

*Biziura**lobata*, Australian Musk Duck

Aberrant Species

*Thalassornis**leuconota*, African White-backed Duck*Heteronetta**atricapilla*, Black-headed Duck

7. TRIBE MERGANETTINI. TORRENT DUCKS

*Merganetta**armata*, Torrent DuckGENERA RECOGNIZED BY PETERS AND SYNONYMIZED HERE*Arctonetta* = *Somateria**Asarcornis* = *Cairina**Casarca* = *Tadorna**Chaulelasmus* = *Anas**Chen* = *Anser**Cheniscus* = *Nettapus**Chenopsis* = *Cygnus**Cygnopsis* = *Anser**Dendronessa* = *Aix**Eulabeia* = *Anser**Lophodytes* = *Mergus**Mareca* = *Anas**Mergellus* = *Mergus**Metopiana* = *Netta**Nesochen* = *Branta**Nesonetta* = *Anas**Nomonyx* = *Oxyura**Nyroca* = *Aythya**Oidemia* = *Melanitta**Philacte* = *Anser**Polysticta* = *Somateria**Pseudotadorna* = *Tadorna**Pteronetta* = *Cairina**Salvadorina* = *Anas**Spatula* = *Anas*

GENERA RECOGNIZED HERE BUT NOT BY PETERS

Amazonetta von Boetticher (for *Anas brasiliensis*)*Lophonetta* Riley (for *Anas specularioides*)

COMPARISON OF CHARACTERS

Our studies have shown that the waterfowl can be divided into about nine groups that are fairly well defined both morphologically and biologically. In addition, there are a number of species and genera that are either intermediate between the otherwise well-defined tribes (e.g. *Coscoroba*) or too poorly known for a safe classification (e.g. *Anas specularis*, *Anas leucophrys*, *Malacorhynchus*, *Tachyeres*); others show peculiarities or a combination of characters that prevent them from fitting well into any of the existing groups. Such genera as the Australian *Cereopsis*, *Anseranas*, *Stictonetta*, and *Chenonetta* could either be made the sole representatives of so many separate tribes or each could be included in the tribe with which it shares the greatest number of similarities. For the sake of convenience we have adopted the latter course, but without forgetting that these genera are not typical representatives of the tribes with which we associate them.

Table 1 lists the more important characters used in our classification of the duck family. Obviously it is impossible in the limited space provided by a table either to describe all characters in detail or to list all the exceptions. The subsequent paragraphs contain some of the information which could not be included in the tabulation.

MORPHOLOGICAL CHARACTERS

As noted above, one of the most fundamental characters in the duck family is the pattern of the tarsus. All species of the subfamily Anserinae have the front of the tarsus reticulate, but in the Anatinae only the aberrant species *Cereopsis*, *Anseranas*, and *Stictonetta*, all of Australia, show this primitive attribute.

The structure of syrinx and trachea⁹ is fairly uniform within each tribe. No special structures are found in the trachea (or syrinx) of the geese, most swans, *Coscoroba*, or *Cereopsis*. The Whooper-Whistling Swan group has the trachea looped through the sternum in both sexes. In *Anseranas* (Cairinini) a large double loop of the trachea is found between the left breast muscle and the skin. This loop is considerably smaller in the female.

The whistling ducks (*Dendrocygna*) have a bulla which consists in an enlargement and ossification of the lower end of the trachea. It is less pronounced in the females.

Most of the Anatinae have strong sexual dimorphism of the vocal apparatus. The male has an asymmetrical bony bulla of the syrinx, big on the left side, small or absent on the right. This structure is absent in the females. Exceptions to this occur in most of the tribes. In *Tadorna tadorna* (and in no other species of this genus) the right bulla is larger than the left. In *Mergus merganser* and *M. serrator* the bulla is exceptionally large. In some Cairinini (e.g. *Sarkidiornis*, and *Plectropterus*), in *Neochen jubatus*, and in two species of scoters it is very small; in *Melanitta nigra* the bulla is absent.

The trachea shows special bulbous inflations among the Anatini (*Anas versicolor*, *Stictonetta naevosa*), the Aythyini (*Netta rufina* and *N. peposaca*), and particularly among the Mergini (*Bucephala*, some species of *Mergus*, *Melanitta*). The bronchi are elongated and inflated in *Melanitta fusca* and in *Somateria*. Oxyurini have no bullae, but their bronchi are inflated; they have curious tracheal or esophageal air sacs. As with all taxonomic characters, the structure of the syrinx sometimes varies independently of the system. This is true particularly in the genera *Cygnus*, *Tadorna*, *Melanitta*, and *Mergus*. Differences in the structure of the syrinx occur in these genera at the species or even at the subspecies level.

⁹ The trachea (and syrinx) of many ducks is still unknown. Collectors should therefore save the syrinx of all the specimens to which they have access. The method of preservation is extremely simple. It consists in cutting off the bronchi from the lungs (below the last bronchial ring) and severing the larynx from the throat. The structure should then be submerged in a solution of peroxide (or if that is not available, in alcohol or any other preserving fluid) until bleached, and finally be stretched and mounted by gluing or wiring it against a cardboard. This will protect the structure against breaking after it has dried.

TABLE 1
COMPARISON OF CHARACTERS IN THE ANATIDAE

SUBFAMILY	ANSERINAE		ANATINAE						
	ANSERINI	DENDROCYGNINI	TADORNINI	ANATINI	AYTHYINI	CAIRININI	MERGINI	OXYURINI	MERGANETINI
TRIBES									
MOLTS	Two (with a few exceptions)								
ADULT PLUMAGE	Usually plain	Elaborate	♂ like or unlike ♀ Speculum common		♂ unlike ♀ Nonmetallic speculum	♂ like or unlike ♀ Metallic colors present	♂ very unlike ♀ Nonmetallic speculum common	♂ like or unlike ♀ No speculum	♂ very unlike ♀ Metallic speculum
PATTERN OF DOWNY YOUNG	Faint or absent	Strong unique	White and gray	Strong, Usually yellowish	Usually yellowish	Usually white and black	Usually strong	Indistinct	Distinct
FRONT OF TARSUS	White and brown	Pale line across nape	White and black (or gray)	Fine eyeline	Eyeline absent or faint	Variable line back of eye	Usually white and black	White and brown (or fuscous)	White and black Dark eyeline Dorsal spot
SYRINX AND TRACHEA	No bulla	Small symmetrical	(except in <i>Cereopsis</i>)	<i>Sitotmetia</i>	Large asymmetrical bulla in ♂ (bulla, only partly ossified)	Variable loop in (<i>Anseranas</i>)	(variable trachea, often inflated)	No bulla	Unknown
VOICE	♂ like ♀				♂ unlike ♀. Voice of ♀ often louder				
DISPLAY	Simple. Alike in ♂ and ♀				Unlike in ♂ and ♀. Elaborate pair-formation displays common				
PAIRING, PARENTAL CARE	Pair for life.	♂ shares care of young	♂ (railways) incubates	(except some widgeons)	♂ leaves ♀ when clutch is complete (no pairing in 2 genera)				Pair for breeding season (life). ♂ shares care of young
LOCATION OF NEST	rarely on ledges or in old nests	sometimes in tree holes		in trees (5 species)	except 2 genera	Holes in trees (or hidden on ground)			On the ground: in marshes among rocks and bushes
HABITUAL DIVING	Absent	Present		Absent except in: <i>Tachyeres</i> , <i>Hymenolaimus</i>	Present	Absent		Present	
CHIEF FOOD		Vegetable except: <i>Tachyeres</i>			Varies with season	Vegetable	Animal	Vegetable	Animal

Although the presence or absence of a double molt seems to constitute a first-class criterion of relationship, the presence of a distinct eclipse plumage in males of the double-molting species is of very little significance. Birds inhabiting the colder regions usually have two very different seasonal plumages, while those living in or near the tropics look the same the year round. As in other families, there are, of course, a few exceptions to this rule.

DOWNY YOUNG

The downy young in most of the nine tribes have a very characteristic pattern and can often be identified as to tribe. Body posture and proportions are also often typical for a tribe. For example, in the Tadornini, and even more in the Cairinini, the insertion of the legs is rather far forward; in the Mergini and particularly in the Oxyurini it is far back. The tails are long in the Cairinini and in most Mergini, and stiffened in the Oxyurini and Merganettini. In the length of the neck and shape of the head there are also characteristic differences between the various tribes. As far as the plumage patterns are concerned, the following short remarks may be useful in conjunction with the semi-diagrammatic drawings (Figures 14–23)¹⁰. We have refrained from showing the downy young of any of the more common ducks. North American species are figured by Kortright (1942), European by O. and M. Heinroth (1928), in addition to illustrations found in other standard works (Phillips, Witherby, etc.).

Anserini. Plumage pattern absent or faint. When present (*Branta*), it is similar to that of the Anatini, consisting of two lateral spots on the back. There is occasional indication of a dark stripe through the eye (*Anser*). The ground color is usually white, but it is yellowish in some species of *Branta* and *Anser*.

Dendrocygnini. This tribe is characterized by a light line across the occiput, which extends under the eye to the bill. There is a broad dark line through the eye and a light line above it. There are three or four lateral spots on the upper parts. The ground color is either yellowish (e.g. *autumnalis*) or grayish white (e.g. *guttata*, *bicolor*). The same pattern, though showing only faintly, is found in *Coscoroba*. In *guttata* and *eytoni* (Figures 14 and 15) there is a white stripe along the side of the back.

Tadornini. Birds of this tribe are characterized by a conspicuous pattern with sharp contrast (Figures 9 and 10). The upper parts are dark (black or gray), sometimes forming a cap on the head (Figure 16. *Tadorna ferruginea*). There are bold white spots on wing and back, often fusing into a longitudinal stripe. In *Chloëphaga* there is great

¹⁰ The excellent semi-diagrammatic illustrations of the downy young were drawn by Alexander Seidel whose services we gratefully acknowledge.

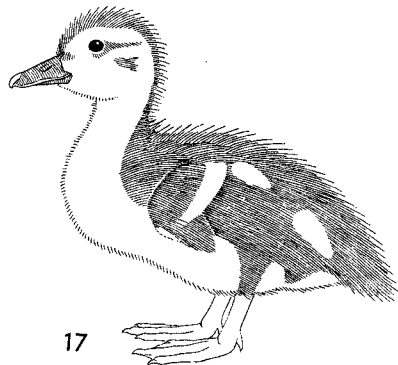
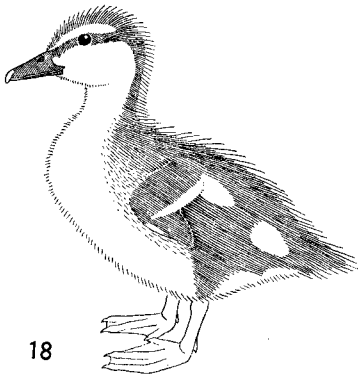
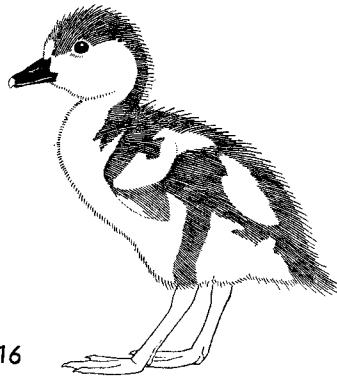
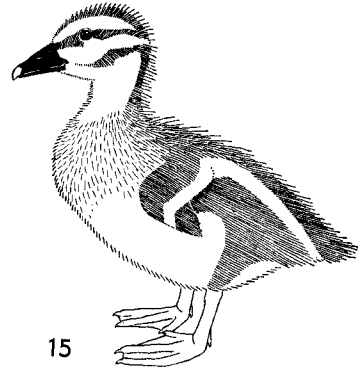
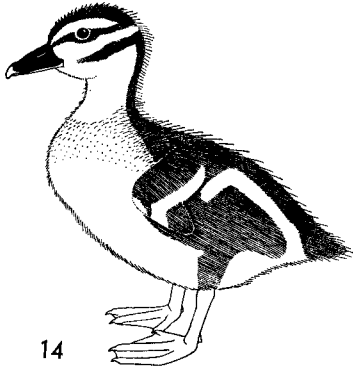


Figure 14. Spotted Whistling Duck, *Dendrocygna guttata*.
Figure 15. Plumed Whistling Duck, *Dendrocygna eytoni*.

Figure 16. Ruddy Sheldrake, *Tadorna ferruginea*.
Figure 17. Salvadori's Duck, *Anas waigiensis*.
Figure 18. Ringed Teal, *Anas leucophrys*.

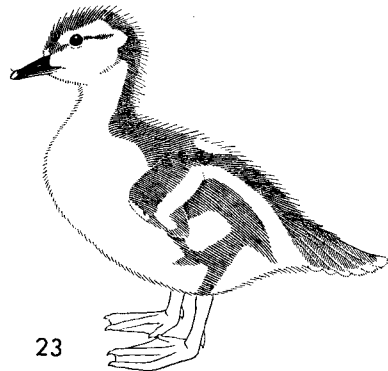
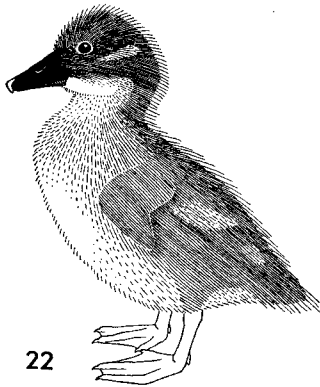
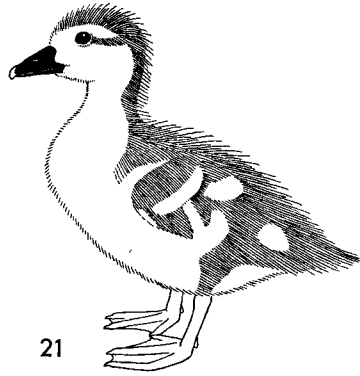
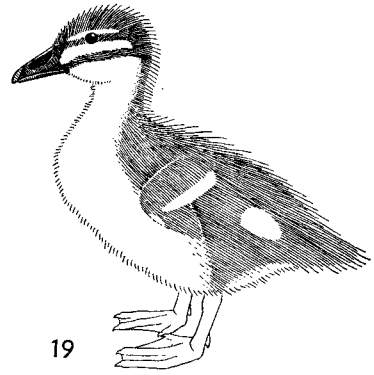
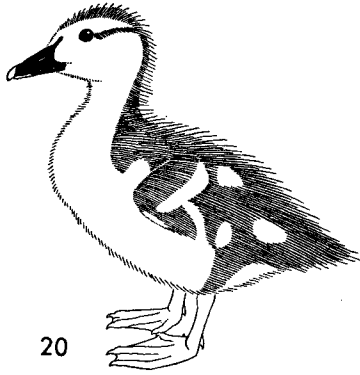


Figure 19. Maned Goose, *Chenonetta jubata*.
Figure 20. Muscovy Duck, *Cairina moschata*.
Figure 21. Spur-winged Goose, *Plectropterus gambensis*.

Figure 22. Southern Stiff-tailed Duck, *Oxyura australis australis*.
Figure 23. Torrent Duck, *Merganetta armata colombiana*.

variability. Broad white superciliary stripes narrow the dark crown in *picta* to a medial stripe from bill to back. The downy young in *Cereopsis* (Figure 7) is very similar, but it has a black facial mask and very little white on the wing.

Anatini. There is great uniformity of pattern in this tribe, the downy young of all species resembling more or less those of the Mallard. There are two lateral spots on the back, and the ulnar edge of the wing is light. A dark line through the eye is apparently always present, though sometimes interrupted as in *Anas waigiuiensis* (Figure 17). Although the adult of *Anas leucophrys* shows many striking peculiarities, the downy young (Figure 18) is much like those of typical species of *Anas*. The ground color is usually pale yellow or yellowish-cinnamon, rarely whitish.

Athyini. The basic pattern of the downy young of the pochard tribe is similar to that of the Anatini. The yellow wash is usually much stronger, and the dark line through the eye inconspicuous or absent. Young scaup are rather dark, and the size of the spots on the back is reduced. Young Tufted Ducks are blackish.

Cairinini. All perching ducks have a contrasting pattern which is in general fairly similar to that of the Anatini but varies from species to species. There is a very variable dark stripe from the eye to the nape. In *Chenonetta* (Figure 19) and *Aix galericulata* there are two parallel dark lines across the face. There is some white at the ulnar edge of the wing and usually two or three rather small lateral light spots on the back. The ground color is usually yellow, sometimes white (*Nettapus*). The downy young in *Sarkidiornis*, *Cairina* (Figure 20), and *Plectropterus* (Figure 21) are similar to one another.

Mergini. Two major plumage patterns are found among the downy young of this family. The eiders (*Somateria*) have a simplified plumage, dull gray-brown above with white breast and belly. Common and Surf Scoters are similar, but more blackish, with an indication of white cheeks and of a dark cap. The White-winged Scoter, Oldsquaw, and Harlequin lead to the typical *Bucephala* pattern. It is boldly black and white. A blackish cap, extending to a line well below the eye, contrasts with the white cheeks. The ulnar edge of the wings and two or three lateral spots on the back are white. The mergansers (*Mergus*) are essentially similar, except that the sides of the face are washed with rufous. Some have a light superciliary.

Oxyurini. The stiff-tailed ducks have a rather aberrant pattern of down; it is indistinct, brownish (or fuscous) and white. (Figure 22. *Oxyura australis*.)

Merganettini. The downy young of *Merganetta* is black and white with a dark line through the eye. It is unique in having long tail

feathers and a central white spot on the back. The pattern gives no clue to the relationship. (Figure 23. *Merganetta armata colombiana*.)

BIOLOGICAL CHARACTERS

Biological characters are of paramount importance to the classifier, for habits and behavior are certainly deeply rooted and are often the product of a very ancient evolution. In the present family the main points are pair formation, displays, nesting, and feeding habits.

Pair formation and parental care. The pair is a well-knit unit in the Anserini, Dendrocygnini, and Tadornini. In all three tribes the two sexes seem to pair for life, both mates share in the raising of the young, and in some species (*Dendrocygna*, *Cygnus atratus*) the male participates even in incubation. In the stiff-tailed ducks (Oxyurini) and certain widgeons, the male helps in raising the young, but it is as yet unknown whether or not the two sexes are paired for life. In most of the ducks (e.g. most Anatini, all Aythyini, most Cairinini, and all Mergini), male and female pair only for the nuptial season. The drake leaves the duck soon after the beginning of incubation. Random fertilization without pair formation seems to occur among certain genera of Cairinini (*Cairina*, *Sarkidiornis*). Merganettini appear to live in pairs, both sexes taking care of the young.

Courtship and displays. The chronology and significance of display in the Anatidae are still not well known. Roughly there are three main phases of courtship: (a) The prenuptial or pair-formation period. During this period one usually sees small troupes of males perform before one or several females. Finally a single male and female become paired and separate from the rest of the flock. (b) The nuptial period. During this period, which lies between pair formation and egg laying, there is commonly less display. The individual display postures are usually the same as in Phase *a*. Among the Anatini, Aythyini, Oxyurini, the pair-forming Cairinini, and most of the Mergini, the males have elaborate display postures, which, particularly during Phase *b*, are usually answered in a simplified manner by the female. The female often takes the initiative in the display of certain Tadornini, while among certain Cairinini there is no regular display, but merely a pursuit of females by males. (c) Sexual period. Copulation is preceded among swans, geese, and certain ducks by rather elaborate preparatory performances.

Hochbaum (1944) may be consulted for an excellent description and analysis of the phases of courtship among the migratory species of the northern hemisphere, which do not mate for life. Different sequences exist in species that pair for life, in sedentary species which pair on the breeding territory, and in non-pairing species such as Muscovies. However, little accurate information on these is available.

Among the most controversial phenomena of duck behavior are the pursuit flights, so often observed during the courtship season, particularly in the genus *Anas*. Usually a single duck is pursued by two drakes, but sometimes three or four drakes join the chase. Such flights are customarily referred to, even in the most recent literature, as "sexual flights" or "courtship flights." Heinroth (1910, 1911) was the first to point out that these flights take place when a paired female is chased by a different male. The mate of the pursued duck joins the chase in order not to lose sight of her. That these flights are actually territory-defense flights was discovered by Geyr (1924), whose findings have been confirmed by Hochbaum (1944). The pursuing drake is the owner of a territory and defends it by attacking and chasing the female of intruding pairs. True "sexual flights" of the members of a pair also occur, but more rarely. It is certain that most of the pursuit flights described in the literature have nothing to do with pair formation. In addition to these pursuit flights, certain aggressive postures are taken during territorial defense by swimming birds.

Nesting habits. There are four main types of nests in the duck family: (a) open nests on the ground, the prevailing type of nest in all tribes of ducks, except the Cairinini and Mergini; (b) open nests raised above the ground (on rocky ledges, tree stumps, old nests of other birds), the regular or occasional form of nesting among Anserini (*Branta*), Dendrocygnini, Anatini (all *Anas* of the *gibberifrons-castanea* group, *platyrhynchos*, *flavirostris*, *leucophrys*); (c) concealed nests, on the ground under rocks, or in holes in the ground, found in Tadornini (*Tadorna*), Merganettini, and Mergini (*Somateria*, *Melanitta*, usually *Histrionicus*, *Clangula*, *Bucephala islandica*, *Mergus serrator* and ? *M. australis*); (d) holes in trees, found in Dendrocygnini (? which species), Tadornini (*Tadorna radjah*), Anatini (*Anas gibberifrons-castanea*, probably *A. leucophrys*), Cairinini (all except *Anseranas* and *Plectropterus*, which nest on the ground), and Mergini (most species of *Mergus*, *Bucephala*, sometimes *Histrionicus*).

Food and feeding habits. All species of Anatidae, except the Mute Swan, have occasionally been observed to dive when pursued, when bathing, or under other special circumstances. Regular diving in connection with feeding occurs only in five of the nine tribes: Dendrocygnini, Aythyini, Mergini, Oxyurini, Merganettini, and in some of the aberrant genera (*Tachyeres*, *Hymenolaimus*). The prevailing food of most Anatidae is vegetable, and the shape of the bill is usually closely correlated with the type of food obtained. Grazing kinds, such as *Anser*, *Branta*, *Cyanochen*, *Chloëphaga*, and *Cereopsis*, have a "goose"-like bill. Species that sift their food from the surface of the water have a broad bill with strongly developed lamellae, as in *Malacorhynchus*, *Anas aucklandica chlorotis*, and the shovellers. The mergansers (*Mergus*), the only ducks that have evolved into habitual

fish eaters, have a long narrow bill with "teeth," especially adapted to catching this type of food. The bill seems to be the most plastic of all the morphological characters of ducks, differing strikingly even among close relatives.

STERILITY

It is generally stated that in the duck family hybrids from crosses within the same genus (or even from crosses of related genera) are usually fertile. The problem, however, is not so simple, and there are any number of intermediate degrees between complete fertility and complete sterility. Fertility is sometimes limited to one sex, to a few exceptional cases, or to the production of non-viable gametes in the gonads. This question has been studied by Poll (1911) and by Ghigi, who has made most of his experiments with game birds and pigeons. It appears that the degree of fertility of hybrids is a fairly reliable clue to relationship, but its significance varies a good deal among the various groups, and there are numerous striking exceptions. Such are, for example, the usually sterile crosses between most species of Cairinini. *Anas penelope* produces sterile hybrids with *A. platyrhynchos*, while those from *A. penelope* with *A. strepera* are fertile, as are also those from *A. strepera* with *A. acuta*. Yet *A. penelope* and *A. acuta* have sterile offspring (Poll, 1911). A common hybrid is *A. sibilatrix* × *A. georgica spinicauda*; it is generally sterile, but we had one case at Clères of such a hybrid female producing young with a drake *spinicauda*. The gonads of hybrid *Anas bahamensis* (Anatini) with *Amazonetta brasiliensis* (Cairinini) and of hybrid *Anas leucophrys* (?Anatini) with *Amazonetta brasiliensis* have been found fully functional by Poll. Yet numerous specimens of the former cross obtained at Clères never produced any offspring; they showed much sexual activity, and the females laid, but the eggs were abnormally small, and did not develop. Phillips reports that hybrids *Anas leucophrys* × *Amazonetta brasiliensis* were sterile. Most crosses within the genera *Anser* (except those involving *cygnoides*) and *Branta* are fully fertile, but hybrids from crosses between *Anser* and *Branta* are sterile.

SEROLOGY

A few preliminary studies by serologists (Sokolovskaia, 1936) fully confirm the findings of the taxonomist. *Cairina* is found to be not distantly related to *Anas*, and *Alopochen* to be closer to *Anas* than to the geese. "The Chinese Goose [*Anser cygnoides*] and the Gray Goose [*Anser anser*] give in all cases a completely homologous reaction. It permits us to assume that the Chinese Goose should be placed in the genus *Anser* and not be separated generically."

EVOLUTION AND DISTRIBUTION

The fact that the duck family is so rich in aberrant and primitive genera (many of them restricted to Australia) indicates the great age

of this family. However, this is by no means proof that evolution has come to a standstill. Many genera, particularly *Branta*, *Anser*, *Tadorna*, *Anas*, and *Aythya*, present convincing evidence of active speciation. Incipient speciation is evidenced by the occurrence of about 25 forms which, though we consider them subspecies, are sufficiently distinct to be listed as full species by other recent authors; nearly completed speciation is evidenced by the occurrence of at least 10 superspecies.

A special problem is posed by the isolated island populations. How did subspecies of a pintail, *Anas acuta*, get to the Kerguelen (*eatoni*) and Crozet (*drygalskii*) Islands in the subantarctic ocean? How did a race of the South American Pintail get to South Georgia (*Anas g. georgica*), or a merganser (*M. australis*) to the Auckland Islands south of New Zealand, or a gadwall (*Anas strepera couesi*) to the Line Islands in the mid-Pacific? The answer is perhaps the arrival on these islands of "castaway" flocks of ducks which have strayed off their normal migration route. Significant in this connection is the report by F. C. Lincoln (1943, *Condor*, 45:232) of a pintail (*Anas acuta*) banded at Bear River, Utah, on August 15, 1942, and recovered with a flock of pintails on November 5, 1942, on Palmyra Island in the Line Island group, 1,100 miles south of Honolulu (3,600 miles from the place of banding). Most of the isolated island populations have developed into races characterized by smaller size and sometimes by darker coloration. This is true, in addition to the above-mentioned ones, of the mallard races *wywilliana* (Hawaiian Islands) and *laysanensis* (Laysan); also of *Anas a. aucklandica*, the Auckland Island form of the New Zealand Brown Teal (*Anas aucklandica chlorotis*).

The duck family presents numerous other interesting problems of distribution. In addition to the isolated island races, many species have very restricted ranges, e.g. Salvadori's Duck (*Anas waigiuenensis*) in the mountains of New Guinea, or some of the New Zealand and Madagascan species. However, even some of the mainland species have a rather limited range, e.g. the Pink-headed Duck (*Rhodonessa*) in parts of India, the Spectacled Eider (*Somateria fischeri*) on parts of the Arctic coasts, and the Cape Shoveller (*Anas smithi*) in South Africa. The opposite extreme is presented by species which show little or no geographical variation though their range extends over several continents. This is true not only for such Holarctic species as the Mallard, the Pintail, and the Gadwall, but also for certain tropical ducks. The Southern Pochard, *Netta erythrophthalma*, is found in tropical South America as well as in the whole southern half of Africa; the White-faced Whistling Duck, *Dendrocygna viduata* (tropical South America, south of the Sahara in Africa, Madagascar), and the Fulvous Whistling Duck, *Dendrocygna bicolor* (America, Africa, Madagascar, India, Ceylon, and Burma), are even more widespread. These are not strong-flying, migratory ducks, and the hy-

pothesis of trans-oceanic colonization therefore faces great difficulties. Every other theory so far presented is, however, even more unlikely.

HISTORY AND FUTURE DISCOVERIES

The accompanying diagram (Figure 24) give the dates of description of the 143 species of ducks. By 1850 only a handful remained undiscovered; the last three species to be described were *Anas waigiensis*, 1894 (mountains of New Guinea); *Aythya innotata*, 1894 (Madagascar); and *Tadorna cristata*, 1917 (Korea). The last-named species, in spite of its rarity, had been known since 1877, but had not been described because it was believed to be a hybrid. It is obvious

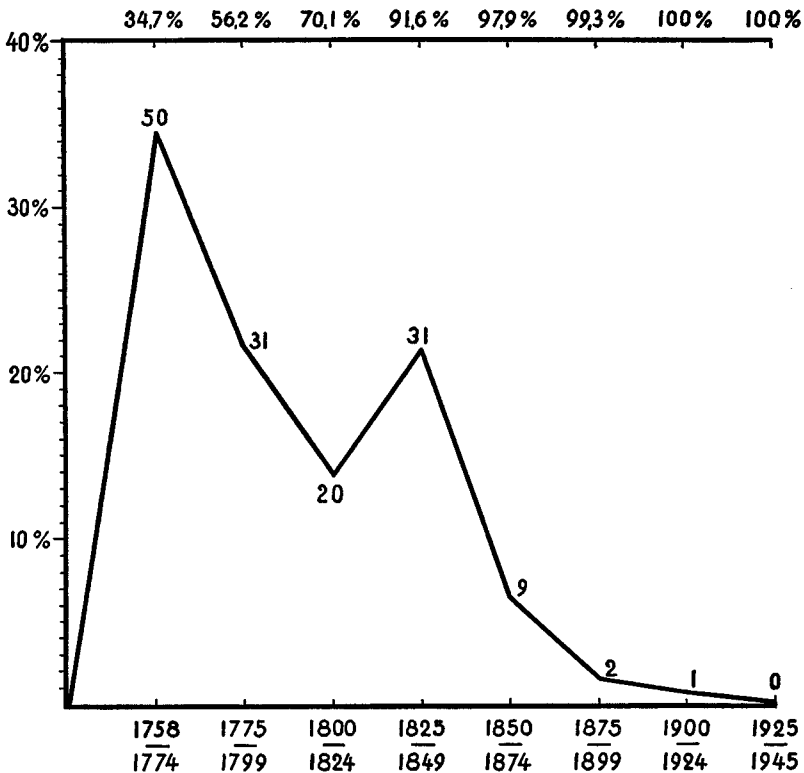


Figure 24. History of the discovery of the Anatidae. The figures on the graph give the number of species discovered in each period of time (their equivalent in percentage can be read from the scale at the left). The figures in the top line give the percentage of species known at the end of each period. More than a third of the species were known within 17 years after the beginning of zoological nomenclature (1758). By 1849 no less than 91.6 per cent of the 144 species were known. In few other families of animals was the discovery and description of species so largely completed in this early period.

from these dates that the probability of the discovery of additional species of Anatidae is very slight. In every respect except the inventory of the species, the family is still insufficiently known. Many of the downy young are still to be described, particularly those of the rarer, more aberrant species, such as *Heteronetta atricapilla*, *Stictonetta naevosa*, *Rhodonessa caryophyllacea*, and *Malacorhynchus membranaceus*. The internal anatomy of ducks is a completely neglected field. There are a few scattered reports on the anatomy of one or the other species, but no comparative study of the various tribes and subfamilies was ever undertaken. The trachea of many species is still unknown. In a survey of the literature (admittedly quick, and by no means exhaustive) we have failed to find the description of the vocal apparatus of such common ducks as the Hooded Merganser and Buffle-head, not to mention rarer birds, such as the Torrent Duck, the Blue Duck of New Zealand, the Crested Duck, Ringed Teal, Pink-headed Duck, and others.

The biology of the ducks is even less known than their morphology. It is remarkable how much new information Hochbaum (1944) was able to give on some of our most common ducks. The various phases of courtship, the relative frequency of various types of pursuit flights, the intensity of the bond between male and female, the possible share of the male in the raising of the young (widgeons, whistling ducks) are still very insufficiently studied. A golden opportunity awaits the student of these problems.

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