

Institute, for the generous appropriation made by him to sustain the several courses of lectures given under the auspices of the Society, during the past winter.

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May 17, 1871.

The President in the chair. Thirty-five persons present.

Dr. Thomas Dwight, Jr., presented by title, "A Description of the Whale, *Balænoptera musculus*," now in the possession of the Society, with remarks on the classification of the Cetacea.

The Secretary read the following paper:—

CATALOGUE OF THE ORNITHOLOGICAL COLLECTION OF THE  
BOSTON SOCIETY OF NATURAL HISTORY. BY PROF. ALPHEUS  
HYATT.

A catalogue of the birds in the possession of this Society is here begun, and the observations recorded are only of such a cursory character as have been made in the course of this work. The subject of the present article, the Spheniscidæ, having been analyzed as a group only by Schlegel, more time and space have been given to them in proportion to the number of species than will be found necessary for other groups. Similar series of observations, however, upon the genera and species will be published, so far as they may be deemed appropriate or useful. The synonymy of each species has been followed out only so far as is necessary in order to settle the appropriate name for each species, and give references to some one or two of the best figures extant.

It is incumbent upon me to express the most grateful acknowledgments to the Smithsonian Institution and Peabody Academy, for the loan of books and specimens; to Prof. S. F. Baird and especially to Dr. Elliott Coues, for revision of my manuscript and proof sheets and many other acts of courtesy and kindness. The note at the end of the enumeration of the species is also by Dr. Coues, and gives an important summary of the principal osteological characteristics of the family.

## SPHENISCIDÆ.

The general affinities of the genera and species of the larger part of this family come to a focus in *Spheniscus minor*. This, while holding a strictly intermediate position, presents a nearer approach to the lowest members of the genera *Pygoscelis*, *Eudyptes* and *Aptenodytes* than any other existing form. Though not very closely related to *Aptenodytes*, it is quite as near this as any other known species, for, as I shall show in the generic analyses, the resemblance of *Pygoscelis papua* to *Aptenodytes* is counterbalanced by characteristics which really ally it closely with *Spheniscus minor*. *Eudyptes chrysolophus*, which stands precisely intermediate between *Spheniscus* and *Eudyptes*, affords an opportunity of making a new genus founded upon a combination of the short tail and coloration of the former with the bill and head plumes of the latter.

If we consider the three modifications which presumably take place upon the basis of the organization of *Spheniscus*, we find that they cannot be associated in any system but one of radiating straight lines.

Every series, except *Aptenodytes*, which has only two very closely allied species, exhibits a decided change in each species. This change in *Pygoscelis* and *Eudyptes* carries each species farther from the lowest member, which in each case is more or less like the ancestral form which was probably closely allied to *Spheniscus minor*. It is entirely conjectural, whether *Aptenodytes* came originally from *Spheniscus* or *vice versâ*, or whether they both sprang from a common ancestor. Such a question can of course only be settled by reference to fossils, and these, with a single Australian tertiary example, are at present wanting.

The family may be divided into two groups; those with truncated mandible and hooked maxilla, and those with both jaws curved and the spindle-shaped areas of the sides of the mandible bare and highly colored. If it is divided according to the length of the tail feathers, the genus *Eudyptes* must be dismembered, if, according to the greater or less feathering of the bill, *Pygoscelis* must be separated into as many groups as it has species, and in either case the genetic connection of *Spheniscus* with *Pygoscelis* and *Eudyptes* is violated. Such a connection may be legitimately inferred in any series of species from the affinities of the adults, when they present in regular succession or gradation a progressive series of changes or

modifications departing more and more widely from some central or original type, whether that type be still in existence or not.

This is undoubtedly the case among the Spheniscidæ. *Pygoscelis* has a long tail, and step by step the nostrils become feathered; *Eudyptes* begins lower with a short tail, then a long tail is added and the aberrant characteristics of the bill are increased. Throughout these two genera the bill has suffered considerable modification, but only in one species, *Pygoscelis adeliæ*, is the mandible sharp at the end, and though every other characteristic of the species may have been changed, the mandible remains straight and truncated. In *Aptenodytes* this law of progress is broken through, and we find not only the long tail developed, but a very long and peculiar bill correlated with a system of coloration distinct from that of all the rest of the family, and apparently an exceptional system of nidification.

According to Jules Verreaux the female of *Aptenodytes Pennantii* carries one egg between the thighs in a pouch formed by a fold of the skin of the abdomen, this pouch disappearing after incubation; *Spheniscus demersus* and one species of *Eudyptes* which were also examined, deposited and hatched their eggs in the regular way.<sup>1</sup>

It is hardly necessary to repeat the family characteristics, they are so well known to every one. The wings are mere lateral paddles covered by feather scales on the upper side, but by perfect, though short, feathers on the under side. All the feathers are exceedingly immature, and the tail feathers have unusually large, broad shafts.

According to Nitzsch there are no apteria. The feathers themselves are narrow, lanceolate, with a very broad, flat shaft, convex beneath, with the ordinary furrow of the lower surface wanting.<sup>2</sup> The terminal barbs are rigid, bristle-like, and flat, at the lower part soft and downy. The aftershaft is recognizable, and similar to the shaft. The tube is short and fusiform, and discriminated from the shaft by a deep constriction. No specially formed remiges can be detected in the wings, but in the tail stiff rectrices are distinguishable. The feathers of the oil gland circlet have finer but still rigid shafts and much longer, capillary, soft barbs which are downy below. The number of the orifices in the gland was not ascertained. The species examined by him were *Spheniscus demersus* and *Aptenodytes Pennantii*.

So far as my observations have gone there appear to be two forms

<sup>1</sup> Revue Zoologique. 1847.

<sup>2</sup> This is not always the case; often in the younger, and in the wing feathers, and even in some adult feathers, a faint trace of this groove may be observed.

of feathers, exclusive of the tail feathers and the long filiform plumes which occur on the heads of the species of *Eudytes*; one is the type found in *Spheniscus*. This has the barbs and shaft which form the extremity of the feathers dark colored, the remaining barbs and the base of the stem growing lighter until the down at the base becomes perfectly white. The stem is in these very flat, and the bases of the barbs turned where they join the shaft or aftershaft. This division of color I presume takes place when the aftershaft barb takes the place of the true shaft barbs, but this I could not determine satisfactorily. In the feathers of *Spheniscus* they occupy a considerable proportion of the whole length of the rather short and truncated plume.

In *Aptenodytes Pennantii* the stem, instead of being but slightly inflated at the base as in *Spheniscus*, is very considerably so; and is, together with the barbs, brownish to the very base as in this genus; the black being, on the contrary, confined to the very summit of the feather. In the form of the stem and its color, the outlines of the feather and the tumidity of the bases of the barbs near the base of the stem, it is very similar to the dorsal feathers of *Spheniscus*, but in the form of the stem and in size it is precisely like *Pygoscelis*.

This genus has very large shafts to the dorsal feathers, very broad and abruptly lanceolate, the tube being smaller at the base than in any other genus. The shaft itself is very broad, becoming suddenly acute instead of gradually tapering, and the tip of the feather itself more acute than in either *Spheniscus* or *Aptenodytes*. The barbs and stem are dark colored at the summit, but speedily become white and wholly downy at some distance from the base. This renders the tip of the feather much denser than the lower two-thirds and gives an attenuated, ragged look to the whole. *Eudytes* has smaller feathers than *Pygoscelis* and the stem considerably longer and narrower, and not so abruptly lanceolate. The tip of the shaft narrows and gradually reaches nearly to the outline of the barbs—these being very short. The outline of the dorsal feathers is much the same as in *Pygoscelis*, with perhaps a slightly more acute tip. The long, lanceolate head feathers are peculiar, and differ from the dorsal feathers in the extreme length of the shaft as well as the small size and thinness of the base of the stem, which bears the later developed barbs. The feathers on the back of the heads of the different species of this genus present an approximation to this same mode of growth, the shaft being attenuated. In other genera the head feath-

ers differ from the dorsal ones only in their smaller size and generally attenuated proportions.

The term "scales" used for the abortive feathers of the wing is an awkward substitute for a more technical expression. These are really feathers in which a simple shaft alone is developed, and this becomes very broad and lanceolate in the outer feathers of the wings. The former are merely fringed by the short barbs, but in the centre of the wing true feathers are developed, though the shaft still remains the principal part, and the color of both shaft and barbs is dark nearly to the base. The form and shape of these feathers also accord with those on the back. In *Spheniscus* and *Aptenodytes* the shaft is gradually tapering, the terminal and lateral barbs long; in *Pygoscelis* there is a much more sudden tapering at both extremities, though the barbs are still long; and in *Eudyptes* there is a gradual tapering with very short terminal barbs.

The feathers of *Aptenodytes* confirm the conclusion deduced from its other characteristics, that it is nearly allied to *Spheniscus minor*. The differences and resemblances between it and *Pygoscelis* are precisely what might have been anticipated if both of these had descended from a type having similar characteristics, and standing in the same relative position as *Spheniscus minor* does.

The toes are scutellate on the distal portions, but higher up reticulate with hexagonal and finally tetragonal or rhomboidal plates on the tarsi. The legs are situated posteriorly, the bird standing erect when on land; most of the crura are buried; the tarsi very short, flat and very broad, the tibio-tarsal joint nearly covered by the feathers, the four toes extended forward and are webbed, the hallux very short, lateral,<sup>1</sup> and attached to the base of the tarsus on the inner side. Nails remarkably broad and flat; the middle toe invariably the longest, all of them straight, and webs complete. The bill has the maxilla curved at the tip, and usually divided by lateral grooves in which the nostrils are situated.

#### APTENODYTES.

Coloration is markedly distinct. The long narrow horns of orange on the sides of the head, the black of all the fore parts of the head,

<sup>1</sup> Whether the hallux is elevated or insistent cannot be decided satisfactorily, it seems to vary — in some species or rather specimens to be elevated, and in others the nail bends under, touching the ground, and perhaps might be considered as insistent rather than elevated.



the blue grey of the back of the neck and the partial collar formed by the extension of this color below the lateral orange bands, are all peculiar to the two species representing this genus. The bill is extremely long and shallow, but very wide proportionally at the base, and flattened. The tip is acute and bent in both mandibles. Broad orange colored spaces occupy either side of the mandible for two-thirds of its length, tapering to a point at either extremity.

Nostrils naked and, in the specimen examined, buried in the nasal groove, which is very deep and distinct.

The maxilla is covered with feathers somewhat more than half its entire length. Tail feathers long. Size largest in the family.

#### SPHENISCUS.

The coloration is uniformly dark, strongly contrasting with *Aptenodytes* in this respect. There is, however, a constant tendency to form a collar around the throat as in *Spheniscus magellanicus*, and to leave the sides of the head lighter colored. The bill is straight, short, laterally compressed, narrow and deep, the maxilla distinctly hooked, the mandible truncated. The feathers extend only a short distance on the maxilla; the nostrils are exposed and naked, the nasal groove being very shallow. In *S. demersus* and its immediate congeners the maxilla has also several sulci towards the base.

The mandible is feathered to the angle of the lower and upper corneous plates of the jaw—about one-half of its length. Tail feathers very short.

#### PYGOSCELIS.

The coloration is uniformly dark, and there is a general tendency to form incomplete hoods of color. Thus, in *P. papua*, the hood is broken by a white semi-lune on top; in *P. antarctica* by white cheeks, the lower border of the hood, however, still remaining as a dark line encircling the throat just below the base of the bill; in *P. adeliae*, when adult, the hood is complete, but the white cheeks of *P. antarctica* are represented by a semi-circle of white continued upward from the neck towards the eyes on either side.

The bill is straight, not so long and flattened as in *Aptenodytes Pennantii*, but looking quite like the bill of that species. Of course it is destitute of the colored patches on the sides of the mandible, the apex of which is truncated with an ascending gonyx, instead of being acute and decurved as in *Aptenodytes*.

Both mandibles are feathered for at least half their entire length, but the nostrils may be either naked, as in *P. papua*, or covered, as in the other three species.

In *P. adeliæ* the amount of the bill exposed is small, (only about one-third), the nostrils are thickly covered, and the naked angle of the upper surface of the bill is very short. The nasal groove is very abrupt and widens out rapidly toward the skull, instead of being long and narrow as in *P. papua* and *Aptenodytes*.

Although the bill becomes shorter in this species, like that of *Spheniscus*, it maintains the breadth of base viewed from above, which characterizes *Aptenodytes* and *Eudyptes*. The tail feathers are very long in all of these species.

If now we seek the affinities of the different forms, we are at once impressed by the fact that *P. papua* and *P. antarctica* really represent *Spheniscus*, and *P. adeliæ* is similar to *Eudyptes*. *P. papua* possesses the longest and narrowest bill of any, except *Aptenodytes*; both mandibles are feathered as in *Spheniscus minor*, though the plumes reach farther forward; the nasal groove is also very similar, especially as it is not strictly coincident with the nostrils as in *Aptenodytes*, but a little above them as in *Spheniscus*. The gonys is slightly concave, the sides compressed, the tip truncate, and the tip of the maxilla hooked. These characteristics indicate a very decided affinity with *Spheniscus minor*; but for the long tail (longer than that of any other bird of the family except *P. adeliæ*) it might be included in the same genus. Separated by this characteristic we are enabled to pass to *P. antarctica*, in which equally strong affinities are shown in the coloration, etc., but the tail is the same and the bill shows characteristics approximating it to *P. adeliæ*.

Finally, *P. adeliæ* has a beak which in general form and characteristics is like that of *Eudyptes*; this is apparent in the width posteriorly of the nasal sulci, and the extent to which the mandible is feathered. The mandible, instead of being straight and truncated, with a concave gonys, as in *P. papua* and *Spheniscus*, is pretty evenly and convexly curved.<sup>1</sup> In this it is peculiar as it is also in the complete feathering of the nostrils.

<sup>1</sup> This was observed in but one specimen, no others being at hand for comparison; and it may prove that the abrupt though even curve, which terminates the mandible, is a varietal difference. It needs a very slight exaggeration of the angularity of the upper portion to make it as decidedly truncated as in *Spheniscus*.

## EUDYPTES.

Coloration uniformly dark. A complete hood is here general, each of the several species having that pattern. The head feathers are generally longer than in other genera and the top of the head is ornamented by two still more elongated bunches of feathers, forming curly pendent lateral crests. These are of an orange or yellowish hue. The bills are reddish, very short, straight, the maxilla hooked at the end, the mandible truncated, deep and broad at the base as in *Pygoscelis*. The nasal groove widens very rapidly posteriorly, and the feathers fill the triangular spaces thus made, but do not in any case entirely cover the nostrils, which are almost concealed under the large fold made by the upper edge of the deep nasal groove. The mandible, however, is plumed for more than half its length as in *Pygoscelis adeliae*. The tail feathers are short in *Eudyptes catarractes*, and long in the other three species. The truncation of the mandible is usually denied, but an examination of the bills of the three specimens in our collection is sufficient to establish the truth of the above; it is hardly so decidedly truncated as in *Spheniscus* but yet very plainly so. The fullest development of this peculiar bill is in *E. chrysocoma* where the bill is deepest, and least in *E. catarractes*, which resembles *Spheniscus minor* in many of its characteristics, in its color, a dark penguin blue, its short tail and the extent to which both jaws are feathered. In all other respects it is a true *Eudyptes*. The size and shape of the head and bill, especially the shortness of the latter, the great breadth posteriorly of the nasal groove, and the great breadth of the base of the bill as well as its depth, are characteristics of *Eudyptes*.

Linnaeus, Editio X and XII, has two species, one confounded with *Diomedea* and one with *Phaëton*.

## LITERATURE.

The genus *Spheniscus* was first formed by Brisson (*Ornithologie*, Tome 6, p. 99), and included one species only — *Spheniscus naevius*, which he identifies as *Diomedea demersa* of Linn., and *Anser magellanicus* of Clusius, *Exot. Lib.*, Cap. v, p. 101. The specimen figured in pl. 9, has the complete collar of the variety described by Forster as *Aptenodytes magellanicus*. *Catarractes* was also formed by Brisson, p. 102, to contain *Phaëton demersus* of Linn., figured by Edwards, Tome 1, p. 49, pl. 49, and *Aptenodytes catarractes* Forster, *Comm.* p. 145. 4to. Paris.



Forster, Comm. Society Reg. Scient. Gotting., vol. III, p. 781, characterizes the genus *Aptenodytes*, and gives descriptions of the following species :—

## CRISTATÆ.

*Aptenodytes chrysocoma*.

## ALOPHÆ.

*Aptenodytes patachonica*.

*Aptenodytes patagonica* Müller.

*Aptenodytes papua*.

*Aptenodytes antarctica*.

*Aptenodytes magellanicus*.

*Aptenodytes demersus*.

*Spheniscus nævius* Briss.

*Diomedea demersa* Linn.

*Aptenodytes catarractes*.

*Phaëton demersus* Linn.

*Aptenodytes torquata*.

*S. demersus*, var.

*Aptenodytes minor*.

The name *Aptenodytes* must belong to *A. patagonica*, since *A. chrysocoma* is of the same group as *Catarractes* Briss., *Spheniscus catarractes* Schl. The genus *Pinguinaria* has for a type *Pinguinaria patachonica* Shaw, Nat. Miscel., vol. IV, pl. 409, Dec. 1799. Reference is also made to Mus. Leverianum, No. 3, t. 144, p. 11, for first description *P. patagonica*, but this I have not seen.

*Eudyptes*, Vieillot, Analyse, etc., 1816, p. 67, is the first tenable distinctive name of the crested genus. In 1825, according to Gray, Vieillot used Brisson's original name of *Catarractes*, which, however, is antedated by Moehring (1752) for a genus of *Alcidæ*.

Stephens, in Shaw's General Zoology, 1825, established a new genus from the same group, *Chrysocoma*, which, however, also included *Spheniscus minor*.

Whether Vieillot included in *Eudyptes* species which were not plumed on the head I cannot say, not having had access to his work.

*Pygoscelis* has Wagler's authority. From an extract in the *Isis*, 1832, it may be seen that the characteristics are the "gestalt" of the beak and the length of the tail. These characteristics are taken from Wagler's Nat. Syst. d. Amph., to which I have not had access. The type is *Aptenodytes papua* Forster.

Hombron and Jacquinot, in preliminary descriptions of new species in *Ann. de Sci. Nat.*, 1841, p. 320, describe two species of *Eudyptes*, and afterward in the publication of results in *Voy. au Pole Sud*, on pl. 33 of the birds, separate *adelicæ* as *Dasyrhamphus adelicæ*, leaving *antipodes* to represent *Eudyptes*.<sup>1</sup>

It follows from the preceding review of the different generic descriptions that Linnæus, neither by the position which he gave the group in his system, nor by his confounding it with *Phaëton*, recognized its real relations to the whole class of birds.

The generic characteristics selected show a similar deficiency. They were taken from the specific differences of the hooking of the maxilla, and the peculiarities of the nostrils and the family characteristic of featherless wings, whereas four toes were used as of specific value in "*Diomedea*" *demersa*, and the freedom of the hind toe as specifically characteristic of "*Phaëton*" *demersus*.

The necessity of separating this very distinct type from the groups with which Linnæus associated it, was first recognized by Brisson, and here we find general characteristics given for the group. These, however, are such as are shared in common with the *Colymbidæ* with which they were associated; viz., four toes, three joined by a membrane, the fourth separate; the limbs behind are hidden in the abdomen.

The minor divisions were properly enough characterized by the peculiarities of the beak, this being hooked in the Penguins and straight in the Divers. The generic characteristics were a mere transcript of those of the group, except the form of the lower mandible, which is shown to be truncated in *Spheniscus* and rounded in *Eudyptes*. The colors of the feathers were very naturally selected as designating the species.

The type of *Spheniscus* is *Spheniscus nævius*, but it becomes necessary to call it by the name of *demersus*, subsequently given to it by Linnæus. The name would then be as used by Schlegel — *Spheniscus demersus*.

*Catarractes demersus* of Brisson, the same species as *Phaëton demersus* of Linn., is the type of the crested group, but this cannot properly retain the generic designation of Brisson, but must, as previously pointed out, take the name of *Eudyptes*, Vieillot, 1816, instead of *Chrysocoma* of Stephens, 1825.

<sup>1</sup> Bonaparte, in 1856, in the *Comptes Rendus*, institutes the genus *Eudyptila* upon the *Aptenodytes minor* of Forster

*Aptenodytes chrysocoma*, which is a crested species, and therefore referable to the genus *Eudyptes*, makes it necessary to select the next species, *Aptenodytes patagonica*, as Forster's type of the genus.

Forster's descriptions, though they did not recognize either of Brisson's divisions, and ignored both of his names, added greatly to the previous knowledge of the species and made the first mention of the crested birds as a group, contrasting them with the *Alophæ* or non-crested group.

*Pinguinaria* of Shaw is evidently identical with *Aptenodytes* of Forster, as may be seen from the figure of the type in *Nat. Miscellany*, vol. 11, pl. 409, Dec. 1799.

#### APTENODYTES.

##### ***Aptenodytes Pennantii* Gray.**

*Aptenodytes Pennantii* Gray, *Ann. Nat. Hist.* 1844, vol. XIII, p. 315. *Patagonian Penguin*, *Trans. Phil. Soc.*; vol. 58, p. 91, pl. 5, nec Forst.

*Pinguinaria patachonica* Shaw, *Nat. Miscellany*, 1799, pl. 409.

The distinctive characteristics of this species as defined by Gray appear to be sufficiently well marked in the single specimen which is in the collection. Comparison with a specimen in the Museum of Peabody Academy at Salem shows, however, that considerable variation must be expected in the coloration. The patches on the sides of the head in our specimen are of a decided orange; they are also quite narrow above; the orange on the throat very broad and quickly fading into lemon color, the greenish tips of the dark feathers of the throat and forehead hardly perceptible. In the Salem specimen the patches are very broad above, and bright lemon color fading into orange, the orange on the throat fading very gradually into lemon and this zone, partly, but not wholly, owing to bad stuffing, is long and narrow; greenish feather tips distinctly marked on the throat and forehead. The Museum possesses no specimen of the Emperor Penguin, *Aptenodytes patagonica* Forst., so that no comparison could be made. The wings are quite dark underneath, the white occupying the larger part of the centre only. About three scutella on each toe.

One adult, *Str. Magellan*, *Coll. La Fresnaye*.

#### SPHENISCUS.

##### ***Spheniscus minor* Temm.**

*Spheniscus minor* Temm., *Man. Orn.*, 2d Ed., 1820, 1, p. 113.

*Aptenodytes minor* Forst., Comm. Soc. Reg. Scient. Gotting., 1760, vol. III, p. 147.

*Spheniscus minor* and *undina* Gould, Birds of Australia, pls. 84 and 85.

*Spheniscus minor* Schlegel, Museum des Pays Bas, Urinatores, p. 10.

Gould's figure is excellent, but the light feet are probably liable to become dark in some specimens, and I am even disposed to credit the assertion of Latham, that some of these birds have red feet and are occasionally marked with black on the toes. Several of the specimens in our collection though much faded, show the reddish tinge quite distinctly, and one only has the feet so light colored that they approximate to the variety figured by Gould. Latham also remarks that the absolute size and color of the feathers vary exceedingly on the back; this indicates that *Spheniscus undina* of Gould is only a small sized, perhaps more or less localized variety of *Spheniscus minor*, if, indeed, it be anything more than a young bird. The wings are white below with only a small spot of penguin blue at the tip.

A young specimen from New Zealand has an imperfect collar formed by lines of dark brown feathers which cross the throat. The bill is shorter and rounder, not flattened on the sides or so deep as in the adults. At a still earlier period, when the true feathers begin to replace the down, there are no tail feathers. These are grown subsequently, though very short, and are thicker and stiffer in some specimens than in others. The longest and thickest shanked feathers occur in the young specimen from New Zealand, described above. There are only one or two scutella on the toes at the bases of the nails.

One, U. S. Ex. Ex., Capt. Wilkes, young. One, Soc. Coll., still in the down. Australia. One, Soc. Coll., adult. One, La Fresnaye Coll., adult. All from New Zealand.

***Spheniscus demersus* Schlegel.**

*Spheniscus nævius* Brisson, Ornith., 1760, vol. VI, p. 99, pl. 9. Black-footed Penguin, Edwards, vol. II, pl. 94.

*Aptenodytes magellanicus* Forst., Commt. Gotting., vol. III, p. 143, pl. 5.

*Diomedea demersa* Linn., Syst. Nat., 1758, Ed. 10, p. 132.

*Spheniscus demersus* Schlegel, Mus. des Pays Bas, 1867, Urinatores, p. 10.

A fine figure of a still younger stage, if *Spheniscus demersus* is



really the young, is given by Ed., pl. 94. This has nearly a complete head of brown. The stripes that occupy the sides of the head are merely indicated by lighter areas on the cheeks.

The young of this species in our collection has the typical characteristics of *S. demersus*, and its companion *S. magellanicus*, has, as previously noted, a complete collar of dark feathers around the neck. The *S. magellanicus* is much the larger bird. In both, the light bar crosses the bill.

The young bird is quite dark under the wing and under the tail, while the old bird has only scattered black feathers forming minute spots under the wings, and is entirely white under the tail.

One fact seems to militate against the supposition that *S. demersus* is the young of *S. magellanicus*. The tail feathers of the former in our collection are much longer and stiffer than those of *Spheniscus magellanicus*, which hardly differ from the feathers of the back. This is a feature of more or less variability, but it is usually the product of mature growth and creates a doubt which can only be answered by the examination of other specimens of *S. magellanicus*.

On the middle and outer toes there are four or five scutella upon each of the first two joints, with hexagonal reticulations upon the joint itself. The inner first joint is wholly scutellate.

One *S. demersus*, young, Cape Good Hope, La Fresnaye. One *S. magellanicus*, U. S. Ex. Exp., Capt. Wilkes, Tierra del Fuego, adult.

#### PYGOSCELIS.

##### *Pygoscelis papua* Wagl.

*Aptenodytes papua* Forst., Comment. Soc. Gotting., 1781, vol. 3, p. 140, pl. 3. Vieillot, Galerie, pl. 299. Gray, Erebus and Terror, pl. 25.

*Aptenodytes taeniata* Peale, U. S. Ex. Exp., Peale Mss. 1848.

*Eudyptes papua* Cassin, U. S. Ex. Exp. (from Peale Mss.), 1859, p. 350.

*Pygoscelis Wagleri* Selater, Proc. Zool. Soc., London, 1860, p. 390.

The maxilla is black down to the lateral channels, and has the tomial parts and mandible, except the tip, yellow. On the under side of the wing the upper edge is dark colored for about one-fourth of its length and the tip is also dark.

One adult. Coll. La Fresnaye.<sup>1</sup>

<sup>1</sup>The locality given is "New Guinea," and probably therefore erroneous.

**Pygoscelis antarctica** Bon.

*Aptenodytes antarcticus* Forst., Comment. Soc. Gotting., vol. 3, p. 141, pl. 4.

*Eudyptes antarctica* Gray, Erebus and Terror, pl. 26.

*Pygoscelis antarctica* Bon. Schlegel, Mus. des Pays Bas, Urinatores, p. 5.

The first joint is scutellate. Two-thirds of the upper edge and tip of the underside of the wing are dark colored.

One adult. No locality. Coll. La Fresnaye.

**Pygoscelis adeliæ.**

*Catarractes adeliæ* Homb. et Jacq., Ann. Sci. Nat., 1841, p. 320.

*Dasyrhamphus adeliæ* Homb. et Jacq., Voy. au Pole Sud, Oiseaux, pl. 33.

*Pygoscelis brevirostris* Gray, Erebus and Terror, Birds, pl. 28.

*Aptenodytes longicaudata* Peale, U. S. Ex. Exp. Mss. 1848.

*Eudyptes adeliæ* Cassin, U. S. Ex. Exp. (from Peale's Mss.), Mam. and Ornith., 1859, p. 350.

*Dasyrhamphus Herculis* Finsch, Proc. Zool. Soc., 1870, p. 322, pl. 25. Young with white throat; *fide* Coues, *in epist.*

The length of the legs in the stuffed skin of this species, has led me to suggest, that observations on recent specimens determining the length of legs might prove of considerable interest and value. There are only four or five scutella on the first joint of each toe.

One adult. Antarctic Ocean.

## EUDYPTES.

**Eudyptes chrysolopha** Brandt.

*Eudyptes chrysolophus* Brandt, Bull. Acad. St. Petersburg, vol. 2, 1837, p. 314.

*Eudyptes chrysocoma* Gould, Birds of Australia, vol. 7, pl. 83.

There are only two or three scutella on the first joint of each toe. Three-fourths of the upper edge, the tip and a portion of the lower margin of the under side of the wing are dark. The dark feathers extend downward on the throat and have a concave outline. All the feathers on the top of the head are long and help to form the crest.

One adult. Falkland Islands, Coll. La Fresnaye.

**Eudyptes catarractes.**

*Aptenodytes catarractes*, Gmelin, p. 558. Forst., Comment. Soc. Gotting., vol. 3, p. 145.

*Catarractes demersus* Brisson, Ornithol., vol. 6, p. 112.

*Phaëton demersus* Linn., Ed. x, p. 135.

There may be three or four scutella on each toe. All of the upper edge, the tip and part of the lower edge of the under wing dark colored. The dark feathers do not extend upon the throat but form a nearly straight line across. On one side the dark feathers of the sides of the neck encroach upon the white of the abdomen and form a partial collar of white which is not seen on the other side. Only the lateral feathers of the oral regions are sufficiently lengthened to form the crest, and they do not extend forwards above the eyes.

One adult. Falkland Islands, Coll. La Fresnaye.

**Eudyptes chrysocoma.**

*Aptenodytes chrysocoma* Forst. Comment. Gott., vol. III, 1781, p. 135, pl. 1.

*Eudyptes pachyrhynchus* Gray, Gen. of Birds, vol. III, pl. 176.

? *Eudyptes nigrivestis* Gould, P. Z. S., 1860, 418.

Three scutella on each toe. Two-thirds of the upper edge and the tip alone of the under wing are dark. The dark feathers extend farther down upon the throat than in either of the two species mentioned and have a pointed, convex outline. The lateral feathers of the oral regions form a double crest as in *Eudyptes catarractes*, but also extend forwards beyond the eyes and join on the front to form a central tuft.

One adult. No locality, Coll. La Fresnaye.

OSTEOLOGICAL NOTES, BY DR. ELLIOTT COUES.

The skeleton of the Spheniscidæ is highly characteristic. With the general conformation, as a whole, of that of other Pygopodes, seen in the backward set of the posterior limbs, the great extent of the bony (costal and sternal) framework enclosing the abdominal as well as thoracic viscera, etc., there are many special modifications of the skeleton, any one of a large number of individual bones being of itself diagnostic of the family. A remarkable solidity, breadth and flatness of different bones is the dominant characteristic; it marks several bones that are cylindrical in all other birds and hollow in most.

Foremost among the diagnostic skeletal characters of the family comes the partly confluent condition of the metatarsals, which in all other existing birds are completely fused. The compound metatarsus is exceptionally broad from side to side, and shows its composition in the two lengthened fenestræ that indicate the three original meta-

tarsals. This may afford a useful hint in any search for the ancestral stock or primitive type of the Spheniscidæ. As well as we can gather from the isolated fossil data at our service, birds have gradually coalesced both metacarpals and metatarsals that were free in a primitive condition. The metacarpals appear to have run together later than the metatarsals; for nearly all birds to-day show partial separation of the former, while the latter are confluent in all but the Spheniscidæ; while the oldest known bird, *Archæopteryx macrurus*, with confluent metatarsals, shows unanchylosed metacarpals, as well as two unguiculate digits on the radial side of the manus, a condition only elsewhere found in *Struthio* and *Rhea*. Reasoning upon this, we may infer that, *cæteris paribus*, the existing species of Spheniscidæ with the broadest and most largely fenestrated metatarsus, comes nearest the original stock, from which the several genera have been differentiated in the process of derivation.

The sternum likewise is positively diagnostic. To general pygopodous features, it adds a special configuration not found outside the family. The postero-external angles each send off a long slender apophysis that runs backward beyond the termination of the sternal body, and curves mesiad, approximating, at the end, to its fellow of the opposite side. There is a deep emargination between each apophysis and the rather narrow but blunt median extremity of the bone. Each one of the four families of Pygopodes shows a different modification of the posterior border of the sternum; comparing which, we may infer that in a very early condition, the sternum of Spheniscidæ extended solidly as far as these apophyses now reach. In *Uria* for example, which has a relatively much longer sternum the posterior border is rounded and continuous, with only indications of the apophyses in two small fenestræ; in *Colymbus*, also with a long sternum, the median portion is very long and broad, and separated from the much shorter apophyses by a wide emargination; in *Podiceps*, with a shorter sternum, the median portion is abrupt, with a reëntrance, and separated from the longer, broad and clavate apophyses by a very narrow emargination — little more than a fenestration. And in view of the fact that lengths of apophyses and of sternum proper seem somewhat complementary, it would appear that these long apophyses of Spheniscidæ have remained in partial compensation for the abbreviation of the sternum that has taken place. This would be the more probable, if the longest sternum, relatively, should be found coexistent with the greatest fenestration of the metatarsus.



The shoulder-girdle is not less diagnostic in the expansion of the scapula, which is irregularly clubbed and almost spatulate. The clavicles are very broad, flat from side to side, and strongly curved backward and downward. The coracoid is long and strong, less conspicuously flattened, and develops an apophysis at the sternal extremity on the mesiad side.

All the bones of the anterior extremity are flattened, and the distal end of the laminar humerus has an oblique truncated articular surface—a condition only elsewhere seen in *Alca impennis*. There is no free radial digit—a state of things that might have been inferred from the pterylosis of the wing. The wrist preserves two free carpals, as usual, but the ulnare has an immense laminar expansion, not found outside this family. The elbow has two sesamoids (a feature shared, however, by the Guillemots), interesting in relation to the unusually large patella, which in these birds ossifies from two centres (Owen). There is a persistent, free ossicle in the ankle of *Aptenodytes*, apparently a sesamoid<sup>1</sup>; this is peculiar, so far as I know. The tibia is very long, but not specially remarkable; it does not develop the long apophysis of the *Colymbidæ*. The pelvico-sacral connections are said to be looser than in other birds. Notwithstanding the small size and sessile and elevated condition of the hallux, this has two bones, as usual, besides the accessory metatarsal; and the phalanges of the other digits are of normal number (3-4-5, from inner to outer anterior toe). The ribs have articulated accessory processes. The bodies of the hinder dorsal vertebræ are strongly compressed with median hypapophyses; the anterior dorsals have broad divergent laminar parapophyses in *Aptenodytes*, and most of the dorsals are opisthocælian (Owen). The palate has the schizognathous structure; there are no basipterygoid processes, and the pterygoids share the flattening that marks so many other bones. In its general configuration, and many minor details of structure, the skull shows three, if not four, strongly marked patterns, corresponding with and incontestably substantiating three, at least, of the genera that Prof. Hyatt has successfully established upon external characters. No one has hitherto shown us what groups are probably generic, and what are purely arbitrary.

<sup>1</sup> Certainly not a true tarsal ossicle, if the tarsus of *Spheniscidæ* agrees in development and structure with that of other birds; but this remains to be seen. Cf. Morse's beautiful and invaluable researches into the carpus and tarsus of birds. *Ann. Lyc. Nat. Hist., N. Y., 1871.*