2. Notes on the History and Geographical Relations of the Pinnipedia frequenting the Spitzbergen and Greenland Seas. By Robert Brown, F.R.G.S. &c.

[Communicated by Dr. Murie.]

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1. *Introduction.*

In the introduction to a former paper* I had occasion to refer to the hazy uncertainty which surrounds the history of many of the Arctic Mammalia; preeminently is this true of the Cetacea, but scarcely less so of the order Pinnipedia. Though the specific determination of the species in this group is more easily managed, and has, to a great extent, been accomplished, yet the end to which these determinations are made, viz. the history of the birth, the life, and the geographical distribution and migrations of the animals themselves, are yet almost unknown, or dependent on the authority of the old Greenland naturalists, many of whose observations, made in a day when the specific characters were less known, or but a limited portion of the Arctic Ocean explored, have been proved to be far beside the truth. Again, these observations were made on the coast of Greenland where none of our sealers go; while in the Spitzbergen and Jan Mayen seas (the "Old Greenland" or "Greenland sea" of the whalers) the vast portion of the sealing of commerce is carried on for a few weeks each spring, but regarding the history of the Seals which form the prey of these hunters, the extent, commercial importance of the trade, and the migrations of these animals from one portion of the Arctic Sea to another we absolutely know nothing. Scientific purists forsooth (the Dr. Dryasdusts of zoology) may look upon the description of the process of a bone, or the elucidation of a dental tubercle, as the aim and end of all biological study; but I again repeat that all this, though of the utmost value, is merely an atom in the description of the animal, and mainly important so far as it tends to render the specific determination of the animals whose life we are studying easier to the field naturalist. I cannot help looking upon natural history as the history of nature; and to have a history of animated beings we must know something further about them than that the palate bone is notched, that the cervical vertebræ are anchylosed, or that the grinders have a posterior lobe.

It is with this view that these fragmentary notes have been put together. The various writers on this group, as far as relates to Arctic zoology, I have already criticised in my former paper, to which I beg leave to refer. In the spring of 1861, with a view to acquire a knowledge of the northern Seals of commerce, I accompanied a sealer

* "On the Mammalian Fauna of Greenland" (P. Z. S. 1868, p. 330).

into the seas between Spitzbergen and Jan Mayen; that year, however, proved a partial failure, and we returned to England by the end of April, leaving immediately for Baffin's, on which voyage I also accompanied her. Dr. John Wallace, now of the Hudson's Bay Company's Service, during the previous year also made a similar voyage, but was fortunate enough to enjoy better opportunities of observing the habits of Seals than I did; for at the period when I left for Davis's Strait, he remained behind, and passed the whole summer in the sea between Spitzbergen, Jan Mayen, and the east coast of Greenland. On my arrival in England he put into my hands an excellent series of notes on these species of animals, part of which I communicated to the Royal Physical Society of Edinburgh in 1862, and of which an abstract was published in their 'Proceedings' for that year. At that time, having some intention of preparing a more extensive work, I reserved my own observations and a great portion of Dr. Wallace's until such time as this might be matured; besides, there were innumerable points in the history of the Seals which I was desirous of investigating before putting any of our observations before the world. However, shortly after this I left on a very long scientific journey, far from the scene of our former studies, and for more than four years the whole subject was laid aside. In the summer of 1867 I again found myself a sojourner as far north as 70° N. lat., in Danish Greenland. During this time I made a very extensive collection of the skeletons, skulls, &c. of these and other animals, besides adding to and correcting some of my former observations. That osteological collection is not yet examined; but this is the less important, because, so far as I was able to judge during the hasty examination it was possible to give them during the process of preservation, there are no new species among them. Moreover the craniological characteristics of the northern Pinnipedia, thanks to the labours of Nilsson, George and Frederick Cuvier, Blainville, Gray, Gaimard, Lilljeborg, and others, are now very satisfactorily determined; and what points are still *sub judice* can easily be settled by an appeal to the collections already in our Museum, and to the one formed by me when it is made accessible to science.

These notes are still very imperfect; but as my stay in England is uncertain, I think it only right, if they are of any value at all, that they should be published, reserving to myself the hope that at some future day I may be enabled to present a more complete monograph of the Pinnipedia. In the following notes are combined most of my own observations with selections from those of Dr. Wallace (distinguished by his name within parentheses when I have been unable to confirm the observation); and to keep up the continuity of remark I have been compelled to occasionally repeat the substance of a portion of the abstract formerly referred to*. As this, however, has been misunderstood, I think that this partial review will not be objected to, especially as it merely consists of a few paragraphs. The remarks on the species are prefaced by some general observations on

* Proceedings of the Royal Physical Society of Edinburgh, 1862, p. 312.

the group. For the reasons already stated, I have purposely omitted giving any craniological or other osteological distinctions, except in a few isolated cases, limiting what descriptive remarks I may have to make to some disputed points regarding the very fallacious distinctive marks derived from the skin. As in the previous paper, I have not attempted anything like a complete history of their habits, geographical distribution, &c., chiefly limiting my remarks to what has fallen within my own observation or knowledge. I have occasionally mentioned facts already known, but still requiring further confirmation; but in general, when I can add nothing to the remarks of other naturalists, a reference is made to their writings, such references being intended to convey the imputation that our observations are similar in their nature. The list of popular names attached to each species is the result of not a little work and extensive acquaintance among the seal-hunters and fishermen of the northern coasts. The scientific synonyms are only given when no doubt existed of their applicability, and are not intended to be a complete list.

2. *Physiological Remarks on the Habits of Seals.*

The Seal is, to a considerable extent, fitted for terrestrial progression, which it performs chiefly by the muscles of the trunk, aided by those of the extremities. The result is a rolling, waddling, or shuffling kind of motion—the animal leaning over on one anterior extremity, and then rolling back on the other to make a similar use of it, using them thus alternately and the muscles of the spine continuously, chiefly those of the lumbar region and *erectores spinæ*. In carnivorous animals the intestinal canal is shorter than in graminivorous species: yet there are exceptions; for the Sloth has a very short intestine, and the Seal a very long one. I have measured the length of the intestine of *Pagophilus grœnlandicus*, and found it to vary between 50 and 56 feet in length.

It is said that the livers of the Seals at Nova Zembla (Hemskirk) and in the southern seas possess poisonous properties: this is not the case with the livers of any of the Greenland seals; for they are often eaten, and I never knew of any bad effect ensuing. The lymphatic glands are well developed, the glands being of great size, though not numerous, it being common to find only one in each axilla and groin. In the young Seals the lymphatics of the neck are subject to disease, which appears to be analogous to, if not indeed true scrofula: the glands swell and suppurate and pour out a purulent discharge; and the animals subject to this do not increase in size.

Many theories have been adduced to account for the Seal's capability of remaining with impunity so long below water. That of Buffon and the physiologists of his time was long celebrated: from their finding the *foramen ovale* open in a few instances, they twisted an exception into a rule, and accounted for it by this fœtal peculiarity. Dr. Wallace considers that this theory is erroneous, and from numerous observations he is satisfied that the open foramen must be very rare; for in only one of the Seals which he examined did he

find the foramen ovale unenclosed to within a line of the aorta. That of Blumenbach and Houston has been also brought forward, viz. that venous sinuses are to be found in the liver and surrounding parts, and that the large veins have been observed to be enlarged and tortuous; these have been supposed to act as reservoirs for the returning venous blood while the animal is diving under the water. But this theory carries inconsistency in itself. The venous system on the whole, and not in any particular part, unless in the vena cava, from the pressure excited on its walls, is greatly enlarged; but this arises from the great quantity of blood these animals possess. But, even supposing these venous sinuses and that the animal will remain below the surface for twenty or twenty-five minutes (though I must assert that I never saw them remain longer below the surface than fifteen minutes, and from five to eight is the common time), are these sinuses large enough to contain the full quantity of blood that may return in that period from the capillary system? The reply is certainly in the negative. Does the heart's action diminish in rapidity or come to a full stop? in that case there would be no need of these sinuses. What, then, are the uses of them?

After a very careful examination, Dr. Wallace informs me that he never could find them, in all the Seals which he examined. He certainly remarked the dilated condition of the veins, but referred this to a physiological cause, viz. the pressure of the superincumbent column of blood. He believes that their power of remaining so long below the surface of the water is to be referred to a cause physiological, and not structural. Their expertness in swimming is not possessed from birth, but only developed from an innate instinct. He has often watched young Seals taking the water at first in smooth pools among the ice, and then swimming slowly and quietly about in the still floe-water—then gradually taking the water, staying below the water at first but a short time, gradually lengthening their stay until they had acquired the faculty of remaining the usual time beneath the surface. Dr. Wallace, then, thinks that this faculty is owing to a cause more physiological than anatomical, and that the explanation he has given, coupled with the enormous quantity of blood which the Seal contains, will account for their power of remaining beneath the water. As I have not examined the anatomy of the Pinnipedia with this object in view, I cannot presume to give an opinion on the matter; in the Narwhal and other Cetacea which I examined, the extensive venous plexus about the vertebral column seemed to explain the possession of this power of temporary subaquatic existence. The flesh of the Seal is quite black, from the enormous quantity of venous blood it is impregnated with; but if exposed to the air or steeped in water, it acquires the usual arterial rosy hue. The flesh of young seals which have not yet taken the water is, on the contrary, quite red.

3. *Habits and Instincts of Seals in general.*

They spend a considerable part of their time in feeding, but they

pass by far the greater part in basking in the sunshine and sleeping on the ice *. It has been remarked that the Seal sleeps and wakes alternately about every 180 seconds. Seals are, however, often killed in considerable numbers when asleep on the ice; and this happens most commonly on a day of warm sunshine. We had a Seal on board about a month old, which I watched attentively for some time, and it certainly seemed to wake and sleep alternately with the interval mentioned (*Wallace*): when disturbed it made attempts to defend itself; and if left alone for a few seconds, it drew its flippers close to its sides, and gradually its head began to look drowsy, then closed its eyes, and from the long deep breathing it was evidently asleep, for a minute or two (for the time varied); and then, without being disturbed in any way, it would suddenly open its large black glassy eyes, stretch out its head, and look about, and, as if satisfied that all was right, would again relapse to sleep, and so on. When asleep, they always leave several sentinels on the watch, which, strange to say, are, for the most part, female Seals. These sentinels, however, conduct themselves in the same manner as I have described the individual Seal we had on shipboard. I have been assured by old seal-hunters that Seals can sleep on their back while floating in the sea; and this statement corroborates that of Fabricius and other naturalists. In 1861, in Davis's Straits, the steamer on which I was ran against a Seal sleeping in this manner. The *blow-holes*, or escape-holes, of the Seals are evidently formed by them when the ice is making, the animal always rising to breath again at the same place, thus preventing the coagulation of the ice, or breaking it as soon as formed. It has been supposed that the Seal could make such an opening by force or by *keeping its warm nose* (though, unfortunately for the theory, that organ is always cold!) *for a time at one place for the purpose of melting the ice*; but these conjectures are not founded on truth, the following reasons being my grounds for that statement:—It could not break the ice by force, and, moreover, it could not even dare to run its nose against such an obstacle; for the nose of the Seal is a tender point; this was known even to the ancients, and is referred to by Oppian in a well-known passage†. This is taken advantage of by the sealers, who secure as many as possible when they are hastening to the water from the ice, by striking them on the nose, and then killing them at their leisure when the others have escaped. Even suppose the muzzle capable of melting the ice (which it certainly is not), where could the animal rise to breath during the process? The preceding explanation of the formation of the breathing- or *blow*-holes was derived from independent observation of the habits of the Seal, but is identical with that given me by the natives of the Arctic regions. It is at such holes that the Eskimo and the Bear watch patiently for their prey.

* "Sternunt se somno diversæ in littore Phocæ" (Virgil, Georgics, lib. 4).

† "Non hami penetrant phocas, sævique tridentes
In caput incutiunt, et circum tempora pulsant.
Nam subita pereunt capitis per vulnera morte."

The *voice* of the Seal is a peculiar cry, somewhat midway between that of a young child and the bleating of a lamb or kid.

They are very fond of music, which was well known to the ancients; and this fondness is often taken advantage of by the hunters at the present day*. I have often seen them raising their heads inquiringly out of the water listening to the sea-songs of the sailors as they wrought at the pumps or tracked the ship to the ice-floe; therefore it seems as if the fabled spell of Orpheus, which was powerless on the Dolphin, takes effect upon the Seals. In moving from one place to another they swim rapidly, sometimes on their backs and often on their sides, occasionally whirling about as if to amuse themselves, and sometimes leaping out of the water altogether.

Their parental love is so great that they will sometimes remain and share the fate of their hapless young. Their instinctive knowledge of danger is very keen; they have been known to seize their young with their flippers and carry them into the water with them when they saw the hunter approaching! I did not see this myself, and only ask you to receive the statement for what it is worth.

Seals are very tenacious of life, and difficult to kill, unless by a bullet through the brain or heart. They are so quickly *flensed*†, that after having been deprived of their skin they have been seen to strike out in the water; so that the sympathies of the rough hunters have been so excited that they will pierce the heart several times with their knives before throwing away the carcass. These movements, however, are apparently reflex or diastaltic, as I have often seen a Seal lying skinned on the deck for an hour, exposed to a temperature of 12° below zero (Fahr.), and yet the muscles of the loins and back retain their contractility to such an extent as to be able to rotate the pelvis on the spine, on those on each side being alternately irritated.

With the exception of the Bladdernose, the other Seals in the Greenland seas appear to have little or no combativeness in their nature, but are a harmless, persecuted, sportive race of graceful athletes making merry the solitary waters of polar lands.

On the other hand, the male Bladdernose is, in truth, the lion of the sea, dividing the empire of the polar waters with his huge ally the Walrus. Instead of flying at the approach of the hunter, he will quite calmly await the approach of danger, preparing for defence by betaking himself to the centre of the piece of ice he is on, and blowing up the air-bladder on his forehead, while he rears his head and snuffs the air like an enraged bull, and often gives battle successfully,

* It is often alluded to by the ancient poets (thus, "gaudebant carmine phocæ," Apol. Rhod. lib. 1; Val. Flacc. lib. 5. lin. 440, &c.); and all ancient historians especially note that it is "perstudiosum musicæ." The well-known passage in Sir W. Scott's poem also refers to this,—

"Rude Heiskars seals through surges dark
Will long pursue the minstrel's bark."

† A convenient whaler's word (of Dutch origin) to express the operation of taking off the blubber (and skin).

making the clubs fly from the hands of his assailants, with his flippers, his head being protected as with a helmet by the air-bladder. He will then in turn act on the offensive, and put his opponents to flight, pursuing them with a shuffling serpent-like motion over the ice, the result often proving somewhat dangerous to the panic-stricken hunter if the boat has left that piece of ice, as the Seal will use his tusks rather ferociously when thus enraged. However, he is not inclined to give battle unless provoked, and looks a dull stupid-looking sort of epicurean as he lolls on the surface of the ice and gazes about with his large black eyes, having an apparently meaningless stare. The "Ground-Seal" and "the Floe-Rat" (*Pagomys hispidus*) in the far north are quite harmless and inoffensive; they apparently delight to swim about in the calm smooth floe-waters, or bask asleep in the sunshine on the surface of the ice. Their greatest enemy is the Polar Bear, who is continually on the alert to take them by surprise, forming, as they do, his chief prey.

Nearly all of the Seals live on the same description of food, varying this at different times of the year and according to the relative abundance or otherwise of that article in different portions of the Arctic seas. The great staple of food, however, consists of various species of Crustacea which swarm in the northern seas. During the sealing-season in the Spitzbergen sea I have invariably taken out of their stomachs various species of *Gammarus* (*G. sabini*, Leach, *G. loricatus*, Sab., *G. pinguis*, Kr., *G. dentatus*, Kr., *G. mutatus*, Lilljeb., &c.), collectively known to the whalers under the name of "Mountebank Shrimps," deriving the name from their peculiar agility in the water. This "seals' food" is found more plentiful in some latitudes than in others, but in all parts of the Greenland sea from Iceland to Spitzbergen; I have seen the sea at some places literally swarming with them. Again, in the summer in Davis's Strait I have found in their stomach remains of whatever species of small fish happened to be just then abundant on the coast, such as the *Mallotus arcticus*, *Salmo* (various species), &c. I have even known them to draw down small birds swimming on the surface; but their chief food is Crustacea and fish.

4. *Notes on the Species of Pinnipedia.*

(1) Callocephalus vitulinus (Linn.), F. Cuv.

Phoca vitulina, Linn.
Phoca communis, Linn. (Mus. Ad. Frid. i. 5).
Phoca canina, Pall. (ad partem).
Phoca variegata, Nilss.
Phoca linnæi, Less.
Phoca littorea, Thienem.

Popular names.—*Sea-dog*, *Sea-calf*, *Sea-cat* (English sailors and fishermen generally); *Selkie*, *Selach*, and *Tangfish* (north of Scotland); *Rawn* (western islands of Scotland); *Spräklig Skäl* (Swedish); in other parts of Scandinavia, and according to age &c., it is variously

designated *Wilkare Skäl, Kubbsæl, Fjordnacke, den spättede Säl* (the Spotted Seal), *Algar, Laggar, Kutar,* and *Skältokar; Kobbe, Stenkobbe* (Norse); *Hylje* (Finnish); *Nuorjo* (Lapp.); *Seehund* (German); *Veau marin* and *Phoque* (French); *Kassigiak* (Greenland); *Spragled Sælhund* (Danes in Greenland).

The Eskimo in Ponds Bay, on being shown a good figure of this Seal, called it *Tupalo*; but whether this is their name for the animal and is to be received for a proof that the *C. vitulinus* is found there, I cannot take upon myself to decide. The Greenlanders also call it, according to age, *Kassigiarak* and *Kassiginak*; but when it attains the age of three years, it is called *Kassiarsoak* ("the big Kassigiak"). Prof. Newton ("Notes on the Zoology of Spitsbergen," Proc. Zool. Soc. 1865, and Ann. Nat. Hist. vol. xvi. 3rd series, p. 423) says that *Pagomys fœtidus* is called *Steen Kobbe* (Stone-Seal) by the Spitzbergen hunters. I suspect that he has erred through his informants mistaking this for *Callocephalus vitulinus*. No doubt Dr. Malmgren seems to think that the latter species is not got in Spitzbergen —an opinion I have ventured to contest in a former paper.

It is also sometimes called "the Freshwater Seal," on account of its following the Salmon high up rivers*.

Remarks &c.—Any laboured account of a Seal so long and so familiarly known would obviously be out of place in these short notes; I question, however, if all the accounts we possess regarding the Seal under the designation of "*Phoca vitulina*" really refer to this species, and not to *Pagomys fœtidus* and others†. It will, I think, be found that in the western and northern islands of Scotland several species, not hitherto supposed to be regular members of the British fauna, exist, known under the popular names of *Selkie, Selach, Sea-cat, &c.* I do not think I can say anything in regard to its habits further than what is already contained in various works on Mammalia &c., viz.:—Bingley, British Quadrupeds, p. 57; Bell, History of British Quadrupeds, p. 282; Hamilton, Amphibious Carnivora (Nat. Lib.), p. 127; James Wilson in Mag. Zool. and Bot. vol. i. p. 239; Edmonston, View of Zetland, vol. ii. p. 293; Martin, Western Islands, p. 62; M'Gillivray, British Quadrupeds (Nat. Lib.), vol. xiii. p. 199; Nilsson, Skandinaviske Fauna, i. p. 276; Fabricius, Naturhistoriske Selskabets Skrifter, I. Band ii. p. 98; Œdmann, Vet. Akad. Handl. 1784, p. 84; Rosted, Norske Vidensk. Nye Skrivter, ii. p. 185 (good description); Cneiff, "Berättelse om Skälfänget i Œsterbotten," in Vet. Akad. Handl. 1759, p. 179. r. 8 (on the hunt); Holmers, Anteckningar om sättet att

* I have known a Seal (probably *Halicyon richardsi*, Gray) to be killed at the Falls of the Columbia River in Oregon, upwards of 200 miles from the Pacific. It was doubtless in pursuit of Salmon. Dog River, a tributary of the Columbia, takes its name from a dog-like animal, probably a Seal, being seen in the lake whence the stream rises.

† In the Appendix to Parry's 'Voyage' is a notice of a Seal said to be "*Phoca vitulina.*" It is the young (in second coat) of *Pagophilus grönlandicus*, which has often been mistaken for this Seal. It can be known by its having the second toe of the fore flippers the longest; while, independently of other characters, *C. vitulina* has the first toe the longest.

skjuta och fänga Skälar &c. (Stockholm, 1828)* (hunt &c.); Ball, Transactions of the Royal Irish Academy, xviii., and Sketches of British Seals; Gaimard, Voyage en Islande &c.

Procreation and Young.—On the coast of Greenland it is said to produce its young in the month of June; but the time seems to vary according to season and place. On our coast its young is dark-coloured; but on the Arctic coasts it is born white, with curly hair, like the young of *Pagomys fœtidus*.

Geographical Distribution.—This is a Seal peculiar to the coasts of the regions which it affects, but has also a wide range, being found over nearly all the northern coasts of Europe and the colder portions of America. It is even said to be found in the Caspian Sea and Lake Baikal. It does not seem, from its littoral habits, to be found in the Spitzbergen sea, or form a portion of the commerce of the sealer; it is, however, found on the coasts of Spitzbergen, tolerably abundant on the eastern shores of Greenland, and in Davis's Strait. It is to be found all the year round all along the coast of Greenland up inlets†, but not to any such extent as *Pagomys fœtidus* and *Pagophilus grœnlandicus*. In Scandinavia it is sometimes called the Fjardskäl on account of its frequenting inlets or fjords.

Economic value and hunting.—We have no data to decide as to what extent it is killed in Danish Greenland, its record being united with that of *Pagomys fœtidus*. The skins are highly valued as articles of dress, more especially as material for the women's breeches; and no more acceptable present can be given to a Greenland damsel than a skin of the *Kassigiak*. While a European Pyramis presents jewels and *bijouterie* to his fair Thisbe, the not less gallant Pingatok in Greenland presents to his squat *innamorata* the fruits of his hunt up the ice-choked fjord, in the form of a Seal of this species! In the Danish settlements they are valued at from three to four rigsdaler. The principal reason which induced the late Admiral Grääh's boatwomen to accompany him on his memorable voyage along the east coast of Greenland was the hope of obtaining some *Kassigiak* skins from that region, the natives of which value them at even less than the more serviceable hides of the other species, which are sold by the west-coast natives for a mere trifle. According to Hr. Cneiff (*l. c.*) a *C. vitulinus* will yield about $6\frac{2}{3}$ Swedish lispunds of blubber, and, according to Holmers, even 8 lispunds. Professor Nilsson says that a Seal of this species killed on the coast between Malmö and Skanör in Sweden yielded over 90 Swedish "potts" of oil, each "pott" being worth 36 skillings,=67 rigsdaler 24 skillings Rigsmont (Swedish) for the oil of one *C. vitulinus*. In August, when the Seals are poorer, another yielded 75 potts, equal in value to 56 rigsdaler 12 skillings (Swedish). In some of the northern and western islands of Scotland, and at the estuary of the Tay, &c., they are still occasionally hunted for their skins and oil. The skin makes excellent leather, and waiscoats made of it are much valued by fishermen.

* *Fide* Nilss.

† The "Colonie" of Christianshaab in Disco Bay is called *Kassigianwitchz*, or the place of the *Kassigiak*.

No separate returns of the catch of this have been kept; but it is estimated that of *Pagomys fœtidus* and *Callocephalus vitulinus*, the yearly capture in Danish Greenland must amount to 70,000* or more. The flesh is looked upon in Greenland as the most palatable of all "seal-beef."

(2) PAGOMYS FŒTIDUS (Müll.), Gray.

Phoca fœtida, Müll.
Phoca hispida, O. Fab. Nat. Selskab. Skrifter, vol. i. 2. p. 74.
Phoca bothnica, Gm.
Phoca fasciata, Shaw.
Phoca annellata, Nilss.
Phoca discolor, Gray.
Phoca frederici, Less.

Popular names.—*Ringlad Skäl* (Nilsson); *Morunge* (Œdmann, Vet. Akad. Handl. 1784, p. 84); *Hringanor* (Mohr, Isl. Naturhistoriske, p. 5); *Kuma* (Tungunsen near Baikal); ?*Nerpa* (Russ.); (*Neitsiak* (young) and *Neitsik* (old, pronounced *Nesik*, Greenlanders and Danes in Greenland); *Floe-rat* or *Flaar-rat*† (of Northern English and Scotch sealers). It has been so often confounded with other Seals that, even on the coasts where it is not uncommon, it has not received many popular names; however, in different parts of the Scandinavian seaboard it is variously called *Inskärsskäl* or *Skärfving*, and *Svart nolled-säl*, or simply the *Nollede*. This is, in all probability, the Seal known in the Hebrides as the *bodach* or old man.

It is doubtful if this is the *Phoca equestris* of Pallas; but I cannot think that there is any serious room for doubt that it is identical with Dekay's *Phoca concolor*. I do not think that any one now entertains any doubt about its being identical with the *Phoca fœtida* of Fabricius (Fauna Grœnl. p. 13. no. 8) or the *Phoca hispida* described by the same author in the 'Naturhistoriske Selskabets Skrifter,' *l. c.*, though Nilsson seemed in 1847 to have been doubtful (Skand. Fauna, i. p. 283).

Descriptive remarks &c.—This is the smallest of the Greenland Seals; it is chiefly looked upon and taken as a curiosity by the whalers, who consider it of very little commercial importance, and call it the "Floe-rat," as it is always either found on floes or quietly swimming about in the smooth floe-waters.

Young.—The young is white, of the yellowish tint of the Polar Bear. The hair is curly.

Habit &c.—They delight to live in retired bays in the neighbourhood of the ice of the coasts, and seldom frequent the open sea. In the Greenland and Spitzbergen seas they chiefly live upon the floes in retired situations at a considerable distance from the margin of the ice. Dr. Wallace observed them for a considerable time in

* Rink, *l. c.*

† I have heard the English sailors call them *Dorrities*; but this term is also used for the Bluebacks (*P. grœnlandicus*).

the months of June and July, between N. lat. 76° and 77°, in possession of a large floe, part of which was formed of bay ice, where they had their "blow-holes" (the *atluk* of the Danes); his ship lay ice-bound for nearly three weeks, at about three miles from this large floe, and hence he had considerable opportunity of observing them. They passed the greater portion of their time apparently asleep beside their holes; and he never saw them all at one time off the ice, unless alarmed by parties from the ship or by the Polar Bear. When the ice slackened away and the sheets of open water formed around the ships, the Seals used to swim near them; and occasionally at these times a few were killed. In the water they are very cautious, swimming near the hunter, gazing on him as if with feelings of curiosity and wonder; but on the ice beside their blow-hole it is almost impossible for the hunter to approach them, so much are they on the alert and so easily alarmed. In Davis's Strait it especially feeds about the base of icebergs and up the ice-fjords. The great ice-fjord at Jakobshavn is a favourite haunt of theirs; the reason for this predilection is apparently that their food is found in such localities in greater abundance. The bergs, even when aground, have a slight motion, stirring up from the bottom the Crustacea and other animals on which the Seals feed*; the native, knowing this, frequently endangers his life by venturing too near the icebergs, which not unfrequently topple over upon the eager Seal-hunter.

The old males have a most disgusting smell, which has suggested the name *fœtida*†.

Geographical Distribution &c.—In the Spitzbergen sea they appear to be confined to high latitudes, and especially to the parallels of 76° and 77° N.; and it is in these latitudes that the whalers chiefly find them. In Davis's Strait it is to be found all the year round, but particularly up the ice-fjords. Its capture constitutes the most important feature of the Seal-hunt in North Greenland; but many are also killed in South Greenland, the Neitsik figuring largely in the trade-returns of that Inspectorate. In Jakobshavn bay, I am told, they are quite numerous about the middle of August.

Economic value.—They are extensively captured for food and clothing. Notwithstanding the nauseous smell of the old ones, the flesh of all of them (but especially the younger individuals) is sufficiently palatable to an *educated* taste. During the latter end of summer and autumn it forms the principal article of food in the Danish settlements, and on it the writer of these notes and his companions dined many a time and oft; we even learned to like it and to become quite epicurean connoisseurs in all the qualities, titbits, and dishes of the well-beloved Neitsik! The skin forms the chief

* Hr. Distrikts-læge Pfaff, who has resided at Jakobshavn for many years as district Medical Officer of North Greenland, suggests this to me; and the idea recommends itself as being that of a very intelligent naturalist.

† Homer refers to this in another species (probably *Monachus albiventer*):

"Web-footed Seals forsake the stormy swell,
And sleep in herds exhaling nauseous smell."

material of clothing in North Greenland. All of the *οἱ πολλοί* dress in Neitsik breeches and jumpers; and we sojourners from a far country soon encased ourselves in the somewhat *hispid* but most comfortable Neitsik unmentionables. It is only high dignitaries, such as "Herr Inspektor," that can afford such extravagance as a Kassigiak (*Callocephalus vitulinus*) wardrobe! the Arctic *belles* monopolize them all.

(3) PAGOPHILUS GRŒNLANDICUS (Müll.), Gray.

Phoca grœnlandica, Müll.
P. oceanica, Lepech.
Callocephalus oceanicus, Less.
Phoca semilunaris, Bodd.
P. dorsata, Pallas.
P. mülleri, Less.
Callocephalus grœnlandicus, F. Cuv.
Young. *Phoca lagura*, Cuv.
Callocephalus lagurus, F. Cuv.
Phoca albicauda, Desm.
P. desmarestii, Less.
P. pilayi, Less.

Popular names.—*Saddleback* (English northern sealers); *Whitecoats* and *Bed Lampiers* (Newfoundland sealers) (young); *Harp Seal* (English authors); *Svartsida* (Norse); *Dælja*, *Dævok*, *Aine* (Lapp); *Svartsiden* (Danish, hence Egede, Grœn. p. 62); *Blaudruselur* (Icelandic); *Karoleek* and *Neitke* (Eskimo at Pond's Bay, Davis's Strait); *Atak* (Greenlanders). The same people, according to the age of the Seal, call it *Atarak*, *Aglektok* or *Uklektok*, and *Atarsoak* (hence Crantz, Grönl. i. p. 163), meaning respectively the little Seal (white), the blueside, and the large Seal, while *Atak* means merely *the* Seal (blackside) without reference to age. A variety having the belly dark also is called by the Danes in Greenland *Svart-svart-siden*. The *Uklektok* of the natives is also called by the whites *Blaa-siden* (the blueside). I shall afterwards refer to some of its other names.

There seems little doubt that the *Phoca oceanica*, Lepech.*, is identical with this species; indeed Lepechin's description is one of the best we have of the *Pagophilus grœnlandicus*. Lepechin seems to have confounded with this the young of another species, and to have erred by trusting wholly to the deceptive characters of colouring, instead of relying for its distinctive character on the more stable distinction of teeth and skull. What he says about the changes of coat in *P. oceanica* exactly agrees with what I have said regarding the present species.

Remarks.—It seems to be almost unknown to most writers on this group that the male and female of the Saddleback are of dif-

* In Sir Joseph Banks's copy of Fabricius's 'Fauna,' in the British Museum, "*Phoca oceanica*" is written (apparently in Sir Joseph's handwriting) opposite the description of *Phoca grœnlandica*.

ferent colours; this, however, has long been known to the Seal-hunters. *Male.*—The length of the male Saddleback rarely reaches 6 feet, and the most common length is 5 feet; while the female in general rarely attains that length. The colour of the male is of a tawny grey, of a lighter or darker shade in different individuals, on a slightly straw-coloured or tawny-yellowish ground, having sometimes a tendency to a reddish-brown tint, which latter colour is often seen in both males and females, but especially in the latter, in oval spots on the dorsal aspect. The pectoral and abdominal regions have a dingy or tarnished silvery hue, and are not white as generally described. But the chief characteristic, at least that which has attracted the most notice, so much as to have been the reason for giving it several names, from the peculiar appearance it was thought to present (*e.g.* "harp" Seal, "saddleback," &c.), is the dark marking or band on its dorsal and lateral aspects. This "saddle-shaped" band commences at the root of the neck posteriorly, and curves downwards and backwards at each side superior to the anterior flippers*, reaches downwards to the abdominal region, whence it curves backwards anteriorly to the posterior flippers, where it gradually disappears, reaching further in some individuals than in others. In some this band is broader than in others and more clearly impressed, while in many the markings only present an approximation, in the form of an aggregation of spots more or less isolated. The grey colour verges into a dark hue, almost a black tint, on the muzzle and flippers; but I have never seen it white on the forehead as mentioned by Fabricius. The muzzle is more prominent than in any other northern Seal.

Female.—The female is very different in appearance from the male: she is not nearly so large, rarely reaching 5 feet in length; and when fully mature her colour is a dull white or yellowish straw-colour, of a tawny hue on the back, but similar to the male on the pectoral and abdominal regions, only perhaps somewhat lighter. In some females I have seen the colour totally different; it presented a bluish or dark grey appearance on the back, with peculiar oval markings of a dark colour apparently impressed on a yellowish or reddish-brown ground. These spots are more or less numerous in different individuals. Some Seal-hunters are inclined to think this is a different species of Seal from the Saddleback, because the appearance of the skin is often so very different and so extremely beautiful when taken out of the water; yet as the females are always found among the immense flocks of the Saddleback, and as hardly two of the latter females are alike, but varying in all stages to the mature female, and on account of there being no males to mate with them, I am inclined to believe with Dr. Wallace that these are only *younger female Saddlebacks*. The muzzle and flippers of the female present the same dark-chestnut appearance as in the male.

Procreation and changes of coats in the young.—I have already

* I use this very convenient sealers' vernacular term to express the "paws," "hands," &c. of systematic authors.

spoken of the young as being different from the male; and in my remarks upon their geographical distribution and migrations reference will be made generally to their period and place of procreation, more theoretically, however, than from actual knowledge or observation. I now supply this from a study of this subject in the Spitzbergen sea. The period at which the Saddlebacks take to the ice to bring forth their young may be stated generally at between the middle of March and the middle of April, according to the state of the season &c., the most common time being about the end of March. At this time they may be seen literally covering the frozen waste as far as the eye can reach with the aid of a telescope, from the "crow's nest" at the main-royal mast-head, and have, on such occasions, been calculated to number upwards of half a million of males and females. After the females have procured suitable ice on which they may bring forth their young, the males leave them and pursue their course to the margin of the ice; there the Seal-hunters lose them, and are at a loss as to what course they take, the common opinion being that they leave for feeding-banks; but where, is unknown. They most probably direct their course along the "cant" of the ice, or among the ice where it has a loose scattered character; for in the month of May sealers fall in with the old Seals (male and female) in about from N. lat. 73° to 75°, and in the following month still further north, by which period the young ones have also joined them. The females commonly produce one at a birth, frequently two; and there is good reason for supposing that there are occasionally three, as most sealers can tell that they have often seen three young ones on a piece of ice floating about which were apparently attended by only one female. Yet it is only proper to remark that, of the several ships I have heard of finding the seals when taking the ice, none of the hunters have been able to tell me that they took more than two from the uterus of the mother*. In contradiction to the opinion of some experienced sealers, I think that it is more than probable that they produce but once a year.

(*a*) The colour after birth is a pure woolly white, which gradually assumes a beautiful yellowish tint when contrasted with the stainless purity of the Arctic snow; they are then called by the sealers "white-coats" or "whitey-coats"†; and they retain this colour until they are able to take the water (when about fourteen or twenty days old). They sleep most of this time on the surface of the snow-covered pack-ice and grow remarkably fast. At this stage they can hardly be distinguished among the icy hummocks and the snow—their colour thus acting as a protection to them; for in this state they

* Perhaps, after all, Pliny has struck the truth in regard to the order, when he says, "*Parit nunquam geminis plures*" (Hist. Nat. lib. 9. § 13).

† These are rarely seen in Danish Greenland, and then are called "Isblink" by the Danes from their colour; at least, so Fabricius says. He, moreover, informs us that the third year they are called *Aglektok* (as mentioned above), the fourth *Millaktok*, and after a winter *Kinaglit*, when they are beginning to assume the harp-shaped markings of the male (Nat. Selsk. Skrift. i. p. 92). I never heard these names in North Greenland.

are perfectly helpless, and the sealer kills them with a blow of the sharp-pointed club or a kick over the nose with his heavy boot. The mother will hold by her young until the last moment, and will even defend it to her own destruction. I have known them seize the hunter when flaying the young one, and inflict severe wounds upon him. In 1862, during a severe gale of wind many of the young seals were blown off the ice and drowned. Sometimes the sealing-ships have accidentally fallen among them during the long dark nights of the end of March or beginning of April, and were aware of their good luck only from hearing the cries of the young Seals. The white-coat changes very quickly. In 1862 the late Capt. George Deuchars, to whom science is indebted for so many specimens, brought me two alive from near Jan Mayen; they were white when brought on board, but they changed this coat to a dark one completely on the passage, of a week or ten days. They ate fresh beef, and recognized different persons quite readily. The young "whitecoat" represented on the plate of *Phoca barbata* by Dr. Hamilton ("Amphibious Carnivora," Naturalist's Library, vol. viii. pl. 5), from a specimen in the Edinburgh Museum, is not the young of that species, but of *Pagophilus grœnlandicus*. The young whitecoat, however, is much plumper than the specimen figured; indeed, in proportion to its size, it has much more blubber between the skin and the flesh than the adult animal.

(β) They take the water under the guidance of the old females. At the same time the colour of the skin begins to change to that of a dark speckled and then spotted hue; these are denominated "Hares" by the sealers*.

(γ) This colour gradually changes to a dark bluish colour on the back, while on the breast and belly it is of a dark silvery hue. Young Seals retain this appearance throughout the summer and are termed "Bluebacks" by the sealers of Spitzbergen, "Aglektok" by the Greenlanders, Blaa-siden by the Danes†.

(δ) The next stage is called Millaktok by the Greenlanders. The Seal is then approaching to its mature coat, getting more spotted, &c., and the saddle-shaped band begins to form.

(ϵ) The last stage (in the male to which these changes refer) is the assumption of the halfmoon-shaped mark on either side, or the "saddle" as it is called by the northern sealers.

I consider that about three years are sufficient to complete these changes. This is also the opinion held in Newfoundland, though the Greenland people consider that five years are necessary. I wish, however, to say that these changes do not proceed so regularly as is usually described, some of them not lasting a year, others longer, while, again, several of the changes are gone through in one year; in fact the coats are always gradually changing, though some of

* In this state it is not unlike *Halichœrus grypus*, but can be distinguished by the characters given by Nilsson, Skand. Fauna, i. p. 301.

† The dental formula of a Seal in this stage killed by me in Davis's Strait, September 1861, was:—Incisors $\frac{6}{4}$; canines $\frac{1-1}{1-1}$; molars $\frac{5-5}{5-5}$.

the more prominent ones may be retained a longer, and others a shorter time. It would require a very careful and extended study of this animal to decide on this point, which, owing to their migrations, it is impossible to give. After all, these changes and their rapidity vary according to the season and the individual, and really will not admit of other than a general description.

Habits.—It has few other characteristic habits beyond what is mentioned regarding the order generally, or in other sections of this paper on its migrations &c. It is looked upon by the Greenlanders as rather a careless, stupid Seal, easily caught by a very ordinary *kayaker*. Its food consists of any small fish (*Mallotus arcticus*, Fab., &c.), Crustacea, and even Mollusca. In this its habits agree with those of other species.

Geographical range and migrations.—The Saddleback has a wide range, being found at certain seasons of the year in almost all parts of the Arctic Ocean, from the American coasts to Nova Zembla, and perhaps even further; it appears that the *Phoca oceanica* (Lepechin, Acta Petropolitana, 1777, t. i. pp. 1, 259, t. 6, 7) is identical with it. Stragglers even find their way into temperate regions; and this is so frequently the case that this Seal may now be classed in the fauna of nearly all of the northern shores of Europe and America. The period of the year influences its position in the Spitzbergen sea (the Greenland sea of the Dutch, the "Old Greenland" of the English whalers). Early in March it is found by the sealing-ships in immense numbers in the proximity of the dreary island of Jan Mayen *, off the east coast of Greenland, not far from the 72nd parallel of north latitude; but, of course, the longitude varies with the extent which the ice stretches out to the eastward, though the common meridian is between 6° and 8° west of Greenwich. They are never found far inwards on the fixed ice, but on the margin of the icebelt which extends along the whole of the eastern shores of Greenland, stretching as far as the longitude of Iceland, and sometimes even for a hundred miles to the eastward of that island and of Jan Mayen island into the ocean. The general direction of its sea-margin is towards the north-east, stretching most commonly as far as Spitzbergen, to N. lat. 80°, but occasionally only to about 75° N. lat., where it joins at an angle another belt of ice which lies in a southern and eastern direction along the coast of Spitzbergen to Cherrie Island. This easterly belt of ice is what the whalers call a "south-east pack;" and at the angle where the two belts join, a passage can generally be accomplished through to the Spitzbergen waters. The nature of the ice, which can easily be perceived by the experienced sealer, determines whether the Seals will be found far from the margin of the ice. Thus, if there is much new light ice, it is probable that the Seals will have taken the ice at a considerable distance from the seaboard margin of the pack, as it is well known that instinctively

* Hence the Norse sealers often call it the *Jan Mayen Kobbe* (the Jan Mayen Seal), but more often the *Springer*, from its gambolling motions in the water (Newton, *l. c.*).

they select ice of a strong consistence for the safety of their young when in that helpless condition in which they are unable to take to the water. Again, they often take the ice where it stretches out to sea in the form of a long, broad promontory, with apparently this end in view, that their young may easily get to sea when able to do so; this is the great clue which guides the sealer in the choice of the ice where he may find his prey. This was very well exhibited in 1859. Dr. Wallace tells me that there was very little ice that year, and the island of Jan Mayen was altogether free from it; indeed the nearest ice lay away nearly 70 miles or more to the north-west of it. The 'Victor,' the 'Intrepid,' and a fleet of other ships met with indications of Seals in 72° N. lat., about eighty miles in a north-westerly direction from Jan Mayen, in the early part of the month of April; they had sailed in an easterly direction through a very loose pack of very heavy ice. The prospects were so good that Capt. Martin, sen., of the 'Intrepid,' perhaps the most successful sealer who ever sailed in the Greenland sea, and Capt. Anderson, of the 'Victor' (my old fellow voyageur both in the North Atlantic and North Pacific Oceans), were congratulating each other on the almost certain prospect of filling their ships (for, indeed, the old Seals had taken the ice and some had already brought forth their young), when suddenly there was a change of wind to the eastward, and before many hours it blew a hard gale from that direction. The results were that the ice was driven together into a firm pack and frozen into solid floes, and the 'Victor' and many of the best ships of the fleet got ice-bound. The Seals shifted their position towards the edge of the ice to be nearer the sea, and for seven weeks the 'Victor' was beset among ice and drifted southwards as far as N. lat. 67° 15′, having described a course of nearly 400 miles. Though I have stated the parallel of 72° N. lat. as being the peculiar whereabouts of the Seals in March, yet they have often been found at a considerable distance from it as well from Jan Mayen. Thus in 1859 they were found in considerable numbers not far from Iceland, the most northerly point of which is in N. lat. 66° 44′; this leads me to remark that the Seals are often divided into several bodies or flocks, and may be at a considerable distance from each other, although it is most common to find these smaller flocks on the skirts or at no great distance from the main body. After the young have begun to take the water in the Spitzbergen sea, they gradually direct their course to the outside streams, where they are often taken in considerable numbers on warm sunny days. When able to provide for themselves, the females gradually leave them and join the males in the north, where they are hunted by the sealers in the months of May and June; and it is especially during the latter month that the females are seen to have joined the males; for at the "old-sealing" (as this is called) in May, it has often been remarked that few or no males are seen in company with the females. Later in the year, in July, there are seen, between the parallels of 76° and 77° N., these flocks of Seals, termed by Scoresby "Seals' weddings;"

and I have found that they were composed of the old males and females and the *bluebacks*, which must have followed the old ones in the north and formed a junction with them some time in June. There is another opinion, that the old females remain and bring their young with them north; but all our facts are against such a theory (*Wallace*).

These migrations may vary with the temperature of the season, and are influenced by it; it is possible that in the Spitzbergen sea as the winter approaches they keep in advance of it and retreat southward to the limit of perpetual ice, off the coast of Greenland, somewhere near Iceland, where they spend the winter. We are, however, at a loss regarding the winter habits of these Seals in that region; here no one winters, and there are no inhabitants to note their migrations and ways of life. Different is it, however, on the Greenland shores of Davis's Strait, where in the Danish settlements the Seals form, both with the Whites and Eskimo, the staple article of food and commerce, and accordingly their habits and arrival are well known and eagerly watched. The *Atarsoak*, as it is commonly called by the Eskimo, the "Svartsidede Sælhund" (Black-sided Sealhound) of the Danes, is the most common Seal in all South Greenland. It is equally by this Seal that the Eskimo lives, and the "Kongl. Grönlandske Handel" make their commerce. In South Greenland when the Seal generally is talked of, or a good or bad year spoken about, everybody thinks of this Seal; on the other hand, in North Greenland *Pagomys fœtidus* and *Callocephalus vitulinus** are the most common. These last two species are the only Seals which can be properly said to have their home in Greenland, affecting ice-fjords and rarely going far from the coast. This is not the case with *P. grœnlandicus*; at certain times of the year they completely leave the coast; therefore the Seal-hunting in South Greenland is more dependent upon contingencies than in North Greenland. This Seal arrives regularly in September in companies travelling from the south to north, keeping among the islands; occasionally at this time individuals detach themselves from the drove and go up the inlets. The Seal at this period is fatter, and continues so until the winter time. In October and November is the great catching, lessening in December. Very few are seen in January, and in February almost none; but regularly towards the end of May they return to the south of Greenland, and in June further north. The Seal is at this time in very poor condition, and remains for the most part in the fjords. For the second time they disappear in July, again to return regularly in September†. It is therefore seen that this Seal regularly comes and goes twice a year.

* I was always under the impression that this Seal was rather rare; but as the return of its capture is not given separately from the former, it is impossible to say accurately.

† This varies a little with latitude &c.; *e.g.* this Seal leaves the vicinity of Jakobshavn ice-fjord about the middle of July or beginning of August, and comes back in October very fat. In August and September there are none on that part of the coast.

Every one knows when it commences its migration from the south to the north, but nobody knows where the Seal goes to when it disappears off the coast. Between the time they leave the coast in the spring and return in the summer they beget their young; and this seems to be accomplished on the pack-ice a great distance from land*, viz. in the Spitzbergen sea. It is at this period that the Seal-ships come after them, as referred to already. Of course a few stragglers occasionally do not leave the coast, and produce their young close to the land; but such exceptions do not at all affect the rule laid down. It is a very familiar fact that round the Spitzbergen seas in April the sealers get the best catch. At this season they accumulate in immense numbers on the pack and can be killed *en masse*; but Dr. Rink cannot believe that in this time the Seals could migrate from the west coast of Greenland to Spitzbergen, the distance being too great. In support of this argument, it is pointed out that in the winter the Seal goes in the opposite direction to that of Spitzbergen, and cannot be seen in the northern parts of Davis's Strait or Baffin's Bay; it is possible therefore, he thinks, that the Seals of Baffin's Bay go in the spring down the west side of Davis's Strait to Newfoundland and Labrador, and supply the bulk of those killed there at that season, that in the winter they cross Davis's Strait and beget their young in that region, and after this cross again to the southern portion of Greenland. One would think that if the Seals came from Spitzbergen there would at this season be great numbers met on the passage round Cape Farewell. At other seasons of the year it is certainly the abundance or otherwise of their food which determines which way the Seal will take. In June the Seals go to feed on fish up the fjords; but what way they go in July, and where they may be in August, is still a matter of doubt. It is often argued in Greenland that in the "old times" Seals were more numerous than now, and that the great slaughter by the European sealers in Spitzbergen and Newfoundland has decreased their numbers on the shores of Greenland. The worthy Inspector of south Greenland therefore rejoices that the recent failures of the Seal-hunting in the former localities will have a tendency to again increase their numbers in Davis's Strait and Baffin's Bay, and thereby bring an increase of prosperity to his hyperborean subjects.

Economic value and hunting.—To the Greenlander this Seal is of vast importance for its oil, flesh, and hide. One full-grown animal will weigh on an average about 230 lbs., of which the skin and blubber weigh 100 lbs., and the meat 93 lbs., the remainder being the head, blood, and entrails. The edible parts may therefore be said to reach the amount of 100 lbs.; but this weight also includes the bones. The blubber of one at the latter part of the year would probably fill about one-third of a cask, but would not yield over a fourth part of that quantity when the animals return in the spring after procreating. The yearly catch in the Danish settlements is estimated at 36,000†.

* Rink, *lib. cit.*, et O. Fabricius in Nat. Selsk. Skrift. *l. c.*

† *Fide* Rink, *l. c.*

(4) PHOCA BARBATA, O. Fab.

Callocephalus barbatus, F. Cuv.
Phoca leporina, Lepech.?
Callocephalus leporinus, F. Cuv.

Popular names.—*Hafert skäl* (Swedish)*; *Ajne* (Lapp); *Ursuk* (so written by Fab., but in north Greenland always pronounced *oo-sook*)† (Greenland). It is also called *Takamugak*; but I never heard the term applied; so that it must be rarely used.

What the "great Seals" of Pennant and other authors are has yet to be investigated; they were originally all set down to be this species, but are now generally supposed to belong to the Grey Seal (*Halichœrus grypus*). The skeleton in the Edinburgh museum at once decides that the *Haaffish* of Shetland and Orkney, which Dr. Fleming referred to *P. barbata*, belongs to the former species. The male is there called the "Bullfish." The *Tapvaist* of the western islands of Scotland appears also to belong to that species, *H. grypus* being a common Seal among the Hebrides.

Descriptive remarks &c.—Next to the Walrus this is the largest species of the order found in the northern seas. Perhaps, however, *H. grypus* may occasionally be found to equal it in size.

Geographical distribution &c.—This species has been so often confounded with the Grey Seal (*H. grypus*) and the Saddleback (*P. grœnlandicus*) in different stages and coats, that it is really very difficult to arrive at anything like a true knowledge of its distribution. In a note at the end of the notice of this species I shall have something to say regarding the probability of its identity with the Ground-Seal of the English Seal-hunters of the Spitzbergen sea. On the coast of Danish Greenland it is principally caught in the district of Julianshaab a little time before the Klapmyds. It is not, however, confined to South Greenland, but is found at the very head of Baffin's Bay, and up the sounds of Lancaster, Eclipse, &c. branching off from the latter sea. The Seals seen by the earlier navigators being nearly always referred in their accounts to either *Phoca vitulina* or *P. grœnlandicus* renders it at present almost impossible to trace its western range; it is, however, much rarer in the north than in the south of Davis's Strait. Accordingly the natives of the former region are obliged to buy the skin from the natives of the more southern settlements, as it is of the utmost value to them. This Seal comes with the pack-ice round Cape Farewell, and is only found on the coast in the spring. Unlike the other Seals, it has no *atluk*, but depends on broken places in the ice; it is generally found among loose broken ice and breaking-up floes.

Economic value &c.—This animal is of great importance to the Eskimo; they cut the skin into long strips for harpoon-lines—a *sine*

* Newton (*l. c.*) says that this is the Seal known to the Norse hunters about Spitzbergen as the *Stor-kobbe* (Great Seal), and less seldom *Blaa-kobbe* (the Blue Seal).

† *Oosook* also means blubber. The name may possibly refer to the size or fatness of the animal, and mean "the *big, fat Seal*."

quâ non of every *kayak*. Out of every hide can be got four or five lines; and these are cut in a circular form off the animal before it is skinned; after this the lines are dried. These *allunaks* are very strong, and are applied to all sorts of purposes in Greenland travelling. The blubber is more delicate in taste than any other, and is accordingly more prized as a culinary dainty, when such can be afforded. There are only from 400 to 600 caught annually (*Rink, l. c.*).

Talking with Spitzbergen sealers, I used to hear much about the "Ground-Seal," which formed a part of their prey. I was, however, unfortunate enough not to meet with a specimen, the spring of my visit to those seas being what is called "a bad sealing-year;" and subsequently during my various voyagings in Davis's Straits and Baffin's Bay I failed to find one which could be pronounced to be the "Ground-Seal" of the Seal-hunters. I find, again, among Dr. Wallace's notes, very particular mention made of this species; and he seems to consider it distinct from all other species found in the Northern seas, and distinguishes it by the MS. name of *Phoca grœnlandica major*. It does not appear that he was acquainted with *P. barbata*; or, at least, it is not mentioned among his otherwise exact memoranda. What I learned regarding it agrees very closely with what he has said about it; I therefore will quote from his manuscript *verbatim*:—

"*Phoca grœnlandica major*. It is the 'Ground-Seal' of the sealers. Like the last-mentioned species [*Pagomys fœtidus*] few of them are taken by the sealers; and they are mostly seen by the Spitzbergen whalers in high latitudes, especially from the parallel of 76° N. lat. as far as Spitzbergen itself. The length of the male is about eight feet, and the female upwards of six feet. The colour and peculiar markings of the male very much resemble those of the male Saddleback; but in appearance it is more robust and of greater girth for its length, while upon the whole the shade of its colour is darker and yellowish, or coppery colour, more distinct. The full-grown female also, to a certain extent, corresponds to the female Saddleback, but with her colour of a deeper tawny yellow. Two females which I saw killed had still the dark-chestnut hue on the back which characterizes the younger Seals, but in addition had the peculiar round and oval spots of a still deeper shade impressed on a yellowish ground; it seems probable that they were in a transition stage in regard to colour, and that the tawny yellow would gradually gain predominance as they advanced in age towards maturity. Lepechin describes a Seal which frequents the White and Spitzbergen seas which bears a great resemblance to the female of this species; in fact his description of the *Phoca leporina*, or 'Hare of the Sea' of the Russians, almost identifies it with the Ground-Seal (female). The habits of the *P. grœnlandica major* and the localities it frequents very clearly differ from those of *P. grœnlandica*, Müll., which, as above mentioned, with the exception of size, it so much resembles. Its most common retreat is on the floe and fixed ice. I have seen herds, numbering upwards of two or three hundred, lying at their ease close besides their 'blow-holes,' down which they would immediately

dive when the hunter attempted to approach them. Occasionally they come to the borders of the ice, as in 1859 a few were secured in N. lat. 79° on a heavy stream of ice, and in about lat. 75° and 76° I have seen considerable numbers in the bottom of deep 'bights' of the ice lying on the 'sailing ice;' and, indeed, in open years, when ships can penetrate through towards Shannon Isle and the 'west land' (the east coast of Greenland), these localities are found to be peculiarly frequented by the 'Bladdernose' and 'Ground-Seals.'"

I should scarcely have hesitated to identify this Seal with *Pagophilus grœnlandicus*, had not Dr. Wallace so expressly stated that it is not that species; and the whalers, who are very familiar with the "Saddleback," have not only distinguished it from that species, but applied a very familiar distinctive name to it. It is just possible that it is the *Phoca leporina* of Lepechin, which is usually classed as a synonym of *Phoca barbata*, O. Fab. (though it ought to be remarked that in such a case Lepechin's name ought to take priority of Otho Fabricius's, the one having been applied in the year 1778, while the other was not published until 1780), or that *Phoca leporina* is a good species—a conjecture which without skulls it is impossible to be certain of. Wallace does not mention the saddle-shaped mark on the back of the male (nor do my notes mention it as being found) of the Ground-Seal; so that the principal stumblingblock is removed to its being classed with *Phoca barbata*. Lepechin, no doubt (Acta Acad. Scient. Imp. Petropol. 1778, vol. iv. p. 264, tabb. viii., ix.), says that there are no spots on his Seal; but Wallace remarks that these may go off as the animal increases in age. At all events it is a subject of regret that a skull, which would have at once settled the point, was not brought. Leaving England very shortly after receiving these notes, and arriving home myself, I was unable to obtain a specimen. Again this spring, on taking up the subject of the Greenland Seals anew, I was so puzzled with this "Ground-Seal" that I had determined to make a short trip to the Spitzbergen sea again with a view to obtaining specimens, but, owing to an unforeseen accident, could not accomplish my purpose. I have, however, been promised that next year specimens shall be brought me. My experience, however, of these promises does not lead me to build any great expectations thereon; however, until that time at least, the specific determination of the "Ground-Seal" must, I fear, remain in abeyance.

(5) Halichœrus grypus, O. Fab.

Phoca grypus (den Krumsnudede sæl), O. Fab.
Halichœrus griseus, Nilss.
Halichœrus grypus, Nilss.
Phoca gryphus, Licht.
Phoca halichœrus, Thienem.
Phoca thienemanni, Less. (young).
Phoca scopulicola, Thienem. (young, *fide* Gray).

Popular names.—*Grey Seal* (English naturalists); *Graskäl* (or Grey Seal of the Scandinavian naturalists); *Ståtskäl* (Œdm. *l. c.*);

Graskäl (Swedish); *Sjöskäl*, *Utskärsskäl*, and *Krumnos* (various Scandinavian local names); *Tapvaist*? (western islands of Scotland); *Haaffish* (northern islands of Scotland).

General remarks.—The Grey Seal has no doubt been frequently confounded with other species, particularly *Phoca barbata* and the female of *Pagophilus grœnlandicus*.

It does not seem to frequent the high seas, though possibly this species may be confounded with the "Ground-Seal" and some forms of the "Saddleback." It is said to produce on the coast of Sweden in February, and to have one pup at a birth, of a white colour, which attains the dark-grey colour of the adult species in about fourteen days. In 1861, a little south of Disco Island, we killed a Seal the skull of which proved it to be of this species; and again this summer I saw a number of skins in Egedesminde and other settlements about Disco Bay which appeared to be of this species. Though the natives do not seem to have any name for it, the Danish traders with whom I talked were of opinion that the *Graskäl*, with which they were acquainted as an inhabitant of the Cattegat, occasionally visited South and the more southerly northern portions of Greenland with the herds of *Atak* (*P. grœnlandicus*).

The skull to which I refer, though carefully examined at the time, was afterwards accidentally destroyed by a young Polar Bear, which formed one of our ship's company on that northern voyage; therefore, though perfectly convinced of its being entitled to be classed as a member of the Greenland fauna, I am not in a position to assert this with more confidence than as being a very strong probability. It should be carefully looked for among the herds of *P. grœnlandicus* when they arrive on the coast. Its hunting forms nowhere an important branch of industry; it is, however, killed on the Scandinavian coasts, at various places, where it is most abundant. A large Grey Seal about eight feet in length will yield (the Swedes say) about 12 lispunds of blubber, equal in value to 36 rigsdaler banco (Swedish); and the hide, which is as large as an ox-hide, will bring the value of such a Seal up to the sum of 60 rigsdaler banco (Swedish)*. I have seen and examined this Seal in various collections, and have seen it alive on the coasts of the Cattegat, &c., and among the northern islands of Scotland, but can add nothing of additional value to the excellent account of Nilsson in his 'Skandinaviske Fauna' (Forsta Delen, Däggdjuren, 1847), pp. 298–310.

(6) Trichechus rosmarus, Linn.

Trichechus rosmarus, Linn.
Rosmarus arcticus, Pall.
Trichechus obesus et *T. divergens*, Ill. (*fide* Gray).
Odobœnus rosmarus (L.), Sundeval, Uebers. der Verhandl. der Akad. der Wiss. 1859, p. 441.

* In the kjökkenmödding of Denmark, in company with remains of the *Castor fiber* and *Bos primigenius* are found those of *Halichœrus grypus*, showing it to have been at one time sufficiently abundant to form part of the food of the primitive inhabitants of Scandinavia.

Popular names.—*Sea-horse* (English sailors); *Walrus* and *Morse* (Russ., English naturalists and authors); *Hvalross* (Swedish and Danish); *Havhest* (Sea-horse) and *Rosmar* (Norse); *Morsk* (Lapp); *Awŭk* (Greenlanders and Eskimo generally): this word is pronounced *āōŏk* and (like many savage names of animals) is derived from the peculiar sound it utters, a guttural *āōŏk*! *āōŏk*!

General descriptive remarks.—The general form of the Walrus is familiar enough. However, specimens in museums and the miserably woebegone cubs which have been already twice brought to this country but poorly represent the Walrus in its native haunts. The skin of the forehead (in stuffed specimens) is generally dried to the skull; while in the live animal it is full, and the cheeks tumid. The skin of old animals is generally wrinkled and gnarled. I have seen an old Walrus quite spotted with leprous-looking marks consisting of irregular tubercular-looking white cartilaginous hairless blotches; they appeared to be the cicatrices of wounds inflicted at different times by ice, the claws of the Polar Bear, or met with in the wear and tear of the rough-and-tumble life a Sea-horse must lead in N. lat. 74°. The very circumstantial account of the number of mystachial bristles given in some accounts is most erroneous; they vary in the number of rows and in the number in each row in almost every specimen. They are elevated on a minute tubercle, and the spaces between these bristles are covered with downy whitish hair. I have seen several young Walruses in all stages, from birth until approaching the adult stage, and never yet saw them of a black colour, and should have been inclined to look upon as unfounded the statement that they are so, had it not been for the high authority of its author*. All I saw were of the ordinary brown colour, though, like most animals, they get lighter as they grow old. Neither are the muffle, palm, and soles "hairy when young;" in one which I examined before it was able to take the water I saw no difference between it and its mother in this respect. The Walrus appears to cast its nails; for in several which I examined about the same time (viz. in August) most of the nails which had been developed were gone, and young ones beginning to appear. The dentition has been examined by M^c^Gillivray†, Rapp‡, Owen §, Peters‖, &c.; so that I need only touch upon that. In an aged male which I examined at Scott's Inlet, Davis's Strait, August 3, 1861, the small fifth molar on the right side of the upper jaw still remained, but loose; on the other side the corresponding alveolus was not yet absorbed.

Shaw (Gen. Zool. i. p. 234) has figured two species of this animal, and inferred their existence principally from the differences in the representations given by Johnston and Cook. Curiously enough, Pontopiddan tells us that the Norwegian fishermen in his day had

* Gray, Cat. Seals and Whales in Brit. Mus. 2nd ed. p. 36.

† *Loc. cit. anteà.*

‡ Bull. Sc. Nat. xvii. p. 280.

§ Proc. Zool. Soc. 1853, p. 103.

‖ Monatsber. der Akad. der Wiss. zu Berlin, Dec. 1864, p. 685; transl. Annals Nat. Hist. xv. (3rd series) p. 355.

an idea that there were two species. The whalers declare that the female Walrus is without tusks; I have certainly seen females without them, but, again, others with both well developed. In this respect it may be similar to the female Narwhal, which has occasionally no "horn" developed; I do not think, however, that there is more than one species of Walrus in the Arctic regions or elsewhere.

Habits and food.—On the floes, lying over soundings and shoals, the Walruses often accumulate in immense numbers, and lie huddled upon the ice. More frequently, in Davis's Strait and Baffin's Bay, they are found floating about on pieces of drift ice, in small family parties of six or seven; and I have even seen only one lying asleep on the ice. Whether in large or small parties, one is always on the watch, as was long ago observed by the sagacious Cook: the watch, on the approach of danger, will rouse those next to them; and the alarm being spread, presently the whole herd will be on the *qui vive*. When attacked, unlike the other Seals (unless it be the *Cystophora*), it will not retreat, but boldly meet its enemies. I was one of a party in a boat which harpooned a solitary Walrus asleep on a piece of ice. It immediately dived, but presently arose, and, notwithstanding all our exertions with lance, axe, and rifle, stove in the bows of the boat; indeed we were only too glad to cut the line adrift and save ourselves on the floe which the Walrus had left, until assistance could reach us. Luckily for us the enraged Morse was magnanimous enough not to attack its chop-fallen enemies, but made off grunting indignantly, with a gun-harpoon and new whale-line dangling from its bleeding flanks. Its *atluk* or breathing-hole is cleanly finished, like that of the Seals, but in much thicker ice, and the radiating lines of fracture much more marked*. The food of the Walrus has long been a matter of dispute, some writers, such as Schreber, Fischer, and others, going so far as to deny its being carnivorous at all, because Fischer saw in the stomach of one "long branches of seaweed, *Fucus digitatus*;" and Mr. Bell seems even to doubt whether the small number of grinding-teeth, and more especially their extreme shortness and rounded form, are not rather calculated to bruise the half-pulpy mass of marine vegetables than to hold and pierce the fish's scaly cuirass. I have generally found in its stomach various species of shelled Mollusca, chiefly *Mya truncata*, a bivalve very common in the Arctic regions on banks and shoals, and a quantity of green slimy matter which I took to be decomposed Algæ which had accidentally found their way into its stomach through being attached to the shells of the Mollusca of which the food of the Walrus chiefly consists. I cannot say that I ever saw any vegetable matter in its stomach which could be decided to have been taken in as food, or which could be distinguished as such. As for its not being carnivorous, if further proof were necessary I have only to add that whenever it was killed near where a Whale's carcass had been let

* There are many interesting details of the habits of the Walrus in Kane's 'Arctic Explorations' and 'First Grinnel Expedition,' in Hayes's 'Boat Journey' and 'Open Polar Sea,' and in Belcher's 'Last of the Arctic Voyages.'

adrift its stomach was invariably found *crammed* full of the *krang* or flesh of that Cetacean. As for its not being able to hold the slippery cuirass of a fish, I fear the distinguished author of 'The British Mammalia' is in error. The Narwhal, which is even less fitted in its want of dentition for an ichthyophagous existence, lives almost entirely upon platichthyoid fishes and Cephalopoda. Finally the *experimentum crucis* has been performed, in the fact that fish have been taken out of its stomach; and a most trustworthy man, the captain of a Norwegian sealer, has assured me (without possessing any theory on the subject) that he has seen one rise out of the water with a fish in its mouth*. In its stomach I have often seen small stones or gravel; and round its *atluk* considerable quantities are always seen: this is a habit which it possesses in common with *Phoca barbata* and even *Beluga catodon*. These stones may be taken in accidentally, but still they may serve some purpose in its digestive economy.

Next to man, its chief enemy is the Polar Bear. The Eskimo used to tell many tales of their battles; and though I have never been fortunate enough to see any of these scenes, yet I have heard the whalers give most circumstantial accounts of the Walrus drowning the Bear, &c. These accounts may be taken merely for what they are worth; but still this shows that they are not wholly confined to Eskimo fable, and ought therefore not to be hastily thrown aside. There is no doubt, however, that the Bear and the Walrus are (like all the Pinnipedia) but indifferent friends. Another pest I believe I discovered upon this animal for the first time, in 1861, in the shape of two undescribed species of *Hæmatopinus*, one invariably infesting the base of the mystachial bristles, and the other its body. I also found the Seals of Davis's Strait much troubled with another species (*Hæmatopinus phocæ*, Lucas)†. I have seen the Walrus *awuking* loudly on the ice, tumbling about, and rushing back from the water to the ice, and from the ice to the water, and then swimming off to another piece, and repeating the same operation as if in pain. A few hours afterwards I saw a flock of *Saxicola œnanthe* (it was on a land-floe, close to the Fru Islands) alight on the spot. On going over, I found the ice speckled with one of these species of *Hæmatopinus*, on which the birds had been feeding; and the unfortunate Walrus seems to have been in the throes of clearing itself of these troublesome friends, after the approved fashion. Subsequently I have seen these and other small birds alight on the back of the Walrus to peck at these insects, just as crows may be seen sitting on the backs of cattle in our fields. Its tusks it apparently uses to dig up the molluscous food on which it chiefly subsists; and I have seen it also use them to drag up its huge body on to the ice. In moving on shore it aids its clumsy progression by their means.

* The young specimen which died this spring in the Society's Gardens was in a very poor condition, and afforded but an indifferent notion of the lion-like *Awuk* which destroyed our boat in Scott's Inlet.

† Proc. Roy. Phys. Soc. Edin. 1863.

The Walrus, being an animal of considerable cerebral development, is capable of being readily domesticated. For many years past the Norwegians have frequently brought specimens to different Scandinavian ports; and two have reached England, and survived a short time. More than a century ago one of these animals reached England. De Laet*, quoting from Edward Worst, who saw one of them alive in England which was three months old and had been brought from Nova Zembla, says :—"Every day it was put into water for a short time, but it always seemed happy to return to dry ground. It was about the size of a calf, and could open and shut its nostrils at pleasure. It grunted like a wild Boar, and sometimes cried with a strong deep voice. It was fed with oats and millet, which it rather sucked in than masticated. It was not without difficulty that it approached its master; but it attempted to follow him, especially when it had the prospect of receiving nourishment at his hand." Its naturalization in our Zoological Gardens having therefore become a subject of considerable interest, I cannot better conclude these notes on the habits of the Walrus than by describing a young one I saw on board a ship in Davis's Strait, in 1861, and which, had it survived, was intended for the Zoological Society.

It was caught near the Duck-Islands off the coast of North Greenland, and at the same time its mother was killed; it was then sucking, and too young to take the water, so that it fell an easy prey to its captors. It could only have been pupped a very few hours. It was then 3 feet in length, but already the canine tusks were beginning to cut the gums. When I first saw it, it was grunting about the deck, sucking a piece of its mother's blubber, or sucking the skin which lay on deck, at the place where the teats were. It was subsequently fed on oatmeal and water and pea-soup, and seemed to thrive upon this *outré* nourishment. No fish could be got for it; and the only animal food which it obtained was a little freshened beef or pork, or Bear's flesh, which it readily ate. It had its likes and dislikes, and its favourites on board, whom it instantly recognized. It became exceedingly irritated if a newspaper was shaken in its face, when it would run open-mouthed all over the deck after the perpetrator of this literary outrage. When a "fall"† was called it would immediately run at a clumsy rate (about one and a half or two miles an hour), first into the surgeon's cabin, then into the captain's (being on a level with the quarterdeck), apparently to see if they were up, and then out again, grunting all about the deck in a most excited manner "*awuk*! *awuk*!" When the men were "sallying"‡, it would imitate the operation, though clumsily, rarely managing to get more than its own length before it required to turn again. It lay

* Description des Indes Occidentales, *apud* Buffon.

† When a boat gets "fast" to a Whale, all the rest of the crew run shouting about the decks, as they get the other boats out, "a fall! a fall!" It is apparently derived from the Dutch word "Val," a Whale.

‡ When a ship gets impeded by loose ice gathering around it, the crew rush in a body from side to side so as to loosen it, by swaying the vessel from beam to beam. This is called "sallying the ship."

during the day basking in the sun, lazily tossing its flippers in the air, and appeared perfectly at home and not at all inclined to change its condition. One day the captain tried it in the water for the first time; but it was quite awkward and got under the floe, whence it was unable to extricate itself, until, guided by its piteous "*awuking*," its master went out on the ice and called it by name, when it immediately came out from under the ice and was, to its great joy, safely assisted on board again, apparently heartily sick of its mother element. After surviving for more than three months, it died, just before the vessel left for England. As I was not near at the time, I was unable to make a dissection in order to learn the cause of death.

Regarding the debated subject of the attitude of the Walrus * I am not in a position to say more than my own notes taken at the time will allow of; I saw none last summer, and I am afraid to trust to a treacherous memory on such a matter. The entries in my diary, however, are explicit enough on the point so far as relates to this young individual; and I presume that its habits are to be taken as a criterion of those of the old one. When asleep in the upturned cask which served it for a kennel, it lay with both fore and hind flippers extended. When *walking* it moved like any other quadruped, but with its *hind flippers heel first*, the *fore flippers* moving in the ordinary way, *toes first*. I am aware that this is in contradiction to the observations of an eminent zoologist; I, however, merely copy what was expressly noted down at the time. It ought also to be mentioned that, in the excellent figures of the Walrus taken by the artist of the Swedish Expedition to Spitzbergen†, under the direction of such well-informed naturalists as Torell, Malmgren, Smitt, Goes, Blomstrand, &c., the fore flippers are represented as rather doubled back, and the hind flippers extended.

Geographical distribution.—The Walrus is an animal essentially of the coast, and not of the high seas. Whenever it is found at any distance from land it is almost always on shoals, where it can obtain the Mollusca which form the bulk of its food. The Seal-hunters never see it, nor is it found among the flocks of Seals on the Spitzbergen and Jan Mayen pack-ice. It is found all along the circumpolar shores of Asia, America, and Europe, sometimes extending into the subpolar, and even stragglers find their way into the temperate regions of America, Asia, and Europe. It is not unlikely that it may even be found in the Antarctic regions. On the north-west coast of America I have known it to come as far south as 50° N. lat. The Indians along the shores of Alaska (lately Russian America) carve the teeth into many fanciful ornaments‡; but we should be liable to

* Gray, Proc. Zool. Soc. 1853, p. 112.

† *Lib. cit.*, facing p. 169 (chromolithograph), and head p. 308, both drawn by Herr von Yhlen.

‡ My friend Mr. A. G. Dallas, late Governor-General of the Hudson's Bay Company's Territories, has a bust of himself beautifully carved out of a Walrus-tooth, by a Tsimpshean Indian at Fort Simpson, B.C.

fall into an error from seeing these teeth among the natives so far south, if we did not know that they are bartered from the more northern tribes. On the American Atlantic seaboard they come as far south as the Gulf of St. Lawrence, and stragglers even further. In Lord Shuldham's day they assembled on the Magdalene Islands in that gulf, to the number of 7000 or 8000; and sometimes as many as 1600 were killed (or rather slaughtered) at one onset by the hunters who pursued them*. It has been killed several times on the British coast; and I suspect that it is not an unfrequent visitor to our less-frequented shores. Perhaps not a few of the "Sea-horses" and "Sea-cows" which every now and again terrify the fishermen on the shores of the wild western Scottish lochs, and get embalmed among their folklore, may be the Walrus. In addition to those already recorded I know of one which was seen in Orkney, in 1857, and another the Shetland fishermen told me had been seen in the Nor' Isles about the same time. There is, however, some ground for believing that at one time it was, if not a regular member of our fauna, at least a very frequent visitor. Hector Boece (or Boethius, as his name has been Latinized), in his quaint 'Cronikles of Scotland,' mentions it towards the end of the fifteenth century as one of the regular inhabitants of our shores; and old Roman historians describe the horse-gear and arms of the ancient Britons as ornamented with bright polished ivory. It is difficult to suppose that this could have been anything else but the carved tusks of the Walrus. It is not, however, without the bounds of possibility that this might have been some of the African Elephants' ivory which the Phœnician traders bartered for tin with the natives of the Cassiterides. Except for its occasional movements from one portion of its feeding-ground to the other, the Walrus cannot be classed among the migratory animals. In Greenland it is found all the year round, but not south of Rifkol, in lat. 65°. In an inlet called Irsortok it collects in considerable numbers, to the terror of the natives who have to pass that way; and not unfrequently kayakers who have gone "express," have to return again, being afraid of the threatening aspect of "Awuk." A voyager has well remarked that "*Awuk*" is the lion of the Danish Eskimo; they always speak of him with the most profound respect! It has been found as far north as the Eskimo live, or explorers have gone. On the western shores of Davis's Strait, it is not uncommon about Pond's, Scott's, and Home Bays, and is killed in considerable numbers by the natives. It is not now found in such numbers as it once was; and no reasonable man who sees the slaughter to which it is subject in Spitzbergen and elsewhere can doubt that its days are numbered. It has already become extinct in several places where it was once common. Its utter extinction is a foregone conclusion. Von Baer has studied its distribution in the Arctic sea; and, so far as they go, his memoir and map may be relied on; both, however, require considerable modifications†.

* *Apud* Pennant, 'Arctic Zoology,' p. 149.

† Mémoires de l'Académie de St. Pétersbourg, t. iv. p. 97, t. 4 (1836).

Economic value and hunting.—The ivory tusks of the Walrus always command a good price in the market; and the hides are held in high value as an article of commerce; they are used as material for defending the yards and rigging of ships from chafing. It is also occasionally used for strong bands in various machinery, carriage-making, &c. The flesh tastes something like coarse beef. The whalers rarely or ever use it, having a strong prejudice against it in common with that of Seals and Whales. The Walrus-hunters in Spitzbergen almost exist upon it; and the Eskimo high up in Smith's Sound look upon it as their staple article of food. The American explorers who wintered there soon acquired a liking for it. Accordingly the "Morsk" has been hunted in northern regions from a very early period. The Icelandic Sagas (such as the *Speculum regale* &c.) speak of it as *Rostungur*; and there is said to be a letter in the library of the Vatican proving that the old Norse and Icelandic colonists in Greenland paid their "Peter's Pence" in the shape of Walrus-tusks and hides. However, in 890, as far back as the days of King Alfred of England, Œthere, "the old sea-captain who dwelt in Helgoland," gave a most circumstantial account to that monarch (who wrote it down in his *Orosius*) of slaying, he and his six companions, no less than "three score Horse-whales" in one day. At the present period it is principally captured in Spitzbergen by Russian and Norwegian hunters, who visit that island for the purpose. In Danish Greenland, though it was once so abundant that the principle article of trade with Europe, in the days of Erik Raude's colonists, was the tusks of this animal, it may be said now-a-days, so far as its hunting or commercial value is concerned, to be extinct. There are never more than a few killed yearly, and it frequently happens that a year passes without any at all being killed within the limits of the Danish trading-posts. It is more than probable that they never were abundant in South Greenland, but that the old colonists went north in pursuit of them. From the Runic column found on the island of Kingatarsoak in 73° N. lat., we know that these enterprising rovers did sail far north; and it is more than reasonable to suppose that it was on one of these Walrus-hunting expeditions that this monument was erected. Indeed so few are now killed in Danish Greenland (whether through degeneracy of the hunters or scarcity of the Walrus it is scarcely worth inquiring too closely) that as, notwithstanding all the appliances of European civilization now accessible to the natives, ivory cannot be dispensed with in the manufacture of Eskimo implements of the chase, its tusks have sometimes to be reimported from Europe into Greenland. North of the glaciers of Melville Bay, the hardy Arctic highlanders, aided by no *kayak* or rifle, but with a manly self-reliance, enfeebled by no bastard civilization engrafted upon their pristine savagedom, with their harpoon and *allunaks* still boldly attack the Walrus as he lies huddled upon the ice foot; and thereby the native supplies to his family the food and light which make tolerable the darkness of the long Arctic night of Smith's Sound. The whalers kill a few annually, striking them, as they do the Whale, with the gun-harpoon, and killing them with

steel lances*; but even then it is dangerous work, and not unfrequently brings the hunter to grief. I have been one of a party who have killed several in this manner, and have also seen them captured by the wild Eskimo at Pond's Bay, on the western shores of Davis's Strait, after the aboriginal fashion; but as this has been excellently described by Kane† and Hayes‡ in their different narratives, I will not trouble you with any details. The Swedish expedition to Spitzbergen §, and Lord Dufferin‖ and Mr. Lamont¶, have given many particulars of its capture by the Spitzbergen hunters. Baron Wrangell** has supplied an account of its chase on different portions of the Siberian coasts; and Nilsson†† and Keilhau‡‡ complete the list of the principal writers regarding its hunting and commercial importance generally. As I can add nothing of any novelty to their descriptions, you will therefore allow me to refer to them for the particulars which otherwise might have been given under this paragraphic heading.

(7) Cystophora cristata (Erxleb.), Nilss.

Phoca cristata, Erxleb.
Phoca leonina, O. Fab. (non Linn.).
Phoca mitrata, Milbert (Cuv.).
Phoca leucopla, Thienem.
Phoca cucullata, Bodd.
Phoca dimidiata, Cretzsch. (*fide* Rüpp.).
Phoca isidorei, Less.
Mirounga cristata, Gray.
Cystophora cristata, Nilss.
Cystophora borealis, Nilss.
Stemmatopus cristatus, F. Cuv.
Stemmatopus mitratus, Gray.

Popular names.—"*Bladdernose*" or, shortly, "Bladder" (of northern sealers, Spitzbergen sea); *Klappmysta* (Swedish); *Klakkekal*, *Kabbutskobbe* (Northern Norse); *Kiknebb* (Finnish); *Avjor*, *Fatte-Nuorjo*, and *Oaado* (Lapp); *Klapmyds* (Danish; hence Egede, Grönl. p. 46: the word *Klapmyssen*, used by him on page 62 of the same work, Engl. trans., and supposed by some commentators to be another name, means only *the* Klapmyds, according to the Danish orthography); *Klapmütze* (German; hence Crantz, Grönl. i. p. 125: I have also occasionally heard the English sealers call it by this

* The ordinary rifle is of comparatively little use in hunting this monster Seal. Musket-balls will scarcely affect their pachydermatous side; and I have often seen leaden balls flattened on their skulls! I have more than once seen it snap a steel lance in two with its powerful molars.

† Arctic Explorations.

‡ 'The Open Polar Sea,' and 'An Arctic Boat-voyage.'

§ Svenska Expeditionen til Spetsbergen år 1861, &c., pp. 168–182.

‖ Letters from High Latitudes.

¶ Seasons with the Sea-horses.

** Nordküste von Sibirien, ii. pp. 319, 320.

†† *Lib. cit.* i. pp. 320–325.

‡‡ Reise i Ost- og Vest-Finnmarken &c. pp. 146–149.

name, apparently learnt from the Dutch and German sailors). All of these words mean the "Seal with a *cap* on," and are derived from the Dutch, who style the frontal appendage of this species a *mutz* or cap, hence the Scotch *mutch*. This prominent characteristic of the Seal is also commemorated in various popular names certain writers have applied to it, such as *Blas-Skäl* (Bladder-Seal) by Nilsson (Skand. Faun. i. p. 312), *Hooded Seal* by Pennant (Synopsis, p. 342), *Seal with a caul* by Ellis (Hudson Bay, p. 134), in the French vernacular *Phoque à capuchon*, and in the sealers' name of *Bladdernose*, *Neitersoak* (Greenland), and *Kakortak* (when two years old).

Descriptive remarks.—This is one of the largest Seals in Greenland, and in its adult state is at once distinguished by the curious bladder-like appendage to its forehead, which is connected with the nostrils and can be blown up at will *. This has been well described by Dr. Dekay in the 'Annals of the Lyceum of Natural History of New York,' vol. i.; and with his observations I perfectly agree. The eye of this Seal is large, and of a glassy black colour with a dark-brown iris. It has, like all the family, no external auricle; and the orifice of the ear is very small. The body is long and robust; its colour on the upper or dorsal aspect is dark chesnut or black, with a greater or less number of round or oval markings of a still deeper hue. The hair is long and somewhat erect, and the thick fur-like coating next the skin is often tinged with a reddish coppery colour. The head and flippers are of the same dark chesnut-colour. The pectoral and ventral regions are of the same dark-grey or tarnished-silvery hue which has been described in the *P. grœnlandicus*.

Habits &c.—The Bladdernose is not only one of the largest, but the fiercest of the northern Seals; and as its capture requires some skill, it is only the most expert *kayaker* that can procure any. It will chase a man and bite him, besides making a great commotion in the water. Therefore the hunt is very dangerous to a man in such a frail craft as the Greenland *kayak*. Like all Seals, during the rutting-time, there are great battles on the ice between the males; and the roaring is said to be sometimes so loud that it can be heard four miles off. The skin is often full of scratches from these fights; but as long as the memory of the oldest inhabitant of South Greenland extends, only one man in the district of Julianshaab (where they are chiefly captured) has been killed by the bite of the Klapmyds, though not unfrequently the harpoon and line have been broken. The hunting is not so dangerous, however, within late years, as it has been effected by the rifle from the ice; but when the Seal has not been killed outright, the hunter goes out in his kayak and despatches it with the lance.

With regard to the favourite localities of this species of Seal, Crantz and the much more accurate Fabricius disagree—the former affirming that they are found mostly on great ice islands where they

* It is often asserted by the sealers that this "bladder" is a sexual mark, and is not found on the female. I do not think there is any just ground for this belief.

sleep in an unguarded manner, while the latter states that they delight in the high seas, visiting the land in April, May, and June. This appears contradictory and confusing; but in reality both authors are right, though not in an exclusive sense. The hood appears to be an organ of defence from any stunning blow on the nose, the most vulnerable place in a Seal. It only inflates this "bladder" when irritated. The sealers look upon it as a reservoir of air when under the water*. The story which Fabricius relates about its "shedding tears abundantly" when surprised by the hunter is, I suspect, only an Eskimo tale of wonder. I could find no one credulous enough to believe it; nor during the whole time I passed among the seal-hunters of the far north did I find that any one esteemed my credulity great enough to venture any such story on me.

It is affirmed, curiously enough, that the *Bladdernose* and the *Saddleback* are rarely or ever found together; they are said to disagree. At all events, the latter is generally found on the inside of the pack, while the former is on the outside. The latter is also much more common than the Bladdernose.

Procreation and young.—At first the young Bladdernose is pure white: during the first year, as it grows older and increases in size, a grey tinge appears; and gradually it assumes a deeper and deeper hue of the same colour. I cannot confirm the remarks of Otho Fabricius, that during the second year (when they are called *Kakortak*) they are snow-white, with a straight line of brown on their backs. Neither I nor any other Seal-hunter with whom I have talked ever saw such a Seal in the Greenland sea; and it appears to be equally unknown in Greenland. Mr. Tegner, who passed several years in a South-Greenland settlement, subsisting almost entirely by the catching of this Seal, informs me that he never heard of such an animal. It is therefore just possible that Fabricius may have been mistaken, though the characteristic marks mentioned are so prominent that it is hardly probable that he could have been in error. In fact, the majority of the "Bladdernoses" which I have seen were about two or three years old, and appeared, by a slow and gradual change, becoming similar to the old and mature Seals, by turning darker and darker in their colours, and assuming the roundish oval markings, while at the same time they were increasing in size. This species seems to produce its young earlier than *P. grœnlandicus*.

Geographical distribution and migrations.—The Bladdernose is found all over the Greenland seas, from Iceland to Greenland and Spitzbergen, but chiefly in the more southern parts. The first Seals which we saw and killed on the making of the ice early in March 1861, were chiefly young "bladders" which had not yet got the hood-like appendage. It even finds its way to the temperate shores

* Mr. J. Walker, Master of the screw-steamer 'Wildfire,' and one of the most intelligent of the whaling captains, assured me (June 1861), from his own observation, that this Seal lies frequently on the top of elevated pieces of ice, and that the use of this hood, or "bladder," appears to be to raise it up with sufficient momentum to the surface (by filling it with air) so as to spring again on to the ice.

of Europe and America; and rare stragglers now and then land on the shores of Britain, though it is by no means a member of our fauna proper. This Seal is not common anywhere. On the shores of Greenland it is chiefly found beside large fields of ice, and comes to the coast, as was remarked by Fabricius long ago, at certain times of the year. They are chiefly found in South Greenland, though it is erroneous to say that they are exclusively confined to that section. I have seen them not uncommonly about Disco Bay, and have killed them in Melville Bay, in the most northerly portion of Baffin's Bay. They are principally killed in the district of Julianshaab, and then almost solely in the most southern part, on the outermost islands from about the 20th of May to the last of June; but in this short time they supply a great portion of the food of the natives, and form a third of the colony's yearly production. In the beginning of July the Klapmyds leaves, but returns in August, when it is much emaciated. Then begins what the Danes in Greenland call the "*magre klapmydsefangst*," or the lean-Klapmyds catching, which lasts from three to four weeks. Very seldom is a Klapmyds to be got at other places, and especially at other times. The natives call a Klapmyds found single up a fjord by the name of "Neriniartout," the meaning of which is "gone after food." They regularly frequent some small islands not far from Julianshaab, where a good number are caught. After this, they go further north, but are lost sight of, and it is not known where they go to (Rink, *l. c.*). Those seen in North Greenland are mere stragglers wandering from the herd, and are not a continuation of the migrating flocks. Johannes (a very knowing man of Jakobshavn) informed me that generally about the 12th of July a few are killed in Jakobshavn Bay (lat. 69° 13′ N.).

Economic value and hunt.—The Klapmyds yields, on the average, half a cask of blubber, and the dried meat of every Seal weighs about 24 Danish lbs.; but this is not the whole Seal, which weighs about 200 lbs. The yearly catch in Greenland (Danish) is about 2000 or 3000*.

5. *Commercial Importance of the "Seal Fisheries."*

The Greenland (*i. e.* Spitzbergen) sealing fleet from the British ports meet about the end of February in Bressa Sound, off Lerwick, in Zetland; it leaves for the north about the first week in March, and generally arrives at the ice in the early part of that month. The vessels then begin to make observations for the purpose of finding the locus of the Seals; and this they do by crawling along the edge of the ice, and occasionally penetrating as far as possible between 70° and 73° N. lat., then continue sailing about until they find them, which they generally do about the first week of April. If they do not get access to them, they remain until early in May, when, if they intend to pursue the whaling in the Spitzbergen sea that summer, they go north to about 74° N. lat. to the "old sealing," or, further still (even to 81° N.), to the whaling. Most of them, however, if not successful

* Rink, *l. c.*

by the middle of April, leave for home, to complete their supplies in order to be off by the 1st of May to the Davis's Straits whale-fishery. During the months of March and the early part of April the sealers are subject to all vicissitudes of weather, calm and storm suddenly alternating, while the thermometer will stand for weeks at zero, or even many degrees below it.

The number of Seals taken yearly by the British and continental ships (principally Norse, Dutch, and German) in the Greenland sea when they get among them will average upwards of 200,000, the great bulk of which are young "saddlebacks," or, in the language of the sealer, "whitecoats." When they have arrived at their maximum quality, 80 generally yield a tun of oil; otherwise the general average is about 100 to the tun. In 1859 good oil sold for about £33 per tun; add to this the value of 100 skins at 5*s*. each, and the whole will amount to £58 sterling. From this simple calculation a very good estimate may be formed of the annual commercial value of the Greenland "Seal Fishery;" for, supposing 2000 tuns of oil to be about the annual produce, and assuming £58 as the value per tun inclusive of the skins, the whole produce of the fishery will amount to the yearly value of £116,000 sterling (*Wallace*). This, of course, does not take into calculation the produce the Danish Government derives from their colonies on the west coast of Greenland (which I notice under the head of each Seal), nor what the Russians derive from the coast of Spitzbergen and from the White Sea. The "fishery," however, is very precarious. Some years little or nothing is got, the ice being too thick for the ships to "get in to them." In one year it may happen that the fishery in the Spitzbergen Sea proves a failure while the Newfoundland one is successful. For some years past it has proved in the former sea almost a failure *. There seems, indeed, little doubt that the fishery must fail in course of time, as have the Seal- and Whale-fisheries in some other parts of the world; and if Seal-hunting is pursued with the energy it is at present, that day cannot be far distant. Some of the sealers laugh at this idea; but where is the enormous produce the South Seas used to yield, superior to anything ever heard of in the north. No doubt the South-Sea hunters said the same thing; and doubtless when the inhabitants of Smeerenberg, that strangest of all strange villages, saw the Whales sporting in thousands in their bays, and the oil-boilers steaming above the peaks of Spitzbergen, they laughed at the idea of their ever becoming scarce! Yet how false that idea has proved! for in our day the waters of those high northern seas are rarely troubled, even by a wandering Mysticete that perchance may have missed its way in making a passage from one secure retreat to another. So will it ultimately be with the Seals. Indeed some are even now of opinion that they are diminishing in numbers; at least they have evidently reached their zenith, as shown by statistics; and taking into

* It has been rather more successful in Newfoundland. This year (1868) up to the 28th of April 250,000 Seals had arrived at St. John and Harbour Grace. *Vide* a good account of the sealing by the continental vessels in Petermann's 'Geogr. Mittheil.' Feb. 1868.

consideration the appearance the young Seals presented on the ice in 1861, they did not approach the numbers reported to have been seen by sealers in many previous years. The South-Sea "fisheries" became extinct in fifteen years, and, making all allowance for the protection afforded to the Greenland Seals by the ice, and supposing the sealing prosecuted with the same vigour as at present, I have little hesitation in stating my opinion that, before thirty years shall have passed away, the "Seal-fishery," as a source of commercial revenue, will have come to a close, and the progeny of the immense number of Seals now swimming about in the Greenland waters will number but comparatively few. This event will then form another era in the northern fisheries.

3. Note on the Alleged Occurrence of the Rhinoceros in Borneo. By Andrew Murray, F.L.S.

It is only lately that I have seen Dr. Gray's paper on the Rhinocerotidæ, published in the third part of the 'Proceedings' of this Society for 1867; and I should wish to be allowed to enter my caveat against the reception of one statement in it which is, I think, likely to mislead, namely, that the Rhinoceros is a native of Borneo.

Some time since I was informed by a friend that the theory by which I had attempted to account for the remarkable absence of all large Mammals, and the great scarcity of all but arboreal, aquatic, or aërial animals, in Borneo, was knocked on the head, for the Rhinoceros had now been actually found in it, and that all doubt as to the locality was set at rest by specimens having been sent to this country which, on examination, were found to belong to a new and distinct species. They not only had specimens of it, but, as Prince Hal said, "we can show it you here in the house"—the British Museum, to wit.

Of course in the face of such a stunning fact I had nothing for it but to eat my leek in silence, abandon my position, and endeavour to rally my disbanded and scattered ideas to the best of my ability.

The perusal of Dr. Gray's paper, however, not only reveals the source of my friend's information, but satisfies me that I have been too hasty in accepting it as correct.

Literally my friend's statement is quite borne out by Dr. Gray's paper. Dr. Gray says everything that he said; but I look in vain for any proof in support of it; and as any statement coming from a man of Dr. Gray's authority is likely to be accepted as *probatio probata*, I think it the more necessary to point out the insufficiency of the grounds on which his statement rests.

In the first place I observe that the sole evidence offered is that of a skull which "was purchased of a dealer, who said that he received it direct from Borneo." It does not follow, supposing the statement