

# External Morphology of Bowhead Fetuses and Calves

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## Introduction

There have been few studies of early development and reproduction in the bowhead or Greenland right whale, *Balaena mysticetus*. Fetuses and young secured from the North Atlantic by early European whalers provided the basis for some information published by Eschricht and Reinhardt (1866) on the early development of bowheads; Home (1812) examined the ear from a neonatal bowhead obtained by Scoresby on his last voyage to the Arctic; Meek (1918) described for the first time the female reproductive system, based on a 35.5 cm (14-inch) fetus, while Gray (1929) wrote on the breeding habits. Marquette<sup>1</sup> summarized and listed additional references on studies of fetal, young, and mature bowheads.

Coastal Eskimos in northwestern Alaska take mostly young bowhead whales. As a result, fetal, newborn, or sexually mature animals are seldom observed. During the 13-year period 1961-73, I collected specimen materials and measurements from bowheads in Alaska and had an opportunity to study several fetal, neonatal, and juvenile whales: 1) Two fetuses collected at Barrow during the springs of 1969 and 1970; 2) one fetus collected at Wainwright in the spring of 1978; 3) one fetus collected at Barrow in the spring of 1976; 4) two neonatal calves taken at Barrow during the springs of 1969 and 1973; and 5) a young-of-the-year calf taken at Barrow in October 1964 (Table 1). None of the Alaskan fetuses collected to date have been dissected for

study. I also received additional information from the Eskimos about embryos, fetuses, and young calves that they had examined. The objective of this paper, therefore, is to describe the external morphology of these young

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bowheads as it relates to early development of the species.

## Fetuses

### Early Fetuses

#### *Fetus, 13.4 cm Long*

A pregnant, 13.0 m female (author's specimen number FED 4398) was harvested near Barrow on 10 May 1970, while I was at Point Hope, Alaska. On returning to Barrow 2 days later, I went to the butchering site and found a 13.4 cm male fetus among the entrails (Fig. 1; Table 1). In the course of slitting the integument of the uterine horn, the fetus in a simple, shapeless water sac fell out, and the frail umbilicus connection to the fetus broke. Anterior to the umbilicus attachment was the 2.7 × 2.0 cm yolk sac. Except for the cervical flexure, the longitudinal axis of the

Table 1.—Morphometric measurements of developing bowhead whales.

Morphological features	Fetus	Fetus	Fetus	Fetus	Neonatal	Calf
Sex	Male	Male	Male	Female	Male	Male
Specimen number <sup>1</sup>	4398	4392	78WW1	76B5F	4478	4329
Length (cm)	13.4	23.5	37.5	128.0	—	—
Tip of snout to (cm)						
Tip of lower jaw	0.9	0.1	1.6	2.5	6.0	—
Blowhole	2.1	4.0	5.8	18.5	74.0	110.0
Eye	3.6	6.5	11.0	33.0	104.0	190.0
Gape	3.3	6.0	11.5	35.5	102.0	180.0
Ear	4.2	7.2	12.5	—	120.0	—
Insertion of flipper	4.3	7.5	13.5	41.0	133.0	245.0
Axilla	5.1	9.0	15.5	50.0	152.0	—
Umbilicus	7.2	13.0	—	71.0	245.0	—
Reproductive slit (center)	—	—	—	88.5	292.0	—
Anus	9.7	15.5	25.6	91.5	342.0	—
Peduncle	12.0	22.0	34.4	113.0	424.0	—
Notch of tail	13.4	23.5	37.5	128.0	460.0	600-640
Diameter (maximum)	2.7	5.0	—	28.9	91.0	160.0
Circumference at (cm)						
Blowhole	4.5	9.6	—	72.0	—	—
Flipper insertion	7.0	13.5	23.5	92.0	—	—
Umbilicus	6.7	13.7	—	85.0	—	—
Anus	4.3	6.0	—	50.0	—	—
Peduncle	2.0	—	5.9	18.0	—	—
Flipper (cm)						
Anterior length	2.0	3.3	5.4	19.1	75.0	92.0
Posterior length	1.5	2.4	4.4	14.0	56.0	70.0
Width at body	0.9	1.1	2.8	—	27.0	—
Width, maximum	1.0	1.3	2.0	8.5	32.0	41.0
Flukes (cm)						
Anterior length	1.4	2.5	—	31.0	—	—
Posterior length	0.9	2.5	—	21.0	72.0	—
Width, maximum	1.4	2.1	4.4	13.0	43.0	—
Span	1.8	5.0	9.2	41.0	137.0	—
Umbilicus diameter (cm)	—	—	—	3.5	9.0	—
Additional data						
Hump, length and width (cm)	—	—	—	0.6 × 10.0	—	—
Percentage maximum diameter of total length	21.0	21.0	—	22.5	19.0	—
Weight (kg)	0.29	1.6	9.0	25.0	—	—

<sup>1</sup>Marquette, W. M. 1977. The 1976 catch of bowhead whales (*Balaena mysticetus*) by Alaskan Eskimos, with a review of the fishery, 1973-1976, and a biological summary of the species. Processed rep., 80 p., Natl. Mar. Mammal Lab., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way N.E., Seattle, WA 98115.

<sup>1</sup>Specimen numbers 4398, 4392, 4478, and 4329 are those of the author, while 78WW1 and 76B5F are NMFS specimen collection numbers.

fetus was straight. The head of the fetus was bulbous with a fontanelle at the top, and it appeared beaked, as in a dolphin (Fig. 1). The blowhole site was immediately anterior to the elevated cranium, at a "low point" on the rostrum. The rostrum was flattened with a gradual down-curve distally, as in a chicken's beak. The tongue was flat and lacked scallops; on the underside the frenum lacked 1.0 mm of extending to the tip. There was no indication of baleen. The lower lip was scarcely more evident than the upper. Black pigmentation of the iris was discernible through the closed but translucent eyelids. Rudimentary ear pinnae were visible directly behind the eyes and slightly above the proximal joints of mandible and humerus.

The flippers were well formed, folded diagonally across the breast, and lacked 4.0 cm of meeting midventrally. Digit numbers II to V showed as ridges on the flipper's surface. The small flukes, shaped like a blunt wedge that pointed posteriorly, had no notch. The trailing edge, like that of the flippers, was not sinuous. There was no trace of hind limb buds. The caudal ridge was barely evident. The penis protruded from the lower abdominal wall and there was no prepuce. The skin was not pigmented.

*Fetus, 23.5 cm Long*

On 2 June 1969, I collected a 23.5 cm long male fetus from a 16 m long female (FED 4392) taken near Barrow (Table 1; Fig. 2). The cranium of the fetus was bulbous and soft. The lower jaw was shorter than the rostrum, and the profile of the head resembled that of a dolphin. However, the flippers, flukes, and lower jaw showed additional development toward adult structures. Of particular interest were the flippers. The characteristic four digits of the bowhead, II, III, IV, and V, were clearly visible and even included a trace of phalanges, particularly in digit V. Proximal to the wide-spreading V digit was the pisiform cartilage, an additional aid in strengthening and broadening the paddle-shaped flipper. The flukes had a terminal notch, were bluntly wedge-shaped, and pointed anteriorly. The

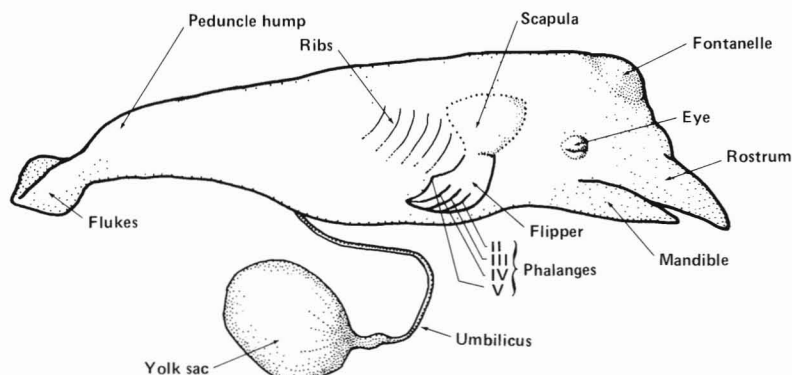
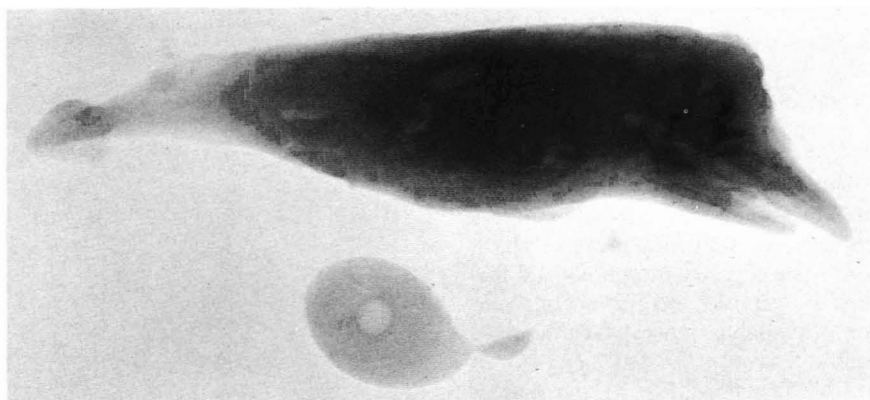


Figure 1.—X-ray (positive print) of a bowhead whale fetus 13.4 cm in length. Externally, the fontanelle, yolk sac, and hump are evident. The phalanges, scapula, and ribs show through the semi-transparent body wall. Photograph by F. E. Durham.

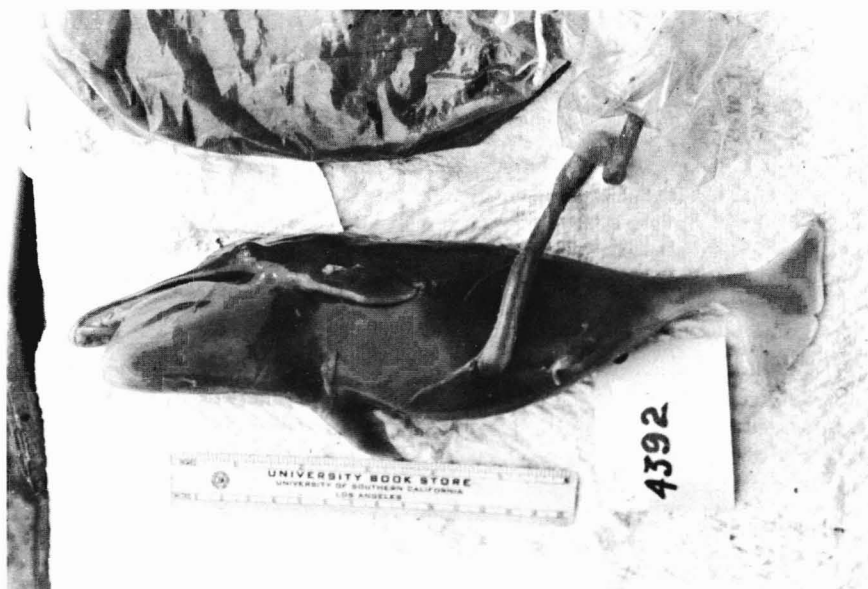


Figure 2.—Ventrolateral view of a 23.5 cm bowhead fetus, showing additional development toward adult structures, particularly in the flukes. Photograph by F. E. Durham.

penis protruded from the lower abdominal wall, and there was no prepuce. There was no baleen present and no pigmentation of the skin.

#### *Fetus, 37.5 cm Long*

Three other small fetuses have been reported. Photographs of two of the fetuses were studied and my observations of discernable morphological features are reported herein; no information is available, however, on the third fetus.

A 37.5 cm fetus (Fig. 3) from a pregnant 16.3 m female (National Marine Fisheries Service [NMFS] specimen number 78-WW-1), harvested on 6 May 1978 at Wainwright, Alaska, was collected and preserved by the whaling captain for a proposed local museum. Although I have not had the opportunity to examine this fetus, measurements obtained by NMFS personnel are presented in Table 1. Examining a photograph of the fetus (Fig. 3), one notes that the profiles of body and appendages have changed little from those of the 23.5 cm fetus shown in Figure 2. Also evident is a hump on the tail and a ventral keel that extends from anus to peduncle.

A resident of Wales, Alaska, informed me that during her childhood her father removed a fetus, estimated to be about 61 cm in length, from a pregnant bowhead he landed there during one spring whaling season in the early 1900's<sup>2</sup>.

#### *Fetus, 77.5 cm Long*

A 77.5 cm long fetus is on deposit at the Peterhead Museum, Peterhead, Scotland. The fetus was believed to have come from a whale taken in Davis Strait, Canada. From a photograph, I observed that the trailing margin of both flippers and flukes appeared sinuous. The notch of the fluke and the trailing tips appeared near adult proportions. A trace of a dorsal hump appeared near the middle of the caudal peduncle. The cranium was the highest part of the head. The blowhole site was on a faint

<sup>2</sup>Katy Tokeimma, resident, Wales, AK 99783, pers. commun. 1967.

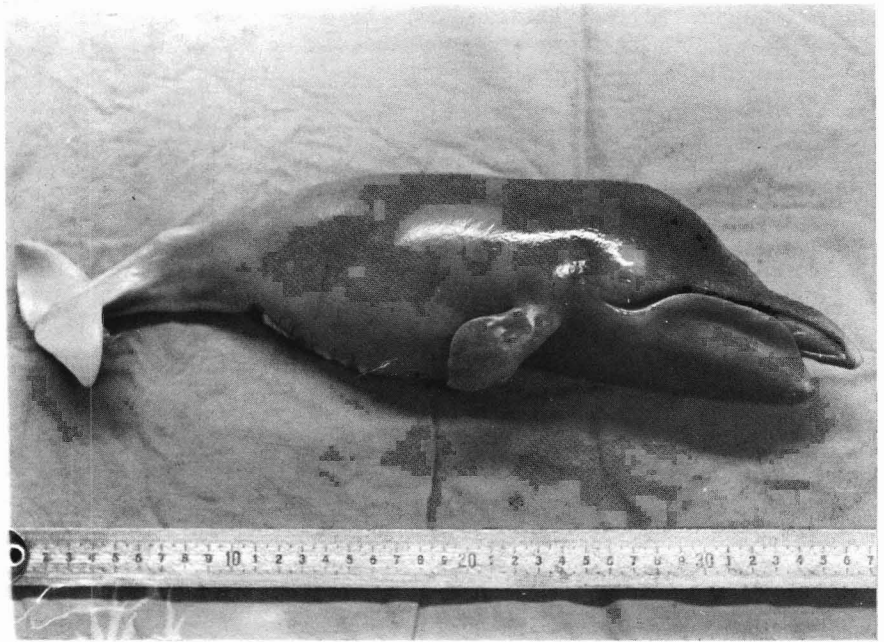


Figure 3. — A 37.5 cm bowhead fetus collected 6 May 1978 at Wainwright, Alaska; the whaling captain had it preserved and is holding for a proposed local museum. Photograph by Larry Rockhill

prominence at the base of the flat rostrum which curved downward near the tip. The upper jaw extended farther forward than the lower.

#### *Fetus, 128 cm Long*

On 3 September 1976, a 128 cm long female fetus (Fig. 4a) was collected by NMFS biologists from a 17.3 m bowhead (76-B-5F) which had been taken near Barrow. I examined the frozen fetus on 9 June 1977, at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. The maximum girth of the fetus was 92.0 cm and the maximum diameter was 28.9 cm (Table 1). The maximum girth represented 72 percent, the maximum diameter 22.5 percent, and the head 30 percent of the fetus' total length.

The cranium and rostrum clearly resembled the balaenid adult form (Fig. 3). The dorsal elevation showed remains of the bulbous cranium. Immediately anterior to and medially on the base of the depressed rostrum were the paired blowholes. They were 1.5 cm long, sinuous, slanted abruptly medio-anteriorly, and appeared to be sealed

shut (Fig. 4a). The prognathic jaws were frozen together, preventing me from determining if baleen was present. The distal tip of the rostrum was curved downward as it is in older bowheads. The lower lip had enlarged to near-adult proportions (Fig. 4b). The flippers were firmly positioned against the sides and revealed the four digits through the skin and thin flesh.

The anal plate (containing surface openings for the digestive, urinary, and reproductive systems) was similar to but more elaborate than that of an adult female bowhead. The anus was 1.5 cm posterior to the genital slit. Two oval mammary slits were 4.0 cm apart, and lay opposite the center of the genital slit. Lateral and posterior to the mammary slits was a pair of pits 6.5 cm apart that were partially connected by an arc of whitish surface fibers, suggesting the position of the primordial pelvic girdle or interpelvic ligament (Fig. 4c). Slight, protruding structures, similar in position to the above pits, were photographed on an adult female (79-WW-1) taken in the spring of 1979 at Wainwright, Alaska (Fig. 5). Their location

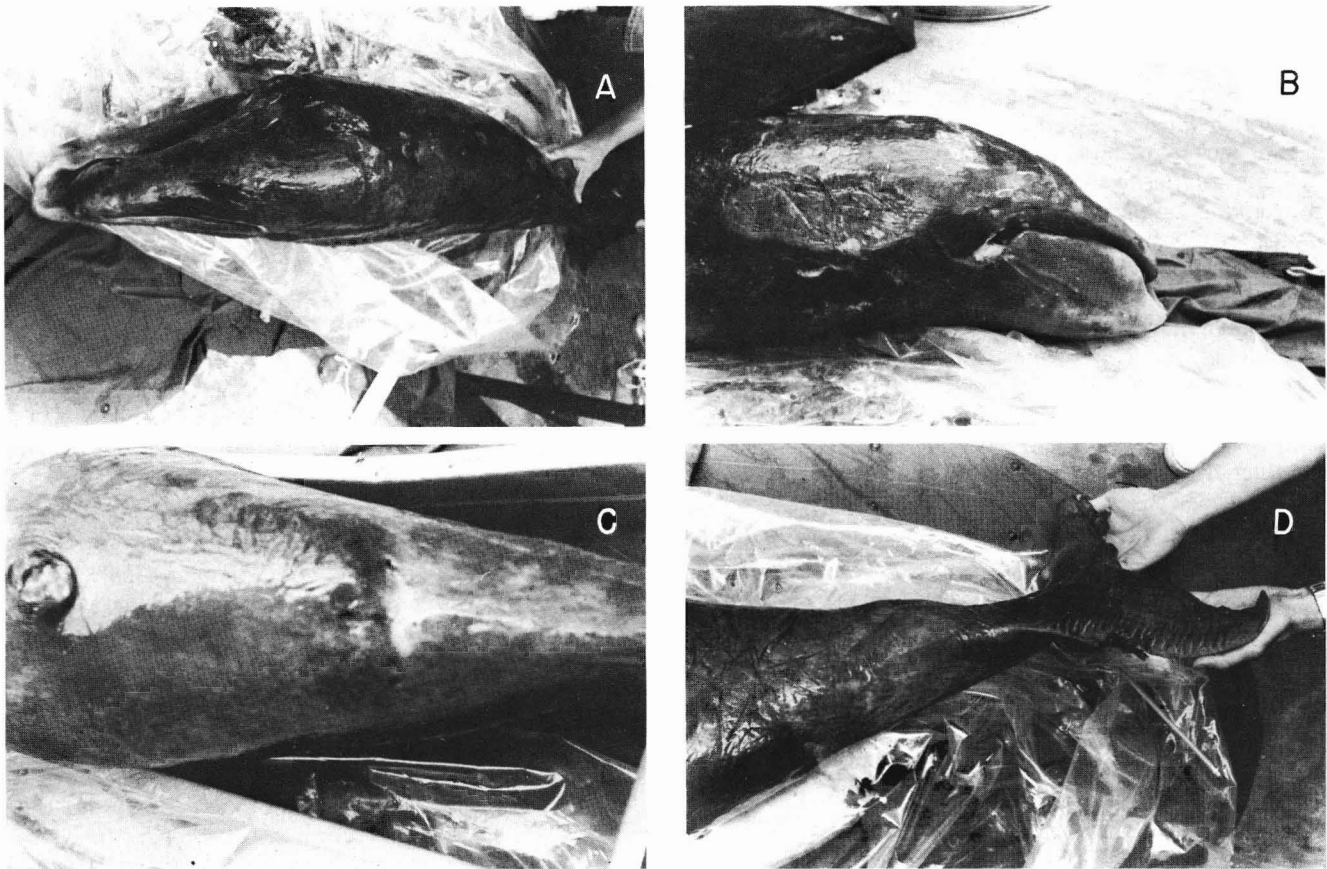


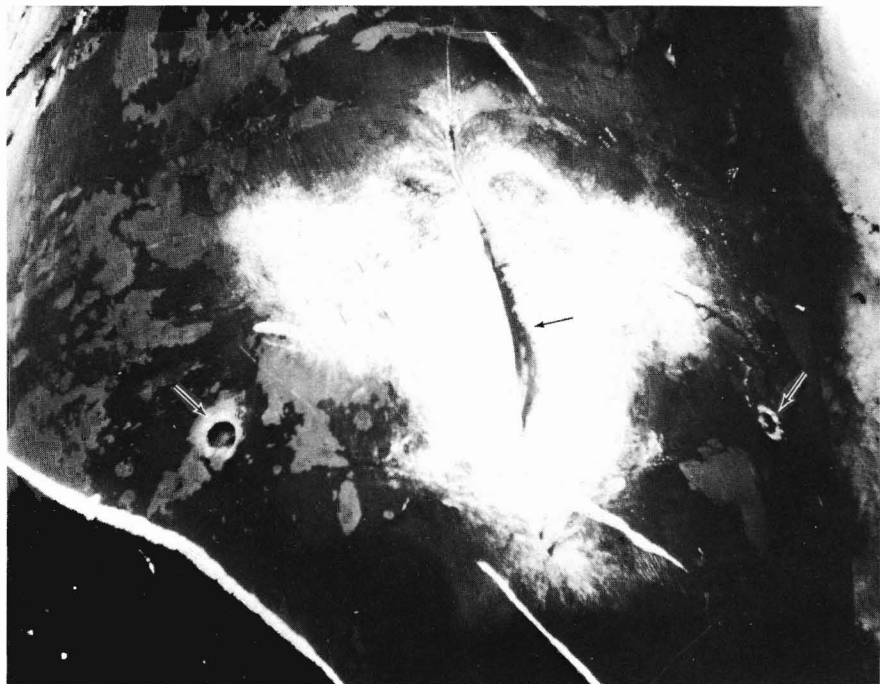
Figure 4. — A 128 cm midterm bowhead fetus showing: A) dorsal view of head; B) lateral view of head; C) ventral view showing umbilicus and anal plate; and D) view of caudal section showing the dorsal hump or ridge and shape of flukes  
Photographs by F. E. Durham.

Figure 5.—Ventral portion of a 1,463 cm bowhead whale (79-WW-1) showing the anal plate (white patch surrounding it) and what are believed to be bulging femori (white arrows). Photograph by Carl Peterson, NMFS.

and appearance suggest that they were bulging femori. The author and NMFS biologists have examined over 200 bowhead whales since 1961, but these were the only individuals showing surface indications of a pelvic girdle and appendages.

Caudally, the dorsal hump or ridge, 0.6 cm high, extended 10 cm anteriorly from a point 6.0 cm anterior to the caudal peduncle (Fig. 4d). The flukes were too distorted to show the margin clearly.

The hair pattern was similar to that of adults and consisted of: 1) Three terminal patches—a black, 2 × 3 cm rostral



patch with hairs just emerging, and two teardrop shaped lateral jaw patches; 2) a row of seven black "beads" or pigment spots, each containing a single hair, 8 mm in length, that extended along the side of each mandible; 3) a double row of hairs parallel to the midline of the rostrum (six on the right side and four on the left) located on the anterior half of the rostrum; and 4) a double arc (one over each blowhole) of 13 hairs, each longer than those on the jaw.

Although the color pattern of the fetus may have been changed by freezing, its back was now black and the sides were lighter with a pinkish-gray mottling. The chin was a muddy white. The anterior end of the lower lip, the throat, and belly were a reddish gray. The flippers were dark with white, dendritic markings along the leading edge. The area posterior to the umbilicus was paler than the surrounding skin. There were white rays in starburst form around the mammary slits, particularly the left one.

### Neonates

Five newborn or neonate bowheads have been taken by Alaskan Eskimo whalers in recent years. I did not have an opportunity to examine three of these animals. Two were reported taken at Point Hope, Alaska, one on 22 May 1969 and one on 3 June 1971. A third newborn, taken at Wainwright, Alaska, on 28 May 1970, was reported by the Eskimos to have been an albino. It was a 447 cm long female estimated by the whalers to have been about 1 month old. I examined the remaining two newborn bowheads landed and these will now be described.

#### Neonate, Length Unknown

The first newborn I examined, taken on 27 May 1969 (FED 4390), had been cut up and partly distributed before my arrival at the village. No measurements had been taken. Because the captain claimed the head and peduncle for his share, I was privileged to examine these parts at his home on 28 May. He also donated the skull (137 × 64 cm) for the bowhead collection at the Los Angeles County Museum.

The cranium was no longer bulbous. The blowholes were not elevated. The gray colored "baby skin" with black reticulations was underlain by 7 cm of "dry" blubber, that is, the unsaturated fats did not ooze out as in older bowheads. I also located and examined one flipper which was stubby, slightly arched, and had a scalloped posterior margin. A profile drawing of the peduncle shows the extreme development of the caudal hump often associated with ingutuks (Braham et al., 1980). The tongue was pink, with a median, longitudinal groove 20 × 9 cm in length and 5 cm deep, near the tip. A few wart-like papillae margined the groove. Near the margin was a row of about 20 short transverse ridges on each side. The frenum allowed the distal 8 cm of the tongue to be free. A gap of 11 cm separated the two rows of baleen at the front of the mouth. This gap, apparently for holding the dam's nipple between the tip of the tongue and palate, seemed ideal for nursing (Slijper, 1962). Of the baleen plates on the right side, most were 7 cm long plus another 11 cm within the gum. The juncture between natal and nursing baleen had not yet become evident. The lower jaw was again shorter and was proportionally wider than the upper. The posterior margins of the flipper and flukes were sinuous.

#### Neonate, 460 cm Long

The second newborn that I examined was a 460 cm male (FED 4478) taken near Barrow on 7 June 1973 (Fig. 6a; Table 1). It was bluish gray with muddy-white markings, particularly on the chin. The pigmented skin had two 2 cm thick layers, which is about twice the thickness of the single layer of skin found in juvenile and adult bowheads. The highest part of the head, the cranium, was no longer bulbous and was demarcated from the trunk by a depression at the neck. The blowholes were not elevated and were at a lower level on the base of the somewhat flattened rostrum, the profile of which was similar to that of a rorqual. The lower jaw was shorter and wider than the upper. The trailing margins of the flippers

and flukes were sinuous (Fig. 6b, c). The mammary slits were opposite the Y-shaped posterior end of the genital slit (Fig. 6d). The dorsal hump or ridge, which is at its greatest development during this stage of growth, was prominent on the peduncle (Fig. 6e). The ventral area, including umbilicus and anal plate, is shown in Figure 6d. Because of the size and condition of the umbilicus, I estimated the animal to be 3 days old. There were 352 plates of baleen on one side, most of them 18.0 cm long, including that portion within the gum.

#### Young-of-the-Year

The smallest bowhead of the 1964 autumn season (FED 4329) was landed at Barrow on 2 October (Table 1). The posterior half of the carcass was butchered before I arrived, but the captain estimated the total length to be about 610 cm. Because the cleaned skull measured 1.8 m long, and because the ratio of head to total body length is 1:3 in most harvested bowheads, the estimated length of the calf appears to be fairly accurate. Its slender body was dark gray with only a faint gray patch on the chin. The "baby skin" had been shed and the remaining layer varied in thickness from 1.9 to 2.2 cm. The blubber was oily and ranged in thickness from 14 cm on the shoulder to 18 cm on the back. The rostrum was slightly arched and the blowholes were at the highest point on the head. One side of baleen measured 140 cm in length and anteriorly there was a conspicuous and slightly worn natal tip 6.5 cm in length. The anal plate, typical of young males, showed a retracted, 40 cm long glans penis. A pair of mammary slits, each with a nipple as in females, was lateral to the base of the penis, and 50 cm anterior to the anus. In addition, there was a secondary mammary slit adjacent to the right one, but without a nipple. Subcutaneous vestigial muscles, which usually are found in neonatal calves, were present around the nipples. The stomach was empty, suggesting that the animal was recently weaned, because juveniles and adults usually have some partially digested food in their stomachs during the autumn.

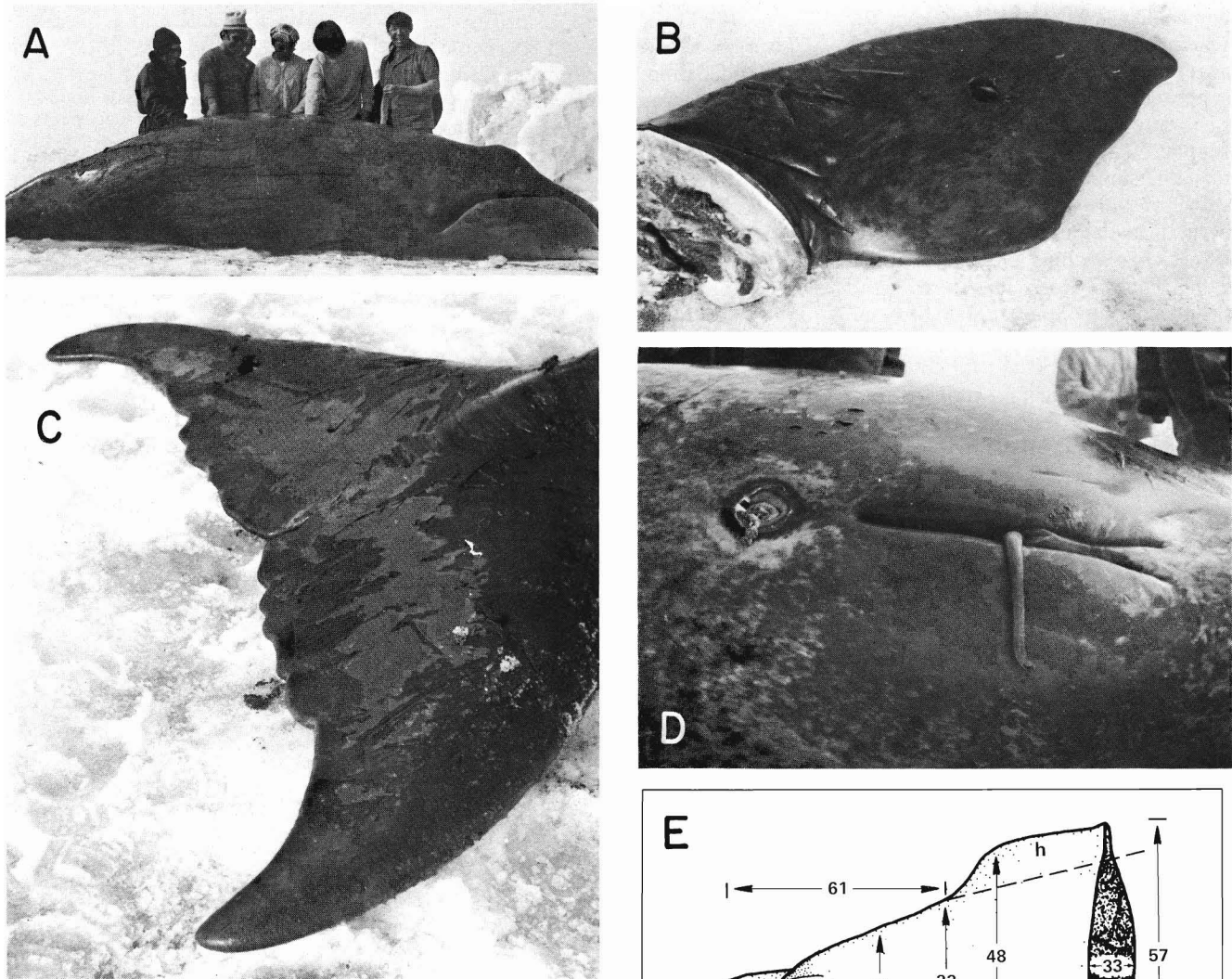


Figure 6. — A newborn bowhead whale 460 cm in length taken 6 June 1973 at Barrow, Alaska, showing: A) whale hauled up on the ice; B) flipper; C) flukes; D) anal plate and raw umbilicus; and E) sketch illustrating well developed hump on caudal section; h = hump, f = fluke, n = notch of fluke. Measurements are in centimeters. Photographs by F. E. Durham.

Two additional bowhead calves, both estimated by Eskimo whalers to be 610 cm in length, were taken during the autumn season. One was taken east of Barrow near Cooper Island on 19 October 1966, and the other was captured on 23 October 1973, 16 km north of Point Barrow. No additional information is available on these two bowheads.

### Conclusion

Although the number of specimens collected is not large, the information reported in this preliminary paper is the first descriptive material on early development of the species. Intensified interest in the reproductive cycle of the bowhead whale has prompted early publication of data on this subject. Pre-

sumably the intensive research program now being conducted by the NMFS will provide additional material in the near future.

### Acknowledgments

I am deeply indebted to the many Eskimo whaling captains who generously shared with me their camps, specimens, and information on

bowhead whales. The Naval Arctic Research Laboratory at Barrow, Alaska, gave me institutional and individual support. The National Marine Mammal Laboratory, NMFS, Seattle, Wash., supplied data on fetuses and provided financial support, as did the Arctic Institute of North America, Calgary, Alberta, Canada, and the Office of Naval Research, Washington, D.C. I also thank James Mead, Jane Small, and David Schmidt of the National Museum of Natural History, Smithsonian Institution, Washington, D.C., for courtesies extended in making it possible for me to examine a frozen fetus on deposit there.

Larry Rockhill, Field Coordinator, University of Alaska, X-CED Program, Rural Education Development Center, Barrow, Alaska, provided the photograph of the 37.5 cm long fetus from Wainwright, Alaska.

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#### Literature Cited

Braham, H. W., F. E. Durham, G. H. Jarrell, and S. Leatherwood. 1980. Ingotuk: A mor-

phological variant of the bowhead whale, *Balaena mysticetus*. Mar. Fish. Rev. 42(9-10): 70-73.

Eschricht, D., and J. Reinhardt. 1866. On the Greenland right-whale (*Balaena mysticetus*, Linn.), with special reference to its geographical distribution and migrations in times past and present, and to its external and internal characteristics. In W. H. Flower (editor), Recent memoirs on the Cetacea, p. 1-150. Robert Hardwicke, Lond.

Gray, R. W. 1929. Breeding habits of the Greenland whale. Nature (Lond.) 123:564-565.

Home, E. 1812. An account of some peculiarities of the structure of the organ of hearing in the *Balaena mysticetus* of Linnaeus. Philos. Trans. R. Soc. Lond., Pt. 1, 1812:83-89

Meek, A. 1918. The reproductive organs of Cetacea. J. Anat. 52:186-210.

Slijper, E. J. 1962. Whales. Hutchinson & Co., Lond., 475 p.

## Observations of Bowhead Whales During Spring Migration

GEOFFRY M. CARROLL and JOHN R. SMITHHISLER

### Introduction

Each spring bowhead whales, *Balaena mysticetus*, of the western Arctic stock travel through breaks in the sea ice, migrating from their winter grounds in the Bering Sea to their summer grounds in the Beaufort Sea (Braham et al., 1980). These breaks in the ice, or leads, form when winds blow the moving pack ice away from landfast ice, creating a flaw zone of open water and broken ice generally parallel to the shore. If conditions allow, most bowheads follow these nearshore leads while migrating along the northwestern coast of Alaska. This provides an excellent opportunity to observe their behavior.

There is little published information on the behavior of bowhead whales. Some whaling captains (Scoresby, 1820; Scammon, 1874; Cook, 1926; Bodfish, 1936) included comments on whale behavior in reporting their experiences in Arctic waters. Tomilin (1957), Sleptsov (1961), Maher and Wilimovsky (1963),

McVay (1973), Marquette (1976, 1978), Everitt and Krogman (1979), Rugh and Cabbage (1980), Gilmore<sup>1</sup>, Foote<sup>2</sup>, Durham<sup>3</sup>, Fiscus and Marquette<sup>4</sup>, Braham and Krogman<sup>5</sup>, and Mar-

<sup>1</sup>Gilmore, R. M. 1951. The Arctic right whale, Greenland whale, or bowhead. Unpubl. manuscript. [Vol. 15, Encyclopedia Arctica], 71 p. Avail. Dartmouth College Library, Hanover, NH 03755.

<sup>2</sup>Foote, D. C. 1964. Observations of the bowhead whale at Point Hope, Alaska. Unpubl. manuscript, 73 p. Geogr. Dep., McGill Univ., Montreal, Que., Can.

<sup>3</sup>Durham, F. E. 1972. Biology of the bowhead whale (*Balaena mysticetus*) in the western Arctic. Unpubl. manuscript, 93 p. Dep. Biol., Univ. South Calif., Los Angeles, CA 90007.

<sup>4</sup>Fiscus, C. H., and W. M. Marquette. 1975. National Marine Fisheries Service field studies relating to the bowhead whale harvest in Alaska, 1974. Processed rep., 23 p. Natl. Mar. Mammal Lab., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way N.E., Bldg. 32, Seattle, WA 98115.

<sup>5</sup>Braham, H. W., and B. D. Krogman. 1977. Population biology of the bowhead (*Balaena mysticetus*) and beluga (*Delphinapterus leucas*) whale in the Bering, Chukchi and Beaufort Seas. Processed rep., 29 p. Natl. Mar. Mammal Lab., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way N.E., Bldg. 32, Seattle, WA 98115.

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quette<sup>6</sup> include comments on bowhead behavior.

During April, May, and June 1975-78, National Marine Fisheries Service (NMFS) biologists were stationed at Point Hope and Point Barrow, Alaska, to census the bowhead whale population, maintaining a 24-hour watch (ice and weather conditions permitting) from camps established on the landfast ice (Braham and Krogman, footnote 5; Braham et al., 1979). They recorded the behavior of bowheads during their northward migration in the nearshore lead past the ice camp. Two categories of behavior were recorded: 1) General migrating behavior directly associated with rate and direction of migration, group size, size class distribution, dive profiles, and movements of whales through constantly changing ice fields; and 2) "extra-migratory" behavior such as reaction to human disturbance,

<sup>6</sup>Marquette, W. M. 1977. The 1976 catch of bowhead whales (*Balaena mysticetus*) by Alaskan Eskimos, with a review of the fishery, 1973-76, and a biological summary of the species. Processed rep., 80 p., Natl. Mar. Mammal Lab., Natl. Mar. Fish. Serv., NOAA, 7600 Sand Point Way N.E., Bldg. 32, Seattle, WA 98115.