

outfit any more he offered to take the things along in his wagon, and we relieved our pack horses almost entirely of their burden, thereby enabling us to travel a great deal faster. That night we made McGinley's store on the foot of Wood Creek, a distance of thirty-five miles, where we made ourselves at home.

Next day I expected to get back to the old mine in good time, but meeting so many friends along the river, it was pretty dark when we got to the Rocky Bar Junction and Charles's cabin.

Charles advised me to stay with him that night and go up to the mine in the morning; but I was too anxious to get back to my old friend McK. I wish I had followed his advice, for the snow lay deep and cold in the dark cañons, the creek was overflowed and frozen, and to complete my misery my saddle horse broke through the ice of the largest stream, was imprisoned perfectly helpless, and obliged me to break an opening for it to get out. Then I had to return for my packhorse, which had bolted. Soaking wet, I was now obliged to walk; the way never before seemed so long and dismal. At last I came to the New Mill, and resting the tired horse a moment for the final steep hill, at last I beheld a light and distinguished the outlining of the buildings of the mine.

McK's dog had announced my arrival; Bill, glad to see me back, tended to my horses, while his kind wife was getting dry garments for my stiff, frozen ones. Then I sat down to a nicely prepared supper, and had quickly forgotten my last sufferings. It was late in the night before turning into my cosy quarters, as I had to give a full account of our eventful trip.

Wednesday I was occupied in packing and arranging my traps to take along on the stage. Next day after dinner I took leave from Mrs. McK. and Howard's folks; friend Bill accompanied me down to Charles's cabin, with whom I spent the last night to be near for the early morning stage. When parting here with Bill McK. who had to go back to the mine, I felt more like going with him back to the old place which had become so dear to me; promising him to come again, he mounted his pony, and was out of sight.

Charles had supper ready, but I did not have any appetite, for I felt as blue as indigo. In the morning we took breakfast at the junction; the stage came rattling along, and thanking Charles, who had become as dear as a brother to me for all his kindness, I took my seat on the box with the driver, and away we went into the crisp cold morning. At passing Willard's I had the chance of saying good-bye to our friend Joe. The stage trip proceeded without any notable event, only it was cutting cold on Camas prairie, and we were glad when the lights of Mountain Home came in sight.

Saturday morning I went over to the station agent and found all my shipped articles in proper condition. Concluding to send all my trophies and camp outfit by freight, I had a large box made resembling Noah's ark. To let the interested reader form his own opinion about the size, I give a summary of the spoils of my hunt, which consisted of one large elk head and antlers, five beautiful blacktail deer heads, eight bear skins, three mountain goats, twenty-four beavers, thirty-five foxes (among which were one handsome "silver" and several beautiful crosses), and divers fishers and martins. Having all securely packed and the box well fastened, I stepped on the east bound train, which came steaming along at 11:30 P. M. and reached New York in due season. F. B.

Natural History.

CETACEANS OF THE UNITED STATES.

BY R. W. SHUFELDT, M.A.O.U.

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WHALES constitute the marine mammalian fauna of the coasts of our country, and few people, I think, unless they have paid especial attention to the subject, realize how many of them we have, and the numerous species we may lay claim to as properly falling within that category. To continue with our list of animals as published by the U. S. National Museum, we find the following to be the arrangement of this highly interesting group of mammals, viz.:

ORDER CETACEA. CETACEANS.

SUBORDER DENTICETE. TOOTHED WHALES.

Family DELPHINIDÆ. The Dolphins.

- Sotalia pallida*, Gervais. Florida (?)
- Steno*, Gray. Cuba.
- Steno compressus*, Gray. Gulf of Mexico (?)
- Delphinus bairdi*, Dall. Baird's Dolphin. Coast of California.
- Delphinus delphis*, Linné. Common Dolphin. Atlantic Ocean.
- Delphinus janira*, Gray. The Janira. Newfoundland (Gray).
- Prodelphinus eulphrosyne* (Gray), Truc. North Atlantic Ocean.
- Leucorhamphus borealis* (Poole), Gill. Right-whale Porpoise. Pacific coast of North America.
- Lagenorhynchus acutus*, Gray. Eschricht's Dolphin. North Atlantic Ocean.
- Lagenorhynchus albobrostris*, Gray. White-beaked Bottlenose. North Atlantic Ocean.
- Lagenorhynchus obliquidens*, Gill. Striped or Common Dolphin. Pacific coast of the United States.
- Lagenorhynchus tibetola*, Gray. West coast of North America.
- Lagenorhynchus tuberculatus*, Cope. Skunk Porpoise. Coast of New England.
- Lagenorhynchus perspicillatus*, Cope. Atlantic coast of the United States.
- Tursiops tursio* (Bonnaterre), Van Ben. & Gervais. Bottle-nosed Dolphin. North Atlantic Ocean.
- Tursiops gillii*, Dall. Cowfish. Pacific coast of the United States.
- Tursiops erchsenius*, (Cope) Gill. Black Dolphin. Atlantic coast of the United States.
- Orca gladiator*, (Bonnaterre) Gray. Atlantic Killer. Atlantic Ocean.
- Orca atra*, Cope. Pacific Killer. Pacific coast of North America.
- Orca pacifica*, (Gray). North Pacific Ocean (?)
- Globiocephalus melas*, (Traill). Blackfish. North Atlantic Ocean.
- Globiocephalus brachypterus*, Cope. Short-finned Blackfish. Coast of New Jersey.
- Globiocephalus scammoni*, (Cope). Scammon's Blackfish. Pacific coast of North America and southward.
- Grampus griseus*, (Cuvier) Gray. Grampus. North Atlantic Ocean.
- Grampus scottii*, Dall. Mottled or White-headed Grampus. Pacific coast of North America.
- Diplonotus adonion*, (Linné) Gill. White Whale. Arctic and Subarctic seas.
- Monodon monoceros*, Linné. Narwhal. Arctic seas.
- Phocœna communis*, Lesson. Puffing-Pig. Herring-Hog. North Atlantic Ocean.
- Phocœna lineata*, Cope. Striped Porpoise. Atlantic coast of the United States.
- Phocœna vomerina*, Gill. California Bay Porpoise. Pacific coast of the United States.

Family ZIPHIIDÆ. Bottle-nose Whales.

- Bevardius bairdi*, Stejneger. Baird's Whale. Bering Island.
- Hyperoodon rostratus*, (Chemnitz) Wesmæl. Bottle-nose Whale. North Atlantic Ocean.
- Ziphius cavirostris*, Cuvier. Temperate and tropical seas.
- ? *Ziphius semijunctus*, (Cope). Atlantic Ocean.

Ziphius grebnitzkii, Stejneger. Grebnitzky's Bottle-nose Whale. Bering Island.

Mesoplodon sowerbiansis, Gervais. Sowerby's Whale. Temperate North Atlantic.

Family PHYSERIDÆ. The Sperm Whales.

Physcler macrocephalus, Linné. Sperm Whale. Temperate and tropical seas.

Kogia breviceps, (De Blainville) Gray. Pygmy Sperm Whale. Temperate and tropical seas.

SUBORDER MYSTICETE. WHALEBONE WHALES.

Family BALÆNIDÆ.

Rhachianectes glaucus, Cope. Devil-fish. Gray Whale. Pacific coast of North America.

Agapheles gibbosus, Cope. (?) Scragg Whale. North Atlantic.

Megaptera longimana, (Rud.) Gray. Humpback Whale. North Atlantic Ocean.

Megaptera callosa, Cope. Carribbean Humpback Whale. Carribbean Sea.

Megaptera versabilis, Cope. Humpback Whale. North Pacific Ocean.

Physalus antiquorum, (Fischer) Gray. Finback Whale; Razor-back. North Atlantic Ocean.

Physalus sibiadai, Gray. North Atlantic Ocean.

Balaenoptera rostratus, (Müller) Gray. Piked Whale (?Grampus of New England fishermen). North Atlantic Ocean.

Balaenoptera davidsoni, Scammon. Finback Whale. Northeastern Pacific Ocean.

Sibbaldus laticeps, Gray. Rudolph's Rorqual. North Atlantic Ocean.

Sibbaldus tuberosus, Cope. Mobjack Bay, Virginia.

Sibbaldus villosus, (Cope). Finback Whale. Pacific coast of North America.

Sibbaldus tectirostris, Cope. Coast of Maryland.

Sibbaldus sulfuratus, Cope. Sulphur-bottom Whale. Pacific coast of North America.

Balaena japonica, Gray. Right Whale of North Pacific. North Pacific Ocean.

Balaena biscayensis, Gray. Black Whale; Right Whale of the North Atlantic. Temperate North Atlantic.

Balaena mysticetus, Linné. Bowhead Whale. Arctic Seas.

It will be observed of the species enumerated in this formidable list, that the vast majority of them actually occur upon our own coasts, so that in a paper of a length that the present must of necessity be, it will simply be out of the question for me to give even the briefest history of the several types, as much as I would like to do so, as the limitations of space would be greatly exceeded, and even, perhaps, the main object of my contribution in the present instance, somewhat interfered with, not to say, defeated.

In the group of Cetaceans which I have chosen to illustrate this article, those United States types have been designedly selected by me which I deemed would best convey to the general reader an idea of the various forms assumed by the species representing this Order; and in the text it will be my aim to present in a general way the habits common to the group, and as far as possible, the characteristics of the several genera.

So far as the fruits of Geology have to this time been enabled to indicate it for us, we are obliged to confess that the ancestry of the Cetaceans in time is still involved in much obscurity. Huge, serpent-like Whales (*Zeuglodon*) have been found in a fossil state in certain parts of Alabama, which have thrown some light on this perplexing subject, and in other parts of the world fossil forms have been discovered which have helped us to a better solution, but, as I say, we are still a long ways from being in possession of an exact knowledge of the origin of this group, as we are in the case of many other animals. One thing, however, must be borne fully in mind, and that is, the Whales are just as truly mammalian in all respects, as are such animals as seals, pigs, or bears. Indeed, they are nothing more nor less than monster marine mammals that have become specially modified in time to lead strictly an aquatic life in recent epochs.

The general external characters of Whales can be readily appreciated from the several drawings of the species accompanying this paper; the fish-like form is to be noted, with the enormous head in some of the species, and with the total absence of anything like unto a neck in all the forms; the peculiar pattern of the horizontally placed tail with its diverging, lateral "flukes," posteriorly divided by the median notch; the form of the anterior paddles, and the entire absence of a hinder pair; that a few of the species may have a showing of scattered hairs on the body, more especially near the mouth; the small eyes, the simple aperture of the ears, the valvular openings of the nostrils situated on top of the head; and a number of other points. Whales also possess immediately beneath the skin a thick layer of fat known as the "blubber," from which the oil is manufactured, and for which men hunt and capture them. As in the case of the topographical anatomy, the internal structure of these ponderous creatures is highly interesting and instructive, but our space will admit of none of it here. But it will be proper to note, however, that all Whales have teeth, with but few exceptions, and that these vary greatly in number; never being preceded by a milk set, while in the adult right whales, in which family the teeth are absent, the well-known whalebone is seen (baleen). It would be as well to remark, too, that the mammae in the female Whales are situated on either side of the genital fissure, being two in number, and each being under the control of a special compressor muscle by means of which the milk of the mother can be injected into the mouth of her young one (there being rarely two), and the latter is thus enabled to nurse under water.

Whales of all species subsist on animal food of some kind or other, such as for example, fish, squids, crustaceans, and the medusæ. The killers (*Orcæ*) alone prey upon the species of their own Order, and upon such other warm-blooded animals as seals and their kind.

During a year that I spent at sea in the Gulf of Mexico and the South Atlantic, I had many opportunities to observe the various kinds of whales and porpoises, which I availed myself of to the fullest extent, and have seen an old Sperm whale blow many and many a time. Professor Flower well describes this act, and according to this eminent authority, when speaking of what a helpless creature a whale is on shore, he says that when in their element, the sea, "they have, however, to rise very frequently to the surface for the purpose of respiration; and, in relation to the constant upward and downward movement in the water thus necessitated, their principal instrument of motion, the tail, is expanded horizontally, quite unlike that of a fish, whose movements are mainly in straight-forward or lateral directions. The position of the respiratory orifice or nostril on the highest part of the head is very important for this mode of life, as it is the only part of the body the exposure of which above the surface is absolutely necessary. Of the numerous erroneous ideas connected with natural history, few are so widespread and still so firmly believed, notwithstanding repeated exposures of its falsity, as that the *Cetacea* spout out through their blowholes water taken in at the mouth.

The fact is, the 'spouting,' or more properly 'blowing,' of the Whale is nothing more than the ordinary act of expiration, which, taking place at longer intervals than in land animals, is performed with a greater amount of emphasis. The moment the animal rises to the surface it forcibly expels from its lungs the air taken in at the last inspiration, which, of course, is highly charged with watery vapor in consequence of the natural respiratory changes. This, rapidly condensing in the cold atmosphere in which the phenomenon is generally observed, forms a column of steam or spray, which has been erroneously taken for water. It also often happens, especially when the surface of the ocean is agitated into waves, that the animal commences its expiratory puff before the orifice has quite cleared the top of the water, some of which may thus be driven upward with the blast, tending to complete the illusion. In hunting Whales the harpoon often pierces the lungs or air passages of the unfortunate victim, and then fountains of blood may be forced high in the air through the blowholes, as commonly depicted in scenes of arctic adventure; but this is nothing more (allowance being made for the Whale's peculiar mode of breathing) than what always follows severe wounds of the respiratory organs of other animals.

The refined oil known as "spermaceti" is manufactured from that oil which is found in the great cavity above the skull in the Sperm Whale, while "ambergris," so extensively used by perfumers in their art, is found in the intestines of the same animal, and sometimes floating on the surface of the seas they inhabit.

By the aid of modern appliances, the chase and capture of these huge mammals has within recent times been reduced almost to a science, but an account of such matters would, in the opinion of the writer, be out of place in the present connection, dealing as we are more particularly with the life histories of these Cetaceans; it will be as well to add, however, that their constant pursuit and destruction by man must in due time tell markedly on their numbers, if it does not lead to their actual extermination.

Glancing again at our List above we find that these Cetaceans are primarily divided into Families of TOOTHED WHALES, BOTTLE-NOSE WHALES, SPERM WHALES and WHALEBONE WHALES. Among the first of these we find the Common Dolphin (*D. delphis*), and who that has ever been out for an ocean voyage over the seas that he inhabits, does not know him. Suddenly a "school" of them will appear under the very bows of your vessel, plunging in and out of the water in graceful curves, and in a manner most fascinating to the observer, who never wearies of the sight. Their powerful, tooth-armed beaks are the very terror of the small fishes upon which they habitually prey, and it is an extraordinary thing to see the agility with which they effect such captures.

Captain Scammon speaking of the Common Porpoise of the Pacific coast, says, "They are seen in numbers varying from a dozen up to many hundreds tumbling over the surface of the sea, or making arching leaps, plunging again on the same curve, or darting high and falling diagonally sidewise upon the water with a spiteful splash, accompanied by a report which may be heard at some distance. In calm weather they are seen in numerous shoals, leaping, plunging, lobtailing and finning, while the assemblage moves swiftly in various directions. They abound more along the coasts where small fish are found. Occasionally a large number of them will get into a school of fish, frightening them so much that they lose nearly all control of their movements, while the Porpoises fill themselves to repletion." This species is the *L. obliquidens* of our List. On our New England coast the best known form is the "Skunk Porpoise," shown in Fig. 2 of the present paper, and its habits are fully as interesting as those of the Dolphin of which we have just been speaking. Even at the present time, it is by no means a rare thing to discover a new species of this group, and undoubtedly there still remain a number of forms as yet unknown to science.

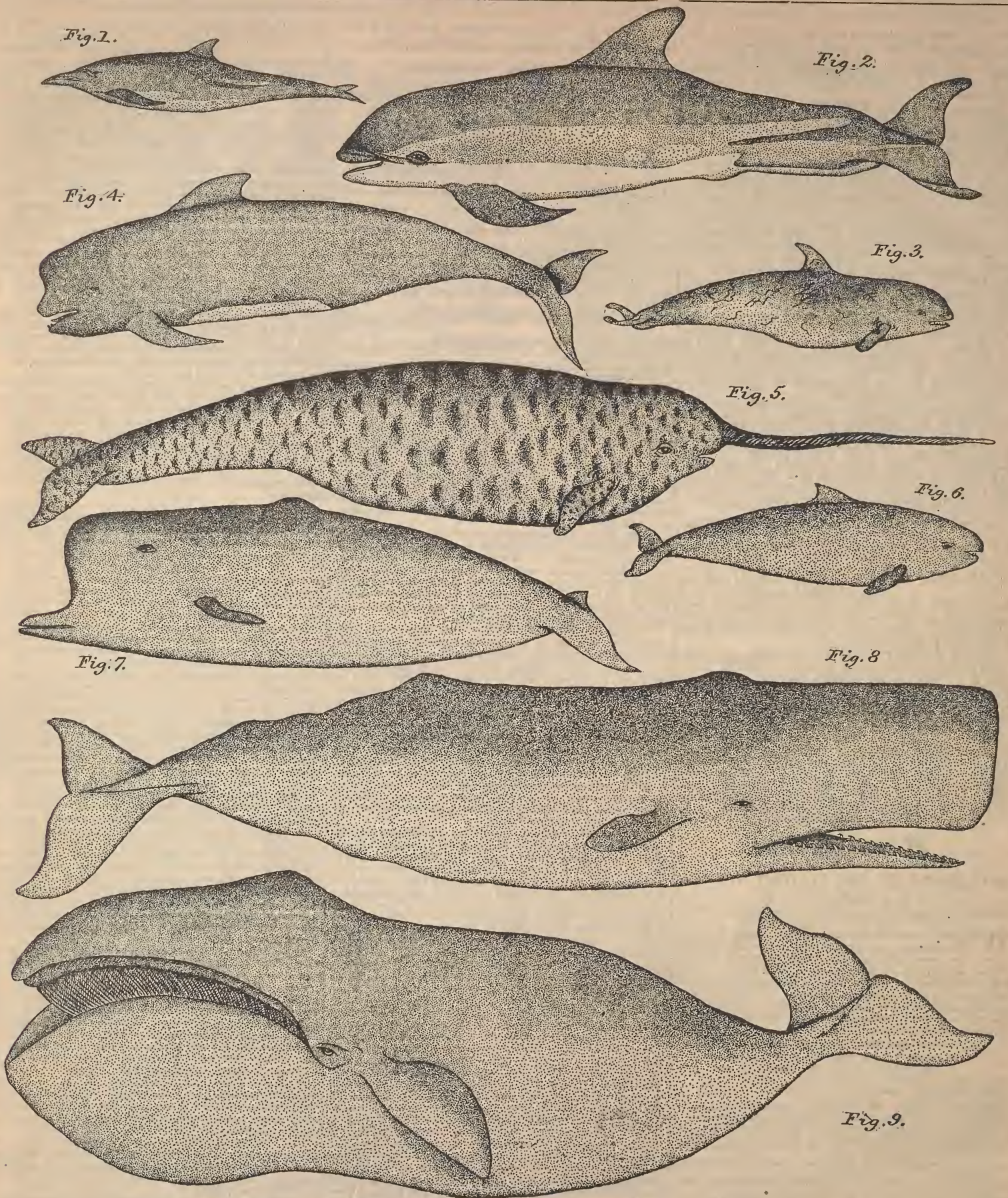
The Orcas or Killer Whales constitute another genus of this family, and they are only too well known to the whalers as the veriest wolves of the high seas, often robbing them of their hard-earned spoils. They are possessed of enormous strength and speed, and even at a distance at sea they can be easily recognized by their lofty dorsal fins, an appendage which, in the High-finned Killer, attains to the enormous height of six feet. These merciless animals will ravenously attack and kill the biggest whale that ever plowed the ocean, and devour the carcass afterward, piecemeal; they are also very destructive of the seals about the islands inhabited by those valuable animals, and according to Professor Goode, Eschricht says that thirteen porpoises and fourteen seals were found in the stomach of an Atlantic Killer, sixteen feet in length.

The Blackfishes (Fig. 4) are a medium-sized whale that range over their oceanic habitat in schools sometimes numbering several hundreds; they are not especially valuable to the whalers, but are mercilessly preyed upon by the Killer Whales.

Rarer than the last mentioned species, though often associated with them, are the Grampuses (Fig. 3), a smaller whale than they, though with very similar habits, and we are told that they make their appearance in our waters only about once in ten years. Professor Flower has proved beyond all manner of doubt that the fantastic markings on the body of this animal are normal and are not due to scars from conflicts with their fellows or other species. A fine cast of a Grampus may be seen and studied at the Smithsonian Institution, where it used to surmount the doorway of the main entrance, down-stairs.

One of the most interesting of all Cetaceans is the Narwhal (Fig. 5), an animal which stands responsible for the Unicorn of fancy, and which is now restricted in its range to the northern shores of our Alaskan territories. The spiral tusk growing from the left side of its upper jaw is a modified tooth which may attain a length of eight or ten feet. It is absent in the female, the sex being practically toothless, or at least the teeth are concealed in the jaw as is the case on the right side in the male Narwhal. This tusk is without enamel, and a single one is valued at \$50.00, the ivory being put to a variety of purposes. Occasionally both tusks are developed, in which case the spirals each turn the same way, or the twist has the same direction. Narwhals feed upon small fish and crustaceans.

Herring Hogs (*Phocœna*), are representatives of another very interesting genus (Fig. 6); these animals are also known as the harbor porpoises or "puffing pigs," they



REPRESENTATIVE SPECIES OF UNITED STATES CETACEANS.—COPIED BY THE AUTHOR.

Fig. 1.—Common Dolphin (*Delphinus delphis*). After Flower. Length of adult 10ft.
 Fig. 2.—Skunk Porpoise (*Lagenorhynchus gubernator*). From Goode, after Cope. Length of adult about 10ft.
 Fig. 3.—The Grampus (*Grampus griseus*). After Elliott. Length of adult 20ft.

Fig. 4.—The Blackfish (*Globiocephalus melas*). From Goode, after Trans. Zool. Soc. of Lond., Vol. 8, Pl. 50. Length of adult 18 to 25ft.
 Fig. 5.—The Narwhal (*Monodon monoceros*). After Elliott. Length of adult 10 to 14ft.
 Fig. 6.—The "Herring-Hog" *Phocena communis*. From a photograph by the U. S. Fish Commission. Length of adult rather more than 4ft.

Fig. 7.—The Sperm Whale Porpoise (*Hyperoodon bidens*). After Blake. Length of adult 25ft.
 Fig. 8.—The Sperm Whale (*Physeter macrocephalus*). From Goode, after Scammon. Length of adult male 84ft.
 Fig. 9.—The Bowhead Whale (*Balana mysticetus*). From Goode, after Scammon. Length of adult male 47ft.

have earned this last name from their habit of puffing and grunting as they disport themselves in the surf or as they roll in the breakers at the mouths of harbors and rivers. These Herring Hogs are very destructive of several species of the small edible fish, and of oysters, but they in turn are often attacked and killed by the Porpoises.

To represent the next Family, the Bottle-nose Whales, I have given a figure of *Hyperoodon bidens*, but very little is known of these forms and the nomenclature of the group is not in a very satisfactory condition.

Passing next to the Family of the true Sperm Whales (*Physeteridae*), we find them represented by the Giant Sperm and the Pigmy Sperm Whales.

The Sperm Whale or Cachalot (*P. macrocephalus*) is a very well-known Cetacean, one of wide distribution and of great commercial importance (Fig. 8). In this species the male may attain the enormous length of 84ft., where-

as the females are not more than one-third as large, and are slenderer. In color these animals are of a blackish brown above, paler on their sides, and grayish on the under parts; very old ones are gray on top of the head and about the nostrils. They feed on small fish principally, and squids; it is related that several hundred mackerel have been taken from the stomach of a third grown one. All times of the year is the breeding season for them, and one at a birth is the rule, never more than two. The female nurses her young by reclining quietly on her side, as she floats passively on the surface of the ocean. The period of gestation is said to be ten months.

Its actions and habits under various circumstances are familiar to the most of us, and have been well described by Scammon; the "blowing" of this whale, and the useful products it yields, I have already alluded to above.

Turning to the Suborder MYSTICETE of our List, we find a splendid array of species representing the animals

known as the Whalebone Whales, all of which are creatures of great size, and valuable for the products they yield to men. Of no little importance among these is the whalebone of commerce, but this is principally obtained from the Bowhead Whale (Fig. 9) of the Polar Seas. The habits of the Bowhead partake of the habits of whales generally, with a number of very interesting ones peculiarly its own. Professor Goode remarks that "The food of the Bowhead consists of floating animals, classed by the whalemen under the names 'right whale feed' and 'brit.' Many kinds of invertebrates are, of course, included under these general terms, one of the most abundant of which is, perhaps, a kind of winged or pteropod mollusk, the *Clio borealis*, which occurs in the northern seas, floating in great masses. When the Bowhead is feeding it moves with considerable velocity near the surface, its jaws being open to allow the passage of currents of water into the cavity of the mouth and through the

layers of baleen at the sides. All eatable substances are strained out by the fringes of the baleen and are swallowed." Much more could be said about these whalebone whales, but I find my space already nearly exhausted, and I still have a few concluding remarks to make of no little importance.

My studies of the Cetaceans and my reading about them have both convinced me that the Order has by no means received the attention at the hands of descriptive zoologists and anatomists that it so justly deserves. This neglect can be atoned for in many ways, and more especially by such persons as reside the year round either upon the Atlantic or Pacific seaboard, or by capable observers who lead a seafaring life. Lighthouse keepers and whalers both have excellent opportunities to thus powerfully aid science in such work. Whalers should be encouraged by some means to systematically capture specimens of the smaller Cetaceans when the opportunity is afforded them, and from these to take accurate measurements of the specimens at the time of capture. Skeletons could also be made, and viscera placed in crude spirits, both being brought home and turned over to the proper authorities for description. And, when it so happens that somebody chances to be on board who can make a serviceable sketch of the animal, this essential aid should never be overlooked; the habits of whales in their normal habitat should also be constantly recorded, and particularly as soon after the observation as possible. Lighthouse keepers and other seashore observers can effect all this, and much more besides, for where any of the whale tribe are driven ashore in their vicinity, they can, in addition to what is suggested above, often be enabled to take a good series of photographs of the specimen, as well as a very complete set of measurements. When within a reasonable distance of Washington, they can, too, immediately send a telegram to Mr. F. W. True, Curator of the Department of Mammals, U. S. National Museum, that such and such suspicious looking specimens have gone ashore at such and such a point, thus giving the proper authorities the opportunity to dispatch a responsible person to the spot should they desire to do so. There are undoubtedly a number of the smaller species of Cetaceans in our waters as yet undescribed.

Those of my readers desiring to further inform themselves upon the subject which of necessity I have been compelled to deal with so briefly in this contribution, can do no better than consult some of the following works:

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Game Bag and Gun.

HUNTING THE ELK.

BY the older writers the elk was called the wapiti or wapiti deer, this being the Iroquois name for the animal. The term is employed now only in books and by Europeans. The elk of Europe is almost identical with our moose, which name is derived from a Cree Indian word, *moosôô*. It is unfortunate that two such magnificent animals, inhabiting different continents, should bear the same English name, but the appellation elk is now so firmly settled in America as belonging to *Cervus canadensis*, that it can never be changed.

The young elk are born in May or June and, like young deer of most species, are at first spotted. The coat is bright bay, like that of the Virginia deer, but the spots are neither so numerous, so regular, nor so well defined. At the first shedding of the pelage, which takes place in September, the spots are lost and the animals assume the yellowish gray which is their winter coloring. The calves are usually born in pairs, male and female, and during the summer the mother and her young keep by themselves. In the early part of August they begin to collect in scattered companies, and early in September the rutting season begins.

Meanwhile, the bulls have been keeping apart. Late in the winter, their superb horns dropped off, and in the early spring the new antlers began to appear, through the summer they have been increasing in size and by the middle of August have reached their full development. They are still covered with the "velvet," however, and although they have ceased growing and are quite hard, the tender skin, beneath which the warm blood still courses, clings to them for a little while longer. At this time the elk are found in bands, more or less numerous, according as the country which they inhabit is much hunted or not. The time for freeing the horns from the velvet varies somewhat.

Most of the bulls begin to "shake," as the mountain men term it, about the first of September. The older ones are usually the first to set about this, and some of the yearlings carry the velvet until the late fall. Soon after the horns are fully grown and hard, the flow of blood through the arteries which supply the horns and the velvet, is checked, and the skin begins to itch. The bull now rubs his horns furiously against bushes and trees, and the velvet is torn off and hangs from the horns and about his ears in bleeding strips. Usually he seeks some low stiff-branched shrub, like the willows in a stream bottom, or a young pine on the mountainside, and thrusting his head among the branches, moves it vigorously up and down and from side to side. This, of course, causes the bush to wave to and fro, and it is from this movement that the term "shaking" is derived.

It is just at and immediately before this time that the bull elk are in their very best condition. They are now enormously fat, and the flesh is delicious, though elk meat, like that of most other animals, should always be kept a few days before eaten. Immediately after being killed it is a little coarse, and in the bulls sometimes tough, but, after hanging four or five days, it becomes tender and very palatable. It has a flavor of its own, which is not found in any other wild meat with which I am acquainted, except in a less degree in that of the mule deer, and is moreover extremely rich and nutritious.

During the time that the bulls are "shaking" they are very easily approached, for with their heads hidden in the brush they can neither see nor hear, and the hunter, provided he has the wind in his favor, finds little difficulty in creeping within rifle range. This is more true on the plains and in an open country than in the mountains. There the elk is as likely to do his shaking in the midst of a dense forest as anywhere else, and in such situations he is not easily discovered until one is quite close to him.

As soon as his horns are free from the velvet, and are hard and polished, the bull elk begins to gather about him all the cows he can. He searches for them in the thickets, along the streams, in the ravines and among the timber, and this search is conducted in a very systematic manner. A year ago last fall, while hunting in Wyoming Territory, I witnessed very satisfactorily the method in which they operate. I was out on foot four or five miles from the camp, and was sitting on a high mesa scanning the surrounding country with my field glass, when I saw a fine bull elk emerge from a ravine, which ran up into the plateau on which I was, walk along over the plain below to the next ravine, enter that and presently come out at its head on to the mesa, and then walk to the head of the next ravine and proceed down that. When he reached the plain he again kept along the foot of the hills until he reached the mouth of another ravine, and then he came up that. In this way he proceeded, systematically searching through these hiding places for any cows that might be lurking there. As the cows have now come together, a bull that finds one is likely to get a dozen or perhaps fifty at the same time. The particular bull mentioned was, when first seen, perhaps a mile from me, but he traveled so briskly that I tried in vain to get within shooting distance. Although he covered more than twice the distance I had to go, he kept far ahead of me, and finally, having followed the edge of the mesa down to where it sloped off into the plain, and the ravines ended, he turned briskly to the right, crossed a broad valley where some cattle were feeding, and disappeared in a narrow mountain valley which ran into the hills two or three miles from the camp.

The next day, however, I had the pleasure of seeing him, in fact, of making his intimate acquaintance. There were three of us in the camp, and all the fresh meat that there was under the wagon was one antelope ham. We had been hard at work for several days sinking a prospect hole in the hillside, high above the camp, and we all of us felt like taking a day for rest. So we started out after breakfast, and went back into the hills to try and get some blacktail. We only saw four, one of them a doe, which walked out on to the hillside within seventy-five steps of us, and which we could easily have killed. But there were three bucks following her, and as the bucks are so much fatter in September than the does, we let her go, hoping that the bucks would come out of the green timber, so that we could see them distinctly enough to shoot. Instead of doing that they kept under cover until they had passed us, and then one of them must have caught our wind, for on a sudden they all stampeded, and we saw no more of them. The rest of our hunt was fruitless, and about three o'clock we started down the valley, which was the same one the bull elk had entered the day before, and followed it down, intending, when we came to a point opposite the camp, to cross the low spur of the hills just below where the mine was. I was riding ahead, Bill next, and Ike bringing up the rear. Suddenly I heard Bill call to me in a low voice, and knowing from his tone that he saw game, I had slipped off my horse and thrown a cartridge into my rifle, before I looked at him. Then following the direction of his rifle barrel, I saw in the bed of the stream among the willows about 200yds. away, the heads and bodies of a dozen cow elk walking up out of the creek.

The shots flew pretty fast for a few seconds. The band, which numbered about forty in all, did not wait to investigate the noise, but dashed out of the stream bed. It was a bad place for them, however. Before they could cross the ridge they had at least 600yds. of steep open ground to cover and all this time they were exposed to our rifles. The last elk to emerge from the willows was the bull, who had stayed behind to hurry up the laggard cows and who now brought up the rear of the fleeing band. Before they had got in motion a calf had fallen, and ere they had gone 50yds. two cows dropped. We had more than meat enough and I shouted at my companions, "Fire at the bull." He was now between 300 and 400yds. distant, but on the smooth slope over which he was passing it was easy to gauge the elevation. My first ball struck a little under him, the next just beyond, and at the third carefully aimed shot I saw him flinch, bend down, and then suddenly turn at right angles to the course he had been pursuing. I gave a little cheer of triumph, for as he was running I felt sure that the ball, if it had hit his body at all, had made a fatal wound. And so it was. After going 100yds. further he slackened his trot and began to walk with his head down, and presently he laid down beneath a solitary pine tree that stood near the top of the slope. We mounted our horses and rode down the hill, across the stream and up to where the elk lay. Near the cows we left the ponies standing and walked up the steep ascent to where the bull was. As we approached him we could see the great antlers tossing in the death agony, but when we reached him the struggle was over and the monarch of the forest was dead.

I had longed to possess that great head when I had first seen it, and had felt a savage satisfaction as I saw the lead strike the bull, for I remembered the exhausting labor that I had undergone on the previous day in my efforts to come up with him. But now, as I stood over him on the mountainside, and beheld his beauty and his strength and his symmetry, I wished that we had not killed him. It seemed a cruel wrong to take so grand a life, except in case of absolute necessity. I suppose that every man who has killed much large game often has these remorseful moments, but usually the feeling that his experiences is nothing more than remorse, and does not reach the height of penitence. So the next time he goes hunting he tries with all his might to do exactly the thing which he had previously regretted doing. Some of us there are—old hunters—who have reached a point where we try to kill only enough for our requirements. One deer or antelope or elk a week is enough for a party of two or three when traveling through the wilds, but it is difficult—almost impossible—if you have young and ardent hunters with you, to keep them down to anything like this limit. I have traveled for weeks through the

mountains where, without hunting, a dozen shots might be had each day at antelope, elk and deer, and have only fired two or three shots a week, killing meat only when it was absolutely required for the camp, but I can remember well enough that years ago, when I was new to the mountains, I used to shoot at pretty nearly everything that I could see.

When a bull elk has got together a band of cows he guards them jealously. The younger bulls, which have not been able to accumulate any wives, often loiter about the harem of their more successful brothers, and try to steal away some of the cows. The old bull is kept pretty busy during the season of the rut, chasing away intruders and keeping his cows together. He treats the latter with scant courtesy, and does not hesitate to prod them viciously with his horns if they are slow in moving in the direction in which he desires them to go. If an alarm takes place he rushes about, starting each one of the band in flight, and not until all are in motion does he himself take to his heels. Even then he always brings up the rear, threatening the last animals with his great antlers and urging them to greater speed.

Just before the rut begins, the bull, as has been said, is enormously fat and at his best. But now he begins to get out of condition. His neck swells, his fat turns yellow, and he has a strong and disagreeable odor. Moreover his arduous labors soon cause him to lose flesh, and, by the time the season is at an end, he is gaunt and poor. It does not take him long to pick up again, however, and often by the middle of the winter the bulls are again in fair order, though by no means as fat as the cows.

Down on the plains in years gone by I have had many a good run after elk, on horseback. This is a delightful method of pursuing them, but a fast, quick horse is needed for success. Speed is required to overtake the game, and quickness to avoid the obstacles met with in the very rough ground where the chase must often be made. The natural gait of the elk is a trot, and it takes a very good horse to overtake him while in this gait. He can keep this trot for hours if not for a whole day, and the amount of ground that he can cover at this pace, without tiring, is astonishing. He also runs, but his run, while faster than the trot, is also more exhausting, and, therefore, the man who is running elk always tries to push them as hard as possible at first, so as to make them break their trot, in which case he will be likely, if his horse is a good one, to overtake the fattest of the band. In a country where the going is good it is by no means difficult to run elk in this way, when the sport becomes very much like buffalo running, but in a rough or mountainous region, there is little opportunity for a chase of this kind. When alarmed they always make for the roughest ground, choosing rocky hillsides, ground covered with fallen timber, or the densest forests. I have seen a band slide, roll and tumble down an almost vertical precipice, where it would be utterly impossible for a rider to follow at all, or trot smoothly and easily along a steep mountainside, rough with huge blocks of stone, among which a horse would have broken his neck or legs at almost every stride.

It is very exciting sport to get a band of elk on just the right ground, and with a horse in which you have confidence, dash out from behind some hill, and, almost before they have taken the alarm, find yourself close to the outskirts of the band. They get together hastily and start off, at first in a close bunch, then gradually stringing out in a long line, the cows and calves ahead, the bulls bringing up the rear. If you are chasing them just for the ride, and without the desire to kill, perhaps you will pass the last of the herd, and as you do so, they will turn off, and running a few hundred yards to one side or the other, will stop and stare at you for a few moments, and then throwing back their horns over their hips will trot off over the hills, and out of sight. I have a hunting mare, a swift, beautiful animal, which is very fond of this sport, and has more than once carried me into the very midst of a band of elk.

ADIRONDACK DEER.

KEENE VALLEY, N. Y., Oct. 16.—*Editor Forest and Stream:* Perhaps you would like a report of the deer shooting in this section this season. Fewer deer have been killed here than in any year in my remembrance; and the advocates of hounding, who insisted last year that the deer were more plenty than ever, this season admitted that there was little use in hunting here. The Au Sable Lakes are closed to them, from the fact that they are included in the tract recently bought by a number of gentlemen, who forbid all hunting and fishing on it for a time; and the fact that their orders are obeyed by the men who have hunted there all their lives, shows, to my mind, how easy it would be for the State to enforce its laws for the protection of game if this was seriously attempted.

Some half dozen deer have been killed up John's Brook, a stream that rises on the northern slopes of Mt. Marcy and empties into the Au Sable River at this place. They were driven by dogs and shot on runways. The same men have brought in deer from other localities, and without doubt have exceeded the limit of three to one hunter. Quite a party went from here to Catlin Lake, in the town of Newcomb, and returned with two bucks and three does. They were enthusiastic in their praise of that section for hunting, saying that they had to keep the dogs tied till they got a mile or so from the lake, as they could "jump them up" at any point near the shores. There had been no hounding done there to amount to anything; the deer were so plenty and so tame that they could be killed at any time by still-hunting in summer. Yet that is the home of a family of noted still-hunters, beginning with old John Cheeny, ending with his descendants of the third generation. His nephews, Caleb and John Chase, are quite as skillful as Cheeny was in his best days. If it is the still-hunters that exterminate the deer, and the bounds that save them from the panthers and all other dangers, how is it that they are yet so plenty there, in a still-hunting district, while in this place, where ten or fifteen years ago the deer were more plenty and where hounding is the rule, they are now too few to pay to hunt? I think there is here a conundrum for Dr. Ward to "put in his pipe and smoke." The one good thing about this hunt was, that the party left five hounds there. They said there was no use in wintering them here. If the still-hunters of that section will think the same, and put them out of existence, the hunt will prove to have been a very successful one.

AU SABLE.