

## OUTLINES OF A MONOGRAPH OF THE CYGNINÆ.\*

By LEONHARD STEJNEGER.

["It is better to err on the side of minuteness than of vagueness."—GOSSE.]

## CYGNINÆ BONAP.

1838.—*Cygnina* BP. Comp. List. p. 55.1850.—*Cygnidæ* KAUP (fide GRAY).1852.—*Olorina* REICH. Syst. Av. p. x.1860.—*Cygenidæ* DES MURS, Tr. Ool. Ornith. p. 537.

DIAGN.—*Anatidæ* having the hind toe without web and the lores naked, coincident with reticulate tarsi, the latter shorter than the middle toe with claw.

The preceding marks combined appear to express the essential characters of the *Cygnina*. By this diagnosis I follow Mr. SUNDEVALL† in excluding the genus *Coscoroba* REICH., which has the lores feathered at all ages. As early even as RÜPPELL'S monograph of the genus *Cygnus*, (Mus. Senkenb. III), it was separated from the Swans. Here, however, it may be remarked, that this diagnosis refers only to the adult birds, because the young have the lores more or less downy or feathered, except in the genus *Chenopsis*, which has the loreal space naked at all ages. The removal of *Coscoroba* to the *Anatina* will be discussed more explicitly below. The criterion "tarsi reticulate" further excludes the genera *Cairina* FLEM. and *Plectropterus* LEACH, which, it is true, have the lores naked, but the tarsi of which are scutellate instead of reticulate. *Anseranas* LESS. has certainly both naked lores and reticulate tarsi, but differs in having the tarsus longer than the middle toe with claw.

*Anatidæ* which do not at once unite all the above characters consequently belong to one of the other subfamilies.

The whole family *Anatidæ* forms, as to structural features, a very homogeneous group, and intermediate links are everywhere to be found. Thus it is very difficult to define the subfamilies anatomically, and to

\* The present treatise comprises merely the outlines of a monograph of the Swans, intended by the author to be much more complete, but which his departure for the Commander Islands prevented him from finishing according to the original plan. The paper contains so many valuable hints and so much important information upon this interesting group of birds, that it has been thought advisable to publish in its present form, as preliminary to the more elaborate monograph contemplated by the author after his return.—R. R.

†Tent. Meth. Av. Disp. p. 147.

give the structural differences by which they are to be separated, so that I find it not improbable that an exact investigation, based on a more abundant material than I can at present procure, will reduce the subfamilies to groups of lower rank.

#### CHARACTERISTICS OF THE SUBFAMILY.

##### *External characters.*

Neck very long, as long as, or longer than, the body. Bill longer than the head, broad, and of nearly equal breadth for the whole length, rounded at the end, culmen high, depressed at the tip; nail rather large, only slightly arched; lamellæ of upper mandible vertical, in one row; nostrils situated nearly at the middle of the bill, in the fore part of the oblong nasal sinus. Lores naked in the adults; in all species, except one, thinly covered with small down or feathers in the young. Legs short, stout; lower part of tibia naked; tarsi compressed, much shorter than the middle toe with the claw, and covered with small hexagonal plates, the size of which diminishes laterally and posteriorly; the anterior toes reticulate as far as the second joint, then scutellate; middle toe longest, longer than the tarsus, the outer longer than the inner, which has a broad margin; hind toe short, elevated, and without web,\* the claws strong, arched, compressed except the middle, which is only compressed on the one side, the claw of the inner toe in old birds the largest and most arched. Wings long, ample, the inner remiges highly developed, with about 32 quills. Tail composed of 20-24 rectrices, short, rounded, or cuneate.

Sexes similar.

##### *Osteological characters.*

The Swans, restricted as above, have a rather elongated skull, the intermaxillar portion being especially lengthened, but their cranium does not otherwise differ materially from that of the other *Anatidæ*. As a rule, however, the *Cygninæ* lack the two apertures on the occiput just above the *foramen magnum*, which always are to be found in the other members of the family† as well circumscribed and often large foramina. The *glandular depressions* along the roof of the orbits are more or less well marked. They are rather distinct in the genus *Cygnus*, whereas they seem to be wanting in most of the other *Anatidæ*.

The neck is extremely long, longer than the body, and is composed of the greatest number of *vertebræ* yet discovered in any recent bird, viz,

\* This expression is not quite correct, for I have, in the freshly-killed bird, always found a narrow, very slightly developed lobe.

† One specimen of *Cairina moschata* (LIN.), which I have examined, had no fontanelles. I have seen two skulls of *Olor columbianus* (ORD.) which presented corresponding openings, their limits, however, being lacerated and in a state indicating that the ossification was not yet finished. The other crania of the same species show no trace of these fontanelles.

from twenty-two to twenty-six. (The next in order are *Coscoroba candida* having 21, and *Branta canadensis* with 20, and of birds belonging to other families, the long necked *Plotus ankinga* with 20 vertebræ colli, and *Phœnicopterus*, in which I have found only 18.)

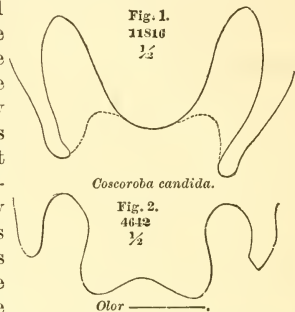
The number of the *dorsal vertebræ* amounts to eight, and consequently there are eight pairs of *dorsal pleurapophyses*, the first five usually supporting *epi-pleural appendages*. The three last have no *uncinate processes* as do likewise neither the two cervical ribs nor the sacral one.

The body of the *sternum* is square, with the lateral margins quite parallel, and not narrower at the hind termination of the costal border, where the last dorsal rib articulates, as in the other *Anatidæ*. (See figs. 1 and 2.) The hind border, with two proportionally shallow notches, their length making as a rule about one-sixth of the greatest length of the sternum. The middle portion of the end of the sternum usually slightly sinuated. The *crista sterni* is rather high, but the *carinal angle* does not protrude forward longer than the short *manubrium*, the fore border of the *crista* being more or less arched. In the one genus (*Olor*), the *carina* of which is shallow for the reception of a long fold of the windpipe, the anterior margin consequently is double; in the other genera only a little concave. The lower limit of the *crista* is slightly curved. The greater portion of the lateral margin of the *corpus sterni* is occupied by the *costal border*, from which eight *hamapophyses* ascend to meet the dorsal ribs, the free border behind being proportionately very short. The *pectoral ridge* on the body of the *sternum*, defining the origin of *musculus pectoralis secundus*, does not run parallel with the external margin or to the end of the keel, as is the case in the other *Anatidæ* (figs. 3-5), but passes obliquely towards the middle, which it reaches before the termination of the *crista*. This feature, however, is not always equally marked. In one of the skeletons of the *Olor columbianus* which I have examined, the course has some resemblance to that of *Coscoroba*, not dismissing, however, its peculiar swanlike character.

The *clavicles* form a broad, rather robust, U-shaped arch, except in the genus *Olor*, where the lower end is bent upwards and backwards to admit the fold of the *trachea* to enter the hollow keel of the breast bone.

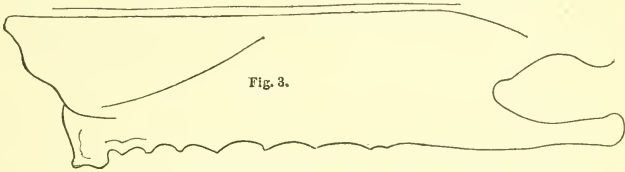
The *coracoids* are rather short and very stout bones. The *scapula* is proportionally short.

The most marked feature in the osteology of the Swans, wherein they differ from the other members of the family, and which characterizes them as powerful flyers, seems to be the considerable length of the *humerus* and *antibrachium*, these being almost of equal length.

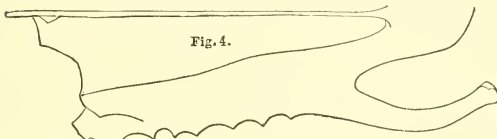


When folded and lying close to the body their elbow-joint reaches far beyond the *acetabulum*. Their length is greater than that of the hand, and considerably more than twice the *tarsus*.

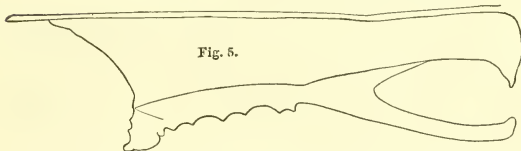
The *pelvis* presents only few differences from that of the other *Anatida*. It is, however, proportionally longer and narrower, the breadth between the *acetabula* making only about one-fifth of the total length of the *ilia*. The very prominent ridges, forming the internal borders of the post-acetabular parts of the *ilia*, run from the *acetabula* backward nearly parallel, the hinder sacral roof being rather narrow and of equal



*Olor cygnus*.—No. 1856, Army Med. Mus. Reduced  $\frac{1}{2}$ .



*Coscoroba candida*.—No. 11816, U. S. Nat. Mus. Reduced  $\frac{1}{2}$ .



*Spatula clypeata*.—No. 1122, Army Med. Mus. Nat. size.

breadth, whereas in the other *Anatida*, the ridges converge backwards from the more distant *acetabula*, forming a wedge-shaped and rather flat and broad roof. The *foramen ischiadicum* is rather large.

The *pelvic limbs* agree in every respect with those of the typical members of the family, except in the proportional length of the single bones mutually.

The number of free *caudal vertebrae* is seven, to which is to be added the *pygostyle*.

The *Cygninae* are more nearly related to the *Anatinae* than to the *Anserinae*, the *Coscoroba* REICHB. being among Ducks the genus most closely allied to the Swans. It has also, as stated above, usually been referred to the latter group, but an accurate examination undoubtedly shows that *Coscoroba* belongs to the *Cygninae* as little as does *Cairina* to the *Anserinae*, and that SUNDEVALL was right in removing it from the Swans.

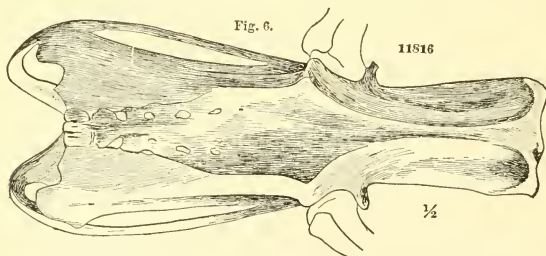
Though both the exterior proportions and the color of the *Coscoroba* are much like those of the Swans, there are, however, considerable differences.

In the first place, the bill is not of equal breadth for the whole length as in the Swans, but broadens, comparatively, considerably towards the tip, being, besides, more depressed in front of the nostrils, so that, on the whole, it is a perfect duck-bill. Add to this that the lores, at all ages, are completely feathered. The relation of the wing-feathers is nearly identical, but there is, however, a difference, the inner web of the third primary of *Coscoroba* not being situated, as is the case in all species of *Cygninae*. The relatively much longer hind toe of *Coscoroba* is another not unimportant difference, the whole nail touching the ground when the bird walks.

The interior differences are even more essential.

As I have just above given a short characteristic of the most interesting and peculiar facts in the osteology of the Swans, I here only intend to enumerate the more essential osteological features wherein *Coscoroba* differs from the *Cygninae*, mostly leaving to the reader himself to draw the comparison.

The skull shows only few differences besides the above-mentioned peculiar shape of the bill. The *os lacrymale*, however, is more duck-like than in the Swans, the fore processes being more elongated. On the *oc-*



Pelvis of *Coscoroba candida*.—No. 11816, U. S. Nat. Mus.

*ciput* the two fontanelles, above the *foramen magnum*, are to be found as well circumscribed, long, and rather narrow apertures (4 by 1.5<sup>mm</sup>). The *vertebræ colli* amount to 21, the last supporting a free rib without *epipleural appendage*. Seven *vertebræ* of the dorsal section with their *pleurapophyses* and *hæmopophyses*, the five first having *uncinate processes*. One sacral rib. The number of free *coccygeal vertebræ* is only five plus the *pygostyle*. The *sternum* is quite duck-like in its outlines, the lateral margins converging to the articulations of the last dorsal *hæmopophyses*, and from this point again diverging. The *costal border* is comparatively short. The notches of the hind margin very deep, making about  $\frac{1}{3}$  of the whole length of the *sternum*. The *pectoral ridge* for the origin of *mus. pectoralis secundus* runs backwards to the end of the *crista*, the lower border of which forms an undulating line, being higher on the



fore portion; the *carinal angle* overhangs the *manubrium* considerably; the fore border of the keel is sharp and rather straight. Most of these features will be well seen in fig. 4. The *brachium* and *antibrachium* are of the same length, proportionally much shorter than in the Swans, their length being shorter than twice the tarsus, and only equal to the distance between the shoulder and hip joints. The *pelvis* is, as fig. 6 shows, quite typically duck-like. Compared with fig. 7, the *pelvis* of a swan, and with fig. 22, in OWENS Anat. Vertebr., II, p. 32, representing a typical *pelvis* of a duck, the differences from the former and the identity with the latter are easily perceptible, the greater breadth and wedge-shaped form of the post-acetabular sacral roof being the most essential characters.

In nearly all the above-mentioned features *Coscoroba* differs from the Swans, while the same characters draw it near to the true Ducks; or, in other words, in nearly all the points wherein the *Cygninae* differ from the *Anatinae*, the *Coscoroba* agrees with the latter.

There can, after this, be no doubt where it, for the future, should be placed in the system.\*

It is, however, unquestionable that the Swans, through *Coscoroba*, are more nearly allied to the *Anatinae* than they are to the *Anserinae*. But

\* The genus *Coscoroba* only comprises two species, of which one is known merely from a single specimen. The following is a short synopsis:

*Coscoroba* REICHB.

=1852.—*Coscoroba* REICHB. Syst. Avium, p. x.

=1855.—“*Pseudolor* G. R. Gray, MSS.” Catal. Gen. Subgen. Bird's Brit. Mus., p. 122.

=1872.—*Pseudoccyenus* SUNDEV., Tent. Meth. Av. Disp. p. 147.

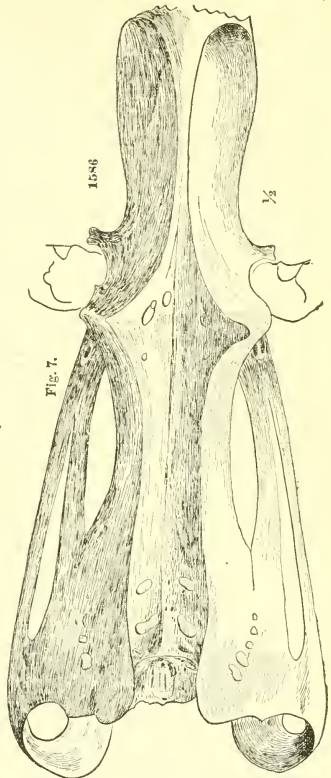
Key to the species:

a<sup>1</sup> Primaries with black tips; the nail of the bill flesh-colored; feet red.

1. *candida* (Vieill.) 1816.

a<sup>2</sup> Primaries entirely white; the nail of the bill black; feet orange-colored.

2. *davidi* SWINH. 1870.



Pelvis of *Cygnus gibbus*.—No. 1586, Army Med. Mus.

this statement refers only to the recent forms, because we, in reality, have a fossil species, which seems to be an intermediate link between the swans and geese. This form is the *Cygnus falconeri* PARKER,\* a gigantic swan from the Zebbug-Cave, Malta, nearly one-third larger than average individuals of the Mute Swan. It stood on longer legs, and had the comparatively short toes of a goose. In fact, the tarsi were considerably longer in proportion than those of the recent swans, the toes being very short, so that, whilst the proximal joint of the middle toe is one-fourth thicker than that of the Mute Swan, it is only three fourths the length. As this species evidently is generically quite distinct from any of the recent genera, I propose for it the name

PALÆOCYCNUS \* Stejneger gen. nov.

Type *Palæocygnus falconeri*.

Fossil Swans have not been found longer back than the diluvium, Mr. R. OWEN indicating the existence of a Swan from the diluvial strata of Essex, alongside of the bones of *Elephas primigenius* and *Rhinoceros tichorhinus*. In the caves of France and of Malta, in the so-

1. *Coscoroba candida* (VIEILL.)

1782.—*Anas coscoroba* MOLIN., Stor. Nat. Chili (p. 207).

1818.—*Anser candidus* VIEILL., Nouv. Dict. d'Hist. Nat. xxiii, p. 331.

1831.—*Cygnus anatoides* KING, Pr. Zool. Soc. Lond. 1830-31, p. 15.

1837.—*Cygnus hyperboreus* D'ORBIGNY, Mag. Zool. p. —.

1854.—*Cygnus chionis* LIGHT., Nomencl. p. 101.

*Hab.*—South America, from Chili and Buenos Ayres southward to the Falkland Islands.

*List of specimens and dimensions.*

Museum.	Catalogue number.	Locality.	Sex and age.	From the tip of the bill to—			The breadth of the bill at the nostrils.	Length of toes, with claws.				Tarsus.	Tail.	Wing.
				The mouth.	The anterior border of—			Outer toe.	Middle toe.	Inner toe.	Hind toe.			
					The nostrils.	The eye.								
Leyden .....	Cy. c. 1	Río de la Plata.	d ..	mm 75	mm 42	mm 98	mm 32	mm 112	mm 125	mm 93	mm 28	mm 87	mm 161	mm 455
Götheburg .....	1072...	Montevideo...	♂ ad.	82	44	106	36	11	128	96	32	89	138	480
Götheburg .....	1071...	.....do .....	♀ ad.	71	38	92	22	906	102	71	24	76	120	405

2. *Coscoroba davidi* SWINHOE.

1870.—*Cygnus (Coscoroba) davidi* SWINH., Proc. Zool. Soc. Lond. 1870, p. 430.

*Hab.*—China. Only one specimen known.

Both species are white with red bill.

\* Proc. Zool. Soc. Lond. 1865, p. 752.

\* *παλαιός* = *antiquus*, *κυκνος* = *cygnus*.

called "Kjökkenmöddings" of Denmark, and in the leavings of the lake-dwellings of Switzerland the bones of *Olor cygnus* are found tolerably common, and likewise from the peat-bogs of England. From Belgium, Prof. P. I. VAN BLUEDEN has described a separate species as *Cygnus herenthalsii*,\* from "une phalange du pied."

The subfamily *Cygninae* is at the present time considered to embrace nine recent species, distributed in four different genera.

This number is only one more than RÜPPELL already indicated in his monograph, but amongst the eight considered by him are enumerated *Cairina moschata* (LIN.) and *Plectropterus rüppellii* SCLAT. (= *gambensis* RÜPP. nec LINN.). BLAINVILLE gave, in Compt. Rend. VII, 1838, pp. 1022-1026, and LESSON, in Rev. Zool. 1839, pp. 321-324, an enumeration of the species belonging to the genus, also comprising eight, having, instead of the two last, adopted *C. coscoroba* (MOL.) and *immutabilis* YARR., whilst, however, they did not distinguish between *bewickii* YARR. and *columbianus* (ORD). EYTON having published in 1838 his "Monograph of the Anatidæ" separates these, and thus makes 9 species. SCHLEGEL, in his synopsis of the genus (Mus. P.-B. 1866, VI, *Anseres*, pp. 78-83) enumerates eight species. He, it is true, adopts also *coscoroba* (MOL.) as belonging to this genus; on the other hand, however, he does not recognize *C. immutabilis* YARR. as a distinct species.

LINNÆUS only described one species of Swan under the name of *Anas cygnus*, enumerating, however, the tame Swan among the synonyms as var. *mansuetus*; but in 1779 PALLAS had already separated the latter specifically, and retained for it the title of *cygnus*, whilst the Hooper received the name *olor*.

MOLINA, in 1782, described the Chilian Swan as *Anas melancorypha*.

In 1788 GMELIN described *nigricollis* after BOUGAINVILLE and *melanocephala* after MOLINA. In the mean time, as these two are synonymous with MOLINA'S *melancorypha*, the number of species known at that time amounted still to only three.

In 1790 LATHAM described *atratus*. In the same year it was described by BONNATERRE under the name of *Anser Noræ-Hollandiæ*.

LEWIS and CLARKE, in their "Travels" (1814), separated the American Swan, which ORD, in the second American edition of GUTHRIE'S Geography in the following year (1815), gave the systematic name *Anas columbianus*, thus making the fifth species.

In 1830 YARRELL described *Cygnus bewickii* as new, by which the number of species was increased to six. In the same year BREHM indicated *C. islandicus* as a supposed new species, which, however, is only a synonym of *Olor cygnus*.

The seventh species was added in the following year (1831) by RICHARDSON, viz: *C. buccinator* from North America.

The eighth dates from the year 1838, when YARRELL introduced *C. immutabilis* into the system.

\* Jour. de Zool. I, 1872, p. 288. (*C. herenthalsi* Ibis, 1873, p. 434.)



Three Swans, which von PELZELN in 1862 described as belonging to *immutabilis*, are in the present work introduced under *C. unvini*, a species which HUME founded in 1871 on two immature specimens, and which has usually been regarded as the young of *C. gibbus* BECHST. Thus we at present allow nine species of Swans.

The *C. passmori*, described by HINCKS in 1865, seems only to be a young *buccinator*. *Cygnus davidi*, which was described by SWINHOE in 1870, does not belong to the Swans, but to the genus *Coscoroba* REICH. amongst the *Anatine*. (See p. 180.)

Until BECHSTEIN in 1803 indicated the genus *Cygnus*, the species belonging to this group were referred to the great LINNÆAN genus *Anas*. The new genus was soon commonly adopted, and remained undivided until 1832, when WAGLER\* divided it into three, viz: *Chenopsis*, *Olor*, and *Cygnus*.

At first I was inclined to regard all the Swans as belonging to only one genus. But since Prof. THEO. GILL has drawn my attention to several differences in the structure I have convinced myself that the genera in question are as well founded as a greater part of genera among the *Anatide*, which I never hesitated to admit. If one would adopt the view of Mr. SEEBOHM,† that the color is the most important generic criterion, only two genera ought to be established, the one white and the other black; but the greatest differences are even to be found between the white species, this fact, for one, showing the untenability of Mr. SEEBOHM's standpoint. The color can indicate where the limits of a genus are to be drawn, and may in many cases be of great value as instruction when the matter is doubtful, or may also add an important character to the other ones, but it ought not to be the only or even the main character of a genus, which should merely be based upon structural marks.

In the matter now before us it will, however, be seen that if we admit any subdivision of the genus, the black-necked Swan must be separated from the Palæartic knob-billed Swan (*Cygnus gibbus*) and its congeners to obtain equivalency with the different groups.‡ I therefore propose the new genus *Sthenelus*, the number of recent genera thus being four. For the fossil *C. falconeri* I have introduced a fifth genus, *Palæocycnus*.

#### SYNOPSIS OF THE GENERA.

- a<sup>1</sup>. Predominant color of the adults white; young with downy or feathered lores; tertiaries and scapulars normal, not crisp; tail longer than the middle toe with claw.

\* Earlier than this BOIE had asserted the necessity of this division (OKEN'S *Isis* 1822, p. 564, nat).

† *Cat. Birds Brit. Mus.*, vol. v, p. viii: "These so-called structural characters have no generic value at all." (!)

‡ REICHENBACH, in his *Naturg. Vög. Neuhol.*, p. 343, expresses the same opinion, nowhere, however, as far as I can detect, giving a name.

b<sup>1</sup>. Tail cuneate; the young with the down on the sides of the bill not forming loral antiæ.\*

c<sup>1</sup>. Inner webs of outer four primaries and outer webs of the second, third, fourth, and fifth sinuated; the young with the down on the sides of the bill reaching almost to the nostrils; webs of the feet scalloped.

1. *Sthenelus* STEJNEGER 1882.

c<sup>2</sup>. Inner webs of outer three primaries and outer webs of the second, third, and fourth sinuated; the young with the down on the sides of the bill terminating far back of the nostrils; webs of the feet straight, not scalloped.

2. *Cygnus* BECHST. 1803.

b<sup>2</sup>. Tail rounded; the young with the down on the sides of the bill forming very distinct loral antiæ.

3. *Olor* WAGL. 1832.

a<sup>2</sup>. Predominant color of the adults blackish; the young with naked lores; tertiaries and scapulars crisp; tail shorter than the middle toe with claw.

4. *Chenopsis* WAGL. 1832.

*Geographical distribution.*

The *Cygninæ* appear both in the northern and the southern hemispheres as extra-tropical birds, no representatives of these large *Lamellirostris* being found within the tropics. They are consequently wanting both in the Indo-African Tropical—they do not at all breed in Africa—and in the American Tropical Region, only one species being met with in the South American Temperate and one in the Australian Region. The remaining seven species occur in the Arctic and the North Temperate Regions, the greatest number, viz, five, being found in the Old World, and here they only extend their winter migrations to the two southern provinces, the Mediterranean and the Manchurian, without breeding there. The two North American species only breed within the American division of the Arctic Region.

The following table gives a synopsis of their distribution:

TABLE I.

Name of species.	Arctic reg.		North temp. reg.		Amer. trop. reg.	Indo-Afr. trop. reg.	South Amer. temp. reg.	African temp. reg.	Antarctic reg.	Australian reg.
	Old world.	New world.	Old world.	New world.						
<i>Sthenelus melancorypha</i> .....	—	—	—	—	—	—	+	—	—	—
<i>Cygnus gibbus</i> .....	—	—	—	—	—	—	—	—	—	—
<i>immutabilis</i> .....	—	—	×	×	—	—	—	—	—	—
<i>unwini</i> .....	—	—	×	×	—	—	—	—	—	—
<i>Olor cygnus</i> .....	×	—	×	—	—	—	—	—	—	—
<i>beewickii</i> .....	×	—	—	—	—	—	—	—	—	—
<i>columbianus</i> .....	—	×	—	×	—	—	—	—	—	—
<i>buccinator</i> .....	—	×	—	×	—	—	—	—	—	—
<i>Chenopsis atratus</i> .....	—	—	—	—	—	—	—	—	—	×

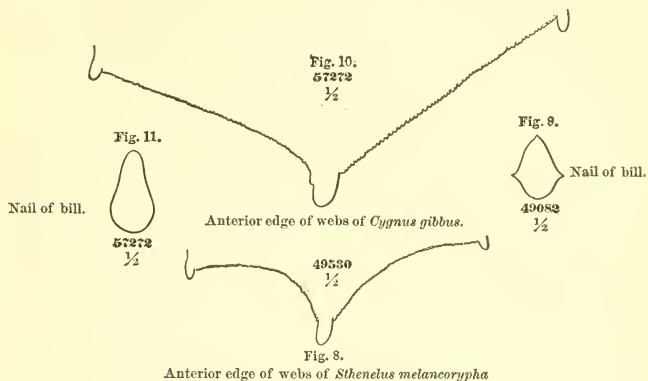
\* This term denotes the projecting angle of the loral feathering at the base of the bill.

TABLE II.—Table of average comparative measurements.

Name of species.	Number of specimens.	Length of bill from tip to anterior border of—				The knob.	Nostrils.	The eye.	Breadth of bill at nostrils.	Height of the knob.	Length of toes with claw.				Tarsus.	Tail.	Wing.
		The mouth.	The knob.	Nostrils.	The eye.						Outer.	Middle.	Inner.	Hind.			
<i>Sthenelus melancorypha</i> (MOL.)	13	68	41	36	91	24	11	101	107	85	20	81	136	425			
<i>Cygnus gibbus</i> BECHST.	4	104	77	59	153	35	17	152	157	121	81	81	106	591			
<i>Cygnus imitabilis</i> YARB.	1	102	82	60	131	25	6	139	145	112	80	95	148	565			
<i>Cygnus urosalpinx</i> HUME	1	91	.....	51	113	32	.....	138	148	108	30	96	103	535			
<i>Olor cygnus</i> (LIN.)	12	97	.....	44	124	36	.....	138	148	114	24	110	168	506			
<i>Olor leucicollis</i> (YARB.)	19	86	.....	38	110	29	.....	112	121	95	22	94	162	516			
<i>Olor columbianus</i> (ORB.)	23	90	.....	42	117	33	.....	130	138	108	26	100	169	545			
<i>Olor buccinator</i> (RICH.)	10	110	.....	53	139	35	.....	154	162	120	26	115	185	603			
<i>Chenopsis atratus</i> (LATH.)	8	73	.....	40	37	25	.....	114	123	96	26	91	103	475			

STHENELUS \* Stejneger gen. nov.

DIAGN.—Predominant color of the adults, white; young with downy or feathered lores, the down on the sides of the bill reaching almost to the nostrils, but not forming distinct loreal antic; tertiaries and scapulars normal, not crisp; tail longer than the middle toe with claw, cuneate; inner webs of outer four primaries and outer webs of the second, third, fourth, and fifth sinuated; webs of the feet scalloped. (See fig. 8, and compare with fig. 10.)



*Sthenelus melancorypha* (MOL.).

Black-necked Swan.

DIAGN.—Head and neck brownish black; body white; young in the down pure white; legs pale flesh-colored.

SYN.—1782—*Anas melancorypha* MOLINA, Stor. Nat., Chili, p. 207.

1786—*Anas melancorypha* BRANDIS, Uebers MOLIN. Naturg. Chili, p. 207.

1788—*Anas nigricollis* GMEL., Syst. Nat. I, p. 502.

1788—*Anas melanocephala* GMEL., ut supra.

1810—*Anas melancorypha* MOLINA, Stor. Nat. Chil., 2 ed. (p. 199).

1837—“*Anas melancoryphypus* MOL.” Less. Compl. Buff. IX, p. 528.

1839—“*Anas melancoryphea* MOL.” Less. Rev. Zool. 1839, p. 322.

1839—“*Anser melancoryphus* BONN.” Less., ut supra.

COLL. STEJNEGER No. 716, (♂ ad. South America).

Length of bill from tip to mouth 70<sup>mm</sup>, to anterior border of the nostrils 40<sup>mm</sup>, to the forward angle of the eye 95<sup>mm</sup>. Breadth of bill at the nostrils, 26<sup>mm</sup>. Length of toes with claw: outer toe 111, middle toe 118, inner toe 95, and hind toe 21<sup>mm</sup>. Tarsus 87, longest tail feathers 140, and wings 450<sup>mm</sup>. From tip of bill to the base of the frontal knob 43<sup>mm</sup>; the height of which amounts to 16<sup>mm</sup>.

The bill, in front of the tubercle and a point under the middle of the nostrils, is dark plumbeous, while the tubercle, the base of the bill behind the point mentioned and the naked lores, are yellowish brown. In

\* Σένελος, nom. myth., father of CYCNUS, Ov. Met. 2, 367.

the live bird, these parts are stated to be, respectively, light plumbeous, with white nail, and intense rose-red. Iris is said to be brown or almost black. The legs are, in the skin, light brownish; in the live bird, pale flesh color.

The head and the upper two-thirds of the neck are of a beautiful blackish-brown color, with velvet gloss; a narrow white stripe surrounds the eye, from the hind angle of which it extends backward into the nape, but without meeting the stripe from the other side. On the chin a large white spot. The whole remaining plumage is pure white.

♀ differs from the ♂ only in being smaller.

COLL. STEJNEGER No. 711, (♂ jun. South America).

Length of bill along gape 69<sup>mm</sup>, from the tip to the front of the nostrils 39<sup>mm</sup>, to the fore border of the eye 98<sup>mm</sup>, breadth at the nostrils 25<sup>mm</sup>. Length of toes with claw: outer toe 103, middle toe 110, inner toe 91, and hind toe 22<sup>mm</sup>. Length of tarsus 87, tailfeathers 110, and wing 400<sup>mm</sup>.

The bill, which does not show the slightest trace of a frontal knob, is, in the dried condition, dark yellowish-red at the base, gradually changing into dark brownish towards the tip; the nail light yellowish. Legs light yellowish gray, with darker webs.

The plumage is white with pale rusty edges on each feather, this tinge being most intense on the upper parts. The head and the upper two-thirds of the neck, as in the adult described above; the brown, however, being considerably lighter. The limit of the feathering round the base of the bill very light, becoming almost white round the eye and on the chin, on which the light color forms a rather large spot; from the hind angle of each eye the white stripe extends backward, nearly meeting its fellow on the median line of the nape. The primaries are white, the tips broadly edged with dark chocolate-brown on the outer five, becoming narrower and fainter on the following quills; in the former, the colored edge is about 20<sup>mm</sup> broad at the tips, tapering towards the base on both webs, and becoming first obsolete on the outer web; the shafts of the outer quills are brown for the most part, gradually decreasing towards the innermost, the shafts of which are almost white to the very tip. The primary coverts are also more or less marked with brown shadings on the tips of the webs and shafts.

Another young specimen, U. S. Nat. Mus., No. 49530 (♀ jun.—*Conchitas*, Buenos Ayres, June, 1866), shows the following dimensions: Length of bill from the tip to the mouth 61<sup>mm</sup>, to the fore border of the nostrils 34<sup>mm</sup>, to the front of the eye 83<sup>mm</sup>, breadth 21<sup>mm</sup>. Length of toes with claw: outer toe 87, middle toe 95, inner toe 74, and hind toe, 20<sup>mm</sup>. Tarsus 88, tailfeathers 104, and wings 395<sup>mm</sup>.

No trace of frontal knob, the culmen only slightly rising above the nostrils.

Color as in the foregoing specimen, with the exception that the white behind the eyes is almost wanting, and the edges of the feathers



of the middle part of the neck are conspicuously lighter brown, becoming almost white above towards the limit of the white part of the neck. Besides, the middle tail feathers are brownish gray on the inner web towards the tip; this color on the outer ones also extending into the outer web, which, however, is edged with white to the very tip; the shafts are brown.

In specimen No. 66605, *U. S. Nat. Mus.*, which has the knob still very small, viz, only 3<sup>mm</sup>, the plumage has already become pure white, without any trace of brown shadings or spots, the same being the case in No. 2, *Mus. Leid.*, in which the height of the tubercle only amounts to 5<sup>mm</sup>.

The *downy plumage* is white. The following dimensions and descriptions are from two cygnets hatched in the Zoological Garden in Rotterdam:

MUS. LEIDEN. (♀ *Pullus*, 34 days old.)

Length of bill along gape 36<sup>mm</sup>, from tip to fore border of the nostrils 20<sup>mm</sup>, to the eye 55<sup>mm</sup>, breadth 12<sup>mm</sup>. Length of toes with claw: outer toe 43, middle toe 44, inner toe 34, and hind toe 10<sup>mm</sup>. Tarsus, 35<sup>mm</sup>.

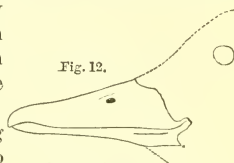
Pure white; the down of the upper parts is gray at the base, giving the upper surface a faint grayish tinge. Bill lead-black, with the nail light. Legs yellowish gray, with the webs grayish yellow.

MUS. LEIDEN. (♂ *Pullus*, 1 day old.)

Length of commissure 21<sup>mm</sup>, bill from tip to the nostrils 12, to the eye 30<sup>mm</sup>, breadth of bill 8<sup>mm</sup>. Length of toes with claw: outer toe 29, middle toe 31, inner toe 24, hind toe 6, and tarsus 23<sup>mm</sup>.

Pure white; the grayish tinge on the upper surface almost imperceptible.

As may be seen by reference to fig. 13, almost the whole of the base of the bill in this species is covered with down, which reaches much more than half way to the nostrils, both above and below, and having a very different anterior outline from the same stage of species of *Cygnus* and *Olor*, as shown in figs. 12 and 14.



*Cygnus gibbus.*



Fig. 13.

*Sthenelus melancorypha.*

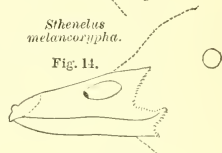


Fig. 14.

*Olor columbianus.*

TABLE III.—*Sthenclus melanocorypha* (Mol.).  
TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to anterior border of—				Breath at the nostrils.	Height of the knob.	Toes with claw.				Tarsus.	Tail.	Wing.
						Mouth.	Knob.	Nostrils.	Eye.			Outer.	Middle.	Inner.	Third.			
						mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Mus. Copenh.	716.	Chil.	.....	♂	ad	72	.....	39	99	26	.....	113	122	93	34	88	135	.....
Coll. Stejneger	15653.	South America.	.....	♂	ad	70	43	40	95	26	16	111	118	95	31	87	140	450
U. S. Nat. Mus.	66607.	Chil.	.....	♂	ad	70	39	38	91	24	14	98	105	85	22	83	140	420
"	.....	Buenos Ayres.	.....	♂	ad	70	41	49	98	25	3	98	102	85	21	84	122	410
Mus. Acad., Phil.	.....	Chil.	.....	♂	ad	73	40	42	99	26	9	108	114	89	24	90	143	450
"	.....	South America.	.....	♂	ad	68	45	37	98	25	12	105	111	87	22	80	132	427
Mus. Leiden	<i>C. nigræ</i> , No. 3	Santiago, Chil.	.....	♂	ad	68	42	39	94	25	.....	103	113	88	21	77	.....	435
"	<i>C. nigræ</i> , No. 3	Chil.	June, 1863	♂	ad	68	41	40	91	26	11	99	107	83	20	78	145	420
U. S. Nat. Mus.	49082.	Chil.	.....	♂	ad	66	39	36	86	25	14	95	100	80	18	78	147	420
"	.....	Santa Fé, Rio Salad.	.....	♂	ad	63	34	40	85	23	9	97	105	85	17	84	127	415
Mus. Leiden	<i>C. nigræ</i> , No. 2	Chil.	July, 1853	♂	ad	62	42	36	87	23	5	96	102	77	18	80	137	415
Amv. Mus., N. Y.	.....	.....	.....	♂	ad	62	40	35	84	23	11	95	102	78	20	76	132	.....
U. S. Nat. Mus.	49083.	Vicinity of Santiago, Chil.	July, 1865	♂	ad	61	33	37	80	23	11	91	94	78	17	76	127	400

## CYGNUS BECHST. 1803.

DIAGN.—*Predominant color of the adults white; young with downy or feathered lores, the down on the sides of the bill terminating far back of the nostrils, and not forming distinct loreal anticæ; tertiaries and scapulars normal, not crisp; tail longer than the middle toe with claw, cuneate; inner webs of outer three primaries and outer webs of the second, third, and fourth sinuated; webs of the feet straight, not scalloped.*

SYN.—< 1803.—*Cygnus* BECHST., Taschenb. Vög. Deutschl. p. 404.

< 1840.—*Cygnus* TEMM., Man. d'Orn. 2 ed. IV, p. 526.

= 1842.—*Olor* BP., Catal. Meth. Uccell. Europ. (gen. 206). (Nec WAGL.)

*Synopsis of the species.*

a<sup>1</sup>. Culmen with a knob at the base.

b<sup>1</sup>. Frontal knob larger; legs in the adults black; young gray or brownish gray, with the bill lead-color.

1. *gibbus* BECHST. 1809.

b<sup>2</sup>. Frontal knob smaller; legs in the adults gray or yellowish gray; young white, with the bill light pinkish red.

2. *immutabilis* YARR. 1838.

a<sup>2</sup>. Culmen without knob.

3. *uwini* HUME 1871.*Cygnus gibbus* BECHST.

## Mute Swan.

DIAGN.—*Culmen with a large knob at the base; legs in the adults black; young gray or brownish gray, with the bill lead-color.*

SYN.—1758.—*Anas cygnus* LINN., Syst. Nat. x, ed. I, p. 122 (part).

1783.—*Anas cygnus* BODD., Tabl. Pl. Enl. p. 54 (ed. TEGETM.).

1788.—*Anas olor* GMEL., Syst. Nat. I, p. 501 (nec PALL. 1779 quæ *Olor cygnus* (L.)).

1809.—*Cygnus gibbus* BECHST., Gemeinn. Naturg. Deutschl. IV, p. 815.

1811.—*Cygnus sibilus* PALL., Zoogr. Rosso-As. II, p. 215.

1817.—*Cygnus mutus* FORSTER, Synopt. Cat. Br. Birds, p. 64.

1820.—“*Cygnus gibbosus* MEYER,” KUHLE, Buff. Fig. Av. Nom. Syst. pp. 16 and 26.

1828.—*Cygnus mansuetus* FLEM., Brit. Anim. (p. 126).

1858.—“*Cygnus sibilans* PALL.,” NILSS. Skand. Fauna, Fogl. 3 ed. II, p. 386.

This species has usually been called *Cygnus olor* (GMEL. nec PALL. 1811). But, as will be shown below, PALLAS has given the name *Anas olor* to the Hooper long before GMELIN compiled his *Systema Naturalis*, for which reason the name of the latter must be suppressed for the present species. The matter stands as follows: PALLAS, in 1779, in the introduction to a treatise on *Anas glacitans* (Sv. Vetensk. Acad. Handl. XL, p. 26–27), says as follows: . . . “*Duck-genus (Anas)* . . . most kinds occur very generally both in Europe, Asia, and America, but not in the Tropics. Thus also . . . the Swan is to be

found, not only that which is rightly called *Cygnus*, which has a hoarse and hissing voice, but also the *Olor*, which the newest zoologists hesitate over, and which has a clear and pleasant voice, which can be heard far; it ought thus to belong to a different species." In a foot-note he adds: "I mean here the so-called *Cygnus feras*, . . . which . . . really is a distinct species from the so-called *Cygnus mansuetus*." He gives the name clearly, in a scientific and highly distinguished journal, which, at that time, was widely spread over everywhere where the science of natural history was cultivated, and four years after the above-quoted remarks were translated into German (Schwed. Abhandl. Uebersetzt von A. G. Kästner, 41 vol. p. 23, Leipzig, 1783). He urges repeatedly that the same species (in opposition to LINNÆUS, who had only distinguished between the two Swans as the wild and the tame state of the same species) must be separated, and his indication of which kind he means is fully unmistakable. By this he has fulfilled all demands by adopting a name given by an author. In this case it is not less than nine years older than GMELIN'S. But of his errors, the same applies to this as to many others—that science must not allow itself to be bound by them, even if it should cause the greatest difficulties to rectify the mistake.

Among the synonyms of this species Mr. DRESSER (Birds of Eur.) cites "*Anas (Cygnus) mansuetus*, LATH. Gen. Synopsis, Suppl. p. 297 (1787)." This quotation is not correct, and can be misapprehended, as if LATHAM had given the name *mansuetus* as a specific one, but he only writes—

GENUS XCII.

*Anas.*

- . . . *Cygnus (ferus)* . . .  
 . . . ——— (*mansuetus*) . . .

TABLE IV.—*Cygnus gibbus* (BECHST.).

TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to fore border of—				Breadth of bill at nostrils.	Height of knob.	Toes with claw.				Tarsus.	Tail.	Wing.
						Mouth.	Knob.	Nostrils.	Eye.			Outer.	Middle.	Inner.	Kind.			
Coll. Stejneger.....	441.....	Copenhagen, Denmark.....	Feb. 22, 1881.....	♂	ad ..	mm. 106	mm. 80	mm. 62	mm. 136	mm. ....	mm. ....	mm. 160	mm. 162	mm. 125	mm. 31	mm. 117	mm. 245	mm. 615
Mus. Copehill.....	Eur. birds, 129 ..	Sealand, Denmark.....	.....	♂	ad ..	mm. 103	mm. 75	mm. 56	mm. 133	mm. ....	mm. ....	mm. 154	mm. 165	mm. 126	mm. 32	mm. 108	mm. 218	mm. 595
Museum Leiden.....	57171.....	Harderwijk, Holland.....	Feb. 17, 1871.....	♂	ad ..	mm. 105	mm. 79	mm. 60	mm. 134	mm. ....	mm. ....	mm. 148	mm. 152	mm. 118	mm. 32	mm. 101	mm. 239	mm. 580
		.....	.....	♂	ad ..	mm. 101	mm. 73	mm. 58	mm. 127	mm. ....	mm. ....	mm. 144	mm. 150	mm. 116	mm. 30	mm. 97	mm. 187	mm. 575



*Cygnus immutabilis* YARR.

## Polish Swan.\*

DIAGN.—*Culmen with a smaller knob at the base; legs in the adults slate-gray or yellowish gray; young white, with the bill light pinkish red.*

SYN.—1838.—*Cygnus immutabilis* YARR., Proc. Zool. Soc. Lond. 1838, p. 19 (nec v. PELZ. 1862, quæ *C. unvini* HUME).

Since YARRELL, in 1838, described this species, but few contributions to the elucidation of the questions concerning its habitat and its relation to *C. gibbus* have been made. The time was when its right as a species was generally denied, essentially for the reason that a few instances of mixed broods with both white and gray cygnets were stated to have occurred. But at present, the opinion being inclined to regard such a case as "the result of an alliance between a Mute and a Polish Swan," the distinction of these two species seems to be generally admitted—at least in England. The various investigations about this question are described at great length, and important new observations given, by Mr. DRESSER in his *Birds of Europe*, Parts lxxvii, lxxviii, and lxxix, April, 1880, but not even he has answered the inquiry as to the true habitat of the *immutabilis*. At first I regarded it as an eastern form, confounding it with *C. unvini*; but I have now convinced myself that the latter constitutes a different species, and I am inclined to believe that the English *immutabilis* will show itself to be a western bird. Specimens can easily be overlooked, and a few may, perhaps, be found in one or another of the European museums (as, for instance, the example in Mus. Leiden.), but I see no reason why it should be supposed that the ornithologists of the continent have been less exact in this case than those of England. I therefore regard the species as being very scarce on the European continent; the only specimen from there was killed in Holland, just opposite to England, in which latter country it seems to be not even rare.

BLAINVILLE has already questioned whether the *immutabilis* is not the wild form of the Tame Swan, and we see that Mr. DRESSER for a long time also was inclined to indorse the same view, which, however, my investigations most positively contradict. It appears to me that the question, with more right, could be asked conversely, viz, whether the Polish Swan is not a race originated by domestication; but even this seems not to be the case, as it appears from the quotation in Mr. DRESSER'S *Birds of Eur.* (l. c.) of the experiences of Mr. SIMPSON, "who had from seventy to a hundred cygnets through his hands yearly for the past thirty years, and who never saw a white one," and from the statement of Mr. DRESSER himself, that the Changeless Swan, "so far

\* Not "Polar Swan (Cygne du Pôle)" as BLAINVILLE, Compt. Rend. VII, 1838, p. 1024, and after him DEGL. & GERBE, Ornith. Eur. II, p. 477, indicates.

as he can ascertain, has only been recorded in a wild state from the shores of Great Britain."\* Should it, after all, be an absurd supposition that *immutabilis* is the indigenous wild English Swan, while *gibbus* is indigenous only to the continent, but introduced, in a half domesticated state, to England during the time of Richard I?

This Swan presents the peculiar fact that the young of it are better distinguishable from its nearest allies than the adults of both species in their perfect plumage. This is, however, no objection to its right to be considered a species any more than in the case of two other species, the plumages of whose young are quite alike.

The most conspicuous distinctive mark of the two species is that the young (in down and in the first plumage) of *immutabilis* are white, and not gray or brownish, as in *gibbus*. They are, however, not pure white, at least not always, as they were described as being on the back more or less tinged with warm buff.

They differ also in the color of the bill, this being pale pinkish red in the young *immutabilis* and plumbeous in *gibbus*. It cannot here be objected that the Mute Swan in the later youth also has the bill of a similar color, as it, during the transition to the white plumage, begins to take a reddish tone, because the mentioned red color on the bill of the young Polish Swan is to be found already in the first summer simultaneous with the first feathers, as is evident from Mr. SOUTWELL'S (DRESSER l. c.) description of the plumage of three young the 20th of August: "They had then assumed nearly all their feathers and were more than half grown; the color was white, apparently stained or sullied by a yellowish tint, which was strongest on the wing-coverts; feet pale ash-color, and beak a purplish flesh-color, differing entirely from the lead-color of the bill in the young Mute Swan of the same age." Also the color of the bill of the adult birds is different, the Polish Swan having it rather redder than the continental species.

The frontal knob is said to be smaller in *immutabilis* at all ages. It is, however, present also in the quite young, as is evident from Mr. DRESSER'S plate, fig. 2. The eye and the lamella, too, are said to be smaller.

The character now to be mentioned belongs only to the adult birds. In the adult *gibbus* the legs are jet-black, sometimes with a shade of red shining through the black color; in *immutabilis* their color is variously stated to be from pale plumbeous or slate-gray to a light drab color. This latter color they had in the specimen examined by me. In the young the color of the feet is nearly the same in the two species, and it

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\* Is the statement, p. 4, about the captures of *immutabilis* in Norfolk, enumerated by Mr. STEVENSON, contrary to this? He says: "Some, at least, if not most of these, however, were undoubtedly birds which had straggled from other waters, and not genuine wild birds." I cannot plainly see if these words are the reflections of Mr. DRESSER himself or only a quotation of Mr. STEVENSON.

is expressly stated "that at no stage of growth is this a character to be depended upon."

In their size they seem not to differ. Mr. DRESSER gives the total length of the adult male of *gibbus* at about four and a half to five feet, the gape 3.55 inches, and the tarsus 4.5 inches; and of the adult *immutabilis*, respectively at about five feet, 3.6, and 4.25 inches. The differences in the length of the wing, 27 inches as against 23.5, and yet more in the length of the tail, 10 to 6.8, are certainly quite considerable, but not more than sometimes occurs in the same species, especially as it is probable that the feathers of the specimen from North-Repps are not fully developed.

Finally, there are the osteological differences described by Mr. PELERIN (Mag. Nat. Hist., 1839, p. 178), which I have had no occasion to verify, and which I cannot remember to have seen confirmed or denied by any other than Mr. YARBELL himself.

The English ornithologists may after this be right when they urge the independence of *C. immutabilis*, and it should be a great offense against the science if one would unite these two forms and hereby cut off, or at least trouble, the study of this particular phenomenon.

As far as my investigations go, they also agree with the results of the English authors. In SCHLEGEL'S Catal. Mus. P.-B., VI, *Anseres*, p. 79, a male "de Pannée" is enumerated under *Cygnus olor* (GMEL.) as killed on the Lake of Haarlem in the month of December, 1840. The description of this interesting specimen, which certainly belongs to *C. immutabilis* YARR., is as follows:

MUS. LEIDEN, *C. olor* No. 3 (*♂*, Lake of Haarlem, Holland, December, 1840).

Length of the bill along the gape, 102<sup>mm</sup>; from the tip to the fore border of the nostrils 60, and to the eye 131<sup>mm</sup>. Length of toes with claws: Outer toe 139, middle toe 145, inner toe 112, and hind toe 30<sup>mm</sup>. Tarsus 95, tail 158, and wing 565<sup>mm</sup>. The distance from the tip of the bill to the fore border of the knob 82<sup>mm</sup>, the knob itself being 6<sup>mm</sup> high.

The whole plumage pure white, with a faint rose-colored shade on the wing-coverts, and a rust-colored tinge on the crown and chin. The tarsus and toes yellowish-gray, the webs grayish-yellow. The original color of the bill cannot be recognized in the dried specimen.

If one compare the above dimensions with those given on Table IV, it will be seen that they agree quite well with the smallest specimen. The small size of the frontal knob, and the remarkably light feet, are very characteristic features, combined with the white plumage. I therefore regard the identification of this specimen with *C. immutabilis* to be unquestionable.

As to the colors of the young, I refer to the descriptions given above.

*Cygnus uncini* HUME.

## Knobless Swan.

DIAGN.—*Culmen without knob; legs in the adults slate-colored; young gray or brownish gray.*

SYN.—? 1804.—*Anas discreva* HERMANN, Observ. Zool. I, p. 139.

1862.—*Cygnus immutabilis* v. PELZELN, Schr. Zool. Bot. Ver. Wien, xii, p. 785 (nec YARR. 1838).

1871.—*Cygnus uncini* A. O. HUME, Ibis 1871, p. 413.

1871.—*Cygnus olor* SALVIN, Ibis 1871, p. 413 (nec PALL., nec GM.).

1872.—*Cygnus urwini* GIEBEL, Thes. Orn. I, p. 857.

*Note 1 to the synonymy.*—DRESSER cites HERMANN'S *Anas discreva* as belonging to *immutabilis* YARR. with a query. Because the description of the said author contains the phrase "*corpore cinereo*" I regard this reference unadvisable. The resemblance of the title *Cygnus polonicus*, cited by HERMANN, and the English name, "Polish Swan," is of no consequence for the reason that such a title is not to be found in GESNER, in spite of the quotation.\* It belongs rather to the species here in question, but the phrase "*rostro rubro*" makes me hesitate, because I am not satisfied whether the young of this species has a red bill or not. From the description of HUME it seems that it should not be the case. HERMANN does not speak about the knob, it is true, but if it had been completely absent he should not have failed to mention it. I have therefore introduced it into the above synonymy with some doubt.

*Note 2.*—The museum at Vienna received in the year 1857 three adult swans which Mr. ZELEBOR had captured in the month of March the foregoing year, and which had been deposited in the imperial menagerie at Schönbrunn, near Vienna, where they died in the beginning of the said year. Misled by the statement that white and gray cygnets had been found in the same brood, Mr. A. v. PELZELN, in a short article (l. c.), identified the specimens with the *C. immutabilis* YARR.

Mr. A. v. PELZELN has had the great courtesy to send one of the specimens a great distance for my inspection, and I am thus enabled to make up my own opinion.

As far as I can judge the specimens in question are distinct from both the *gibbus* and the *immutabilis*. From both these species they are separated by the complete absence of even the slightest trace of a tubercle or knob, by their inferior size, and by the different form of the bill. From the former, with which they agree in having the plumage of the young brownish, they are further distinguishable by the legs and webs, which are "slate-colored, changing into olive," and from the latter by having a brownish and not white plumage of the young.

\* HERMANN quotes: GESNER, Edit. Francof. 1604, p. 273 B; but on p. 373 B (on p. 273 he treats of *Ciconia*) he only says: "*In Polonia cygni sunt diversi generis; sunt cuim alij feri, pari magnitudine, alij domestici, quorum vox suavis est, & tuba refert.*"

In 1871 Mr. A. O. HUME described two young swans from India under the name *C. uncinus*, which I consider not to be identical with the *gibbus*, as is the general opinion, for the following reason:

They are said to have not the faintest trace of a tubercle. The young of the common Mute Swan get their knob very early, as soon as they have been full feathered. The fact that the female has a smaller and more indistinct knob is of no consequence, while HUME had before him both male and female. They were, too, full grown, ready to take the white plumage in the first spring, and in this age the young *gibbus* has a very distinct knob, even in the female sex.

Nor can these birds be identified with the *immutabilis* YARR., the total absence of the knob and the brownish plumage being invincible obstacles.

On the other hand, the description in these points agrees very well with the above-mentioned birds from Egypt. The following description is by HUME: "From the frontal feathers to beyond the end of the nasal fossa, a distance of very nearly  $1\frac{1}{2}$  inch, the culmen is a perfectly straight line. Beyond this there is a very shallow concavity to the posterior margin of the nail."

To the foregoing five specimens I add a sixth, which agrees in the eastern habitat, the absence of the tubercle, and the apparently dark young plumage, viz: the bird, which C. A. WRIGHT mentions (Ibis, 1874, p. 241), as follows: "There is an example of *C. olor* in the Malta University Museum nearly pure white, but with scarcely any appearance of the frontal knob."

The Polish Swans, indicated to have been found in Corfu and Epirus (Ibis, 1860, p. 351, and 1870, p. 338), probably may also belong to the species here in question.

K. K. HOF.-NAT. CAB. VIENNA. (Taken alive in March, 1856, on Lake Menzaleh, Egypt; died in confinement at Vienna, 1857. By H. ZELBOR.)

Total length 1,300<sup>mm</sup> (v. PELZELN *in litt.*)\*

Length of the bill along gape 91<sup>mm</sup>, from the tip to the front of the nostrils 51<sup>mm</sup>, to the fore border of the eye 113<sup>mm</sup>; breadth of bill at nostrils 32<sup>mm</sup>. Length of toes with claws: outer toe 138, middle toe 148, inner toe 108, and hind toe 30<sup>mm</sup>. Tarsus 96, wing 535, and tail 193<sup>mm</sup>.

Mr. A. v. PELZELN† describes the color of the bill on the newly dead bird as orange changing into crimson, with the same black markings as the Mute Swan. On the stuffed bird the black color has the follow-

\* The dimensions of the two other specimens were: Total length 1,360 and 1,330<sup>mm</sup>; wing 540 and 550; bill along gape 105 and 85<sup>mm</sup>. (v. PELZ. *in litt.*)

†Schr. Zool. Bot. Ver. Wien, Bd. XII. 1862, p. 785: Notiz. über *Cygnus immutabilis* YARRELL. Von A. v. PELZELN.



ing extension: The naked skin between the base of the bill and the eye; further, a large spot 8<sup>mm</sup> long, on the culmen adjacent to the frontal feathers, and connected with the black loreal space by a small black stripe; besides, the whole skin covering the nasal cavity is black, surrounded by the red-bill color; finally, the nail both on the upper and lower mandible with the edges of both jaws. "The legs and webs are not black, but slate-colored, changing into olive" (V. PELZELN).

Plumage pure white with a few brownish feathers here and there, the remains of the young plumage.

For the sake of completeness, I here give the main points of Mr. HUME'S description of the coloration of the young.

(♂ and ♀ jun. Jubbee stream, on the borders of the Hazara and Rawalpindes districts, India.—17th January, 1871.—By Capt. UNWIN.)

"If from each side of the frontal tongue of feathers, about half an inch from its point, a slightly curving line be drawn to a point on the edge of the upper mandible about a quarter of an inch from the gape, the whole of the space inclosed by such line between it and the eye is perfectly black. At the extreme point of the frontal feathers, again, is a black band about a quarter of an inch wide, which extends right and left over the whole narial space. The nail is black; the rest of the bill was light gray. The legs and feet, I may add, were grayish black.

"The general color of the lower surface is a dull white; of the upper whitey-brown. The crown and occiput wood-brown; the greater portion of the wing, the scapulars, and rump are wood or sandy brown. There is nowhere any trace of a 'sooty gray.' The brown is essentially a buffy or sandy brown, though here and there, as in the feathers of the base of the neck, a faint grayish shade is intermingled.

"Both male and female, though differing somewhat in size, are precisely similar both as regards plumage and coloration of the bill."

I am aware that of late there have been published two or three papers about the Indian Swans in "Stray Feathers," and in the "Journal of the Asiatic Society of Bengal," but as I have not been able to procure any of them, I cannot say whether they have any influence on the question discussed above. If they really prove that Capt. UNWIN'S young birds belong to *Cygnus gibbus*, I would propose that the present species, which certainly at all events is distinct from the Knob-Swan, should be called *Cygnus pelzelni*.

#### OLOR WAGL. 1832.

DIAGN.—Predominant color of the adults white; the young with downy or feathered lores, the down on the sides of the bill terminating far back of the nostrils, and forming very distinct loreal antiæ; tertiaries and scapulars normal, not crisp; tail longer than the middle toe with claw, rounded; in-

*ner webs of outer three primaries, and outer webs of the second, third, and fourth, sinuated; webs of the feet not scalloped.*

SYN.—1832.—*Olor* WAGLER, Isis 1832, p. 1234 (nec BP. 1842, quæ *Cygnus*).  
1845.—*Cygnus* GERBE, Rev. Zool., 1845, p. 244.

*Synopsis of the species.*

- a<sup>1</sup>. The distance from the anterior angle of the eye to the hind border of the nostrils much longer than the distance from the latter to the tip of the bill.  
b<sup>1</sup>. The yellow color at the base of the bill extending beyond the nostrils.

1. *cygnus* (LIN.), 1758.

- b<sup>2</sup>. The yellow color at the base of the bill not extending to the nostrils.  
c<sup>1</sup>. Smaller: Total length about 1,150<sup>mm</sup>; middle toe with claw about 125<sup>mm</sup>; the yellow spot at the base of the bill making at least  $\frac{1}{2}$  of the surface of the bill and lores.

2. *bewickii* (YARR.), 1830.

- c<sup>2</sup>. Larger: Total length about 1,400<sup>mm</sup>; middle toe with claw about 140<sup>mm</sup>; the yellow spot at the base of the bill making, at most,  $\frac{1}{5}$  of the surface of the bill and lores.

3. *columbianus* (ORD.), 1815.

- a<sup>2</sup>. The distance from the anterior angle of the eye to the hind border of the nostrils equal to the distance from the latter to the tip of the bill.

4. *buccinator* (RICH.), 1831.

*Olor cygnus* (LIN.).

Hooper Swan.

DIAGN.—*The distance from the anterior angle of the eye to the hind border of the nostrils is much longer than the distance from the latter to the tip of the bill; the yellow color at the base of the bill extending beyond the nostrils, making  $\frac{2}{3}$  of the surface of the bill and lore.*

SYN.—1758.—*Anas cygnus* LINN., Syst. Nat. x ed. I, p. 122 (*part*).

1779.—*Anas olor* PALL., Sv. Vet. Acad. Handl. XL, p. 27 (nec GMEL. 1788 quæ *Cygnus gibbus* BECHST.)

1809.—*Cygnus musicus* BECHST., Gemein. Naturg. Deutschl. IV, p. 830 (nec BP. 1826, quæ *O. columbianus* (ORD)).

1810.—*Cygnus melanorhynchus* MEY. & WOLF, Taschenb. Vög. Deutschl. II, p. 498.

1816.—*Cygnus ferus* LEACH, Syst. Cat. Mam. & Birds, Br. Mus. (p. 37) (nec BARTR. 1791, quæ ? *O. columbianus* (ORD)).

1830.—*Cygnus islandicus* BREHM, Isis, 1830, p. 1135 (nec NAUM. 1838, quæ *O. bewickii* (YARR)).

1842.—*Cygnus xanthorhinus* NAUM., Vög. Deutschl. XI, p. 478.

1877.—*Cygnus linnei* MALM., Götebs. och Bohusl. Fauna, pp. 90 and 343.

Since BECHSTEIN raised the specific name *cygnus*, given by LINNÆUS, to the rank of a generic name, the species has been called *musicus* or *ferus*. As synonymous, *Cygnus olor* PALL., Zoogr. Rosso-Asiat. II, p. 211 (nec

GMEL. 1783) has been thus quoted. But the name of PALLAS has, without doubt, the priority in this species, as I have shown above (p. 189), for which both BECHSTEIN'S name for this and GMELIN'S *olor* must give way, and I cannot see but that the authors, who only admit one genus of Swans, viz, *Cygnus*, must adopt the name of PALLAS as the oldest for the present species. It is certainly a serious matter to transfer the name, which the Mute Swan has borne so long, to the Hooper, but if we consider the right of priority, there is nothing else to be done. In this case it does not depend upon a question which can be disputed, how the old authors' descriptions can be interpreted (as, for example, with *Sterna hirundo* and *Stercorarius parasiticus*). [See the note under *Cygnus gibbus*.]

TABLE V.—*Olor cygnus* (LIN).  
TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to anterior border of—			Breadth of bill at nostrils.	Toes with claw.				Tarsus.	Tail.	Wing.	
						Mouth.	Nostrils.	Eye.		Outer.	Middle.	Inner.	Hind.				
Mus. Acad., Phil.	17-No. 70	Europe			ad	108	52	136	32	mm.	155	167	130	95	114	mm.	615
Mus. Copenh.		"			ad	103	46	133	29	mm.	147	156	121	27	111	mm.	590
Mus. Leiden		Ringkjøbing, Jutland, Denmark.	Janr., 1863	♂	ad	101	45	127	34	mm.	147	159	118	25	121	mm.	628
Mus. Bergen	C. Mus. No 5	New York			ad	100	44	131	30	mm.	145	154	118	30	112	mm.	585
"		Bergen, Norway			ad	99	45	128	30	mm.	139	146	115	24	112	mm.	630
"		"			ad	93	46	118	31	mm.	142	148	115	29	108	mm.	595
"		"	22 Febr., 1877		ad	93	42	122	31	mm.	137	145	118	23	115	mm.	620
"		"	29 Novbr., 1877		ad	94	41	119	29	mm.	133	140	111	28	102	mm.	625
Mus. Acad., Phil.	17-No. 26	Lappland, Sweden			ad	95	42	119	28	mm.	132	141	106	26	101	mm.	558
U. S. Nat. Mus.	57173	"			ad	97	41	122	28	mm.	132	140	111	23	98	mm.	575
Coll. Stejneger	436	Stavanger, Norway	Febr., 1881	♂(?)	ad	93	42	119	32	mm.	129	146	113	23	99	mm.	560
Mus. Copenh.		Greenland	13 Novbr., 1861	♀	ad	90	40	114	30	mm.	124	132	107	26	110	mm.	570

*Olor bewickii* (YARR.).

## Bewick's Swan.

DIAGN.—*The distance from the anterior angle of the eye to the hind border of the nostrils is much longer than the distance from the latter to the tip of the bill; the yellow color at the base of the bill does not extend to the nostrils, making at least  $\frac{1}{3}$  of the surface of the bill and lores. Smaller: Total length about 1150<sup>mm</sup>; middle toe with claw about 125<sup>mm</sup>.*

- SYN.—1830.—*Cygnus bewickii* YARRELL, Trans. Lin. Soc. XVI, p. 453 (nec RICH. 1831 quæ *O. columbianus* (ORD)).
- 1838.—*Cygnus islandicus* NAUM., WIEGM. Archiv, IV, 1838, p. 364 (nec BREHM, 1830, quæ *Olor cygnus* (LIN.)).
- 1838.—*Cygnus bewickii* EYTON, Monogr. Anat. Pl. 18 (err. typ.).
- 1840.—*Cygnus minor* KEYS. & BLAS., Wirbelth. Europ. p. LXXXII.
- 1842.—*Cygnus melanorhinus* NAUM., Vög. Deutschl. XI, p. 497.\*
- 1851.—*Cygnus musicus* KJÆRBÖLL., Orn. Dan., Pl. XLIV (nec BECHST. quæ *O. cygnus* (LIN.)).
- 1854.—*Cygnus americanus* HARTL., Naumannia, 1854, p. 327 (nec SHARPL. quæ *O. columbianus* (ORD)).
- 1856.—“*Cygnus altumi* HOMEYER” BP., Cat. PARZUD., p. 15.
- 1866.—“*Cygnus altumii* BÄDEKER,” SCHLEGEL, Mus. P. B., VI, *Anseres*, p. 82.
- 1880.—*Cygnus bewickii* DRESSER, Birds of Eur. pt. lxxvii-lxxix.

Note 1.—In PALLAS'S Zoographia Rosso-Asiatica I, p. 214, this species is found to be separated from the common Hooper, but only as variety “ $\beta$  minor” under *Cygnus olor*.† In 1840 KEYSERLING and BLASIUS altered the name given by PALLAS to a binominal, and called the species *minor*; but already, 10 years earlier,‡ YARRELL had described it under the name *bewickii*. The same year BREHM, in *Isis*, had named a little Swan as *islandicus*, but after what I have tried to show, in my second note on the synonymy, it does not belong here, but to the Hooper, whilst the species described and well drawn by NAUMANN in WIEGMANN'S Archiv. 1838, under BREHM'S name *islandicus* certainly belongs to *bewickii*; he altered the name 4 years later to *melanorhinus*. In Naumannia for the year 1854, p. 145, Taf. I and II, Professor ALTUM described and delineated a little Swan after specimens killed in North-western Germany, and which he considered to be a new species, different from *bewickii*, but without giving it a name, and whose principal

\*GIEBEL, Thesaur. Ornith. I, cites, “WIEGM. Arch. IV, 1838, p. 361, Taf. 9,” and DRESSER, B. of Eur., has the same quotation.

†Although PALLAS'S description in the above-named place only partly refers to *C. bewickii*, it will not do to place his name as unconditionally synonymous with the Hooper, as Mr. FINSCH does (Verh. Zool.-Bot. Ver. Wien XXXIX, 1879, p. 255).

‡A specimen was killed in France in 1807, and was deposited in the museum at Leiden under the name *Cygnus musicus*, until I, the last summer, identified it with *bewickii*.



character consisted in the unmixed black color of the whole culmen. During the discussion which followed, the name ALTUM'S Swan was occasionally employed to indicate the specimens described by him, and hence probably "*Cygnus altumii*" originated.

Note 2.—Mr. DRESSER indicates the year of publication of YARRELL'S name to be 1833, probably because the volume of the "Transactions" in question bears that date on the title-page. But the part in which YARRELL'S treatise was printed was published in 1830. Besides, Mr. DRESSER quotes "p. 445," which also is that on which the treatise begins, but the name and the diagnosis first occur on p. 453.

Note 3.—Prof. J. REINHARDT has already made a statement\* which, strange to say, has generally been overlooked, to the effect that C. L. BREHM'S *Cygnus islandicus* is not synonymous with the species in question. His description in OKEN'S *Isis*, 1830, p. 1135, and in *Handb. Vög. Deutschl.* 1831, p. 832, contains nothing on which the identity can be founded, with the exception that the Iceland Swan was smaller, "frequently 6 inches shorter," than the Hooper. Besides, the shape of the bill of the two supposed species was indicated to be different, but not in such a manner that anything about the present question is to be concluded from this. It is highly improbable that BREHM could really have a *C. bewickii* before him without taking notice of the difference between the extension of the yellow on the beak. The matter will be found to be quite certain when we look at the drawing in his *Handb. Vög. Deutschl.*, pl. xli, fig. 1, which, according to p. 1035, is meant to represent *C. islandicus*. Though drawn by GOETZ, and belonging to the class of unlucky representations, it still unmistakably shows the extension of the yellow color, both in the upper and the lower mandible, precisely as in the Hooper, viz, the yellow color is carried to a point under the nostrils, and BREHM expressly assures us that all the figures are drawn from nature. Neither can it be pleaded as a proof against the opinion here expressed that Iceland is stated as the habitat after it is known that *C. bewickii* has never been seen there. Neither do BREHM'S small specimens allow themselves to be referred to as any pigmy variety of the Hooper. Prof. J. REINHARDT, in Copenhagen, has, at all events, kindly informed me that those Swans occurring in Iceland cannot be separated from those of the continent on account of smaller size.† Here it must be remarked that the so-called considerable difference in size, viz, "6 inches," is not especially extraordinary. The difference between the largest and smallest individuals of the latter species which I have measured (except an unusually small specimen from Greenland) amounts to 5 inches.

Note 4.—The uppermost figure to the right on Plate xlv in KJÆR-

\* Natuhistorisk Tidsskrift, II (p. 532).

† Personally I have had no opportunity of examining skins of specimens from Iceland. In the mean time this affair ought to be very closely examined. I refer here to the remarkably small specimen of the Hooper from Greenland, included in the table of dimensions on p. 202.

BÖLLING'S "Ornithologia Danica" represents undoubtedly a *C. bewickii*, although that on the plate is called *musicus*, and although the author in the text under the latter species refers to the same representation. The yellow color on the beak has in fact precisely the peculiar limit of that in *bewickii*.

Note 5.—In SCHLEGEL'S *Mus. P.-B. Anseres*, p. 82, and in DEGLAND and GERBE'S *Ornith. Europ. II*, p. 474 (probably on his authority), as synonymous with the supposed species, *Cygnus altumii*,\* BÄDEKER is stated, without date and without naming the place from which the quotation is taken. In BONAPARTE'S *Cat. Ois. Eur.* PARZUDAKI, 1858, in SEVERZOW'S "Turkistanskije Jevotnie," 1873, and again in Mr. DRESSER'S translation of the same in the *Ibis*, 1876, p. 416, also in *CAB. Journ. Ornith.* 1875, p. 184, the name *Cygnus altumi* occurs, but with the author's name, HOMEYER, added. Mr. E. V. HOMEYER has in the meantime had the kindness to inform me as follows: "Neither I nor any of my friends in Berlin have any knowledge that BÄDEKER has anywhere spoken of a *C. altumii*. Neither have I ever done so. . . . I repeat that I have never spoken about *C. altumii*, and do not know how SEVERZOW can have quoted me." Prof. B. ALTUM writes to me that the Swan described by him in *Naumannia IV*, p. 145, BÄDEKER has had figured with the name in question. He can, however, neither give place nor date.

COLL. STEJNEGER no. 394. (♀ *ad.* *Sömme, Jadderren, Norway*, 58° 53' N. lat., 22d January, 1880. By Mr. SOPHUS A. BUCH.)

Total length of the newly-killed bird, 1,135<sup>mm</sup>; length of the bill along gape, 89<sup>mm</sup>; from the hip to the front of the nostrils, 39<sup>mm</sup>; to the fore border of the eye, 108<sup>mm</sup>; length of toes with claws: outer toe 116, middle toe 124, inner toe 99, and hind toe 19<sup>mm</sup>. Tarsus 90, wing 530, and tail 163<sup>mm</sup>.

Bill, black on the whole surface from the tip to the front, and on the sides to a point about 15<sup>mm</sup> behind the nostrils; the remainder and the naked lores intense reddish-yellow, about of the same color as the pulp of the blood-orange; the border of the black color forms a very jagged line; on that part of the culmen which lies between the lateral yellow spots the yellow color shines through the black, like the shadings in marble; along the forehead towards the eye both the beak and the lores are black; the lower jaw black, the margins with the lamellæ dark flesh-colored; the naked skin of the chin grayish-black, with transparent faint yellowish marbled shadings. Feet, grayish-black.

The plumage pure white, with a fine ashy-gray tinge on the sides of the head, and edged with pale rust-color on the feathers of the forehead, crown, and cheeks.

\* Or *altumi*, as DEGL. and GERBE, 1867, write it.

MUS. BERGEN (*Balestrand, Sogn, Norway, 61° 8' N. Lat., 19th January, 1880. By Mr. SVØRDRUP.*)

Length of the bill from the tip to the mouth 89<sup>mm</sup>, to the front of the nostrils 39<sup>mm</sup>, and to the fore border of the eye 113<sup>mm</sup>. Length of toes with claws: outer toe 118, middle toe 127, inner toe 96, and hind toe 21<sup>mm</sup>. Tarsus 92, wing 550, and tail 166<sup>mm</sup>.

In this specimen, when fresh, the lateral spots on the bill are of a purer yellow color than the preceding, without red; also the whole culmen is jet black, without the shaded yellow transverse stripe towards the forehead; the margin of the lower mandible with the lamella quite light flesh-colored.

On the whole like the former, although without the grayish tinge on the sides of the head.

COLL. OF NORWAY SCIENTIFIC SOC. TRONDHJEM. (♀ ? *ad.*, *Stjordalen, Norway, 63° 25' N. Lat.—The first half of February, 1880.*)

Length of bill along gape, 87<sup>mm</sup>; from the tip to the front of the nostrils, 39<sup>mm</sup>; to the fore border of the eye, 116<sup>mm</sup>. Length of toes with claws: Outer toe 117, middle toe 125, inner toe 95, and hind toe 22<sup>mm</sup>. Tarsus 92, wing 560, and tail 163<sup>mm</sup>.

The shortest distance from the openings of the nostrils to the yellow lateral spot on the base of the bill amounts to 18<sup>mm</sup>. The lateral spots are in connection with each other over the culmen by a narrow yellow stripe, which forms an angle in the middle of the culmen with the point turned towards the front; the margin nearest the feathers of the forehead, blackish. From the upper and hinder border of the skin of the nostrils, but not in immediate connection with the yellow at the base of the bill, a yellowish brown spot almost 8<sup>mm</sup> long extends towards the tip to cr. 10<sup>mm</sup> from the hind border of the openings of the nostrils. Skin of the chin brownish.

The whole plumage dazzlingly white, with faint yellowish edges on the feathers of the fore part of the head.

COLL. OF NORWAY SCIENTIFIC SOC. TRONDHJEM (*Jun.; Hitren, Norway, 63° 30' N. Lat. Last of December, 1879. By Mr. ARNET.*)

Mr. STORM\* gives the total length at 1,040<sup>mm</sup>. The distance from the tip of the bill to the mouth I found in the stuffed specimen to be 83<sup>mm</sup>, to the fore border of the nostrils 37<sup>mm</sup>, and to the anterior angle of the eye 109<sup>mm</sup>. Length of the toes with claws: Outer toe 114, middle toe 120, inner toe 91, and hind toe 18<sup>mm</sup>. Tarsus 92, wing 500<sup>mm</sup>, and tail 134<sup>mm</sup>. The slight differences in the dimensions given by Mr. STORM (*l. c.*) of the same specimen probably arise from some difference in our respective modes of measurement. The dimensions given here are carried out in the same manner as all those undertaken and introduced by me into this treatise.

\* Kgl. N. Vidmsk. Selsk. Skr. 1879, p. 129.

From the base forward to between the nostrils and the nail, the bill on the unskinned bird was flesh-colored (Mr. STORM, *l. c.* and *in litt.*). The red color in the dried condition has now exactly the same extent, but has changed to a dull yellowish-red in the hinder part and dark crimson in the front part; border, tip, and a spot round the opening of the nostrils, black. Mr. STORM describes the feet in the freshly-killed specimen as grayish, lighter than in the adult, and the iris as light grayish.

The upper part of the head and neck dull bluish-gray, with the edges of the feathers on the head lighter; chin and throat dirty-white; forehead partly with rather strong rusty-yellow tinge; round the eyes a sharply-defined, downy, white ring. Rest of the surface of the body light violet-gray, with the edges of the feathers tawny yellow; on the back, shoulders, wing-coverts, sides, and the rather purer light bluish-gray rump, the shafts are blackish, forming very distinct dark streaks; on each shoulder a pure white feather protrudes, with a few gray rays. The underside whitish, with the edges of the feathers rust-colored, especially on the middle of the belly; crissum shaded with dull grayish. The primaries a trifle darker than the back, the first with a white stripe in the outer web, along the shaft; the primary coverts rather light. Rectrices gray, lighter along the edge of the inner web; a cluster of the outer tail-coverts on each side pure white.

The tail consists of 20 rectrices.\*

MUS. UNIVERSITY COPENHAGEN (*♀ jun. Velling, Jutland, Denmark, 6th March, 1859.*)

Length of the bill along gape, 82<sup>mm</sup>; to the fore border of the nostrils, 36<sup>mm</sup>; and to the fore border of the bill, 104<sup>mm</sup>. Breadth at the nostrils, 28<sup>mm</sup>. Length of toes with claws: Outer toe 114, middle toe 119, inner toe 97, and hind toe 24<sup>mm</sup>. Tarsus 90, wing 475, and tail 138<sup>mm</sup>.

Lores almost bare, and the light color on those and the bill yellow. This color extends along the edge of the upper mandible not farther than is usual in the adult birds, whilst that on the culmen reaches as far as the fore border of the nostrils; likewise the hinder part of the skin of the nostrils is yellow. On the culmen, straight up from the upper posterior point of the skin of the nostrils, a large horseshoe-shaped black spot, with the opening towards the back. The limits between black and yellow less distinct than in the adult.

The color of the plumage about the same as that of the young specimen in the collection at Trondhjem, described above, although not so bluish; the tint on the back, wings, and tail feathers being, on the contrary, brownish. Also, the shafts are light, except on the remiges and rectrices, the shafts of which are brownish. The forehead and the abdomen with rusty-yellow tinge.

\* Mr. DRESSER, *Birds of Eur.*, part for April, 1880, says: "The young bird is said to have only eighteen or nineteen tail-feathers."

♀ MUS. ACAD. NAT. SCI. PHILADELPHIA, No. 1794. (*Pull. Europe.*)

Length of bill along gape, 26<sup>mm</sup>; from the tip to the fore border of the nostrils 14, and to the anterior angle of the eye 36<sup>mm</sup>. Breadth of the bill at the nostrils, 10<sup>mm</sup>. Toes with claws: Outer toe 32, middle toe 33, inner toe 27, and hind toe 8<sup>mm</sup>. Tarsus 33<sup>mm</sup>.

Color of the bill, brownish, with whitish nail. Legs yellowish-gray.

The down on the upper surface has a distinct tinge of brownish on the white ground, this tinge changing into a lighter tone on the under-side of the neck, while it forms a very well defined limit against the white on the rest of the under surface.

This specimen is admitted to the present species with doubt. Perhaps it may belong to *O. cygnus*; but the proportionately great height of the bill at the base, and the position of the nostrils parallel to the commissure and not to the culmen, seem to indicate it to be a true *bewickii*.

BEWICK'S Swan has often been confounded with both the Hooper and *O. columbianus*, and even quite recently doubts about the difference from the first mentioned have been stated; whilst the erroneous identification of *columbianus* with *bewickii* has caused the impression that the latter is to be found in the Neartic region.

When once attention has been drawn to the difference between the adult Hooper and the adult *bewickii*, it is almost impossible afterwards to make a mistake between them, as one, only from the color of the beak, will be able to distinguish them from each other, apart from the size and structural differences, which will be spoken of later. In the Hooper, the yellow color on the bill and lores embraces really a larger surface than the black, and reaches, even on the jaw, in a pointed angle to under and in front of the nostrils, whilst that in the *bewickii* only embraces about one-third of the surface of the bill and lores, as also that in the latter ends in a curved line behind the nostrils, without reaching them. On some individuals one sees a very little portion or spot of the yellow, stretching itself on to the skin of the nostrils, where it occasionally is said to extend in a narrow stripe to the hind border of the opening of the nostrils, but on the jaw itself the yellow color does not reach by a long way near the opening of the nostrils. The mentioned relation concerning the extent of the yellow on the skin of the nostrils I have most frequently observed on specimens from Denmark.

As is clearly shown by a comparison of the measurements given in Tables V and VI, the difference in size alone is sufficient to separate the adult birds of both species from each other.

With regard to the adults there is thus no difficulty. On the contrary, it is not always so easy to distinguish the young birds of the two species from each other, as in them the given distinctions in the color of the bill and the size do not always hold good. Dr. O. FINSCH thinks, after having spoken about the mentioned difficulties, which for him even

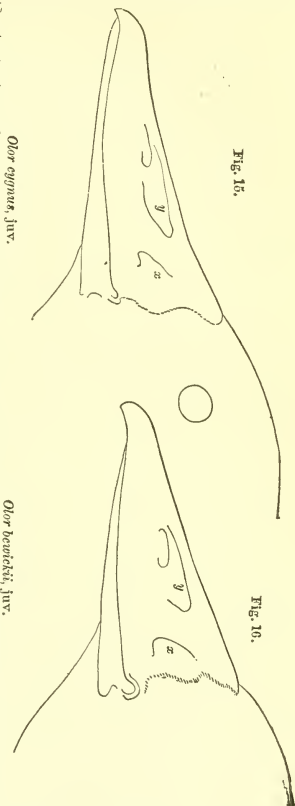


appear to raise doubts about the specific value of *bewickii*\* (Verh. Zool. Bot. Ver. Wien, 1879, p. 256), that "only the shorter tarsus and middle toe can be given as distinctions"; but even this mark cannot be employed with individuals that have not yet reached their full size. I have therefore looked about after another distinctive mark, and believe I have found one, which is characteristic in all ages.

What there is most peculiar in *O. bewickii*, when compared with the Hooper, is without doubt the higher and rather shorter form of the bill, and on the whole the bill is that part in which we can expect to find the most essential characters in these birds.

I have had the beaks of two full-grown young birds, in gray plumage, photographed, the one of BEWICK'S, the other of the Hooper, so that the former, in order to be more easily compared, is so much enlarged that it has obtained exactly the same size as the latter. Figs. 15 and 16 are taken very carefully after these photographs.

If one takes the distances from the tip of the bill to the hind border of the nostrils, and from this point again to the mouth, in the one figure, between the feet of the dividers, and places these measurements on the other figure, it will be very easy to convince oneself that the nostrils in *bewickii* lie nearer the tip of the bill than in the Hooper, which can also be expressed thus, viz, that in the Hooper the distance from the mouth to the hind border of the nostrils is equal to the distance between this and the hind border of the nail of the bill, whilst in *bewickii* the former distance is equal to that between the hind border of the nostrils and a point on the middle



\*When Dr. FINSCH, l. c., in his comparative table of the dimensions, quotes the measurements of Professor SCHLEGEL, and thereby makes out that the difference in size between *cygnus* and *bewickii* is only slight, it should not be forgotten that one of the specimens which Professor SCHLEGEL measures as *cygnus* is only a female of *bewickii*, and, moreover, a very small one, too, as is fully evident from my table.

The mistake of Professor SCHLEGEL is the more strange from the fact that he in his catalogue (p. 81) expressly adverts to the peculiar extension of the yellow color on the bill being exactly that of the typical *bewickii*.



of the nail. It will further be easily seen in the same figure that a straight line laid along the upper border of the nostrils in the Hooper will go almost parallel with the culmen, whilst this in BEWICK'S Swan will form a much more obtuse angle with the same.\*

It will not be difficult in general in these birds to notice through the skin of the bill the outlines of the bones which lie underneath. Especially easy will one be able to discern the outlines of the *processus maxillaris* of the nasal bone with the open angle lying back and below the same, between the named *processus* and the *arcus zygomaticus* (*x* on figs. 15, 16), together with the angle lying above and to the front (*y* on the same figures), formed by the *processus maxillaris* and *intermaxillaris* of the *os nasale*.

In all the specimens which I have examined it has shown itself that the *processus maxillaris* in *O. cygnus* is much more inclined than in *O. bewickii*, in which it is more perpendicular, so that perpendicular lines through the upper points of the angles *x* and *y* in the figures, descending to a line parallel with the commissure, have a not inconsiderable distance from each other in *bewickii*, whilst they come together, or almost so, in the Hooper; or, in other words, in the latter the point of the angle *x* extends so far forward that it comes almost under the point of the angle *y*, which is far from being the case in BEWICK'S Swan. The relation can be very clearly seen in the sketches.

I have thus always found the formation of the bill, in old as well as in young specimens; and I have but little doubt that this relation, which agrees with the greater height of the bill in *bewickii*, will show itself to be an excellent, easily perceived, and constant mark, and that by this the difficulty of distinguishing the young birds of both species by the assistance of outward marks is satisfactorily settled.

Besides, if one compare the two above-mentioned young birds, separately described (see pp. 206 and 207), which would have taken, the ensuing spring, the white plumage of the old birds, the color does not show any particular difference. Exactly the contrary to what Mr. DRESSER (Birds of Eur., April, 1880) describes,† the young *bewickii* now before me is considerably lighter than my specimen of the Hooper. Besides, the former has on the back numerous blackish hairlike stripes, formed by the dark-colored shafts, whilst they in the other are not darker than the *radii*. Another young specimen of the Hooper, belonging to the Bergen Museum, and which I have described in *Nyt Mag. for Naturv.*, xxv, p. 145, is similar to the one in my collection.

\* NAUMANN has already drawn attention to this feature.

† Said to resemble the young of *C. musicus*, but is, of course, much smaller, and the coloration of the plumage is rather darker.

TABLE VI.—*Olor boreickii* (YARR.).

TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to anterior border of—			Breath of bill at nostrils.	Toes with claws.				Tarsus.	Tail.	Wing.
						Mouth.	Nostrils.	Eye.		Outer.	Middle.	Inner.	Hind.			
Mus. Trondhjem.	.....	Stjördalen, Norway	♀ Febr., 1880	(?)	ad	87	39	116	33	117	125	95	.....	92	163	560
Mus. Bergen.	.....	Harejde, Søndmør, Norw	♂ 27 Febr., 1880	♂	ad	88	39	113	32	118	125	102	.....	91	162	550
"	.....	Balestrand, Sogn, Norw	♂ 19 Janr., 1880.	♂	ad	89	39	113	30	118	127	96	.....	92	166	550
"	.....	Holland	♂ 1 July, 1855	♂	ad	92	38	116	29	114	123	93	.....	94	140	505
Mus. Leiden	C. minor, No. 1	Orlandet, Trondhjem, Norw	♂ Janr., 1880	♂	ad	90	38	109	31	118	126	99	.....	93	176	530
Coll. Gram	.....	Sole, Jæstøderen, Norw	♂ Janr., 1879	♂	ad	84	38	112	26	110	125	90	.....	90	173	555
Mus. Stavanger	.....	Indeneen, Indherred, Norw	♂ Mar., 1880	♂	ad	88	41	111	31	117	120	98	.....	90	161	540
Mus. Christania	.....	Somme, Jæstøderen, Norw	♂ Janr., 1880	♂	ad	89	39	108	31	116	124	99	.....	90	163	530
Coll. Schneger	394	Rinkåbing, Jutland, Denmark	♂ 23 Janr., 1861	♂	ad	85	35	109	29	118	128	103	.....	90	163	530
Mus. Copenhagen	.....	Stanning, Jutland, Denn	♂ 10 Octbr., 1850.	♂	ad	94	39	116	30	116	123	94	.....	22	110	359
"	.....	Europo	.....	♂	ad	87	40	108	27	115	123	99	.....	25	89	152
Amer. Mus., N. Y.	.....	Bilow	.....	♂	ad	84	39	110	29	115	122	99	.....	26	100	172
Mus. Copenhagen	.....	Ringkøbbingsfjord, Jutland, Denn.	♂ 30 March, 1863	♂	ad	84	35	105	28	110	118	92	.....	18	99	163
"	.....	Bolgen, Kristiansund, Norw	♂ March, 1857	♂	ad	85	39	105	29	108	117	91	.....	22	94	163
Coll. Gram	.....	Reinsvandet, Stenkjær, Norw.	♂ Decbr., 1870	♂ (?)	ad	86	39	111	29	106	116	85	.....	22	89	161
"	.....	Europe	♂ Janr., 1880.	♂	ad	82	36	109	30	110	120	93	.....	23	94	156
Mus. Acad., Philad'a.	.....	France	1867.	♂	ad	80	36	113	29	112	120	82	.....	21	91	160
Mus. Leiden	C. musculus, No. 7.	Holland	♂ 15 March, 1856	♂	ad	81	38	103	29	102	110	85	.....	26	87	158
"	C. minor, No. 2.	Hamburg, Germany	♂ 20 Octbr., 1880	♂	ad	81	36	102	29	100	115	.....	.....	20	87	163

*Olor columbianus* (ORD.)

## Whistling Swan.

DIAGN.—*The distance from the anterior angle of the eye to the hind border of the nostrils much longer than the distance from the latter to the tip of the bill; the yellow color at the base of the bill does not extend to the nostrils, making at most  $\frac{1}{15}$  of the surface of the bill and lores; larger. Total length about 1,400<sup>mm</sup>; middle toe with claw about 140<sup>mm</sup>.*

SYN.—? 1791.—*Cygnus ferus* BARTRAM, Travels (p. 294) (nec LEACH, 1816 quæ *O. cygnus* (L.)).

1815.—*Anas columbianus* ORD, GUTHRIE'S Geogr. 2d Amer. ed. (p. 319).

1826.—*Anas cygnus* BP., Obs. Nomencl. Wils. p. — (nec LIN. 1758).

1826.—*Cygnus musicus* BP., nt supra (nec BECHST. 1809, quæ *O. cygnus* (L.)).

1831.—*Cygnus ferus* SHARPLESS, DOUGHTY'S Cab. Nat. Hist. I. No. 8, p. 181 (nec LEACH, 1816).

1831.—*Cygnus americanus* SHARPL., op. cit. p. 185.\*

1831.—*Cygnus bewickii* RICHL., in SW. & RICHL., Fauna Bor., Amer. II, p. 465 (nec YARR. 1830).

*Note 1 to the Synonymy.*—As it seems impossible to decide whether BARTRAM has met with the Trumpeter or the Whistling Swan, I have admitted it to the latter species with query. Probably it may belong to this, but on the probability alone I should not like to transfer to any species a name which another bird has borne during a long time.

*Note 2.*—In order to justify the change of the name given by SHARPLESS, and the reinstatement of ORD's title, I quote below Dr. ELLIOTT COUES's investigation in this matter:—"By their size and the difference in the voice, the two American species are correctly discriminated by LEWIS and CLARKE;† unfortunately, however, they blunder in the matter by saying that the large species (i. e., the one subsequently called *Cygnus buccinator* by Sir JOHN RICHARDSON) is the same as that common on the Atlantic coast; whereas, it is their other species, here called by them the Trumpeter, that is found also in the Atlantic States. But this confusion must not be allowed to stand in the light of the main point of this case, which is that in 1815, ORD based his *Anas columbianus* exclusively upon the Whistling Swan of LEWIS and CLARKE, i. e., upon the smaller of the two species, subsequently named *Cygnus americanus* by SHARPLESS. The blunder of the original authors does not extend to ORD, to whose name *columbianus* should be restored its rightful priority." (Bull. U. S. Geol. and Geogr. Surv. Terr. 2d ser. No. 6, p. 444.)

*Note 3.*—In opposition to those American ornithologists who have regarded the specimen from Igloodik (in 66° N. Lat.), described by RICHL.

\* Only the word "*Americana*" occurs, the whole name, *Cygnus americanus* first being found in SHARPLESS's paper in the Americ. Journ. Sc. Art. xxii, 1832, p. 83. The date of number 8 of DOUGHTY'S Cabinet is 1831 and not 1830, as generally quoted.

† History of the Expedition under the command of Captains LEWIS and CLARKE. By PAUL ALLEN, Philad., 1814, II, (p. 192).

ARDSON in Faun. Bor.-Amer. II. p. 465, as belonging to *O. columbianus*, Professor SCHLEGEL (Mus. T. B. VI, *Anseres*, p. 82) refers it to *bewickii*, under which name RICHARDSON also described it. In the mean time, after it has been shown that this species does not at all occur in the New World, it appears to be certain that the American ornithologists are right. The description contains, besides, nothing that speaks in favor of SCHLEGEL'S opinion. "Cere orange (that color entirely behind the nostrils)" agrees fully as well to *O. columbianus*. It is not so remarkable that RICHARDSON himself identifies it with YARRELL'S *bewickii*, for this was first described the previous year, and that without special details, concerning the color of the bill. Besides, it would almost seem as if the specimen had not been preserved, and the description compiled from memory, or from a short notice in his journal. When the specimen was killed at Igloolik the *O. bewickii* was not yet described. It is therefore most probable that RICHARDSON at the time overlooked the species, and then, when first informed of the description of YARRELL, has remembered that he had killed a Swan on which the yellow color did not extend to the nostrils. In confirmation of this, it may be stated that the dimensions given are not of the specimen described, but copied from YARRELL, and that it is not indicated where it was deposited, as is the case with the other specimens collected by him.

U. S. NAT. MUS. No. 85578. (*♂ ad. Currituck, North Carolina, 1st December, 1881. By Mr. ISAAC HINCKLEY.*)

Total length of the newly killed bird 1,355<sup>mm</sup>\*, between the tips of the outstretched wings 2,180<sup>mm</sup>. Length of the bill along gape 100<sup>mm</sup>, from the tip to the front of the nostrils 46<sup>mm</sup>, to the fore border of the eye 121<sup>mm</sup>. Distance from the anterior angle of the eye to the hind border of the nostrils 64, and from that point to the tip of the bill 56<sup>mm</sup>. Breadth of bill at the nostrils 33<sup>mm</sup>. Length of toes with claws: outer toe 143, middle toe 154, inner toe 121, and hind toe 30<sup>mm</sup>. Tarsus 117, wing 575, and tail 192<sup>mm</sup>.

Tip of tail beyond folded wings 92<sup>mm</sup>. Outstretched legs reach 50<sup>mm</sup> beyond the tip of tail. Length of cubitus, measured inside of the wing, 290<sup>mm</sup>.

Largest secondaries 23<sup>mm</sup> longer than the longest primary. 2nd primary longest, 8<sup>mm</sup> longer than the 1st, which is equal to the 3d. The inner web of the the three first primaries and the outer web of the second, third, and fourth, sinuated. Number of primaries 10, of secondaries 25.

Number of tail-feathers 20, one in the sheath.

Color of the bill black, with a 15<sup>mm</sup> long, pale greenish yellow spot in front of the eye. Tomium of the lower mandible, with the lamella, dark pinkish red, changing into plumbeous black at the base. Naked skin

\* Another freshly killed bird, which I measured 15th December, 1881, was 1,390<sup>mm</sup> long. The spot before the eye was 12<sup>mm</sup> long, and intense orange colored.

of the *angulus mentalis* black, with higher shadings of pinkish lead-color.

Legs brownish black.

Iris dark brown.

Plumage pure white, with a faint tinge on rusty of the forehead and crown.

COLL. STEJNEGER, NO. 437. (*♂ ad. Koshkonong Lake, Jefferson County, Wisconsin, 9th November, 1880. By Prof. THURE KUMLIEN.*)

In the freshly killed bird the length from the tip of the bill to the end of the tail amounted, according to Mr. KUMLIEN'S kind information, to 52.72 inches, *i. e.*, 1,333<sup>mm</sup>, and the tail reached 2 inches, *i. e.*, 51<sup>mm</sup>, beyond the tips of the folded wings. The remaining dimensions are as follows: Length of bill from tip to mouth, 99<sup>mm</sup>; to the fore border of the nostrils, 44<sup>mm</sup>; to the front of the eye, 117<sup>mm</sup>; the breadth of the bill at the nostrils, 32<sup>mm</sup>. Length of toes with claws: Outer toe 141, middle toe 151, inner toe 121, and hind toe 30<sup>mm</sup>. Length of tarsus 123, wing 547, and tail 152<sup>mm</sup>.

The whole of the bill and lores black, with exception of a spot about 20<sup>mm</sup> long and 8<sup>mm</sup> broad (now of a yellowish-gray color), which extends from the eye forward and downward, along the borders of the plumage of the cheeks, and which in the fresh condition, according to Mr. KUMLIEN'S statement, was "very conspicuously orange-yellow; feet and tarsi black, the naked portion of tibia a little lighter; iris brownish black."

The whole plumage pure white, with exception of a great many small, narrow, but regularly spread, rusty yellow longitudinal spots on the crown, the points of many of the feathers being of this color. Besides, the points and the edge of the outer web of some of the first primaries, and the large upper coverts of these, are shaded with brownish gray.

U. S. NAT. MUS. NO. 85579. (*—jun. Currituck, North Carolina, 28th November, 1881. By Mr. ISAAC HINCKLEY.*)

Total length of the bird in flesh 1,183<sup>mm</sup>. L. of bill along gape 84<sup>mm</sup>, from the tip to the front of the nostrils 39<sup>mm</sup>, to the fore border of the eye 108<sup>mm</sup>. Breadth of bill at the middle of the nostrils 31<sup>mm</sup>. Distance from the anterior angle of the eye to the hind border of the nostrils 58, and from this point to the tip of the bill 48<sup>mm</sup>. Length of toes with claws: outer toe 130, middle toe 138, inner toe 112, and hind toe 26<sup>mm</sup>. Length of tarsus 110, wing 510, and tail 137<sup>mm</sup>.

The tip of the tail reaches 63<sup>mm</sup> beyond the folded wings, outstretched legs 100<sup>mm</sup> beyond the tip of tail. Length of cubitus, measured inside of the wing, 258<sup>mm</sup>.

The longest secondaries are equal to the longest primary. 2nd and 3d primaries equal and largest, the first considerably shorter. The

simulation of the four first quills as in the adult bird, with the exception that the inner web of the fourth primary also is slightly sinuated. The number of the primaries is 10, and of the secondaries 23.

Tail feathers 20.

The middle portion of the bill (in the newly killed bird) is of a dull purplish lead-color, lighter and changing into pale pinkish red on the hind part of the skin, covering the nasal fossæ and the *processus maxillaris* of the nasal bone, becoming plumbeous at the borders of this area; the remaining portion of the bill and the nearly naked lores, is plumbeous black, a small stripe of which also is to be found behind the openings of the nostrils. The borders of the dark color are very indistinct, forming numerous more or less perceptible islets within the light area. The tomium of the lower mandible dark purplish plumbeous, becoming almost black at the base.

Legs light plumbeous-gray, dark, almost black in the midst of the web. The underside of the feet blackish with a stripe mostly of bluish white on the webs along the toes.

Iris dark.

The color of the plumage is dull ash-gray, tinged with lavender, and on neck, shoulders, and middle wing-coverts each feather bordered with light yellowish gray. The head is much darker, the crown being especially dull brownish, while the chin is much lighter, and a grayish white spot is to be found right under the eye. The hinder back, and upper part of the rump are quite white, the rest of the rump and the tail-coverts the same as the shoulders; one of the tail-coverts was quite white, and as its base was still in the sheath,\* showing itself to be a feather of the coming white plumage. The remiges are white, with broad pure gray tips, this color reaching back as far as the sinuation; on the first and second still longer. The tail feathers are darker ashy gray, the basal half of the shafts being white. Whole of the under surface light grayish with a slight tinge of yellowish. Under wing-coverts and axillaries pure white. The shafts of the upper surface are somewhat darker than the webs, but not very perceptibly so, and do not form any distinct dark stripes.

Another young specimen in flesh (for the examination of which I am indebted to the kindness of Professor S. F. Baird), killed 14th December, 1881, measured from tip of the bill to the end of the tail 1,225<sup>mm</sup>. The bill had the same color as the foregoing specimen, but the light portion was somewhat more pinkish red. The plumage was also similar, with the exception that the whole underside behind the neck was white with faint rusty tinge on the border of each feather.

In addition to the statements above about the color of the bill of the young bird, I give the following note, kindly given me by Mr. E. W. Nelson, showing the color of several freshly killed specimens, shot at St.

\* "The outer follicle," Nitsch, Pterylographie.



Michael's, Alaska, September 19, 1879: "Bill purplish flesh-color, rather light, and bordered along gape by black. Iris hazel."

March 15, 1882, I had the opportunity of examining a living young specimen. The bill was black, except the portion between the nostrils, the posterior half of the upper tomium, and the whole margin of the lower mandible, which were of a vivid pinkish flesh-color. The yellow spot in front of the eye was very perceptible, of common length, but still narrower and duller than in the quite adult bird. Iris hazel. The plumage white, except head and neck, which were gray, somewhat lighter than in the specimen described above.

TABLE VII.—*Otocolumbianus* (ORD.).  
TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to anterior border of—			Breath of bill at nostrils.	Toes with claw.				Tail.	Wings.	
						Mouth.	Nostrils.	Eye.		Outer.	Middle.	Inner.	Hind.			Tarsus.
						mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
U. S. Nat. Mus.	85578	Currituck, North Carol.	1 Decbr., 1881	♂	ad	100	46	121	33	143	154	121	30	117	192	575
Mus. Acad., Phil.					ad	98	47	120	33					107	186	570
Coll. Stejneger	437	Laake Koshkonong, Wis.	9 Novbr., 1880	♂	ad	99	48	117	32	141	151	121	30	133	152	547
U. S. Nat. Mus.		Oregon			ad	98	41	121	33	140	148	116	26	107	173	570
Mus. Copenhagen		Washington, D. C.	Decbr., 1865		ad	97	46	118	33	137	150	116	25	102	165	570
Mus. Leiden		California.		♂	ad	95	45	117	33	134	139	110	30	110	178	543
U. S. Nat. Mus.	78332				ad	93	41	120	34	131	138	110	22	110	168	550
		Oregon			ad	90	40	115	31	129	137	107	26	103	178	555
Mus. Acad., Phil.		Roonoke River, Virginia.	March, 1867		ad	93	45	114	32	128	138	110	25	102	162	543
		Columbia River.	19 Febr., 1896	♀	ad	94	45	122	29	124	133	104	26	107	170	548
U. S. Nat. Mus.	80657	Yankton, Dakota			ad	93	45	120	31	125	133	98	26	103	170	548
	1197	Potomac River	Decbr., 1843		ad	96	41	119	30	121	127	97	25	99	153	530
	40249	Washington, D. C.	Decbr., 1865	♀	ad	95	44	122	33							
	12740			♀	ad	94	42	113	30							
	44063	Franklin Bay	8 July, 1864	♀	ad	94	42	119	29							
	54629	Koyukuk	21 May, 1868	♀	ad	92	40	117	32							
	9981	Vancouver Isl., W. T.	Decbr., 1853		ad	91	41	115	33							
	44063	Anderson River, N. of Bear L.	June, 1865	♀	ad	91	44	113	32							
	44064	Franklin Bay	5 July, 1864	♀	ad	93	41	112								
		Mauinee Bay	19 May, 1877	♀	ad	92	41	114	32							
Mus. Leiden				♀	ad	88	35	109	33	124	131	105	25	101	164	550
Mus. Acad., Phil.		California.			ad	88	40	111	29	120	129	102	23	109	165	550
					ad	86	41	118	31	113	123	94	20	95	173	520

*Olor buccinator* (RICH.).

## Trumpeter Swan.

DIAGN.—*The distance from the anterior angle of the eye to the hind border of the nostrils equal to the distance from the latter to the tip of the bill; color of the bill and lores entirely black.*

- SYN.—1831.—*Cygnus buccinator* RICH. in SW. & RICH. Fauna Bor.-Amer. I, p. 464.  
 1844.—*Cygnus buccinator* GIRAUD, Birds of Long Island, p. 299.  
 1865.—*Cygnus passmori* HINCKS, Journ. Linn. Soc. Zool. VIII, p. 1.  
 1872.—“*Cygnus passmorei* HINCKS,” COUES, Key, N. A. B. p. 281.  
 1876.—*Olor passmorii* BOUCARD, Catal. Av. p. 57.

*Note to the Synonymy.*—Prof. W. HINCKS laid before the Linnean Society, on January 21, 1864, the description of a supposed new species of Swan, *Cygnus passmori*, from Canada, which could be distinguished from *O. buccinator* RICH., by several anatomical differences, also, amongst other things, by a smaller size (the whole length from the bill to the end of the tail being 1,295<sup>mm</sup>, in opposition to 1,524<sup>mm</sup>, the distance between the tip of the bill and the hind border of the nostrils 51<sup>mm</sup>, in opposition to 76<sup>mm</sup>); also, by faint dirty gray tinge in opposition to *buccinator's* generally more or less rust-colored tinge on the head and neck; by the same gray tinge on the inner web and points of the remiges, and by the naked black skin of the lores only reaching to the eyes and not surrounding them. There is, however, reason to suppose, and Mr. HINCKS himself expresses strong doubts, that these differences only arise from age. The smaller size, gray tinge on head and wing-feathers, feathering of the skin surrounding the eye, are all features which prove the young age of the bird, and *C. passmori* may therefore be regarded as a young *buccinator* until the reverse has been demonstrated.

Though the present species is a very distinct one, and the most remote of the genus to which it belongs, it has been very difficult to point out a character which will hold good in birds of all ages. I am not at all acquainted with the quite young bird, but think, however, that the above diagnosis will be sufficient even for identification of the younger specimens.

As both *Olor cygnus* and *bewickii* are easily recognizable by the yellow color of the base of their bills, a nearer comparison only is needed with the *O. columbianus*, of which specimens are said to be found which want entirely the yellow spot. I may here remark that I myself never met, amongst the numerous birds of this species which I have examined, a specimen on which I could not detect distinct traces of the spot by a careful inspection.

Besides the larger size, which is not always sufficient to distinguish the two species, as a comparison of the Tables VII and VIII will show, it has often been stated as a good criterion that *buccinator* has twenty-four tail feathers in contradistinction to *columbianus*, which only has

twenty. Independent of the inconvenience of this character, when the birds moult their rectrices, I may confess that I only in a few cases have been able to count twenty-four tail feathers; and the inconstancy of the number of these feathers I have found pervading the whole group, this character changing individually, so that it is not at all to be depended upon.

As a rule, the frontal apex of the ptilosis forms a sharp angle in *buccinator*, whilst it always is rounded in *columbianus*; but I have also seen specimens of the former which had the limit of the feathering rounded as in the latter. In *buccinator* I also usually found the distance from the eye to the point of the mentioned frontal apex to be larger than from the same point to the hind border of the nasal fossæ, whilst the relation is quite the reverse in *columbianus*; but I have also met specimens of both species in which this character was only very slightly expressed, the young *columbianus* especially having the culmen feathered longer forward than the older birds.

The position of the nostrils, those being situated more backwards in the Trumpeter than in the Whistling Swan, is thus the only mark which it is possible to express in a short diagnosis, and which I have found constant and easily perceptible.

TABLE VIII.—*Olor buccinator* (Rich.).

TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Date.	Sex.	Age.	Bill from tip to anterior border of—			Breadth of bill at nostrils.	Toes with claw.				Tarsus.	Tail.	Wing.
						Mouth.	Nostrils.	Eye.		Outer.	Middle.	Inner.	Hind.			
U. S. Nat. Mus.	81290	Lake Koshkonong, Wisc.	20 Apr., 1880	♂	ad	113	55	142	34	163	170	133	27	122	191	652
Mus. Leiden	C. bucc. No. 1	Missouri	.....	.....	ad	112	54	140	36	163	173	128	23	108	204	620
U. S. Nat. Mus.	5470	Yellow Stone River.	27 Aug., 1856	♂	ad	115	57	142	34	168	165	128	.....	127	179	630
"	70317	St. Clair Flats, Mich.	20 Novbr., 1875	♂	ad	109	50	142	35	164	168	132	26	126	173	545
Mus. Leiden	.....	North America	21 Febr., 1877	♂	ad	111	55	141	37	153	164	129	27	123	175	600
Mus. Acad. Phil.	.....	.....	.....	.....	ad	110	53	140	35	150	164	122	30	113	196	630
U. S. Nat. Mus.	.....	Oregon	.....	.....	ad	106	51	133	36	156	165	127	27	113	189	.....
"	.....	Ft. Resolution	.....	.....	ad	108	53	136	34	141	151	118	22	103	178	605
"	.....	Mouth of Fraser River	May	.....	ad	110	53	137	33	142	147	118	27	111	173	550
"	46224	.....	8 Janr., 1866	.....	ad	105	51	133	35	150	156	124	25	108	195	598

## CHENOPIS WAGL. 1832.

DIAGN.—*Predominant color of the adults blackish; the young with naked lores; tertiaries and scapulars crisp; tail shorter than the middle toe with claw, rounded; inner webs of outer three primaries and outer webs of the second, third, and fourth sinuated; webs of the feet not scalloped.*

SYN.—=1832.—*Chenopsis*, WAGLER, Isis, 1832, p. 1234.

=1852.—*Chenopsis* REICHENB., Syst. AV., p. X.\*

=1864.—*Chenopsis* JERDON, Birds of India, III, p. 777.

*Chenopsis atrata* (LATH.).

## Black Swan.

DIAGN.—*Plumage of the adults blackish, with white wing feathers; bill red, with a white band behind the nail; legs black.*

SYN.—1790.—*Anas atrata* LATH., Ind. Ornith., II, p. 834.

1790.—*Anser Nova-Hollandic* BONNAT., Encycl. Méth. Ornith. I, p. 103.

1791.—*Anas plutonia* SHAW, Natur. Miscell. III (tab. 108).

COLL. STEJNEGER, No. 710. (*Pullus, Victoria, Australia.*)

Length of bill along gape 24<sup>mm</sup>, from the tip to the fore border of the nostrils 14<sup>mm</sup>, to the front of the eye 34<sup>mm</sup>. Length of toes with claws: Outer toe 34, middle toe 36, inner toe 29, and hind toe 7<sup>mm</sup>. Tarsus 29<sup>mm</sup>.

The bill and an entirely naked 2<sup>mm</sup> broad stripe from that to the eye dark horn colored, or brownish black; the nail of the upper mandible as well as the lower is white at the tip. The feet dull grayish brown.

The faintly glossy plumage, is on the whole of the upper surface, the cheeks, the tibia, and the crissum, light brownish gray, which color, especially behind the feet, is tolerably distinctly marked against the white color of the undersurface; this on the throat is shaded with the same tinge as the back; the white color of the chin and throat goes imperceptibly over into the grayish tinge on the cheeks.

\* Usually is quoted "*Chenopsis* AGASSIZ," and GIEBEL, in his Thes. Ornith., adds "Nomencl. univers"; but I have not been able to find it in his Nomenclator Zoologicus, Aves, nor in either of the two editions of his Index Universalis.



TABLE IX.—*Chenopsis atrata* (LATH).

## TABLE OF DIMENSIONS.

Collection.	Mus. No.	Locality.	Sex.	Age.	Bill from tip to fore border of—			Breadth of bill at nostrils.	Toes with claw.				Tarsus.	Tail.	Wing.
					Mouth.	Nostrils.	Eye.		Outer.	Middle.	Inner.	Hind.			
U. S. Nat. Mus.	15652	Australia.	.....	ad	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.	mm.
Mus. Acad., Philada.	1443*	N. South Wales, Australia.	.....	ad	81	44	109	26	125	136	107	29	97	116	508
"	1442*	N. South Wales, Australia.	.....	ad	76	41	101	25	121	129	99	25	89	100	470
"	17-No. 8	Australia.	.....	ad	73	40	100	22	117	123	94	28	95	98	495
U. S. Nat. Mus.	71664	Victoria, Australia.	.....	ad	70	39	90	26	118	122	100	28	93	95	470
"	71656	Victoria, Australia.	.....	ad	70	39	90	26	112	118	92	26	92	.....	490
Mus. Leiden	C. atratus, No. 1	Australia.	.....	ad	68	36	90	23	106	118	90	19	83	107	470
Mus. Copenhagen		Australia.	.....	ad	70	40	98	26	110	117	90	25	88	.....	465

\* "Type of Gould's B. of Austr."

## INDEX OF SPECIFIC NAMES MENTIONED IN THIS WORK.

- altumi = *Olor bewickii*.  
 altumii = *Olor bewickii*.  
 americanus = *Olor columbianus*.  
 anatoides = *Coscoroba candida*.  
 atrata (CHENOPIA).  
 bewicki = *Olor bewickii*.  
 bewickii (OLOR).  
 bewickii = *Olor columbianus*.  
 berwickii = *Olor bewickii*.  
 buccinator (OLOR).  
 buccinator = *Olor buccinator*.  
 candida (COSCOROBA).  
 candidus = *Coscoroba candida*.  
 chionis = *Coscoroba candida*.  
 columbianus (OLOR).  
 coscoroba = *Coscoroba candida*.  
 cygnas = *Cygnus gibbus*.  
 cygnus = *Cygnus gibbus*.  
 cygnus (OLOR).  
 cygnus = *Olor columbianus*.  
 davidi (COSCOROBA).  
 dircea = *Cygnus unwini*?  
 falconeri (PALEOCYGNUS).  
 ferus = *Olor cygnus*.  
 ferus = *Olor columbianus*.  
 gambensis (PLECTROPTERUS).  
 gibbosus = *Cygnus gibbus*.  
 gibbus (CYGNUS).  
 herenthalsi (CYGNUS).  
 herenthalsii = *Cygnus herenthalsi*.  
 hyperboreus = *Coscoroba candida*.  
 immutabilis (CYGNUS).  
 immutabilis = *Cygnus unwini*.  
 islandicus = *Olor cygnus*.  
 islandicus = *Olor bewickii*.  
 linnei = *Olor cygnus*.  
 mansuetus = *Cygnus gibbus*.  
 melancorypha = *Sthenelus melancorypha*.  
 melancorypha (STHENELUS).  
 melanocephala = *Sthenelus melancorypha*.  
 melancoryphea = *Sthenelus melancorypha*.  
 melancoryphus = *Sthenelus melancorypha*.  
 melanorhinus = *Olor bewickii*.  
 melanorhynchus = *Olor cygnus*.  
 minor = *Olor bewickii*.  
 moschata (CAIRINA).  
 musicus = *Olor bewickii*.  
 musicus = *Olor columbianus*.  
 musicus = *Olor cygnus*.  
 nigricollis = *Sthenelus melancorypha*.  
 novæ-hollandiæ = *Chenopsis atrata*.  
 olor = *Cygnus gibbus*.  
 olor = *Cygnus unwini*.  
 olor = *Olor cygnus*.  
 passmorei = *Olor buccinator*.  
 passmori = *Olor buccinator*.  
 plutonia = *Chenopsis atrata*.  
 rüppellii (PLECTROPTERUS).  
 sibilans = *Cygnus gibbus*.  
 sibilus = *Cygnus gibbus*.  
 unwini (CYGNUS).  
 urwini = *Cygnus unwini*.  
 xanthorhinus = *Olor cygnus*.

NOTE ON THE HABITS AND THE REARING OF THE AXOLOTL,  
 AMBLYSTOMA MEXICANUM.\*

By M. CARBONNIER.

These amphibians live very well in an aquarium of suitable capacity—30 to 40 liters of water for each pair. This water should be renewed about once a fortnight. Some clusters of aquatic plants (*Elodea canadensis*) will assist in maintaining the purity of the water, and their topmost branches will serve, at the same time, as a support for the eggs deposited by the female. These eggs resemble frogs' eggs; they are covered with a similar viscous material and are deposited in strings instead of being agglomerated; they hatch in from 15 days to 3 weeks, depending upon the temperature of the water.

\* Translated from the French by Tarleton H. Bean.