I.

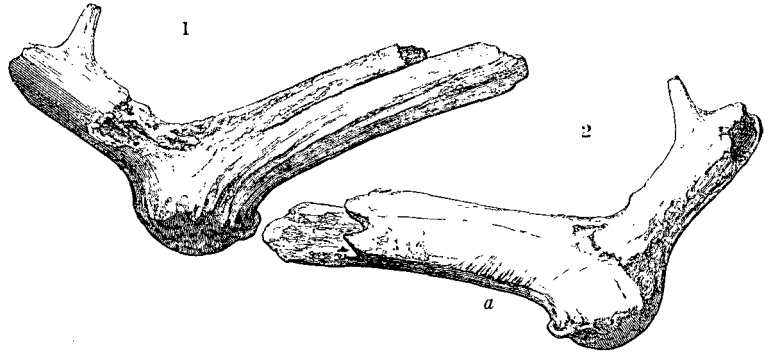
NOTICE OF THE REMAINS OF THE GREAT AUK, OR GARE-FOWL, (*ALCA IMPENNIS*, LINN.), FOUND IN CAITHNESS; WITH NOTES OF ITS OCCURRENCE IN SCOTLAND AND OF ITS EARLY HISTORY.

By JOHN ALEXANDER SMITH, M.D., Secretary S.A. Scot., &c.

As one of the editors of the "Proceedings" of the Society, I prepared the list of the various donations for the meeting of the Society held in January 1867 ("Proceedings," vol. vii.), and gave a rough summary of the collection of stone, bone, and metal implements, also portions of human skeletons and animal remains found at Keiss, Caithness; which Samuel Laing, Esq., M.P., F.S.A. Scot., so kindly and judiciously presented for preservation to our National Museum of Antiquities. Full details of many of these specimens were given, illustrated by numerous figures, in the work published by the donor, entitled "Prehistoric Remains of Caithness, by Samuel Laing, Esq., M.P., and F.S.A. Scot.; with Notes on the Human Remains, by Thomas H. Huxley, Esq., F.R.S., Professor of Natural History, Royal School of Mines, London, 1866." In preparing the notes of this donation for press I took advantage of the woodcuts Mr Laing had used in his book, and also most liberally handed over to our keeping, and gave along with them, as I have said, a short summary of the various remains.

When, however, I had afterwards an opportunity of looking over the animal remains more carefully, after they had come into our possession, I was fortunate enough to find one which from its peculiar shape had been supposed to have been artificially formed into a hammer, and had been overlooked when the other bones were examined and named by Professor Richard Owen of the British Museum. This hammer-like bone I saw was really a portion of the horn of a reindeer (*Cervus tarandus*). Accordingly I afterwards described and figured it, and gave some notes on the occurrence of the Reindeer in Scotland in a paper read before the Society in June 1869 ("Proceedings," vol. viii.).

Since that time I have brought before the Society notices of some of the other extinct animals of Scotland, as the Elk (*Cervus alces*), the Irish



Horn of Reindeer (*Cervus taraudus*) found at Keiss, Caithness.
1, Front; 2, Back view of Horn; *a*, Marks of Cutting.

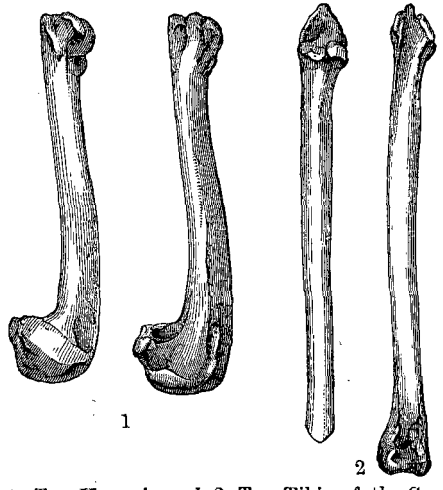
Elk (*Megaceros Hibernicus*), and the "Ancient Cattle of Scotland," published in vol. ix. of our "Proceedings." I also brought before the Society some notes of the bear, and the more doubtful rhinoceros ("Proceedings," vol. ix. p. 636), as having left some remains in Scotland; these, I regret to say, I have not been able as yet to publish in the "Proceedings."

It might be of some little interest, I thought, to add to these Notices of Extinct Animals in Scotland, a notice of the Great Auk, or "Penguin of the North," as it has been named, which would appear to have become nearly if not altogether extinct in our own day; more especially as several bones of this bird found at Keiss, in Caithness, have also been added to our Museum, and as the published reference to them in Mr Laing's work does little more than include them in the list of animal remains, with the notes, that,—"We are indebted to Professor Owen for the important identification of the *Alca impennis*, or great auk,"—"The most interesting fact is the discovery of the "*Alca impennis*," which is now extinct in Europe, having but lately died out in Iceland, but said to survive in Greenland. Its bones are frequent in the Danish Kjökkenmöddings, where they have been thought to imply great antiquity and a more glacial

climate, but it is believed that they have never been found in any tumuli or deposits of a later date than these primæval middens. Hence their discovery in the Caithness middens affords an important link of connection with those of Denmark, and strengthens the evidence of high antiquity drawn from the rudeness of the implements" (p. 50, *l.c.*).

I need not stop here to say that, of course, this argument might tell both ways; even from the presence of the recently living auk to the recent age of the middens; but into this subject I shall not enter here. Then, in our "Proceedings," vol. vii., already referred to, I have done little more than repeat the figures of the auk's bones, with a short reference to them; no detailed description being given to show what they really were.

Accordingly, some time ago, I collected various notes on the subject of the great auk, and I now bring them before you; to supply this lack of information, and also to correct a printer's mistake, in Mr Laing's book, to be afterwards explained (which for want of proper knowledge at the time, was repeated in our "Proceedings");—as well as also to add the notice of another example, to my list of Scottish animals now apparently extinct.



1, Two Humeri; and 2, Two Tibiæ of the Great Auk (*Alca impennis*) found in a kitchen midden in Caithness. (Half the natural size.)

The osseous remains of the auk figured in Mr Laing's book consist of two bones of the wing and two bones of the leg. I repeat his figures here.

The bones of the wing consist of a humerus of the right wing, and a humerus of the left wing of this bird, both perfect, each measuring 4 inches in length (woodcut No. 1). Those of the leg, are a tibia of the right leg and a tibia of the left

(woodcut No. 2); all these bones might have belonged to the same bird. One of the leg bones is whole and measures 5 inches in length; the other is broken, the lower articulation being wanting.

There is, however, another leg bone, also a tibia, rather smaller in size than the others, and belonging to the left leg of the bird; with its lower extremity also broken off. Professor Owen, from the smaller size of this bone, thinks that it may have belonged to a female bird; and that the other and larger bones were those of a male. He also makes the remark that it was the first time that bones of this nearly-extinct species had been found in Britain.

When Mr Joseph Anderson became the Curator of our Museum, he informed me (being fully cognisant of all the remains found at Keiss) that a portion of the mandible, or bill, of the great auk had also been found. From a curious printer's mistake a woodcut of this bone (there being no reference to it by Mr Laing in his short note of the bones of the great auk) had been taken as representing "apparently a small curved spear-head made from the conchoidal fracture of a piece of sandstone from the beach," and associated with the woodcut of another stone spear-head, and the two had been printed together, as figs. 44 and 45 in Mr Laing's book, as having been found in the "Birkle Hill Kist." Following this example, in my ignorance I also repeated the cuts of the two supposed spear-heads from the Birkle Hill Kist. ("Proceedings," vol. vii.) On making a search among the animal remains, accordingly, we found this bone, part of the premaxillary or upper mandible of the bird, with Professor Owen's label still attached to it, and I have now the pleasure of repeating the figure of it here, with its correct designation.

Upper mandible of Great Auk. (Half the natural size.)

Professor Owen, in his memoir on the Gare-fowl, in the "Transactions of the Zoological Society," noticed at the end of this paper, adds a note

referring to the specimens sent to him by Mr Samuel Laing from Caithness. He says: "Amongst the bones of birds in this kitchen midden, including those of the Gannet (*Sula bassana*), Shag (*Phalacrocorax graculus*), Cormorant (*Phalacrocorax carbo*), and Razor-bill (*Alca torda*), were the following bones of the Gare-fowl (*Alca impennis, L.*)—the anterior or free extremity of the premaxillary; a right and a left humerus; a left tibia; and parts of three other tibiæ, left and right. The premaxillary showed a little more vertical diameter than that of the specimen from Newfoundland here described. In both, the extent from the tip to the fore margin of the bony external nostril is 2 inches; the vertical diameter in front of the nostril in one is $9\frac{1}{2}$ lines, in the other it is 11 lines."

We have now, therefore, in our Museum these parts of the skeletons of two, if not three, specimens of the great auk, and possibly more might have been gathered in the same locality had they been specially looked for by one able to identify them.

Mr Laing in his book gives us the following list of the Fauna of the Keiss middens, p. 50:—

"Mollusca:—Limpet (*Patella vulgaris*); Periwinkle (*Littorina littorea*); Lesser Periwinkle (*Littorina nontridia*); Whelk (*Buccinum undatum*); Cockle (*Cardium*); Scallop (*Pecten majus*); Lesser Scallop (*Pecten argus*).

"Annulosa:—Lobster; (*Serpula*).

"Fish:—Cod (*Morrhua vulgata*).

"Mammalia:—Ox (*Bos longifrons*); Horse (*Equus caballus*[?], *fossilis*); Red Deer (*Cervus elaphus*); Goat (*Capra hircus*); Hog (*Sus scrofa*); Dog (*Canis familiaris*, or *familiaris fossilis*); Fox (*Canis vulpes*); Rabbit (*Lepus cuniculus*), perhaps recent.

"Cetacea:—Grampus (*Delphinus orca*), or small whale; Dolphin (*Delphinus delphis*), or some other small cetacean.

"Birds:—Great Auk (*Alca impennis*); Lesser Auk (*Alca torda*); Cormorant (*Phalacrocorax carbo*); Shag (*Phalacrocorax graculus*); Solan Goose (*Sula bassana*)."

Mr Anderson informed me that he had himself also collected various bones from this "kitchen midden" at Keiss, which he sent, by request, to

Sir John Lubbock, who got them examined and named by the late G. W. Busk, of London, as follows. Mr Busk writes:—

"1. A small *Bos taurus.*
2. A very large fox.
3. Small mature sheep.
4. A very young lamb.
5. The large guillemot.
6. The great auk (*Alca impennis*).

"Which, I see, has also been found in Mr Laing's collection; none of the bones appear to be of any very great antiquity, and I should imagine the presence of the sheep would also be against their dating to any very remote period. As the great auk was taken so lately as 1822 in St Kilda, and appears to have existed in the Orkneys in the last generation, its presence is of itself no proof of antiquity."

Mr Anderson tells me the great auk's bones here referred to were portions of a large sternum, and that they were found in the place designated by Mr Laing as "The Harbour Mound;" which he considered was simply the remains of a Broch or Pictish Tower. Mr Busk writes in addition: "The fragments of the auk's sternum would be very acceptable at the College of Surgeons, as also the fox's bones, one of which, strange to say, has sustained a compound fracture not unlike that of the bear from Gibraltar. Was it once caught in a trap?" Mr Anderson accordingly allowed Mr Busk to keep the bones for the celebrated Museum of the Royal College of Surgeons, London, where they are now preserved among the treasures of that magnificent collection.

Being anxious to learn what these fragments really were, I wrote to W. H. Flowers, LL.D., &c., Hunterian Professor of Comparative Anatomy, and Conservator of the Museum of the Royal College of Surgeons, London, and received from him the following note kindly giving me the information I asked for, and referring to the other specimens of the great auk in their collection:—

"We have a single fragment (the anterior portion) of the sternum of

the Great Auk from Caithness, which is entered as 'presented by George Busk, Esq., 1865.' This, if I remember rightly, is the specimen by which the occurrence of the remains of this bird in the 'kitchen middens' of Caithness was identified. It is the only one which was brought to this museum. We have besides the skeleton nearly complete, and a second skull belonging to the Hunterian collection, and some other bones recently found in Newfoundland."

I may mention that in our important Edinburgh "Museum of Science and Art" there are preserved two very fine eggs of the great auk; as well as several bones, the latter recently got from Newfoundland.

Notes on the Occurrence of the Great Auk in Scotland.—I might be tempted to go into some details as to the life history of this most striking bird the great auk, and its gradual destruction by man until it is now apparently almost, if not altogether, extinct. I shall, however, content myself with a few references to some of the earlier and later notices of the bird in Scotland; these may give us a few additional facts in its history which have, perhaps, been rather overlooked.

An early reference to this bird, if not the first by any Scottish writer, is to be found in "An Account of Hirta and Rona given to Sir Robert Sibbald by the Lord Register, Sir George M'Kenzie of Tarbat." I quote from John Pinkerton's "General Collection of Voyages and Travels," vol. iii. 4to. London, 1809:—

"*Hirta.*—The island of Hirta of all the isles about Scotland, lyeth farthest out into the sea, is very mountainous, and not accessible but by climbing; it is incredible what number of fowls frequent the rocks there; so far as we can see the sea is covered with them, and when they rise they darken the sky, they are so numerous; they are ordinarily catched this way: a man lies upon his back with a long pole in his hand, and knocketh them down as they fly over him. There be many sorts of these fowls; some of them of strange shapes, among which there is one they call the Gare-fowl, which is bigger than any goose, and hath eggs as big almost as those of the ostrich. Among the other com-

modities they export out of the island this is none of the meanest. They take the fat of these fowls that frequent the island and stuff the stomach of this fowl with it, which they preserve by hanging it near the chimney, where it is dried with the smoke, and they sell it to their neighbours on the continent, as a remedy they use for aches and pains."

This same Account is also printed in "The Miscellanea Scotica," vol. ii. p. 79, Glasgow, 1818. Here, then, we have the name of Gare-fowl used as that by which it was known; this is of interest, as showing probably a Norse origin, Geyr-fugl being the name by which the bird was known in Iceland, where it was once also common, as well as in other localities. *Geyr* is the Icelandic for a spear; it may perhaps refer in this case to the large spear-like beak of the bird, if not to its extraordinary speed in the water like the flight of a spear! These birds were probably at that time very numerous at Hirta or St Kilda, and it would almost appear from the reference given here that a special use had been made of their large stomachs, to hold the fat of the other sea-fowl; forming the well-known "giben" of the islanders—both for home use and for sale. In addition, of course, to its feathers, flesh, and eggs, this would add to its value, and increase the number of the birds annually destroyed by the natives.

To test, if possible, the correctness of this perhaps rather doubtful statement, I made an examination of the Sibbald MSS. now preserved in the Advocates' Library here, and especially of one entitled "A Discription of the Islands belonging to the Crowne of Scotland taken from several manuscripts," &c., by Sir Robert Sibbald. In this MS., however, I could find no continuous narrative, the same as that quoted above; but a much more detailed account of Hirta is given, being probably that furnished by Sir George M'Kenzie to Sir Robert Sibbald, of which the one printed by Pinkerton seems merely to be a short abstract. Sibbald also in his MSS. subsequently quotes at great length from Martin's account of his voyage to St Kilda. I shall quote part of the first MS., referring to the fowls of Hirta; that which is believed to have been furnished to him by Sir George M'Kenzie. He says:—"The fowls that frequentt

these Rocks are Solan Geese, which goe away at Michaelmasse and return in February. The Fulmar stayeth all the year except October. It is a small Fowle not bigger as a duke. When any approache it, it casteth out at the mouth a quantity of red oyle, which they catch in a dish at the tyme, and make use of it for atches and stitches. It is good for this. It is pure and a clear rid colour. Ther are other fowles such as the Lavir, Falkir, Gug, Gare-Fowle. The Lavir and Falkir come in July. The Gare-Fowle is bigger then any goose, and heth eggs almost as big as those of the ostrich. There are some Fowles of strange shapes. They take the fatt of the fowles that frequent thes places and stuff the stomach of the fowle with it, which they preserve by hanging it neer the chimney, wher it is dryed with the smoake. They sell it on the Continent as a remedie for aches and pains."—Sibbald MSS. 33. 3. 2, Advocates' Library, Edinburgh.

In the first part of this extract the gare-fowl is noticed, but the latter part seems to be merely a general statement referring to any of the fowls, and seems to say simply that the natives of Hirta take the fat of any of these fowls in their season and preserve it, by filling the stomachs of the fowls with it, and then drying them in the smoke of their fires. It may be of some interest to explain what the other birds here noticed—as doubtless among the most important to the natives of Hirta—really were. As previously referred to, there is the well-known Solan Goose (*Sula alba*) and the Fulmar (*Procellaria glacialis*). There are other Fowls, it is stated, such as the *Lavir*, or "*Lavy* (of Martin), by the *Welch* called *Guillem*"—undoubtedly referring to the Guillemot (*Uria troile*). The *Falkir*, or *Falk* of Martin, the Awk, or Razor-bill Auk (*Alca torda*), and the *Gug*. This last bird is not referred to by this name by Martin; Macaulay, however, tells us that "the young of the solan geese before they fly are called *Goug*. Turning to Armstrong's Gaelic Dictionary for the chance of an explanation, I find the word *Guga* translated "A St Kilda goose; a fat fellow," which I have little doubt is the true meaning of this appropriate designation for a very fat bird.

It will be noticed then that the gare-fowl is merely included in the general list of the fowls at that time doubtless most important to the natives,

without any other remark; as if it were quite as well known and as common there as any of the other birds. All the more so when you find some birds such as the "*Bowger*" of St Kilda, according to Martin "the *Coulter-neb* of the Farn Islands," or the Puffin (*Mormon fratercula*); which is at once very abundant and of the greatest importance to the natives, altogether omitted from the above general list. This seems to me to be a proof of the abundance of the great auk at that time on the island of Hirta.

Sir George M'Kenzie also refers to the great size of its eggs, so much larger than that of any of the other sea-fowl, and suggesting to him at least a comparison with the largest egg he knew, and probably but imperfectly, that of the ostrich. Then Sir Robert Sibbald, to whom this information was sent, probably before the publication of his "Scotia Illustrata;" in his second volume "De Animalibus Scotiæ," Edinburgh, 1684, at p. 22, thus refers to this bird, classing it with others, of which he says he desires a more accurate description:—

"CAPUT VII.

"*De Avibus quibus dam apud nos, Quæincertæ Classes sunt, Quarum proinde Descriptiones accuratas desidero.*

Avis *Gare* dicta, Corvo Marino Similis, Ovo maximo."

That is all the reference Sir Robert makes to the bird, and it shows us that however common it may have been at that time at the distant St Kilda, he had not seen a specimen, and that it was probably not known on our eastern coasts, but confined to the farther Hebrides on the west, or to our northern islands.

M. Martin describes the Gair-fowl more fully in his "Voyage to St Kilda," 1698, for which he tells us (with Mr John Campbell, minister of Harries, who was going to visit the island) he "embarked at the Isle Esay, in Harries, May the 29th," 1697. The wind at S.E. By change of wind, however, and stormy weather, they did not reach St Kilda until the 1st of June. After giving a list of the land fowls,—and, let me say, he gives a good description of the different birds,—he next tells us,

"The sea-fowl are first, *Gair-fowl*, being the stateliest as well as the largest Sort, and above the Size of a *Solan* Goose, of a black Colour, red about the Eyes, a large white Spot under each, a long broad Bill; it stands stately, its whole Body erected, its Wings short; it flies not at all, lays its Egg upon the bare Rock, which, if taken away, she lays no more for that Year; she is whole footed, and has the hatching Spot upon her Breast, *i.e.*, a bare Spot from which the Feathers have fallen off with the Heat in hatching; its Egg is twice as big as that of a *Solan* goose, and is variously spotted, Black, Green, and Dark; it comes without Regard to any Wind, appears the 1st of *May*, and goes away about the middle of *June*" (p. 27).

Now, from this minutely-detailed description of this bird, its strikingly erect attitude when seated on the rocks, its peculiar appearance and shape, its short wings and plumage, and its nesting, with the hatching spot on its breast, and colour of its eggs; I think it certain that Martin must have seen numbers of the bird alive; especially when we remember that he landed on the island at the very time when the yearly harvest of this particular bird must have been ready for being gathered in its season by the fowlers of St Kilda, and that he remained there, at all events until near the end of the month of June, as he tells us at p. 10: "We had the Curiosity, after Three Weeks' Residence, to make a Calculation of the Number of Eggs bestowed upon those of our Boat, and the *Stewart's Birlin* or *Galley;* the whole amounted to Sixteen Thousand Eggs." There is, however, one character which he gives, the truth of which is not very evident, at least at first sight, where he states that it is "red about the eyes," a very striking variety of colour in a bird, which has all the rest of the plumage entirely of a black or white colour. I shall, however, attempt to account for this statement when I refer to a later description of the bird also taken from a living specimen. Meantime, I may quote what Martin says in his Preface to the "Voyage":—"He has been careful to relate nothing in the following Account, but what he asserts for truth, either upon his own particular Knowledge, or from the constant and harmonious Testimony given him by the Inhabitants. People so plain

and so little inclined to impose upon Mankind, that perhaps no place in the World at this Day, knows Instances like these of primitive Honour and Simplicity; a People abhorring lying, Tricks, and Artifices, as they do the most poisonous Plants, or devouring Animals."

After describing the most striking of the sea-fowl, the gair-fowl, he goes on to tell us of the numerous other birds which are of the greatest economic importance to the inhabitants, such as the solan-goose, the fulmar, and the puffin, &c., which in great multitudes frequent St Kilda, with the times of their arrival and departure, in the same way as he has told us of the gair-fowl. He tells us also about "their great and beloved Catholicon, the 'Giben,' *i.e.*, the fat of their fowls, with which they stuff the stomach of a solan goose, in fashion of a pudding;" in another place he says: "This *Giben* is by daily Experience found to be a sovereign Remedy for the Healing of Green Wounds," &c. &c. "They boil the Sea-plants, *Dulse* and *Slake*, melting the '*Giben*' upon them instead of Butter," . . . "They use this 'Giben' with their Fish, and it is become the common Vehicle that conveys all their Food down their Throats." When describing the sea-fowl he says, "Every Fowl lays an Egg three different times, except the *Gair-fowl* and the *Fulmar*, which lay but once; if the first or Second Egg be taken away, every Fowl lays but one other Egg that year, except the *Sea Malls*, and they ordinarily lay the third Egg, whether the first or second Eggs be taken away or no." In this statement of the gare-fowl laying but once during its short stay on the island, we have another cause shown us of its easier diminution and extirpation than the other fowl.

In the preface to which I have already referred, Martin says of himself "that the Author was born in one of the most spacious and fertile Isles of the West of Scotland." He was therefore one familiar with the natives of the Hebrides, himself a native, and able, doubtless, to speak to them, and understand thoroughly their own Gaelic mother tongue.

In the other larger and later work, by the same author, "A Description of the Western Islands of Scotland," London, 1703, he gives us a series of notices of all the different Islands, referring briefly to each, and

stating their principal peculiarities and productions. He, therefore, in noticing St Kilda again, only mentions the solan goose and the fulmar as the most important of all the birds to its inhabitants, and, indeed, he refers to no other. Although we know that various other birds, as the puffin, for example, existed in countless numbers, and were also of the greatest importance; so that from his not again referring to the gare-fowl we cannot draw any conclusion, except as to its having now become of less importance than the two principal and most abundant birds, which he thinks specially worthy of being mentioned.

In a later work,—"A Description of St Kilda," by the Rev. Alexander Buchan, late minister there, which was printed in 1773 by his daughter. From her preface we learn that her father was ordained and sent to St Kilda, *alias* Hirta, in the year 1708, and that he died there about the beginning of the year 1730. Mr Buchan tells us he chose Martin's "Voyage to St Kilda," London, 1698, as the best account published; and because it is out of print he "takes a few of his remarks anent this place, which are still genuine, as we find them fitting to our present purpose as we go along." Accordingly, the most of the book is little else than extracts from Martin's "Voyage." With regard to the gare-fowl, however, we find he only gives the beginning of Martin's account of it: "The sea-fowls are, first, gare-fowl, the stateliest and largest of all the fowls here." Martin's account, therefore, was still "genuine" or correct, at that later date, and the bird accordingly remained, but probably in greatly diminished numbers, and was, therefore, now of less consequence to the islanders, and so he does not give any lengthened description of it, as he does of the other fowls, which from their continued abundance were then of much greater importance to the people.

In another and still later work, "The History of St Kilda," by the Rev. Mr Kenneth Macaulay, minister of Ardnamurchan, missionary to the island from the Society for Propagating Christian Knowledge, London, 1764; we find that Mr Macaulay visited St Kilda in the beginning of June 1758, some twenty-eight years subsequent to Mr Buchan's ministrations there. He gives considerable details of what he saw,

but, referring to the gare-fowl (at p. 156), he says:—"I had not an opportunity of knowing a very curious fowl, sometimes seen upon this coast, and an absolute stranger, I am apt to believe, in every other part of *Scotland*. The men of *Hirta* call it the Gare-fowl, corruptly, perhaps, instead of Rare fowl, a name probably given it by some one of those foreigners whom either choice or necessity draw into this secure region. The bird is about four feet in length from the bill to the extremities of its feet; its wings are in proportion to its size very short, so that they can hardly poise or support the weight of its very large body. His legs, neck, and bill, are extremely long; it lays its egg, which, according to the account given me, exceeds that of a goose, no less than the latter exceeds the egg of a hen, close by the sea mark, being incapable, on account of its bulk, to soar up to the cliffs. It makes its appearance in the month of *July*. The *St Kildians* do not receive an annual visit from this strange bird, as from all the rest in the list, and from many more. It keeps at a distance from them, they know not where, for a course of years. From what land or ocean it makes its uncertain voyages to their isle is perhaps a mystery in nature. A gentleman who had been in the *West Indies* informed me that, according to the description given of him, he must be the penguin of that clime, a fowl that points out the proper soundings to seafaring people."

Mr Macaulay seems, apparently, not to have considered gare-fowl a native, or Gaelic name of the bird, and not to have known its Norse origin. Instead, however, of putting this bird the first in his list of the sea-fowl, as the others before him have done, he places it near the end; the bird has now ceased to be of importance, and is no longer a regular visitor, but is still well known, though only an occasional visitor to the island. His description is, therefore, derived from the islanders themselves, still familiar with the bird and its more salient peculiarities and habits, one being that it laid only one egg, and that so large a one, that he thinks it necessary to qualify the statement by saying he tells what was told to him. He tells us also that the bird was obliged, from its short wings, to lay its egg close by

the sea or tide mark, and consequently was easily gathered by all marauders, but especially man. It might also be destroyed at times by gales raising tremendous seas and washing over their low-lying nesting-places—giving us another cause why this bird might be more easily injured in its nesting-places, and the species thus gradually diminished. We learn nothing, however, from this describer, who simply tells us what the natives told him, of any peculiar red colour being seen about the eyes of the bird. But we have pointed out to us here, the probable relation of the gare-fowl to the same bird under another name—the penguin of the West Indies, or rather of the North American continent, and of the northern seas, as well as the fact of its being generally found within soundings, or at no very great distance from land. Mr Macaulay also tells us of the "Gibain," which they preserve in "a kind of bag, made of the stomach of the old solan goose, caught in March."

From the time of Sir George M'Kenzie's account, when the bird was probably abundant, to Martin's visit, when the bird was doubtless a regular visitor to St Kilda, arriving in May, nesting and leaving in June; we find that it has now been altogether extirpated from this island, and at the date of Mr Macaulay's visit appeared only at uncertain intervals as an occasional visitor in the month of July, after having probably nested in much diminished numbers on some still more rarely visited, or uninhabited rocky islands among the Hebrides; where a few birds, it may be, were still able to carry on, undisturbed, the work of incubation.

These accounts apparently include nearly all that is recorded of any value in regard to the existence of the great auk in Scotland; other visitors to St Kilda giving us little additional information of any consequence as to the very rare appearance of the great auk at more recent dates.

At a still later date we have the great auk figured and described by Thomas Pennant in his "British Zoology," London, 1776, vol. ii. p. 507. He refers to Martin and Macaulay as his authorities for its presence in Britain, and to other authorities for its presence elsewhere, under the various names of Goirfugel, Penguin, Gare, *Alca major*, Le Grand Pingoin, *Alca impennis*, L., &c. I shall refer to some of these names when

I notice shortly the geographical range of the bird; meantime I shall only allude to some of the later recorded appearances of the bird on the Scottish coasts.

In the Appendix to the Supplement of Montagu's "Ornithological Dictionary," 1813, we are told the natives of Orkney informed Mr Bullock, in his tour there in 1812, that the island of Papa Westray had been regularly visited by these birds, which they designated the King and Queen of the Auks, but that of late only a male had visited the island for several seasons. A female was, however, killed just before his visit, and he had an opportunity of attempting to capture the male with a six-oared boat without success. A male bird was, however, afterwards killed and sent to him, and is now preserved in the British Museum.

MacGillivray, in his "British Birds," vol. iv. p. 361, tells us: "One was seen off Fair Isle in 1798. A pair bred in Papa Westray for several years." The latter statement is apparently on the authority of Dr Baikie and Mr Heddle, "Natural History of Orkney." He also refers to the bird got by Professor Fleming, which I shall describe more particularly, and to one or two other examples on record, of the great auk being taken on the coasts of England and Ireland. "Dr Edward Moore," he says, "alludes to one found dead near Lundy Island in 1829; and Mr Thompson of Belfast ("Birds of Ireland") mentions an individual taken in 1834 off the coast of Waterford, and preserved in Mr Burkitt's collection." (I find, however, that Professor Newton, in his paper to be afterwards noticed, is very doubtful of the correctness of this statement of the gare-fowl found on Lundy Island, as well as of that mentioned by Mr Bullock of the bird taken in Buckinghamshire, afterwards referred to; he also tells us that Mr Burkitt's specimen is now in the Museum of Trinity College, Dublin, carefully enshrined in the professorial sanctum.)

Professor Fleming was fortunate enough to have the opportunity of examining a living specimen of the great auk in 1821, when on a voyage of inspection with the Board of Commissioners of Northern Lights. The bird which Mr MacLellan had captured some time before off St Kilda

was brought on board by Mr MacLellan (Professor Fleming tells us, in his Account of the Voyage, published in the *Edinburgh Philosophical Journal*, vol. x., 1824), at the Isle of Glass or Scalpa. The bird was given to Mr Stevenson, the Engineer of the Board, who was with the party, and was intended by him for the University Museum here, but it afterwards unfortunately made its escape. A year or two afterwards, Professor John Fleming, D.D., published his "History of British Animals" (Edinburgh, 1828, 8vo), in which he gives an excellent account of the bird; and as this book is now becoming scarce, and the description refers to the living bird, I think it worth quoting in full:—

"203. *Alca impennis.*—Great Auk. Wings not reaching to the rump. Bill black. An oval patch in front of the eye.

"Gair-fowl, *Martin's*, St Kilda, 48; Penguin, *Will.* Orn. 242; Northern Penguin, *Edward's* Birds; A. im. *Linn.* Sys. i. 210, tab. 147; *Penn.* Brit. Zool. ii. 507; *Temm.* Orn. ii. 939. *S.* Gair-fowl, King of the Auks. Breeds occasionally in the island of St Kilda.

Length, 3 feet. Bill, dorsally, 3 inches; in front of the nostrils, $2\frac{1}{4}$; in the gape, $4\frac{1}{2}$; depth, $1\frac{5}{8}$; 7 ridges in the upper, and 11 in the lower mandible. Legs black. Irides chestnut; margin of the eye-lid black. Inside of the mouth orange. Head, back, and neck, black; the latter with a brownish tinge. Quills, dusky; secondaries tipped with white. Breast and belly white. In winter, the brownish-black of the throat and fore-neck is replaced with white, as I had an opportunity of observing in a living bird brought from St Kilda in 1822 (see *Edin. Phil. Jour.* vol. x. p. 97). This bird occasionally visits the Orkney Islands, as witnessed by Mr Bullock (*Mont.* Orn. Dict. Supp.). I have been informed by the same observer that an individual was taken in a pond of fresh water two miles from the Thames, on the estate of Sir William Clayton, in Buckinghamshire. When fed in confinement it holds up its head, expressing its anxiety by shaking the head and neck, and uttering a gurgling noise. It dives and swims under water, even with a long cord attached to its feet, with incredible swiftness."

It is interesting to observe how this careful and minute description agrees with the early account given of this bird by Martin, which

I have already quoted. It also, I am inclined to think, shows that even the mistakes or less careful observations of the earlier non-scientific describer may be, perhaps, corrected by the later and more careful description of the naturalist. Thus Martin, in his description of this bird, tells us, not that the eyes are red, but that it is "red about the eyes, a large white spot under each," &c. Fleming, from his examination of the living bird, tells us, "the eyes are chestnut, the margin of each eyelid black." He notices, of course, but more particularly, the other striking characters of the black head and the white spot in front of each eye, but he also points out the fact that "the inside of the mouth is orange," probably, also, the edges of the mouth; a character which would be distinctly seen only in the living or recently killed bird. Now it seems to me not unlikely that this may explain the rather puzzling statement of Martin, that it was red about the eyes, which he gives in his somewhat cursory description, as he saw, probably in the distance, the living birds opening and shutting their beaks, with wide extended gape reaching below and beyond their eyes; or the recently killed birds carried about by the native fowlers as they returned from capturing them on their low-lying nesting-places on the rocks. He could not avoid being struck with the great contrast of this reddish orange colour, with the sombre black and white plumage of the rest of the bird, and might therefore speak of it in this general way as being "red about the eyes." Otherwise it is not easy to account for such an apparently strange addition to his in other respects, very correct description of the bird. We must also remember, as I have already pointed out, that Martin visited the island at the very time the harvest or in-gathering of this particular bird must have been going on. It seems to me, therefore, an additional proof of the fact that Martin had seen these birds alive or recently killed; because, though it might be a not unnatural mistake for a mere unscientific visitor to make, especially one not particularly knowing or interested in all the varieties of the abundant sea-fowl, still it is not one at all likely to be made by a native, describing the bird in detail to him; who would, of course, be thoroughly conversant with all the peculiarities

of the various birds found in the island, and at the same time was, as Martin tells us, so perfectly truthful in all his statements.

Mr Joseph Anderson has called my attention to a specimen of the great auk included in the interesting "Synopsis of the Newcastle Museum," by G. T. Fox, Esq., F.L.S., &c. Newcastle, 1827. 8vo. It includes the collections of Marmaduke Tunstall of Wycliffe, made in the latter part of the last century, and the additions made to them by George Allan, of Blackwell Grange, near Darlington. This combined museum was purchased in 1822 by Mr Fox for the Literary and Philosophical Society of Newcastle, and now forms part of the Newcastle Museum. Mr Fox has added various curious notes from the MSS. of Mr Allan to illustrate the history of many of the specimens. I shall quote his notes to the specimen of the great auk, which are interesting as giving us early and additional information about this bird, its nesting, and its young:— "THE GREAT AUK (*Alca impennis*, Linn. and Gm.) breeds on the island of St Kilda. Lays one egg, close to the sea-mark, six inches long, which, if taken away, they will not lay another that season. Feeds on fish, is a very shy bird, walks ill, but dives well, and is seldom observed beyond soundings. The wings are so small as to be useless for flight." . . . "The old ones are rarely seen ashore, though the young are not unfrequently met with.—Allan MS." p. 92. "They burrow like rabbits; sometimes three or four take possession of one hole, and hatch their young together in a common nest, and sit upon this their general possession by turns. When sitting or attempting to walk, they seem like a dog that has been taught to sit up and move a minuet.—Allan Cat., No. 294." Mr Fox adds the following notes:—"Our bird is apparently a young one, agreeably to Mr Allan's remark. I add some description of it, as the young was not known to Temminick.—Neck black, spotted or mottled with white; bill, upper mandible, with one large sulcus at the base, none at the tip, in this respect analogous to the young and old Razor Bill (*Alca Torda* and *Pica*, Linn.); six or eight grooves at the tip of the lower mandible, but without the white ground.—ED." p. 92. "Dr Latham notices our specimen in these words: 'In Mr Tunstall's Museum is one

of these with only two or three furrows on the bill, and the oval space between the bill and the eye speckled black and white. This is probably a young bird.'—Syn. iii. p. 312. (*See* our remarks before.—ED.) 'This species is found in greater plenty in Iceland than elsewhere.'—Arct. Zool. Int. 72," p. 211.

Mr Allan in these notes quotes probably from Latham's "General Synopsis of Birds" (London, 1785, 4to), but he also adds the account of its nesting in holes, from some private authority of his own, or one unknown at least to me, as I have not seen it referred to by any other naturalist. Can this possibly be a variety in its nesting; or simply a reference by mistake to the great auk, of what we know to be the habit of the Puffin (*Mormon fratercula*), one of the most abundant species of birds on St Kilda? This peculiarity of the Puffin making its nest in holes was, however, also well known to Mr Allan, who specially notices the fact in his reference to this bird in the MS. notes to the Synopsis of his Museum.

In these few notes, then, we have an account of the gradual extirpation of the great auk from the island of St Kilda, and a similar history might probably be given of its disappearance from many of its other old localities. The bird, adapted by its form and small wings for speed in the water alone; its nesting-places accordingly close to the sea-shore; both birds and eggs being thus easily taken on the land by all marauders, and laying, as it did, only once in the season. The numbers of the birds would thus be gradually diminished as their nesting-places became known, the bird becoming scarcer and scarcer, until only a stray individual is seen at distant intervals of time, and at last the bird ceases to appear altogether over the whole range of its old known localities.

How interesting, then, is its life history, showing as it does, how a whole species of animals, from various apparently accidental causes, is gradually brought to a conclusion in our own day, and, like many others that have gone before it, is apparently now almost if not altogether destroyed by man from off the face of the earth. At the same time, a stray

specimen has been captured near St Kilda so recently as to have been examined by our old friend the late Professor Fleming, D.D., and in the comparatively few years that have passed since that time, the bird is now considered by naturalists as being in all probability altogether extinct; so far, at least, as there is any recent knowledge of it by men of science of all countries.

In the comparatively few museums where this bird has been preserved, its remains are now, therefore, cared for as among their most prized, because among the rarest, of their natural history treasures.

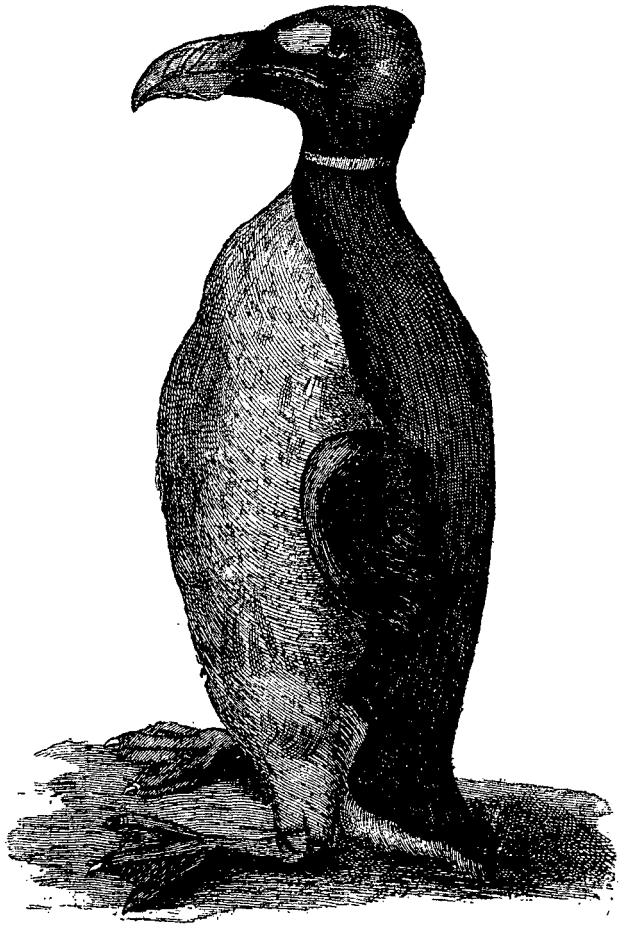
Early History and Geographical Range of the Great Auk.—Naturalists have stated, in a general way, that the great auk inhabits the northern oceans of Europe and America.

Perhaps a few notes taken from the older works on natural history may be of some little interest in relation to this subject.

Carolus Clusius, in his "Exoticorum Decem Libri," Leyden, 1605, figures and describes the true Penguin of the Southern or Pacific Ocean under the name of *Anser magellanicus*, of which he says the name *Pinguin* is derived from their excessive fatness. "Illas autem a pinguedine quâ erant præditæ, *Pinguins* appellarunt" (p. 101). He also figures and describes a foreign bird, a coloured drawing of which had been sent to him by James Plateau of America. He had seen no description of this bird recorded (lib. v. p. 103.) The bird is manifestly the great auk, and he designates it the *Mergus Americanus*, which he describes pretty correctly with the remarkable white spots and all. The figure given is not a good one, and I may therefore quote a part of his cautious description to show there can be no doubt of the species :—" Rostrum aquilinum et satis crassum, non planum, in quo nulla dentium vestigia expressa apparent: ejus autem partem pronam obliquas quasdam strias habuisse, pictura fidem faciebat, et anteriorem capitis paullò supra rostrum partem, albâ macula insignitam, si pictor quidem legitime illam expresserat," &c.

Olaus Wormius, in his " Museum Wormianum seu Historiæ Rerum Rariorum" (Copenhagen), Leyden, 1655, at p. 301, gives an excellent figure

of the great auk, which he describes as the *Anser magellanicus, seu*



Anser magellanicus, seu Pinguini, of Olaus Wormius; from Faröe, 1655.
Great Auk (*Alca impennis*, Linn.)

Pinguini of Clusius, confusing it, however, with his *Mergus Americanus*, the true great auk, and stating he had got one from the Faröe Islands,

which he kept alive for several months, and from which this excellent figure of the great auk is taken. Its only peculiarity being that it seems to have in addition a narrow white collar round the neck of the bird; this, however, may be perhaps explained as a mere variety due to the remains of its winter plumage, when the throat and neck are more or less replaced with white. As this figure of the bird, both from its early date and its being taken from the living bird, is of much interest; I give a fac-simile of it here, reduced in size by one-third.

Wormius seems, therefore, to consider the great auk the same as the true penguins of the south; and when describing this bird he refers to the distinct white spot above each of the eyes "that you would have sworn were a pair of spectacles," and remarks "(which *Clusius* observed not)," whereas Clusius really did so when describing the same bird, the great auk, which he, however, had named the *Mergus Americanus*.

Then in "The Ornithology of Francis Willughby," edited by John Ray, London, 1678, there is repeated in his chapter on "The Bird called Penguin by our Seamen," the confounding by Wormius of the true "Penguin of the Hollanders, or Magellanic Goose of Clusius," with the *Mergus Americanus* and the same bird the great auk, from the *Ferroyer* Islands. Willughby also gives a reduced copy of the figure (great auk) of Wormius, with the title Penguin of Wormius.

John Ray, again, in his own "Synopsis Methodica Avium et Piscium," London, 1713, under "PENGUIN *nautis nostratibus, quæ* Goifugel *Hoieri* esse videtur," compares the two birds, and considers it scarcely credible that the *Anser magellanicus* of Clusius, and that described by Wormius from the islands of Faröe can be the same. He mentions also that the specimens in the Royal Society of London, and in the museum of John Tradescant, agree with the former rather than the latter bird.

George Edwards, in his "Natural History of Birds,—The most of which have not hitherto been figured or described, and the rest, by Reason of obscure or too brief Descriptions, without Figures, or with Figures very ill design'd, are hitherto but little known," part iii. London, 1750, 4to, —describes and figures (Plate 47) the great auk under the name of the

Northern Penguin. After describing the bird, he says:—"This Bird I procured of the Master of a *Newfoundland* Fishing-Vessel, who told me, it was taken with their Fish-baits, on the Fishing-banks of *Newfoundland*, near an hundred Leagues from Shore. This Bird hath already been figur'd and described; but the Figure has a Ring round the Neck in *Willughby*, which is not found in the natural Bird and the Descriptions are not clear; it is also confounded with the Southern *Penguins*, and Mr *Willughby* seems to think them and the Northern the same Birds; but I who have seen several both from the South and the North, am so far from being of his Opinion, that I should rather make them of two distinct Tribes of Birds. The Southern has four toes on a Foot, tho' Mr *Willughby* says *Clusius's* Figure is false in having four Toes whereas it is confirmed to me to be true. The Southern has also different Wings, and nothing on them to be called Feathers; see one of the Prime Quills figur'd in the Plate, together with a Quill of the Northern, both of their natural Size. See the *Penguins* from the South, Plate 49 and 94 of this Work. I have figur'd this Bird principally to show, that the above described Bird is a distinct Species, if not of a different Genus, from those called *Penguins*, about the *Streights of Magellan*, and the *Cape of Good Hope.* The above describ'd is a Bird common to the Northern parts both of *Europe* and *America*, it being found in the Island of *Ferro* belonging to *Norway:* see what Mr *Willughby* has said and collected of *Penguins* in his *Ornithology*, pp. 322, 323. All the *Penguins* have escaped Mr *Albin's* Notice" (p. 147).

Mr Edwards in his Plate gives a pretty good figure of the great auk, with a full-sized drawing of its bill, and of one of its longest primary quills ($3\frac{1}{2}$ inches in length), also one of a southern penguin (little more than half an inch long). It, however, is not so good as the older figure from the living bird by Wormius, of which I have given a reduced copy; it is taken from a stuffed specimen, the bird being made to stand erect, and raised up, on its short legs. Edwards's criticisms on Willughby are, of course, occasioned by the confounding together by him of the Penguin of the Southern with that of the Northern oceans.

I may mention that naturalists now include the true penguins of the Southern, and the great auk of the Northern oceans, as being both members of the same great Family ALCIDÆ. The great auk belonging to the Sub-Family *Alcinæ*, and the Penguins of the south, to another Sub-Family altogether, the *Spheniscinæ*.

Carolus Linnæus, again, in his "Fauna Suecica," Lugduni Batavorum, 1746, describes the great auk as :—

" 119. ALCA rostri sulcis octo ; macula alba ante oculum."

He, however, gives references to Barthol, act. p. 91, Avis garfahl; the Penguin of Willughby ; the *Anser magellanicus* of Clausius and of Wormius, and the Penguin of Ray, which he supposes is the same bird, only he gives the habitat of the great auk as in Norway—"Habitat in mari Norvegico rarius."

In his SYSTEMA NATURÆ, Holmiæ, 1758, the great auk, now named the *Alca impennis*, is quoted from his "Fauna Suecica," 119 ; with references to the *Anser magellanicus* of Wormius, and the Penguin of Willughby and Edwards : and the note—"*Habitat in* Europa *artica.*" This mistake, however, is put to rights in later editions. Thus we find it quoted as No. 140 in his "Systema Naturæ," of Leipsic, 1788, where the whole matter is corrected, and the Great Auk, *Alca impennis*, is given, with proper references to Clusius, Wormius, &c., and the Great Auk of Pennant, Grand Pingouin of Buffon, "Hist. Nat. des Ois." ix. p. 393, t. 29, Pl. enl. n. 367 ; which, we are now informed : "*Habitat in* Europæ *et* Americæ *articæ alto mari.*"

Otho Fabricius, in his "Fauna Groenlandica," Hafniæ et Leipsiæ, 1780, describes the great auk under Linnæus's name of *Alca impennis*. He gives its Greenland name, *Isarokitsok* (Little Wings), and says—"Habitat in alto mari, raro ad insulas extremas visa, et quidem tempore brumali. Veteres rarissimi" (p. 82). He tells us that it breeds on rocks in the sea the most remote from the presence of man, and he does not think its nest has been seen in Greenland, although he has seen young birds in the month of August still showing much of the greyish nesting down among their feathers. He therefore supposes they were not very long from the nest,

and could not have come from a very great distance. He tells us also that Eggert Olafsen, in his Bjarne Povelsen's "Reise igiennem Island Soröe," 1772, describes its nest and eggs in his account of the Soröe Island; which is on the coast of Norway, not far from the North Cape. He also adds a remark of some interest, as showing an economic use made of the stomach of the great auk, probably from its size. The gullet and stomach were used as a bag filled with air,—an inflated bladder-like float, attached to the line of the Greenlander's favourite weapon the harpoon —"Usus idem ac precedentis (*Alca pica*), faux tamen etiam pro vesica jaculorum habetur."

Pennant in his "Arctic Zoology," London, 1785, 2 vols. 4to, says of the great auk :—"Inhabits (but not very frequently, the coasts of *Norway*), the *Ferroe* islands (in a certain number of years *St Kilda*), Iceland, Greenland, and *Newfoundland*."—Vol. ii. p. 509.

Sir John Lubbock in his "Prehistoric Times," London, 1869, tells us of the former presence of the great auk in Denmark; when describing the fauna of the Kjökkenmöddings, or shell mounds, he says—"Perhaps the most interesting of the birds whose remains have been identified is the great auk (*Alca impennis*, L.), a species which is now almost extinct," (p. 225). The other birds found in these kitchen middens include the capercailzie, several species of ducks and geese, and the wild swan

Audubon, in his "Synopsis of the Birds of America," Edinburgh, 1839, says of this bird, which he figures and describes—"Rare and accidental on the banks of Newfoundland; said to breed on a rock near that island;" while MacGillivray tells us in his "British Birds" the specimen figured by Audubon was got by him in London.

Traces of their former presence, however, still remain in the various islands bearing the name of Penguin or Geyr-fugl Islands, on the northern coasts of the Atlantic and North Sea.

We have thus attempted to clear up some of the confusion connected with the early history of the great auk, or the northern penguin, and have given these notices of the bird found and breeding on the coasts

of America, rarely so far north as the borders of the Arctic Sea, and also in Norway, Denmark, Iceland, and Faröe; as well, as we have already stated, in the Orkneys and St Kilda; showing thus its former extensive range over the north Atlantic Ocean and the North Sea.

[Turning recently for any later notice of this bird to Mr Robert Gray's valuable "Birds of the West of Scotland," I find an interesting and lengthened account of the bird given, with references to both old and recent authorities, one of the most important of which, unfortunately, I have only now been able to see. I refer especially to a paper by Professor Alfred Newton, of Cambridge, on "The Gare-fowl and its Historians," published so long ago as 1865, in the *Natural History Review*. Professor Newton goes over much of the ground I had taken up, though perhaps not quite so fully, on the Scottish localities. He, however, gives details of the more recent notices of the bird, reviewing the different writers on the subject, and giving accounts of its recent appearance in the Faröe Islands, and in the various small islands off the coast of Iceland down to 1844; when the last capture of two great auks was made at Eldey, which were sent to the Royal Museum at Copenhagen. Indeed, Professor Newton is inclined to think it not impossible that a few birds may still perhaps survive on the remote and inaccessible Geirfugladrángr rocks off the coast of Iceland; or on the outlying and rarely visited Virgin Rocks on the north-west side of the Great Bank of Newfoundland. He also introduces us to the paper of Professor Steenstrup, which tells of the wonderful abundance of this bird at one time on the coasts of Newfoundland, as brought out in the accounts of the voyagers of the sixteenth century. Where, indeed (as I have been informed by a gentleman recently from Newfoundland), the birds have been seen by fishermen still alive; and their bones have been sought for and found in quite recent times in great abundance (as at the Funk Islands, off the coast of Newfoundland), reminding us thus of the similar abundance of the true penguins in the islands of the Southern Ocean, and proving that the pen-

guin of the old sailors in these northern seas; as, indeed, was shown by the old writers in natural history, was really the great auk.

I must, however, refer any who wish more information as to the general history of the bird, to this valuable paper by Professor Alfred Newton, and can only hope that, as he is so fully informed on the whole subject, and is such an accomplished ornithologist, he will give us even a still more instructive, interesting, and exhaustive monograph of the Life History of this probably now extinct bird.]

Geological Range of the Great Auk.—The geological history of the great auk is but a short one, as it belongs, so far as I am aware, only to our recent period. Its remains, therefore, are now to be sought for in any of the recent deposits; and as it was used extensively for food, it will also be found among the remains left by man in his kitchen middens, especially in those occurring near the old localities where it was at one time abundant in Scotland, as in Orkney, and above all in St Kilda, where it is probable the bones of this bird may be discovered, by those able to detect them, among the remains of the abundant sea-fowl, the food of the natives of the island for many generations.

In the instance I have now brought before you, you have some bones of several specimens of this bird accidentally discovered among the debris of the kitchen middens of a Broch at Keiss, on the sea-coast of Caithness, where no record or tradition now remains to tell us that this bird ever existed; and doubtless it will be found in many other similar localities round our coasts. With regard to the question of the supposed age of the auk remains found in the ruins of this Broch at Keiss, I may remind you that, in my notice of the horn of the reindeer found in the same locality, I called attention to the statement made in the Orkneyinga Saga that the Norsemen came over from Orkney to Caithness to hunt the reindeer in the twelfth century. Then Mr Joseph Anderson, in his valuable paper on the Brochs or Pictish Towers, published in the "Archæologia Scotica," vol. v., gives us evidence to prove that the brochs were erected by the Celtic inhabitants of the country to protect them-

selves from the incursions of the Norsemen, and may therefore range in age and occupation from the sixth to the tenth or later centuries. But we must always remember that the kitchen midden associated with any broch is, of course, not necessarily of the age of this earlier occupation; as most of the brochs show distinct traces of a secondary occupation; and this broch had a fire-place with a chimney made in one of its original entrances; which Mr Laing describes in his book, pp. 25, 26. In this case, at least, a great part of the kitchen midden may be fairly assumed as belonging to a late and secondary occupation of the broch. We have thus a probable approximation to the comparatively recent times when the great auk may have lived on the coasts of Caithness.

I have already referred to the fact of the discovery of the remains of this bird in the kitchen middens of Denmark, and again call attention to Professor Steenstrup's paper (quoted by Professor Newton) telling us of their bones having been found quite recently, in great abundance, on the sites of their old nesting-places on the coasts of Newfoundland, as described by the voyagers of the sixteenth century.

Note.—I subjoin a note of some of the more recent authorities quoted by Professor Newton in his paper referred to; which, with the exception of Professor Owen's, I have not as yet been fortunate enough to be able to examine, but have no doubt are all well worthy of the study of those wishing to get a full account of the general history of this bird.

"Et Bidrag Til Geirfuglens Naturhistorie og seerligt Til kundskaben om dens Tidligere Udbredningskreds. Af J. Jap. Sm. Steenstrup, Kjöbenhavn, 1857. (Naturh. Foren. Vidensk. Meddelelser, 1855, Nos. 3–7.)"

"Abstract of Mr J. Wolley's Researches in Iceland respecting the Gare-Fowl, or Great Auk (*Alca impennis*, Linn.) By Alfred Newton. *The Ibis*, 1861, pp. 374–399."

"Description of the Skeleton of the Great Auk or Gar-fowl (*Alca impennis*, L.). By Professor Owen." "Transactions of the Zoological

Society of London," vol. v. pp. 317–335. This memoir, with its descriptions and figures, will be valuable for assisting inquirers in the identification of the bones of the gare-fowl, which may chance to be turned up in the course of the examination of any of the "kitchen middens" of our sea-coasts.