Birds

Reed Cormorant *Phalacrocorax africanus*
Darter *Anhinga anhinga*
White Pelican *Pelecanus onocrotaus*
Pink-backed Pelican *Pelecanus rufescens*
Grey Heron *Ardea cinerea*
Black-headed Heron *Ardea melanocephala*
Goliath Heron *Ardea goliath*
Purple Heron *Ardea purpurea*
Great White Heron *Egretta alba*
Little Egret *Egretta garzetta*
Yellow-billed Egret *Egretta intermedia*
Black Heron *Egretta ardesiaca*
Cattle Egret *Ardeola ibis*
Squacco Heron *Ardeola ralloides*
Rufous-bellied Heron *Butorides rufiventris*
Hammerkop *Scopus umbretta*
Openbill *Anastomus lamelligerus*
Saddlebill *Ephippiorhynchus senegalensis*
Marabou *Leptoptilos crumeniferus*
Wood Ibis *Ibis ibis*
Sacred Ibis *Threskiornis aethiopicus*
Glossy Ibis *Plegadis falcinellus*
African Spoonbill *Platalea alba*
Fish Eagle *Haliaeetus vocifer*
White-backed Duck *Thalassornis leuconotus*
African Pochard *Aythya erythrophthalma*
Yellow-billed Duck *Anas undulata*
Black Duck *Anas sparsa*
Cape Wigeon *Anas capensis*
Hottentot Teal *Anas punctata*
Red-billed Teal *Anas erythrorhynchos*
White-faced Tree Duck *Dendrocygna viduata*
Fulvous Tree Duck *Dendrocygna bicolor*
Pygmy Goose *Nettapus auritus*
Knob-billed Goose *Sarkidiornis melanotos*
Egyptian Goose *Alopochen aegyptiacus*
Spur-winged Goose *Plectropterus gambensis*
Red-knobbed Coot *Fulica cristata*
African Jacana *Actophilornis africanus*
Lesser Jacana *Microparra capensis*
Crowned Crane *Balearica pavonina*
Wattled Crane *Grus carunculatus*
Kittlitz's Sandplover *Charadrius pecuarius*
Three-banded Plover *Charadrius tricollaris*
Caspian Plover *Charadrius asiaticus*
Long-toed Plover *Hemiparra crassirostris*
Blacksmith Plover *Hoplopterus armatus*
Ethiopian Snipe *Gallinago nigripennis*
Curlew-Sandpiper *Calidris ferruginea*
Little Stint *Calidris minuta*
Ruff *Philomachus pugnax*
Common Sandpiper *Tringa hypoleucos*
Marsh Sandpiper *Tringa stagnatilis*
Greenshank *Tringa nebularia*
Wood Sandpiper *Tringa glareola*
Curlew *Numenius arquata*
Whimbrel *Numenius phaeopus*
Stilt *Himantopus himantopus*
Pratincole *Glareola pratincola*
Grey-headed Gull *Larus cirrocephalus*
White-winged Black Tern *Chlidonias leucoptera*
Whiskered Tern *Chlidonias hybrida*
Cape Wagtail *Motacilla capensis*
Yellow Wagtail *Motacilla flava*

Observations on some aberrant Australian Anatidae

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Summary

Field observations on the Pink-eared Duck, Freckled Duck, Musk Duck and Blue-billed Duck generally confirm earlier conclusions regarding the affinities of these birds. The Pink-eared Duck's vocalisations and displays suggest that it is an aberrant dabbling duck having surprising behavioral similarities to the typical shovelers that are probably the result of evolutionary convergence. The Freckled Duck exhibits a curious mixture of swan or goose-like anatomical and behavioral features that must be weighed against a duck-like bodily form. These conflicting and unusual features of the species suggest that it should be given tribal status in the subfamily Anserinae, or at the very least should be removed from the dabbling duck tribe, with which it shares almost no features. Observations on flight, sound production and sexual behaviour of the Musk Duck, and on molts and vocalisations in the Blue-billed Duck are included.

1 Studies (No. 366) from the Department of Zoology and Physiology of the University of Nebraska.

Introduction

It is difficult to describe the waterfowl of Australia without resorting to such terms as 'unique', 'remarkable', or 'incredible'. Although only 19 species are regularly found on that large continent, these include representatives of all the sub-families and tribes accepted by Delacour (1954–1964) except the sea ducks.

Of the 13 genera represented, six (*Anseranas*, *Cereopsis*, *Chenonetta*, *Biziura*, *Malacorhynchus* and *Stictonetta*) are essentially limited to Australia and are monotypic. The taxonomic positions of several of these have been disputed at various times. Thus, the Magpie Goose *Anseranas semipalmata* is generally regarded as representing a distinct tribe and subfamily, a conclusion supported by abundant anatomical (Boetticher, 1943, Miller, 1919, Delacour, 1954, Woolfenden, 1961), biochemical (Sibley, 1960, Tyler, 1964) and behavioral (Johnsgard, 1961) evidence. However, Davies and Frith (1964) have

recently advanced the theory that the Magpie Goose is possibly a typical goose that has been modified through the action of convergent evolution into its present form, a view which presently appears to have little supporting evidence. The Cape Barren Goose *Cereopsis novae-hollandiae* likewise exhibits a combination of sheldgoose-like features (Delacour, 1954) contrasted with anatomical and behavioral similarities to the true geese (Woolfenden, 1961, Johnsgard, 1961). The Maned Goose *Chenonetta jubata*, once included with the sheldgeese, s now generally agreed to represent a southern hemisphere perching duck. The Musk Duck *Biziura lobata*, although large and grotesquely wattled, clearly exhibits affinities with the typical stiff-tailed ducks (*Oxyura*). The shoveler-like Pink-eared Duck *Malacorhynchus membranaceus* has, in the absence of contradictory evidence, been usually regarded as an aberrant dabbling duck, and the same applies to the little-studied Freckled Duck *Stictonetta naevosa*.

Because neither of these two latter species has been kept in captivity outside Australia, and since there was such a paucity of behavioural information regarding them, I planned a trip to Australia for the primary purpose of learning whatever was possible regarding the behaviour and probable relationships of these birds. In addition, I wanted to observe and film the displays of the Musk Duck and Blue-billed Duck *Oxyura australis*, for, although some accounts of the behavior of these species do exist, I wanted to obtain detailed information for future comparison with the South American and African stiff-tails. My notes on the displays of the Australian stiff-tails will be published separately (Johnsgard, in press), and only some general observations on them will be made here.

Pink-eared Duck

The Pink-eared Duck is regarded as a reasonably common bird in southeastern Australia, and it occurs generally over the continent as well. It is highly nomadic, however, and numbers in a particular area may vary enormously from year to year. I observed several hundred Pink-ears on the Metropolitan Farm, 30 miles southwest of Melbourne on 13th July, and had under daily observation a flock of nearly 500 birds at Kangaroo Lake, near Kerang, northern Victoria, from 16th July to 7th August, 1964.

My first impression of the species was that the duck is smaller and stockier than I had visualized, and that the tail and rump are held quite high in the water while swimming, exposing a buffy undertail colouration that is quite conspicuous. Not all the birds exhibited such markedly buffy coloring, and I suspect that this variation must have sexual or seasonal significance, but I could not resolve this point. Aside from this, the strong vertical barring on the flanks sets the Pink-ear apart from all other Australian waterfowl, and its colloquial name, 'Zebra Duck', is an apt one.

Throughout my stay the Pink-ear remained by far the shyest of the ducks I observed. Repeatedly, large flocks would take to the air at the slightest disturbance, accompanied by a chorus of whistled alarm notes. The passing over of even such innocuous birds as the Australian Pelican *Pelecanus conspicillatus* would cause a general panic among the Pink-ears, and the first sight of any raptors was certain to produce the same effect. However, I was told by several persons that at times Pink-ears are amazingly tame, and will remain oblivious to human beings only 20 or 30 yards away.

Pink-ears fly extremely well, and are reminiscent of various small dabbling ducks in their agility and manoeuvrability. Indeed, the Grey Teal *Anas gibberifrons* is often associated with Pink-ears, and the two species exhibited much similarity in flight. The long, flap-tipped bill is conspicuous in flying Pink-ears, and is often tilted slightly downwards, while the wings alternately flash their white undersides and brown upper surfaces. No speculum is present, but the secondaries and inner primaries do have a pale whitish trailing edge. Another plumage feature visible in flight that I had not anticipated is the white crescent on the upper tail coverts immediately in front of the brown tail. This feature resembles the similar crescent patterns of whistling ducks and geese which, like the Pink-ear, lack specula or contrasting upper wing patterns. I therefore wondered if this plumage feature (which is not found in any other dabbling ducks) might be of significance in coordinating the flock movements of flying birds.

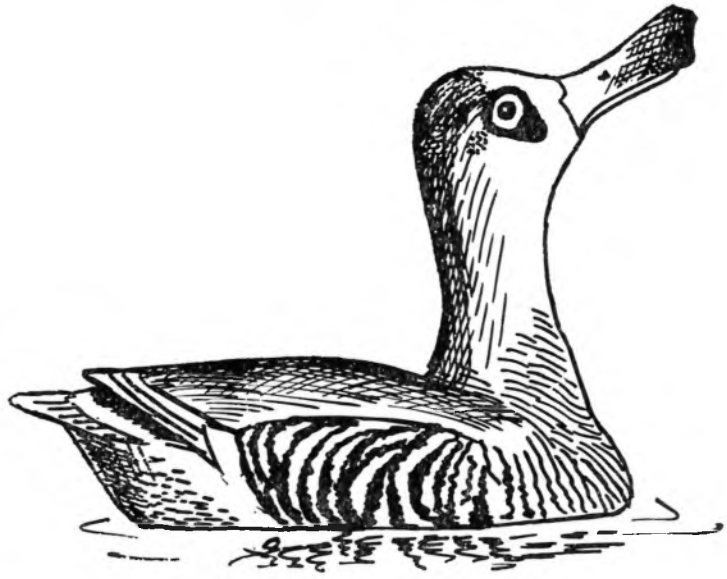
Because the birds called almost constantly in flight (and a flock of Pink-ears could often be recognized by sound long before they could be visually identified), it is almost impossible to describe the flight call as anything more than a clear, tittering whistle. I am uncertain whether both sexes can whistle, but at least the male has a pure whistled note. The trachea of the female shows no obvious specializations for whistling, but H. J. Frith informed me that the tracheal bulla of the male is very similar to that of the Grey Teal. Warham (1959) describes the male's call as a 'loud fluty

cry,' and that of the female as a purring note. I observed an apparent female utter a sharp, rapid series of 'Whe-he-he' notes towards another bird, which, although not a true whistle, was quite unlike the typical female dabbling duck calls.

Displays described in the literature for the Pink-ear fall into two categories: head-bobbing displays (Scott, 1958, Hobbs, 1957) and ritualised foraging displays (Shanks, 1953). Among the typical dabbling ducks, the shoveler group is noted for its conspicuous head-bobbing and 'mock-feeding' displays (Lorenz, 1951–1953), and I was therefore eager to compare the behavior of the Pink-ear with that of the typical shovelers.

I first observed the communal foraging of Pink-ears on July 16 at Kangaroo Lake, but I was never sufficiently close to the birds to film this interesting behavior pattern. In the typical shovelers, communal foraging (unritualised, and performed by both sexes at all times of the year) consists of several birds swimming head-to-tail, with each bird dabbling in the wake of the one before. Such foraging groups may become circular when the leading bird begins to follow the hindmost individual. Ritualised foraging, or 'mock-feeding', is performed by males to females and consists of apparent dabbling in front of or beside the female, without much forward swimming, and often terminated by calling or up-ending. In the Pink-ear, communal foraging takes a different form, for the birds tend to feed in pairs, and only rarely in trios or larger groups. Further, each bird tends to keep its body parallel to its partner, but turns its head towards its partner's tail, and the two birds forage in each other's wake as they rotate in a tight circle. Occasionally, even a single bird will attempt to feed in its own wake. This type of feeding is obviously most effective when performed by two birds, and thus accounts for the tendency of large flocks to break up into apparent pairs when foraging in this manner. However, it would be presumptuous to suggest that such foraging is totally lacking in social significance, for I often observed that when an 'outsider' attempted to enter such a feeding circle, there was a pronounced chin-lifting, clearly hostile, response from one or both of the participants. This upward bill-tilting (from 45 to 60 degrees above the horizontal), accompanied by neck-stretching and a series of rising 'we-we-we-we-we-whew' notes, closely resembled chin-lifting of shovelers and various other dabbling ducks. No lateral inciting movements were observed, and if an inciting display does occur in the Pink-ear, it probably has this same chin-lifting form as found in the shovelers.

Two probable male displays were observed. Sometimes, during a pair's foraging, a presumed male would suddenly draw its bill out of the water, stretch its neck into an erect posture, and momentarily hold this stiffened, alert position before resuming foraging. The posture reminded me of the 'At-attention' (Wall, 1961) display of various dabbling and perching ducks. This same erect posture was also often assumed after a curious bill-tossing call, which was performed only by birds I judged to be males. In this display the bird would toss its bill upwards and rapidly lower it while its neck was held vertical, and a hoarse and cat-like 'Who-



ee-oo' call was uttered. At times the call would be repeated once or twice in rapid succession. Although the call appeared frequently directed to presumed females, at other times it seemed to be uttered at random. Suggesting the possibility that this behaviour is a major pair-forming display is the fact that birds which uttered this call were often immediately attacked, or at least threatened, by other probable males. I also saw one possible male display performed as a presumed female swam past: a lateral head-shake (made conspicuous by the enlarged bill), followed by a dorsal preening in the region of the scapulars.

A few other behaviour observations might be of interest. Lateral head-shaking was the only pre-flight movement I observed. Upending was never observed by me, but two birds were seen to dive using opened wings) in the course of preening and bathing.

The Lowes have recently observed three copulations, involving two different pairs, which indicate that the species diverges markedly from *Anas* in its copulatory behaviour. In each case the male flew in from a distance and, as it landed about twelve yards from the female, greeted her with a loud flute-like whistle, to which the female replied similarly. The male immediately swam to the female and, with no apparent preliminary displays, mounted her. Following a rapid copulation both birds performed rapid, energetic dabbling and "head-tossing" movements (seven and ten in two cases counted), terminating with a single preening movement on the breast, wingflapping, and finally swimming about in small circles and up-ending as if feeding. How much of this postcopulatory behaviour represents actual display is uncertain, but in any case these observations suggest that a very distinctive copulatory behaviour exists in Pink-eared Ducks.

In summary, its behaviour suggests that the Pink-ear belongs in the large assemblage of dabbling ducks but that it is not necessarily extremely closely related to the typical dabblers. Although the body form, foraging adaptations, and, to some extent, the displays of the Pink-ear are reminiscent of shovelers, it is probable that these traits are simply splendid examples of convergent evolution in which similar ritualised behaviour patterns have evolved from independent evolutionary sources. Precopulatory behaviour has not yet been adequately described. Tom Lowe's observations suggest that an *Anas*-like precopulatory head-pumping is absent and that the postcopulatory behaviour may be unusual as well.

Freckled Duck

For nearly ten years I had cherished a dream of studying the Freckled Duck in life, for although this bird is among the least impressive of all the Anatidae in beauty, so little is known of its biology that I have long considered it the most important species of waterfowl to be investigated behaviorally.

My suspicions that the Freckled Duck was something other than just an aberrant dabbling duck were aroused by the skeletal studies of Verheyen (1953) who, in spite of his doubtful taxonomic interpretations, completed a fairly comprehensive survey of skeletal variations in waterfowl. He concluded that the Freckled Duck's anatomy was sufficiently distinctive to warrant 'family' status (corresponding in Verheyen's treatment roughly to the tribes of Delacour), but exhibiting affinities with both the whistling ducks and the pochards. The large number of 'primitive' features found in the Freckled Duck cannot be easily reconciled with the generally specialised characteristics of the dabbling ducks, and I was forced to conclude (1960, 1961a), that the species probably should be placed in the subfamily Anserinae, either in the Anserini or, more probably, in a separate tribe 'Stictonettini'. In the absence of available anatomical specimens, Woolfenden (1961) came to similar tentative conclusions, but felt that the whistling ducks might represent the Freckled Duck's nearest relatives. The contrasting downy plumages of the whistling ducks are highly distinctive and different from the weakly patterned or uniformly coloured young of swans and geese, but the absence of a description of the downy young of the Freckled Duck made this source of evidence unavailable until recently, when Frith (1964a, 1964b) described the downy plumage. Interestingly, the downy young of Freckled Ducks show no similarity to those of any dabbling ducks, but rather are a uniform silvery grey throughout. Among the ducks only the downy young of the Musk Duck nearly approaches that of the Freckled Duck, and the cygnets of Black and Mute Swans (*Cygnus atratus* and *C.olor*) are even more similar. Thus, additional evidence for including the Freckled Duck in the subfamily Anserinae is now at hand.

Although my major purpose in going to Australia was to locate the Freckled Duck, I had been forewarned by nearly everyone I contacted that the rarity of this species and its unpredictable movements precluded any real hope of locating wild birds. My optimism was further weakened upon

corresponding and talking with several of Australia's most active ornithologists, some of whom confided that they had never seen the species and politely wondered how I might not only locate it but also study its behaviour in the relatively few weeks I had at my disposal. Although a plea for assistance in locating Freckled Ducks had gone out from Roy Wheeler to the members of the Bird Observers Club of Victoria, no promising responses resulted, and I therefore decided to begin searching areas such as the Kerang region, where records of Freckled Ducks were fairly numerous and where Vic and Tom Lowe had promised to help me try to locate the species.

The Lowes had previously recorded Freckled Ducks in seven different months of the year, with a maximum number of 200 recorded in September 1957. Before my arrival some preliminary searches on their part had not produced any Freckled Ducks, and so it was without a high degree of optimism that we set out on 19th July to search in a few likely spots.

One promising place was Cullen's Lake, where Harry Wright of the Victoria Fisheries and Wildlife Department had observed a few birds some weeks previously. It was a cold, windy day, with periodic showers, and as we scanned the choppy waters I could see only Musk Ducks, Pink-ears and a few Grey Teal. After fruitlessly searching an area of shoreline and shallows well lined with protruding fence-posts (a favourite Freckled Duck roosting site), I suggested to Tom that we try counting the sex ratio of the Musk Ducks. As we walked up to the shore to improve our view, we flushed a large flock of ducks that had been resting in a shallow bay hidden from my vision. As the flock flew away I scanned it with unbelieving eyes; although the birds appeared nearly the size of Grey Ducks *Anas superciliosa* and were nearly as dark, I could see no trace of a metallic speculum. Tom ended my uncertainty with a shout that they were indeed Freckled Ducks! The flock of approximately 180 birds landed near the middle of the lake, but gradually swam back toward the lee shore. The birds remained in gradually declining numbers on the lake until I left the area on 7th August, by which time nearly all of them had dispersed and vanished. The following observations are based on this single flock, and include several points of doubtful significance, mentioned only because of the rarity of concrete information on the species.

General appearance

Although my first impressions of flying Freckled Ducks was to be reminded of Grey Ducks, I later decided that they have an even stronger similarity on the wing to Gadwall *Anas strepera*. Like Gadwall, they have a silvery white underwing lining and abdomen, contrasting with a rather uniformly dark breast, head and upper surface (but lacking the white speculum of the Gadwall). Their pattern of flight is generally like that of a dabbling duck, being both swift and somewhat erratic. The accompanying table shows the rate of wingbeats determined from cine footage for various conditions of flight, as compared with typical dabbling and whistling ducks. Although Frith (in Delacour, 1956) states that the wingbeat is normally slow and bittern-like, I did not find this to be the case. Rather, the rate of wingbeats is almost as rapid as a Mallard's (*Anas platyrhynchos*), and faster than a Fulvous Whistling Duck's (*Dendrocygna bicolor*). On the water the birds present a profile similar to that of a typical dabbling duck, with the tail held somewhat out of the water (but not nearly as high as in the Pink-ear). Except when alert and ready to fly, the head and neck are not held very high above the body; indeed, the birds generally present an impression of being rather sleepy, with the bill held only slightly above the level of the breast. The head appears surprisingly large, but this is the result of the elongated feathers in the occipital region, resulting in a short crest and a distinctly triangular head profile. This distinctive head profile is an excellent field mark for sitting birds, and allows for easy distinction from such species as Grey Ducks. Although the bill is high and robust

Table I. Rate of wingbeats in Freckled Ducks as determined from films

	total wingbeats	*total seconds*	*ave. wingbeats/second*
Freckled Duck			
losing altitude	58	7·7	7·5
sustained flight	91	11·4	8·0
taking off	41	3·9	10·6
Mallard			
sustained flight	75	8·7	8·6
Fulvous Whistling Duck			
sustained flight	47	6·8	6·8

at the base, the culmen profile is very concave, and the outer part of the bill is strongly flattened and almost spatulate. The nail is fairly sharp and, curiously, is slightly recurved as in the typical stifftails (*Oxyura*). In fact, the total bill shape is probably more like that of an *Oxyura* than of a dabbling duck.

Sexual differences are minor and did not allow me to determine the sex ratio of the flock. Birds that were undoubted males had a more distinct occipital crest, a tendency toward a blackish rather than brownish head (especially on the cheeks), and a variable amount of red on the bill. This last point is one which has been disputed (Frith, in Delacour, 1956), but there can be no doubt that a brilliant, sealing-wax red colour appears at the base of the bill (extending to a point just beyond the nostrils) of males during the breeding season. In the flock I observed, only two birds had brilliant red bills, while nearly 20 more had variable indications of red on the bill. Evidently the colour is retained for a very short time; Vic Lowe informed me that he has not observed it in hundreds of Freckled Ducks he has seen shot during the hunting season. This seasonal occurrence of bill colour is of interest, and it, plus the tendency of the male to assume darker, more distinctly crested head than the female's, belies the generality that Freckled Ducks do not exhibit sexual dimorphism. In this regard, therefore, they cannot be considered wholly typical members of the subfamily Anserinae (although some swans show slight amounts of sexual dimorphism). Mr. Harry Wright informed me that he believes the male loses its crest and blackish head during the non-breeding season, suggesting at least a partial double moult, which is also an anatine characteristic. Aside from the Freckled Duck, only some of the stiff-tails (*Oxyura* and *Heteronetta*) display a conspicuous seasonal variation in bill colouration, and the situation in the Black-headed Duck *Heteronetta atricapilla* is remarkably like that of the Freckled Duck. The male Black-headed Duck's bill is very similar in shape to that of the Freckled Duck, being high at the base, flattened at the tip, and with a recurved nail. Furthermore, it develops a bright orange to red colour at the base of the bill during the breeding season. Other notable similarities of males of the two species include their blackish heads, greyish to brownish body plumages, the absence of wing specula, and rusty-brown undertail coverts. The downy plumages, however, are very dissimilar, and the females are likewise quite unlike.

General Behaviour

The similarity of Freckled Ducks to dabbling ducks in flight has been mentioned, but I noticed that in leaving the water Freckled Ducks appear unable to spring directly out of the water in the manner of dabbling ducks, and instead run for several feet along the surface. By investigating my films I verified this behaviour and determined that in four cases that could be analysed up to nine steps (average seven) were taken while clearing the water. It is probable that variation does exist here, depending on wind velocity and urgency of take-off, but it was an unexpected observation and seems worth noting.

Although I observed Freckled Ducks flush literally dozens of times, often when frightened by Whistling Eagles *Haliastur sphenurus* or White-breasted Sea Eagles *Haliaeëtus leucogaster*, I never heard any alarm calls by any of the birds either while taking off or as they were milling about overhead. This is quite different from the situation in typical dabbling ducks, in which both sexes usually exhibit alarm calls.

Another surprising point was that, although Freckled Ducks were usually much more numerous than other species with which they associated, mainly Australian White-eyes *Aythya australis*, Shovelers *Anas rhynchotis*, Pink-ears, and Grey Teal, these other species seemed much more alert than the Freckled Ducks and were always the first to flush at the approach of possible danger. This evident tameness (or stupidity) of Freckled Ducks was impressed upon me the second day of my observations, when I proceeded to set up a wood and burlap blind along the shoreline some 100 yards from the birds' usual foraging area. Deciding that the only way to set up the blind was to march brazenly down and get the job done without regard for the likelihood of flushing the birds, I began to pound in the supporting stakes in full view of the entire flock. Although the Coots *Fulica atra* and other duck species had flushed at my first appearance, the Freckled Ducks remained, and about 30 of their number left the main flock and swam directly toward me, stopping and watching when they reached a distance of some 30 yards from me. I frantically finished the blind and disappeared behind it, at which time the birds lost interest and swam away in a leisurely manner! It is possible that this apparent stupidity is the main basis for the colloquial name 'Monkey Duck'; however, Harry Wright has suggested (personal com-

munication) that the tendency of the birds to climb out of water and perch on floating logs or flooded posts and timbers might also account for this name, which is commonly used by Victorian hunters.

During most of the day, the birds swam about in flocks of 50 or so near the middle of the lake, resting or sleeping and showing no interest in foraging. The lake is a shallow one, possibly ten feet deep at most, and has an extensive growth of aquatic plants which often break and drift in to form windrows along the shoreline. The only foraging I observed occurred very close to shore, while the ducks swam or stood in shallow water and immersed their bills just under the water's surface. I observed neither up-ending nor diving, but doubtless at least the former is used occasionally, since Hobbs (1957) reported upending by birds feeding in about two feet of water. Although the birds were obviously filter-feeding, I have no real idea of what they were consuming. H. J. Frith (personal communication) believes that Freckled Ducks feed largely on plankton-sized food particles. The flattened and concave-shaped bill may have functional significance here, by allowing the tip of the bill to filter-feed while still keeping the nostrils above water. While swimming from the middle of the lake to the foraging area along shore the birds showed a strong tendency to 'follow the leader', swimming in single file at a speed determined by the leading bird.

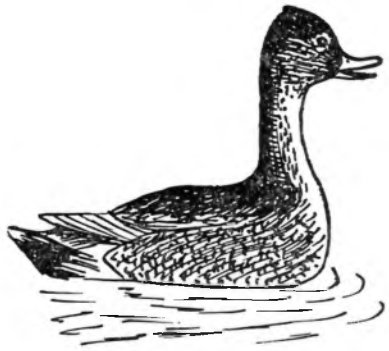
Although I did not personally observe nesting, some notes regarding nests and young were sent to me from Mr. Len Harvey. He mentions finding clutches of seven and nine eggs, and seeing three broods numbering from seven to nine young. In one instance, both parents were present with the young while in the other two, only the female was seen. Thus, it remains uncertain whether both sexes normally participate in incubation and brood care.

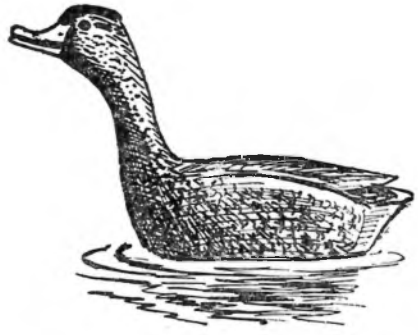
Vocalisations

Little has been recorded concerning the calls of Freckled Ducks. Delacour (1956) mentions only a pig-like grunt and a cat-like mewing note, and so I wanted to try to resolve this point. In spite of attentive listening on my part, it was not until 22nd July that Tom Lowe and I definitely identified a call as that of the Freckled Duck. This was a series of rather protracted, muttering notes, which we agreed was a 'hissing, raspy murmur', scarcely audible at a distance of over 30 or 40 yards. We also heard several sharper, flute-like calls which, we believed, emanated from the Freckled Ducks, but we couldn't locate the individuals responsible. H. J. Frith (personal communication) has also heard a number of different calls in his captive Freckled Ducks. It is certain, however, that Freckled Ducks are similar neither to dabbling ducks nor to whistling ducks in their vocalisations. Considering the almost complete absence of visual display structures, one is forced to conclude that auditory display specialisations must exist. There is a slight sexual dimorphism in the structure of the trachea, for although both sexes lack a tracheal bulla, the male does exhibit two enlargements of the tracheal tube (Campbell, 1899).

Sexual Behaviour and Displays

Considering the large number of birds under observation, the relatively long (three week) period they were studied, and the fact that, judging from bill colouration, at least some of the males were clearly coming into breeding condition, it might be expected that pair-forming activity would have been frequently observed. Yet, in spite of these favourable conditions, I saw very little that could be interpreted as pair-forming behaviour and thus was led to conclude that such activities must be poorly developed and inconspicuous at best in Freckled Ducks. An inconspicuous courtship is typical in the subfamily





Anserinae, for whistling ducks appear to lack elaborate 'courtship' postures, and among the geese and swans the 'triumph ceremonies' appear to play a major role in pair formation. In the true ducks of the subfamily Anatinae there is usually considerable dimorphism in the behaviour of the sexes, and variably complex displays are exhibited by the males.

In the Freckled Ducks I could see no indication of pair bond attachments between individual birds, and no tendency for small groups to separate out as courting parties, as might be expected among dabbling ducks. I particularly looked for, but failed to find, a female inciting display, which is of widespread occurrence in the subfamily Anatinae (Johnsgard, 1962). Likewise, I looked for evidence indicating the presence of a triumph ceremony similar to that of geese or swans, and the only clear-cut display I observed might possibly be interpreted as such. This display, seen on several occasions, is a rapid and extreme vertical neck-stretching, associated with gaping (and probably calling), performed by one bird towards another while facing it, and to which the other responds in the same manner. The display is preceded by forward neck-stretching and gaping by one bird toward the other, in what would appear to be hostile posture. In one case a red-billed male performed this display to an apparent female, who then responded by the vertical neck-stretching. This behaviour could most readily be interpreted as a mutual threat display, but it is similar in form to the triumph ceremonies of some swans and geese. The general absence of colour patterns on the wings and body and their concentration on the bill fits the supposition that Freckled Duck displays probably mainly involve head movements and possibly vocalisations, as in the triumph ceremonies of swans and geese. However, I did not observe prior attacks or threats towards other individuals of the type which usually elicit triumph ceremonies in swans and geese.

Unfortunately, no copulatory behaviour was observed, and a knowledge of copulatory displays, particularly precopulatory displays, would be of the greatest value in evaluating Freckled Duck relationships. Should a goose-like mutual head-dipping precopulatory display be present, this would strongly favour the hypothesis of anserine affinities, as would the occurrence of a mutual postcopulatory display. However, some of the true ducks exhibit head-dipping and mutual postcopulatory displays, and so even these findings would have to be viewed with caution.

In summary, although I believe that too many uncertainties remain to allow an unequivocal statement of the Freckled Duck's relationships, none of my observations suggest that the Freckled Duck is an aberrant dabbling duck, for it apparently exhibits none of the typical specialised behavioural features of that group. Furthermore, although much of what I observed could be interpreted as indicating that the Freckled Duck is an extremely generalised species with many primitive and apparently anserine features, there is no real justification for including the species in either the whistling duck tribe or that of geese and swans. Finally, and this came as a personal surprise, a few of the features of Freckled Ducks are reminiscent of the stiff-tails and particularly the Black-headed Duck. Therefore, I am led to the conclusion that the only reasonable taxonomic procedure is to erect a monotypic tribe (Stictonettini) for the Freckled Duck, and to include it within the subfamily Anserinae, as I first suggested in 1960. Nonetheless, the several obviously duck-like features of the species suggest that the bird is descended from stock that probably gave rise to the true ducks of the subfamily Anatinae, and particularly the stiff-tails. A detailed anatomical comparison of the Freckled Duck and the Black-headed Duck might shed some light on this possibility. Of greater importance than the simple relegation of this species to a convenient taxonomic niche is the need for a realisation of the Freckled Duck's evolutionary status as a surviving generalised form that needs to be studied further in all respects, and to the best of our abilities we should protect it from its present danger of extinction.

Musk Duck

The Musk Duck is a common species over much of southern Australia, and can frequently be observed off the coastline in winter. Most of my observations were obtained at Kangaroo and Cullen's Lakes, where several hundred of these birds were present throughout my stay. According to Vic Lowe Musk Ducks are seen at Kangaroo Lake throughout the year, and young have been sighted from as early as September to as late as April.

In spite of the evident abundance of the Musk Duck, information on its behaviour is surprisingly scanty and contradictory. Thus, although the Musk Duck is reputed to fly almost only at night, Vic and Tom Lowe have observed adults of both sexes fly on numerous occasions, and I observed a total of four different birds in flight. In each case, the birds, all females, flew towards shore from some distance out in the lake, first pattering over the surface

some 30 to 40 yards, then clearing the water by a foot or two, and flying 100 yards or more before 'crash landing' into the calmer water near shore. In each instance, the wind was blowing off shore at an estimated 20 to 25 miles per hour, but Tom Lowe has observed Musk Ducks take off from calm water and fly as high as seven feet above the water surface.

The calls of the Musk Duck have similarly been disputed and variously described. The whistling call of the male, a clear penetrating note rather similar to that of the White-backed Duck *Thalassornis leuconotus*, has been described by several observers. Mack (1959) describes it as a 'Chee-ip' or 'Chee-eep', and he heard it only from wattled birds (thus, adult males). Likewise, I heard this call only in birds that appeared to be adult males, and, furthermore, I observed it only in association with a specific display I have termed the Whistle Kick (Johnsgard, in press). Tom Lowe tells me that he is certain he once heard the whistle produced by a bird possessing no evident wattle, and Vic Lowe twice observed a male utter a whistle when it saw a hawk flying overhead. Interestingly, the Lowes have heard this note whistled every month of the year, and during practically all hours of the day and night. During the time I was at Kangaroo Lake it was unusual to go outside at night and not hear a Musk Duck whistling in the distance. The note can be readily heard for a half mile or more under favourable conditions.

The other sound commonly attributed to the male Musk Duck is the 'plonk call', which Gould fittingly described as resembling the noise produced by a large object falling into a deep well. Although there is little disagreement regarding the nature of the sound, its origin is far less certain. Some authorities suggest it is vocally produced, while others have attributed it to the slapping of the tail or the feet on the water. I am convinced that the sound is made by the outstretched webs of the feet as they slap downward on the water following one of the several types of kick displays (Johnsgard, in press).

To my knowledge no calls have been attributed to the female, and I personally heard none, but the Lowes and Mr. David Dent heard a female accompanied by a well-grown young utter a gabbling note as an apparent warning call. Mr. Lowe thought that the call was similar to the barking call of a Crested Grebe *Podiceps cristatus*.

There has been some speculation as to the type of pair bond, if any, found in the Musk Duck. I made a few sex ratio counts, and found an approximately equal ratio. In the absence of marked birds, no definite evidence of pair relationships could be established, but I seriously doubt that any pair bond exists, and believe that males are completely promiscuous in their contacts with females. Unlike the pair-forming behaviour of other waterfowl, in which males actively seek out and display to unpaired females, male Musk Ducks typically begin their displays alone, and apparently rely on the combination of loud splashes and vocal noises to attract females. This importance of auditory signals may explain the tendency for display to occur in total darkness, and the absence of bright colouration on male Musk Ducks. The sounds of a displaying male are clearly effective in attracting both females and other males; I have seen Musk Ducks interrupt preening or sleeping to swim promptly toward the sound of a displaying male that was completely hidden from view around a point and over 100 yards away. Why other males should be attracted to displaying birds is uncertain, but they showed a keen interest in watching such birds, and occasionally approached quite close. Displaying males would usually not attack other 'onlooker' males unless they approached too closely the females that had also been attracted to the display.

Like other stiff-tails, Musk Ducks are excellent divers, and while foraging much time is spent under water. I timed one undisturbed foraging male that spent an average of 24·4 seconds under water in 14 consecutive dives (range 15 to 32 seconds), while in the intervening 13 periods he was surfaced an average of 15·5 seconds (range 10 to 25 seconds). When frightened the submergence time is much greater.

There can be little question that the Musk Duck is a stiff-tail and that its nearest relatives comprise the genus *Oxyura*. However, I was surprised by the similarity of the whistled notes of Musk Ducks and White-backed Ducks, and impressed by the remarkable similarity of the general plumage patterning of these two species, a fact which Scott (1958) had also noticed when he first observed the birds.

Blue-billed Duck

The Blue-billed Duck is relatively rare in Australia, and is limited as a breeding bird to the permanent swamps that are well-lined with emergent vegetation. Although it nests in the Kerang area, it is far more abundant as a winter visitor. During July and early August it was easily the most common of the ducks on Lake Kangaroo. On 30th July I counted over 1,600 Blue-bills along a mile of shoreline centred on the

Lowes' property, and, considering that the lake is approximately four miles in length, the actual population was doubtless several thousand. These flocks typically arrive in early winter, but Vic Lowe informed me that there is great variation in numbers, with few birds arriving in some years, and in any case most disperse prior to the nesting season.

According to Delacour (1959) there is no record of an eclipse plumage in Blue-billed Ducks, but I am convinced that a female-like winter plumage does exist. The Lowes have noted that in early winter flocks of Blue-bills, the female-like birds may outnumber obvious males by as much as 20 to one, but that this ratio rather rapidly drops towards equality. In late July I made various sex ratio counts in which males always predominated (cumulative total 445 males to 266 females), but many of the males showed varying degrees of female-like feathering. At the time I left Kangaroo Lake (7th August) a minority of the males had assumed the brilliant blue bill colour typical of breeding birds, but pair-forming activity was becoming quite intense. The nesting season of Blue-bills is probably more restricted than that of Musk Ducks; the Lowes have observed young in the months of November, December, March and April, while Wheeler (1954) reports the nesting season at Ballarat (central Victoria) extends from November to early February.

Vocalisations in the Blue-bill are apparently poorly developed, as Delacour (1959) suggests. Shanks (1954) heard a male utter a 'quack' like a Grey Duck, as he attacked a female. Tom Lowe has heard a repeated 'Kek-kek-kek . . .' or 'Bub-bub-bub . . .' note, but is uncertain which sex was responsible. This call probably corresponds to a 'Teh-teh-teh . . .' which Tom and I heard females utter when they were gaping toward males, and which is quite different from the squeaking note uttered by female North American Ruddy Ducks *Oxyura j. jamaicensis* under the same circumstances.

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Returns from Steller's Eiders banded in Izembek Bay, Alaska

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Summary
The author has recorded observations of a large wintering population of Steller's Eiders in Izembek Bay for eight years. From 1957 through 1962 the birds arrived in early fall to complete the post nuptial moult in the Bay. Advantage was taken of the flightless period to band 833 of the eiders. Methods are described along with observations of the bird's behaviour. In 1963 and 1964 the moult was completed elsewhere on the migration route and the population arrived nearly three months later that before. Returns from the Soviet Bird-Ringing Centre indicate the moult to have taken place in Siberia, the principal nesting ground of the Steller's Eider. The remarkable fact is that in some years many of these birds migrate upwards of 3,200 kilometres before the post nuptial moult.

Wintering populations of Steller's Eiders *Polysticta stelleri* are known from the waters of Kodiak Island west along the south coast of the Alaska Peninsula and the eastern Aleutian Islands (Gabrielson and Lincoln, 1959). This writer has observed them in the area of the western half of the Alaska Peninsula where they are known colloquially as 'Scotchies'. A considerable segment of this population, aggregating roughly 200,000 birds at its peak, moves in and out of three large lagoons on the north coast of the Peninsula, dependent on freezing and thawing conditions. These are Nelson Lagoon, Izembek Bay, and Bechevin Bay (at the north end of Isanotski Strait). These, together with the intervening coast form the western end (about 125 miles) of the Alaska Peninsula. McKinney (1959) has recorded his observations of waterfowl in these areas. The peak population of the little Steller's Eider is reached in this area in April, when about half of them are in Nelson Lagoon and the other half are divided between Izembek Bay and Bechevin Bay. The peak occurs on the eve of spring migration when these lagoons are ice-free and all other water areas farther north are still frozen. In Nelson Lagoon these birds are associated in April with even larger numbers of King Eiders *Somateria spectabilis*, and several thousands of Common Eiders *Somateria mollissima v-nigra*, Scoters *Melanitta nigra americana* and *M. fusca dixoni* and Old Squaw Ducks *Clangula hyemalis*. In Izembek Bay and Bechevin Bay they are associated in April with about 30,000 Emperor Geese *Anser canagicus* and 70,000 Black Brant *Branta bernicla orientalis*.

The arrival date of the Steller's Eider population in Izembek Bay in fall has proven strikingly variable. Some years most, if not all, of these birds arrive in August to perform the post nuptial moult in the three lagoons of this area, while other years they arrive almost three months later, having completed the moult at some other point on their migration route. For six years, 1957 through 1962, the moult was conducted in these lagoons but in 1963 and 1964 only about 5% of the population appeared until after the moult. We do not have a record of the arrival date for 1963, but in 1964 between sunset 6th November and midmorning of 9th the population appeared in Izembek Bay in an avalanche migration.

In 1961 we began banding these birds during the flightless period. At low tide Izembek Bay becomes a pattern of exposed mud and sand bars with channels running between them. We found that the flocks of flightless eiders could be driven up these channels from the deeper portions where they normally rest, into the shallow water at the channel's head. Here they could be held in a compact flock while a trap was installed, generally upchannel. When all was ready, the flock could usually be driven into the trap. Anyone who has engaged in this type of endeavour will recognise that there is no certainty in capturing wild birds. These were day to day operations, taking