ON THE NOMENCLATURE OF THE WHALEBONE WHALES OF THE TENTH EDITION OF LINNÆUS'S SYSTEMA NATURE.

By Frederick W. True,
Head Curator, Department of Biology.

The present paper is intended as an introduction to an inquiry as to the identity of the whalebone whales frequenting respectively the Eastern and the Western Atlantic.

The species inhabiting European waters have been studied by many naturalists for a very long time, and may be said to be well known. Those of the American coasts and of African waters, on the contrary, have received less attention and are much less well understood. As regards North American species, some zoologists have tacitly assumed that they were identical with the European forms, while others have bestowed new names on the various specimens which have come under their observation. The whole subject is, therefore, involved in an uncertainty, which is a hindrance to the progress of cetology in many ways, and especially prevents a correct understanding of the geographical distribution of these huge animals.

As a preliminary step to the investigation of this subject, it has seemed to me desirable that the nomenclature of the European species should be thoroughly established. Taking as the starting point the Tenth Edition of Linnaeus’s Systema Natura, I have endeavored to ascertain whether the names in current use for the species are the correct ones according to accepted canons of nomenclature.

It has to be said that the species of cetaceans in the Systema are no more to be certainly determined from the diagnoses than many other Linnaean species. The main reliance has to be placed on the bibliographical references and synonymy, but even with these helps the Linnaean species are not always to be identified beyond peradventure. Nevertheless, the tendency of zoologists in the main is to adopt these names whenever at least a colorable defense of them can be made. This is, undoubtedly, on the whole, a wise course, as the tendency of all nomenclatural investigations is to go back as far as is in anywise warrantable. If one goes no further back than the earliest fully-established name, there are always those who, taking up the matter anew, will
argue in favor of an earlier though less well-founded name. By falling back at once to the earliest name that, under rules generally accepted, can be adopted with any plausibility whatever, such discussions are cut off, and stability is on the whole promoted.

It will be a fortunate day for zoology when the names of animals are determined by common assent, without regard to history or recourse to argument.

No special originality is claimed for the conclusions reached in this paper, some of which have been hinted at by Sir William Turner and other cetologists. I believe, however, that the fact that the Linnaean names for the finback whales are based exclusively on Martens's and Sibbald's descriptions is now for the first time demonstrated.

The European species of whalebone whales (including the bowhead among the number) now currently recognized are as follows:

1. The bowhead, Greenland or Arctic right whale, known as *Balaena mysticetus*.
2. The black whale, nordecaper or Basque whale, known as *Balaena bicoayensis*.
3. The common finback or rorqual, known as *Balenoptera musculus*.
4. The blue whale, known as *Balenoptera sibbaldii*.
5. Rudolphi's whale or rorqual, known as *Balenoptera borealis*.
6. The little piked whale or lesser rorqual, known as *Balenoptera rostrata*.
7. The humpback, known as *Megaptera boops* or *longimana*.

The species of whalebone whales described by Linnaeus are as follows:

1. *Balaena Mysticetus*.
2. *Balaena Physalus*.
3. *Balaena Boops*.
4. *Balaena Musculus*.

It is questionable how far Linnaeus was personally familiar with specimens representing the species he described.

He states in the Systema that he had access to the collections of King Adolphus Frederick and Queen Louise Ulrica of Sweden, Tessin's and De Geer's museums, and the museums of the Upsala and Stockholm academies. There is no mention of specimens of cetaceans in the catalogues of these collections published in Linnaeus's time, with a single exception. In the catalogue of the Adolphus-Frederick Museum (p. 51), he records a foetus of a whale under the name of *Balaena gronlandica*. It appears to be a Greenland whale, but as we shall presently see, Linnaeus afterwards referred it to the finbacks.  

1 Van Beneden remarks of the bowhead and nordecaper:

"Du Hamel, Linné, Pierre Camper, and, later Lacépède have occupied themselves successively with these giants of the sea; but Pierre Camper alone had in his hands pieces of the true 'Baleine franche' [*Balaena mysticetus*]; the others only knew them from figures, or from the accounts of explorers." (Hist. Nat. des Cétacés des Mers d'Europe, 1889, p. 52.)
THE BOWHEAD OR GREENLAND RIGHT WHALE.

The first species described by Linnaeus is Balana Mysticetus (p. 75). The diagnosis "B. naribus flexuosis in medio capite, dorso impenni" is generic, rather than specific. The habitat—"In oceano Gronelandico"—points to the bowhead whale. The description is in part erroneous and for the rest consists of generic or superficicn characters.

The bibliographic references include the works of Artedi, Willoughby, Rondelet, Ray, and Martens, and Linnaeus's own writings. I discuss them for convenience in chronological order, as follows:

"Rond. pisc. 475" = RONDELET, De Piscibus Marinus, 1554, p. 475.

Rondelet gives the characters, though with some evident inaccuracies, of a species of right whale which occurs "on the coast of the Aquitanian Sea and in India." He states explicitly that it has no fin on the back ("In dorso nullam habet").

As the Greenland whale, or bowhead, was unknown to the European naturalists of Rondelet's time, it may be presumed that the species he had in mind was the black whale or nor dcaper. Gervais has called special attention to the following sentence, which, in his opinion, points conclusively to the nor dcaper: "Rostro est brevi, fistula caret, corio duro, nigro integitur sine pilis, cui lepades et ostrea harentia aliquando reperiantur." 2

Rondelet cites localities and facts indicating that he was familiar with the whale fishery of the Basques in the Bay of Biscay, which had for its object, as Fischer, Van Beneden, and others have shown, the black whale or nor dcaper.

Rondelet writes under the heading "De Balana vulgo dicta sive de Musculo," and a large part of the chapter consists of a discussion as to the identity of the Musculus of Pliny and other writers.

"Will. icht. 35" = WILLOUGHBY, Ichthyographia (or Historia Piscium), 1686, p. 35.

Willoughby in this place, under the heading "Balana Rondeletii, Gesneri & ali orum—The Whale," merely repeats the observations of Rondelet, John Faber (the expositor of Hernandez's natural history of Mexico), Polydorus Virgil (Bishop of Bath and Wells, 1502 to 1555), and others, and adds some comments of his own on the various records. These records appear to refer severally to the right whales, the finbacks, and the humpback.

No attempt is made to formulate a diagnosis of any particular species.


2 Translation: It is provided with a short beak; the blowhole is wanting; it is covered with a hard black skin, without hairs, to which barnacles and oysters are sometimes found adhering.
"Raj. pisc. 6" = RAY, Synopsis Methodica Piscium, 1713, p. 6.

The nomenclature in this work is polynomial, and we find instead of a specific name the usual brief diagnosis, consisting, however, of generic and suprageneric characters. This is followed by an extended account of the supposed species compiled from early writers. From the localities given it is evident that the bowhead and black whale or nordeyper are confounded. Thus the author mentions a specimen reported by Faber as being stranded in 1624 not far from the maritime fortress of St. Severus, about 30 miles from Rome; of another near Corsica in 1620, and a third stranded in 1532 (according to Polydorus Virgil) at Tynemouth, England. These, if they refer to right whales at all, were the black whale and not the bowhead. On the other hand, Ray quotes from Martens, who observed the bowhead at Spitzbergen.

"Art. gen. 76" = ARTEDI, Genera Piscium, 1738, p. 76.

Artedi in the two works cited gives a brief diagnosis without genuine specific characters, and describes a specimen which he himself examined in London, November, 1734. It is highly probable that his description, which appears to indicate clearly that he had before him a right whale or true Balæna, relates to the black whale or nordeyper. In the Genera Piscium, however, he cites among his bibliographical references Marten's "Balæna Spitsbergensis," which was the bowhead or Greenland whale. He also gives "Greenland whale" as the English name of his species, and "Grönlands Hvalfisk" as the Swedish name. It is evident that Artedi did not distinguish between the black whale and the bowhead.

"Faun. suec." 264 = LINNÆUS, Fauna Suecica, 1746, No. 264 (p. 98).

This work is polynomial, and at the place cited we find only what is really an attempt at a brief diagnosis, consisting, however, of generic characters, followed by citations of numerous early authors, such as Gesner and Jonston, and the remarks "Grönlands valfisk of the Swedes;" "inhabits the Atlantic Ocean, feeding on meduse."

"Syst. nat. 39, n. i."

I understand this to refer to the ninth edition of the Systema Naturæ. The matter, however, is not on page 39 but on page 40. Under No. 1 we have the same references to the Fauna Suecica and Artedi's Synonymia which we find in the tenth edition of the Systema Naturæ, now under consideration. The entire matter is as follows: "1. Balæna fistula in medio capite, dorso caudem versus acuminato. Art. syn. 106, Fn. 264. Mystieetus, la Balaine."

No new or independent information will be looked for here.

It will be perceived from the foregoing examination of Linnaeus's authorities that these writers had no clear notion of the distinction between the black whale and the bowhead, or even in some cases between the different types of whalebone whales, and that it is conse-
quenty impossible to arrive at any definite conclusion as to the applicability of Linnaeus's name *mysticetus* from a study of their works. We must therefore get what satisfaction we can from Linnaeus's own words, and it would seem that even here the only certain indication is to be found in the phrase "lives in the Greenland Ocean." This, as already mentioned, may probably be considered as a sufficient warrant for attaching the specific name "mysticetus" to the bowhead. There is, so far as I know, no record of the occurrence of the black whale in Greenland waters, and, furthermore, it is well known that there was an extensive fishery for the bowhead in those waters in Linnaeus's time.

**THE FINBACK AND HUMBACK WHALES.**

We pass now from the bowhead to the consideration of the other whalebone whales mentioned by Linnaeus. These are three in number—*Physalus, Boops*, and *Musculus*.

1. **BALÆNA PHYSALUS.**

Linnaeus's diagnosis of this species is as follows: "A whale with the nostrils in the middle of the head; an adipose fin at the end of the back." The only other bit of information is—"lives in the European Ocean."

It is evident that these data, though they suffice to indicate a finback whale, are insufficient to enable us to associate the name *Physalus* with any one of the four European species, and if the matter is to be resolved at all it will be through the help of the authorities cited by Linnaeus. Taking these in chronological order, the first we meet with is Rondelet. The citation is as follows:

"Physeter. Rond. pisc. 485" = **RONDELET, De Piscibus marinus, 1554, p. 485.**

The whale which Rondelet describes under the name of *Physeter*, in the work above mentioned, is probably the sperm whale, though the figure which heads the chapter represents an animal having teeth in both jaws and the blowhole on the top of the head, somewhat as *I. Orca*. In any event, it can not be counted among the whalebone whales, and Linnaeus was in error in citing it under this or any other of his species of *Balana*.

"Physalis bellua s. Physeter. Gesn. pisc. 723."

I understand this to refer to Gesner's *Historia Animalium*, Liber IV, and possibly the edition of 1620. I have seen only the first edition of 1558, in which, on page 551, begins a chapter entitled "De (Physalo bellua, seu) physteter, rondeletius." The description here given is quoted verbatim from Rondelet, and the figure which heads the chapter is also from that author. So far as the present species is concerned, therefore, Gesner's work can not be cited as an independent source of information.

---

1 "B. naribus in medio capite dorso extremo pinna adiposa" (p. 75).
In chronological order, Martens comes next after Rondelet and Gesner among the authors cited by Linnaeus. Martens visited Spitzbergen in 1671, and his Beschreibung includes an account of the various marine animals found in the waters thereabouts.

These descriptions are very full for the time in which they were written, and are of especial interest, both because they represent the source from which many later authors drew their information, and because they appear to have been based largely on personal observation.

Martens's description of the "Finfisch" is as follows:

The finfish is equal to the whale [Balena mysticetus] in size.
As to thickness, the whale is, however, three or four times as thick as the finfish.
The finfish is recognized when in motion by the "Flossenfarn" or fins, which stand on the back, near the tail.
It is distinguished also by the strong spouting from the right whale, which does not blow so powerfully.
The eminence on its head is divided longitudinally, and this is its blowhole, out of which it blows the water higher and stronger than the whale.
The eminence, however, is not so high as in the whale, and the back is likewise not so deeply furrowed.
The lips of the finfish are of a brownish color and diversified with plaits (Kransen), like a line or streak.
On the upper lip hangs the so-called whalebone, as in the whale, but whether it opens and shuts its mouth is variously believed. Some hold that it can not shut its mouth. It is not so, however. It moves (but not always) with open mouth. Its whalebone, like that of the right whale, does not hang out on the sides outside the lips. It can shut its mouth completely when it will.
The inside of the mouth between the whalebone is entirely rough with hairs, like horsehair, which are situated on the inside of the whalebone and on the little whalebone, which develops first, and is blue in color.
The other whalebone is brown in color; also dark brown, with yellow streaks, which is considered the oldest.
The blue is found in young whales and finfish.
In color it [i.e., the finfish] is not velvet black, like the whale, but like the fish called "Schley" [the tench, Tinca vulgaris].
The form of the body is long, round, and slender, and has not so much blubber as the whale, on which account one does not particularly care to catch the finfish, as it does not repay one for the trouble.
It is much more dangerous to kill than the whale, because it can move and turn much quicker, for it strikes about it with his tail and from it (von sich) with its flippers, called fins, so that one can not come near it with boats, when the lances help most to kill it.

This description is accompanied by a figure which shows with considerable fidelity the characteristic form of a finback whale, but the furrows of the throat are wanting, a peculiarity which has attracted the attention of many zoologists.

1 Or East Greenland, as it was then frequently called.
2 In describing the Greenland whale, he refers to the whalebone as being "sometimes yellow in color, with parti-colored streaks, like that of the finfish" (p. 99).
3 Spitzbergische oder Groenlandische Reise, Beschreibung, 1675, pp. 125, 126.
Martens's description of the form, color, etc., of his finfish, and especially also of the whalebone, corresponds with the common finback, usually known as *Balaenoptera musculus*. With the other three species of finbacks known to frequent the waters of northwestern Europe it shows less close agreement. In the present state of knowledge we may, I think, on the basis of the color of the whalebone alone, decide that Martens's description applies to the common finback.

Martens states in his Beschreibung¹ that all the illustrations are from sketches of his own from life. We may believe, therefore, that his description and figure of the finfish are based on direct observation of specimens. As above mentioned, it is somewhat singular that he neither describes nor illustrates the throat furrows, which are so characteristic of all finback whales. F. Cuvier accounts for this on the ground that Martens did not regard the furrows as an essential character, but this seems hardly sufficient. It is possible that the figure was made by Martens from memory and not with the whale before him.

"Balæa edentula, corpore strictiore, dorso pinnato, Raj. pisc. 9"—RAY, Synopsis methodica Piscium, 1713, p. 9.

The description accompanying this polynomial is nothing more than a Latin translation of Martens's account of the "Finfisch," somewhat abbreviated and paraphrased. It has in itself therefore no independent value as a means of determining to what species Linnaeus's name *Physalus* is to be applied. Ray's species is simply Martens's "Finfisch" under another name.

"Will. ichi. 41"—WILLOUGHBY, Historia Piscium, 1686, p. 41.

On the page cited Willoughby merely quotes the first part of Rondelet's account of the *Physeter*, leaving out a few words here and there. He adds a few critical remarks regarding the *Physalus* of Oppian and the *Pristis* of Rondelet and Bellon, but nothing of the slightest service in connection with the present inquiry.

Willoughby appears to have known nothing of Martens's Beschreibung.

"Art. gen. 77"—ARTEDI, Genera Piscium, 1738, p. 77.

Two species of whales are described by Artedi in the place cited. The one referred to by Linnaeus in the citation quoted above is No. 2—"Balæna fistula in medio capite, tubere pinniformi in extremo dorso."

Artedi merely cites Ray and paraphrases and abbreviates his description, without giving any new information. Ray, as we have seen, copies Martens, and hence we have to fall back again on the latter author in determining with what species Linnaeus's name is to be associated.


Under the heading "Balæna fistula in medio capito, tubero pinniformi in extremo dorso," Artedi cites Ray, pp. 9-10, as the principal

¹Page 93.
synonym, and adds references to ten early authors, Ælian, Pliny, Gesner, etc., with the remark, "These synonyms are seen to pertain to the same species with 'a'" [i.e., Ray].

We have already considered Ray's description, and have concluded that it was copied from Martens, and refers to the common finback.

The descriptions of the earlier authors are for the most part indeterminable, so far as species are concerned, and some relate to entirely different classes of animals. Ælian's Physalus, for example, is a small fish of the Red Sea, which has the power of inflating itself and floating on the waves. This was probably a globefish, or Tetrodon.

The Physeter of Rondelet was very probably the sperm whale, as we have already stated.


Linnaeus in this place copies Artedi's diagnosis, which the latter in turn took from Ray, and he from Martens. He cites some six of the early authors—Gesner, Jonston, etc.—where whales called "Physeter" are mentioned, but some of them at least, as we have already seen, treat of the sperm whale.

Linnaeus adds this independent information: "Lives in the Norwegian sea and is eaten by the natives; tastes nearly like the sturgeon, which was eaten daily by the natives while it migrated by northern Finmark to the highest part of Norway."

As four species of finback whales are known to frequent Norwegian waters, the one particularly referred to in this item can not, of course, be discriminated, though very probably it was the "common" finback.

Here, then, as in the case of Ray and Artedi, we are obliged to turn back to Martens as the only means of determining the proper use of the specific name Physalus. We have already decided that Martens's "Finfisch" was the common finback, usually called Balænoptera musculus.

To sum up the matter, then, it seems necessary to bestow on the common finback the name of Balænoptera physalus (Linnaeus).

This is more important than would at first appear, because, as I shall hope to show, the specific name musculus, now in common use for this whale, is misapplied. Unless the Linnean name physalus is accepted, it will be necessary to apply some other cognomen. I am of the opinion, however, that physalus should be considered applicable.

2. BALÆNA BOOPS.

Linnaeus's diagnosis of his Balæna Boops is as follows: "B. fistula duplici in rostro, dorso extremp protuberantia cornea." (A whale with a double blowhole in the snout; a horny protuberance at the end of the back.)

This diagnosis is in no wise specific, but, as we shall see presently, was taken from a description in Sibbald's Phalainologia. Linnaeus adds
nothing further but certain synonyms (which we shall consider in order) and the remark "lives in the Northern Ocean."

It is clear that Linnaeus's diagnosis is not sufficient for the identification of the species, and if the proper use of the name hoops is to be ascertained at all it will be through the synonyms, which are as follows:

"Art. gen. 77" = ARTEDI, Genera Piscium, 1738, p. 77.

Upon turning to the place cited, we find the following:


Anno 1690, d. 17. Novembris in sinum quendam portus Brantisland, in late re ustuarior Fortis Boreali in Scotia, ejecta fuit.

Rostrum respectu ad congeneres acutum. Plicae in ventre adsunt. Longituo 46 pedum.

Fistula nasiformes ab apice rostri 6 pedes & 8 polllices longae & septo divisa. Oculi exigui.

It is evident that this entire matter was extracted from Sibbald's Phalainologia. The whale "stranded on the 17th of November, 1690," is one figured and described in detail in that work.


The species here referred to is described in full, as follows:


It is evident that this is merely a repetition of the diagnosis given by Artedi in the Genera Piscium, and which he extracted from Sibbald's work.

"Balana tripennis nares habens cum rostro acuto & plicis in ventre. Raj. pisc. 16" = RAY, Synopsis Methodica Piscium, 1713, p. 16.

The account given in the place cited above begins thus:

8. Balana tripennis, nares habens, cum rostro acuto & plicis in ventre.

Anno 1690, Novembris 17, in sinum quendam ad occasum Portus Brantisland dicti, in late re ustuarior Fortis Boreali ejecta fuit hujusmodi Bellua.

This is likewise an abbreviation, with some paraphrasing, of the account by Sibbald of the whale stranded on November 17, 1690, in the Firth of Forth. Artedi, in turn, in 1738 copied the description of this same whale from Sibbald, as we have seen.


This was stranded on the 17th of November, 1690, in a certain bay of the harbor of Brantisland, on the north shore of the Firth of Forth, in Scotland.

The snout, in comparison with its congeneres, acute. Folds present on the belly. Length, 46 feet.

Nariform blowholes 6 feet from the tip of the snout and 8 inches long and divided by a septum. Eyes small.

Proc. N. M. vol. xxi—40
Through the kindness of Dr. A. W. Keppel, librarian of the Linnaean Society of London, I have received a transcript of the pages in this work which contain matter relating to cetaceans. It is all on pages 51 and 52, and this reference must therefore be regarded as a false one. Whatever the species of which Linnaeus found a specimen in the Adolphus Frederick Museum, it is not likely to have been his boops. Furthermore, he makes a correct reference to the work under musculus, the species which comes next after boops.

This exhausts all of Linnaeus's synonyms and bibliographical citations, and all of the matter referred to has been shown to have its origin in Sibbald's Phalainologia. It remains, therefore, to examine this work.

The original edition of Sibbald's Phalainologia, published in 1692, is a very rare book. Indeed, I do not know that there is a copy in the United States. It was reprinted in 1773, under the editorship of Thomas Pennant. There is a copy of this reprint in the library of Harvard College, which I have had the pleasure of examining, through the courtesy of the superintendent of circulation, Mr. Thomas J. Kiernan. Another copy is in the library of the Academy of Natural Sciences, Philadelphia.

The full title of the reprinted work (translated) is as follows: "Phalainologia Nova: or, observations on certain of the rarer whales recently stranded on the coast of Scotland: In which whales recently observed are divided among genera and species according to characters impressed by Nature herself; some now described for the first time; errors in descriptions also disclosed; and brief dissertations given on teeth, spermaceti, and the origin of ambergris."

Excluding the passages relating to writings of classical authors and those containing the description of certain anatomical details, chapter three of this work, beginning page 68, may be translated as follows:

Chapter III. De Balea na hujusmodi Tripinni que rostrum acutum habet, & plicae in Ventre.

On the seventeenth day of November, 1690, the following whale was cast up in a certain bay to the west of the harbor called Bruntsland, on the north shore of the Firth of Forth: *

This remarkable kind of animal was distinguished by the very shining surface of the body (as if it were cast from the most refined brass), which was very long.

1 With the exception just mentioned.
2 PHALAINOLOGIA NOVA; | SIVE | OBSERVATIONES | DE | RARIORIBUS QUIBUSDAM BALEXIS | In SCOTISE LITTUS super ejectis; | IN QUIBUS, | super conspectae BALEX E per Genera & | Species, secundum Characteres a ipsa | Natura impressos, distribuintur; | quaedam nune primum describuntur; errores etiam | circumscriptiones deguntur; | & braves de Dentium, | Spermatis Ceti, & Ambre | Grise orta, natura & | ipsa, dissertationes traduntur. | — | [quotation] | — | EDINBURGI | Typis Ioannis Redi, MDCCCLII. | Veneunt apud M. ROBERTUM EDWARD, | verbi divini ministrum, in | vico dicto, The Bishop's Land Close. | Horum impressi, LONDINI, | apud BENJ. WHITE, in Vico Fleet street, MDCCCLXXIII.
and appeared more slender in form by the proportion of the thickness to the length. From the extremity of the snout to the tail was 16 feet; near the lateral fins, where the body was thickest, the circumference measured with a cord was 20 feet. It had two fins on the sides, and besides these also on the back toward the tail a certain protuberance like a horn, which Bellon calls a fin, but our sailors call a pike—that is, a spine. The tail was bifurcated, and placed parallel to the horizon. The whole skin of the body was very smooth; black and pellucid in color on the back, white on the belly. On the belly from the navel to the lower jaw and all the way to the lateral fins were very many plice or ridges, prolonged to that length which was between the lower jaw and the navel. They were similar to those which we see in that kind of woman's cloak called Mantauro-gown. In this animal these folds were 1 inch broad, and the furrows between them in breadth and depth less than an inch, and it appeared to me that the learned Bartholinus knew of this corrugated belly. A fin was located on the breast on each side; the anterior part of the same was 5 feet from the eye. The real fin of the back was 8½ feet from the tail; the girth of the body in the neighborhood of this was 12 feet. The vent was 14 feet from the extremity of the tail. The penis was situated between the umbilicus and the anus, and a little of it hung down; cut out and drawn out by a weight suspended, it attained scarcely 2 feet in length; the sheath from which it hung down was a foot long in the middle; from the penis to the navel was 5½ feet; the aperture of the anus equaled one-half a foot. From the navel to the extremity of the lower jaw was 24½ feet; the navel was the size of a fist. The tail was 9½ feet between the outer points; where narrower (contractior), 2½ feet. The tail was placed transversely. The skin, as remarked, was black; the entire was like the silk cloth called taffeta, very thin, but the skin equaled in thickness the imperial coin called a dollar, and everywhere black.

The head in this animal held the due proportion to the rest of the body, and was oblong in form, curving gradually to a certain narrowness back of the snout; the snout was of a form between acute and obtuse, neither extended as in Delphius and Orca, nor obtuse as in Phocena. This animal had no spiracle in the head, but nostrils in the snout, of which more below. The form of the back was like an inverted ship, and the summit of the back was like a keel, with the body receding from this running out into the greater breadth. It was possible to see the whole body, which, floating on the waves, was turned now on one side, now on the other. The breadth of the lower jaw near the middle was 4½ feet, and had such a margin as John Faber describes in the place cited above; indeed, the bony, black, obtundt, thick lip of the jaw corresponded to those garlands with which the summits of walls are crowned. Above the lower jaw the tongue reclined, which could be contracted, and was 5 feet long, and near the roots 3 feet broad; in substance, color, and figure clearly like that of an ox, and almost of equal thickness with the breadth. In the upper jaw the nostrils were situated in the higher part of the snout, distant 6 feet 8 inches from the extremity of the upper jaw. They were also 8 or 9 inches long, and divided with a septum, and were shut up against the septum. Further, beginning from the broader basis and gradually contracting to the narrow extremity, the broadest part at the base, with the septum closed, was 6 inches; the extremity was 1 inch narrower. The inside of the aperture was lined with a rugose membrane of a black color, like that seen in the nostrils of a horse. The length of the opening of the mouth was 10 feet; the breadth of the opening was 4 feet 2 inches, in which a fish was lying.

The lateral fins situated in the breast were 5 feet long and 1½ feet wide.

The third or dorsal fin consisted of a certain peculiar glandular substance like that of which the manume are composed in quadrupeds, but firmer and harder; the spine traversed the middle of this, and it was covered with a black skin.
From the foregoing description we are able to extract the following characters:

Body very long and slender.
Head oblong and neither very acute nor very obtuse.
Color black on the back; white on the belly.

The following measurements are stated:

<table>
<thead>
<tr>
<th>Character</th>
<th>Feet</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremity of snout to flukes</td>
<td>46</td>
<td>0</td>
</tr>
<tr>
<td>Circumference of body near insertion of pectoral fins</td>
<td>20</td>
<td>0</td>
</tr>
<tr>
<td>Breadth of the ridges of the throat</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>From the eye to the pectoral fin</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>From the dorsal fin to the flukes</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Girth of the body near the dorsal fin</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>From anus to flukes</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>From penis to the navel</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>From extremity of the lower jaw to the navel</td>
<td>24</td>
<td>6</td>
</tr>
<tr>
<td>Breadth of the flukes</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Breadth of lower jaw near the middle</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>Length of tongue</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Breadth of tongue near the roots</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Blowhole to extremity of snout</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Length of blowhole</td>
<td>8 (or 9)</td>
<td></td>
</tr>
<tr>
<td>Length of mouth</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Breadth of mouth</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Length of pectoral fins</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Breadth of pectoral fins</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

We learn from these characters and measurements that the body was "very long and appeared more slender in form by the proportion of the thickness to the length;" that the dorsal fin was placed very far back, according to the measurements even posterior the commencement of the last fourth of the length of the body; that the pectoral fins were quite short, or about as 1 to 9\(^{1/2}\), compared with the length of the body; that the lower jaw was moderately long, or about as 1 to 4\(^{1/2}\), compared with the length of the body.

All these characteristics, especially the emaciated form, point very strongly to the common finback, usually called *Balaenoptera musculus*.

From *B. rostrata* it is distinguished by size (total length, 46 feet), backward position of the dorsal fin, longer jaws, and many other characters.

From *B. borealis* it is distinguished also by the backward position of the dorsal fin and by the larger pectoral fins.

In some features, especially the position of the dorsal fin, it coincides closely with the blue whale, *B. sibbaldii*, and might be thought to represent a young individual of that species, but the slender form, the decidedly smaller pectoral fins, and somewhat shorter jaw militate against that identification. Furthermore, Sibbald describes another whale, which, as will be seen presently, is much more likely to have been the blue whale, and is quite different from the present one.

In the matter of color there is an apparent deviation from the common finback, since Sibbald describes his specimen as black on the back.
and white on the belly, while Collett, Cocks, and others who have had abundant opportunities to study this species, describe it as "grayish slate," or brownish, on the back. Sibbald’s specimen, however, had been dead for at least a day when he saw it, and it is well known that in cetaceans of all kinds grays rapidly turn to black after life is extinct. Taking into consideration all the facts presented, there is apparently little reason for doubt that Sibbald’s specimen was an immature common finback. At all events, the description tallies much more closely with that species than any of the other whalebone whales known to frequent European waters. Thus being granted, it is obvious that Linnaeus’s name, *boops*, which is based entirely on Sibbald’s description and the later paraphrases of it by other authors, must be regarded as one of the specific appellations of the common finback, and, as such, a synonym of Linnaeus’s *physalus.*

European authors, beginning with Rudolphi, have been disposed to regard Linnaeus’s species, *boops*, as representing the humpback (*Megaptera*), but it is entirely certain that the name can not be applied to any species of that genus.

3. *BALÆNA MUSCULUS.*

The last of Linnaeus’s species of whalebone whales is *Balæna musculus.* His diagnosis is as follows: "*B. fistula duplici in fronte, marilla inferiori eti multo latior.*" ("A whale with a double blowhole in the forehead, and with the lower jaw much the wider.")

His only comments are: "*Lives in the Scotch sea*" and "*provided this is sufficiently distinct from Mysticetus; Mus. Ad. Fr., 51, should be compared.*"

He cites three works, which will be considered in turn. The first is:

"Art. gen. 78" — ARTEDI, Genera Piscium, 1738, p. 78.

The diagnosis here given is the same as that of Linnaeus, the latter having copied it verbatim. Artedi also cites "Ray," page 17, and adds the following remarks: "It was cast up on the southern shore of the Firth of Forth in the month of September, 1692. Length, 78 feet. Lower jaw the wider and of a semicircular form. Blowhole pyramidal in form and divided with a septum toward the forehead. For the rest, see Sibbald."

These statements show conclusively that Artedi has taken his information from Sibbald, who, as we shall see presently, described a whale cast up on the shore of the Firth of Forth in this month and year.

---

1 Sibbald published a figure of his specimen in the Phallnologia, pl. 1, but as, like other figures on the same work, it is obviously inaccurate, it can not be used in a critical examination of species.


The whole matter found under this citation is as follows:

   Balana tripinnis, maxillam inferiorem rotundam, et superiorum multo latiorem habens

It will be observed that the first diagnosis, or polynomial designation, is the same as in the Genera Piscium and in Linnaeus's Systema Naturæ.

The second is copied verbatim from Ray's Synopsis Methodica Piscium, page 17.

"Raj. pisc. 17" = Ray, Synopsis Methodica Piscium, 1713, p. 17.

Ray in this place has only the diagnosis just mentioned, and a paragraph of description condensed from Sibbald, beginning, "In September, 1692, this [whale] was cast up on the southern shore of the Firth of Forth, near the ancient fortress of Abercorn," and ending, "For the rest, see the author" [i.e., Sibbald].

From the foregoing it is clear that Linnaeus obtained his information as to musculus solely from Ray and Artedi, who in turn obtained theirs from Sibbald. The name musculus must, therefore, be applied to the species (if it can be identified) which Sibbald saw in 1692 and described in his Phalainologia.

The description which occurs on page 78 of the reprint of his work is very long. It may be summarized as follows:

Chapter IV. Of the whale with three fins, which has the lower jaw round and much broader than the upper.

In the month of September of this year (1692), on the south shore of the Firth of Forth, near the ancient fortress of Abercorn, was cast up a male whale 78 feet long.

It was believed that its girth exceeded 35 feet.

It was seen to be of that kind which Purchas (Vol. III, where he treats of whales) called Gibraltar, except that it had horny plates on the palate, that the color of the back was black, and that it had a fin on the back; but the form of the mouth in this whale was peculiar. The lower jaw was much broader and larger than the upper, and of semicircular shape; whence the head appeared obtuse and rounded.

The length of the lower jaw was 13 feet 2¾ inches, and the shape of the opening of the mouth approached an equilateral triangle. From the middle of the palate to the opposite part of the lower jaw the distance was 13 feet 2 inches.

The upper jaw was narrower, and toward the extremity contracted and terminated more to a point, and so was received within the circuit of the lower, which, as already said, was broader and larger.

In the upper jaw the whole palate was seen to be covered with black hairs, or rather bristles, which hung above the tongue, with which, at the sides, equally separated, appeared black, horny plates; and in this particular whale the longest were 3 feet; 1 foot broad where they emerged from the gum of the palate, becoming gradually narrower where they touched the tongue, finally terminating in a filamentous point; in the lower part (which was narrower), furnished throughout their whole length with hairs, the color of which was also black. Where the beak was most slender and narrow, these laminae were scarcely half a foot long and scarcely an inch broad. They were arranged in a bundle (fasciculus) and contained in a sort of sheath of the same substance with themselves.
The eye, in this beast was located not far from the place where the opening of the mouth began; from this (the eye) to the end of the beak the distance was 13 feet 2 inches. Freed from the cartilaginous substance with which it was covered as with an involucr, and from the muscles surrounding the same, the diameter was 5 inches; but the pupil of the eye was 1½ inches in diameter, and in size and color the inside was like the eye of an ox.

No blowhole was present in this beast, but toward the forehead were to be seen two large apertures approaching a pyramid in shape. Their base was toward the forehead, and toward the narrow part of the beak they were gradually contracted very closely. They were divided by a septum, but the turmoil [of the water] which prevailed did not permit of anything further being noted.

The lateral fin was 10 feet long, 2½ feet broad where widest, and was narrowed up toward the extremity, being there but 3 inches broad. From this (the fin) to the opening of the mouth the distance was 6 feet 5 inches.

Besides the two lateral fins there was a third and smaller fin on the back, about 3 feet long and 2 feet high. From the lower part of this fin, that part of the tail where the bifurcation begins, the length was 12 feet 10 inches. * * *

From the lower jaw to the navel the belly was full of folds or ridges, which were 2 inches broad, and the elevated part and excavated part of these were of equal measure.

The penis, which hung from the body not far from the navel, was 5 feet long, where thicker it was 4 feet in girth, and it gradually diminished to a very narrow extremity. It was placed in an oblique position.

At 5 feet below the penis, opposite the dorsal fin, was placed the anus, distant about 12 feet from the bifurcated tail; the margin was 1 foot long. The tail, from that part in which it was divided into two flukes to the upper extremity, was 10 feet long; the distance between the two extremities of this (the flukes) was 18½ feet.

The blubber on the side was as much as ½ inches thick, and in the head and in the neck where it was thickest did not exceed 1 foot. The skin was one-half inch thick. The belly was whitish in color.

From this description we extract the following measurements of Sibbald's whale:

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Feet</th>
<th>Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total length</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td>Length of lower jaw</td>
<td>13</td>
<td>2½</td>
</tr>
<tr>
<td>From the eye to the end of the beak</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Length of pectoral fin</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Greatest breadth of pectoral fin</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>From pectoral fin to angle of mouth</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Height of dorsal fin</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Length of dorsal fin (about)</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>From posterior insertion of dorsal fin to bifurcation of flukes</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Breadth of flukes from tip to tip</td>
<td>18</td>
<td>6</td>
</tr>
<tr>
<td>Length of longest whalebone</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Breadth of longest whalebone</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

We learn from the description and measurements that Sibbald had before him a finback whale 78 feet long, with the dorsal fin very far back, the pectoral fin about one-seventh the total length, the whalebone having a maximum length of 36 inches, and both the plates themselves and the bristles black.

This combination of characters belongs to the blue whale (Balaenoptera sibbaldii Gray), the largest of the known European finback whales. The black whalebone with its black bristles is especially characteristic.
Sibbald mentions the color explicitly and in such a manner as to leave no doubt as to the correctness of his observation. No other finback whale of European waters possesses this peculiarity. In the coalfish whale or Rudolphi's rorqual (Balaenoptera borealis Lesson) the whalebone itself is black, but the bristles are white.

The fact can not be ignored that Sibbald's description contains some discrepancies. Thus, for example, the lower jaw is shown in the measurements to barely exceed one-sixth the total length. In the blue whale, according to Collett,¹ the length is 1 to 4½. There is, indeed, no European finback in which the jaw is as short as is indicated by Sibbald's measurement. The nearest is the little piked whale, B. rostrata, but in this species the total length rarely exceeds 30 feet. The whalebone is white and the external coloration peculiar.²

We may now consider for a moment Linnaeus's question,³ whether his musculus may not be the same as his mysticetus, and his reference to the "Museum Adolphi Friderici Regis" (p. 51). In the latter work he describes aetus which is clearly a right whale, and probably the Greenland whale. Indeed, he names it Balaena grænlandica. In his diagnosis he states that the lower jaw is much the broader. Now, this is also the principal character of musculus, and was derived by Linnaeus through Ray and Artedi from Sibbald's Phalainologia. Had he but read Sibbald's description he would have found that the whale therein characterized had a relatively short mouth and a fin on the back, which his own Balaena mysticetus (and probably identical B. grænlandica) had not.

CONCLUSIONS.

As a result of this inquiry I am brought to the following conclusions:

1. That the Linnaean names can without violence to the evidence be applied to certain of the European species.
2. That the specific name mysticetus should be applied to the bowhead or Arctic right whale, as is now the current practice.
3. That the specific name physalus should be applied to the common finback, currently denominated Balaenoptera musculus.
4. That the whale named Balaena bœops by Linnaeus was an immature specimen of the common finback, and that the Linnaean names physalus and bœops are, therefore, synonymous.
5. That the specific name musculus relates to the blue whale, currently called Balaenoptera sibbaldii.

²It is true that in Sibbald's figure the jaw is represented as longer, or about as 1 to 4½. While this is nearer the proportion for the blue whale, it can not be denied that Sibbald's figures are in many respects so inaccurate that they can hardly be brought forward as proof in doubtful points.
³It is interesting to note that the figure shows the under side of the pectoral fin white, which is characteristic of the blue whale.
The list of species will, therefore, stand as follows:

   The bowhead or Arctic right whale.

2. *Balaenoptera physalus* (Linnaeus).
   The common finback or rorqual.
   **Synonyms:**
   - *Balaena physalus* Linnaeus.
   - *Balaena brydei* Linnaeus. (Young.)
   - *Physalus antiquorum* Gray.
   - *Balaenoptera musculus* auct.

   The blue whale.
   **Synonyms:**
   - *Balaena musculus* Linnaeus.
   - *Balaenoptera sibbaldii* (Gray).

While three of the European species of whalebone whales are thus believed to be provided with their proper Linnaean names, four others not included in the Systema Naturae are yet to be considered. These are the black whale, or nordcaper; the lesser rorqual, or little piked whale; Rudolph's rorqual; and the humpback.

The first of these passes currently under the name of *Balaena hiscayensis*, but this appellation was not used in print by Eschricht until 1860. Subsequent to 1758 the first Latin name for this whale, accompanied by a description, appears to be *Balaena glacialis*, which occurs in Bonnaterre's Cetologie, 1789. Comparing it with the bowhead, this author remarks: "This species only differs from the preceding by the color and by the dimensions of the body. * * * It lives in the seas of the North, near the coasts of Norway and of Iceland." In a footnote he remarks: "In France it is called Nord-Caper, Baleine de Sarde; in Germany, Nordkaper; in Norway, Sildqual, Lilie-Hual, Nordkaper."

This would seem to be sufficient for purposes of determination, and the name *Balaena glacialis* should hold, unless discarded on the technical ground that *glacialis* is not a suitable name for a whale which does not live in the ice, or because it may cause the species to be confounded with the bowhead, which lives only in the arctic ice. Those who discard the name for these reasons, will probably adopt Kerr's term *islandica* (1792).

The little piked whale bears currently the name of *Balaenoptera rostrata*. The name *Balaena rostrata* is given for the first time with a

---

2 Tableau Encycl. and Méthod. des Trois Règnes de la Nature, Cetologie, 1789, p. 3.
3 The name *Balaena glacialis* occurs earlier (but subsequently to 1758) in Müller's Zool. Dan. Prodromus, 1776, p. 7, but it is a *nomen nudum*.

diagnosis by Müller. The diagnosis is merely "B. rostrata minima rostro longissimo et acutissimo." This might apply to a toothed whale. It appears to have been taken from Egede, who gives, under the heading of swordfish, a description which seems to relate partly to that fish, partly to the sawfish, and partly to the orca or killer whale.

The figure which he gives does not accord at all with the main part of the description, as Fabricius long ago pointed out; but as far as it resembles any known animal, appears to represent the killer. It is not worthy of serious consideration.

The figure of Pontoppidan, which is cited by Müller, is that of a toothed whale and probably Hyperoïdus, while the common names cited "Nebbe Hval," "Anderne-Fia," "Dogling," etc., refer also to that genus.

Fabricius, in 1780, introduces under the same name, Balana rostrata, a whalebone whale, which in all probability is the species under consideration. As the name is preoccupied in Müller's work, however, it cannot be used.

We find our species again under another name for the first time in Lacepède's Histoire Naturelle des Cétacés.

It is here called Balanoptera acuto-rostrata, and it would appear that this name must hold. The description is very full and fairly accurate, and the figure is unmistakable.

[Since the foregoing was written an article by Mr. Oldfield Thomas on the technical names of British mammals has appeared in the Zoologist (March, 1898), in which I observe that he accepts Balanoptera acuto-rostrata as the proper name for this species.]

The European humpback is currently designated Megaptera boops. We have observed, however, that the Balana boops of Linnaeus (1758) is not this animal. On the other hand, the Balana boops of Fabricius (1780) is undoubtedly of the present genus, and if the Greenland animal is the same would be applicable; but in any case, as the name is preoccupied, we shall have to search the later literature for a valid cognomen. This would appear to be found in Bonnaterre's Balana nodosa. This species, however, is founded on Dudley's account of the whales of New England, and if there is a difference between the humpback of the eastern and that of the western Atlantic, this name would belong to the latter rather than the former.

The next name in chronological order is Rudolph's Balana longimana, published in 1829 (?). This was based on a specimen thrown up

1 Zoologie Daniæ Prodromus, 1776, p. 7.
2 Egede, A Description of Greenland, 1745, p. 73, pl. 6 (English translation). I have not seen the original work.
3 Fauna Greelandica, 1780, p. 40.
5 Cétologie, 1789, p. 5.
at Vogelsand at the mouth of the Elbe in 1824, and the name is thoroughly valid. For the present purposes, therefore, the European humpback will be styled *Megaptera longimana* (Rudolphi).

The generic name *Megaptera* was bestowed by Gray in 1846.¹

The earliest name for Rudolph's roqual is *Balaena rostrata*, employed by Rudolph in 1822.² This was preoccupied by Müller in 1776, as we have already seen. Cuvier described and figured Rudolph's specimen in his *Recherches sur les Ossemens fossiles*, under the name of "*Rorqual du Nord."* Lesson in 1828 copied the description under the Latin name *Balaenoptera borealis*.³

Though Lesson's work is almost entirely a compilation, the name will hold.

The generic name *Balaenoptera* originated with Lacépède in 1803–04.⁴ The complete list of European whalebone whales as now recognized will stand as follows:

   The bowhead, or Arctic right whale.

2. *Balaena glacialis* Bonnaterre.
   The black whale, or nordeaper.

   The common finback, or roqual.

   The blue whale.

5. *Balaenoptera borealis* Lesson.
   Rudolph's roqual.

   The little piked whale, or least roqual.

7. *Megaptera longimana* (Rudolphi).⁵
   The humpback.

---

¹ *Zoology of the voyage of the Erebus and Terror, 1846.*
⁵ If the humpback of New England waters is the same species, then *Megaptera nodosa* (Bonnaterre) is the correct name. This can not be taken for granted in the present paper.