

REVIEW OF JAPANESE BIRDS.

V.—IBISES, STORKS, AND HERONS.

By LEONHARD STEJNEGER.

(With one plate.)

The present part of the "Review" embraces the order *Herodii*, of which 21 species have been recorded with certainty as occurring in Japan.

Many of these birds are shy and of skulking habits, difficult to collect and very bulky, so as to make it quite a task to bring large series together; other species are superficially so alike on account of the uniform white color as to require a close study of their structural differences in order to enable one to properly distinguish them; others again are so changeable in the coloration of their plumage and so variable in size that the museum naturalist has to appeal to his colleague in the field in order to have him solve some of the questions by observations in the haunts of the living birds.

These circumstances explain why our knowledge of these birds is still so defective, and, at the same time, are my excuse for the fragmentary form of the following review and for its great bulk.

To Mr. P. L. Jouy, who has recently returned from Korea and Japan with magnificent collections, I am under great obligations for being allowed to examine his material, a courtesy for which I herewith tender him my sincere thanks. I am also indebted to Mr. J. A. Allen for loan of specimens in the New York American Museum of Natural History; to Mr. Harry V. Henson, for the privilege of inspecting his magnificent collection of Hakodate birds; and to Professor R. Collett, Christiania University, Norway, for submitting for my examination two most interesting collections made by Mr. Petersen in the neighborhood of Nagasaki.

Order HERODII.

The following synopsis of the families and subfamilies of Japanese *Herodii* only comprises a few of the most obvious external characters, by which the known species may be easily referred to their respective divisions, but the arrangement here adopted is capable of being supported by strong anatomical characters.

*a*¹. Sides of the upper mandible with a deep, narrow groove, extending uninterruptedly from the nasal fossæ to the extreme tip of the bill, which is truncate and bent downwards.

I.—IBIDOIDEÆ.

i. IBIDIDÆ.

*b*¹. Bill nearly cylindrical, tapering gradually towards the tip, and conspicuously arched from the base. 1. IBIDINÆ

- b*². Bill very broad and depressed, widened at the tip into a spatule, and nearly straight, except at the extreme tip.....2. PLATALEINÆ.
*a*². Nasal groove never reaching the tip of the bill, which is pointed and straight.

II.—ARDOIDEÆ.

- b*¹. Inner edge of middle claw not pectinated; tarsus reticulate; chin-feathering not extending in front of the nostrils.

ii. CICONIIDÆ.

- b*². Inner edge of middle claw pectinated; tarsus more or less scutellate; chin-feathering extending considerably in front of the nostrils.

iii. ARDEIDÆ.

Superfamily IBIDOIDEÆ.

Family IBIDIDÆ.

Subfamily IBIDINÆ, Ibises.

The status of the genera composing the subfamily *Ibidinæ* is by no means yet satisfactorily settled. As our material is very small, we shall not attempt to solve the question here. The apparent difference between the two species inhabiting Japan is so great, however, that we prefer to regard them as generically distinct until we have had an opportunity to convince ourselves that the differences are bridged over by some of the forms unknown to us.

The two genera may be distinguished as follows:

- a*¹. Face only bare of feathers.....*Nipponia*.
*a*². Entire head and neck naked.....*Ibis*.

NIPPONIA REICHB.

1852.—*Nipponia* REICHENBACH, Syst. Av., p. xiv (type *I. nippon* TEMM.).

(125.) *Nipponia nippon* (TEMME.).

Japan Ibis.

Toki.

1835.—*Ibis nippon* TEMMINCK, Pl. Color., V, 93 livr., pl. 551.—TEMME. & SCHL., Fauna Jap. Av (p. — pl. lxxi.) (1849).—BLAKIST., Ibis 1862, p. 331.—*Id.*, Amend. L. B. Jap., p. 12 (1884).—SCHLEGEL, Mus. P. B., Ibis., p. 9 (1863).—OUSTALET, Bull. Nouv. Arch. Mus., VIII, 1872, p. 136.—SWINHOE, Ibis, 1873, p. 249.—*Id.*, *ibid.*, 1875, p. 455.—BLAK. & PRYER, Ibis, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 198.—*Id.*, *ibid.*, X, 1882, p. 117.—*Nipponia nippon* BONAPARTE, Consp. Av., II, p. 152 (1855).—ELLIOT, Ibis, 1877, p. 495.—*Geronticus n.* M'VEAN, Proc. Roy. Phys. Soc. Edinb., 1877, p. —, extr. p. 7.

1852.—*Nipponia temminckii* REICHENBACH, Syst. Av., p. xiv.

I have not included in the above synonymy Père David's *Ibis sinensis* (Compt. Rend., 1872 (p. 64)), from Tshe-kiang, China, which is characterized by being gray throughout life. The bird which is figured by

Oustalet (Bull. Nouv. Arch. Mus., VIII, 1872, pl. 6) has nothing to indicate young age, or immaturity; the face is apparently quite bare of feathers, and the quills are in that high state of coloration only found in the adult bird. I am the more convinced of the correctness of this view by the fact that I have before me a Japanese specimen, which to all appearance is younger than the one represented in the figure quoted above, which has still a stripe of downy feathers down the middle of the fore crown, and the outer quills more or less dusky with hardly any trace of salmon color; yet the rest of the plumage is pure white. I therefore agree with Mr. Oustalet in regarding the Tshe-kiang bird as a local race* of the true Rosy or Japan Ibis.

It would be a promising field for local ornithologists to work out the history of this beautiful species. Swinhoe, in the Ibis for 1873, has some good notes on its feeding habits, accompanied by observations on the changes of plumage, etc., but his statements are rather obscure, and, I think, somewhat confused. In one place (p. 251) he describes the plumage of the adult as being "of a lovely rosy white," while two pages previously he speaks of being told in April "that they were putting on their dark breeding-feathers." "A full-fledged bird of the year" he describes as being "of a dusky cream-color washed lightly with rosy," and "its cheeks and over the eye were covered with small downy feathers, while the rest of its face was bare and colored orange-yellow instead of red." The "male, after autumnal moult," he says, has "the general plumage rosy; wings shorter than in the adult, and wanting its flammeous lateral rectrices, moulting into the flame-color of the adult dress." The changes of plumage he sums up as follows (*op. cit.*, p. 253):

The young are fully fledged and have the appearance of adult birds by April. * * * The young retain their grey plumage throughout the summer, associating with adults, even while the latter are continuing their nesting-duties, and moult about October, when they change their attire for a white robe with a tinge only of rosiness, their wings and tail alone remaining the same; but these get abraded and the former fades, and occasionally some quills are cast, to be renewed by others of the early spring suit which these birds of the year put on before breeding.

The two Japanese specimens before me are females collected in January, and probably birds of the foregoing year. They are nearly pure white all over with a faint salmon-colored glow on the concealed parts of the feathers, especially the inner secondaries, upper wing-coverts and under tail-coverts; the two outer primaries are of a nearly uniform dark drab-gray, while the two next to them are white mottled with the same color.

It should be remarked, that the "glow" of salmon-color, or perhaps rather saturn-red, fades very soon in museum specimens.

* Mr. D. G. Elliott, Ibis, 1877, p. 497, says that he agrees "with M. Oustalet (*l. c.*) that they are only the young of the present species" [*nippon*], but O. does not regard it as the young. On the contrary, he (*l. c.*) calls it "var. *sinensis* : omni æstate juveni [*nipponis*] simillima."

Mr. P. L. Jouy has kindly furnished me with the following color notes on the specimen which he collected:

U. S. Nat. Mus. No. 91486, P. L. Jouy, No. 933: "Lores, forehead, and chin orange vermilion, color lighter on the chin, intensified around the base of bill; eyelid golden yellow; iris orange; bill black mottled with red at the tips of both mandibles, nail yellow; nasal grooves red; tarsi, toes, and naked tibiae light red."

Measurements.

U. S. Nat. Museum No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Chord of culmen from base.	Tarsus.	Middle toe with claw.	Total length.	Stretch of wing.
91486	Jouy, 933	♂	Tokio, Hondo ...	Jan. 8, 1883	390	140	170	80	.....	"768"	"1308"
109457	.....	.....	Shimosa, Hondo	Jan. 29, 1883	390	147	175	83	80	.....	.....
.....	Jouy, 1353	♂	Fusan, Korea ...	Dec. 17, 1883	424	161	192	90	84	.....	"1460"

I have added the measurements of a male collected by Mr. Jouy near Fusan, Korea, in order to show the dimensions of the male. This specimen has a rather slight crest, but the red glow is more vivid than in the other two specimens; the two outer primaries, however, are still dusky for the greater extent, while the following ones are more or less mottled with dusky toward the tips. The fresh colors of the naked parts noted by Mr. Jouy are as follows: "Iris (faded) light sienna; bill black, tip scarlet; naked face-skin scarlet vermilion; tarsus and toes dull red."

IBIS LACÉP.

- 1799.—*Ibis* LACÉPÈDE (type, as restricted by Illiger, 1811, *I. aethiopicus* LATH.).
- 1842.—*Threskiornis* GRAY, App. List Gen. B., p. 13 (same type).
- 1855.—*Thereschiornis* BREHM, Naumannia, 1855, p. 290 (emend.).

(126.) *Ibis propinqua* SWINH.

- Black-headed Ibis. Kuro-toki.
- 1863.—*Threskiornis melanocephalus*? SWINHOE, P. Z. S., 1863, p. 318 (*nec* LATH. ?).—ELLIOT, *Ibis*, 1877, p. 488 (part).
- 1870.—*Ibis propinqua* SWINHOE, P. Z. S., 1870, p. 428.—BLAK. & PRYER, *Ibis*, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 198.—*Id.*, *ibid.*, X, 1882, p. 117.—SEEBOHM, *Ibis*, 1884, p. 35.—BLAKIST., Amend. L. B. Jap., pp. 24, 40 (1884).

Both Elliot and Reichenow, in their monographs, unite *Ibis propinqua* with *I. melanocephalus* (LATH.), but neither of them seems to have examined specimens of the former. I, therefore, retain Swinhoe's name, for the present at least, especially since Mr. Seebohm has pronounced Blakiston and Pryer's identification of the Japanese specimen as *I. propinqua* to be correct without suggesting its identity with *I. melanocephalus*. But being without specimens of either species I am at present unable to give any description of the former or to point out the differences between the two supposed species.

I. propinqua is one of our greatest desiderata among Japanese birds. It is very rare in collections; in fact, I am not aware of the existence in any museum of a specimen except Blakiston's No. 1829 [formerly in the Hakodadi Mus.], which was obtained by Dr. Hilgendorf at Tokio, July 5th, 1874, and those which he has recorded as being in the Tokio museums. According to Messrs. Blakiston and Pryer, it is "not uncommon about Omori, Tokio." We would, therefore, earnestly request the friends of our Museum to aid us in obtaining specimens of the Black-headed Ibis, and in order to facilitate the identification I reprint Mr. D. G. Elliot's description of the typical *Ibis melanocephalus*, as given on page 489, Ibis, 1877:

Head and neck denuded of feathers, skin black, occasionally with reddish bars across the back of neck. Scapulars and tertials with open lengthened barbs, rather thin in substance, and falling over the wing; the color of these varies in individuals from a pearly white to almost a black shade. Rest of plumage and wings pure white. In the breeding season the lower feathers of neck in front are much lengthened. Bill black; feet black. Total length about 29 inches [737^{mm}]; wings 14 inches [356^{mm}]; tail 5 inches [127^{mm}]; bill along culmen 6 $\frac{3}{4}$ to 7 $\frac{1}{2}$ inches [171-190^{mm}]; tarsus 4 inches [102^{mm}].

Young.—The head and neck covered with short feathers, at first dark brown, then white; and the lengthened scapulars are absent.

Subfamily PLATALEINÆ, Spoonbills.

PLATALEA LINN.

- 1758.—*Platalea* LINN., S. N., 10 ed., I, p. 139 (type *P. leucorodia* LINN.).
 1760.—*Platea* BRISSON, Ornith., V, p. 351 (same type).
 1761.—*Platelea* LINN., Fauna Suecica, 2 ed., p. 56 (emend.).
 1852.—*Spathorodia* REICHENBACH, Syst. Av., p. xvi (type *P. melanorhynchos* REICHB.).
 1852.—*Leucorodia* REICHENBACH, Syst. Av., p. xvi (type *P. nudifrons* CUV.).

The Japanese fauna apparently possesses two species of Spoonbills, which may be distinguished as follows:

- a¹. Throat naked for a considerable distance from the base of the lower mandible; naked skin of face and throat light colored, yellowish, or pinkish... *P. major*.
 a². Throat entirely feathered until between the mandibular rami; naked skin blackish *P. minor*.

(127.) *Platalea major* TEMM. & SCHL.

Japan Spoonbill.

Hiro-sagi.

- 1849.—*Platalea major* TEMMINCK & SCHLEGEL, Fauna Japon., Aves (p. 119, pl. lxxv). SCHLEGEL, Mus. P. Bas, Cicon., p. 21 (1865).—MARTENS, Preuss. Exp. Ost-As., Zool. Th., I, p. 105 (1866).—WHITELY, Ibis, 1867, p. 204. —DRESSER, B. of Eur., VI, p. 324 (1873).—M'VEAN, Proc. Roy. Phys. Soc., Edinb., 1877, p. —, extr., p. 7.—BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 198.—*Id.*, *ibid.*, X, 1882, p. 117.—SEEBOHM, Ibis, 1879, p. 27.—BLAKIST., Chrysanth., 1883, Jan., p. 28.
 1877.—*Platalea japonica* REICHENOW, Journ. f. Orn., 1877, p. 159.
 1882.—*Platalea leucorodia* SEEBOHM, Ibis, 1882, p. 370 (*nec* LINN.).—*Id.*, Brit. B. Eggs, II, p. 514 (1884).—BLAKIST., Amend. List B. Jap., pp. 12, 40 (1884).

The problem of the Japanese Spoonbills has of late become more complicated than ever, and, unfortunately, my material is too scanty to

solve the mystery completely. I, therefore, can do nothing better than state the case in all its details and point out as distinctly as possible the different questions at issue.

To begin with the beginning, Schlegel (and Temminck?), in the "Fauna Japonica," described two Japanese specimens, collected by Dr. Bürger, as *P. major* and *P. minor*. Both were young birds (both described as "mâle de l'année") chiefly distinguished *inter se* by their size, and from the European *P. leucorodia* by the naked portion of the throat being less extensive. Schlegel himself, afterwards (Mus. P.-Bas, Cicon., p. 21) united the two Japanese specimens under the common heading of *P. major*, evidently influenced by having obtained from Swinhoe a specimen, likewise "individu de l'année," killed at Swatow, China, which in dimensions is nearly intermediate between the two types of *P. major* and *minor*, and possibly also by Swinhoe's remarks in the Ibis for 1864, to which we shall return later on. But he still maintains the distinctness of the eastern species, and characterizes it as "très semblable à la *Platalea leucorodia*; mais à la partie postérieure de la gorge emplumée et à bec brunâtre." I may here remark, by the way, that for comparison he had, according to his catalogue, 6 young birds "de l'année" of *P. leucorodia*.

This view was accepted by nearly everybody until Mr. Seebohm, in 1882, suggested the identity of the Japanese (and the Formosan) birds with the true *P. leucorodia*. Upon receiving an adult male, collected by Captain Blakiston at Hakodadi in April, 1879, he positively asserts (Brit. B. Eggs, II, p. 515, foot-note) that it "belongs to the European species, of which *Platalea major* of Temminck is undoubtedly a young bird." Unfortunately, no further details in regard to this specimen are given. At the same time he recognized *P. minor* as a second Japanese species, as will be seen from the following quotation: "In a paper on the ornithology of Japan ('Ibis,' 1882, p. 370) I made the mistake of identifying Swinhoe's examples from Formosa with this species (*P. leucorodia*). They belong undoubtedly to *P. minor* of Temminck, which species is founded on immature examples of the previously described *P. regia* from Australia. This species differs from our bird (*leucorodia*) in being slightly smaller, in having the bare space on the forehead and sides of the head extending to the eye, and in having the gular pouch feathered to the base of the lower mandible, beyond which the chin is black. The signs of immaturity are the same as in the Common Spoonbill." These are all the details given, and we are not informed if the above conclusion is based on a study of the type specimen of *P. minor* from Japan, and if the latter has been compared carefully with *undoubted* specimens of *P. regia* in *corresponding* plumage. We may, by the way, point out one error in the above statement, viz, that *P. regia* differs from *P. leucorodia* "in having the gular pouch feathered to the base of the lower mandible," for in the specimen before us the gular pouch is naked for a distance of over 40^{mm} from the base of the lower mandible

(Plate X, fig. 7), a feature also shown in Gould's plate (B. Austr., VI, pl. 50).*

This mistake of his is easily explained, however, when we consider that the feathered throat belongs to his Formosan specimens, which are *not* identical with the Australian *P. regia*, as I shall attempt to prove later on. For the present it suffices to state that Mr. Seebohm now holds that there occur in Japan two species of Spoonbills, which he calls *P. leucorodia* (synon. *major*), and *P. regia* (synon. *minor*).

For reasons which will appear in the following remarks I am not prepared to accept Mr. Seebohm's nomenclature. The material at hand is scanty, it is true, but in several points it gives results at variance with those of Mr. Seebohm, and which cannot be disposed of with the mere statement that the birds in question are "undoubtedly" identical. It will be useful, however, first to review the characters assigned to the different forms, confining ourselves here to the first mentioned species.

Mr. Taczanowski is the latest author to compare them, à propos of a pair of adult birds from Sungatsha, Ussuri, which he refers to *Platalea major*. He says (Bulletin Soc. Zool. France, X, 1885, p. 476), that these birds, in addition to the distinctive character of the naked part of the throat being more restricted, have the tips of the remiges black, a feature only found in the young of the European form; they have, besides, the crest less elongated, and the jugular region less yellowish.

That the Japanese birds when fully adult also have the wing tips pure white is undeniable. Blakiston's Hakodadi specimen is said to have the wing entirely white, and so they are in an adult specimen in the Tokio Educational Museum (No. 761), and in another in the National Museum in Tokio, according to Blakiston's manuscript notes. Black tips to the quills are, therefore, also a sign of immaturity in the Japanese form. That Taczanowski's Ussuri birds had crests combined with black-tipped quills is not so strange, for the European bird, according to Naumann, assumes a quite perceptible crest in the second year, and the Ussuri birds may not have molted the quills of the first plumage. On the other hand, there is a possibility that the eastern birds (*P. major*) may retain the black tips longer than the true *P. leucorodia*.

The less amount of yellowish on the jugulum and the smaller size of the crest also agree with the supposed immaturity of Taczanowski's specimens.

There remains the alleged smaller extent of the naked space on the throat in the eastern form, which also is the character ascribed to *P. major* by Professor Schlegel. Keeping in mind that the type of the latter, and that Taczanowski's birds have black primary tips, conse-

* With only one specimen of *P. regia* I felt a little uncertain, but in reply to a request to examine a specimen in the American Museum, New York, Professor J. A. Allen kindly writes me as follows: "The naked black space on the throat of our ad. *P. regia* is over $2\frac{1}{2}$ inches long and extends fully 2 inches posteriorly to the angle of the mouth."

quently immature bird, the alleged restriction of the naked space on the throat might easily be accounted for. I have, however, by the courtesy of Mr. J. A. Allen, had the opportunity of comparing my eastern young birds with a slightly younger specimen from France, now in the American Museum, New York, (Plate X, fig. 1), and even at this age the European bird is characterized by the greater extent of the naked space, and I have reasons for believing that this naked space is smaller also in the adult birds, and that the character, therefore, will hold. Mr. P. L. Jouy has kindly furnished me with an accurate sketch, natural size, of the bill and throat of No. 761, Tokio Educational Museum, a fully adult female with crest, entirely white primaries, and corrugations at the base of the lower mandible (Plate X, fig. 2). In this bird the denudation extends only 54^{mm} down the throat, ending in a blunt point, a distance considerably less, I believe, than the corresponding space in the European bird.

According to Schlegel, Professor Sundevall has pointed out that the rim of the upper mandible between the nasal groove and the edge is broader in the Japanese form than in the European, but Schlegel himself regards this character as neither "assez sensible" nor "constant." Whether this character is absolutely constant I cannot say, but my specimens bear out the distinctions made by Sundevall, for in the two eastern immature birds the greatest width of the rim measures 4.2 to 4.9^{mm} against 3.3^{mm} in the fully adult European specimen, and 2.5^{mm} in the young of the year (Amer. Mus., N. Y.), a difference which is "assez sensible."

My material also seems to indicate that the eastern birds have the upper mandible proportionably more widened at the tip than the western ones, as evidenced by the measurements contained in the tables below. I therefore consider myself justified in regarding the Japanese form as separable, characterized by the restriction of the naked gular space, the broader rim to the upper mandible, and the greater width of the "spatule".

It is, however, very desirable that the ornithologists residing in Japan should do all in their power to settle the question beyond doubt, to that end collecting series of old birds and observing the changes which take place in the Japanese species in the different stages of its growth. In order to facilitate their work I shall give a short abstract of Naumann's account of these changes in the European true *P. leucorodia*, which will afford material for comparison.

The *downy young* is white, with nearly the whole face and throat naked; iris pearl-white; bill and feet light plumbeous.

The young in the *first plumage* is white with black shafts to the quills, and with the outer primaries more or less marked with dusky towards the tips; hardly a trace of crest yet; iris light grayish blue; bill smooth above, flesh-colored near the forehead and the entire under side, reddish

gray on the upper side toward the tip; lores and naked eye-ring whitish; naked throat flesh-color.

In the *second year* a small crest appears, and the quills are pure white*, very rarely with a dusky streak on or near the shaft of the first primary; the male has a slight trace of the yellow band across the lower neck; iris changes to brownish yellow after the second year; on the bill a few corrugations appear from the nostrils downwards, the color above on the widened spatula somewhat dusky, becoming yellowish towards the tip; naked skin round the eyes yellowish white, that of the throat more reddish.

When *three years* old the European Spoonbill has obtained its final coloration; the large white crest reaches a length of 6 inches, white on the outside, but beautifully tinged with rusty on the inside; a broad, ill-defined cross band of ochraceous buff surrounds the lower end of the neck; iris blood-red; the corrugations on the bill extend further; the color of the bill is black except the terminal half of the spatula, which is of a vivid ocher-yellow, and the spaces between the corrugations are tinged with light slate-blue; naked throat reddish yellow, paler above, or like the lores and eyelids, which are whitish yellow, or often only white.

In the subjoined tables of measurements I have incorporated the dimensions of the type as given by Schlegel (*l. c.*), and of a Formosan specimen recorded by Mr. Swinhoe (*Ibis*, 1864, p. 367), converted into millimeters. I have also tabulated Blakiston's notes, to which I have added a few measurements derived from Mr. Jouy's tracings from two of the specimens in the Educational Museum, Tokio. Finally, there are some measurements of European *P. leucorodia* for comparison. I have thus laid all the available data before the reader.

Tables of dimensions.

I.—PLATALEA MAJOR (U. S. Nat. Mus.).

U. S. Nat. Museum No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Greatest width at tip.	Tarsus.	Middle toe with claw.	Total length.	Naked portion of tibia.
				1883.								
91485	Jouy, 932....	♂ jan.	Tokio, Hondo.....	Jan. 8	388	118	223	55	158	95	895	84
109456	.....	jun.	Shimosa, Hondo	Feb. 19	360	111	184	49	130	84	.....	64

* Mr. Seebohm (*l. c.*) says that "Birds of the year have the bill somewhat intermediate; the primaries are pure white." This is evidently a mistake, and he probably means "Birds of the second year."

II.—PLATALEA MAJOR (fide Schlegel and Swinhoe).

Museum.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail.	Bill.	Greatest width at tip.	Tarsus.	Middle toe.	Total length.	Naked portion of tibia.
Leiden	Bürger.....	♂ jun.	"Japan".....	.....	395	131	230	....	158	....	.....	106
.....	Swinhoe	♀ jun.	Tamsuy, Formosa ..	Mar. 7	381	127	190	....	140	...	838	76

III.—PLATALEA MAJOR (from Blakiston's MSS.).

Museum.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Culmen.	Greatest width at tip.	Tarsus.	Middle toe with-out claw.	Total length.	Remarks.
Seebohm?	Blakist., 2669	♂ ad.	Hakodadi, Yesso.	Apr., 1879	395	.....	.....	.....	.....	890	(1)
Tokio Educ.	♀ ad.	Shimosa, Hondo.	.....	400	180	48	128	73	.....	(2)
Do	jun.	.....	.....	397	215	55	140	81	.....	(3)
Tokio Univers.	jun.	.....	.....	406	211	.....	140	90	.....	(4)
Jap. Nat.	ad.	.....	.....	410	210	50	150	83	.....	(5)
Owston	jun.	.....	.....	380	195	.....	.....	80	860	(6)

REMARKS.—(1) No black on wing; well developed crest; bill dark and rough, yellow only at end.

(2) All white with crest like Ibis [nippon]; bill black, tip of upper mandible yellow; bare skin on throat yellow.

(3) Primaries partly black; shafts of primaries and scapulars black; slight appearance of crest.

(4) Partly crested; some of the quill shafts partly black; bill black except near tip; bare skin on throat yellow.

(5) Uncrested; white wing; black rough bill.

(6) All the primaries with more or less black, secondaries with black tips only; bill straw color at tip mottled with brown for about the middle two thirds; base brown with yellow; beneath mottled brown and yellow with a few spots near the tip approaching to flesh color.

Mr. Jouy's description of the soft parts of the fresh bird obtained by him in the Tokio market, January 1, 1883 (U. S. Nat. Mus. No. 91485), is as follows:

Iris black, or dark brown. Bill: upper mandible dusky, horn color, mottled with darker markings; base bluish; tip slightly lighter, with dull orange blotches on sides and median ridge; a slight bluish reflection is more prominent on the lower third of the bill; lower mandible dusky; tip dull reddish, speckled all over with small red spots; throat flesh color; cere dull bluish; lower lid dull grayish. Feet and legs black.

IV.—PLATALEA LEUCORODIA.

Museum and No.	Collector.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exp. culmen.	Greatest width at tip.	Tarsus.	Middle toe with claw.	Total length.	Naked portion of tibia.
U. S. Nat. 57036	.....	♂ ad.	Central Europe.	.....	403	127	225	48	158	95	.....	96
Am. N. Y.	Pluche.	♂ jun.	Hâvre, France	Oct. 19, 1876	392	127	163	44	152	94	.....	87
U. S. Nat. 57033	.....	juv.	Europe .....	.....	315	108	97	25	123	88	.....	58

Platalea minor TEMM. & SCHL.

Formosan Spoonbill.

1849.—? *Platalea minor* TEMMINCK & SCHLEGEL, Fauna Japon., Aves (p. 120, pl. lxxvi).—SWINHOE, Ibis, 1864, p. 368.—BLAKIST. & PRYER, Ibis, 1878, p. 223.

1864.—*Platalea major* SWINHOE, Ibis, 1864, p. 368 (*nec* TEMM. & SCHLEG.).—SCHLEGEL, Mus. P.-B., Cicon., p. 21 (1865) (part).

1882.—*Platalea leucorodia* SEEBOHM, Ibis, 1882, p. 370 (part; *nec* LINN.).

1884.—*Platalea regia* SEEBOHM, Brit. B. Eggs. II, p. 515 (*nec* GOULD).

The claim of the present species to a place in the Japanese avifauna rests on the type specimen in the Leyden Museum, Holland, which was collected by Dr. Bürger in "Japan," and described and figured in "Fauna Japonica," and on a specimen collected by Mr. Petersen at Nagasaki.

From the dimensions given by Schlegel (*l. c.*) and the description by Bonaparte (Consp. Av., II, p. 148; unfortunately I cannot consult the original description and plate in Fauna Japonica), I conclude that the type is a very young bird. It is a curious peculiarity of the Spoonbills (at least of the European species) that the very youngest birds have the face more denuded of feathers than the older ones. Bonaparte describes *P. minor* as follows: "Frontis parte plumosa antice emarginata ultra oculum vix producta; orbitis nudis; genarum parte plumosa marginem oculi haud attingente: gulæ [sc. parte plumosa] antice valde protracta acuminatim." This description of the outline of the feathering suits exactly a very young European specimen before me (U. S. Nat. Mus. No. 57033) with the exception of the last sentence; for in the latter the gular feathering does not extend further forwards than that of the cheeks, and is cut squarely across anteriorly, not acuminate. That the type of *P. minor* is not so young as the young *P. leucorodia* just referred to, is plain from the size of the bill, and also from an inspection of Reichenbach's otherwise very indifferent reproduction of the original figure (Vollst. Naturg., Grallat., pl. cccxi, fig. 2829). This anterior protrusion of the feathered apex of the chin is, I think, by itself alone sufficient to prove *P. minor* specifically distinct from *P. major*. The type of the former exhibits another peculiarity in the proportions, which, if the measurements given by Schlegel are correct, is very remarkable, for the

length of its tarsus is so much under the minimum of all the allied species, and so much out of proportion with the other measurements, that it can be hardly more than an extreme individual aberration.

A young specimen which Mr. P. L. Jouy collected at Fusan, Korea, December 7, 1884 (Plate X, figs. 5, 6), may be the same as *P. minor*. The outline of the feathering on the face agrees nearly with Bonaparte's description, and the gular portion particularly corresponds exactly; for in the Korean bird the feathering runs in between the mandibular rami forming a triangular apex 18^{mm} high. Compared with three Japanese *P. major* of apparently corresponding age the difference in the outline of the feathering is quite striking. On the other hand, the dimensions and proportions are widely different from Schlegel's and Bonaparte's bird, the tarsus especially being much longer.

Since formulating the above I have received for examination a young bird collected by Mr. Petersen, at Nagasaki, in December, 1886, and kindly lent me by Professor Robert Collett, in Christiania. It is somewhat large, but otherwise a perfect counterpart of Jouy's Korean example. The feathered angle on the chin is identical; the feathering recedes at least equally far on the forehead, and the naked skin of the face is abruptly blackish, except a light patch underneath each eye. It is evidently of the same age as the above, or slightly older, judging from the longer bill, and bears out the characters assigned to *P. minor* beautifully.

However, if we look at the appended tables of measurements, we will find a bewildering individual variation, and all we can do is to confess our profound ignorance and to ask information from those in possession of more material.

I shall now devote a few remarks to the Spoonbills which Mr. Swinhoe collected in Formosa and called *P. major*, but which Seeböhm has afterwards identified with *P. minor* and *P. regia*. Swinhoe obtained four birds, of which he has given very full descriptions in the Ibis for 1864, pp. 364-370.

The bird which he designates as No. 4 (Tamsuy Harbor, March 17) is a male, and evidently *fully* adult, with the "entire plumage pure white," "the occipital crest long, but not fully developed, being still partially in quill"; "irides blood-red"; "sides of upper and lower mandibles deeply corrugated transversely, the corrugæ being black"; "bare face-skin black, with a bright yellow-ocher patch before the eye, extending over the under lid and in a thin line over the upper lid." The outline of the feathering on the head he describes as follows: "Round the eye bare. The plumes advance on the forehead to just over the middle of the eye, form an obtuse angle towards the commissure in about the same plane, and then recede well clear of the lower jaw, advancing again on to the gular pouch .6 [15.2^{mm}] and terminating in its center in an undetermined angle."

No. 3, a ♀, same date and locality, and "paired with the foregoing," is younger, with a smoother, lighter colored bill, occipital feathers only

"somewhat elongated"; "irides yellowish-brown"; and "the external quills and shafts of most of the rectrices black." "The plumes advance on the forehead to about .3 in. [7.6^{mm}] beyond exterior plane of eye towards the commissure only slightly in advance of the eye; they then recede inwards and downwards .5 [12.7^{mm}], and forming inwardly an angle of about 80°, advance on to the gular pouch about .8 [20.3^{mm}], terminating in an angle of 45°;" "bare face-skin dull purplish-brown."

No. 2, ♂, same locality, March 7, is very similar to No. 3, with the "naked face-skin purplish-black," and apparently of corresponding age. The outline of the facial feathering is also very similar, viz: "the plumes advance on the forehead about .1 in. [2.5^{mm}] beyond the eye; towards the commissure they fall short of the exterior plane of the eye, and recede only .2 [5^{mm}]; then advance .8 [20.3^{mm}] on to the center of the pouch, and terminate in an imperfect angle.*

Leaving the immature birds (Nos. 2 and 3) out of consideration for the present, it is evident that the adult (No. 4) represents a very distinct species, differing equally well from *P. major* and *P. regia*. Both of the latter have the throat more or less bare, while the Formosan bird has the whole throat feathered in advance of the lateral feathering of the lower mandible. From the former it differs furthermore by having the bare face-skin blackish, while from the latter it is distinguished by the feathering of the forehead reaching as far forward as the eye. The differences of the full-grown birds of the three species may be tabulated in the following manner (applying the name *P. minor* for the Formosan birds):

Throat naked	{	<i>P. major.</i> Face-skin light (flesh color to yellowish).
	{	<i>P. regia.</i>
Throat feathered	{	<i>P. minor.</i> Face-skin blackish.

A comparison of Mr. Jouy's Korean specimen and of Petersen's Nagasaki skin with Swinhoe's descriptions of his Nos. 2 and 3 estab-

* No. 1 is here left out of consideration, for it is plain from the description that it belongs to a different species, it being in fact an immature *P. major*, corresponding exactly with the two birds before me from the Main Island of Japan. A few quotations from Swinhoe's description is sufficient to prove this assertion: (♀, March 7, Tamsuy Harbor) "bare face-skin flesh-colored, more or less tinged with yellow"; "plumage white, except part of some outer quills, the shafts of the quills, and a few other wing-feathers, which are faded blackish-brown"; "the frontal plumes advance .4 in. [10^{mm}] before the exterior plane of eye. The plumed skin advances below the eye .6 in. [15.2^{mm}] beyond its exterior plane on to the lower mandible, ending obtusely beyond the plane of the commissure; then receding downwards and inwards 1.5 [38^{mm}], exposes the gular pouch without readvancing." That this specimen is said to have been "paired" with No. 2 is of no importance, for Swinhoe did not shoot the birds himself, but got them from a friend of his, and the dissection revealed that the sexual organs were quite undeveloped: "ovary minute," and "testes small." The statement evidently only means that the birds kept company. A further proof of the distinctness is the fact that No. 1, the female, is considerably larger than the male (2), while in the other couple (3 and 4) the male is the larger.

lishes their identity beyond a doubt. The characteristic feathering of the throat is the same, and the color of bill and naked skin is also unmistakable, as evidenced by the following description by Mr. Jouy from the fresh bird: "Upper mandible dusky purplish, lower mandible pale reddish; naked skin dusky; iris dark brown." In the Nagasaki bird the dark color of the face and the light brown of the bill are very strongly and abruptly contrasted.

Whether the *P. minor* of "Fauna Japonica" really is a younger bird of the black-faced species which Swinhoe collected in Formosa, Petersen in Kiusiu, and Jouy in Korea is not quite certain, but I am of the opinion that there is sufficient reason for using the name given by Temminck and Schlegel. Swinhoe compares his birds with the description in "Fauna Japonica" in the following manner: "In *P. minor* the feathered forehead, it is said, is 'un peu échancré par devant, et ne dépassant guère le bord antérieure de l'œil.' So far it would agree with our (2). But 'la partie emplumée des joues ne s'avance que jusque sous le bord postérieur de l'œil.' This last shows a greater expansion of bare skin than in our most developed (4)." To this I would remark that, as already stated, I regard the type of *P. minor* as very young, and that the greater extent of naked skin is due to its *younger* age. At any rate, Bonaparte's expression "gulæ parte plumosa antice valde protracta acuminatim" is to me sufficient evidence that the specimens in question are correctly referred to *P. minor*. Should, however, an inspection of the type disprove this conclusion, then I would propose *Platalea swinhoei* as a fitting name for the Formosan black-faced species.

Tables of dimensions.

I.—PLATALEA MINOR (Korea and Japan).

Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Exposed culmen.	Greatest width at tip.	Tarsus.	Middle toe, with claw.	Total length.	Naked portion of tibia.
Jouy, 1470	♂ jun.	Fusan, Korea.	Dec. 7, 1884	380	109	168	52	133	87	775	66
Petersen, 81	♂ jun.	Nagasaki, Jap.	Dec., 1866	350	104	188	51	129	80	.....	80

II.—PLATALEA MINOR (Formosa; *vide* Swinhoe).

Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail.	Bill.	Tarsus.	Total length.	Tibia.
Swinhoe, 4	♂ ad.	Tamsuy, Formosa.....	March 17	361	127	198	127	800	89
Swinhoe, 2	♂ jun.	.....do	March 7	330	114	183	119	787	61
Swinhoe, 3	♀ jun.	.....do	March 17	356	114	190	127	800	76

III.—PLATALEA MINOR (type; fide Schlegel).

Museum.	Collector.	Sex and age.	Locality.	Date.	Wing.	Tail.	Bill.	Tarsus.	Total length.	Naked portion of tibia.
Leiden...	Bürger....	♂ jun.	Japan .....	.....	329	122	151	110	.....	88

IV.—PLATALEA REGIA.

U.S. Nat. Ms. No.	Collector.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Exposed culmen.	Greatest width at tip.	Tarsus.	Middle toe, with claw.	Total length.	Naked portion of tibia.
15360	Peale ...	.....	Australia.....	.....	390	121	189	51	130	95	.....	80

Superfamily ARDOIDEÆ.

Family CICONIIDÆ.

Subfamily CICONINÆ, Storks.

CICONIA BRISS.

1760.—*Ciconia* BRISSON, Ornith., V, p. 361 (type, *Ardea ciconia* LINN.)
1852.—*Melanopelargus* REICHENBACH, Syst. Av., p. xvi (type, *A. nigra* LINN.).

Only one species of Storks has been recorded from Japan. As the Black Stork, however, is said to occur throughout Eastern Siberia (except Kamtschatka and the extreme north) and Northern China, it may be well to give the characters by which it is distinguished from the white Japanese species, in order to facilitate the identification if any straggler should visit Japanese territory.*

- a¹. White, except quills, alula, and greater wing-coverts, which are black with greenish metallic luster, tertiaries, and edges of secondaries and inner coverts also with purplish and bronzy reflections; outer webs of secondaries and inner primaries, except the edge, of a silvery whitish gray, more or less mottled with dusky *C. boyciana*.
a². Brownish-black with metallic reflections, especially on head and neck, except the lower surface from the breast backwards, which is white [*C. nigra*.]†

* Cf. von Martens, Preuss. Exped. Ost-As., Zool. Th., I, p. 105 (1866).
† 1758.—*Ardea nigra* LINN., S. N., 10 ed., I, p. 142.—*Id.*, S. N., 12 ed., I, p. 235 (1766).—*Ciconia nigra* BECHSTEIN, Gemeinn. Naturg., I, p. 420 (1792).—SCHRENCK, Reis. Amurl., I, p. 453 (1860).—RADDE, Reis. Süd. Ost-Sibir., II (p. 345) (1863).—SWINHOE, P. Z. S., 1871, p. 411.—TACZANOWSKI, Bull. Soc. Zool. France, 1876, p. 257.—BOLAU, Journ. f. Orn., 1882, p. 339.
1793.—*Ardea chrysopelargus* LICHTENSTEIN, Cat. Rer. Nat. Rar., p. 29 (reprint).
1831.—*Ciconia fusca* BREHM, Handb. Vög. Deutschl., p. 576.

(139.) *Ciconia boyciana** SWINH.

Japan Stork. Ko-dzuru.
1860.—*Ciconia alba* SCHRENCK, Reis. Amurl., I, p. 454 (*nec* SCHÄFFER, 1789).
1873.—*Ciconia boyciana* SWINHOE, P. Z. S., 1873, p. 513.—SCLATER, P. Z. S., 1874, pp. 2, 306, pl. i.—BLAKIST. & PRYER, Ibis, 1878, p. 224.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 200.—*Id.*, *ibid.*, X, 1882, p. 121.—BLAKIST., Amend. List B. Jap., p. 24 (1884).

The Stork is mentioned as a Japanese bird as early as Kämpfer, who in his History of Japan (Vol. I, London, 1778, p. 129), says that the “Storks stay in the country all the year round.” No *Ciconia* was obtained by any of the later Dutch travelers, and no specimen from Japan seems to have come under the observation of any ornithologist until Swinhoe, in 1873, described *C. boyciana* from two living Japanese specimens.

This bird is evidently very rare in collections, and is also wanting in the National Museum, being one of our most important desiderata. The characters of the above “key” are drawn from specimens collected near Fusan, Korea, by Mr. P. L. Jouy, to whom I am indebted for the privilege of examining this rare species.

Measurements.

Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Expanded culmen.	Tarsus.	Middle toe, with claw.
Jouy, 1350 ...	♂ ad.	Fusan, Korea.....	Dec. 15, 1883	690	260	260	305	110
Jouy, 1341 ...	♂ ad.	.....do	Dec. 3, 1883	650	238	.....	290	112
Jouy, 1356 ...	♀ ad.	.....do	Dec. 21, 1883	640	238	231	247	97

Family ARDEIDÆ.

Subfamily ARDEINÆ, Herons.

A closer study of the birds composing the present family has convinced the present writer that it should only be divided into two sub-families, the *Cochleariinae*, the Boatbills, and the *Ardeinae*, comprising the Bitterns and the true Herons, which may be better treated of as sections of lower rank than subfamilies, the proportionate length of the inner toe and the number of tail-feathers being the most obvious external characters for separating them. The Bitterns (*Botaureæ*) have, besides, only two pair of powder-down patches, while the Herons (*Ardeæ*) have three. The genus *Gorsachius* is often referred to the Bitterns, but in the length of the inner toe and the number of tail-feathers it agrees with the Herons, and seems most nearly related to the Night-Herons. As our only specimen is mounted, I have not attempted to

* Named in honor of Mr. R. H. Boyce.

ascertain the number of powder-down patches in this form, a question worthy the investigation of the naturalists now in the field.

SYNOPSIS OF THE JAPANESE GENERA OF THE SUBFAMILY *ARDEINÆ*.

- a*¹. Inner toe decidedly longer than the outer; 10 rectrices (*BOTAUREÆ*).
- b*¹. Middle toe, without claw, much longer than exposed culmen; hind claw more than one-third the exposed culmen; wing more than 250^{mm}.....*Botaurus*.
- b*². Middle toe, without claw, about equal to, or shorter than, exposed culmen; hind claw less than one-third the exposed culmen; wing less than 250^{mm}...*Ardetta*.
- a*². Inner toe equal to, or shorter than, the outer; 12 rectrices (*ARDEÆ*).
- b*¹. Naked portion of tibia shorter than inner toe without claw.
- c*¹. Lower part of tarsus in front reticulate.
- d*¹. Exposed culmen shorter than middle toe, with claw.
- e*¹. Naked tibia and tarsus combined much more than twice the culmen which is shorter than outer toe with claw; inner toe, with claw, equals middle toe without claw.....*Gorsachius*.
- e*². Naked tibia and tarsus combined much less than twice the culmen, which is longer than the outer toe with, claw; inner toe, with claw, decidedly shorter than middle toe, without claw.....*Nycticorax*.
- d*². Exposed culmen longer than middle toe, with claw.....*Butorides*.
- c*². Tarsus in front scutellate to the tarso-phalangeal joint.
- d*¹. Exposed culmen longer than middle toe, with claw.
- e*¹. Tarsus much longer than middle toe, with claw.....*Demiegretta*.
- e*². Tarsus about equal to middle toe, with claw.....*Ardeola*.
- d*². Exposed culmen much shorter than middle toe, without claw....*Bubulcus*.
- b*². Naked portion of tibia longer than inner toe, without claw.
- c*¹. Lower end of tarsus in front covered with regular hexagonal meshes; Japanese species particolored, and the ornamental plumes of the adults with compact webs.....*Ardea*.
- c*². Lower end of tarsus in front covered with narrow band-shaped transverse scutellæ, or narrow transverse bands of nearly quadrangular scutellæ; Japanese species pure white, and some of the ornamental plumes with decomposed webs.....*Herodias*.

BOTAUREÆ.

BOTAURUS HERMANN.

1783.—*Botaurus* HERMANN, Tabl. Affin. Anim., p. 135, (type *Ardea stellaris* L.)

1837.—*Butor* SWAINSON, Classif. B., II, p. 354, (same type.)

(130.) **Botaurus stellaris** (LINN.).

Bittern.

Sankano-goi.

1758.—*Ardea stellaris* LINN., S. N., 10 ed., I, p. 144.—*Id.*, S. N., 12 ed., I, p. 239 (1766).
 —TEMME., Man. d'Orn., 2 ed., IV, p. 381 (1840).—TEMME. & SCHL., Fauna Japon., Aves, p. 116 (1849).—SCHLEGEL, Mus. P. Bas, Ardeæ, p. 47 (1863).
 —*Botaurus* s. STEPHENS, Gen. Zool., XI, ii (p. 593), (1819).—SHARPE, Ann. Mag. Nat. Hist., 4 ser. VI, 1870, p. 160.—SWINHOE, Ibis, 1875, p. 455.—MCVEAN, Proc. R. Phys. Soc. Edinb., 1877, p. —, extr. p. 7.—BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 199.—*Id.*, *ibid.*, X, 1882, p. 118.—BLAKIST., Chrysanth., 1883, April, p. 173.—*Id.*, Amend. List B. Jap., p. 12 (1884).

1831.—*Botaurus lacustris* BREHM, Handb. Vög. Deutschl., p. 596.

1831.—*Botaurus arundinaceus* BREHM, Handb. Vög. Deutschl., p. 596.

Two Japanese specimens of Bittern agree in every respect with European examples. Their coloration is identical, and the table of measurements given below shows that there is no difference in size.

Captain Blakiston (in "Chrysanthemum" for April, 1883, p. 173) remarks that "the Common Bittern seems to vary much in size. Ten specimens obtained one day in February in the Yokohama market by Mr. Owston ran thus: Males, wings 342 to 360, bills 71 to 74, tarsi 96 to 98; females, wings 310 to 325, bills 62 to 73, tarsi 82 to 92; while in the Hakodate museum is a female example obtained in April which only measured 558 in total length, and 280 in the wing."

The latter (Blak. No. 1426, Hakod. Mus. No. 1059), according to Captain Blakiston's manuscript notes, was a female collected by him at Kunebetz, Yezo, April 6, 1874. The measurements, however, are so much under the minimum of ordinary specimens, that I am somewhat skeptical as to the correctness of the identification, for the early date shows that it was no young bird of that year. The length of the wing, 280^{mm}, on the other hand, is nearly like the average length of wing in the American Bittern (*B. lentiginosus* MONT.). This species is very easily distinguished by the uniform blackish color of the primaries, which in *B. stellaris* are irregularly barred with cinnamon-rufous. It would, therefore, be interesting if anybody having access to the specimen in question (Hakodate Museum, No. 1059) would examine it in regard to its primaries and report the result of his examination. The American Bittern on the Pacific coast goes as far north as Vancouver Island, at least.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe without claw.
91598	Jouy, 1044	♂ ad.	Yokohama, Hondo	Feb. 21, 1883	350	121	72	104	94
91597	Jouy, 1045	♂ ad.	.....do	Feb. 21, 1883	305	109	62	90	85
.....	Henson, 7	♂ ad.	.....do	Aug. 26, 1885	355	115	67	102	.....
.....	Henson, 1020 . .	♂ ad.	.....do	Mar. 29, 1885	310	118	66	88	.....

[European specimens.]

57023	Schlüter	♂ ad.	Germany . . . . .	.....	345	121	74	.....	.....
57024	Schlüter, 109 . .	ad.	.....do . . . . .	.....	342	121	67	.....	.....
80800	.....	ad.	Italy . . . . .	.....	300	101	64	.....	.....

ARDETTA GRAY.

- 1827.—*Ardeola* BONAPARTE, Specchio Comp., p. 60 (type *A. minuta* LIN.) (nec BOIE, 1822).
- 1842.—*Ardetta* GRAY, App. List Gen. B., p. 13 (same type).
- 1842.—*Erodiscus* GLOGER, Handb. Naturg. (p. 410) (same type).
- 1887.—*Nannocnus* STEJNEGER, Proc. U. S. Nat. Mus., 1887, p. 289 (type *A. eurhythma* Sw.).

Only two species of this genus have been recorded as occurring in Japan. As another species has been found abundant in Formosa (Ibis, 1863, p. 422), however, I think it proper to include the latter in the following synopsis, from which it will be seen, that I have found it necessary to establish a special group of at least subgeneric value for *A. eurhythmia* and its allies.

- a*¹. Tibiæ feathered nearly to the heel joint; longest tail-feathers longer than middle toe without claw (ARDETTA) *A. sinensis*.
*a*². Tibiæ naked at the lower end; longest tail-feathers shorter than middle toe without claw (NANNOCNUS).
*b*¹. Quills and tail-feathers blackish *A. eurhythmia*.
*b*². Quills and tail-feathers cinnamon-rufous [*A. cinnamomea*.*]

(131.) *Ardetta sinensis* (GMEL.).

Little Yellow Bittern.

1788.—*Ardea sinensis* GMELIN, S. N., I, p. 642.—*Ardetta s.* GRAY, List. Spec. B. Brit. Mus., III, p. 83 (1844).—SEEBOHM, Ibis, 1879, p. 27.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 199.—*Id.*, *ibid.*, X, 1882, p. 118.—BLAKIST., Amend. List. B. Jap., p. 12 (1884).

1823.—*Ardea lepida* HORSFIELD, Trans. Lin. Soc., XIII (p. 190).

1831.—“*Ardea melanophis* CUVIER,” fide LESSON, Traité d’Orn., p. 573.

1849.—“*Ardea melanotis* CUVIER,” fide GRAY, Gen. B., III., App., p. 25.

1851.—“*Ardea melanoptera*” CUVIER, fide PUCHERAN, Rev. Mag. Zool., 1851, p. 375 (nec BECHST.).

1873.—? [*Ardetta*] *pulchra* HUME, Stray Feath., I, p. 309.

1878.—*Ardetta* sp. inc. BLAKIST. & PRYER, Ibis, 1878, p. 223.

With only one adult Japanese specimen, another from the Philippines, and a third one from China, it is impossible to say with certainty whether the form occurring in Japan is identical with the typical *A. sinensis*.

The adult bird from Japan (U. S. Nat. Mus. No. 95972; Wakayama, Kii, Hondo; Coll. Ota) differs from the two other specimens mentioned in several respects: The color of the back is much darker, being a dull Vandyke-brown, while in the other two it is more russet; the brown of the hind neck is strongly tinged with vinaceous in the latter, of which there is hardly a trace in the Japanese specimen; this one, moreover, has the upper wing-coverts (except the series covering the cubitus) of a dirty “wood-brown” or grayish clay color, with the series just mentioned forming a uniform and uninterrupted band of dull chestnut along the cubital edge of the wing, while in the specimens of what I take to be true *A. sinensis* the majority of the wing-coverts are buff, more or less tinged with ochraceous, and the cubital edge only slightly tinged with the brown of the back near the elbow and the wrist; in the Japanese

* 1788.—*Ardea cinnamomea* GMELIN, S. N., I, p. 643.—*Ardetta c.* GRAY, List. Spec. B. Brit. Mus., III, p. 83 (1844).—SWINH., Ibis, 1863, p. 422.

1823.—*Ardea nebulosa* HORSFIELD, Trans. Lin. Soc., XIII (p. 190).

Habitat.—From India, including Ceylon, eastward throughout Burmah and China to the Philippines and Formosa, south to Malacca and the Malayan Archipelago.

The Little Chestnut Bittern is easily recognizable in all ages by the rufous color of the quills and tail-feathers.

example the rump and upper tail-coverts are almost uniform with the back, the latter being slightly more dusky, while in the other two the rump is nearly drab-gray and the upper tail-coverts blackish slate; in these latter birds the top of the head from the bill and the upper nape is solid slate black, while the Japan bird has the feathers of the forehead and fore part of crown broadly edged with cinnamon-rufous.

The differences pointed out above do not seem to be due to age, for the Japanese specimen has certainly passed the young stage, and has every appearance of being an old bird. Inasmuch as the different plumages of these birds are only imperfectly known, I draw the attention of my fellow-ornithologists in Japan to the great importance of collecting extensive series of these birds and to study them closely. Should then the little Japanese Yellow Bittern turn out to be distinct, I would propose to name it *Ardetta luteola*.

The Little Yellow Bittern is closely allied to the European *A. minuta*, but differs at once by having in no stage of plumage the glossy black back of the latter. The young ones are especially alike, but the Eastern species has the light edges to the feathers of the back broader and brighter, and has also light edges to the feathers on the top of the head, while in the young European bird the crown and upper nape are nearly solid black.

In the table below I have included the dimensions of several extralimital specimens for comparison. But I do so especially in order to call attention to the necessity of having the sex of these birds carefully ascertained by dissection. Judging from analogy, I take the adult Japan bird to be a female, and the *larger*, but younger, ones to be males. By a similar way of reasoning we are led to believe that the adult Philippine example is a female, and the one from Hankow a male. If these assumptions be correct, then the Japanese form is larger, but everybody will see how futile are conclusions drawn from such material. To be of value the specimens must be properly sexed.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe without claw.
95972	Ota, Bl., 2704 ..	ad	Wakayama, Kii, Hondo .....	.....	125	43	50	....	....
95971	Blakist., 2592 ..	jun ...	Hakodate, Yezo	Sept. —, —	134	41	47	46	39
.....	Henson, 147 ...	♂ jun.	.....do	Sept. 6, 1883	130	42	44	41	....
109455	.....	♂ jun.	Shimosa, Hondo	Mar. —, 1884	132	43	50	46	39
77002	.....	ad	Philippines .....	.....	119	40	51	43	37
37714	Swinhoe	ad	Hankow, China	"Summer"	127	44	50	....	37
86102	Jouy	♂ jun.	Deep Bay, Hong-Kong, China ..	Oct. 9, 1881	130	42	54	47	39
85749	Shanghai Mus.	jun ...	Shanghai, China .....	.....	123	40	51	....	....

Subgenus NANNOCNUS Stejn.

(ναννος, dwarf; οκνος, bittern.)

(132.) *Ardetta eurhyma* SWINH.

Schrenck's Little Bittern.

Yoshi-goi.

1860.—*Ardea cinnamomea* SCHRENCK, Reis. Amurl., I, p. 447, pl. xiii, fig. 3 (*nec* GMEL., 1788).1873.—*Ardetta eurhyma* SWINHOE, Ibis, 1873, p. 73.—*Id.*, *ibid.*, 1875, pp. 132, 455.—*Id.*, *ibid.*, 1876, p. 335.—BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Id.*, Trans. As. Soc. Jap. VIII, 1880, p. 199.—*Id.*, *ibid.*, X, 1882, p. 118.—BLAKIST., Amend. List B. Jap., p. 12 (1884).1873.—*Ardetta eurhyma* SWINHOE, Ibis, 1873, pl. ii.1874.—*Ardetta sinensis* TACZANOWSKI, Journ. f. Orn., 1874, p. 325 (*nec* GMEL.).

Schrenck's Little Bittern differs from the Little Yellow Bittern not only by the characters of structure and proportions already pointed out, but also by the coloration of the upper parts, which is more or less dark chestnut, uniform, or varied with whitish spots.

The exact relations of the different plumages are not yet fully understood, and a thorough study of these birds in the field is a very desirable and promising one. How complicated the question is may be best understood from a quotation of Mr. Swinhoe's observations on breeding birds (Ibis, 1875, p. 133).

On May 20 he obtained a "male with enormous testes," and on the same date a female with the "eggs largely developed, nearly ready for emission," but it had the "*plumage spotted like that of the immature bird.*" He continues as follows: "On the 21st a bird in the male dress [unspotted] proved on dissection to be a female, and on the 22d one in female dress [spotted] turned out to be a male. There was no difference in the swollen state of their sexual organs from those of normal birds. From the number of adult females I examined there can be no doubt that the immature dress is the full feminine costume; and that an occasional female, probably well advanced in years, should affect the male plumage is a very ordinary circumstance amongst birds. But what means the adult male in immature dress? I presume that males require two years to acquire their full plumage, and breed in their first year." Finally he adds (p. 134): "I know no other Bittern of which the sexes have different plumages."

This last remark at once makes us think of the European Little Bittern (*Ardetta minuta*) and the American Least Bittern (*Ardetta exilis*). Nearly all the European authorities (including Dresser and Seebohm) agree that in the former the sexes are very different, the male having the back glossy greenish black, and the female dark Vandyke-brown, like the adult Japanese Yellow Bittern. Naumann, however, asserts most positively (Naturgesch. Vög. Deutschl., IX, p. 201) that the old female is black above like the male. But may it not be that Naumann obtained female *A. minuta* in the plumage of the male just as Swinhoe

did? And may it not be that females in that plumage are more common than perhaps supposed? In regard to the American *A. exilis*, on the other hand, there seems to be no doubt as to the sexes being dissimilar in somewhat the same manner as the European bird, and I am not aware of any record of a female *A. exilis* in the male garb. In this species, furthermore, the male apparently molts the first year directly from the young plumage (chestnut with pale margins) to the black of the adult, as I have a specimen before me (U. S. Nat. Mus. No. 12628), from Washington, D. C., which is still mostly in the first plumage, but with the glossy greenish-black feathers protruding on the back. In this species, therefore, the males do not require two years to acquire their full plumage.

I have added the dimensions of a specimen in the unspotted plumage from the coast of Cochin China, apparently the southernmost record of this species.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe without claw.	Total length.
95974	Blakist., 1843...	♂ ad..	Hakodate, Yezo	Aug. 16, 1875	143	35	43	50	43	359
95973	Blakist., 1832...	♀ .....	.....do	Apr. 8, 1875	136	39	43	48	43	346
.....	Henson, 54	♂ ad..	.....do	July 25, 1883	141	43	48	51	.....	.....
.....	Henson, 53 .....	♀ .....	.....do	Aug. 20, 1883	139	40	45	50	.....	.....
9120	Dr. Suckley...	ad	Coast of Cochin China	May 22, 1857	132	37	44	46	44	.....

ARDEÆ.

GORSACHIUS BONAP.

1854.—*Gorsakius* BONAPARTE, Ann. Sc. Nat., 4 ser., I, ii, p. 141 (*nomen nudum*).
1855.—*Gorsachius* “Pucheran” BONAPARTE, Consp. Av., II, p. 138 (type *A. goisaki* TEMM.).
1855.—*Goisakius* GRAY, Cat. Gen. B., p. 114 (emend.).
1871.—*Goisachius* SWINHOE, P. Z. S., 1871, p. 413 (emend.).
1877.—*Butio* REICHENOW, Journ. f. Orn., 1877, p. 246 (same type).

(129.) *Gorsachius goisagi* (TEMME.).

Japan Tiger Bittern. Miso-goi.
1835.—*Nycticorax goisagi* TEMMINCK, Pl. Color., V, livr. 78, pl. 582.—*Ardea g.* TEMM. & SCHLEG., Fauna Jap. Aves, p. 116, pl. lxx (1849).—BLAKISTON, Ibis, 1862, p. 331.—*Gorsachius g.* BLYTH, Ibis, 1865, p. 38.—BÜTTIKOFER, Notes Leyd. Mus. IX, 1887, p. 84.—*Butio goisagi* CABANIS, Journ. f. Orn., 1881, p. 425.
1855.—*Gorsachius goisaki* BONAPARTE, Consp. Av., II, p. 138 (part).
1871.—*Nyctiardea melanolophos* GRAY, Hand-l. B., III, p. 33 (*nec* RAFFLES).—*Goisachius melanolophus* BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Iid.*, Tr. As. Soc. Jap., VIII, 1880, p. 199.—*Iid.*, *ibid.*, X, 1882, p. 118.—BLAKISTON, Amend. List B. Jap., pp. 24, 40 (1884).—SEEBOHM, Ibis, 1884, p. 176

It will be seen from the above synonymy that I regard the Japanese Tiger Bittern as different from *G. melanolophus* of Raffles, which ranges from Ceylon to Formosa. The question is by no means settled, however, and with only one specimen before me I cannot be expected to elucidate it much. A review of what has been written on the subject* may throw some light on the subject, and seems to prove that a union of the two names, at present at least, is premature.†

First, in regard to the adult birds the most marked differential character possessed by *G. melanolophus*, according to Lord Walden (Tr. Zool. Soc., IX, p. 238; Tweedd. Works, p. 401), "is its black crown and long black crest. In no authentic Japanese individuals do the crown and crest seem to be black. In the adult they are of a rich purple-chestnut." So far as I know there is only one record of a black-crowned Japanese specimen, viz, by Bonaparte, in his *Conspectus Avium* (II, p. 138.) This specimen he states to be in the Paris Museum, collected in 1829 by Brossard; but this assertion carries little weight in the face of his well-known inaccuracy in regard to localities. Blyth,‡ Walden (*l. c.*), and Cabanis§ seem to be right when stating that the Japanese bird never has black on the crown.

Bonaparte regarded the black-capped individuals as adults and the brown-crowned ones as young, but this is now known to be erroneous. Swinhoe (*Ibis*, 1866, p. 403) explains the difference by *assuming* that the crest is black, but that it is shed in winter. "In winter the crest seems to fall, leaving the head smooth and plain chestnut, instead of being capped and crested with cinereous-black plumes." But Lord Walden describes a Nagasaki example in his own collection as having "a full chestnut-colored crest," while on the other hand he had a Malacca specimen with black crest killed in December; and I would likewise call the attention to Mr. Bourdillon's description of a male obtained by him in Travancore, on January 3 (apparently a bird of the year, as the crest feathers were marked by white), with "crown of head and

* I have to regret my inability to consult Mr. Oates' remarks (*B. Brit. Burmah*, II, p. 261), as his book is not in the library.

† Since this article was set in type, the January number of the "Notes from the Leyden Museum," vol. IX, has come to hand. In a paper entitled "On a Collection of Birds made by Dr. C. Klaesi in the Highlands of Padang (W. Sumatra)," Dr. J. Büttikofer discusses the question very fully, and he comes to the same conclusions as myself, viz, that the two forms are quite distinct. The synonymies of both are elaborately treated of, and the essential differences well pointed out. He also gives "A chronological review of the essential papers hitherto published on both species." The discussion occupies pp. 81-91.

‡ Mr. Swinhoe (*Ibis*, 1866, p. 123) most erroneously asserts that Blyth "identifies (*Ibis*, 1865, p. 38) the *Ardea melanolopha* of Raffles with the Japanese bird." On the contrary, Blyth (*l. c.*) maintains their distinctness as follows: "The adult of *G. melanolophus* is similar to that of *P. goisagi*, but has a long black crested pileus at all ages. *G. goisagi*, from Japan, has no black on crest at any age." This view he modified, however, *subsequent* to Swinhoe's remarks, as quoted above (*Ibis*, 1867, p. 173).

§ *Journ. f. Orn.*, 1881, p. 425.

nape black; the feathers of the occiput lengthened into a full crest" (Stray Feath., VII, 1878, p. 523).

It appears from the descriptions of the two species that the young birds of the year differ no less than the adults. The young *G. melanolophus* proper is said to have the crown and crest black, "each plume having a bold subterminal white irregular mark,"* while those of the young *G. goisagi* are described as being brownish, with dusky vermiculations like the wing-coverts, and destitute of white spots.

Lord Walden also remarks that "the bill in all the Malaccan examples I have examined is longer and straighter than in that of the Nagasaki individual above referred to," and Mr. R. G. Wardlaw Ramsay partially confirms this distinction (Ibis, 1884, p. 335).

That the true *G. goisagi* has been obtained in the Philippine Islands,† in which the black-crested form (*G. melanolophus*, or *G. kutteri*, as the Philippine bird has been named by Cabanis), proves nothing against the supposed distinctness of the two species, as Japanese birds may well be supposed to migrate so far south. The question which rises, and which will have to be solved by the ornithologists in Japan, is simply this: Does *G. goisagi*, at any season or at any age, assume a black crest, and have the young Japanese birds white subterminal marks on the crest feathers?

In answering this question it should not be forgotten that the black-crested species is found in Formosa,‡ and that, consequently, it may turn up on some of the small islands belonging to the Japanese Empire and situated near Formosa.

The dimensions of the only specimen in our museum (additional material is very desirable) are as follows: ♀ *ad.* (*U. S. Nat. Mus. No. 91599, Yokohama, April 14, 1883, coll. L. P. Jouy*). "Total length, 485^{mm}" (Jouy). Wing, 200^{mm}; tail-feathers, 116^{mm}; exposed culmen, 36^{mm}; tarsus, 64^{mm}; middle toe with claw, 49^{mm}.

Mr. Jouy's notes in regard to the soft parts of the fresh bird are to the following effect: "Iris chrome; bill dusky greenish; feet and legs light brownish yellow."

* Mr. A. O. Hume (Str. Feath., II, 1874, pp. 313 and 314) describes the head of an adult ♂ and an immature ♀ of *G. melanolophus* collected in the Nicobars about the middle of March, as follows:

♂ *ad.* "Forehead, crown, occiput, and nape, and the elongated pointed occipital crest, which is fully three inches in length, a deep blackish brown exhibiting in some lights a faint maroon tinge; over the eyes there is an ill-defined chestnut band.

♀ *immat.* "The whole of the top, sides, and back of the head and back of the neck black; each feather, including those of the crest, with a larger or smaller white subterminal spot, which, especially on the longer crest and neck feathers, are more or less curviform; besides these there is a tiny white dot at the tips of the most of the feathers."

† Wardlaw Ramsay, Ibis, 1884, p. 335; *ibid.*, 1886, p. 161.

‡ Swinhoe, Ibis, 1866, pp. 123, 403. The young specimen ("nearly full grown") had the "coronal and occipital feathers fine black, with white spots and streaks, those of the front having brown edges."

NYCTICORAX FORSTER.

1817.—*Nycticorax* FORSTER, Synopt. Cat. Brit. B., p. 59 (type *N. infaustus* FORST. = *A. nycticorax* LINN.).

1837.—*Nyctiardea* SWAINSON, Classif. B., II, p. 354 (same type).

1840.—*Scotæus* KEYSERLING & BLASIUS, Wirbelth. Eur., I, p. 220 (same type.)

1842.—*Nycterodius** MACGILLIVRAY, Man. Brit. Orn., II, p. 126 (same type) (*nec* REICHENB., 1852.)

At least two species of Night Herons occur in Japan, inasmuch as the Bonin Islands are inhabited by a species entirely different from the common Gray Night Heron. The status of the Bonin bird is, however, extremely uncertain, a question to be discussed more fully under the head of that species. It may be sufficient to remark here that the two species may be easily distinguished as follows:

- a*¹. Primaries gray; adults with the back glossy blackish green *N. nycticorax*.
*a*². Primaries rufous; adults with the back rufous..... *N. crassirostris*

(128.) *Nycticorax nycticorax* (LIN.).

Gray Night Heron.

Seguro-goi.

1758.—*Ardea nycticorax* LINN., S. N., 10 ed., I, p. 142.—*Id.*, S. N., 12 ed., I, p. 235 (1766).—
 TEMM. & SCHLEG., Fauna Jap. Aves, p. 116 (1849).—SCHLEG., Mus. P-Bas
Ardeæ, p. 56 (1863).—*Nycticorax n.* BOIE, Isis, 1822, p. 560.

1762.—*Alcedo ægyptia* HASSELQUIST, Reise Palæst., p. 300.

1766.—*Ardea grisea* LINN., S. N., 12 ed., I, p. 239.—*Nycticorax g.* SWINHOE, Ibis, 1877,
 p. 146.—BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII,
 1880, p. 198.—*Id.*, *ibid.*, X, 1882, p. 117.—BLAKIST., Amend. List B. Jap., p.
 24 (1884).

1771.—*Ardea kwakwa* S. G. GMELIN, Nov. Comm. Petrop., XV (p. 452, pl. xiv).

1771.—*Ardea ferruginea* S. G. GMELIN, Nov. Comm. Petrop., XV (p. 456, pl. xvi).

1788.—*Ardea maculata* GMELIN, S. N., I, ii, p. 645.

1817.—*Nycticorax infaustus* FORSTER, Synopt. Cat. Brit. B., p. 59.

1819.—*Nycticorax europæus* STEPHENS, Gen. Zool., XI, ii (p. 609).

1828.—*Nycticorax vulgaris* HEMPR. & EHRENB., Symb. Phys., Aves (fol. *m*).

1828.—*Nycticorax brevipes* HEMPR. & EHRENB., Symb. Phys., Aves (fol. *m*).

1831.—*Nycticorax orientalis* BREHM, Handb. Vög. Deutschl., p. 592.

1831.—*Nycticorax badius* BREHM, Handb. Vög. Deutschl., p. 592.

1831.—*Nycticorax meridionalis* BREHM, Handb. Vög. Deutschl., p. 593.

1835.—*Nycticorax ardeola* TEMMINCK, Man. d'Orn., 2 ed., III, p. lii.—*Id.*, *ibid.*, IV, p.
 384 (1840).

1852.—*Nycticorax gesneri* REICHENBACH, Syst. Av., p. xvi.

1856.—*Scotæus guttatus* HEUGLIN, Syst. Uebers. (p. 59).

1877.—? *Ardea goisaga* MCVEAN, Proc. Roy. Phys. Soc. Edinb., 1877, p. —, extr., p. 7
 (*nec N. goisagi* TEMM.).

The only adult Japanese bird before me agrees well with European specimens as regards size, but it is considerably darker. The sides of the head and neck, the flanks, axillaries, and the under wing-coverts are of a dark smoke-gray, and the upper surface of the wing is

* It will be seen that this name antedates *Nycterodius* REICHENBACH by ten years. As no other generic name seems available for the Yellow-crowned Night Heron (*Ardea violacea* LINN.), I propose *Nyctanassa* (νυξ, night, αραξσα, queen) as a new name for this type, which should stand as *Nyctanassa violacea*.

strongly washed with brown; while in the European examples the flanks are pure white or nearly so, and the axillaries, under wing-coverts, and sides of head and neck pale French gray, the latter more or less tinged with vinous. Larger series will be necessary, however, to decide whether there exists any average difference between Japanese and Western specimens.* I should remark that an example from Lower Pegu (♀, U. S. Nat. Mus. No. 95930, November 18, 1879) agrees well with the Japanese bird, but is a shade lighter.

In the synonymy above I have quoted McVean's "Night Heron, *Ardea goisaga*," with a query, though I have but little doubt that he really means the present species, for he speaks of it as very common within the city limits of Tokio, and says that he has "seen a perfect cloud of them rise from a favorite clump of trees when disturbed."

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.	Total length.
91518	Jouy, 967	♀ ad.	Tokio, Hondo.....	Feb. 11, 1883	273	100	69	72	78	"572"
91529	Jouy, 978	♀ jun.	Yokohama, Hondo...	Mar. 1, 1883	264	107	64	68	77	.....
.....	Namiye...	♀ ad.	Liu Kiu Island.....	Mar. 26, 1883	280	107	69	71	74	"560"

Mr. Jouy's notes relating to the fresh colors of the above specimens are as follows:

No. 91518. "Iris, carmine; bare skin around eye, dark greenish; bill, dusky; under mandible, greenish yellow; tarsus and toes, chrome."

No. 91529. "Iris, orange."

Nycticorax crassirostris VIGORS.

Thick-billed Night Heron.

1833.—*Ardea caledonica* KITTLITZ, Kupfertaf., III, p. 27, pl. 35, fig. 2 (*nec* GMEL., 1788).

1839.—*Nycticorax crassirostris* VIGORS, Voy., Blossom, Ornith., p. 27.—BONAP., Consp. Av., II, p. 140 (1855).—KITTL., Denkw., II, p. 182 (1858).—*Nyctiardea c.* GRAY, Hand-l. B., III, p. 33 (1871).

1863.—*Ardea manillensis* SCHLEGEL, Mus. P. B., Ardeæ, p. 60 (*part*).

Neither Schlegel (*l. c.*) nor Reichenow (Journ. f. Orn., 1877, p. 238), who both unite this species with *manillensis* VIG., seem to have seen specimens from the Bonin Islands. Gray, having specimens of both forms in the British Museum, gives them as distinct, and so does Bonaparte, who may have examined specimens too, judging from his description as compared with that of Vigors. The name *crassirostris*, as based upon the Bonin specimen, is therefore retained here, especially since Schlegel's measurements indicate that the Philippine birds have the

* Since the above was written I have examined a specimen collected by Mr. Namiye on Liu Kiu Island, which in every respect resembles the lighter European examples.

tarsus as long as, or longer than, the bill, while Vigors's original measurements show the bill one-fourth of an inch longer than the tarsus.

Having no access to a specimen, I quote the original description of *N. crassirostris*:

"Above, chestnut-red; below and the three occipital plumes, white; head above, black; bill, thick, nearly straight; the lower mandible whitish with dusky tip; the upper one black.

"Length of the body, 21; of the wing, from the bend to the end of the third primary, $10\frac{3}{4}$; of the bill, $4\frac{1}{4}$; of the tail, 5; of the tarsus, 4.

"This species agrees in every respect with the *Nyet. Caledonica* in its colors and the distribution of them, with the exception of the color of the bill, which is black in the latter bird. It differs essentially, however, in the shape of the bill, which is much more solid and nearly straight, approaching in this respect to the bill of the *Bitterns*. The proportions of the wing also are different, the length from the carpal joint to the extremity of the largest quill-feather being an inch less in our bird than in the allied species."

Von Kittlitz makes the following remarks on the birds collected by him: "The figure [*l. c.*] represents a fully developed male, and this seems to be the perfect plumage. True, I shot once a specimen of a very beautiful, entirely unspotted dark isabel color, with slate-colored top of the head and a crest consisting of three long plumes, quite similar to that of *A. caledonica* as it is seen in the Paris Museum, but this was a female. Another female, on the other hand, was still more strongly spotted than the other males, with very short crest."

Schlegel has probably united *N. crassirostris* with *N. manillensis* on account of their habitats being neighboring, while *N. caledonicus* is more southern and western. But the first-mentioned species is said to resemble *N. caledonicus* in every respect except in the size and shape of the bill, which is larger and heavier. The adults of the three forms may probably be distinguished by the following characters derived from an Australian specimen of *N. caledonicus* and the published descriptions of the others:*

*a*¹. Exposed culmen shorter than tarsus.

*b*¹. Occipital plumes wholly black, or at the tips at least; axillaries pale rufous; fore neck, upper breast, and flanks pale rufous tawny.....*N. manillensis*.

*b*². Occipital plumes wholly white, axillaries pure white; fore neck and upper breast slightly tinged with ocraceous buff, flanks pure white....*N. caledonicus*.

*a*². Exposed culmen longer than tarsus (coloration similar to foregoing species).....*N. crassirostris*.

The type of *N. crassirostris* does not seem to be in existence any more, for the Marquis of Tweeddale remarks (Trans. Zool. Soc., IX., p. 238; Orn. Works, p. 400) that it is no longer contained in the British Museum, although enumerated in the Hand-list as being extant.

* For descriptions of Philippine specimens of *N. manillensis*, see Tweeddale, P. Z. S., 1877, p. 769; 1878, p. 346; Orn. Works, pp. 542, 602.

Mr. Collie on the "Blossom" was the first to collect this species, which has only been found on Boninshima. He remarks that several were seen frequenting the rocks on the sea-shore, and Von Kittlitz, who shortly after visited the same place and collected specimens, says: "Rather common, keeping itself concealed during day-time in the lava caves at the shore and in the neighboring dense bushes." The same author, in his "Denkwürdigh. einer Reise," &c., *l. c.*, adds that "the single rough call-notes, which are also heard during the day-time, have some resemblance to the cry of the raven."

BUTORIDES BLYTH.

1849.—*Butorides* BLYTH, Cat. B. Mus. As. Soc. (p. 281) (type *A. javanicus* HORSEF.).

1856.—*Ocniscus* CABANIS, Journ. f. Orn., 1856, p. 343 (type *A. virescens* LIN.).

(138.) *Butorides javanicus amurensis* (SCHRENCK).

Green Heron.

Mino-goi.*

1849.—*Ardea scapularis* TEMM. & SCHLEG., Fauna Japon. Aves, p. 116 (*nec* LICHT, 1823).

1855.—*Butorides chloriceps* BONAPARTE, Consp. Av., II, p. 129 (*part*).

1860.—*Ardea virescens* var. *scapularis* SCHRENCK, Reis. Amurl., I, p. 437.

1860.—[*Ardea virescens*] var. *amurensis* SCHRENCK, Reis. Amurl., I, p. 441.

1863.—*Ardea macrorhyncha* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 44 (*part*).—*Butorides macrorhynchus* SWINHOE, P. Z. S., 1871, p. 413.—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 120.—SEEBOHM, Ibis, 1884, p. 35.—BLAKIST., Amend. List. B. Jap., p. 41 (1884).

1882.—*Nycticorax griseus* BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 117 *in fine* (*part*; *nec* LINN.).

1884. *Butorides schrenckii*, BOGDANOW, Consp. Av. Imp. Ross., I, p. 115.

Bogdanow has recently (*l. c.*) described the bird from the Amur and Ussuri as distinct under the name of *B. schrenckii*. Judging from my material I think he is right in regarding the northern form as separable from the Australian representative, and I refer the Japanese specimens without hesitation to the continental form, but I cannot regard either of these forms otherwise than subspecies of the original *B. javanicus* (HORSEF.), nor can I adopt Bogdanow's name, in view of the fact that Von Schrenck himself has intimated a subspecific appellation for the bird afterwards named in his honor.

It is a curious fact that *B. javanicus* and its subspecies are much more like the South American *B. striatus* (LINN.), than the North American *B. virescens* (LINN.), but the South American form is easily distinguished by the rich rufous spots on the fore neck.

B. amurensis shares the thick bill (by which it chiefly differs from the typical *B. javanicus*) with the Australian *B. macrorhynchus*. Bogdanow states that its bill is even much thicker ("rostrum ad basin sesquicrassius"), but I cannot help thinking that he has had an unusually slender-billed *B. macrorhynchus* for comparison, for the three specimens

* According to the invoice received from the Tokio Educational Museum.

before me, which I refer to *B. amurensis*, are fully equaled, as far as robustness of bill is concerned, by an Australian example.

The main feature by which *B. amurensis* seems to differ from the Australian form is the pure cinereous color of the sides and back of neck and sides of head, while in the southern representative these parts are more or less washed with brownish. Both of my Japanese specimens are apparently immature, the front of the neck being strongly spotted with blackish, but the absence of a brownish tinge to the parts mentioned is quite marked. A fully adult bird from the Philippines in perfect plumage shares these features, but the fore neck and sides of face are nearly unspotted; the gray of the sides and back of neck is nearly pure, and corresponds in intensity with Ridgway's Gray No. 6 (Nomencl. Colors, pl. ii); the bill is very stout, and the bird undoubtedly belongs to the form *B. amurensis*. In this specimen, as well as in the two Japanese examples, there is a very pronounced and pure white streak running from the malar apex backwards along the upper edge of the lower mandible; this streak is not indicated in the Australian specimen nor in Gould's figure. On the other hand, it is present in a *B. javanicus* from Tenasserim, and in Peale's type of *B. patruelis* (which I cannot separate from the latter) from Tahiti.

Ornithologists in Japan should be on the lookout for this bird, and our correspondents would confer a great favor upon us could they procure for our inspection fully adult specimens from that country.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Height of bill at base.	Tarsus.	Middle toe with claw.
95976	Ringer, Bl. 2811.	jun ...	Nagasaki, Kiusiu ..	.....	190	66	64	14	52	57
109454	.....	♀ .....	Sagami, Hondo	June 20, 1886	63	62	13.5	50	55	.....
107648	Marche, 394	♂ ad..	Luzon, Philippines..	May —, 1880	203	76	67	15	52	.....

For the sake of comparison, I here reproduce von Schrenck's measurements of his Ussuri and Amur specimens, as given in his great work (*op. cit.*, p. 443). Reduced to millimeters, they may be tabulated as follows:

Museum.	Collector and No.	Locality.	Wing.	Tail.	Culmen.	Height of bill at forehead.	Tarsus.	Total length.
St. Petersburg ..	Schrenck ..	Ussuri, East Siberia	201	77	65	16.5	50	508
Do .....	.....do	Amur, East Siberia	201	77	68	16.5	52	.....

DEMIEGRETТА BLYTH.

1846.—*Demiegretta** BLYTH, Journ. As. Soc. Bengal, XV, 1846 (p. 376), (type *A. jugularis*; nec BAIRD, 1858).

1855.—*Herodias* BONAPARTE, Consp. Av., II, p. 120 (nec BOIE, 1822).

Two forms or phases of Reef Herons, which, for reasons given further on, we have treated as different species, are recorded from the small southern islands of the empire, being the northernmost localities for any of the forms of this genus, the distribution of which is tropical and subtropical. They may be distinguished thus:

- a*¹. Slate-colored with a white streak down the chin and throat *D. ringeri*.
*a*². Pure white all over *D. greyi*.

(137½.) *Demiegretta ringeri*, sp. n.

Japanese Reef Heron.

Kuro-Sagi.

1862.—*Ardea jugularis* CASSIN, Proc. Acad. Phila., 1862, p. 321 (nec WAGLER).

1863.—*Ardea albilineata* SCHLEGEL, Mus. P. B., Ardeæ, p. 27 (part. nec *A. albolineata* GRAY, 1859).

1882.—*Ardeola* ——— ? BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 120.

1884.—*Ardea sacra* ? BLAKIST., Amend. List B. Jap., p. 41.—SEEBOHM, Ibis, 1884, p. 176.

Diagn.—Similar to *D. jugularis* WAGL., but with the top of the head and the occipital crest plumbeous and lighter than the back.

Hab.—Tsu-shima; Goto Island; Liu Kiu Island.

Type.—U. S. Nat. Mus. No. 21241.

Through the courtesy of Mr. P. L. Jouy, who collected four fine specimens of this bird on Tsu-shima, I have been able to institute a comparison of the Japanese Reef Heron with a series of typical specimens of the true *D. jugularis*.

Schlegel has recorded several Japanese specimens in the Leyden Museum, as *A. albilineata* GRAY, saying that this form differs from *D. jugularis* only in its larger size. As the tables below show, there is no appreciable difference in this respect, and Schlegel's own measurements do not bear out his assertion. On the whole, *D. jugularis* seems to be subject to a great amount of individual variation in regard to size, as already shown by Hume (Stray Feathers, II, p. 304). In referring to the tables given below, I should remark that the apparent shortness of the tarsus of the typical *D. jugularis* is probably due to the fact that all the specimens of the latter are mounted, while those of *D. ringeri* are skins; the measurements of the former are therefore less reliable.

The Tsu-shima specimens and one from Liu Kiu, collected by Dr. William Stimpson, differ materially from five specimens collected by the U. S. Exploring Expedition in several islands of Central Polynesia, by having the top of the head and the occipital crest of a fine plumbeous color, which is appreciably lighter than the rest of the upper surface, except the scapular plumes, while in the Polynesian specimens the top of head and the occipital crest is much darker, corresponding closely to Ridg-

* Often spelt *Demigretta*. I cannot now ascertain the original spelling.

way's "slate black" (Nomencl. Colors, pl. ii, f. 2). I was at first led to believe that the northern birds might be identical with those inhabiting the islands of the Bay of Bengal, but Hume (Str. Feath., II, p. 305) describes "the adult in full breeding plumage" from these localities as being "everywhere of a deep blackish slate color; the feathers of the head almost black." This agrees very well with the coloration of the Polynesian examples, which on the whole are darker and less plumbeous than the Japanese ones. I have therefore been obliged to give a new name* to the northern form, and in doing so I dedicate it to Mr. Frederick Ringer, of Nagasaki, who collected this species on Goto Island, and to whom we are indebted for some of the most interesting additions to the avifauna of Southern Japan.

I abstain here from giving a detailed description of this bird in the present connection, as such a one may be expected in Mr. Jouy's forthcoming report on the birds collected by him in the East.

I may mention, however, that the scapular plumes which are very well developed in three of the Tsu-shima birds appear to have the webs more compact and less disintegrated than the Polynesian specimens.

I.—Measurements of DEMIEGRETТА RINGERI.

Museum and No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.	Total length.
U. S. Nat., 21241	Stimpson, 168..	ad..	Liu Kiu	Dec. —, 1854	296	105	86	87	68	....
P. L. Jouy	Jouy, 1518	♂ ad..	Tsu-shima	May 26, 1885	320	110	88	89	67	660
Do.....	Jouy, 1519	♂ ad..	.....do	May 26, 1885	306	112	86	....	....	650
Do.....	Jouy, 1517	♀ ad..	.....do	May 25, 1885	297	110	84	81	65	610
Do.....	Jouy, 1520	♀ ad..	.....do	May 26, 1885	283	95	79	....	....	600

* The synonymy of true *Demiegretta jugularis* may be given as follows :
1788.—(?) *Ardea sacra* GMELIN, S. N., I, ii, p. 640.
1827.—*Ardea jugularis* WAGLER, Syst. Av., p. 214, n. 18.
1843.—*Herodias matook* GRAY, App. Dieffenb. Nov. Zeal., II (p. 196) (*nec* VIEILL.).
1846.—*Demiegretta concolor* BLYTH, Journ. As. Soc. Bengal, XV (p. 372).
1859.—*Ardea (Herodias) abolineata* GRAY, P. Z. S., 1859, p. 166.
1861.—*Ardea cinerea* ELLMAN, Zoologist, 1861 (p. 7469) (*nec* LINN.).
1867.—*Herodias andamanensis* "TYTLER," BEAVAN, Ibis, 1867, p. 333.
1874.—*Demi-egretta sacra* HUME, Stray Feath., II, p. 304.
1877.—*Ardea jugularis* var. *concolor* REICHENOW, Journ. f. Orn., 1877, p. 262.

The present species is often given as *Demiegretta sacra* GMEL., but I am not at all satisfied that this is the bird described by Latham and named by Gmelin, hence I have only quoted it with a query.

Vieillot's *Ardea matook* (Nouv. Dict. d'Hist. Nat., XIV, 1817, p. 416) is also usually referred to this species, but as he describes it as being "d'un bleu vert-p le," I think it more probable that he meant the bird already described by Latham under the name of *Ardea nov -hollandi *.

In the same manner I have excluded Syke's *Ardea asha*, which Hume has referred to Bosc's *A. gularis*.

II.—Measurements of DEMIEGRETTA JUGULARIS.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
15296	Peale	ad..	Samoa Islands .....	.....	300	102	.....	79	67
15298	.....do	♀ ad..	Upolu Islands .....	.....	284	89	79	74	61
15281	.....do	ad..	Aurora Island, Society Islands .....	.....	286	95	88	76	60
15288	.....do	ad..	Matavai Bay, Tahiti, Society Islands .....	.....	293	92	89	82	64
17102	.....do	ad..	Tongatabu Island .....	.....	303	95	91	92	74

Demiegretta greyi (GRAY).

White Reef Heron.

- 1844.—*Herodias greyi* GRAY, List B. Brit. Mus., III, p. 80 (*part; nomen nudum*).
 1848.—*Herodias greyi* GOULD, B. Austr., VI, p. & pl. 61 (descr. & fig.).—*Ardea g.* CASSIN, Proc. Acad. Phila., 1862, p. 321.
 1874.—*Demiegretta candida* TYTLER, Stray Feath., II, p. 307.
 1877.—*Ardea jugularis* var. *greyi* REICHENOW, Journ. f. Orn., 1877, p. 262.
 1887.—*Ardea grayi* SEEBOHM, Ibis, 1887, p. 182 (nec SYKES).

A perfectly white Reef Heron, obtained by Mr. Stimpson during his visit to Liu Kiu in December, 1854, forces upon us the very perplexing question of the so-called "dichromatism" in the Herons. As this problem has not previously entered Japanese ornithology a brief review of it may not be out of place.

By the term "dichromatism" we designate the peculiarity in certain species of birds, that individuals, otherwise identical, present two different styles of coloration, or "phases," presumably more or less independent of geographical distribution, present or past, or, in fact, of any apparent cause whatsoever. The difficulty in finding a plausible theory is much increased by the circumstance that there are nearly as many kinds of dichromatism as there are dichromatic species. Thus, among Japanese birds we may mention Richardson's Jæger (*Stercorarius parasiticus*), the Fulmar (*Fulmarus*), and the little Screech Owl (*Megascops japonicus*), but in neither of these cases do we know the exact nature of the phenomenon nor its significance in the animal economy. In some of the cases, however, we can trace a connection with the geographical distribution, but the only thing we know for certain is, that the two phases are entirely independent of sex, age, or season.

The Herons afford a more striking and at the same time more puzzling example of dichromatism, for of the two phases one is generally very vividly colored or strongly marked, while the other is pure white all over. This problem has been studied closer here in America than in the Old World, and consequently we know a little more about the American species. The earlier authors supposed that the white birds were the young ones, but observations both in the Old World and in this hemisphere have proved conclusively that this was an entirely

erroneous theory, for not only have we white birds with the ornamental plumes showing them to be fully adult, but actual observations have established the fact that the young birds belong to the white or colored phases already in the nest. What makes the question so very troublesome is the fact that there are hardly two species in which the relation between the two phases is exactly alike. In the Little Blue Heron (*Florida cærulea*), from the eastern parts of North America and the West Indies, the white phase is seldom if ever perfectly developed in the adults, while intermediate specimens are quite numerous. The Reddish Egret (*Dichromanassa rufescens*), upon which Mr. Ridgway bestowed the generic appellation in allusion to the dichromatism of its plumage, may also be regarded as strictly dimorph, for in Florida, where this species breeds abundantly, both phases are said to have been found in the same nest, attended by parents either both reddish, both white, or one in each of these stages of plumage, other circumstances at the same time leading to the conclusion that the two phases are not only not specifically distinct, but that they have nothing to do with either sex, age, or season. It is not quite so certain that *Ardea occidentalis* is now only a white phase of *A. wardi*, for it is stated that in Florida the former is confined mainly to the Atlantic coast while the latter chiefly inhabits the Gulf side. I believe that the differentiation between the colored and the white phase of the Reef Heron has reached a degree further. Butler (B. of New Zealand, 1873, p. 229) asserts that the white form has never yet been met with in New Zealand,* and according to Seebohm (Ibis, 1884, p. 177), it is also said to be absent in Southeastern Australia. Nor do pied examples occur in these localities, and contrary to the rule in *Florida cærulea*, these intermediate birds appear to be comparatively rare in the Reef Herons, for it seems that all the specimens collected by Mr. Hume and his collectors on the islands in the Bay of Bengal (forty-one specimens) belonged either to the normal dark form or to the pure white phase, and the same was the case with the large collection of these birds by Mr. Titian Peale (U. S. Exploring Expedition) from the Polynesian Islands. Among the fifteen specimens enumerated by Schlegel (*l. c.*) as contained in the Leyden Museum only one appears to be pied (No. 4). Von Pelzeln (Novara Reise, Zool., I, Vögel, 1869, pp. 118-123) examined thirteen specimens, only two being pied. Dr. Finsch (Jour. f. Orn., 1870, pp. 136-139) does not give data sufficiently explicit to enable us to state the proportion between the uniformly colored specimens and the pied ones, but the latter seem to be in a decided minority. I am therefore inclined to accept Mr. Seebohm's theory (*l. c.*) that these pied individuals are hybrids between the two forms, the more so since Dr. Finsch (*tom. cit.*, p. 137) informs us that he received from Viti-Levu a pair collected by Dr. Gräffe, of which the male was slate-colored, the female pure white, and both were

* I may mention, however, that Schlegel enumerates a white bird in the Leyden Museum as from New Zealand (Mus. P. Bas, Ardeæ, 1863, p. 27, No. 15.)

said to have been "killed at the nest," and during his trip to the Pacific islands he also observed dark and white or pied birds paired (Ibis, 1880, pp. 220, 432). Both v. Pelzeln and Dr. Finsch (*ll. cc.*) find in the specimens examined by them ample proof that a change of color takes place in the individual bird, and assert that the change ("Verfärbung") is independent of the molt. How little this "proof" is entitled to consideration is apparent from the fact that v. Pelzeln proves the bird to change from white to black, while Dr. Finsch proves that it changes from black to white. But against both theories there are the observations of trustworthy collectors and naturalists that the dark and the white birds are dark and white respectively from the nest.

Mr. Hume, in the article repeatedly quoted (Str. Feath., II, p. 307), speaks of the pure white adult as having the "fully developed dorsal plumes rather more disintegrated than in the adult ashy bird, and some of them extending fully an inch beyond the end of the tail (which is the case in no specimen of the ash-colored bird that I have seen)." Of the white specimens before me, only one (U. S. Nat. Mus. No. 15399, from Upolu, coll. Peale) is provided with these plumes, and the structure of these seems to corroborate Mr. Hume's statement.

I also want to call attention to the difference in the habits of the two forms, as observed by this author, who states that the white birds are "infinitely more wary, so much so that * * * we ourselves only succeeded in shooting one white adult against thirty-two ashy ones, though we were daily seeing and trying to shoot the white ones."

Taking all the above facts into consideration, I think it is by far the wiser course to distinguish the white bird by a name and to treat of it separately.

The question is one of great interest and importance. It seems to me that there is a tendency in all the colored day Herons to develop into a white form which may finally bring about the extinction of the colored phase by absorption, unless the latter be preserved intact in some locality not influenced by the conditions favorable to the production of the white form. In this connection I would call attention to the white birds which are usually regarded as a generic or subgeneric group under the name of Egrets (*Herodias*). There can hardly be any doubt that these have developed out of colored phases which have become extinct, and the high degree of disintegration of their ornamental plumes lends an additional importance to the observation by Hume, quoted above, and strengthens the theory that the Reef Herons are now undergoing the same development which in the different species of *Herodias* has resulted in a single pure white form.

Such a possibility contains a warning against basing any generalizations on the geographical distribution of the white forms. Suppose a North American Egret to be indistinguishable from a New Zealand species; any conclusions as to the former history, migrations, &c., based upon the apparent identity of these birds would be very hazardous

in view of the fact that the former might have developed in its present habitat from a blue form, while the latter emanated from an ancestor as gaily decorated as the European Purple Heron. It will be seen how extremely important it is in such a case to be on the lookout for the minutest and even apparently most trifling distinctions; and even so slight a character as the color of the naked portion of the tibiæ, or the length of the barbs of the scapular plumes may become important facts in distinguishing forms like *Herodias egretta* and *H. syrmatophorus*.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
21242	Stimpson, 174 .	ad	Liu Kiu, Japan	Dec., 1854 ...	290	98	88	86	68

Beyond the fact that a specimen of this form was obtained on Great Liu Kiu during Rodger's North Pacific Exploring Expedition, December, 1854, nothing is known in regard to the occurrence of the White Reef Heron in Japan. It may easily be overlooked, however, on account of its great similarity to the Egrets, but is easily distinguishable by its generic characters.

ARDEOLA BOIE.

1822.—*Ardeola* BOIE, Isis, 1822, p. 559 (type *A. ralloides* SCOP.).

1826.—*Buphus* BOIE, Isis, 1826, p. 979 (type *A. malaccensis* GM.).

1829.—*Cancrophagus* KAUP, Entw. Eur. Thierw., p. 42 (type *A. ralloides* SCOP.).

The Squacco Herons form a very interesting little group of tropical and subtropical species. All of the known species are apparently very much alike in structure and proportions, while the coloration of the adults in summer is very different. The young and winter birds, of at least five of the known six species (the first five ones of the following synopsis), on the other hand, are so much alike that no characters have as yet been pointed out, which will satisfactorily separate them. For that reason the following synopsis only refers to the adult birds in full breeding plumage.

Synopsis of the known species of the genus ARDEOLA.

a¹. Abdomen and upper wing-coverts white.

b¹. Crest-feathers streaked with blackish 1. *A. ralloides* (SCOP.).*

* SYN.—1769.—*Ardea ralloides* SCOPOLI, Ann. I Hist. Nat., p. 88.

1770.—*Ardea castanea* S. G. GMELIN, Reise Russl., I (p. 165).

1770.—*Ardea marsigli* LEPECHIN, Nov. Comm. Petrop., XIV (p. 205).

1770.—*Ardea pumila* LEPECHIN, Nov. Comm. Petrop., XIV (p. 205).

1773.—*Ardea comata* PALLAS, Reise Russ. R., II (p. 715).

b². Crest-feathers not streaked with blackish.

c¹. Back dark colored, slate-black, or bay.

d¹. Back bay colored, slightly suffused with cinereous. . . 2. *A. grayii* (SYKES).*

d². Back slate-black, or "purplish black with a hoary shade."

e¹. Neck "pale ferruginous buff," crest "white" . . . 3. *A. speciosa* (HORSF.).†

e². Neck chestnut, crest deep bay 4. *A. leucoptera* (BODD.).

e². Back pure white, or slightly suffused with yellowish. 5. *A. xanthopoda* (PELZ.).‡

a². Abdomen and upper wing-coverts "rufous bay" 6. *A. rufiventris* (SUNDEV.).§

For reasons, to be given further on, we refer Boddaert's *A. leucoptera* to the bird with chestnut head and neck, which afterwards was described by Swinhoe as *A. prasinoscels*. We are unable to place the bird which Dr. A. Reichenow, in his monograph of the order (Journ. f. Orn., 1877, p. 257), describes under *A. leucoptera*. Its habitat is given as the "Indo-Malayan Subregion (Malacca, Sumatra)," and it is characterized as "alba, capite, colloque totis candidis; dorsi plumis longis laxis nigro-schistaceis."|| It is not probable that Malacca is inhabited by two species of this genus, both with slate-colored backs and one with chestnut head and neck, the other with these parts entirely white, and as Hume (who does not seem to know any bird of the latter description) obtained the former from there, we are considerably puzzled in regard to Dr. Reichenow's bird.

1782.—*Ardea audax* LAPEIROUSE, Sv. Vet. Acad. Nya Handl., III, 1782, p. 112.

1783.—*Ardea grisea* BODDAERT, Tabl. Pl. Enl., p. 19 (*nec* LINN.).

1788.—*Ardea squaiotta* GMELIN, S. N., I, p. 634.

1788.—*Ardea erythropus* GMELIN, S. N., I, p. 634.

1788.—*Ardea senegalensis* GMELIN, S. N., I, p. 645.

1792.—? *Ardea griseo-alba* BOSC, Act. Soc. d'Hist. Nat., Paris, I, i, p. —.

1793.—*Ardea botaurulus* SCHRANCK, Fauna Boica, I (p. 221).

HAB.—Mediterranean Subregion; Africa.

* SYN.—1832.—*Ardea grayii* SYKES, P. Z. S., 1832, p. 158.

1832.—*Ardea malaccensis* SYKES, P. Z. S., 1832, p. 158 (*nec* GMEL.).

1849.—*Ardea leucoptera* BLYTH, Cat. B. Mus. As. Soc., p. — (*nec* BODD.).

1863.—*Ardea leucoptera grayi* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 35.

HAB.—India; Ceylon; Burmah; Tenasserim.

† SYN.—1823.—*Ardea speciosa* HORSFIELD, Tr. Linn. Soc., XIII (p. 189).

1863.—*Ardea leucoptera speciosa* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 34.

HAB.—Java; Borneo; Sumbava; Celebes.

‡ SYN.—1858.—*Ardea* sp. PELZELN, Naumannia, 1858, p. 497.

1860.—*Ardea xanthopoda* PELZELN, Journ. f. Orn., 1860, p. 166.

1860.—*Ardea idae* HARTLAUB, Journ. f. Orn., 1860, p. 167.

1861.—*Ardea elegans* VERREAUX, in Hartlaub's Orn. Beitr. Fauna Madag., p. 73.

1866.—*Ardea leucoptera* SCHLEGEL, P. Z. S., 1866, p. 425 (*nec* BODD.).

1867.—*Ardea leucoptera idae* SCHLEGEL & POLLEN, Rech. Faune Madag. (p. 125).

HAB.—Madagascar; Eastern Africa.

§ SYN.—1850.—*Ardea rufiventris* SUNDEVALL, Oefv. Sn. Vet. Akad. Förhandl., 1850 (p. 110).

1863.—? *Ardea semirufa* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 35.

HAB.—Southern Africa.

|| Cf. also Swinhoe, Ibis, 1863, p. 422: "*A. leucoptera* has the blue back, but the head and neck are pure white."

(138½.) *Ardeola leucoptera* (BODD.).

Eastern Pond Heron.

1783.—*Cancroma leucoptera* BODDAERT, Tabl. Pl. Enl., p. 54 (nec *A. leucoptera* JERDON quæ *A. grayii*).—*Ardea l.* SCHLEGEL, Mus. P. B., Ardeæ, p. 32.—HUME, Stray Feath., VIII, 1879, p. 161.1783.—*Ardea malaccensis* GMELIN, S. N., I, ii, p. 643.1855.—*Buphus bacchus* BONAPARTE, Consp. Av., II, p. 127.1860.—*Ardeola prasinoscels* SWINHOE, Ibis, 1860, p. 64.—*Id.*, *ibid.*, 1861, p. 52.—*Id.*, *ibid.*, 1863, p. 421.—SEEBOHM, Ibis, 1884, p. 35.—BLAKIST., Amend. List B. Jap., p. 41 (1884).1861.—*Ardeola speciosa* SCLATER, Ibis, 1861, p. 52, foot-note (nec HORSE.).1874.—*Ardeola prasinoscels* HUME, Stray Feath., II, p. 483.1880.—*Herodias* —? BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 200.

The right of the present species to a place in the Japanese avifauna rests solely on a single specimen, in young plumage, obtained by Captain Blakiston at Hakodate, October 12, 1879, and now in the U. S. National Museum (No. 95977). To Japanese ornithologists a detailed description of this interesting specimen may be quite welcome.

Jun. (U. S. Nat. Mus. No. 95977; Hakodate, October 12, 1879; coll. Thos. Blakiston).—Upper side of head black, each feather with a sharply defined and narrow streak of pale buff along the middle for its entire length; hind neck of a pale sepia with similar but broader and more ill-defined buffy streaks; interscapilium and scapulars rather dark sepia, the latter slightly washed with russet and indistinctly streaked with pale buff; lower back, uropygium and upper tail-coverts pure white; chin and throat white, unspotted; sides of head and neck and front of neck of a pale buff, becoming nearly pure white in the middle line of the latter, each feather striped with a submarginal longitudinal spot or stripe of blackish brown in each web, rest of under surface pure white, except a bunch of feathers on each side of breast, which are of a tint slightly paler than the interscapilium, with a narrow shaft-stripe of a pale buff; wings white, the wing-coverts slightly suffused with buff and shaded with drab in the outer webs; primaries white, the outer ones with distinctly black shafts, the two outermost, besides, having the tips drab colored for a distance of 25mm and 15mm, respectively, the entire outer web being similar, but fading into dirty white towards the base; the four primaries following have a small mark of the same color near the extreme tip; secondaries white, the three innermost ones brownish drab, and the one next to them shaded with the same color near the tip; tail-feathers white, faintly shaded with dusky towards the tips, giving them a dirty appearance. Upper mandible and tip of lower mandible "dark horn color," rest of under mandible "yellowish green"; legs "yellowish green" (*Blakiston*).

Total length, 483mm (*Blakiston*). Wing, 193mm; tail-feathers, 71mm; exposed culmen, 60mm; tarsus, 59mm; middle toe with claw, 58mm.

No occipital crest; feathers of the lower neck elongated, but not particularly narrow. Second primary longest, third slightly shorter; first between third and fourth, the first four ones forming the tip; inner secondaries reaching slightly beyond the longest primaries.

Mr. Seebohm has identified this specimen as *Ardeola prasinoscels* of Swinhoe. As remarked above, however, the immature plumages of the species of this genus are practically indistinguishable as far as our present knowledge goes, and I think that all that can be said with absolute certainty is that the present specimen belongs to this group of Herons. The probability is that it belongs to the Chinese species, being apparently only a straggler to the northern island of Japan. As it

differs somewhat from four specimens of *A. prasinoscels* which practically are identical *inter se*, and in a plumage precisely corresponding to the one described above, I may point out the most striking differences.

In the Japanese specimen the light shaft-stripes on the top of the head are much narrower, and the black deeper; the brown of the interscapilium and the scapulars is darker and less russet; and the buffy suffusion is less vivid. From the subjoined table it will be seen that the dimensions are the same, but it may be worth mentioning that in the Japanese bird the inner secondaries are longer than the primaries, while in the four immature specimens given in the table, and in the only adult of this species (Shanghai, May 1, 1881, Jouy's Coll.) before me the longest primaries reach 20^{mm} to 33^{mm} beyond the secondaries. I mention this particularly, because Mr. Hume has intimated the possibility of this character being diagnostic of *Ardeola speciosa* (Str. Feath., VI, p. 482), but I hardly think that it is of any value, as an adult male *A. grayi* (U. S. Nat. Mus. No. 95927; Lower Pegu; May 7, 1880, coll. Oates) in this respect closely resembles the Japanese specimen.

Boddaert's name *Ardea leucoptera* is based on Pl. Enl. pl. 911, which represents a bird in the immature plumage, said to have come from Malacca, and the name, therefore, properly belongs to the species inhabiting that peninsula. From Hume's note in "Stray Feathers," VIII, p. 161, it appears that the adult Malacca bird has the head and neck chestnut, that it consequently is the same as Swinhoe's *A. prasinoscels*. This being the case, the latter appellation will have to give way to the older one by Boddaert.

The geographical distribution of *A. leucoptera* may then be stated to embrace China, at least from Shanghai southwards to Cochin China, Siam, and Malacca. An accidental straggler (?) has been taken in Northern Japan, but I am not aware that this species has been recorded from Formosa, or the Philippine Islands. Another solitary specimen, possibly also a straggler, has recently been reported from Ussuri by Mr. Taczanowski (Bull. Soc. Zool. France, 1886, p. 309).

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
95977	Blakist., 2677.	jun ...	Hakodate, Yezo	Oct. 12, 1879.	193	71	60	59	58
85820	Jouy, 135.....	♂ jun.	Hong Kong, China.....	Sept. 16, 1881.	200	80	56	57	59
85819	Jouy, 134.....	♂ jun.	.....do	Sept. 16, 1881.	208	71	60	60	61
86154	Jouy, 217.....	♀ jun.	.....do	Oct. —, 1881.	194	71	60	56	57
107659	Germain, 1276	♂ jun.	Cochin China.....	Sept. —, —.	223	80	66	63	66

BUBULCUS BONAP.

- 1854.—*Bubulcus* "PUCHERAN," BONAPARTE, Ann. Sc. Nat., 4 ser., I, ii, p. 141 (*nomen nudum*).
 1855.—*Bubulcus* "PUCHERAN," BONAPARTE, Consp. Av., II, p. 124 (type *A. ibis* HASSELQV.).

(137.) *Bubulcus coromandus* (BODD.).

Eastern Cattle Heron.

Ama-sagi.

- 1783.—*Cancroma coromanda* BODDAERT, Tabl. Pl. Enl., p. 54.—*Ardea c.* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 30 (1863).—*Bubulcus coromandus* MEYER, Journ. f. Orn., 1873, p. 405.—BLAKIST. & PRYER, Tr. As. Soc. Jap., X, 1882, p. 120.—BLAKIST., Chrysanth., 1883, Apr., p. 173.—*Id.*, Amend. List B. Jap., p. 41 (1884).—SEEBOHM, Ibis, 1884, p. 35.
 1788.—*Ardea comata* β. GMELIN, S. N., I, ii, p. 633.
 1817.—*Ardea bicolor* VIEILLOT, Nouv. Dict. d'Hist. Nat., XIV, p. 409.
 1817.—? *Ardea ruficapilla* VIEILLOT, Nouv. Dict. d'Hist. Nat., XIV, p. 409.
 1819.—*Ardea coromandelensis* STEPHENS, Shaw's Gen. Zool., XI, ii, p. 577.
 1820.—*Ardea deaurata* MERREM, Ersch & Gruber's Encycl., 1 sect., V, p. 173.
 1823.—*Ardea affinis* HORSFIELD, Trans. Linn. Soc., XIII (p. 189).
 1823.—*Ardea flavirostris* VIEILLOT, Enc. Méth., III, p. 1124.
 1823.—*Ardea coromandelica* LICHTENSTEIN, Verz. Doubl., p. 78 (*part*).
 1827.—*Ardea russata* WAGLER, Syst. Av., p. 211, n. 12 (*part*).—TEMME, Man. d'Orn., 2 ed., III, p. lii (1835); IV, p. 377 (1840).—TEMME & SCHLEG., Fauna Japon., Aves, p. 115 (1849).—*Egretta r.* BLAKIST. & PRYER, Ibis, 1878, p. 224.—*Herodias r.* BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 200.
 1831.—*Ardea caboga** FRANKLIN, P. Z. S., 1831, p. 124.

In regard to the above synonymy I have only to remark that Merrem's *Ardea deaurata* undoubtedly belongs here, and not, as usually supposed, to *Ardeola ralloides*, being based expressly upon Buffon's "Crabier de Coromandel" (Pl. Enl., pl. 910), the same bird upon which Boddaert previously had bestowed the name *Cancroma coromanda*.

The Eastern Cattle Heron has often been regarded as conspecific with the Mediterranean *Bubulcus ibis* (LINN.), from which, however, it differs in many important respects. In the white winter plumage the two birds may be easily distinguished by the proportionately much smaller feet of the latter, and especially by the shortness of the bare portion of the tibiæ. It is asserted that it is in every way a smaller bird, but such is hardly the case, as will be seen from the appended measurements. The breeding plumages are also differently colored, for in *B. ibis* the elongated plumes on head, lower end of fore neck, and back are of a nearly uniform "reddish buff"; in *B. coromandus*, however, this color is confined to the dorsal plumes, while the whole head and neck are of a beautiful golden ochraceous.

The ground color of this species is white in all ages, and the richly-colored plumes of the adults are only assumed early in spring, to be dropped in the autumn, the bird being plain white during the winter.

* Sykes (P. Z. S., 1832, p. 158) quotes as authority for this name: "Penn., Hindoos. 2. 158," which I am unable to place, unless Pennant's "Outlines of the Globe," vol. 2, Eastern Hindostan (London, 1798-1880), be meant, a book inaccessible to me.

The bright plumes are apparently not assumed before the bird has passed its second winter, since when a year old it only shows a few ochraceous feathers on the crown and on the neck, as well as a few buff ones on the back, the rest being white. A bird in this plumage, taken in the latter part of June, has been received from the Tokio Educational Museum.

Captain Blakiston, in the April number, 1883, of the "Chrysanthemum", remarks as follows:

"An example obtained by Mr. Ota at Tokio as late as December 20, now in my possession, retains a good deal of the summer rust-color on the head, neck, breast, and plumes of the back, which Mr. Ota considers singular at this season." This specimen is now before me (U. S. Nat. Mus. No. 95975), and I think I can explain the abnormality. The ochraceous and buff plumes are extremely abraded, indicating that they have been worn for a longer period than originally contemplated by nature; but they would undoubtedly have disappeared very shortly, for the bird is in full molt, and new *white* feathers are protruding. The left wing is clipped, proof that the bird had been kept in captivity, and this fact alone is sufficient to explain the retarded molt, a thing not at all uncommon among birds in similar circumstances.

Measurements of BUBULCUS COROMANDUS.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe without claw.
85794	Jouy, 21	♂ ad..	Nagasaki	May 27, 1881	248	91	56	96	65
95975	Blak., 3215	♀ ad..	Tokio	Dec. 20, 1882	232	82	57	87	64
109453	.....	♂ .....	Mayebashi, Joshiu	June 21, 1886	249	85	58	96	68
85748	J. M. Young ..	♂ ad..	Shanghai, China	April 25, 1881	252	83	60	94	64

Measurements of BUBULCUS IBIS.

57021	Schlüter, 1049.	♂	Southern Europe	255	96	54	80	54
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ARDEA LINN.

- 1758.—*Ardea* LINN., S. N., 10 ed., I, p. 141 (type *A. cinerea* LINN.).
- 1855.—*Audubonia* BONAPARTE, Consp. Av., II, p. 113 (type *A. occidentalis* AUDUB.).
- 1887.—*Phoyx* STEJNEGER, MS. (type *A. purpurea* LINN.).

There being a probability that the Purple Heron may occasionally occur in Japanese territory, a synopsis of the characters by which it can easily be recognized may be useful:

- a¹. Tarsus much longer than exposed culmen or middle toe; hind claw about one-eighth the length of the tarsus; predominating colors gray, white, and black, (ARDEA) *A. cinerea*.

- a*². Tarsus about equal to exposed culmen or middle toe; hind claw more than one-fourth the length of the tarsus; predominating colors, black, gray, and different shades of chestnut and rufous (PHOYX) [*A. purpurea*.]

(133.) *Ardea cinerea* LINN.

Common Heron.

Awo-sagi.

- 1758.—*Ardea cinerea* LINN., S. N., 10 ed., I, p. 143.—*Id.*, S. N., 12 ed., I, p. 236 (1766).—TEMMINCK, Man. d'Orn., 2 ed., III, p. lii (1835); IV, p. 371 (1840).—TEMM. & SCHLEG., Fauna Japon., Aves, p. 114 (1849).—CASSIN, Perry's Exp. Jap., II, p. 244 (1858).—*Id.*, Journ. f. Orn., 1858, p. 450.—SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 5 (1863).—? MARTENS, Preuss. Exped. Ost-Asien, Zool., I, p. 88 (1866), p. 371 (1876).—SWINHOE, Ibis, 1876, p. 335.—M'VEAN, Pr. R. Phys. Soc. Edinb., 1877, Extr., p. 7.—BLAKIST. & PRYER, Ibis, 1878, p. 223.—*Id.*, Tr. As. Soc. Jap., VIII, 1880, p. 199.—*Id.*, *ibid.*, X, 1882, p. 118.—BLAKIST., Chrysanth., Feb., 1883, p. —.—*Id.*, Amend. List. B. Jap., p. 12 (1884).—JOUY, Proc. U. S. Nat. Mus., VI, 1883, p. 317.
- 1848.—? *Ardea leucophæa* GOULD, P. Z. S., 1848, p. 58.
- 1874.—? *Ardea brag* TACZANOWSKI, Journ. f. Orn., 1874, pp. 335, 336 (*nec* GEOFFR. ST. HIL.).—*Id.*, Bull. Soc. Zool. France, 1876, p. 258.

With only a few fragments of a young bird from Japan (U. S. Nat. Mus. No. 91600), I can say nothing as to the correctness of referring the Japanese Awo-sagi to the true *Ardea cinerea*. I trust, however, that Mr. P. L. Jouy, who collected this species in Korea, will soon have something to say in regard to the Eastern birds.

Subgenus PHOYX* Stejneger.

[*Ardea purpurea* LINN.]

Purple Heron.

- 1766.—*Ardea purpurea* LINN., S. N., 12 ed., I, p. 236.—TEMMINCK, Man. d'Orn., 2 ed., IV, 372 (1840).—SWINHOE, Ibis, 1863, p. 319.—HARTLAUB & FINSCH, Vög. Ost-Afr. (p. 676), (1870).—ARM. DAVID, Nouv. Arch. Mus. d'Hist. Nat. Bullet., VII, p. 12 (1871).—DRESSER, B. of Eur., VI, 217 (1875).—WALDEN, Tr. Zool. Soc. Lond., IX, 1875, p. 236.
- 1769.—*Ardea rufa* SCOPOLI, Ann. I Hist. Nat., p. 87 (*nec* BODD., 1783).
- 1769.—*Ardea variegata* SCOPOLI, Ann. I Hist. Nat., p. 88.
- 1774.—*Ardea caspia* S. G. GMELIN, Reise Russl., II, (p. 193, pl. 24).
- 1787.—*Ardea rutila* LATHAM, Syn. Suppl., I, p. 291.
- 1788.—*Ardea botaurus* GMELIN, S. N., I, p. 636.
- 1788.—*Ardea purpurata* GMELIN, S. N., I, p. 641.
- 1799.—*Ardea monticola* LA PEYROUSE, Tab. Méth. Mamm. Ois. (p. 44).
- 1831.—*Ardea purpurascens* BREHM, Handb. Vög. Deutschl., p. 583.
- 1834.—? *Ardea purpurea* var. *manillensis* MEYEN, Nov. Acta Ac. Leop. Carol., XIV, suppl. i (p. 102).
- 1855.—*Ardea pharaonica* BONAPARTE, Consp. Av., II, p. 113.

The Purple Heron has been found as far east as China and the Philippine Islands, but there is no authentic record of it having been obtained anywhere in Japan, although it is vaguely stated by various authors (Swinhoe, Hartlaub & Finsch, Dresser, *ll. cc.*) that it occurs there, statements which are probably based upon the assertion of Temminck (*l. c.*) that the Purple Heron is "tout aussi abondante que l'espèce pré-

* Φῶυς, a species of Heron mentioned by Aristoteles (IX, 17.2), possibly *Ardea purpurea*.

cédente [*A. cinerea*] et dans les mêmes climats qui viennent d'être désignés ci-dessus," where he says that the common Herons "font aussi partie des oiseaux qui peuplent les contrées du Japon et les côtes de la Corée."

Meyen (*l. c.*) separated the Philippine Islands bird subspecifically from the Western examples, it is said, on account of its superior size. I have only one Eastern bird at hand, but as far as size is concerned, it is rather smaller than the European specimens, as will be seen from the table below. Then the question comes up whether the Philippine bird is identical with those inhabiting Pegu, a question which, of course, cannot be settled without specimens from those islands. For the present I feel constrained to assume that all the Eastern birds belong to the same race, if, in reality, they differ from Western specimens, and my Pegu bird leads me to think that such is the case. This specimen is certainly very different from two European examples and one from South Africa, particularly in the following points:

(1) The entire front of the neck is destitute of the black longitudinal spots and streaks so conspicuous in the other three examples.

(2) The whole breast and abdomen is black with a greenish gloss, a narrow margin of liver-brown separating it from the gray of the flanks, while in the other specimens the under surface is of a vinaceous chestnut, marked in the middle with large blackish longitudinal spots.

(3) "Epaulettes" anteriorly of a deep claret-brown, with a hoary suffusion, posteriorly grading into a bluish or greenish—according to the light—slate-color, against the medium bay color of these tufts in the Western specimens.

(4) The interscapilium appears to be of a more plumbeous tint.

Should these differences hold good in other specimens from the East, it will be necessary to recognize the Purple Heron from there as a distinct geographical subspecies at least.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.
95931	Oates	ad	Lower Pegu.....	July—, 1880.	355	125	115	121	115
109835	Pratt	ad	Pretoria, Transvaal		335	125	112	110	115
19054	Lazar	ad	Hungary		370	120	125	121	120
57010	Schlüter, 267..	♂ ad..	.....do		380	124	136	136	140

Schlegel remarks (Mus. P.-Bas, Ardeæ, p. 8) that birds from Eastern and Southern Africa seem to be smaller than those from other countries. The above measurements slightly corroborate this statement, but then Bonaparte diagnosed his *A. pharaonica* "from Eastern Africa" as

similar to *A. purpurea*, "sed valde major." Size appears, therefore, to be a poor diagnostic character in these birds. I may add that our Transvaal specimen has the back much more bronzy than the other specimens, but is otherwise like those from Hungary.

HERODIAS BOIE.

1822.—*Herodias* BOIE, Isis, 1822, p. 559 (type *A. egretta* GM. ?).

1828.—*Lepterodias* EHRENBERG, Symb. Phys. (type *L. schistacea* EHR.), (*fide* Reichenow).

1829.—*Garzetta* KAUP, Entw. Eur. Thierw., p. 76 (type *A. garzetta* LIN.).

1830.—*Egretta* BONAPARTE, Sulla Sec. Ed. Regno Anim. Cuv., p. 97 (type *A. egretta* GM.).

1842.—*Erodias* MACGILLIVRAY, Man. Br. B., II, p. 130 (type *A. alba* LIN.).

1842.—*Cosmerodius* GLOGER, Handb. Naturg. (p. 412), (same type).

Synopsis of the Japanese species of the genus HERODIAS

AT ALL SEASONS.

*a*¹. Feathering on sides of lower mandible reaches beyond frontal apex; wing, more than 330^{mm} (HERODIAS).

*b*¹. Wing more than 400^{mm} *H. alba*.

*b*². Wing less than 400^{mm} *H. modesta*.

*a*². Feathering on sides of lower mandible not beyond frontal apex; wing less than 330^{mm} (GARZETTA).

*b*¹. Exposed culmen shorter than middle toe, with claw *H. intermedia*.

*b*². Exposed culmen longer than middle toe, with claw.

*c*¹. Bill black; toes [usually] light yellow *H. garzetta*.

*c*². Bill yellowish or greenish; toes dark colored [*H. eulophotes*.]

ADULTS IN FULL BREEDING PLUMAGE.

*a*¹. Without long pectoral plumes (HERODIAS).

*b*¹. Wing more than 400^{mm} *H. alba*.

*b*². Wing less than 400^{mm} *H. modesta*.

*a*². With long pendant pectoral plumes (GARZETTA).

*b*¹. No occipital crest of elongated plumes; pectoral plumes with decomposed webs of hair-like barbs *H. intermedia*.

*b*². With an occipital crest; pectoral plumes narrow and pointed, but with ordinary webs.

*c*¹. Occipital crest consisting of two or three very long and band-like feathers; bill black *H. garzetta*.

*c*². Occipital crest of numerous narrow and pointed plumes; bill yellow [*H. eulophotes*.]

(134½.) *Herodias alba* (LINN.).

Great Egret.

? Ō-sagi.

1758.—*Ardea alba* LINN., S. N., 10 ed., I, p. 144.—*Id.*, S. N., 12 ed., I, p. 239 (1766).—

Herodias a. GRAY, List Spec. B. Br. Mus., III, p. 77 (1844).—BLAKISTON, Chrysanth., April, 1883, p. 173.—*Id.*, Amend. List B. Jap., p. 40 (1884).

1774.—*Ardea egretoides* S. G. GMELIN, Reise Russl., II (p. 193, pl. 25).

1803.—*Ardea egretta* BECHSTEIN, Orn. Taschb., p. 261 (*nec* GMEL., 1788).

1829.—*Lepterodatis flavirostris* EHRENBERG, Symb. Phys. Aves (fol. m).

1831.—*Herodias candida* BREHM, Handb. Vög. Deutschl., p. 584.

1842.—*Erodias victoriae* MACGILLIVRAY, Man. Br. Orn., II, p. 131.

1852.—*Egretta nigrirostris* MACGILLIVRAY, Hist. Br. B., IV, p. 460.

1882.—*Herodias modesta* BLAKISTON & PRYER, Tr. As. Soc. Jap., X, 1882, p. 119 (*part*).

In a letter dated September 21, 1886, Captain Blakiston kindly informed me that Mr. Henson, of Hakodate, had obtained at that place, on October 10, another specimen of the Great Egret, a ♂, with yellow bill.

Through the liberality of Mr. Henson I have had the opportunity to examine this specimen. The measurements are incorporated in the table below. It is in every respect a typical *H. alba* in winter plumage.

It would appear that this large form, apparently identical with the European bird, is only an occasional winter visitor to the Japanese islands, which would account for the four specimens thus far collected there having yellow bills. This circumstance seems, therefore, to indicate that the difference in size between this form and the birds breeding in Japan is not simply one of individual variation.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail-feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.	Total length.
91484	Jouy, 931	♂ ad..	Tokio, Hondo..	Jan. 8, 1883	440	158	124	189	120	"1090"
91483	Jouy, 930	♀ ad..	.....do	Jan. 8, 1883	420	167	120	164	110	"1060"
.....	Henson, 4	♂ ad..	Hakodate, Yezo	Oct. 10, 1863	435	161	125	200	120	"910"

Mr. Jouy's remarks in regard to the fresh colors of these birds are as follows:

"Iris, chrome; bill, yellow, with the tip of upper mandible dusky; bill at bas and lores greenish; tarsus and toes black; naked portion of tibia mottled with yellowish."

(134.) *Herodias alba modesta* (J. E. GRAY).

South-eastern Egret.

Ō-sagi.

1827.—*Ardea flavirostris* WAGLER, Syst. Av., p. 210, n. 9 (*nec* VIEILL., 1823).

1831.—*Ardea torra* "BUCHANAN," FRANKLIN, P. Z. S., 1831, p. 123.—*Herodias torra* HUME, Stray Feath., VI, 1878, p. 472.

1831.—*Ardea putea* BUCHANAN, *vide* Franklin, P. Z. S., 1831, p. 124.

1831.—*Ardea modesta* J. E. GRAY, Zool. Miscell., p. 19.—*Egretta m.* SWINHOE, Ibis, 1876, p. 335.—BLAKIST. & PRYER, Ibis, 1878, p. 224.—SEEBOHM, Ibis, 1879, p. 27.—*Herodias m.* BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 199.—*Ibid.*, *ibid.*, X, 1882, p. 118.—BLAKIST., Amend. List B. Jap., pp. 12, 40 (1884).

1835.—*Ardea egretta* TEMMINCK, Man. d'Orn., 2 ed., III, p. lii; IV, p. 372 (1840) (*nec* GMEL., 1788).—SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 17 (part) (1863).

1849.—*Ardea alba* TEMM. & SCHLEG., Fauna Japon., Aves, p. 114.—CASSIN, Proc. Acad. Philada., 1862, p. 321.—*Herodias a.* McVEAN, Proc. R. Phys. Soc. Edinb., 1877, Extr. p. 7.

1854.—? *Herodias latiefu* A. E. BREHM, Journ. f. Orn., 1854, p. 80.

1874.—*Egretta syrmatophora* TACZANOWSKI, Journ. f. Orn., 1874, p. 325 (*nec* GOULD).

1876.—*Ardea alba* var. *modesta* BRÜGGEMAN, Abh. Naturw. Ver. Bremen, V, p. 96.

Only to be distinguished from the foregoing by its smaller size. Measurements of the wings of eleven specimens indicate that the individual variation in this form runs between 340^{mm} and 390^{mm}. In verification of this I have appended a table of measurements derived from Captain Blakiston's manuscript notes.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.	Remarks.
21240	Stimpson, 175	.....	Liu Kiu Island ...	Dec. —, 1854	383	135	106	164	112	Tibia dark; bill light.
109448	Namiye	♂ ad.	Joshiu, Hondo	June 21, 1886	385	142	111	157	112	Tibia light; bill black.
109449	do	♀ ad.	do	June 21, 1886	360	131	103	150	105	Tibia light; bill black.
.....	Henson, 116	♂ ad.	Hakodate, Yezo	July 10, 1884	370	138	162	162	110	Tibia light; bill black.

Blakiston's measurements of HERODIAS MODESTA.

Museum and No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Exposed culmen.
Hakod., 1053	Blak., 1010	.....	Hakodate	.....	340	.....
Swinhoe	Blak., 1865	.....	do	Sept. 10, 1875	340	.....
Hakod., 1053	Blak., 2255	.....	do	May 2, 1877	370	.....
Hakod., 1054	Blak., 2521	.....	do	April —, —	350	.....
.....	Pryer	.....	.....	.....	372	108
Tokio Educat.	.....	.....	.....	.....	380	110
.....	Ringer	♂	Nagasaki	April —, —	355	105
.....	do	♂	do	April —, —	383	117

Subgenus GARZETTA Kaup.

(135.) *Herodias intermedia* (WAGL.).

Intermediate Egret.

Chiu-sagi.

1829.—*Ardea intermedia* WAGLER, Isis, 1829, p. 659.—SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 19, (1863).—*Egretta i.* BLAKIST. & PRYER, Ibis, 1878, p. 224.—*Herodias i.* BLYTH, Cat. B. Mus. As. Soc. Beng. (p. 279) (1849).—SEEBOHM, Ibis, 1879, p. 27.—BLAK. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 200.—*Id.*, *ibid.*, X, 1882, p. 119.

1829.—*Ardea melanopus* WAGLER, Isis, 1829, p. 659 (*nec* BLYTH).

1831.—? *Ardea nigrirostris* J. E. GRAY, Zool., Miscell., p. 19.

1840.—*Ardea egrettoides* TAMMINCK, Man. d'Orn., 2 ed., IV, p. 374 (*nec* S. G. GMEL., 1774).—TEMM. & SCHLEG., Fauna Japon. Aves, p. 115 (pl. lxix).

1854.—? *Herodias brachyrhynchos* BREHM, Journ. f. Orn., 1854, p. 80.

1884.—*Herodias plumiferus* RIDGWAY, Water B. N. Am., I, p. 23 (*nec* GOULD).

I have questioned the propriety of referring J. E. Gray's *A. nigrirostris* to the present species, because he gives the middle toe with claw as

being one-quarter of an inch shorter than the "bill to gape," whereas in *H. intermedia* it is at least as long as the commissure.

H. plumiferus of Gould, from Australia, is very closely allied to the present species, if not quite identical. It seems to differ chiefly in having the bill yellow even in the breeding plumage, while in the Japanese form it is black during the summer; the latter form also appears to have the naked portion of the tibiæ entirely black, and not "inclining to flesh-color," as the Australian bird.

The Intermediate Egret is easily recognized by its short and comparatively stout bill, and should at no season be confounded with any of its congeners.

Measurements.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Exposed culmen.	Tarsus.	Middle toe with claw.	Remarks.
91504	Jouy, 953..	♂ ad.	Yokohama..	Jan. 20, 1883	.....	119	67	112	94	Bill yellow.
109450	Namiye...	♂ ad.	Joshiu.....	June 2, 1886	325	125	76	117	99	Bill black, yellow at base.
109452	....do	♂ ad.	....do	June 2, 1886	320	125	76	113	98	Do.
109451	....do	♀ ad.	....do	June 2, 1886	323	124	76	113	97	Do.

(136.) *Herodias garzetta* (LIN.).

Little Egret.

Shira-sagi.

1766.—*Ardea garzetta* (LINN.), S. N., 12 ed., I, p. 237.—TEMMINCK, Man. d'Orn., 2 ed., III, p. lii (1835); IV, p. 376 (1840).—TEMM. & SCHLEG., Fauna Japon., Aves, p. 115 (1849).—SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 12 (1863).—MARTENS, Preuss. Exp. Ost-As. Zool., I, pp. 88, 106 (1866); p. 371 (1876).—*Egretta g.* BLAKIST. & PRYER, Ibis, 1878, p. 224.—*Herodias g.* BOIE, Isis, 1822, p. 559.—MCVEAN, Proc. R. Phys. Soc. Edinb., 1877, Extr., p. 7.—SEEBOHM, Ibis, 1879, p. 27.—BLAKIST. & PRYER, Tr. As. Soc. Jap., VIII, 1880, p. 200.—*Id.*, *ibid.*, X, 1882, p. 119.—BLAKIST., Amend. List B. Jap., p. 24 (1884).

1770.—*Ardea nivea* S. G. GMELIN, Reise Russl., I (p. 164).

1774.—*Ardea santodactylos* S. G. GMELIN, Reise Russl., III (p. 253).

1810.—*Ardea xanthodactyla* RAFINESQUE, Caratteri (p. 5).

1816.—*Ardea equinoctialis* LEACH, Syst. Cat. M. B. Br. Mus., p. 33 (*nom. nud.*).

1831.—*Ardea orientalis* J. E. GRAY, Zool. Miscell., p. 20.

1854.—? *Herodias lindermayeri* BREHM, Journ. f. Orn., 1854, p. 80.

1855.—*Garzetta egretta* BONAPARTE, Consp. Av., II, p. 118 (nec *A. egretta* GMEL.).

In regard to the synonymy I have the following remarks to make:

Ardea nigrirostris J. E. GRAY, Zool. Misc., p. 19, is often quoted as a synonym to this species, but the length of the middle toe with claw, 4 inches=102^{mm}, at once dismisses it from consideration in the present connection.

Herodias jubata BREHM, Handb. Vög. Deutschl., p. 586, also regularly quoted as belonging here, seems to me to be something else, perhaps a distinct but overlooked species, for he describes it as having an occipital

crest “consisting of many plumes more than 3 inches long, which form a kind of *mane*,” consequently *toto cælo* different from the two or three long, ribbon-like plumes of the true *H. garzetta*, and apparently like the crest of *H. eulophotes* SWINHOE. The tarsus is also said to be shorter. Brehm’s collection ought to be brought to light some day and his types examined.

Herodias immaculata GOULD may possibly belong to the following species, but is probably distinct from both. We have Salvadori’s word for it that it is different from *H. garzetta* (Prodr. Orn. Pap. Mol., XII, p. 17, foot-note; Ann. Mus. Civ. St. Nat. Genova, XVIII, 1882, p. 334).

Individuals from Java, Borneo, and Celebes have been separated as *Herodias nigripes*,* on account of the toes being black and the basal half of the lower mandible light, and Walden refers the birds of the Philippine Islands to this race (P. Z. S., 1877, p. 703). In the true *H. garzetta* the toes are usually yellow, in strong contrast with the dusky tarsus, but Schlegel (Mus. P.-Bas, Ardeæ, p. 13) enumerates specimens from Japan, some with yellow toes and some with the toes dusky. It may be that both races meet in Southern Japan, but there is also a bare possibility that the dark-toed specimens belong to Swinhoe’s *H. eulophotes*.

Our museum possesses no Japanese specimen of the Little Egret, which, therefore, is one of our desiderata, and I am unable to say whether Schlegel’s remark that specimens from Japan, as a rule, are smaller than those from Europe holds good. The few measurements of European specimens below may help in solving this question. I add the dimensions of a specimen from Pegu, apparently belonging to *A. nigripes*, to show that they differ in nowise from the true *H. garzetta*.

Measurements.

I.—HERODIAS GARZETTA.

U. S. Nat. Mus. No.	Collector and No.	Sex and age.	Locality.	Date.	Wing.	Tail feathers.	Exposed culmen.	Commissure.	Tarsus.	Middle toe with claw.
109834	Ruiz	♂ ad..	Sevilla, Spain...	May 26, 1869	265	92	85	100	98	73
9657	v. Müller	♂ ad..	“Europe”	Aug. 15, —	290	110	.....	.....	105	76
57013	Schlüter, 1052.	+♂ ad..	Hungary	May 17, —	278	99	82	98	98	70

II.—HERODIAS GARZETTA NIGRIPES.

95926	Oates	♂ ad..	Pegu	Sept. 30, 1880	292	99	83	100	100	73
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* 1840.—*Ardea nigripes* TEMMINCK, Man. d’Orn., 2 ed., IV, p. 377 (*nom. nud.*).—*Herodias n.* WALDEN, Tr. Zool. Soc., VIII, p. 99 (1872).—W. BLASIUS, Journ. f. Orn., 1882, p. 253.—*Id.*, Zeitschr. Ges. Orn., 1885, p. 316.
1876.—*Ardea garzetta* var. *nigripes* BRÜGGEMAN, Abh. Natur. Ver. Bremen, V, p. 96.

[*Herodias eulophotes* SWINH.]

- 1860.—*Herodias eulophotes* SWINHOE, Ibis, 1860, p. 64.—*Id.*, *ibid.*, 1863, p. 418.—*Id.*, P. Z. S., 1863, p. 320.—HUME, Stray Feath., VI, 1878, p. 478.—*Ardea e.* SCHLEGEL, Mus. P.-Bas, Ardeæ, p. 29 (1863).
 1853.—*Herodias melanopus* BLYTH, Journ. As. Soc., XXII (p. 437) (*nec* WAGL.).
 1865.—*Herodias immaculata* BLYTH, Ibis, 1865, p. 37 (*nec* Gould?).
 1877.—*Ardea candidissima* subsp. *eulophotes* REICHENOW, Journ. f. Ornith., 1877, p. 274.

I have included the present species, which was originally described from Amoy by Mr. Swinhoe, because it is quite probable that it may occur, at least occasionally, on Japanese territory. It is as yet but imperfectly known, and specimens are found only in very few collections.

Swinhoe's original description (Ibis, 1860, p. 64) reads as follows :

This differs from *H. garzetta* strikingly in having a yellow bill, full-crested occiput, and shorter legs. It is a rare and solitary species. Length, 27 inches [686^{mm}]; wing, 9.25 [235^{mm}]; bill, from tip to gape, 3.75 [95^{mm}]; tarsus, 3.00 [76^{mm}]; naked part of the tibia about 1.75 [44^{mm}]; middle toe, 2.25 [57^{mm}]; its claw, .25 [6.4^{mm}]. Legs, greenish black; feet, olive-brown, patched in places with yellow. Bill, orange-yellow, becoming flesh-colored and purplish in the lores and around the eye. Irides pearl-white. A number of loose feathers spring from the occiput, forming a full ornamental crest, the highest ones being longest and measuring 4½ inches [114^{mm}] each, the length diminishing gradually in the lower ones. Long loose feathers also spring from the lower neck, as also from the back, whereas in *H. garzetta* they become decomposed into hair-like silky webs curling upwards at their ends. This bird appears to have considerable affinity with *H. candidissima* of N. American ornithology.

He afterwards met with it in Northern Formosa, where he found it "pretty common on the Tamsuy River, being frequently seen in parties of four and five, and occasionally in company with the *H. garzetta*." I transcribe some of his remarks in regard to the Formosa birds (Ibis, 1863, p. 418) :

I procured both males and females of this species at Tamsuy. The female is a little larger, but they are not otherwise to be distinguished. This Egret has a fine clear yellow bill in summer, becoming tinged with brown in winter. Its cere is tinged with green and purple; its irides light pearly yellow. Its legs are in summer black, in winter greenish brown; its feet and claws are greenish yellow. From *H. garzetta* it can at all seasons be distinguished by its light and shorter bill, and by its much shorter legs; but in summer its fine full crest marks it at once as different, as well as the scantiness of the dorsal plumes, which do not, as in that species, exceed the tail, and turn feathering upwards. It has considerably more affinity with *H. candidissima* of America; but that bird is of different proportions, and has a black bill and feet. This bird, in common with most of the Heron tribe, loses its crest early in August; and the other nuptial plumes are then much worn and scanty, and soon drop away. The breeding season is then over.

In regard to the alleged close relationship to *H. candidissima* it may be remarked that the resemblance is only confined to the fact that both have the occipital crest composed of a great number of plumes. In other respects *H. eulophotes* differs even more from its American cousin than from *H. garzetta*. In fact so close are its affinities with the latter

that it is difficult to point out a structural character which will separate the two forms at all seasons. The measurements given by Swinhoe would seem to furnish such characters, but Schlegel (*l. c.*) has recorded the dimensions of another Formosan specimen collected by Mr. Swinhoe, which throw doubt on the accuracy of the former and on their value as distinctive characters.*

Mr. A. Hume (*l. c.*), in his "Key to the White Herons of India," is under the impression that *H. eulophotes* has the dorsal plumes of exactly the same structure as those of lower end of the fore neck, and Swinhoe's description of 1860 certainly justifies such an impression. But the wording of this author's remarks in his two papers in 1863, quoted in the synonymy above, is less explicit in this respect, and I have reasons to believe that in reality the fully developed dorsal plumes are quite decomposed, though considerably less so than in *H. garzetta*.

SMITHSONIAN INSTITUTION, March 30, 1887.

* The dimensions of a male collected April, 1862, in Formosa are given by Schlegel as follows: Wing, 10 inches [Pied du Roi, 271^{mm}]; tail, 3 inches 1 line [84^{mm}]; tarsus, 3 inches 4 lines [90^{mm}]; naked portion of tibia, 2 inches [54^{mm}]; middle toe, 2 inches 1 line [54^{mm}]; bill, 3 inches 2 lines [86^{mm}]; nuchal plumes, 3 to 4 inches [80 to 108^{mm}].



Stejneger, Leonhard. 1887. "Review of Japanese birds. V..Ibises, storks, and herons." *Proceedings of the United States National Museum* 10, 271–319.

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