A SECONDARY SEXUAL CHARACTER OF FIN WHALES

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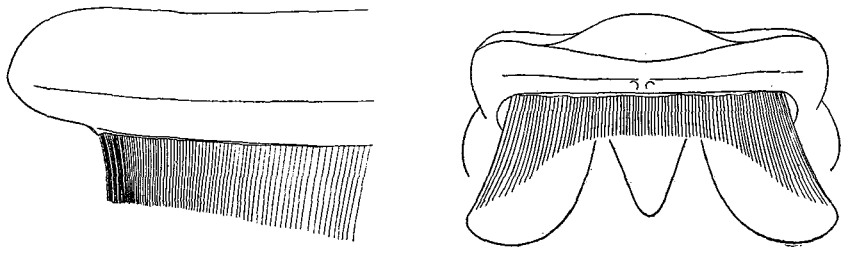
Up to these days, the body length of baleen whales is considered as only a secondary sexual external character of baleen whales. Usually female baleen whales are larger than male whales in each species especially after they attained their sexual puberty and maturity, and other external body characters and proportions do not display the sexual dimorphism (Mackintosh & Wheeler, 1929; Ohsumi, 1960). The length between the anus and the genital is the clear distinction of the sex of whales, however, this is already clear in the youngest fin whale, even in the foetal stage in mothers' body.

In the whaling expedition in the North Pacific in 1960 when I was aboard, the protuberance in the tip of the snout of upper jaws of male fin whales was noticed as the secondary sexual character and this character has been examined in the North Pacific expeditions in 1960 (Kataoka 1960) and 1961, by staffs of the Whales Research Institute and inspectors.

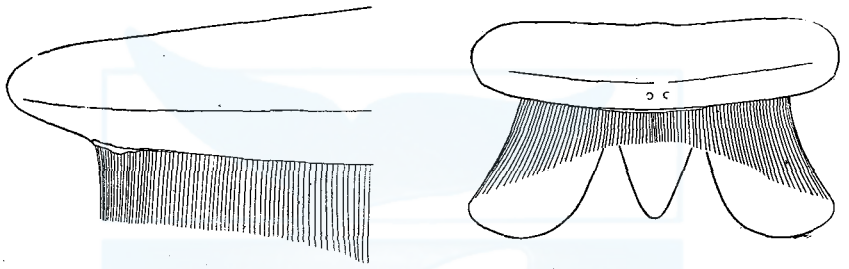
The protuberance in the tip of the snout is easily found by observers from the side or infront of the head part of the body of fin whales on the deck of factory ships. The tip of the snout of a full grown male fin whale becomes thicker and swells like the goose neck along the surface streching about 50 cm long and wide from the very pointed end of the snout as illustrated in Fig. 1. This protuberance varies considerably according to the stage of the sexual maturity of fin whales, and immature males lack the protuberance. Although full grown female fin whales have thicker tips than immature whales, they completely lack this protuberance in the tip of the snout. As younger male fin whales also lack the protuberance, full grown male fin whales are easily distinguished from female and immature fin whales in this point at a glance.

The relation between testicle weight and the presence of the protuberance in the tip of the snout is illustrated in Fig. 3. According to Fig. 3, those fin whales which have testicles heavier than 5.0 kg demonstrate typical protuberance in the tip except two whales. Usually fin whales are considered to attain to their sexual maturity at each testicle weight 1 to 3 kg. And all testicles over 3 kg weight have the sexual mature character when they are examined histrogically (Ohsumi, Nishiwaki & Hibiya, 1958). As illustrated in Fig. 3, the younger males lacking the protuberance are sometimes have a mature testicle when it is examined histrogically, but the weight is far lighter. From the above



A B

Fig. 1. Top protuberance in the tip of the snout of a sexually mature male fin whale. A—From the side; B—From the front.



A B

Fig. 2. Tip of the snout of a sexually mature female fin whale. A—From the side; B—From the front.

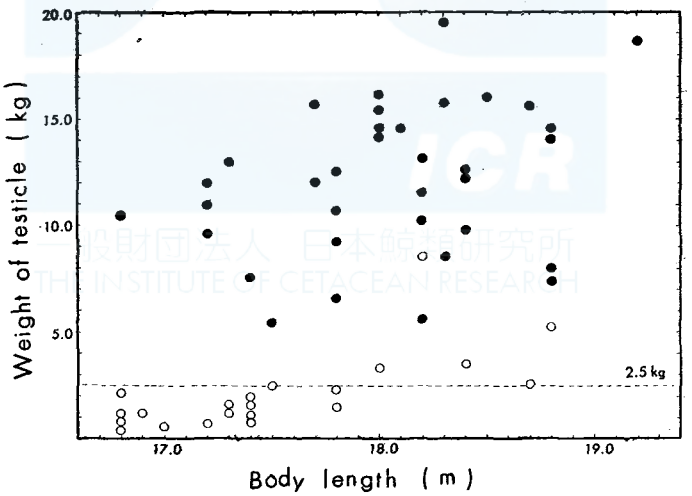


Fig. 3. Testicle weight in fin whales with or without the protuberance in the tip of the snout. Black symbols—The protuberance present; White symbols—The protuberance absent.

fact, it is considered the young fin whales which begin to form spermatozoa in their testicles will not bear the protuberadce at the same time, and the protuberance is gradually formed with the increasing of weight of testicles and the developing of sexual ability after the beginning of spermatozoa formation. If laminations of ear plugs show the age of whales as they have been considered (Purves, 1955, etc.), among the fin whales possessing the protuberance in their tip of snouts, the youngest male fin whale has the ear plug of 10 laminations, but the heavier testicle weight of which is 5.5 kg. This value is far higher for usual fin whales having 10 laminations in their ear plugs. Other whales with the protuberance have ear plugs of 18 laminations or more, and the oldest whale has 82 laminations in its ear plug.

There are three exceptional fin whales without the protuberance shown in Fig. 4, which are considered to be rather older whales as they have

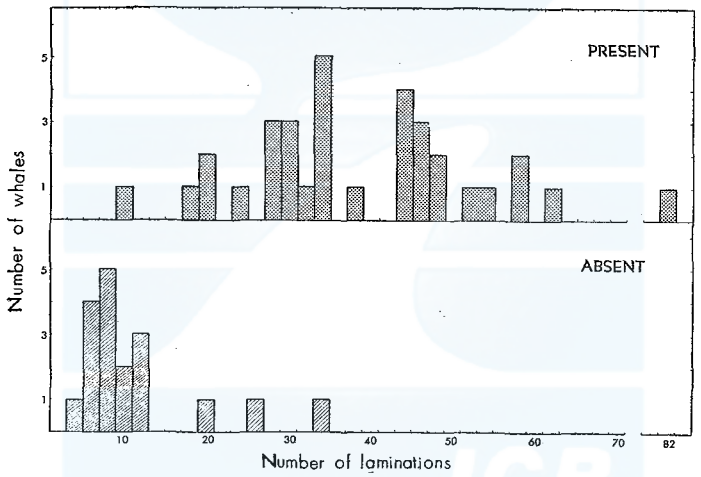


Fig. 4. Number of fin whale in each ear plug lamination. Black—The protuberance present; Oblique—The protuberance absent.

many laminated ear plugs. But they have comparatively light testicles respectively. One of these whales has 19 laminations in the ear plug, but the heavier testicles is only 3.6 kg in weight. The heavier testicles of other two fin whales are 5.5 and 8.6 kg respectively. These two values are also not so high among the whales possessing the protuberance although they are mature in the histrogical examination of their testicles.

From observations on the *Balaenoptera* whales up to now, only full grown male fin whales possess this distinct secondary sexual character. Full grown male Bryde's whales also have the slight protuberance in the tip of the snout as illustrated in Fig. 5, but this observations are

only based on several specimens caught in the adjacent waters to Japan. So, further investigation will prcve the convincible result as to the presence of the tip protuberance in Bryde's whales.

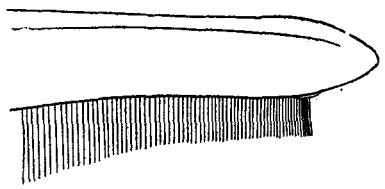


Fig. 5. Top protuberance in the tip of the snout of a sexually mature male Bryde's whale.

Other two baleen whales, blue and sei whales have not been observed to show this sexual dimorphism, and I have no information on humpback and little-piked whales.

In some other aquatic animals, this type of the secondary sexual character in head parts is often observed. Full grown male elephant seals in southern and northern hemisphere have the tremendous sexual character-proboscis, which gradually develops after their sexual maturity (Matthews, 1929). Laws (1960) describes that male elephant seals in southern hemisphere attain to their sexual maturity at an average age of four years by the examination of the testis, but bulls of this stage do not usually play an active part in the social organization of the breeding rookeries until they become six years old. According to Matthews (1929), these younger sexually grown bulls of three or four years old have no typical developed proboscis (Matthews, 1929, pl. 23, Fig. 2). On the other hand, every harem bull has excesively developed proboscis, and it is always inflated when they fight against or frighten other males and human intruders.

Of course fin whals do not form the harem like elephant seals when they are breeding in the warmer waters. But if the protuberance in the tip of the snout of males means the greater activity in sexual behavior than the younger male whales without the protuberance, fin whales play the active part in the breeding after they have heavier testicles more than 5 kg in weight with having the developed protuberance. And the laminations of ear plugs are more than 20 in general. It seems reasonable to consider the younger whales without the protuberance do not take a part in sexual movements. Because usually about the half of mature females are pregnant or lactating in winter, and the number of free adult females is far smaller in number than males if all the sexually mature males are capable of perfect copulating directly after their sperm formation.

Another example of the secondary sexual character of this type is found in fish. In some salmonoid fish, the second sexual character in upper jaw is also very distinct. Male *Oncorhynchus* salmons, Dog salman *O. keta*, pink salmon *O. gorbusha* and Silver salmon *O. kisutch* have strong curved nostrils (Bécarts) when they are breeding in the

river (Hikita, 1956). The slight curve is sometimes observed in the sexual mature salmons in the sea, when they are feeding and migrating. The curve becomes the strong second sexual character with going up rivers for breeding. This example also means that there is a delay between the sexual maturity and the completion of a secondary sexual character in the upper jaw.

There is a question still remained, if this secondary sexual character lasts for the life or vanishes with the passing of seasons. The data in figures have been collected in the late of July and August in Bering Sea, when fin whales have swarmed to feed on fish, Alaska pollack (*Theragra chalcogramma*). As fin whales usually come to this northern feeding area from the beginning of summer, May and June, those fin whales have already taken their foods considerably in the sea. This may help the appearance of this sexual character growing for the next breeding season in coming winter.

This secondary sexual character has not been examined about the Antarctic fin whales yet, although some unpublished data have been collected. Not a few examples prove the same tendency observed in fin whales in the North Pacific. And it is said the protuberance in the tip is also a clear mark for the weight of testicles of male fin whales in the Antarctic at a glance, as observations on the size of penis may be useful as a means of deciding whether a fin whale is sexually mature or not (Mackintosh & Wheeler, 1929).

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EXPLANATION OF PLATES

PLATE I

Fig. 1. Top protuberance in the tip of a sexually mature male fin whale.
Fig. 2. Tip of the snout of a sexually mature female fin whale.
Fig. 3. Slight protuberance in the tip of the snout of a sexually mature male Bryde's whale.
Fig. 4. Tip of the snout of a sexually mature sei whale.

PLATE II

Fig. 1. Top protuberance of the sexually mature fin whale from the front.
Fig. 2. Tip of the snout of the sexually mature female fin whale.
Fig. 3. Tip of the snout of the sexually mature sei whale.

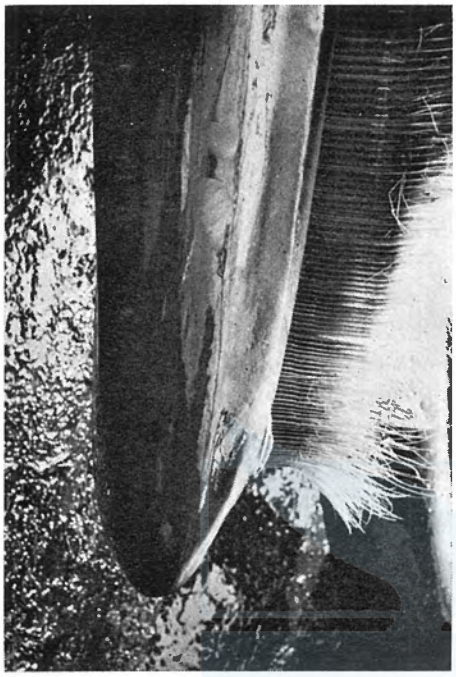


Fig. 2.

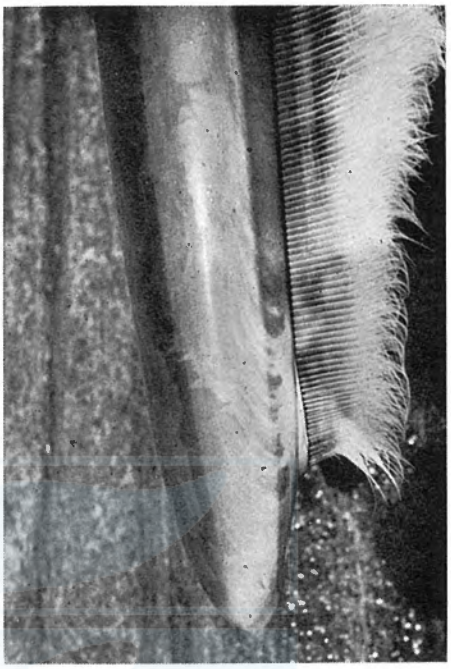
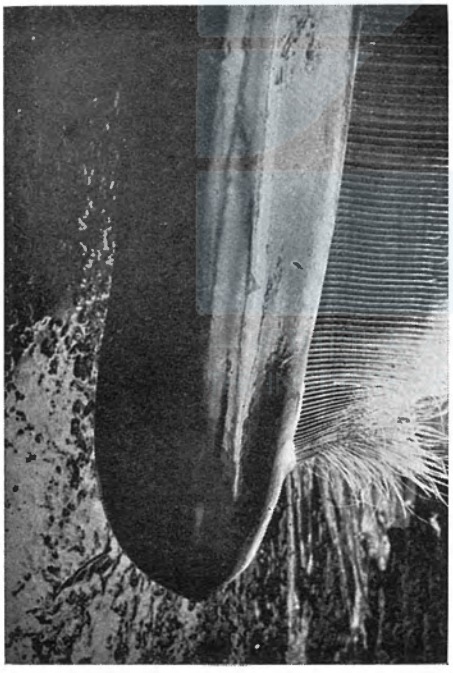


Fig. 4.



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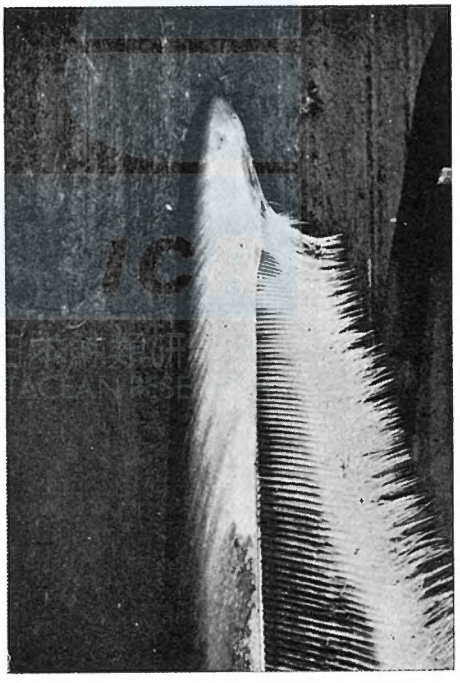

Fig. 3.

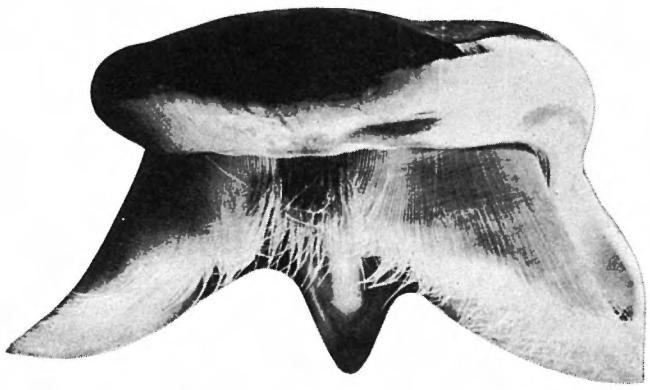

Fig 1

Fig. 2.

Fig. 3.