise in the wound and does not become dislodged; a strap [line] is fastened to this, the other end of which they have in their baidar, laid in many coils and 100 and more fathoms in length. Not far from the strap is attached an inflated bladder or whale intestine, by which they can tell at all times upon the sea [surface] where the whale goes. Wherever he goes now, they let themselves be drawn along with him; if he goes into the depths [sounds] they let out the line, if he comes up they draw it in again, and row closer to the whale, thrust him again with a *Nosok*, or the other baidar does this; they hunt and follow him continually, until he again goes into

²² A sleeping compartment off the main room.

²³ This passage may refer to scrying (see Cooper, 1928).

the depth and wears himself out. As soon as he comes up [breaches], the third baidar thrusts him. When they have collectively fastened onto him and pretty well worn him down, they begin with all their might to shriek, clap their hands, and make all sorts of noise, upon which the whale hurries with all his might to the shore and they are drawn after him. [When] he is near shore they storm and rage still more violently, until the whale in passion and blindness (*Eifer und Blindheit*) throws himself with greatest energy far upon the land, where he is completely massacred by them. In the meanwhile the rest of the people, young and old, dance and jump with great joy (*Frohlocken*) upon the shore, as has already been mentioned above. On those islands between America and the Tschuktschi Cape [St. Lawrence, Diomedes] the whale is taken in just this manner. The Tschuktschi catch so many whales, and rely upon their skill therein to such an extent, that they touch none which are cast dead upon the shore, except that they use fat from them to burn. Although the Tschuktschi have very numerous herds of reindeer, and therewith can be satisfied, they nevertheless occupy themselves intensively with the taking of sea animals, because they have the most extreme need for blubber not only as the greatest delicacy, but also the oil, lacking all wood, in order to obtain fire, which they pour [i. e., whale oil] upon moss, peat, and whale bones, and burn instead of wood.²⁴ The Tschuktschi make from the intestines of the whale shirts like the Americans, and use them [intestines] instead of barrels, as [do] the Elutorski Koryak.

Bogoras (1904-9, pt. 1, p. 124) and Aldrich (1889, pp. 56-57) have good accounts of the Chukchee whale-fishery, and mention stone-headed harpoon, sealskin floats attached to the line^{24a} dispatching of exhausted whale with a lance, yelling and noise-making connected with the capture (fig. 57, c).

With the Chukchee we leave the Asiatics who indulge in the whale fishery in such varied forms, and turn to a review of the American techniques of whaling in Bering Sea and the North Pacific.

ALEUTIAN ISLANDS

This island chain extends as a partly submerged continuation of the Alaskan peninsula, from Unimak Island in the east fairly continuously through the Fox Islands (Unalaska, Akutan, Umnak), the Andreanof Islands (Amlia, Atka, Adak), the Rat Islands (Amchitka, Kiska), the Near Islands (Agattu, Attu), then jumps about 175 miles to the isolated Commander Islands (Bering, Copper), which are about 115 miles from the southeast shores of the Kamchatka peninsula. It seems improbable that American or Asiatic natives could have made the trip over open water between Kamchatka and the Commander Islands or between the latter and the westernmost Aleutian

²⁴ This describes in a very clear manner an interesting and apparently unique cultural adaptation to the lack of wood. The principle is similar to the lamp with a wick set in train oil (cf. Birket-Smith, 1929, p. 99).

^{24a} Inflated sealskin floats or buoys described by Bogoras and Aldrich are not mentioned by Steller who says only that a *small* indicator float was employed by the Chukchee. In the light of abundant evidence of Chukchee cultural borrowing from the Eskimo, it appears that the use of double-floats attached to the harpoon line was adopted from the north after 1770. In this connection, see footnote 15, p. 424.

island, Attu. But evidence summarized in the latter part of this paper does show that such trips were actually made, presumably in both directions, and probably performed by Asiatic and American natives.

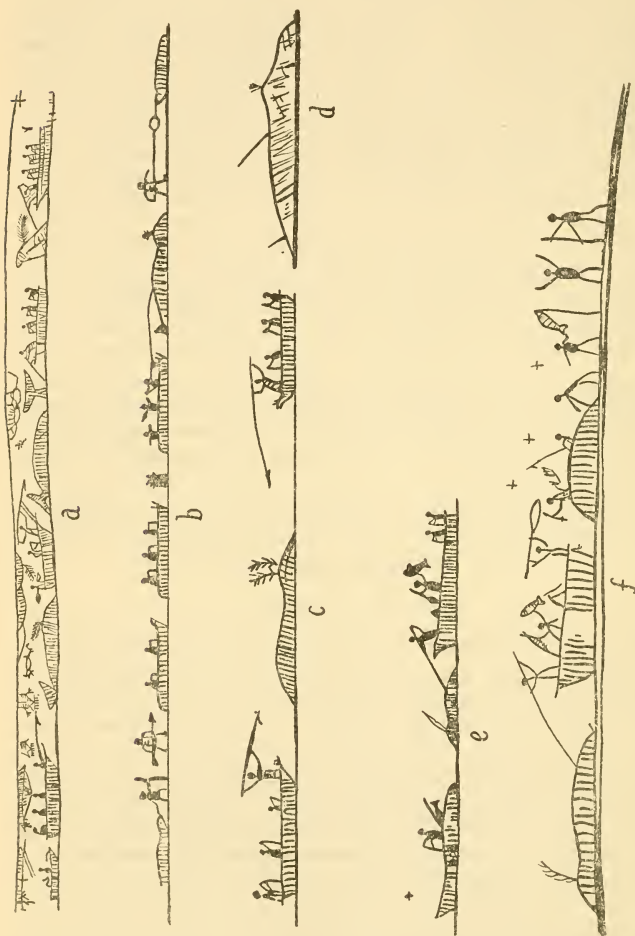


FIGURE 53.—Whaling scenes according to native Eskimo artists. (After Hoffman, 1897.)
a, Whaling scene (pl. 66, fig. 1). *b*, Whaling record (pl. 69, fig. 1). *c*, Rival whale hunters (fig. 104). *d*, A captive whale (fig. 135). *e*, Whale hunt (pl. 70, fig. 1). *f*, Whaling scene (fig. 105).

Von Wrangell (1839, ftn. 53) has a significant note implying the absence of whaling in the Aleutian Islands west of Atka in the eastern Andreanof group:

The Aleuts of Atka and those of the islands lying farther to the west have, as a result of fear, never been able to set their minds to the whale fishery. In the year 1832 they began to be instructed, with the help of Kadjak Aleuts [Kaniagmiut] in this so useful business.²⁵

Unalaska Island, the important location of the Russian settlement of the Aleutians, seems to have been the western center²⁶ of the aboriginal whale fishery. I present here a series of translated accounts from the German, copies of manuscript translations from the Russian in the Bancroft Library, and from other published papers.²⁷ I am omitting any but passing reference to the esoteric aspects of whaling (i. e., "whale cult")—I hope later to present this to make a complete picture.

Veniaminov²⁸ says:

The spear heads used in hunting the whale were greased with human fat, or portions of human bodies were tied to them, obtained from corpses found in burial caves, or portions of a widow's garments, or some poisoned roots or weed. All such objects had their own special properties and influence, and the whalers always kept them in their bidarkas. The hunter who launched a spear provided with such a charm upon a whale at once blew upon his hands, and having sent one spear and struck the whale, he would not throw again but would proceed at once to his home. . . . Then, taking with him a companion, he proceeded to the shore where he presumed the whale had lodged, and if the animal was dead he commenced at once to cut out the place where the death wound had been inflicted.

Von Wrangell (1839, p. 54) states:

A single Aleut in his single-oared baidar,²⁹ and armed only with a short spear the point of which consists of sharp, ground slate, attacks this giant of the sea; he approaches him cautiously from behind until [he gets] in the vicinity of the head, thrusts his weapon into his body under the front fluke (Vorderflossen), and goes away with the greatest rapidity. If the spear has penetrated through the blubber into the flesh, the wound is mortal; within 2 or 3 days the whale dies; the current or the waves throw the body on the nearest shore. Each spear carries a certain mark, by which one recognizes the catcher and owner of the same if the weapon still sticks in the body of the slain animal.

²⁵ Joehelson (1925, text figs. 10, 11, 28) illustrates chipped throwing-lance points from Attu and Atka. Granting that these be whaling points, it may indicate that whaling was once known, but later lost on Attu Island, far to the westward of the Atka region where von Wrangell draws the line. If the Kon'ag did introduce whaling to the islands west of Atka, it is possible that they also introduced the polished slate-pointed lances, rather than the Unalaska chipped obsidian-pointed lance. Thus we may have a not uncommon situation of a complex once present, subsequently lost, and later reintroduced. This may account for the Aleutian nonwhaling area which I felt constrained to enter on the map.

²⁶ Kodiak is the eastern center of Aleutian poison-lance whaling.

²⁷ Again I wish to say that I do not claim complete citations—the ones I give here seem particularly appropriate in helping to give a general picture of Pacific Eskimo whaling methods.

²⁸ Quoted by Petroff (1884, pp. 154–155), from Veniaminov, 1840. For a short biographical sketch of Veniaminov, see Baker, 1906, p. 73.

²⁹ Refers to a kayak with a double-bladed paddle. Ordinarily the two-hatch bidarka seems to have been employed in whale hunting in both the Unalaska and Kodiak districts.

Markoff (1856, pp. 99–100) has this to say about the Aleut whale fishery:

The Aleuts often shoot at whales with slate spear heads, which, entering deeply into the flesh, make a bad wound; the salt water of the sea gradually eats into it; the whale gradually weakens and finally dies in about 3 days; the waves wash the carcass upon the beach, and the feast is decked out for the Aleuts.

Von Kittlitz (1858, pp. 266–269) was a particularly astute observer, and his description of the manner of whaling in the Fox Islands is full of significance:

Adverse winds necessitated our going rather far to the south, and not until the 20th of August did we find ourselves in the vicinity of the Fox Islands, the most important of the entire [Aleutian] chain. Only once during this voyage had we seen from afar a dead whale floating on the sea, which from its great distance from any land seemed to have been floating around for a long time, after possibly having been hunted and killed at one of the easternmost of these islands in the manner customary there. That is to say the Aleuts, who by instinct (*durch ihren Naturtrieb durchweg*) are most eager and skillful sea hunters, possess, however, no other means of securing for themselves the numerous whales which inhabit these waters, than by wounding them with javelins, specially prepared for this purpose, in the hope that the monstrous beast, after it has died of the wound, will finally be grounded by wind and waves on one of their islands. The sea connection of the inhabitants of the islands with one another, but particularly the geographical situation of the islands themselves, make it possible that this practice can be accompanied by some success. It has not even been essentially altered since the Russian conquest, by which the natives have become serfs of the present Russian-American Co., since the whale fishery in this country is carried on only for the purpose of sustaining the natives, for whom the oil (*Thran*) as well as the meat of different species are principal means of nourishment. In fact, the whale lines customary in Europe and America in our time are completely lacking in the Aleutian Islands and even the whalers, who even at that time, were frequenting the major portion of the ocean, were never accustomed to show themselves there although the quantity of great cetaceans of various kinds, was never on earth more considerable than in these regions.³⁰ But the aforementioned hunting method of the Aleuts is so frightfully wasteful. Of 10 whales struck, as a rule it is to be expected that 9 will be completely lost—that one must suppose the population of the islands can never have been so considerable, as the fabulous statements of the first discoverers report,³¹ because otherwise the whales, were not entirely exterminated, must have at least have been much rarer than they are at present. Among the darts which

³⁰ Jenkins (1921, pp. 28–29) defines the "Kodiak Grounds" from Vancouver Island north to the Aleutian chain and from the west coast to 150 degrees west longitude as the home of the Japan whale, or the Right Whale. The California Grey Whale also inhabits this North Pacific area. All were hunted in aboriginal times.

³¹ E. g., Shelekhov said in 1786, the population of Kodiak was 50,000 people. It was actually nearer 6,500 (Petroff, 1884, p. 33). These remarks by von Kittlitz have a significant bearing on the problem of the population density of the Aleutian Islands. The series, *Neue Nordische Beyträge*, edited by P. S. Pallas, will be of value to those students of Pacific Eskimo population statistics.

the Aleuts carry with them in their sea hunts, particularly in the single-seated baidar [kayak], there are always some especially for whales. They are, like the others, made of wood, have toward the point a continuation made of bone and about a foot long [foreshaft?], which by its weight promotes the arched cast of the throw.⁵² This bone piece is carefully smoothed and is notched on one side, so that a row of barbs juts out, by which the penetrated projectile remains very fast in the wound (pl. 23). The wounding points themselves are made in part of obsidian or lava-glass, partly also of trachyte. The latter material is used by preference, upon Kodiak and Aljaschka [Alaska Peninsula], the former, however, on the Fox Islands. By its brittle, glassy nature it is particularly fitted to cause inflammation in the body of the animal⁵³ as soon as the cast has penetrated the thick blubber. As a result of this inflammation the whale usually dies on the third day and the corpse is then cast up on one of the Aleutian Islands, the community that finds it first examines the wound, where the spear must be found which bears the mark of the community of the hunter. This community is immediately apprised, and shares in the booty with that [village] in which it was found.

One would think that the Russian-American Co. must have been for long a petty one, not only not to have shown the Aleuts the use of whale lines, but also not to have supplied them with the materials they lacked [for making them]. In such case the whale fishery would have been much less wasteful and perhaps itself would have become a very profitable enterprise for the company. That the earlier Aleuts did not lack knowledge of the appropriateness of the use of such lines, is apparent from the arrangement of the darts (Wurfspieße) used in hunting sea otters, which show something very similar in miniature. In these points, carved out of bone or walrus tusks, and supplied with strong barks, are movable; they are set in in such manner that they become detached from the shaft when they penetrate the body of the animal. They are, however, fastened to the shaft by a long cord of intestine sinew which is wound around it, and to which is fastened a bladder. The wounded animal has by this considerable space to dive, while the shaft with the bladder floating overhead indicates to the hunter, the vicinity in which it may be found.

Von Kotzebue (1821, vol. 2, pp. 100-101) has an interesting statement concerning a drift whale:

The 4th of June. A dead whale, stranded here [Unalaska District] set everything in a tumult; the Aleuts swarmed thither, and clung to the half-rotten fish, like flies on honey; to us the obnoxious exhalations barred the way. By an arrow, which still stuck in the corpse, they immediately recognized who killed it and hence was the owner. To the district, in which such a treasure comes ashore, one part of it is apportioned, and the inhabitants are permitted to eat upon the spot as much of it as they are able, which accordingly takes place uninterruptedly, for 24 hours. Often the owner [i. e., he who killed the whale] and the people eating the whale fall into a fierce altercation, because these had not thought to set aside (zurückgelassen) for him the tidbits, that is to say, the parts which are most rotten.

⁵² One of these "darts" with a bone foreshaft and flaked-stone point is illustrated by Scammon (1874).

⁵³ The inflammation referred to is probably a result of the poison, not of the obsidian. Cf. Holmberg (1855, p. 110).

The concern which von Kittlitz shows over the wastefulness of the native method of whaling is echoed by Veniaminov (1840, pt. 2, p. 231), who says:

Whales are sometimes very numerous in the summer, but only at Ounalashka and now and then at Akanna, and though the hunters there spear from 30 to 60 every year, they only secure 33 of them on the average, and sometimes no more than 10. Ten or twenty whales would appear to be an enormous quantity of meat, but the whales here are generally of a small species, so that the meat of a whole whale is easily packed into single baidar.

Von Langsdorff gives substantially the same account of whaling methods as presented before (Von Langsdorff, 1813, pp. 44-45; see also Scammon, 1874, p. 76).

The javelins³⁴ . . . designed for whales . . . are pointed with *Scoriae* of *lava*, or *Silex obsidianus*. When the Aleutians see a whale they follow him

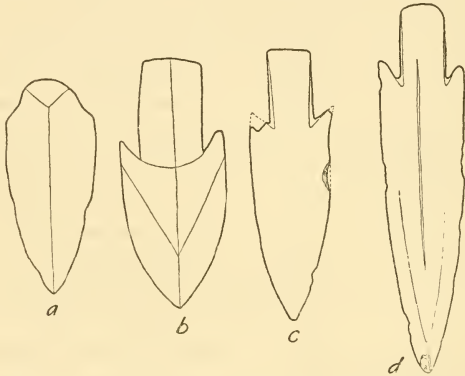


FIGURE 59.—South Alaskan lance-heads of ground slate.

a, Unalaska (Dall, 1877, fig. opp. p. 75). *b*, Wooden model of slate lance head, Aknanh cavern, Unga Island (Pinart, 1875, pl. 7, fig. 3), *c* and *d*, Cook Inlet (de Laguna, 1934, pl. 31, figs. 11 and 13).

in their boats, watching for the moment when he raises his gigantic head above the water to breathe, and then endeavor to wound him with their javelins near the front fin. If this is done effectually, the creature begins to writhe and rage furiously, till by degrees he grows faint and exhausted by the loss of blood. The Aleutian then returns perpetually during the day to the same spot, to watch for the monster floating dead upon the surface of the water; or if a strong wind blows towards land, he watches along the neighboring coast for its being blown thither, and then collects the whole village together, to draw him on to their dwellings³⁵ where he is cut up.

The point of the javelin which is commonly found in the wound that occasioned the death of the animal, is a testimony to whom the fish of right belongs;

³⁴ Darts cast by means of the spear-thrower.

³⁵ This is the only reference to towing the whale ashore (pp. 44, 45.)

for every Aleutian has some peculiar mark by which his weapons are distinguished from those of his neighbour's. Formerly, according to the laws of the country, when a whale was taken, the chief of the village, the person by whom it was killed, and every individual of the society, had his regular portion assigned to him.

The statements (by Holmberg, von Kittlitz, etc.) on drift whales bear out certain archeological evidence. De Laguna (1934, p. 183, fn. 241) has called attention to the fact that the barbed polished slate blade is absent or atypical of the Aleutian Islands, but notes a single specimen collected by Dall from Unalaska (Dall, 1877 a, fig. opposite p. 75). (See fig. 59, a.) I interpret this specimen of Dall's (and presumably there are others either hidden in undug sites or in museum collections) as a whaling lance head got from a drift whale which was struck near Kodiak or on the Peninsula and washed ashore on Unalaska. In this connection it will be recalled that Holmberg (1855, quoted on p. 434) mentions a case of this kind. The case seems clinched if we recall von Kittlitz' statement (1858; quoted here) that the Kodiak and Alaska Peninsula natives (both of the Kaniagmiut group) preferred ground and polished slate, while the Unalaska natives preferred chipped obsidian or trachyte whale lance points.³⁶

KODIAK ISLAND REGION

This area includes Kodiak, Afognak, and the mainland opposite from 159 degrees west longitude into Cook Inlet. It was occupied by the Kaniagmiut,³⁷ of Eskimoan linguistic affinity, whose culture showed a significant compromise between Eskimo and Northwest Coast types.³⁸

The most complete, single account of Koniag whaling is that of Holmberg,³⁹ who probably took some of his information from Davidof's earlier report.

Early in the morning customarily two two-oared baidars go from the shore and row to the vicinity of the bay in which most of the whales reside, who

³⁶ See Pinart (1875, pl. 7, fig. 3) for a wooden model of a slate lance head of the Kodiak type from Unga in the Shumagin Archipelago. Pinart (1872, p. 15) describes an Unalaska javelin with an obsidian point as follows: "The point of the javelin used here [Unalaska] answers to the same purpose as the slate lance of the Kaniagmioute; the whale which the Aleoutes hunt only in the bays, generally die at the end of several days, and are cast upon the coast; the Aleoutes scarcely attack any but the two smallest species of whales, that is to say, the *Megaptera versabilis* and the *Balaenoptera velifera*." Cf. Veniaminov, 1840, vol. 2, p. 231, quoted on p. 432.

³⁷ Handbook, 1912, pt. 1, p. 652. Called here also Koniag.

³⁸ See Lantis (1938, pp. 123-128, 168) and Petroff (1884, pp. 136-146) for brief descriptions of this little-known group. The cultural position of these intermediate Pacific Eskimo is important not only in relation to the larger Eskimo problem (see Birket-Smith, 1929, pp. 229, 232), but as an Eskimoan group whose intermediate geographical location between the Northwest Coast and Western Eskimo may reflect developmental history and interinfluencing of these regions. The people are nearly all gone, but there is a tremendous body of historical data waiting to be gathered together from its recondite sources.

³⁹ Holmberg, 1855, pp. 108-110. Petroff (1884, p. 142) seems to have got his data from this source.

always give evidence of their presence when they rise to the surface by a terrific waterspout.⁴⁰ Of the Koniags who are sitting in the baidarka, it is only the forward man who is the actual whale hunter; the other is a mere paddler and has nothing more to do than to set the boat in motion according to the command of the first. When the hunter has approached a whale, yet not within throwing distance, he observes exactly the direction in which the animal is moving in order to be in the vicinity when he dives below the surface. Nevertheless, he must take great care in this matter, not to be noticed by the animal, in which case it would immediately alter its direction under the water. If he succeeds, however, in approaching within 10 or 15 fathoms of the sounding Colossus, he casts his dart with his throwing-stick, aiming at the region of the dorsal flukes (Rückenflösse). When the weapon has been thrown, the hunters seek by paddling the baidarkas backward to place themselves at a distance as soon as possible, in order to avoid the contortions and thrashings of the wounded animal, whereby it nevertheless happens occasionally, particularly when the distance is not so great as that abovementioned, that the baidarkas are overturned through the violent movements of the animal either by high waves or by the animal itself. In such case the hunters would be lost beyond hope of rescue, if it were not that usually two baidarkas went together on a hunt of this sort, in order to be able to support one another in case of necessity.

The spear has a length of about 3 ells and is furnished on the end with a dagger-shaped point fashioned of soft slate (Thonschiefer). When the cast weapon has struck the whale it breaks into two parts, so that the stone point remains in the wound which is made deadly by the movements of the animal.⁴¹ Every whale hunter scratches his mark and token in the slate [point], for which reason a quarrel concerning the possession of a dead whale can never arise, inasmuch as the pieces of slate occurring in the wound declare the slayer, who is at the same time owner of the animal.

When the whale has received a wound, he goes out of the bay toward the open sea, where, as the natives claim, on the third day he "goes to sleep" or in other words dies. If the direction of the winds and currents is toward the shore, the booty never escapes the hunter, for on the fourth or fifth day the dead animal is cast up by the waves, and is cut up in the manner previously described. Often enough it happens, however, that the animal is carried past the island and reaches a wholly remote shore. There are even examples that the sea about Unalaska has cast up a whale which was killed at Kodiak.

Holmberg (1855, p. 107) distinguishes four names of whales hunted by the Koniags:

- | | | |
|---------------|--------------------------|------------------------------|
| 1. Annikwak | ----- Old whale | ----- ca. 10 fathoms long. |
| 2. Kawwichnak | ----- Middle-aged whale | ----- ca. 8 fathoms long. |
| 3. Agashitnak | ----- One-year-old whale | ----- ca. 6 fathoms long. |
| 4. Achwak | ----- Young whale | ----- ca. 3½-4 fathoms long. |

Von Wrangell (1859, p. 55) gives a list of four different species of whale distinguished by the Koniag:

⁴⁰ As Steensby (1917, p. 145) and Birket-Smith (1929, p. 77) point out, two-hatch skin boats (bidarkas) are a local development which took place in the Pacific Eskimo area. Krenitzyn and Lewaschef (1781, p. 269) said in 1768 that the two-hatch boats at Unalaska appeared to belong only to the chiefs (Häupter) of the villages. As is shown elsewhere, chiefs were likely to be rich men and whalers, so there is a possibility that the local development of the bidarka out of the kayak is understandable as owing to whaling, in which this type of boat figured, and ascribable to whalers.

⁴¹ Here again the deadly effect probably came from the aconite poison rather than the movements of the animal.

The Aleuts of Kodiak distinguish four kinds of whales: *Polossatik* (the feared one); *Aljama*; ⁴² *Kulema*, and *Utschulochpak* (i. e., an old woman); at times, although seldom, the *Kashelot* also occurs.

Sauer ⁴³ states that:

Whales are in amazing numbers about the straits of the islands, and in the vicinity of Kodiak; the natives pursue them in their small boats, and kill numbers with a poisoned slate-pointed lance.

This same author's specific statement concerning the use, and method of preparing aconite arrow poison is valuable:

They use darts and lances headed with slate, with which they kill the sea animals. They also use poison to their arrows, and the Aconite is the drug adopted for this purpose; selecting the roots of such plants as grow alone, these roots are dried and pounded, or grated; water is then poured upon them, and they are kept in a warm place until fermented: when in this state, the men anoint the points of their arrows, or lances, which makes the wound that may be inflicted mortal. [Sauer, 1802, p. 177.]

Pinart (1872, pp. 12-13), much of whose Kaniagmiut ethnography still remains in the form of manuscript field notes, has included, in a published catalog of a Pacific Eskimo collection, the following in regard to Koniag whaling:

These lances [of slate] are used by the Kaniagmioutes ⁴⁴ [of Kodiak and Afognak] for whale hunting. Those struck once, generally die at the end of several days, and are stranded on the beach; the lances are dipped, before they are used, in human grease, which has been prepared for this purpose by the whaler, from the corpses of rich persons whom they have just dug up and put to boil.

Each of these blades carries the particular mark of its owner.

This blade, fixed in its shaft, is then hurled by means of a board in the form of a lever [spear-thrower] . . .

The use of a fat or grease rendered from the corpses of deceased whalers or rich persons is a characteristic feature of Koniag whaling. Apparently the danger involved in handling corpses was great, and only a whaler, initiated into the procedure, could indulge in it. (Lantis, 1938 a, pp. 441-443; Pinart, 1873, pp. 679-680.)

Lisiansky says: ⁴⁵

The whale harpoon is about ten feet long; the spear or point is of slate stone and of the form of a knife, sharp on both sides, and is set loose in the handle.

The whale fishing, however, belongs almost exclusively to particular families, and is handed down in succession to those children who prove to be most

⁴² Kotzebue (1821, vol. 1) says the whale is called *Aliamak* at Unalaska. Chamisso, quoted by Möbius (1893, p. 1067) mentions a whale, *Alimoch*, caught at Unalaska.

⁴³ Sauer, 1802, p. 181. Mention is also made of hunting sea lions with poisoned arrows (p. 180).

⁴⁴ See Pinart (1873, p. 673) for the area inhabited by this group.

⁴⁵ Lisiansky, 1814, pp. 206, 202, 174. Hoffman (1891, p. 70) has an excellent account of the use of dead whaler's corpses as a "poison" and for amulets. He obtained his data from the *Algaluxamut*, a group which I am unable to identify, but suspect that they are from the area (probably a single village) in the Cook Inlet-Kodiak-Alaska Peninsula region.

expert at it. But this art is not brought to such perfection in the island of Cadiack, as in Greenland, and many other places. A Cadiack whaler, in a single bidarka attacks only small whales;⁴⁶ and for this purpose he is provided with a harpoon, the spear of which is made of slatestone, and so fixed into the handle, as to detach itself when the whale is struck. When wounded by it, the whale runs to sea and dies, and is perhaps never seen again, unless the currents and winds should throw it on the coast. Thus no whaler is sure of his prey. The spears of the whale harpoons are marked by the whalers, so that every one knows his own.

Of these whalers a story prevails, that when the fishing season is over, they conceal their instruments in the mountains till wanted again; and that they steal, whenever they can, the bodies of such fishermen that die, and were known to have distinguished themselves in their calling, which they preserve in caves. These bodies are said by some to be stolen, from the idea that the possession of them conduces to render the fishing season prosperous; and by others, that a juice or fat is extracted from them, into which if an arrow be dipped, the whale, when wounded by it, dies the sooner.

Weyer⁴⁷ has given what is likely to be the correct interpretation of this fat as a "poison":

Information secured by Frederica de Laguna from Athabascan Indians at Kenai, Cook Inlet, concerning the use to which the Kodiak Eskimos put dead human bodies is confirmatory of other Kodiak data but somewhat perplexing. The statement of these natives that the Kodiak Islanders killed whales with poison extracted from corpses by means of boiling may not mean that it was actually poison but only a fetish substance. The stuff was smeared on their weapon points, and was kept in the prows of their bidarkas. When they had lanced a whale, they used to paddle in a circle around it, and then paddle to the shore, dropping poison in the water behind them; the whale was supposed to wash up on the shore where they landed. The flesh around the wound had to be cut out before the whale could be eaten.

Osgood (1937, p. 39) gives much the same description from his Tanaina informants:

The large whale inhabiting the waters of Cook Inlet is not killed, though much relished by the Tanaina of the region. They obtain the meat from the neighboring Eskimo. These people (Kaniagmiut) they describe as hunting the whale with spears having heads of slate-like stone about 8 inches long and 1 inch wide which break off in the body causing death. The belief is that the Kaniagmiut poison these spear points by rubbing them in the decaying remains of a "fat man" [sic] over which an incantation has been made.

The Tanaina do not have the proper medicine to kill whales so they trade furs for the meat.

⁴⁶ Small whales are mentioned often. If the species could be determined, identification from the archeological remains might be possible. If the Eskimo-type whaling was once practiced in this area, the species of whale hunted is likely to have been a larger one; this, too, ought to be reflected in the archeological remains. Dall 1877 b) claimed that only in the upper (i. e., later) layers were bones of the larger whale species found. Jochelson (1925) has challenged Dall's interpretation of stratigraphic succession so seriously that little faith can be placed in it.

⁴⁷ Weyer, 1932, p. 309. As I have mentioned elsewhere, if uninitiated people aspired to become whale hunters, they would be reluctant to undertake the highly dangerous procedure of rendering from dead bodies fat "poison," actually innocuous but putatively toxic. This latter may well have served to distract attention from the true poison made from aconite roots, the preparation of which, according to this view, was a secret closely guarded by initiated whalers.

The use of dead bodies of rich persons and of whalers may mean the same thing. A whaler was likely to be a rich person, for he would own a whale he killed, and would control the division of it among the community in which he lived and was accorded social position. His control of whaling ritual would include a knowledge of the preparation and use of aconite poison—the essential feature of whale hunting. This was likely to be a carefully guarded secret, since it was economically advantageous to its possessor. Some reason had to be given out to explain the tremendous effectiveness of the whaling dart-points, and the common people (i. e., the uninitiated) probably were led to believe that it was the fat rendered from dead bodies. This was a ruse to hide the identity of the true poison—indeed a clever dodge, since an ordinary person would consider it extremely dangerous to have anything to do with a corpse.

The conclusion is that the Kodiak whalers used an *actual* poison of aconite,⁴⁸ which was a carefully guarded secret. Additional “poisons” in the form of fat rendered from corpses were used, but these were ceremonial and actually innocuous as far as toxic effects go.

In view of the break-down of the old culture under Russian impact, it is likely from our evidence that the whaler’s secret society⁴⁹ became abandoned or, at any rate, much more restricted. Such a situation as

⁴⁸ See citation this paper and the data in Heizer (1938, p. 359). Lantis (1938 a, pp. 454-455) gives further citations of the Koniag use of poisonous roots in whaling, presumably aconite.

⁴⁹ Pinart, 1875 a, p. 2. If not an actual secret society, Koniag whalers were of high social rank, holding their social position by hereditary rights. See Petroff (1884, p. 137) and Lisiansky (1814, p. 209) for statements on the hereditary whaler’s caste. The tendency toward forming a closed group of whalers has a modern parallel in Nantucket. The following rather lengthy but extremely interesting quotation illustrates how, in functional terms, such an organization might develop.

“It was never fairly understood what were the secret obligations of these female Masons; and it was even doubted that they had any ‘secrets worth knowing,’ inasmuch as no important operations, whether of good or evil tendency, were known to be put in practice in the little town of Sherburne Nantucket, or to disturb the world at large. Thus much, however, came afterwards to be divulged: An obligation, if not under the solemnity of an oath or affirmation, was at least assumed by the novice under the charge of the officiating mistress, that she would favor the courageous whale fishermen, under every circumstance, in preference to a stranger and a landsman, if the alternative should ever occur. The letter and the spirit of this charge were for a long time pertinaciously adhered to by the unmarried members; and some of them were known to carry it so far as to make it a *sine qua non* in permitting the addresses of their suitors, and they should have struck their whale, at least, before the smallest encouragement would be given or a favoring smile awarded as the earnest of preferment.

“It has been shrewdly suspected that the chivalric ordeal, thus enforced by the fair maidens of the isle, was set on foot by some of the patriotic whale fishermen and oil merchants of the place in order to perpetuate a nursery of peculiar seamen; while in doing so they were sure to secure valorous husbands, and a certain competency for their daughters, as well as a monopoly of the trade to the island. The intermarriage of so many whale fishermen with the daughters of whale fishermen, until almost all the inhabitants did, in reality, claim near relationship and call each ‘cousin,’ at all events would seem to point that way, and to favor the presumption. Certain it is that the daughters of some of the wealthiest men of the island had already formed a compact not to accept the addresses of sighing swains, much less to enter into the holy bonds of matrimony with any but such as had been on a voyage and could produce ample proof of successfully striking a whale.” (Brown, 1887, p. 220, ftm. quoting from Miriam Coffin, or the Whale Fisherman, pp. 57-58).

outlined above would account for some of the puzzling later aspects of whaling. Thus, Holmberg (1855, p. 110) said:

An attempt has also been made to supply the spears with iron points instead of the stone ones. These were not found to fulfill the purpose, however, since never has a whale wounded with such weapons been cast up.⁶⁰ There is reason to suspect that the iron point does not inflict a deadly wound, and this supposition is the more strengthened by the circumstance that not seldom whales with healed wounds are killed.

Steensby (1917, p. 144) says of the Koniag that for whale hunting they used a lance with a broad-bladed point of slate. The hunters believe that wounds caused by slate spears prove fatal more quickly than those caused by iron points, and they have stuck to slate blades obstinately.

As a final point in relation to the weakening of the complex in its old form, we have direct historical statements as to when the change began. Von Wrangell (1839, p. 55, ftn.) says:

Since the year 1833 the harpoon and vessels outfitted properly after the European manner have been made use of for the whale fishery. A skilled English harpooner has already been invited to enter the service of the Russian-American Co. It is to be hoped that a happy result will crown this important attempt.

Recalling Veniaminov's statement (1840, pt. 2, p. 341; quoted on p. 432) of the low percentage of recoveries of wounded whales, and von Kittlitz' remark that of 10 whales struck 9 will be expectably lost, it is of interest to note von Wrangell's (1839, pp. 54-55) figures. He says:

Since the whale hunter abandons the wounded animal to the sea, it is natural that many become lost. For example, in the summer of 1831 there were at Kadjak 118 whales wounded, of which only 43 found their way upon the shore.

This concludes our survey of Aleutian-Kodiak whaling. Steensby⁶¹ says that the Cook Inlet Indians hunt white whale (beluga), the hunter hurling a slate-pointed lance at the whale from a pole staging erected over the water. After the animal is hit, the hunter pursues it

⁶⁰ I suspect quite strongly that these iron spear points simply did not bear aconite poison. The whalers society apparently kept as a strict secret their knowledge of the extraction of the poison. Thus, in historic times with the break-down of the old culture, a "Company man" might go whaling without poisoned dart heads—the result being that he (being uninitiated into the whaling mysteries which include poison-extraction methods and use) could spear, but never succeed in killing whales. The decided preference shown by so many primitive peoples for stone weapon-points over those made of metal (for the area under discussion see Steensby, 1917, p. 144 (Koniag); Mason, 1902, p. 270 (Point Barrow); Jochelson, 1905-1908, p. 551, and Bogoras, 1904-1909, p. 124 (Koryak), may have a rational explanation, since stone-pointed projectiles are apparently more effective in cutting animal tissue than metal ones (see Murdock, 1892, p. 240; Pope, 1930, pp. 56-57).

⁶¹ Steensby, 1917, p. 143. Osgood claims the Tanaina do not hunt whales. Birket-Smith and de Laguna (1938, p. 107) state that the Eyak are not whalers.

in his boat. Large whales are not hunted. Shelekhoff⁵² says of the Chugachmiut of the "Bay of Chugatzy":⁵³

The marine animals hunted there are as follows: sea-otter, whales, sea-lions and bear-seals, the weapons used being spears thrown with little boards and lances such as used by the Kenaitze and other tribes.

ESKIMO

North of the Alaska Peninsula, we immediately find a different method of whaling. The same situation, as we have already seen, occurred on the eastern Asiatic coast north of the Kamchatka peninsula where Koryak-Chukchee whaling was sharply distinguished from the Kamchatka-Kurile method.

The Eskimo of St. Lawrence Island,⁵⁴ geographically intermediate between Asia and America, have the same type of whaling as the Chukchee⁵⁵ and their cousins, the American Eskimo.

Eskimo whaling south of Point Barrow to Bristol Bay (?)⁵⁶ and eastward to Greenland,⁵⁷ covers a tremendous area, yet is without question historically related. The real break comes at the Alaska peninsula, or more strictly, south of it in the Aleutian Islands-Kodiak area.

There is abundant information concerning Eskimo whaling; typical accounts may be found in Murdoch (1892, pp. 235-242, 272-276), Mason (1902, pp. 269-270) and Moore (1923, pp. 353, 359). The capture of whales is carried out by a crew of 8 or 10 men in a large skin boat (figs. 57, *d*; 58). The heavy toggle-type harpoon has a long attached line to which are tied sealskin floats (generally two) with a third float called a trailer or indicator with a line 15 or 20 fathoms long which is used to determine the position of the whale.⁵⁸ The whale is harpooned, he sounds, carrying down the line with the floats attached, and upon breaching is harpooned again. Finally exhausted, unable to dive again because the numerous floats or "pokes" buoy him up, he is dispatched with lances.⁵⁹ The dead whale is towed ashore by a series of umiaks tied bow-to-stern (figs. 57, 58).

⁵² Shelekhoff (Shelekof, Shelekov), 1812, vol. 2, p. 24.

⁵³ These are an Eskimoan group of the southern shore of the Kenai peninsula and Prince William Sound. See Handbook (1912, pt. 1, p. 294) and Petroff (1884, pp. 145-146, map). Shelekhoff said the Koniag and Chugatz spoke the same language, which was different from that of the neighboring Kenaitze and Ugalachmiut.

⁵⁴ These belong to the Siberian or Yuit group of Eskimo (Collins, 1932, p. 107).

⁵⁵ Steller, 1774, p. 101 (quoted verbatim *supra*). For St. Lawrence Island whaling, see Moore, 1923, pp. 353, 359.

⁵⁶ Not all the Western Eskimo whale; some do not know how and in some places it is not convenient. Bristol Bay, aside from beluga "whaling" (which is not strictly whaling as treated in this paper) seems to be beyond the actual southern limit of Western Eskimo whale fishery.

⁵⁷ Here again the distribution is not always continuous. Geographical limitations have played their part in causing this. (Birket-Smith, 1929, vol. 2, pp. 223, 233.)

⁵⁸ An indicator float is also used in Nootka-Makah, as well as Chuckchee whaling.

⁵⁹ Illustrated by Nelson (1899, pl. 55b, 57a) and Murdock (1892, figs. 238-240).

The lances used for dispatching the exhausted whale are of particular interest to our study. Nelson (1899, p. 147) says of the Kuskowim and Norton Sound area:

These lances were used when the seal or walrus has been disabled, so that it cannot keep out of reach of its pursuers, when the hunter paddles up close alongside and strikes the animal, driving the detachable head in its entire length. The head remains in the animal, and the hunter immediately fits another point into the shaft and repeats the blow, thus inserting as many of the barbed heads as possible, until the animal is killed or the supply of points is exhausted. Every hunter has his private mark cut on these points,⁶⁰ so that, when the animal is secured each is enabled to reclaim his own.

There is immediately suggested by this statement, the similarity to the Kodiak whaling lance with its detachable slate (or in Unalaska, flaked obsidian or trachyte) head with property marks inscribed on it. De Laguna (1934, p. 183), in a discussion of the distribution of barbed slate lance blades, has rightly seen that the Norton Sound-Kuskokwim method of stabbing sea mammals is similar to Kodiak whale-lancing except that in the latter place only *one* penetration, instead of a series of thrusts, is made. The Kodiak-Aleutian procedure is explainable by recalling that: (1) Only one penetration is possible, since the whale escapes after being lanced; and (2) a single thrust is normally mortal since the animal's death results from the action of the aconite poison.⁶¹ With repeated stabs, death of the

⁶⁰ See Weyer, 1932, pp. 179-182; Wissler, 1919, p. 414, figs. 12, 32, 35. Boas (1899, p. 601) says: "They [property marks] occur almost exclusively on weapons used in hunting, which, after being dispatched, remain in the bodies of large game. These are, particularly, whaling harpoons [figs. 16-19], walrus harpoons [figs. 20-23], lance-heads used for killing whales, and detachable arrowheads [figs. 24-25]. . . . It appears, therefore, that the object of the property mark is to secure property-right in the animal in which the weapon bearing the mark is found."

Nelson (1899, p. 147) indicates another possible origin for property marks, viz, the identification of each individual's own points so that he is enabled to reclaim them. Where a number of hunters are shooting at one animal some question might arise upon recovering the point from the dead animal as to who owned which points. Which of the two was first developed is impossible to say, but a problem is indicated. The place of property marks on Kodiak and the Aleutians is clearly that of securing property right in whales (see accounts quoted). Dawydow (1816, p. 213) mentions property marks for Kodiak. De Laguna (1934, pp. 71, 72) found only two slate points with ownership marks; there is a suspicion that these may be Koniag (or Chugachmlut) points recovered from drift whales in Cook Inlet. This may not be so, however, since the barbed-slate point is common at Cook Inlet.

⁶¹ The Right whale, despite its great size, seems to be a relatively easy animal to kill. The vegetable alkaloids are derived mainly from the Phanerogams, the Papaveraceae, Leguminosae, and Ranunculaceae being richest in these substances. Allen, 1920, pp. 260-262, gives some interesting figures on lethal doses of aconitine: 0.13 mgrm. per kilogram of body weight for warm-blooded animals. Two mgrm. (1/30 grain) is the minimum fatal dose for an adult man when the poison is taken by the mouth; but, if given hypodermically, 0.15 mgrm. (1/45 grain) is sufficient to cause death, since all the poison is thrown into the circulation at the same time with no chance to throw it off by vomiting. Allen, 1929, p. 262, says, "The most constant symptoms of aconite poisoning are difficulty in breathing, progressive muscular weakness, a weak intermittent pulse. Death usually occurs from syncope, preceded in some cases by delirium and convulsions." Cheney (1924) discusses physiological effects of arrow poisons with alkaloidal properties. The relative toxic doses of aconitine are given by Allen (p. 263, see table p. 229) and its allies as: Aconitine 1,

(Footnote 61 continued on following page)

animal results from loss of blood or because a vital spot is struck; the poisoned-lance technique actually effects an intravenous injection of aconitine.⁶²

In broad outline, then, I believe the gross differences between Bering Sea Eskimo and Kodiak-Aleutian whaling methods to be:

TABLE 1.—*Differences between Bering Sea Eskimo and Kodiak-Aleutian whaling methods*

Whaling technique	Kodiak-Aleutians	Bering Sea Eskimo
Whaling instrument.....	Poisoned; polished slate or chipped obsidian—pointed lance or dart; hand cast or spear-thrower.	Heavy, toggle harpoon with line and floats.
Boats and crew.....	1-man kayak; 2-man bidarka.....	8- or 10-man crew in umiak.
Recovery of whale.....	Drifts on shore.....	Towed to shore.

NORTHWEST COAST

It is generally believed that most Northwest Coast peoples, viz, Tlinkit, Haida, Tsimshian, Kwakiutl, and Coast Salish, were not whalers. There is, however, some evidence that some of these tribes formerly were whalers, and, while I am reluctant to omit treating this question here, I reserve discussion till a later time. Thus, between the Chugachmiut and the Nootka of Vancouver Island there is a blank area; a region where, at least in the full historic period, whaling was not practiced.

Some of these nonwhalers make little or no use of drift whales which are cast upon their beaches. At the risk of indulging in a flight of fancy, I should like to present a possible explanation for the well-known aversion of the Tlinkit to whale blubber or flesh. Krashenninikov⁶³ gives a vivid description of a Kamchadal feast from a drift whale, the results of which were great sickness and some deaths by the participants. Petroff (1884, p. 140) says, "It frequently happens that a long time elapses between the killing of a whale and the capture of the carcass, and under such circumstances the consumption of the meat causes disease and sometimes death." A possible explanation

Indaconitine 1, Japaconitine 0.85-0.9, Bikhaconitine 0.75, and Pseudaconitine 0.4-0.45. If we knew what species of *Aconitum* plants were used in the Aleutian-Kodiak area, we might calculate the amount of poison necessary to kill a Right whale, since we have some data on the time elapsed from subcutaneous injection and death (generally 3 days). The above should answer a question which will occur to most readers, viz, Can a large animal like a whale be killed by an aconite smeared dart? The answer is yes; it is possible.

⁶²The statistics showing the large number of whale struck and small number of whales recovered given by von Wrangell, Veniaminov, and von Kittlitz for the Aleutian-Kodiak region are perhaps in part explainable on the basis that the single penetration did not pierce through the exterior blubber layer and therefore did not cause death of the animal. Whales which went too far to sea and drifted past the islands, to come ashore on the Northwest Coast, may account for some of the whales which were struck, killed, but not recovered to the knowledge of the people in the locality where they were hunted.

⁶³Krashenninikov (1764, p. 141), "... a healthy young man began to groan and complain that his throat burnt." This sounds like a symptom of aconitine poisoning. Krashenninikov himself says that eating a whale killed by poisoned darts may account for this.

of this might be as follows: A whale is struck near Kodiak (perhaps even by the Chugachmiut) with a lance heavily laden with aconite poison. The whale dies, remains drifting for some time, and finally becomes stranded. The flesh and possibly the blubber surrounding the wound is impregnated with aconite,⁶⁴ and proves toxic in varying degrees, some of the eaters of it sickening, others dying. The oceanic drift from Kodiak swings out to westward to about Unalaska, swings south and east, hits the Queen Charlotte Islands, goes north in the Gulf of Alaska, past the Kenai Peninsula, and on past Kodiak. Thus, a whale killed near Kodiak might easily drift ashore on the Northwest Coast anywhere north of the Queen Charlotte Islands. This would be Tlinkit country, and we note that there are numerous statements that these people did not have anything to do with drift whales.⁶⁵ I suggest that the Tlinkit got hold of many poisoned whales over a period of time long enough to build up a dread of eating their flesh or blubber which is today reflected in their taboo.

The chief whale hunters of the Northwest Coast were the Nootka, Makah, Clallam, Quinault, and Quileute. (Drucker, Nootkan manuscript; Koppert, 1930, pp. 56-63 (Clayoquot); Bancroft, 1886, p. 186 (Nootka); Swan, 1870, pp. 19-22; Waterman, 1920; Gibbs, 1877, p. 175 (Makah); Gunther, 1927, p. 204 (Clallam); Olson, 1936, pp. 44-48 (Quinault); Reagan, 1925 (Quileute).) The Nootka are commonly considered the local fountainhead of whaling, the practice having spread southward across the Straits of Juan de Fuca to Cape Flattery and as far south along the coast as the Quinault River.

The characteristic features of Vancouver Island-Western Washington whaling include: A boat crew of eight in a dugout whaling canoe; a composite harpoon, in general type conforming to the usual local type, only larger,⁶⁶ to which is attached a long line with inflated bladders tied on; dispatch of wounded whale with a lance; dead whale towed to shore (fig. 58, *b*).

If the features just enumerated are compared with Bering Sea whaling techniques in table 1, a great similarity will be seen. Appar-

⁶⁴ That there is danger of this portion, at least, becoming impregnated with the aconite poison is suggested by the almost universally recorded cutting out of the area surrounding the wound where the poisoned weapon point has penetrated. See Heizer, 1938, pp. 360-361 (Aleut, Ainu, Southwest China); St. John, 1873, p. 250 (Ainu). Petroff (1884, p. 140) says, "The Kanlags, however, claim to be able to decide whether the meat is still fit to eat by observing the gulls and other aquatic birds that swarm about the carcass; and if a certain species of bird is absent the Kanlag will not touch the meat."

⁶⁵ Von Langsdorff (1813, p. 131) says, "Whale fat they never eat; it seems from some prejudice forbidden to them . . ." For further citations, see: Holmberg, 1855, p. 22; Erman, 1870, p. 316; Krause, 1885, p. 181. Dall (1877, pp. 36-37) says that of all the Tlinkit groups, the Yakutat were the only ones to eat whale's flesh and blubber. The Yakutat Bay Tlinkit were strongly influenced by the Pacific Eskimo, as judged from their possessing the umlak and spear thrower. They may have learned, like the Athabaskan Tanaina, that the Konlag killed whales with poison.

⁶⁶ For illustration and description, see Waterman, 1920, pp. 29-34.

ently this southern whaling is more closely comparable in technology with that of the Eskimo than with Aleut-Koniag.⁶⁷

ACONITE POISON

We have repeatedly made reference to the fact that aconite poison was used on the Kodiak-Aleutian whaling spears. Indeed, the effectiveness of this whole whaling method depends upon the use of this substance and is not intelligible without its employment. It has been suggested previously that the use⁶⁸ of an aconite extract as a weapon poison spread from the Kamchatka-Kurile region eastward along the Aleutian Islands to the Kodiak region.⁶⁹ There is some justification for this view, since the use of aconite arrow poison has a very extensive distribution in eastern Asia.

Sternberg (1929, pp. 766-777) associated the aconite arrow poison of the Ainu with the extensive use of poisons in the Philippines and Indonesia. He neglects reference to China and India. It is true that the whole area of Southeastern Asia employs weapon poisons of vegetable alkaloids. In view of this, we cannot consider the use of aconite a particular, isolated poison technique, but as associated as a part of a widely distributed use of alkaloidal phytotoxins in the larger area. What does seem significant to me, however, is that the further northeast we go, the less important plant poisons become. Thus, the Ainu apparently use at least three poisons (*Ranunculus*, *Aconitum*, *Anemone*); the Kurile-Kamchatka area only one or two; the Aleutian-Kodiak area only one. Not only is aconite used alone, so far as we know, in the latter area, but, in addition, is solely and functionally related to whaling, a concurrence which we have seen in the closest adjoining region (Kamchatka-Kurile Islands). The connection is thus strengthened; it seems to be a northern peripheral occurrence of a climax or central-area or plant alkaloid-poison use in Southeastern Asia.

Cornevin (1887, p. 214) says that, according to the age of the plant and the climate, there is inequality in the toxicity of *Aconitum napellus* (mentioned by Steller?). This plant is more toxic in southern than in northern latitudes. In proportion as one goes farther north, its venosity decreases to such a degree that, according to the testimony of Linnaeus, in Norway and Lapland, the young stalks are eaten without danger. Von Middendorf (1867, vol. 4, p. 697) says, "A great advantage that the north possesses is

⁶⁷ With regard to the nonmaterial, or esoteric, aspects of whaling, the Vancouver Island-Western Washington area seems to be most closely comparable to the Aleutian-Kodiak area.

⁶⁸ Heizer, 1938. In this paper I did little more than demonstrate the Asiatic-American connection of the use (not the function) of aconite poison in hunting. This functional aspect, with an obvious bearing upon the history of the whaling complex, will be treated here.

⁶⁹ Birket-Smith and de Leguna (1938, pp. 465, 519) have suggested independently that vegetable poison is a circum-Pacific element; they do not specifically isolate *Aconitum* species as the plants from which the particular poison was extracted.

that poison plants do not extend this far. There is known to me only one single example of a plant of the high north recognized as poisonous (*Hedysaurum Mackenzii* Richards)."⁷⁰ Thus, we may have a botanical reason why poisons are not used north of the Kamchatka-Aleutian axis, since plants with a sufficient toxic content do not grow.

In a recent Flora of the Aleutian Islands, I find these statements:

The middle Aleutians belong to a northern Pacific [floristic] region to which is added in both ends circumpolar and arctic-montane species and, furthermore, in the eastern end Asiatic Pacific and in the western end American Pacific types . . . the islands in phytogeographical respect belong in Asia, as their associations are decidedly Kamchatkan . . . The northern Kuriles, South Kamchatka, and the Aleutians have a close affinity to each other. [Hultén, 1937, pp. 43-44.]

It will occur to the reader to ask whether or not the plants used for extracting poison are found outside the areas where their use as arrow-poisons is recorded. The answer is emphatically in the affirmative. Hultén, presenting the North American and Asiatic Mainland distributions of the flora of the Aleutian Islands, finds that 2 *Aconitum* species,⁷¹ 3 *Anemone* species,⁷² and 13 *Ranunculus* forms⁷³ are shared by the islands with the mainland areas to the west and east. In most cases, the plants listed here are widely distributed in the northern hemisphere, and are found in the Chukchi Peninsula and Alaskan areas. There thus seems to be no lack of toxin-producing plants—their restricted utilization seems due to two main causes: (1) A cultural one, meaning that the idea of the use of phytotoxins was not diffused; and, (2) a phytogeographical cause in terms of northern latitudes where the toxic properties of plants decrease to the degree that they may be innocuous. How important this latter reason has been I am unfortunately unable to say, but von Middendorf's and Cornevin's statements on the subject indicate that phytotoxins are at least rare in the high northern latitudes.⁷⁴

Since my first paper on aconite arrow poison appeared, additional sources of information have become available. Feng and Kilborn (1937), in a pharmacological study of Nosu and Miao arrow poisons,

⁷⁰ In a recent inquiry into fish poisoning, this same fact obtruded itself, viz, piscicides were not used north of Japan in Asia, or north of the State of Washington in western North America.

⁷¹ Hultén, 1937, pp. 178-180 (*Aconitum delphinifolium* DC., *A. maximum* Pall.).

⁷² Hultén, 1937, pp. 180-182 (*Anemone narcissiflora* L., *A. parviflora* Michx., *A. Richardsonii* Hook.).

⁷³ Hultén, 1937, pp. 182-189 (*Ranunculus acer* L., *R. acer* var. *frigidus* Regel, *R. Bongardi* Greene, *R. Eschscholtzii* Schlecht., *R. Nelsonii* DC., *R. Nelsonii* subsp. *insularis* Hult., *R. nivalis* L., *R. repans* L., *R. reptans* L., *R. sulpherens*, *R. sulpherens* var. *intercedens* Hult., *R. trichophyllus* Chalk., *R. trichophyllus* var. *hispidulus*).

⁷⁴ Lewin (1923, p. 175) says that the Koryak, Yukaghir, and Chukchee have arrow poisons. I am unable to state what these poisons are, but Lewin says that it is improbable that the Koryak use aconite.

list a series of sources which attest the use of aconite for this purpose among the ancient Chinese in Yunnan, and in Hokkaido (Yezo). China, left blank or questionable on my distribution map, can now be shown to have used aconite arrow poisons, thus forming a continuous area of employment from India through China, to Yezo, the Kurile Islands, and Kamchatka (Heizer, 1938, p. 362).

Steller (1774, pp. 235-236, ftn. (a)) says of the southern Kamchadal, "Nichts destoweniger werden solche sehr gefürchtet, weil sie dieselben mit dem aufgeleiteten Pulver der Wurzel des *Napelli* [*Aconitum napellus*?], auf russisch *Ludik* vergiften . . ." Shelekhoff⁷⁵ says, "Paramushir Island has a plant called *Liutik*, with the roots of which the natives paint themselves and into its juice they dip the points of their arrows, to kill animals." Krashenninikov's statement (1764, p. 42) about "poisonous herbs, whose roots are as yellow as saffron and as thick as rhubarb, and are well known to the inhabitants of the first Kurilskoy island . . ." may refer to the same plant. Lewin⁷⁶ identified the "zgate" spoken of by Krashenninikov⁷⁷ as *Anemone ranunculoides*. Thus, there seems to be not a single clear reference to aconite poison from Kamchatka, but of *Anemone*. There can be little doubt but that this poison extracted from roots is related to the high development in the area to the south and southeast.

The Ainu use of arrow poison made from aconite roots is well known; references to its use occur commonly,⁷⁸ and there are several excellent special papers and descriptions of the method of making it.⁷⁹ (Batchelor, 1892, pp. 169-170; Eldridge, 1876; von Siebold, 1878.) Starr (1904, p. 42) says of the Ainu:

The poisoned arrow was an ingenious affair. The foundation of the poison was aconite secured from the corm of the plant; to this various other ingredients

⁷⁵ Shelekhoff, 1812, vol. 1, p. 90. Neue Beschreibung . . . 1782, p. 118. Paramushir was occupied by Kamchadal. In fact, at least the two northernmost islands of the Kurile chain (Paramushir and Sumshiri), and perhaps still others, were not held by Ainu, but by Kamchadal. (See Golownin, 1818, vol. 2; Tooke, 1801, p. 127; Sarytschew, 1806, vol. 1, p. 59; Krashenninikov, 1764, pp. 34, 35, 39, 170; von Siebold, 1859, pp. 122-123; Torii, 1919, pp. 77-82; von Siebold, 1897, vol. 2, p. 251.) This implies Ainu-Kamchadal contacts and probable cultural interchange. We know, for example, they both hunted whales in the same manner.

⁷⁶ Lewin, 1923, pp. 174-175. See also Cornevin, 1897, p. 193.

⁷⁷ Krashenninikov, 1764, pp. 92-93; Heizer, 1938, p. 360. Cheney (1924, pp. 13-14) refers in a rather obscure manner to *Anemone* sp. used in Northwest North America as an arrow poison.

⁷⁸ Savage-Landor, p. 223; Golownin, 1852, vol. 2, p. 200 (*Ranunculus flammula*); von Langsdorff, 1813, p. 334; Torii, 1919, p. 223; von Siebold, 1859, pp. 99, 101, 118, 164 (*Aconitum Kamchaticum*); Batchelor, 1901, p. 454; St. John, 1873, p. 250. Another type of poison is described by St. John (1873, p. 250) as prepared from crows' brains, tobacco ashes, and two insects named "Yousiki" and "Krombi." These four ingredients are mixed and allowed to putrefy. The poison is so strong that a considerable portion of the flesh around the wound must be cut out before the animal can be used as food. See also von Siebold, 1859, p. 157.

⁷⁹ Stegmiller, 1925, p. 612 (Khasi); Anderson, 1871 (Kakhyen to the east of Bhamo in Southwest Yunnan); Hamilton, 1824, pp. 249-251 (Himalayas); Fraser, T. R., 1916 (Abors, Mishmi).

were added. Not everyone knew how to compound the poison and today the knowledge is possessed by few.

A thorough search of the literature would undoubtedly yield numerous additional references to aconite poison in India and the Himalaya provinces.

In the earlier discussion of Kamchatkan and Kurilian whaling there were references to the use of poisoned darts. References, not only to poison-lance whaling, but to the use of poisoned darts for the killing of sea lions and in war, are given elsewhere.⁸⁰

TABLE 2.—*Comparison of American and other whaling methods*

Elements of whaling methods	Japan	Kurile-Kamchatka	Koryak	Chukchee	Eskimo	Aleutian Islands	Kodiak Island	S. Northwest Coast
Large nets	1 X		² XXX					
Harpoon with line and attached floats				XX	XX			XX
Crew: 8 or 10 men in large boat	³ X							XX
Whale harpooned repeatedly	³ X			XX	XX			XX
Dispatched with hand-lances	³ X			XX	XX			XX
Dead whales towed to shore	³ X		X	X	X			X
Stone-headed dart or hand-lance		X				X	X	
Poisoned with aconitine		XX				X	X	
Whale lanced only once		X				X	X	
Whale dies of poison, drifts ashore		X				X	X	
Property marks on lance-head					⁴ X	⁵ X	⁵ X	

¹ Harpoons also, but probably post-European (Tsuchiya, 1937, pl. 24, p. 171).

² Likely also to be post-European (after 1543). An interesting parallel between the fundamental method of European and Eskimo types is shown by this.

³ Only Oluotores (southern Koryak).

⁴ For identification and recovery of each hunter's points.

⁵ For identification of hunter and for property right in the whale.

The evidence seems clear on the point that the Eskimo do not use arrow poisons (Weyer, 1932, p. 330; Lewin, 1923, p. 409), and they are apparently lacking on the Northwest Coast south of the Tlinkit to Puget Sound (Hoffman, 1888, p. 260). Unless we derive Kodiak-Aleutian Island aconite weapon poison from the Plateau,⁸¹ which I consider unlikely, we must assume its transference from the Kamchatka-Kurile area.

The technological aspects of whaling have set off the Kurile-Kamchatka area from that of the Koryak-Chukchee region to the

⁸⁰ Heizer, 1938, pp. 359-361. I have been unable to consult Lowe (1842, p. 479), who according to Birket-Smith and de Laguna (1938, p. 465), states vegetable poison was used among the Aleut. It is likely to be the same one given by Petroff (1884, p. 154), which mentions "poisoned roots or weed . . ."

⁸¹ Sources listed by Birket-Smith and de Laguna (1938, p. 465, fn. 1).

north, and from that of the Japanese area to the south.⁵² A similar conclusion was reached (see table 2) regarding American whaling, where it was seen that the Aleutian Islands-Kodiak method of whaling was sharply differentiated from that of the Bering Sea Eskimo to the north and from Vancouver Island-Western Washington coast whaling far to the south.

There seems to be no reason for assuming the poison-tip lance method was ever practiced north of the areas where it now occurs, that is, in Chukchee or Eskimo territory.

On the other hand, there is a possibility that the harpoon with line and floats method may have been once used in the Kodiak-Aleutian area as suggested by the following observations:

1. Seal and otter hunting in the Kodiak-Aleutian region are performed by means of a dart with a line and float. This is the same principle as the larger Eskimo whale harpoons. There is no *a priori* reason that heavy whaling harpoons of this type were not once present in the Kodiak-Aleutian area, since there is no apparent cultural objection to the type, but only to their function. The latter, as far as whaling goes, may have been supplanted by poison lances or darts.

2. Wherever whaling is practiced, the stone-headed lance is nearly always present.⁵³ But in the areas where the harpoon-line-float method of whaling is operative, lances are used only for dispatching the exhausted whale after being harpooned. The same lance, typologically speaking, is used as the sole whaling instrument in the Kodiak-Aleutian area with a specialized function resulting from the presence of poison on the tip. Thus, in the latter area, if the use of poisons for hunting was instituted, it might be transferred to whaling. The instrument used would be, obviously, not the harpoon with line and floats attached, but the stone-headed lance.

3. MacLeod (1925; map opposite p. 125) correctly shows the use of corpses in whaling ritual in both the Kodiak and the distant pan-Nootka areas. If we hypothesize that: (1), At an earlier time Western Eskimo, Kodiak, and Nootka all shared the harpoon-line-float, eight-man crew whaling method, and that; (2), as part of a wider cultural use of corpses for hunting or fishing luck, the Kodiak and Nootka area applied this specifically to whale hunting, and subsequently; (3), aconite-poison lance whaling diffused into the Kodiak region, we could explain in large part the present situation. Ceremonial fat "poison" rendered from corpses on Kodiak might be a specialization suggested by the existence of true poison. Both are lacking in the Nootka area, which shares with Kodiak only the closely similar use of corpses in getting "power" by bathing with them, etc. Whether whaling was once practiced and subsequently abandoned in the coastal area between the Chugachmiut and the Nootka, or

⁵² If we knew for certain that Japanese whaling was aboriginal, and with what type it was classifiable, we should be on more certain grounds in reconstructing the history of Asiatic whaling. Thus, the difference between Japanese and Koryak-Chukchee types of whaling, if Japanese whaling is post-1543, may not be a condition of very long standing. The independence of Kurile-Kamchatka as against Koryak-Chukchee whaling cannot be denied. Thus, the latter type may have been pressing southward, and meeting resistance in the Kamchatka region. The cultural break at this point is a very profound one, and we have noted that a great many cultural traits of the Asiatic littoral veer eastward across the Aleutians from Kamchatka rather than continuing north into Koryak or Chukchee territory.

⁵³ There are exceptions, e. g., Nootka, who use a long, chisel-pointed bone-headed lance. This may be a local specialization. Collins (1937 a, pp. 337-338) gives a very wide distribution for ground slate points.

whether Nootka whaling is due to actual introduction by a non-Wakashan immigrant group of whalers are two alternatives, either one of which may ultimately be shown to explain best this extremely puzzling situation.^{53a}

Marchand (1801, vol. 1, p. 344) describes Thinkit whaling at Norfolk Sound (Sitka) in 1791—this is post-Russian in time, and may indicate Aleut or Koniag introduction, since we know many of these people were imported for sea-otter hunting as "ticket men." Boas (1909, p. 495, fig. 158) figures a Kwakiutl harpoon rest which seems very similar to the Eskimo specimens shown by Nelson, Murdoch, and Hoffman. (Nelson, 1899, pl. 78, figs. 33, 37; pl. 107, fig. *a*; Murdoch, 1892, p. 341-343, figs. 347-349; Hoffman, 1897, p. 793, pls. 29, 72.) Data of this sort, as well as the esoteric aspects of whaling,⁵⁴ must be completely and critically analyzed before conclusions can be offered.

Following the lead of Mathiasen's work on the Thule culture, Birket-Smith (1929, pp. 231-232) points out that the development of this culture occurred in the western regions aided by Northwest coast and Asiatic stimuli. The Thule culture is one in which whaling is an important feature, and Birket-Smith (1929, p. 232) intimates a genetic connection between Vancouver Island whaling and that of the Thule culture,⁵⁵ at the same time recognizing the distinctive lance-whaling in the intervening Pacific Eskimo area (1929, p. 329). The problem, therefore, will ultimately be referable to certain aspects of the major inquiry connected with the origins and development of Eskimo culture.

4. There seems to be a more extensive use of aconite poison on the eastern Asiatic coast than in the Aleutian-Kodiak region where poison is employed only in whale-hunting.⁵⁶ Thus, in the Asiatic area poisoned weapons are used in war, bear, sea-lion, and whale hunting. This leads us to the conclusion that poison for weapons was commonly known and not kept a strict secret as in the American (Aleutian-Kodiak) area where poisoned weapons were not generally used (e. g., for war), but almost exclusively for whaling.⁵⁷ Thus, the use of aconite poison in America seems to be associated with (1) whaling, and (2) a special guild of hereditary whalers who kept the knowledge of poison strictly unto themselves. Its entry into the Aleutian Islands and Kodiak could hardly, then, have been a gradual diffusion, else poison knowledge would be generally shared by *all* the people instead of the whalers alone. We conclude, therefore, that there is a close functional association of whaling and poison—they must have been introduced together, and as a unit.

Thus, there are presented several possibilities for explaining the restricted and unique presence of the Aleutian-Kodiak whaling method in reference to the other American method. The possibility of there having been an earlier, now submerged and forgotten har-

^{53a} Subsequent inquiry into Northwest Coast whaling since the present paper was completed has suggested the possibility that Nootkan whale hunting may be due to independent, parallel origin. This possibility should be kept in mind in addition to the others outlined above.

⁵⁴ Lantls (1938 a) recognizes the problem, and sees the connection, but only incidentally.

⁵⁵ Collins (1937 a, p. 217) indicated at the time that whaling was not an Old Bering Sea culture trait. In his recent summary of Eskimo prehistory (1940, p. 549) Collins notes the single find at Kukulik (by O. W. Geist) of an O. B. S. whale harpoon head.

⁵⁶ Sea-lion hunting with poisoned arrows is mentioned *only* by Sauer, who, as we have seen, knew more about Kodiak whaling secrets than any other observer we have encountered. I suspect sea-lion hunting may have been similar to whale hunting, insofar as they were hunted by whalers with poisoned darts. Other men, when hunting sea lion, seem to have used a retrieving dart. (Jochelson, 1925.)

⁵⁷ Veniaminov (1840, vol. 2, pp. 105-106) says arrow points (?) were sometimes poisoned with a poison which was known to *very few people*.

poon-line-float-eight-man-crew-umiak method in the Kodiak area seems not unlikely, yet it is impossible to demonstrate it. It is suggested, however, by the very specific resemblances of the cult or ceremonial or esoteric aspects of Aleut-Koniag whaling to those of the Nootka region to the far south, which uses the Eskimo-type whale-hunting method.

As to the probable history of whaling on the Asiatic coast, we are on less sure grounds, since the data are fewer and less specific than for the native American whale fishery. Chukchee-Koryak whaling is very much like Eskimo—in fact, identical. The Olutores' specialization of netting whales may be an extension of a rather widely spread method of netting sea mammals.⁸⁸ The presence of a highly developed esoteric aspect of whaling among the Kamchadal and Olutores who lie south of the Chukchee-Koryak area is attested by Steller's early account. We may never know the full details of the whale-cult here, since native cultures were shattered before full recording, incidental or planned, could be accomplished. But the significant point about the mere presence of a highly developed ceremonial accompaniment of whaling, which we are led to suspect from Steller's tantalizing account, probably does indicate an old, developed area of whaling in Kamchatka and the area immediately north and east. Here, as in the Aleutian-Kodiak area, the dart-line-float method for hunting smaller sea mammals is present. The Chukchee-Koryak typological equivalent for whales (i. e., the large whaling harpoon) is absent. If we knew more about early Japanese whaling there is some expectation that we could reconstruct the history, or rather prehistory, of whaling of the east Asiatic coast. From data available to me, there seems some warrant for believing that, if it was pre-European, it was like the Chukchee type.⁸⁹ Yet, if so, it must have been heavily overlaid with European techniques at an early date.

What does seem clear is this—a localized intercontinental area of maritime cultures has applied aconite poison to lances and used them for hunting whales. Granting the introduction of aconite poison to America from Asia (Heizer, 1938), there is reason to believe that it was spread in connection with the method of lance whaling, since in both areas poison and whaling method are associated. It is difficult, in view of the data presented in this paper, and with the knowledge that there has been some culture drift from Asia to America by this route,⁹⁰ to assume a convergent development of whaling in the Asiatic

⁸⁸ The Sakhalin Gilyak netted sea lions (Hawes, 1904, p. 256). See Steensby (1917, pp. 153-154) for a discussion which supports this view.

⁸⁹ Tsuchiya (1937, p. 11) mentions archeological finds of what may be bone stoppers similar to those used by the Eskimo to plug the inflated sealskin floats.

⁹⁰ See last section of this paper; Birket-Smith and de Laguna (1938, p. 519); Jochelson (1925, p. 111 ff.).

and American areas⁹¹—rather, we cannot escape the conclusion that the presence of Aleutian Island-Kodiak poisoned lance whaling is attributable to introduction from the Kamchatka region, where it originated in connection with the use of aconite poison.⁹²

GENERAL IMPLICATIONS OF NORTH PACIFIC WHALING

Leaving the specific inquiry connected with the whale hunting, let us review briefly the bearing of our main conclusions on the general problems of the route of entry of man and culture into the New World—problems basic to much work in American anthropology.

The continuing interest in the question of man's antiquity in the New World has had the salutary effect of focusing attention on how and when and with what cultural equipment man entered America.⁹³ Alaskan archeologists are fully aware of this problem, yet have been unable to find actual evidence of ancient remains.⁹⁴ The Old Bering Sea culture, as described by Collins (1937 a, 1940), is highly specialized with definite Eskimoid characteristics, yet is the oldest Alaskan culture known to date.

In the absence of direct archeological evidence, we have left to us another method of approach—that of inferring cultural transference within the ethnographic time continuum. In most cases our conclusions as to relative time must depend on inferential deductions on the basis of geographical distribution. Thus, Kroeber (1923 a, p. 2; 1923, b, fig. 35) and Wissler (1938, p. 386) have listed a series of cultural elements which may be ascribed to the earliest immigrants to America. This might be called the minimal basic substratum of New World culture with its roots perhaps in the Mesolithic or early Neolithic of the Old World. (See also Cooper, 1942, p. 30 ff.)

A large number of studies have appeared whose aim has been to demonstrate the diffusion of Eurasiatic elements into North America. In general, these have implied the use of the Bering Strait (East Cape-Seward Peninsula-Yukon-Mackenzie Valley) route. Notable among these have been contributions by Hallowell (1926), Cooper (1936),

⁹¹ I reject the theoretical possibility that the use of aconite poison was independently developed in the Aleutians and on the eastern Asiatic coast.

⁹² Needless to say, archeology will undoubtedly throw a great deal of light on the question of possible former occurrence of a different type of whaling from that practiced in any single area today. This remains the ultimate test.

⁹³ See Howard, 1935, 1936, for a statement of these problems.

⁹⁴ Finds of the type reported by Rainey (1939) may be exceptions, but are still "continental" and do not prove cultural importation. They show, however, that hope may be entertained that evidence of early cultures, now known only from more southerly locations, may ultimately be disclosed in the critical areas of Alaska and Asia. Collins (1937 a, p. 378) says, "Although on theoretical grounds we are forced to assume that man originally entered the American continent at Bering Strait, it must be emphasized that archeological work in this region has revealed as yet no trace of these earliest migrants." See also Nelson (1937) and Collins (1932, pp. 107-108).

Lowie (1923, 1934), Davidson (1937), Boas (1929), and Hatt (1914, 1934).

The important papers of Collins (1937 a, 1940), de Laguna (1934), and Birket-Smith and de Laguna (1938), have reopened the question of the Aleutian Islands as a possible route of cultural exchange between Asia and America. The early observations indicating the Commander Islands as uninhabited at the time of discovery (by Vitus Bering in 1742), and Aleut culture as of an American, rather than Asiatic type, for a long time led to the categorical denial of the probability that the Aleutians served as a path of entry of Asiatic cultures or people into America.⁹⁵

Hrdlička (1930, fig. 29) has indicated his belief in the probability of the use of this island chain as included in the itinerary of a portion, however small, of the people who settled America from Asia.

Hrdlička (1939, pp. 358-359) has recently summarized the results of his Alaskan labors of the last decade in a highly interesting and stimulating paper in which the following statements are of particular interest to us:

The third and fourth major results were that the Koniag people of the once very populous Kodiak Island, though speaking an Eskimo dialect, were physically not Eskimo, but close to the Aleuts and also the southern Alaska Indians; and that, before these people arrived at Kodiak, the island had already for many centuries been peopled by a physically as well as culturally different type of American native, whose identity is not yet established. . .

The fifth result—and one of equal importance—was that the Aleuts who, too, spoke Eskimoid dialects, were physically a radically different type from the Eskimo, allied to the upper people (Koniags) of Kodiak and the Indians of the Gulf of Alaska.

The sixth fact of importance, reported formerly by Stejneger but decided definitely by our expedition in 1938, is that, contrary to expectations, the Commander Islands had never been peopled before the advent of the Russians and had therefore not served as a bridge for the coming of any part of the American population from Kamchatka. It now appears much more probable that the Aleuts may have come from more southern parts of the eastern Asiatic coast, across the Kuriles.⁹⁶

H. B. Collins and F. de Laguna have been able to demonstrate the fact of cultural exchange between the Kamchatka-Kurile and Aleu-

⁹⁵ See Jochelson (1925, p. 111 ff.) for citations and critical discussions of various theories as to the use of the Aleutian bridge as a cultural route. (See also de Laguna, 1940; Jenness, 1940; Hewes, 1942. These three important papers have appeared since the present paper was written.)

⁹⁶ Bering and Copper Islands are isolated, and people on their way from Kamchatka to the Aleutian Islands to the east might stop only temporarily, camping for a few days to replenish their food supply or to rest. Thus, there may be evidence of pre-Russian native visits on the Commander Islands. As for the Aleuts coming directly from the Kuriles to the Aleutians (e. g., Attu), I consider this very unlikely on the grounds that the open-water distance is too excessive. Evidence of cultural connections between the Aleutian and Kamchatka areas makes it not unlikely, even in view of the lack of evidence of occupation of the Commander Islands, that the connection is direct. Until we know definitely and conclusively that the Commanders were not visited or occupied, however, sporadically or temporarily, the question must remain an open one.

tian Islands-Kodiak-Cook Inlet areas via the Aleutian chain. (Collins, 1937 a, pp. 280, 345, 373-378; 1940, pp. 577-583; de Laguna, 1934, pp. 216-220.) These data indicate a cultural connection as shown by: Roof entrance for the underground house; refuge island; notched and grooved stones; stone with hole; grinding stone and slab; oval stone lamp; hunter's lamp with ring; labret; large bone arrowhead with blade but no barbs; broken and cut human bones; and Japanese form of harpoon head, toggle type with closed socket and line hole in the same plane with the spur. Collins (1937 a, p. 375), on the basis of the elements just listed, states ". . . there is unmistakable evidence of cultural relationship between south Alaska and a fairly restricted area along the east Asiatic coast." In summary, Collins concludes that "The indications of cultural connections between the Aleutians and Kamchatka are so clear as to lead to the expectation that evidences of aboriginal occupancy will eventually be discovered on the Commander Islands." (Collins, 1937 a, p. 377, See also Collins, 1937 b, pp. 380-384.)

The foregoing evidence seems to point mainly to a diffusion of cultural traits from America to Asia; that is, from east to west. The Japanese type toggle harpoon head probably came from Asia to America. The use, as weapon poison, of aconitine, extracted from the roots of *Aconitum* plants, I have indicated previously as apparently a transfer from Kamchatka-Kurile region to the Aleutian Island-Kodiak region. (Heizer, 1938. See also Collins, 1940, p. 580.) Another culture element, the bulbed enema syringe (Heizer, 1940, map p. 87, p. 89), is possibly an American transfer to Kamchatka and the Kurile Islands, but the evidence is slender and ascription to this element of intercontinental diffusion status is to be entertained with doubt until further evidence is forthcoming. MacLeod⁹⁷ proposes that Pacific Eskimo mummification was introduced from the Asiatic coast.

The welcome Eyak ethnography by K. Birket-Smith and F. de Laguna (1938) has thrown some clear light on the problem under discussion here. A comparative analysis of Eyak culture aimed at defining the cultural position (op. cit., pp. 365-514) has resulted in the identification of a series of traits with a circum-Pacific distribution which includes (op. cit., p. 519): Rectangular plank house; separate sleeping compartment; notched ladder; stockade; raised cache-houses; shirt made of horizontal strips of small animals' fur; apron; stone pecking technique; stone mortar; twisted basketry; boat-shaped container; round plate; wooden quiver; openwater sea mammal hunting; vegetable arrow poison; slavery; transvestism; bride service; cremation; shaman's dolls; attitude toward dogs;

⁹⁷ MacLeod, 1925, p. 143 ff. Until North Pacific mummification is more fully treated, this opinion should be considered tentative.

sounding board; raven myths; tale of the girl and the dog. The questionable inclusion of the following elements is tentatively offered: Nose ornaments; weregild; digging stick; dugout; fish buried in the ground to rot; mother-in-law taboo. These are elements of culture whose distributions are concurrent in this respect—they occur along the Pacific rim. The conclusion is that "There can hardly be any doubt that the general direction of this circum-Pacific drift has been from Asia, more particularly perhaps from the Lower Amur region, towards North America."⁹⁸

I submit that with poison-lance whaling we may add another item to the steadily mounting number of cultural elements and complexes which can be demonstrated to have entered the New World from Asia via the Aleutian Island chain.

APPENDIX 1

THE USE OF POISON HARPOONS AND NETS IN THE MODERN WHALE FISHERY

The practical difficulties attendant upon hunting whales, the largest of all animals, has doubtless led those who follow this dangerous pursuit to make the method as effective as possible. Whaling is a very highly specialized hunting technique, but at best an exceedingly hazardous means of securing an animal.

It is not surprising to learn that in modern times there are recorded attempts to hunt whales with poison-laden harpoons. In recent times, with the scientific knowledge of poisons and their effects known, it is understandable that such an application of poison might be made to whaling by a progressive firm or shipowner. This is an origin of a somewhat different sort than the probable beginning of the aboriginal poison-lance whaling discussed in the main body of this paper. Logic would seem to indicate that the use of aconite poison for whaling in the Kamchatka-Kurile and Kodiak-Aleutian area is originally ascribable to a transfer from the use of poison in hunting land animals. As weapon poison became known to coastal people (presumably either Ainu or Kamchadal) they applied it to hunting the whale.

The earliest occurrence of the modern use of poison for whaling that I have found dates from the year 1831 (Christison, 1860). Christison was requested in that year by the mercantile firm of W. and G. Young, of Leith, Scotland, to devise a means for catching whales by poison. Christison considered the problem of the size of the whale (60 feet long and up to 70 tons in weight, according to

⁹⁸ Birket-Smith and de Laguna, 1938, p. 520. Kroeber (1923 b) emphasizes Asiatic influences on the Northwest coast. See also Collins, 1940, p. 578.

Scoresby) and decided that ordinary whales encountered would not be above 40 feet in length or weigh over 40 tons. Christison assumed that one minim of hydrocyanic (prussic) acid would kill a man of 200-weight, and computed that 2 ounces (875 minims) would suffice for stupefying or even killing a 40-ton whale. A method was devised for introducing the poison at the right moment after the harpoon had penetrated the whale. The hydrocyanic acid was put in a glass tube and attached to the harpoon near the blade with a heavy copper wire which was also attached to the harpoon line. When the whale had received the harpoon the line was drawn tight, pulling the copper wire and crushing the tube which released the poison. Another type of dispenser was devised and described thus:

The blade of the harpoon has commonly a double barb thus, figure 1. In the poison harpoons, the ends of the barbs were jointed as in figure 2 [see fig. 60]. It is evident, that as soon as the animal sprung off on the harpoon being struck into its body, the ends of the barbs would be pulled open by the drag exerted on the harpoon, and that the inner point of the barbs would be pressed strongly against the glass tubes, and crush them. [Christison, 1866, p. 76.]

Materials for producing concentrated hydrocyanic acid were carried on the voyage, but on the eve of beginning to hunt whales the ships carrying the harpoons and poison were crushed in the ice pack and lost. The next year (1833) the same firm made a second, and successful, attempt. One eyewitness said the poison tubes were fired from a musket at the whales but did no harm.¹ A harpoon gun² was used, but only once. The poisoned harpoon entered the whale's body, the whale sounded, and in "a very short time"³ the line relaxed, and the whale appeared dead on the surface. The terrific effect of the harpoon so appalled the men that they declined to use them any more. Christison goes on to say, however, that this ship caught 24 whales on this voyage, which was a record, no number for some time previously or afterward reaching this mark. This fact, together with the observation that the ship's log made no mention of the use of poison, leads to the belief that the Youngs wanted to conceal their experiment.⁴ The news did spread, probably through men employed on the ship, and short notices appeared in newspapers and periodicals. An Aberdeen or Peterhead ship is reported to have successfully used harpoons poisoned with prussic acid. The whales struck either were killed outright or were so paralyzed that they were unable to move, and were easily dispatched

¹ This may be the earliest of a series of attempts at using poison shells. If so, it was abortive.

² A short-barrelled gun which shot an iron harpoon with the line attached.

³ Normally a whale sounded for about a half hour. Presumably, in this instance, it was for a much shorter period of time.

⁴ Secrecy was important, but too many people shared the secret and information leaked out. Christison himself was sworn to secrecy, and wrote his paper in 1866 after the Leith firm was no longer in existence.

with lances. This case is reported in 1838 or 1839. The crew was so frightened by the effect of the poison that they were afraid to flense the whales.

The next case that comes to my attention is recorded by Clark.⁵ The *Susan Swain*, which sailed from Nantucket on November 17, 1833, carried poison harpoons, but the crew was frightened by reports of deaths resulting from handling blubber of whales killed with poison, and these harpoons were not used. Clark (1887, p. 249) thinks poison whaling originated in Scotland with Christison, whose report is sum-

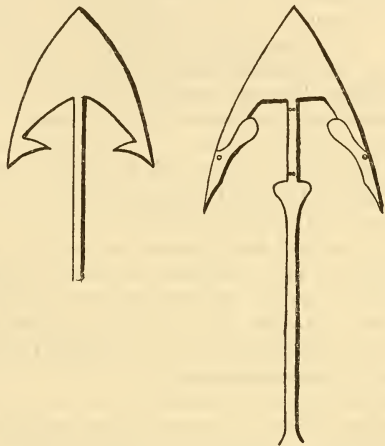


FIGURE 60.—Ordinary whale harpoon with simple lateral barbs and a poison harpoon with hinged barbs. (From Christison, 1860, p. 76, figs. 1, 2.)

marized above, but he states that the American whale men attribute the development of poison whaling to the French.⁶

There is a mention that whaling with poisoned harpoons originated in Baltimore in 1835 or 1838, but I have not found the original article (*Niles National Register*, 1843, p. 16).

Between 1843 and 1849, a surgeon of the French navy named Ackermann concerned himself with the problem of prussic acid as a means of whaling. He named his harpoon a *harpon inoculateur*; it seems to have had a tube of acid attached to the point which was crushed after penetration. He seems not to have published a full report of his

⁵ Clark, 1887, p. 248. Given erroneously as 1873 by Spears (1908, p. 228).

⁶ Clark, 1887, p. 248. The French were known to have made and published the result of their attempts at poison whaling. In this way they may have been attributed all efforts in this direction.

researches; and I find only three brief and unenlightening communications to the Academy of Sciences. (Ackermann, 1843 a, 1843 b, 1849. Mentioned in Niles National Register, 1843, p. 16.)

Scotland appears next in our chronological study of the modern development of whale hunting with poison-bearing harpoons. Clark (1887, p. 249) describes a large, two-grooved rifle made in 1861 in Edinburgh. It weighed 28 pounds and fired shells filled with one-half ounce of concentrated prussic acid and a small powder charge fired by a 10-second fuse. On May 12, 1862, at 11 a. m., a whale was struck with the harpoon gun and sounded, carrying out 4 lines (480 fathoms). At 12 noon the whale surfaced and a prussic acid shell was fired into it. The whale submerged for 4 or 5 minutes, and upon surfacing, another shell was fired into its body. The whale then seemed quite helpless. Three harpoon guns were fired into the body as the whale lay on its side, and at 12:30 it was quite dead.

In 1866 there appeared in France a paper by Thiercelin on the employment of strychnine and curare as a means of hunting the large cetaceans (Thiercelin, 1866). The experiment was carried out with the aim of improving the method of whale hunting. Two problems presented themselves; first, how to effect the greatest possible dissemination of the poison and, second, how to cause the greatest absorption of the poison in the shortest possible time. The choice of what poison to use caused trouble, since whales sometimes exceed 100,000 kg. Finally, there was selected the most soluble of the salts of strychnine⁷ united with a twentieth of curare.⁸

As a result of a large number of experiments upon terrestrial mammals (dogs, rabbits, horses), Thiercelin found that this poison employed in a minimal dose, resulted in the death of these animals in the space of 12 to 40 minutes, according to: (1) Being porphyriated, (2) being dispersed in a large wound by means of insufflation, and (3) being administered in a dosage of five ten-thousandths (0.005) of a gram per kilogram of the animal if the animal weighs more than 10 kilograms. A larger dose caused a more rapid death; if the dose was less the animal recovered. The larger the animal being experimented with, the smaller the proportionate quantity of poison necessary to cause death.

⁷ Mitchell (1929, p. 788) states that strychnine characteristically produces tetanic convulsions which are recurrent; lockjaw is a constant symptom. Death, in humans, has been known to ensue within as short a time as 12 minutes, but usually occurs in from $\frac{1}{2}$ to 2 hours. In rare cases with fatal ending life has been prolonged for one or more days (p. 789). See also Henry (1924, pp. 190-191).

⁸ Mitchell (1929, p. 771) says that "curare exercises both a paralyzing and tetanizing action, but it appears to owe its chief poisonous properties to its action on the motor nerves, which it paralyzes, so that an animal under its influence dies of suffocation from paralysis of the muscles of the chest. . . . curare produces tetanus just like strychnine." See also Henry (1924, p. 191).

The whales, in actual experiments performed by Thiercelin (described below), were inoculated with 0.005 gram per kilogram of body weight. Cartridges were made, each containing 30 grams of toxic mixture, one being sufficient to kill a whale of 60,000 kilograms or less, and two would be enough to kill the largest whales of the Arctic. Each cartridge was inserted in the powder of an ordinary explosive projectile known as the bomb lance.⁹ After these preparations, Thiercelin shipped on a whaling cruise to make actual experiments. Ten whales were shot with bomb lances containing poison capsules. All died in a length of time indicating that he "had not presumed too much in the energetic action of the poison."

Case 1.—August 20, 1863 (Coral Sea, Chesterfield Islands).

A rorqual, already wounded but still full of vigor and upon the point of escaping from the whalers, received a bomb lance in the abdomen. It died 11 minutes after penetration, in convulsions and without sudden starts.

Case 2.—August 22, 1863.

A free whale received, accidentally, a bomb near the tail. The wound produced would never have been mortal by an ordinary bomb. The animal acted as though it had an attack of tetanus. This state lasted 5 minutes and was followed by death.

Case 3.—December 5, 1863 (on the Australian coast).

A killer whale received a bomb in the dorsal fin. It exhibited a general trembling and small convulsive movements for 2 minutes. After 2 more minutes of automatic progression, it turned turtle, presented its ventral side to the air, was undeniably dead, and sank.¹⁰

Case 4.—May 10, 1864 (in sight of one of the Kurile Islands).

Another killer whale (Fr., *jubarte*) received a bomb and exhibited the same symptoms as in the preceding case. Death followed 4 or 5 minutes after inoculation.¹¹

Case 5.—August 1, 1864 (Sea of Ochotsk).

A polar whale received a bomb. It sounded immediately, and died near the shore in 15 fathoms. No movement could be ascertained.

Case 6.—February 2, 1865 (Baja California, Santa Margarita Bay).

A California gray whale received a bomb and died, so to speak, with the thrust. It sank in 10 fathoms in water clear enough to enable one to say that it made no movement.

Case 7.—February 28, 1865.

A female of the same species nursing a young one which had been made fast, received a bomb. For 10 minutes it exhibited several convulsions and a general trembling, then died on the surface.

Case 8.—March 1, 1865.

A bomb struck a whale, already issuing blood. It sank in 20 fathoms and died in 8 or 10 minutes without apparent movement.

Case 9.—July 2, 1865 (East Cape, Bering Sea).

⁹ A lance with an explosive cartridge on the head and shot from either a shoulder gun or a heavier swivel gun attached to the rail of the whaleboat.

¹⁰ The killer whale is notoriously easy to kill. It was never hunted commercially by deep-sea whalers.

¹¹ It is a curious coincidence that Thiercelin should be practicing poison whaling in the Kurile area where it was formerly an aboriginal technique.

A polar whale, held by two harpoons, received a bomb. Tremblings, etc., as in the preceding case. Death at the end of 10 minutes.

Case 10.—September 6, 1865 (East Cape, Bering Sea).

A polar whale, attached by a harpoon, received almost at the same time, two bomb lances. It exhibited the same symptoms as outlined in case 9, and died after 18 minutes.

Of these 10 poisoned whales, 6 were "tried out."¹² The blubber chunks were handled without excessive precautions by men having scratches and even recent (open) wounds on their hands, without a single one experiencing the slightest accident. Two whales belonged to a species which is not regularly fished for, and the other two were lost as a result of the fortunes of the chase independent of the new (poisoning) method. Of the 10 whales receiving poisoned bombs, all died in a lapse of time not exceeding 18 minutes, and, if one does not object to the numerous wounds made by the lances and ordinary bombs which did not cause the death of the animals attacked, it is not possible to deny or gainsay the influence of poison on the whales. These marine mammals appear to be more susceptible to the action of the poison than all the terrestrial mammals. "By reason of this sensibility," said Thiercelin in 1866, "there will be opportunity for the future to practice with diminishing the dose of the toxic agent for effecting a less immediate death." The differences in the elapsed time between the wounding and death is probably attributable to the variable dispersion of the poison, depending upon the more or less complete fragmentation of the bomb, as well as the location of the wound. Thiercelin concludes by pointing out that the several obscurities and inconclusive results are due to difficulties attendant upon controlled or laboratory experiments. There can be little doubt, however, that the method is an extremely effective one.

There is suggested by the foregoing data a parallel between the aboriginal and modern poison whaling in the effort to keep the technique a secret. Fundamentally, secrecy in each instance had an economic motivation. Among the Koniag, for example, possession of a whale automatically gave the owner the privilege of giving it away—in this way his social prestige was elevated. I have treated the question of how and why these people maintained secrecy regarding the extraction and use of poison for whaling and refer the reader to this earlier discussion. We have noted the fact that in 1831, the date which marks the first recorded attempt to employ poison on modern, commercial whaling ships, the firm which innovated the practice attempted to keep it secret. It was not possible to do so, however, since the crew talked and other firms or individuals in other ports learned of the technique and tried

¹² The process of boiling the blubber to extract the oil.

it out. Among the Koniag each whaler found it expedient, for his own ends, to keep silent—the whale hunters constituted a closed group. Why modern poison whaling was not more widely accepted is difficult to say. There is no proof that men were ever killed by handling the whale blubber from animals killed by poison. The story may have been an excuse on the part of the whaling crews, to avoid implication in this type of whaling which, if accepted, would necessitate smaller crews and would result in fewer jobs. At any rate, our evidence does not indicate that the idea was ever accepted and turned to commercial advantage.

THE MODERN USE OF HEAVY NETS IN WHALE CATCHING

It is difficult to determine how early large nets were used in the modern whale fishery. The early Basque, Dutch, and New England whalers are not known to have employed nets in this connection.¹³ Clark gives an account of a certain Captain Josiah Ghenn, a Provincetown whaleman, who attempted to capture a bowhead whale off the coast of Labrador in 1848 with a net made of whale-line. (Clark, 1887, p. 248. Cited by Spears, 1903, p. 225.) The net was 159 fathoms long and 8 fathoms deep with large meshes. After the net was set in a right angle out from, and then turned parallel to the shore, a bowhead whale entered the net and carried it away.

In the Faro Islands in the north Atlantic, blackfish (*Globicephalus melas*) enter the fiords in great numbers. The herd is prevented from escaping by a large net 200 fathoms long, 8 fathoms deep, made of 9-yarn rope with lead sinkers at the bottom and oak barrels for floats (Clark, 1887, pp. 306-307). This fishery is reported as early as 1584, but whether nets were used at this early date is not stated.

In the Norwegian fiords, in the neighborhood of Bergen, whales are impounded with nets stretched across the narrow entrance of the bay. Here, however, the net is used to prevent the whales from escaping, rather than entangling them as a means of capture (Brunchorst, 1899).

In New Zealand, a large net made of three-quarter inch wire rope with a 6-foot mesh and buoyed with barrels, is put out to sea from a point of rocks. The whale gets entangled, is seen from shore by the lookout, and boats are put out to harpoon and lance it. (Kelly, 1906. Mentioned also by Fraser, F. C., 1937.)

This concludes our survey of modern whale netting. Parallels are suggested by these data to the aboriginal use of nets for catching

¹³ Scoresby (1820, vol. 2, p. 173) says the English used rope nets for whales in the early seventeenth century, but further details are lacking.

whales. The Japanese method of setting out a net in the open sea and entangling the whale by drawing the two ends together by boats (see pl. 22) has no modern parallel. The use of lookouts (noted also for the Faroe Islands, Bergen fiord, and New Zealand) in Japan is explainable in functional terms of shore-whaling—i. e., whale hunting by small boats which put out from shore when a whale is sighted.

The whale netting of the Olutorski Koryak is similar in this respect to the modern whale netting described above, viz, anchoring one end of the net on land. Inside the entrance of the bay, the net is placed by the Koryak so as to intercept the whales as they enter. There is nothing specifically like this recorded by modern whale netters—the New Zealand instance probably approaches the manner in which the Koryak net was set.

There need only be added here that there seems to be no historical connection whatever between the aboriginal poison-lance whaling of the east Asiatic coast and Aleutian Islands and the modern European and American instances referred to above. The same is probably true of whale netting, but it must be remembered that Europeans were at a very early date whaling in the Japan Sea. Japanese whale netting must have been seen and described by Europeans and the mere transmission of the idea may have stimulated attempts to use them. This may, however, be doubted on the grounds that the Japanese use nets for entangling whales in the open sea, while all the modern instances recorded here refer to the setting of nets along the shore. The two are different, and the question obviously cannot be solved on logical grounds. There is no recorded evidence that the Japanese stimulated others in recent times to take up their rather unusual whaling technique. To have done so would have been a difficult undertaking, and it would be costly, since great numbers of men were needed;¹⁴ it might be said that Japanese whaling, however effective, was extremely inefficient in modern terms of labor and investment, considering the economic returns. Of course, only a rich Japanese could indulge in the whaling business on such a scale (Kempfer, 1811, pp. 705-706), but the point I am making here is that it would be economically unprofitable in these days. This point is of possible further application in regard to the whole large question of the diffusion of whaling techniques, not only in modern whaling, but that of aboriginal forms as well. A specialized hunting method such as this is may not readily diffuse unless certain conditions are favorable.

¹⁴ Müblus (1893, p. 1056) says that at one coastal whaling station (Ichibuura) there were 587 people employed, 440 of which were rowers of the small boats. There is a record that in 1884 a Japanese whaling company employed 100,000 men. (State St. Trust Co., 1915, p. 34.) In Euro-American culture, the labor costs would have prohibited anything of this sort.

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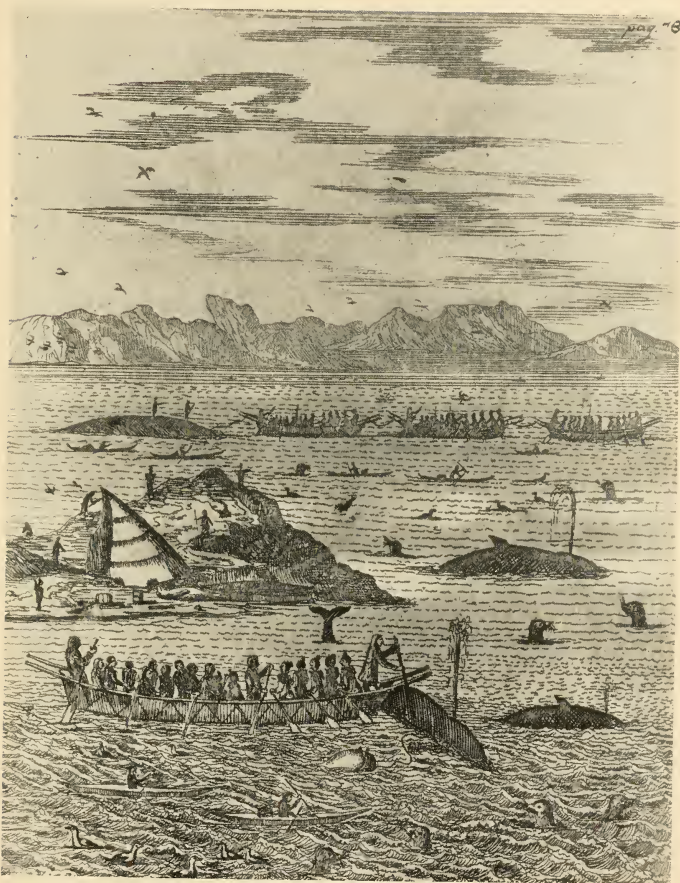
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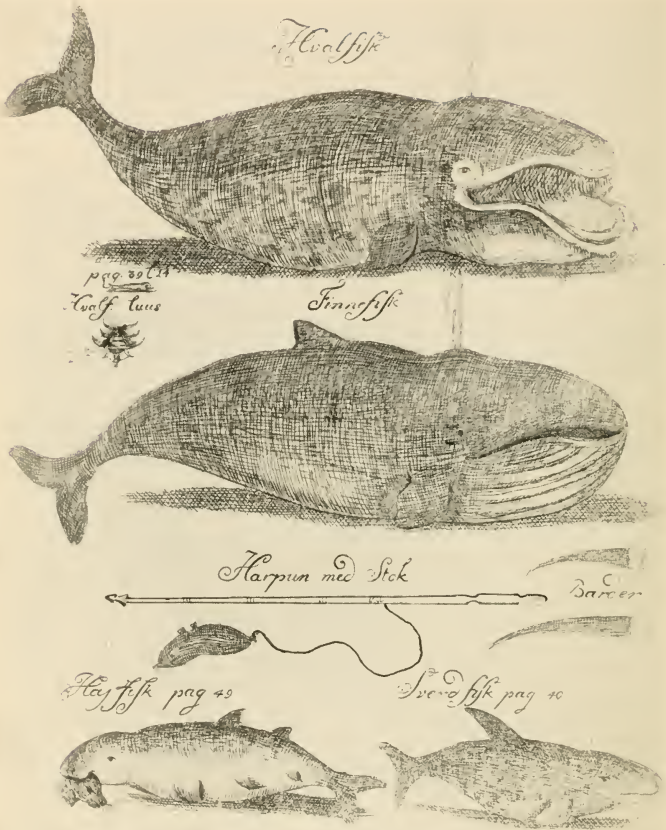
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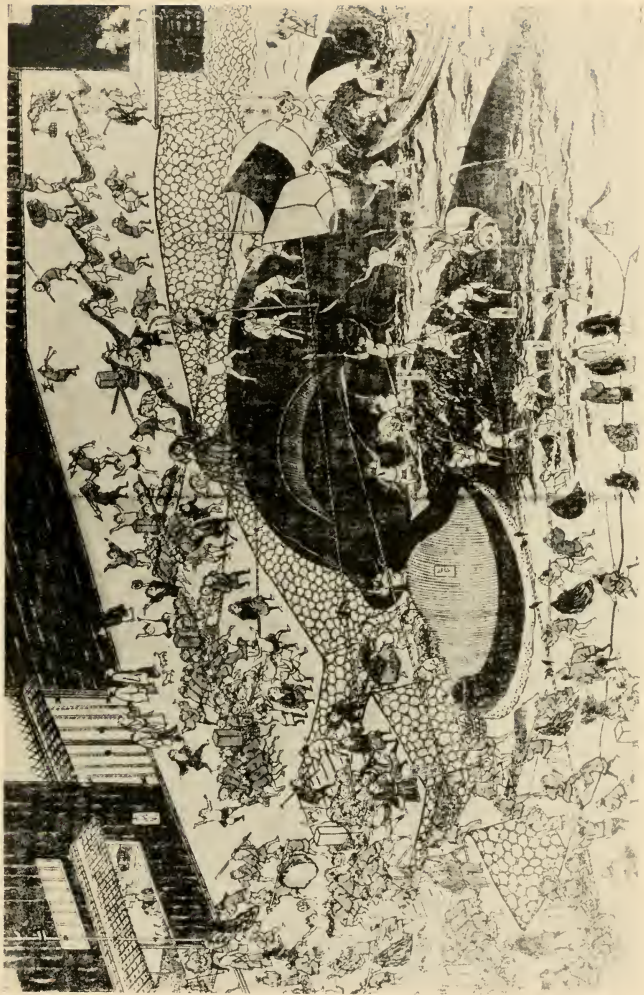
THE WHALE FISHERY OF THE GREENLAND ESKIMO.

(After Eggede, 1763, pl. opp. p. 78.)



GREENLAND WHALES AND HARPOON WITH BLADDER.

(After Eggede, 1763, pl. opp. p. 48.)



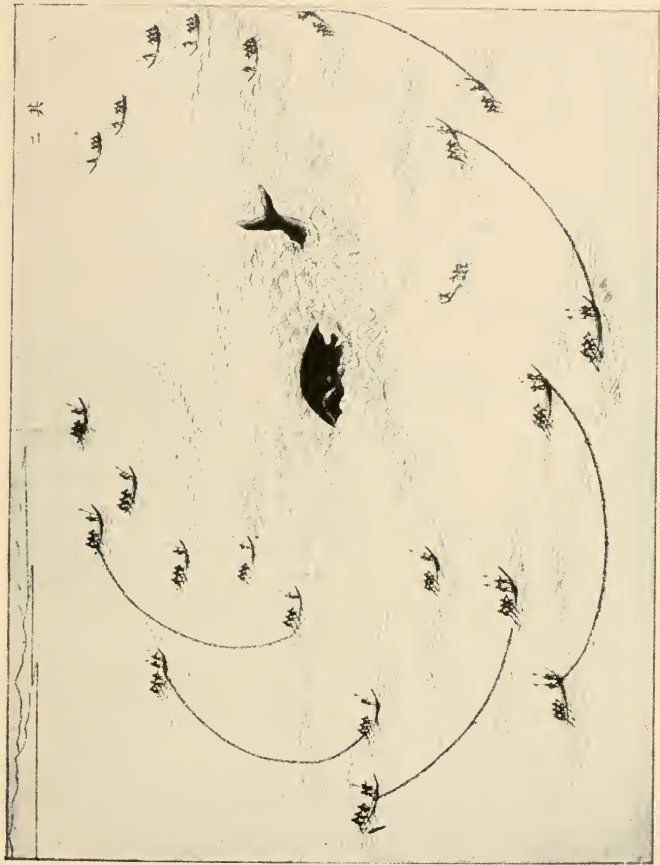
CUTTING UP THE WHALE. JAPAN.

Originally from Pictures of Whaling (Yugyotoru Eshū), by Yamada Yosai, 1790 or 1829; reproduced subsequently by Möbius, 1893; Fraser, 1937; and Tsuchiya, 1937.



DISPATCHING THE ALREADY HARPOONED AND NETTED WHALE WITH LANCES, JAPAN.

(From the volume of plates accompanying the Report on Fisheries, by G. B. Goode, 1887, Section 5.)



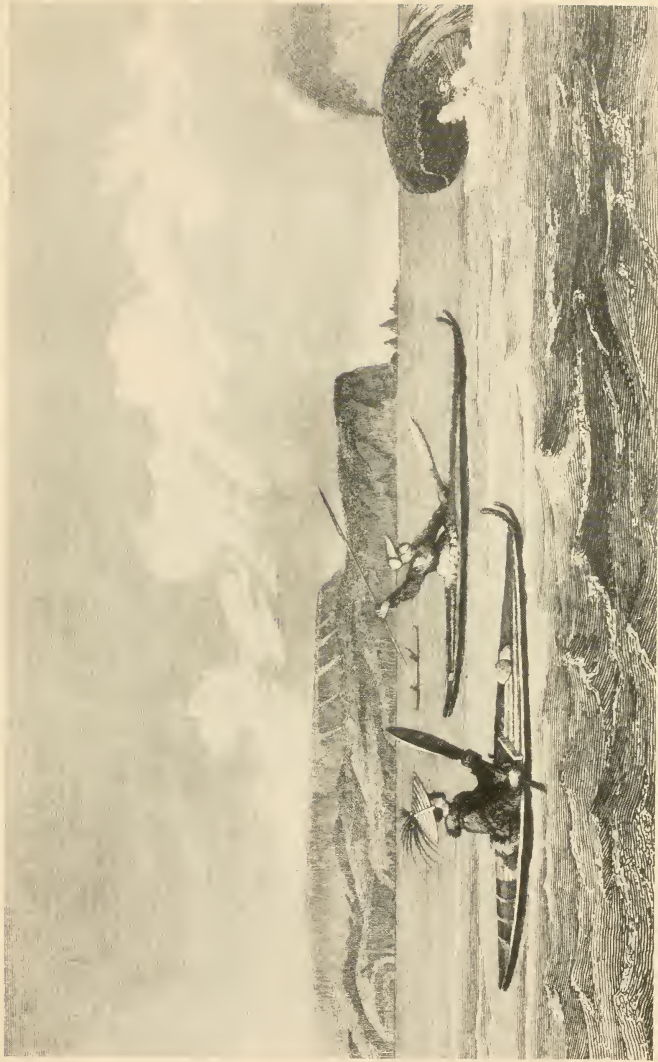
JAPANESE WHALERS SETTING OUT NETS FOR A WHALE.

Note boats with harpooners approaching the whale. (Originally from Pictures of Whaling, by Yamada Yosei.)



THE WHALE HUNT OF THE ALEUTS.

Aleuts throwing poisoned lances at the Humpback whale (*Megaptera versabilis*). (From the volume of plates accompanying the Report on Fisheries, by G. B. Goode, 1887, Section 5. Drawing by H. W. Elliott.)



WHALE HUNT OF THE KODIAK ISLAND NATIVES.

(After de Mofras, 1844, vol. 2, frontispiece.)