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Handbook of Waterfowl Behavior: Tribe Aythyini (Pochards)

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Agonistic and sexual behavior: male. Males differ from *Anas* males in their courtship displays, which are most unusual. Jones (1951) has described the major display, which consists in its complete form of a sudden stretching of the neck (Fig. 58E), a pause, and then an equally sudden jerking of the head back and down to the shoulders (Figs. 58F, 59A). The male's crest is erected during this display, and sometimes the neck-stretching phase is not followed by the jerking back. The call is uttered only if the second phase of the display is performed, and it is a weak, nasal *eeeeep*, emitted as the head touches the back. Strangely, the Introductory Shake sometimes follows this display, but it is never used as an introductory movement. As in many species of *Anas*, males try to assume a position parallel to the courted female when about to display. A second frequent posture is one very similar to the Sneak of the Aythyini (Fig. 59B), which males direct to other males and also to females. This is apparently a silent display. Preening-behind-the-wing has not been observed, but males Turn-the-back-of-the-head to Inciting females in the usual manner of both dabbling ducks and pochards (Fig. 59C).

Copulatory behavior. In its copulatory behavior the marbled teal is totally unlike the typical dabbling ducks and is much closer to the pochards. The precopulatory behavior lacks any indication of Head-pumping, and consists instead of mutual Bill-dipping, Drinking, and Preening-dorsally, usually performed synchronously by both birds (Fig. 59E, F). The female finally assumes a prone posture and is immediately mounted by the male. After treading, the male calls once with his neck extended, then swims away from the female with his bill tilted downward (Fig. 59F) in a posture almost certainly homologous to the Bill-down postcopulatory posture of male pochards.

TRIBE AYTHYINI (POCHARDS)

The dabbling ducks grade almost imperceptibly into the pochard group considered here, and whether *Marmaronetta* and *Rhodonessa* should be included in one tribe or the other may be open to some question. As here constituted, the tribe includes 16 species of almost world-wide distribution which differ from the preceding group in several minor details. The hind toe has a larger lobe than occurs in the dabbling ducks, and it presumably aids in diving. The feet are also correspondingly larger and are set farther apart and more to the rear than in *Anas*. One of the most clear-cut differences is in the

tracheal structure of the male. Instead of a rounded and entirely osseous tracheal bulla such as occurs in *Anas*, the bulla is larger, rather angular, and contains several membranaceous fenestrae of varying sizes. Although the bulla structure of *Netta* and *Aythya* is strikingly different from that of the *Anas*, the genera *Marmaronetta* and *Rhodonessa* provide such perfect intermediate stages that the evolutionary development of this structure is very clear (Johnsgard, 1961c). In addition, the tracheal tube of males of nearly all species (*Aythya novae-seelandiae* and *A. collaris* are apparently exceptions) varies in diameter and is enlarged toward the middle. Unlike the typical dabbling ducks, none of these species have metallic-colored specula, and metallic coloration is restricted to the head plumage of the males of some species. Although some species (especially *Rhodonessa* and *Netta*) frequently feed on the surface, all species dive well and typically do not open their wings when submerging. Most species are predominantly vegetarian, but the scauplike ducks tend to consume a high proportion of animal material. Nests may be built on land, usually near water, or on reed beds over the water surface, and females lack the disruptively marked plumage pattern typical of female dabbling ducks. Downy young tend to lack eye stripes and cheek marks, and also generally have reduced back spotting. Most if not all species become sexually mature during the first year; the scauplike ducks may take slightly longer. All species exhibit sexual dimorphism in plumage and/or soft-part coloration, and nearly all species have distinct eclipse plumages. Although metallic-colored specula are absent, the secondaries have a contrasting white pattern in many species.

Diving ducks are less vocal than dabbling ducks, and males are generally silent except during courtship. Probably only one species, and at most two, exhibits female calls which might correspond to the Decrescendo Call of *Anas*, but all species have Inciting calls, and some of them have other courtship calls as well. Sexual behavior patterns of the males are very uniform, and it is relatively easy to recognize homologous movements. Either these species are a much more homogeneous group than *Anas*, or quantitative difference in displays are more important than qualitative ones for species recognition among pochards. Precopulatory and postcopulatory displays are also remarkably constant in the group. The former consists of Drinking (or Bill-dipping) and Preening-dorsally by males, and sometimes by

females as well, and a rudimentary form of Head-pumping occurs in a few species. In all species studied the postcopulatory behavior consists of the male's calling once and then swimming away in a rigid Bill-down posture. The female may assume the same posture for a few seconds, but usually she begins to bathe immediately.

Pink-headed Duck (*Rhodonessa caryophyllacea*)

The now apparently extinct pink-headed duck is considered by Delacour (1956) to be an aberrant member of the Anatini, presumably because of its slightly lobed hallux and its surface-feeding tendencies. The tracheal anatomy of the male, however, leaves little doubt that the species is a close relative of the pochards (Johnsgard, 1961c); Woolfenden (1961) and Humphrey and Ripley (1962) have found additional evidence favoring this hypothesis. In addition, the body plumage, including the black abdomen, nonmetallic wing pattern, and brownish body, is certainly more similar to that of *Netta* than to any species of *Anas*. The downy young have never been described. It seems probable that the pink-headed duck is not too distantly related to the red-crested pochard. The two species are easily confused, and this accounts for the repeated reports of pink-headed ducks being seen or shot in India during recent years.

General behavior. Most of what is known about the pink-headed duck has been summarized by Salim Ali (1960). Delacour, who kept pink-headed ducks for some years, states (1956) that the female has a low quacking voice and the male has a whizzing whistle and behaves in a mallardlike fashion. The males display socially, puffing out the short head feathers with the neck shortened and resting on the back, then stretching the neck upward as they utter their call. This may seem to be a reversed version of the marbled teal's display, but actually the behavior is nothing like that of the typical mallard. Nothing has been written concerning the copulatory behavior of this species, which would have been of much greater value in judging relationships than an incomplete account of the male courtship displays.

NARROW-BILLED POCHARDS

Delacour (1959) has grouped three species of pochards into a genus which he considers less well adapted to diving than the rest of the group. Of these, one species (the red-crested pochard) is pre-

dominantly a surface-feeder and is the least *Aythya*-like of the group. A second species (the southern pochard) outwardly resembles the typical pochards but deviates from them somewhat in its displays, and the third species (the rosy-bill), although rather specialized, appears to provide the closest link with the genus *Aythya*.

Red-crested Pochard (*Netta rufina*)

The red-crested pochard exhibits affinities both with the pochards and with the dabbling ducks, but it is predominantly pochardlike. This is one of the few species of pochards in which the downy young exhibit a distinct, although faint, eye stripe such as is typical of *Anas* downies. Juvenile birds resemble adult females, which have a two-tone head pattern quite unlike that of the other female pochards. The male in nuptial plumage bears a general similarity to some of the other pochards, but is unique in its "shaving brush" crest. The secondaries and inner primaries are a pale whitish color that contrasts with the darker parts of the wing and provides a simple speculum. There is a distinct eclipse plumage which closely resembles the plumage of the female. The trachea of the male varies gradually in diameter, with two enlargements, and the bulla has the trihedral shape and fenestrated structure typical of all the pochards (see Johnsgard, 1961c). The species occurs over much of Europe and Asia, and is sympatric with no other *Netta* species but with several species of *Aythya*. Wild hybrids have been reported involving the common pochard, and fertile hybrids have been obtained in captivity with the common pochard and the rosy-bill. Hybrids with five other species of *Aythya* have also been reported.

General behavior. Although red-crested pochards frequently feed by up-ending, they can dive very well in the usual pochard manner of using only the feet. They often associate with other pochards, and they are more adept at walking on land than are these birds. This species differs from species of *Anas* in using repeated Chin-lifting instead of Neck-jerking as the primary preflight movement.

Agonistic and sexual behavior: female. Female Inciting is a slightly ritualized combination of direct threatening movements alternated with neck-stretching toward the preferred male (see illustration in Lind, 1958). The associated call is a soft *rarr-rarr*. Steinbacher (1960) states that in this and the other pochards there are two distinct female calls, *kurr* and *gock*, and that the former is especially

indicative of anxiety and the latter occurs during vigorous threat. I have not heard any calls which resemble the Decrescendo Call of *Anas*, but von de Wall (pers. comm.) informs me that he has heard a possibly equivalent call. Females often Preen-behind-the-wing toward mates or potential mates, and in general female Preening-behind-the-wing is more frequent in the pochard group than in the dabbling ducks. Females also perform an *Anas*-like Gesture of Repulsion when they are being chased by males attempting to rape them.

Agonistic and sexual behavior: male. Lind (1958, 1962) and Steinbacher (1960) have both discussed the behavior of this species in some detail. As in the dabbling ducks, general display movements include the Introductory Shake and Preening-behind-the-wing. Rapid head-shaking often precedes or alternates with other displays. Wing-flapping is fairly frequent in this and other species, and is probably ritualized. Ritualized Drinking is primarily a precopulatory display. The male's head feathers are erected into a bushy crest during courtship, and the black patch on the nape is consequently conspicuous. This patch is often exhibited to an Inciting female as the male swims in front of her in a display equivalent to Leading in the dabbling ducks. While displaying, males frequently perform Neck-stretching, during which they often utter a *geng* call with the crest raised. Often the male will lower his crest and stretch his neck out over the water as he points his bill toward a female and utters a nasal call. This movement, which has been called Sneaking (Hochbaum, 1944), closely resembles an aggressive posture. The typical courtship call, the "Sneeze," is usually uttered with the crest erect, the neck withdrawn, and the crest "thrown" toward the female with a sideways movement of the head (see Fig. 60E). At times this same call and movement is directed toward other males, but at such times the crest is usually depressed and the movement is forward rather than sideways. That this Sneeze call is probably homologous to the Burp of *Anas* and the Kinked-neck call of the more typical pochards is indicated by the fact that hybrids of this species and the yellow-billed pintail perform a pintail-like Burp with a sideways head movement, and hybrids with the redheaded duck perform the Sneeze with a distinct kink in the neck. Lind (1962), however, believes the Sneeze to be homologous with the pochard's Sneak posture. Lind (1958) describes the Sneeze call as *chrrriib*, but in general it is reminiscent

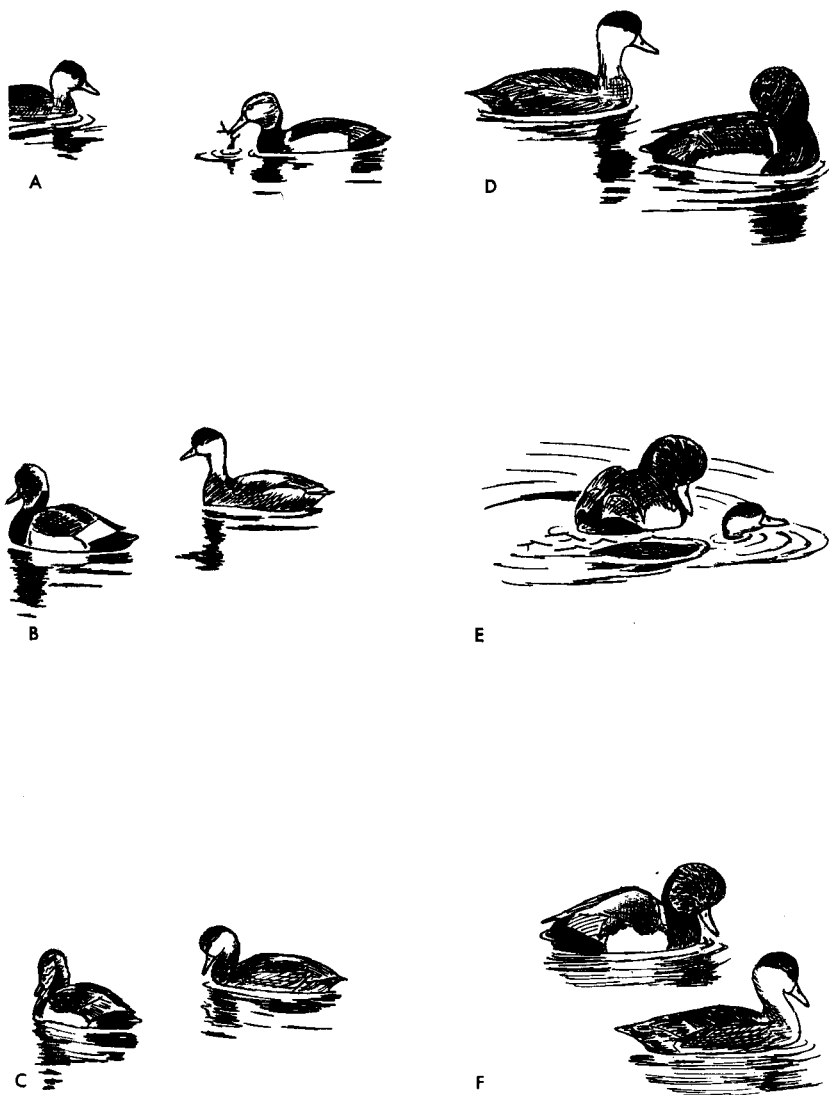


Figure 60. Red-crested Pochard

- A. Courtship feeding. The male has just surfaced with some vegetation which he is about to take to the female.
- B, C. Precopulatory Head-pumping by red-crested pochards.
- D. Precopulatory Preening-dorsally by male. Note that the head is turned toward the side facing the female.
- E. Postcopulatory Sneeze uttered by male immediately after treading is completed.
- F. Postcopulatory Bill-down posture of male. Female is about to start bathing.

of a half-repressed sneeze. The red-crested pochard is the only species of Anatidae which to my knowledge exhibits anything like a true "courtship feeding." Males will dive to the bottom of a pond and bring up anything from aquatic vegetation to submerged sticks (Fig. 60A), which the female then takes from the male's bill and attempts to eat. This behavior appears to be confined to well-formed pairs; thus it is probably a pair-maintenance activity rather than true courtship. Attempted rape by males is more evident in this species than in the other pochards.

Copulatory behavior. The copulatory behavior of red-crested pochards presents an interesting mixture of pochard and dabbling duck components. Males initiate precopulatory display by Bill-dipping and Preening-dorsally, interspersing these movements with Preening-behind-the-wing, preening in other areas, lateral head-shaking, and a rudimentary form of Head-pumping (Fig. 60B-D). The female responds with what is definitely a Head-pumping movement, although it is not quite so marked as it is in the dabbling ducks (Fig. 60B, C); then she gradually assumes a receptive posture (illustrated in Steinbacher, 1960), in which the tail and body are held low in the water and the neck is stretched out diagonally. As the male completes treading, he performs a single Sneeze toward the female (Fig. 60E), then swims away with his bill pointed downward in the usual pochard Bill-down posture (Fig. 60F). The female begins to bathe immediately.

Southern Pochard (*Netta erythrophthalma*)

The southern pochard is outwardly similar to the scauplike ducks, but Delacour (1959) has pointed out that the similarity is only superficial. The downy young closely resemble those of the rosy-bill, being bright lemon-yellow below, dark above, and lacking any eye stripes. Juveniles and females are an almost uniform brown except for lighter head markings and a white speculum. The adult male is somewhat similar to the rosy-bill male, but differs in having dark brown flanks, a dark brown abdomen, and dark under-tail coverts. The white speculum on the secondaries contrasts sharply with the otherwise dark plumage. There is no eclipse plumage. The tracheal tube of the male has only a single enlargement, and the bulla is similar in shape to that of the red-crested pochard. The species consists of two races, one South American and one African. The South American race

does not appear to be sympatric with the rosy-bill. A captive-bred hybrid of the southern pochard and the common pochard has been reported.

General behavior. This species appears to dive to a somewhat greater extent than do the other two species of *Netta*. Preflight movements consist of the usual Chin-lifting.

Agonistic and sexual behavior: female. Inciting in the southern pochard is somewhat more ritualized than in the red-crested pochard, and consists of lateral bill movements alternated with forward neck-stretching toward the preferred male (Fig. 61A, B). The call is a harsh *rrrrr-rrrr*. I have not heard any sound approaching the Decrescendo Call of dabbling ducks. Preening-behind-the-wing is frequently performed by females.

Agonistic and sexual behavior: male. The male courtship call is uttered in a manner that differs both from the Sneeze of the red-crested pochard and the Kinked-neck call of the following species. The bill is held level and directly forward with the neck somewhat extended, and the call is uttered as the head is drawn into the shoulders with the bill remaining level. The call, a soft, rather mechanical *eerooow*, sounds like a rapidly unwinding spring. There appears to be no second courtship call which would correspond to the "Coughing" call of the following species. The Sneak is rarely performed and is very inconspicuous, consisting of only a slight extension of the neck and head toward the female as a three- or four-note call similar to the courtship call is uttered. Unlike the red-crested pochard, this species performs a true Head-throw display (Fig. 61C). This is performed fairly rapidly (in about $\frac{1}{4}$ second) after a few preliminary head-shakes, and the bill is thrown back vertically over an arc of about 135 degrees. The call appears to be exactly like the usual courtship call. The display is symmetrical in that the head and bill follow the median axis of the body. The male responds to female Inciting by swimming ahead of her with his head feathers depressed as he Turns-the-back-of-the-head to her (Fig. 61A, B). Males frequently Preen-behind-the-wing to females, and pairs often do this as a mutual display, alternating it with mutual Drinking.

Copulatory behavior. Copulation is initiated by the male, who performs Bill-dipping movements together with Preening-dorsally. He also preens in other places, such as the flanks, the breast, or behind the wing. The female performs a few slight Head-pumping move-

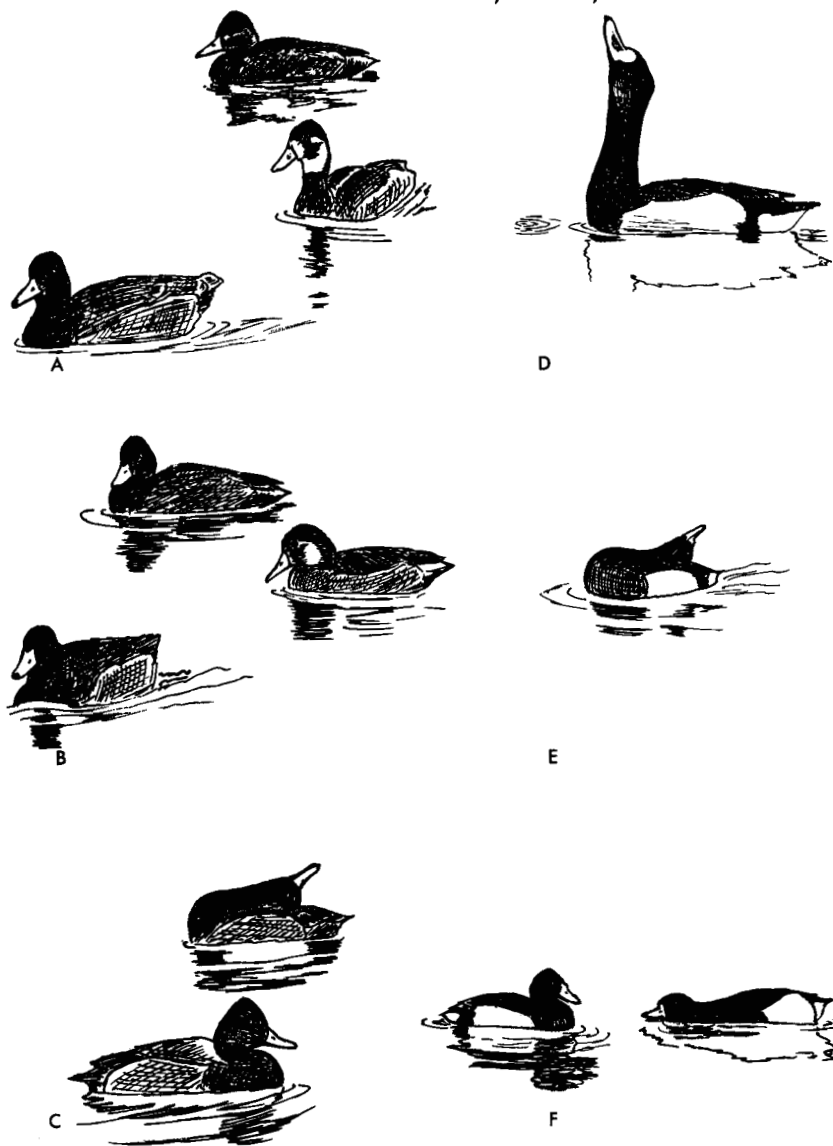


Figure 61. Southern Pochard, Rosy-bill

- A, B. Southern pochard male Leading an Inciting female by Turning-the-back-of-the-head toward her. Note lowered crest of male as compared with that of other male behind.
- C. Head-throw display by male southern pochard.
- D. Ritualized Drinking by male rosy-bill.
- E. Head-throw by male rosy-bill.
- F. Male rosy-bill (right) performing Sneak display toward another male.

ments, but in the instances I observed she did no Bill-dipping or Preening-dorsally. She soon assumes a receptive posture, and the male mounts. As the male completes treading he utters a single courtship call, then swims away in the typical Bill-down posture. The female then bathes.

Rosy-bill (*Netta peposaca*)

Although this species has the least external similarity to the pochards of the genus *Aythya*, behaviorally it is the species most similar to that group. The downy young are much like those of the three following species, and juveniles and females also have plumages which fairly closely resemble the corresponding plumages of the canvasback, the redhead, and the common pochard. The adult male's crimson and basally enlarged bill sets it apart from the other pochards, but in other respects the head and body are typically pochardlike. Unlike those of the other species of *Netta*, the undertail coverts are white, and the white speculum extends to the inner primaries as in some of the scaups. There is no eclipse plumage. The male trachea has a very abrupt central enlargement rather than the gradual enlargement typical of other species of pochards. The bulla differs from those of the two preceding species in that the right chamber is somewhat inflated in a manner characteristic of the scaup group. The rosy-bill ranges over southern South America, but is probably not sympatric with the southern pochard. It has been hybridized in captivity with numerous species of *Aythya* as well as with the red-crested pochard. The latter cross has proved fertile.

General behavior. The rosy-bill, although an excellent diver, feeds to a considerable degree from the surface. Preflight movements are the usual Chin-lifting of pochards, which in males is very conspicuous because of the brightly colored bill.

Agonistic and sexual behavior: female. Rosy-bills are of interest in several respects. For example, I once heard a decrescendo-like call of three or four syllables on one occasion, although like other pochards the female tends to be relatively quiet. Inciting takes the usual, only slightly ritualized, form of threatening movements alternated with neck stretching. A harsh *krrrr* is uttered with each movement. Steinbacher (1960) describes this call as *errrr*, and the other common female call as *kack*. Females perform a conspicuous Preening-behind-the-wing and in addition perform the same form of highly

ritualized Drinking as males. The Sneak posture is also performed by females, and in exactly the same manner as by males.

Agonistic and sexual behavior: male. Although somewhat specialized in its form and postures, the rosy-bill shows very clear affinities with *Aythya*. The two most conspicuous displays are highly ritualized. The first is a type of Drinking (Fig. 61D) which in this species entirely replaces normal drinking. It occurs whenever two birds meet, regardless of their sex. The second display is a highly exaggerated Sneak (Fig. 61F), in which the male stretches his head and neck out along the water surface toward another bird and utters a low, guttural *krrrrr*. A third major display is the Head-throw, which is performed relatively infrequently (Fig. 61E). There are no preceding head shakes, and the display is a fairly slow one (taking approximately $\frac{1}{2}$ second) in which the bill travels an arc of approximately 135 degrees. The associated call is a faint *wheee-ow*. The same call is uttered during what is clearly homologous with the Kinked-neck call of *Aythya*. This call may be uttered while the neck is partly extended or when the head is resting on the shoulders. A final call is one which appears to be homologous to the Coughing call of *Aythya*. It is emitted without any neck movement, though there is a distinct compression of the body plumage, and consists of a soft whirring sound which closely resembles the courtship call of the southern pochard. In addition, wing-flapping occurs frequently during display and is possibly ritualized, and Preening-behind-the-wing is also very frequently performed. Males swim ahead of Inciting females while Turning-the-back-of-the-head to them and holding the head feathers very depressed (the "gedrucktes Schwimmen" of Steinbacher, 1960).

Copulatory behavior. I have not observed a complete copulation, but I have seen precopulatory behavior on a few occasions. This consists of the male Bill-dipping and Preening-dorsally, while the female performs rudimentary Head-pumping movements similar to those of the southern pochard. Lind (1962) reports rudimentary Head-pumping in the male. McKinney informs me (pers. comm.) that the male assumes the typical Bill-down postcopulatory posture.

TYPICAL POCHARDS

The typical pochards of the genus *Aythya* consist of 12 species, which can be divided into several subgroups. All the species have, however, several characteristics in common. Females lack any calls

similar to the Decrescendo Call of dabbling ducks. Their common vocalizations consist of Inciting and aggressive calls, and the females of some species have calls homologous to male display calls. Males are relatively quiet except during courtship display. Male courtship calls are of two major types. The first is uttered during obvious neck-stretching (in the Kinked-neck and Head-throw), and the second is uttered without special neck-stretching (Coughing). Males of all species studied (11 out of 12) exhibit the Kinked-neck call, the Head-throw, the Sneak posture, Coughing, and Turning-the-back-of-the-head. Preening-behind-the-wing is probably present in all species as well. Precopulatory displays consist of Bill-dipping and Preening-dorsally by males, and sometimes also by females. Rudimentary Head-pumping occurs in males of a few species, but not in females. After treading, the male always utters a single Kinked-neck call and swims away in the Bill-down posture.

There are three fairly distinct subgroups of *Aythya*. These include the true pochards (the canvasback, the redhead, the European pochard, and the ring-necked duck), the white-eyes (the common white-eye, the Australian white-eye, Baer's white-eye, and the Madagascan white-eye) and the scauplike ducks (the tufted duck, the New Zealand scaup, the greater scaup, and the lesser scaup). I do not accept Delacour's grouping (1959) of the ring-necked duck with the scaup group, for as Hollister (1919) pointed out, it is clearly a member of the true pochard group.

Canvasback (*Aythya vallisneria*)

It is difficult to judge which of the *Aythya* species is closest to *Netta*, but the true pochards appear to be the most generalized in their plumages and behavior, and they will be considered first. Downy canvasbacks are very similar to downy rosy-bills, and juveniles and adult females also have a similar uniformly brownish coloration. Females of all the true pochards have light eye-rings and narrow eye-stripes, and also exhibit sexual dimorphism in iris coloration. The male in nuptial plumage is very similar to the European pochard, and the differences in head and bill shape between the canvasback and the redhead can probably be attributed to selection pressures for species recognition. Males have an eclipse plumage which approaches the female pattern. The trachea of the male has a partially membranaceous bulla which is very similar to that of the European

pochard, and the tracheal tube varies gradually in diameter. The canvasback ranges over most of North America and is widely sympatric with the redhead. I am not aware of any wild hybrids involving these two species, but such hybrids would be very difficult to recognize. In captivity fertile hybrids of these two species have been obtained, and hybrid combinations involving the ring-necked duck, the greater scaup, and the lesser scaup have also been reported.

General behavior. Hochbaum's (1944) classic study of the canvasback is the standard reference on the general biology of this species, and also the primary reference for pochard courtship displays. Preflight movements consist of repeated Chin-lifting.

Agonistic and sexual behavior: female. Inciting consists of overt threatening movements alternated with neck-stretching toward the preferred male, and the uttering of a soft *krrr-krrr* note. Neck-stretching also occurs independently of Inciting, often being elicited in response to a male's Neck-stretching. Hochbaum (1944) reports observing a single captive female perform the Head-throw display; I have rarely seen this and agree with him that it is not typical of normal birds (see the redhead account).

Agonistic and sexual behavior: male. The canvasback exhibits all of the *Aythya* displays, and Hochbaum's terminology is largely used here. Hochbaum's "Courtship call," however, is here called the Kinked-neck call (Fig. 62D-F), since there is more than one type of courtship call. In addition, the "Threat" posture appears to me to be an unritualized pre-attack posture and not to function as a sexual display. The Head-throw (Fig. 62A) has been well described by Hochbaum. In this species there is no preliminary head-shake, and the display is relatively slow (lasting about $\frac{2}{3}$ second). It tends to be asymmetrical, with the bill diverging from the vertical plane toward the courted female. The associated cooing note has been described by Hochbaum. The second courtship call, Coughing, is infrequent and inconspicuous in the canvasback. There is no neck or throat movement, but the wings and tail are slightly flicked, and a soft *hfff* is uttered. The Sneak (Fig. 62B) display is highly developed in the canvasback, but it apparently differs from the Sneak of the rosy-bill in that there is no associated call. Neck-stretching (Fig. 62C) is also very frequent, serving both as a hostile display toward other males and an apparent sexual display toward females. Males respond to Inciting by swimming ahead and Turning-the-back-of-the-head (Fig.

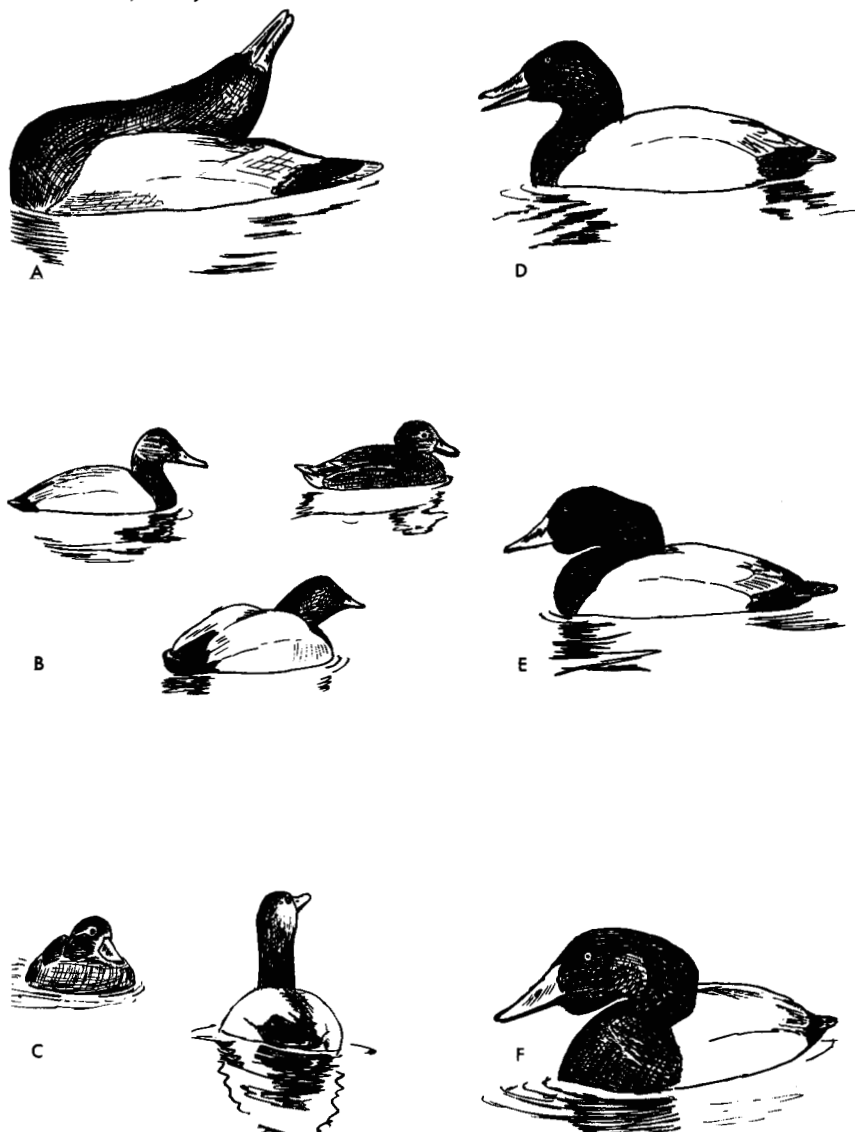


Figure 62. Canvasback

- A. Head-throw by male canvasback.
- B. Sneak posture performed by male canvasback (*foreground*) to female redhead (*right background*).
- C. Neck-stretching by male canvasback to female redhead.
- D, E. Two phases of the Kinked-neck call in male canvasback. Note bulge in throat, probably produced by lowering the tongue.
- F. Close view of the Kinked-neck call.

63A). Preening-behind-the-wing has not been recorded in either sex of canvasback. The aerial chases so well described by Hochbaum, (1944) in which the male attempts to catch the female by the tail, may be examples of attempted rape, since I have observed similar behavior in mallard rape chases.

Copulatory behavior. The male initiates copulation by alternately Bill-dipping and Preening-dorsally. The female may respond with similar Bill-dipping and Preening-dorsally, but there is no Head-pumping as in the three preceding species. The female soon assumes the receptive posture, and the male then mounts. After treading, the male utters a single Kinked-neck call (Fig. 62B), then swims away in the Bill-down posture (Fig. 62C). The female may also assume this posture for a short time before bathing.

European Pochard (*Aythya ferina*)

In appearance, the European pochard falls between the canvasback and the redhead, but it is probably more like the former. Presumably it approximates the ancestral condition from which the two American species diverged. Downy, juvenile, and adult plumages are all very much like those of the canvasback and the redhead, and the tracheal structure is also very similar to that of those species.

General behavior. Like the canvasback and the redhead, the European pochard is a vegetarian, diving frequently while foraging. Preflight consists of repeated Chin-lifting movements.

Agonistic and sexual behavior: female. I have observed relatively little display in this species, but the movements of both sexes are very much like those of the canvasback. Steinbacher (1960) describes the two major female calls as *pack* or *back*, and *brerr* or *errr*. The latter call is typically used in Inciting. The Inciting movements are much like those of the canvasback, as lateral threatening movements are alternated with neck-stretching. Preening-behind-the-wing has not been observed.

Agonistic and sexual behavior: male. According to Steinbacher (1960), two courtship calls are present, a soft breathing *wiwierrr* and a loud *kilkilkil*, which varies in the number of syllables. The former note is used in the Head-throw (Fig. 63D) and Sneak (Fig. 63F) postures, as well as in the Kinked-neck call. The louder call probably corresponds to the Coughing call, but I have not observed display sufficiently to be certain of this. Neck-stretching (Fig. 63E) occurs

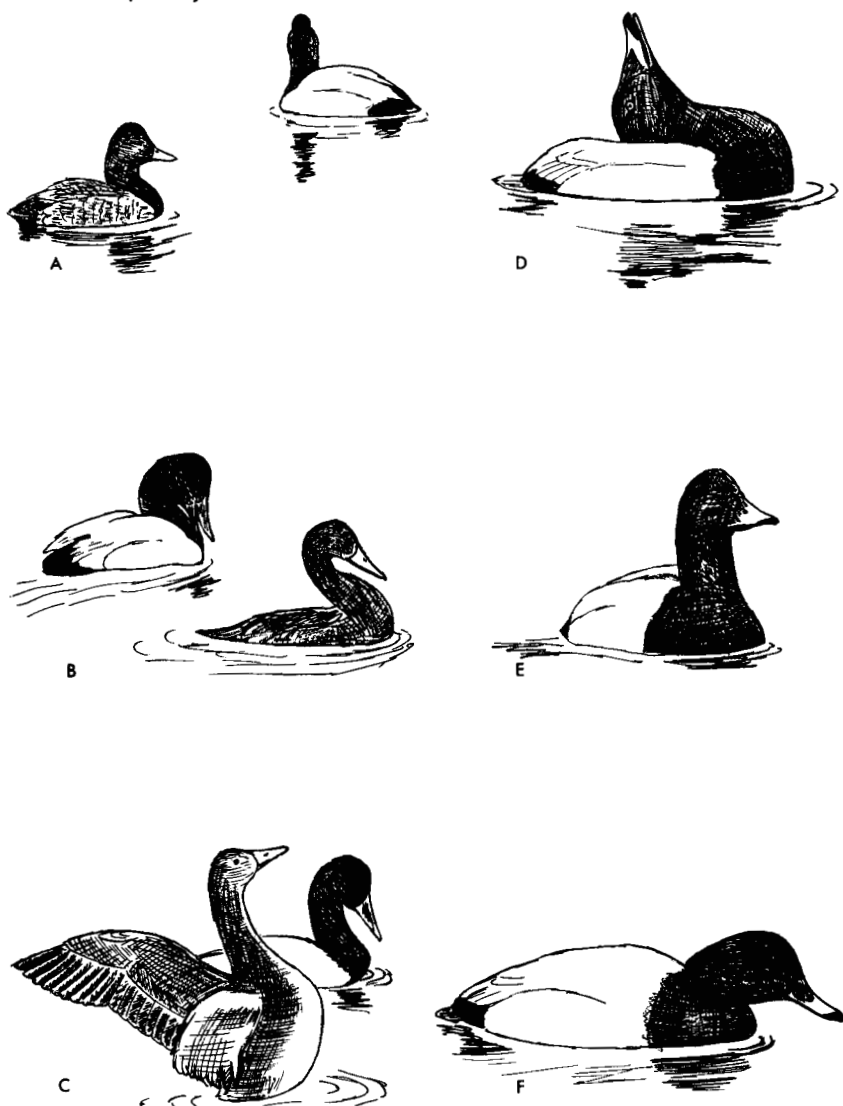


Figure 63. Canvasback, European Pochard

- A. Male canvasback Turning-the-back-of-the-head toward female.
- B. Postcopulatory display by canvasbacks. Male utters the Kinked-neck call as female bathes.
- C. Male canvasback in postcopulatory Bill-down posture as female flaps wings after bathing.
- D. Male European pochard performing Head-throw.
- E. Neck-stretching by male European pochard.
- F. Sneak posture by male European pochard.

frequently during display, and thus the species strongly resembles the canvasback. As in the canvasback, the Head-throw is a fairly slow display (lasting approximately $\frac{1}{2}$ second), and the bill does not travel back much beyond the vertical. I have not observed Turning-the-back-of-the-head and Preening-behind-the-wing, but very likely they occur.

Copulatory behavior. I have not observed copulation, but no doubt it is very much like that in the canvasback and the redhead.

Redhead (*Aythya americana*)

The redhead of North America is very similar to the European pochard in most aspects of its plumage, although it has a higher forehead, darker back and flanks, and, in males, a yellow rather than reddish iris. The downy young are somewhat lighter than those of either the canvasback or the European pochard. Juveniles and females have the uniformly brownish coloration typical of all true pochards. Males have an eclipse plumage which closely resembles the plumage of the females. The male trachea is enlarged for most of its length, and in shape the bulla is very much like that of the European pochard, with the right chamber scarcely enlarged. The species ranges over much of North America, and is sympatric with the canvasback and the ring-necked duck, as well as with several other species of *Aythya*. Wild hybrids have been reported with the ring-necked duck, the lesser scaup, and the greater scaup.

General behavior. Redheads inhabit much the same kinds of marshes and lakes as canvasbacks, and one must presume that they exhibit certain differences in feeding behavior to avoid interspecific competition. The two species sometimes associate, but courting flocks tend to remain separated. Preflight movements are the usual Chin-lifting with the neck slightly stretched.

Agonistic and sexual behavior: female. Inciting in this species (Fig. 64E) lacks such extreme neck-stretching as occurs in the canvasback, but the Inciting calls and movements are very similar in the two species. A soft *errrr* note accompanies Inciting in the redhead. Independent Neck-stretching is not nearly so conspicuous in the redhead as in the canvasback. I have observed the Head-throw a few times in an old female that had assumed a partial male plumage, but I have never seen other females perform it, and I judge that it is not

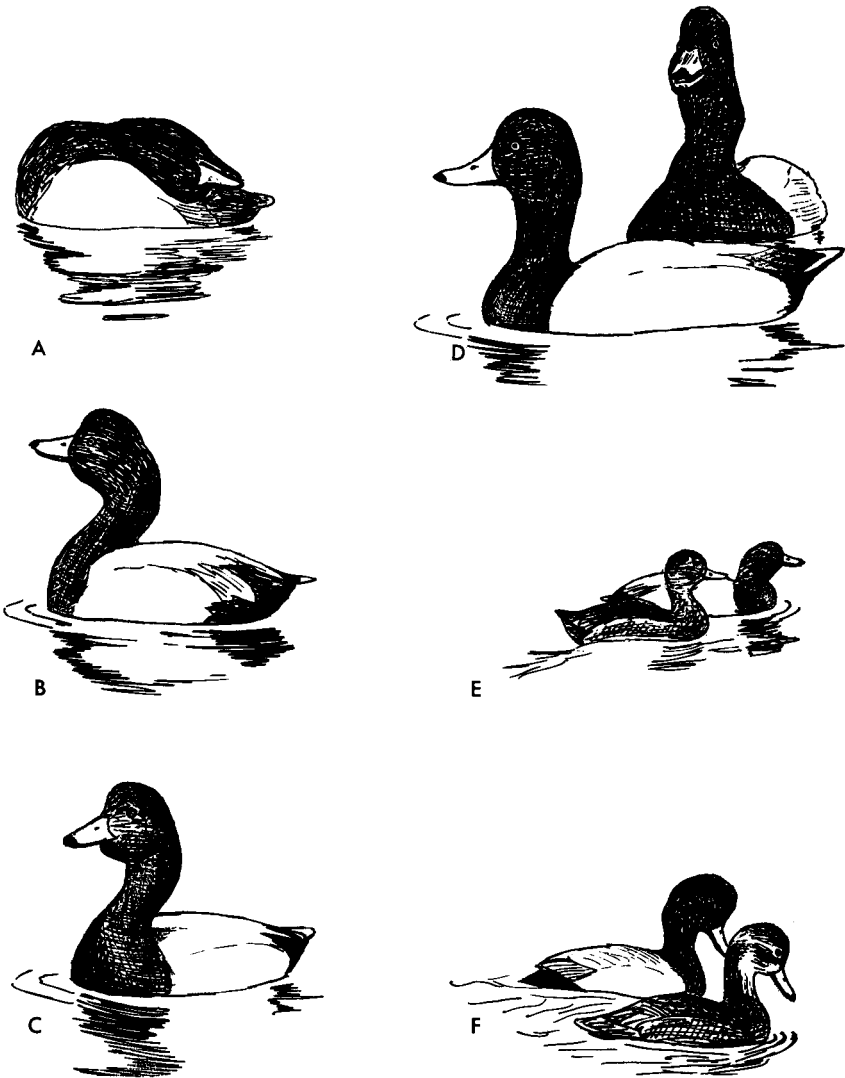


Figure 64. Redhead

- A, B. Stages in the performance of the Head-throw. The call is uttered during the second stage of the display.
- C. Kinked-neck call as uttered without accompanying Head-throw. Compare with B above.
- D. Front view of Kinked-neck call. Compare with Fig. 62F.
- E. Male redhead Leading an Inciting female. Note lowered head feathers of male and compare with other drawings on this page.
- F. Postcopulatory Bill-down display in redheads. Both birds are in this posture.

normally used by females during courting. Preening-behind-the-wing is rather infrequent in female redheads.

Agonistic and sexual behavior: male. Although the male redhead performs the same displays as the canvasback, there are considerable differences in the form and vocalizations of these displays. One is therefore inclined to attribute these differences to selection for species-specific signals that will avoid hybridization. Thus the Kinked-neck call of the canvasback is a cooing sound, usually uttered with the head held near the shoulders, whereas in the redhead the call is a distinct *wheee-oww*, uttered with the neck almost fully extended (Fig. 64B-D). The Sneak posture, which is so conspicuous in the canvasback, is reduced to little more than an intention movement in the redhead. The Head-throw, however, is a highly exaggerated and spectacular toss of the head back 180 degrees to the base of the tail (Fig. 64A). There is no preliminary head-shake, and the display is relatively long (taking approximately one second). As in the canvasback, the bill is tilted in the direction of the courted female. The Coughing call is infrequent and inconspicuous. Neck-stretching is also relatively less frequent and conspicuous than in the canvasback. Males also Preen-behind-the-wing to females fairly frequently, a display which I have not observed in the canvasback. Males will Turn-the-back-of-the-head to Inciting females, depressing their head feathers in the usual manner of most if not all pochards (Fig. 64E).

Copulatory behavior. Unlike the courtship pattern, the copulation patterns of the redhead differ little from those of the canvasback. The male initiates copulation by alternately Bill-dipping and Preening-dorsally to the female, preening his back on the side toward her in the usual fashion. Females sometimes respond with similar Bill-dipping and Preening-dorsally, but often they assume the copulation posture without mutual display. After treading, the male utters a single Kinked-neck call, then swims away in a Bill-down posture (Fig. 64F). The female often swims for a short distance in this same posture before beginning to bathe.

Ring-necked Duck (*Aythya collaris*)

Although Delacour (1959) considers this species to be closely related to the tufted duck, the similarity of the adult males of these two species is almost certainly a case of convergence. The downy young of the ring-necked duck do not in the least resemble those of

the tufted duck or the scaup, and are practically identical to those of the true pochards and white-eyes. Juveniles resemble adult females, which have the uniform brown coloration and light eye-stripe and eye-ring of the pochard group. Adult males in nuptial plumage outwardly resemble tufted ducks, but they lack the white speculum pattern typical of the scauplike ducks, exhibit sexual dimorphism in iris coloration, and, unlike the scaups, have a narrow bill with a light subterminal band such as occurs in redheads, European pochards, and Australian white-eyes. The trachea of the male, to judge from the one specimen I have seen, apparently lacks the conspicuous enlargements found in most other pochards, but the bulla is of the usual pochard type. The right chamber of the bulla is slightly inflated in this species as it typically is in the white-eye and scaup groups, suggesting that the ring-necked duck may be a linking form between the pochards and the white-eyes. The species is restricted to North America and is sympatric with numerous *Aythya* species. Wild hybrids have been reported with the redhead and the lesser scaup, and captive-bred hybrids have been reported with these two species and also with the canvasback, the tufted duck, and the red-crested pochard.

General behavior. Mendall (1958) provides an excellent account of the ecology and general behavior of this species. The ring-necked duck is more of a forest bird than any of the other pochards, but—like the true pochards and unlike the scaups—it is primarily a vegetarian. Chin-lifting is the only preflight movement noted.

Agonistic and sexual behavior: female. I have seen very little display in this species, but the Inciting movements of the female appear to be like those of the other pochards, and a soft *rrrrrr* call is uttered. Head-throws have not been observed in females, but Preening-behind-the-wing has been noted as a female display.

Agonistic and sexual behavior: male. I have observed display only a few times in captive birds, and also only a few times in wild birds (Johnsgard, 1955). The Kinked-neck call is uttered without noticeable bending of the neck and is emitted during Neck-stretching. The call is a soft breathing note, similar to but weaker than that of the redhead. The Coughing call is fairly frequent and is conspicuous because of its loud, clear note and also because of the slight wing-flick visible as the call is uttered. The Head-throw is almost exactly like that of the redhead, in that there is no preliminary head-flick

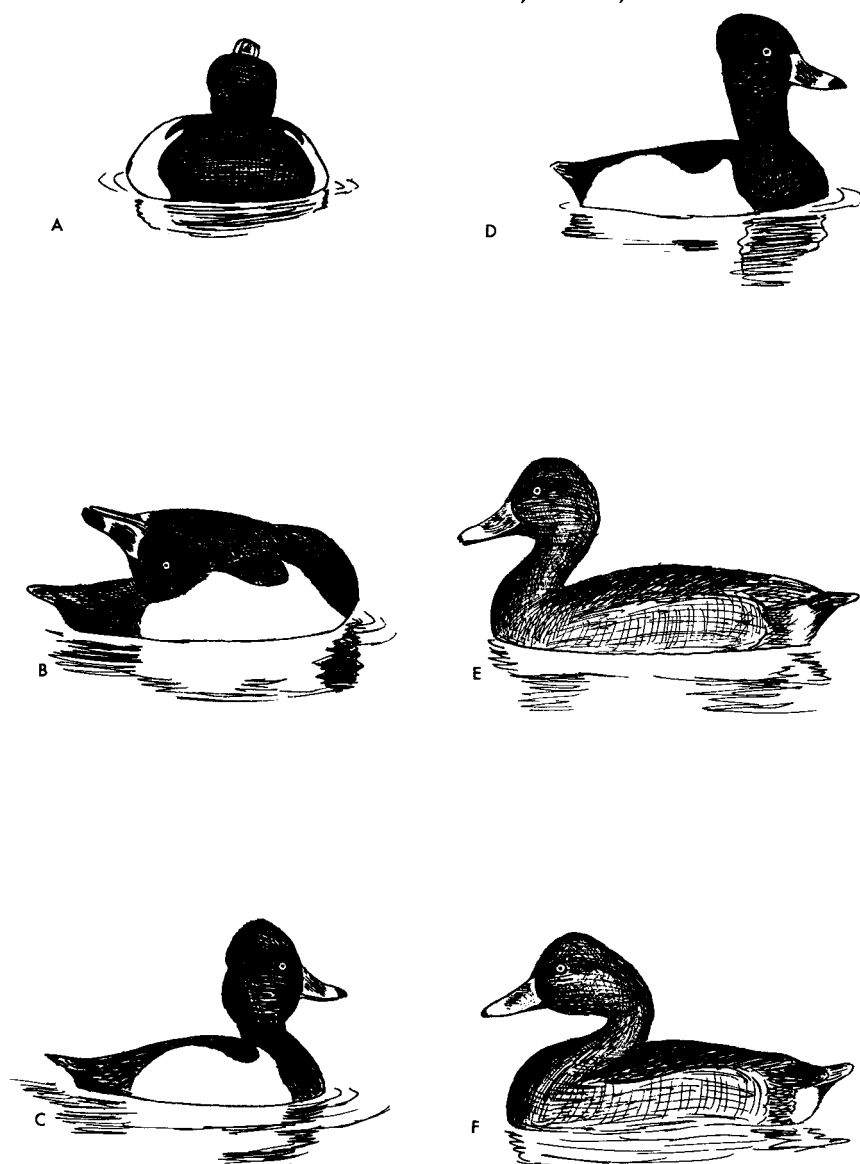


Figure 65. Ring-necked Duck, Australian White-eye

A. Ring-necked duck Head-throw, front view.

B, C. Two phases of Head-throw performed by male ring-necked duck.
Note the slight tilting of the bill toward the right.

D. Triangular-crest posture of male ring-necked duck. Compare with normal head shape as shown in C.

E, F. Two phases of Kinked-neck call by male Australian white-eye.

and the bill traverses an arc of 180 degrees as the head is brought back almost to the tail (Fig. 65A-C). As in the redhead the display is slightly asymmetrical, depending upon the position of the female, and it is a moderately slow display (lasting approximately $\frac{1}{2}$ second). Unlike the males of the previous species, but like the male white-eye, the ring-necked male performs a Nod-swim in which, as he swims rapidly about nodding his head, he erects his crest feathers to a distinctive angle, producing a triangular crest (Fig. 65D). Neck-stretching may be associated with this display. Males also Turn-the-back-of-the-head toward Inciting females, and at such times the crest is strongly depressed. I have not observed what was without doubt the Sneak posture, but Westfall (in Mendall, 1958) illustrates it, and the drawing suggests that it is similar to that of the canvasback. Ripley (1963) describes an apparently similar posture as a threat. Preening-behind-the-wing has been observed by McKinney (1953). Ripley (1963) has reported an unusual lateral threat display in this species as well as in southern pochards.

Copulatory behavior. I have not observed a complete copulation, although I have seen the male Bill-dipping and Preening-dorsally, to which the female responded by Bill-dipping. According to McKinney (pers. comm.) the postcopulatory display is the same as in the other pochards.

Australasian White-eye (*Aythya australis*)

The Australian and Banks Island races constitute the first of the white-eye group. They are characterized by sexually dimorphic iris coloration (brown in females, white in males) but reduced sexual dimorphism in plumage. In this group both sexes are predominantly brownish, but have white under-tail coverts, white wing specula, and whitish under parts. Juveniles and females lack the light eye-rings typical of the preceding group, and males of all species have brownish breasts and flanks. Both sexes of the Australasian white-eye have a broad white subterminal bar on the bill which approaches the bill-barring of the preceding group. There is no distinct eclipse plumage, which is understandable considering the similarity of the sexes. The tracheal tube of the male is enlarged toward the middle and the bulla is almost identical in shape to that of the ring-necked duck. The species is sympatric with only the New Zealand scaup, and no hybrids are known.

General behavior. The preflight movements of this species are the usual Chin-lifting of pochards.

Agonistic and sexual behavior: female. Inciting in this species is only slightly ritualized, and consists of overt threatening movements to the side (Fig. 66A), followed by rapid retreats toward the preferred drake in a neck-stretched posture (Fig. 66B). The Inciting call is a harsh and rather loud rattling noise similar to that produced by drawing a stick along a lathe fence. Preening-behind-the-wing has not been recorded, but almost certainly is present. Females also exhibit an additional display, the Head-throw. This occurs only rarely, and apparently abnormally, in all the preceding species of pochards but in the Australian white-eye it is a frequent and conspicuous part of courtship display. The call is a hoarse *gaaack*, and the form of the Head-throw is essentially the same as in males. I have also observed females utter the Kinked-neck call, but this is less frequent than in the ferruginous white-eye, the females of which frequently perform both the Head-throw and the Kinked-neck call.

Agonistic and sexual behavior: male. The Australian white-eye differs most markedly from the preceding species in that the Kinked-neck call of the male is strongly exaggerated and is often uttered several times in rapid succession (Fig. 65E, F). There is a very conspicuous bending of the neck each time the call is emitted, although the tongue is not so strongly depressed as in the canvasback or red-head. In addition, the Kinked-neck call occurs in association with the Sneak posture. The male stretches his neck toward the courted female (or another male) with his head low over the water, then as he withdraws it he utters the Kinked-neck call (Fig. 66E, F). A very similar display occurs in Baer's pochard. The Coughing call occurs only infrequently in this species and is a very soft whistling note. The Head-throw is a conspicuous display in this species (Fig. 66C, D). The display is a relatively slow one (lasting approximately $\frac{2}{3}$ second), and is distinctly asymmetrical, with the bill being sharply tilted toward the courted female as it is brought back from a point well past the vertical. The Head-throw and Kinked-neck call is a soft *whirrrr*. Males perform the Nod-Swim only infrequently and not very conspicuously. Preening-behind-the-wing has been noted several times, as would be expected because of the conspicuous white speculum pattern. In common with the other pochards, males Turn-the-back-of-the-head to Inciting females in the usual manner. The

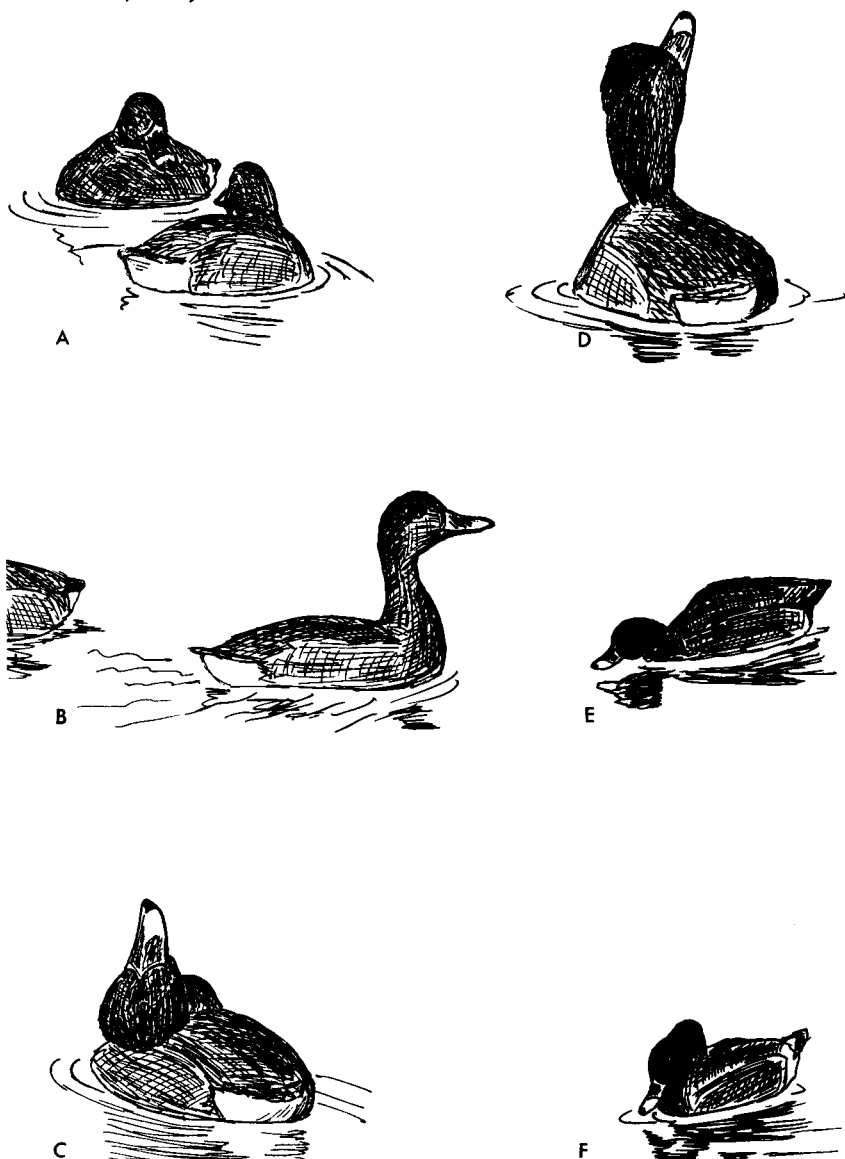


Figure 66. Australian White-eye

A, B. Inciting by female Australian white-eye. Note direct threats alternated with extreme neck-stretching.

C, D. Two phases of Head-throw by male. Note marked asymmetry of head movement. (*Female off picture to right.*)

E, F. Two phases of Sneak-Kinked-neck call display. Compare with corresponding displays in Figs. 67, 68.

white under-tail coverts do not appear to be displayed in any obvious fashion, and although the white iris of males is doubtless a signal characteristic, it is uncertain whether the size of the pupil can be altered during display.

Copulatory behavior. The Australian and Baer's white-eyes are the only species of *Aythya* I have observed in which the males perform slight Head-pumping movements which are alternated with Bill-dipping and Preening-dorsally. There is no obvious response of the female to these movements, but eventually she assumes the typical pochard copulation posture. After treading, the male utters a single Kinked-neck call and swims away in the usual Bill-down posture, and the female begins to bathe.

Baer's White-eye (*Aythya baeri*)

Baer's white-eye, or "Baer's pochard," is certainly a typical member of the white-eye group. Little is known about the species, and it has often been thought possibly to represent an eastern race of the common white-eye. This hypothesis is not, however, supported by the behavior of the species. The downy young are undescribed, and it would be of interest to learn if they have the grayish and white coloration found in the Australian white-eye or the blackish and yellow color of the common white-eye. The juveniles and females are very similar to those of the common white-eye, although both females and adult males have a slightly metallic-green head color that is absent in the other white-eyes. The trachea has a gradual enlargement toward the middle and the bulla is very similar in shape to that of the Australian white-eye. Baer's white-eye is not sympatric with any other species of the white-eye group. A possible hybrid between this species and the redhead has been reported from captivity.

General behavior. The few individuals of this species that I have seen could not be distinguished easily from the other white-eyes. In general appearance they are reminiscent of the common white-eye, but their behavior suggests that they are closer to the Australian species. The preflight signal is the usual Chin-lifting, which is rather exaggerated and jerky in this species.

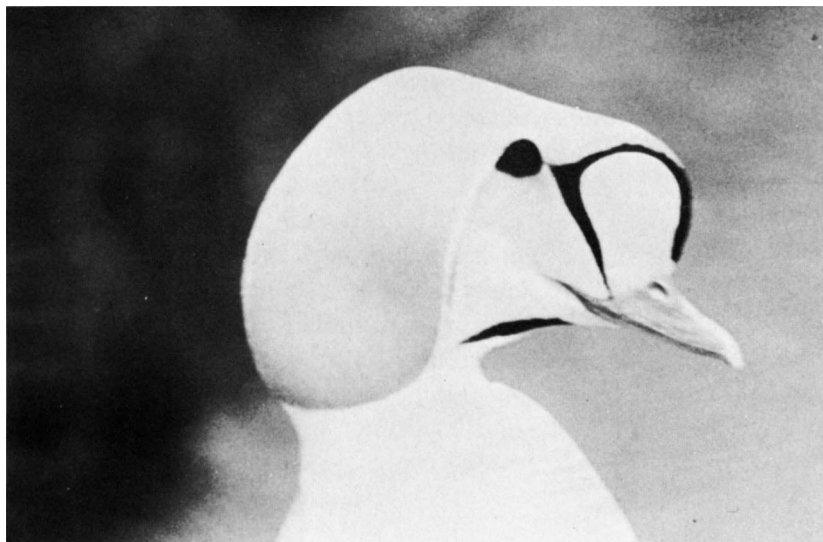
Agonistic and sexual behavior: female. Female Inciting is of the usual slightly ritualized pattern, and the call is a fairly loud and coarse *gaaaa* similar to that of the other white-eyes. Females also possess a Head-throw display, in which a similar *gaaak* note is



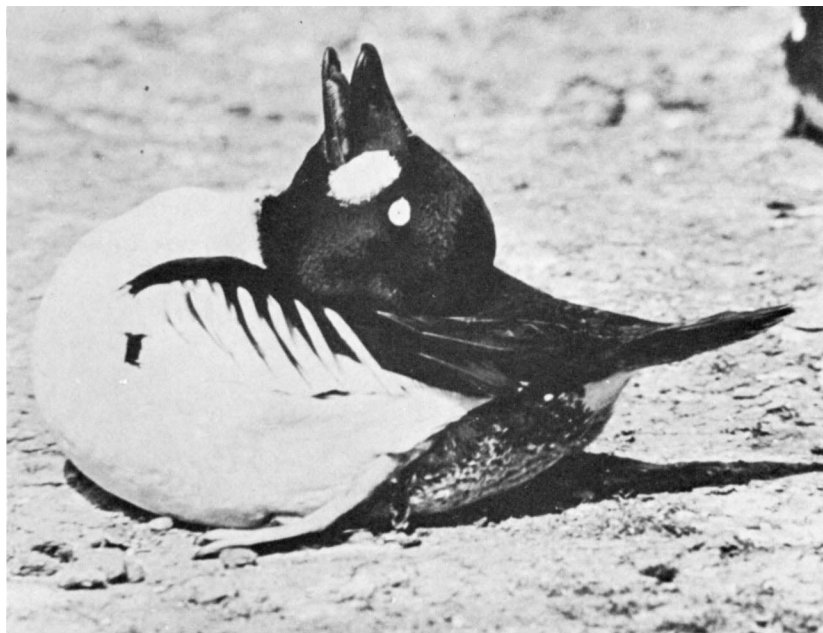
Canvasback, Sneak display by male.



Common White-eye, Head-throw by male.



King Eider, Neck-stretching by male.



Common Goldeneye, Head-throw by male on land.

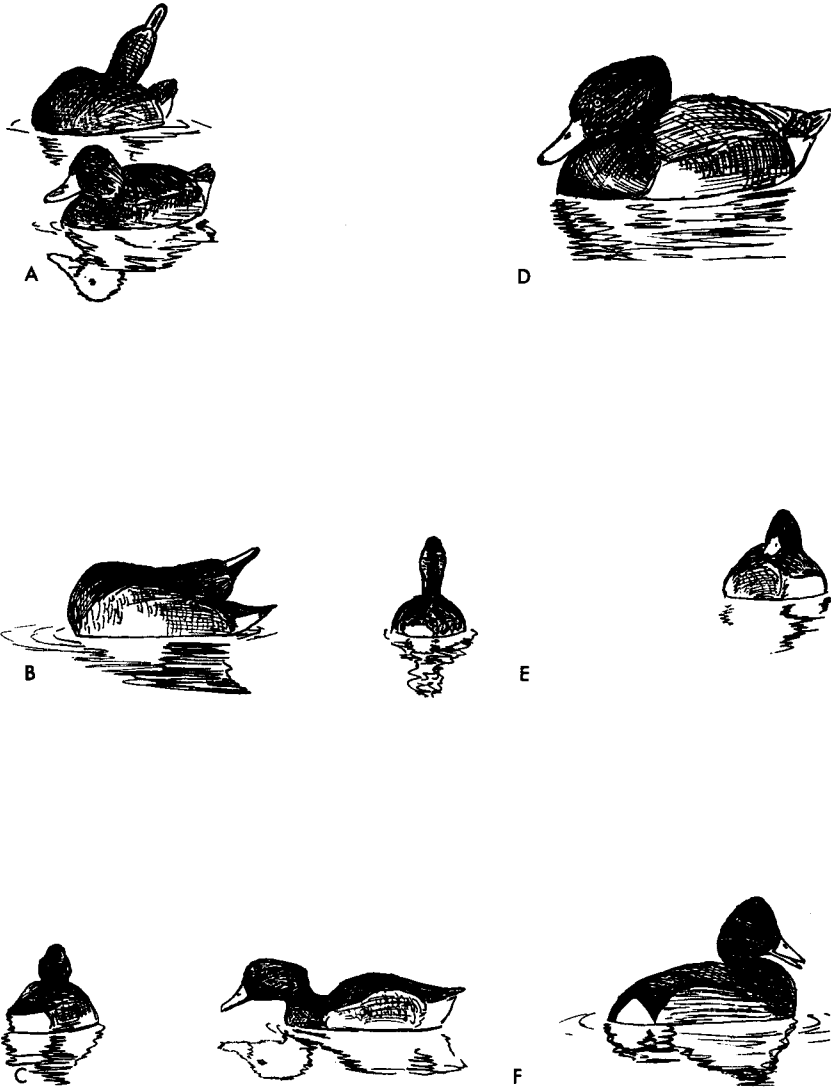


Figure 67. Baer's Pochard, Common White-eye.

- A. Head-throw by male Baer's pochard. Note tilting of bill to side nearest female.
- B. Another view of Baer's pochard male performing Head-throw.
- C. Sneak posture of Baer's pochard.
- D. Kinked-neck call by male Baer's pochard.
- E. Precopulatory Preening-dorsally by male Baer's pochard. Note that preening is on side toward female.
- F. Kinked-neck call by common white-eye male. Note that tail is tilted downward to form white triangular patch.

uttered, and during which the head is thrown back slightly beyond the vertical. I have not observed females perform the Kinked-neck call such as occurs in the Australian and common white-eyes. Females do, however, frequently Preen-behind-the-wing to males.

Agonistic and sexual behavior: male. Male displays in this species are very much like those of the Australian white-eye. The Kinked-neck call (Fig. 67D) is sometimes performed repeatedly, but this is not done as frequently as in the Australian white-eye. The call associated with this display and the Head-throw is extremely unusual, and is a harsh female-like *krraaaa* that has a distinctly ventriloquistic effect. As in the Australian white-eye, the Sneak (Fig. 67C) is linked to the Kinked-neck call and is always directed toward another bird. The Head-throw (Fig. 67A, B) is sometimes preceded by one or more head-shakes, but this is not typical. It is a moderately slow display, (lasting approximately $\frac{1}{2}$ second), and the bill is brought back almost 180 degrees. The display is distinctly asymmetrical, toward the side of the courted female. The Coughing call and the Nod-swim are inconspicuous and infrequent. Preening-behind-the-wing is frequently performed as a mutual display with females, and males also often Turn-the-back-of-the-head to Inciting females.

Copulatory behavior. As in the Australian white-eye, males initiate copulation by performing slight Head-pumping movements, which are alternated with Bill-dipping and Preening-dorsally (Fig. 67F). The female sometimes Preen-dorsally and Bill-dips in response before assuming the receptive posture. After treading, the male utters a single Kinked-neck call and swims away in the usual Bill-down posture.

Common White-eye (*Aythya nyroca*)

The common, or ferruginous, white-eye differs somewhat from the two preceding species, and possibly represents a connecting form between the white-eyes and the scauplike ducks. The downy young are darker than those of the Australian white-eye, but lack any facial markings. Juveniles and females resemble adult males except for their duller plumage and different iris coloration. The male in nuptial plumage has a rich brownish-red head and breast and, like the two preceding species, has white under-tail coverts and a white speculum. A female-like eclipse plumage is present. The male tracheal tube is enlarged over most of its length, and the bulla is al-

most identical in shape to that of the Australian white-eye. The common white-eye has a broad range in Europe and eastern Asia, and is sympatric with several species of *Aythya*. Wild hybrids have been reported with the European pochard, the tufted duck, and the greater scaup. Hybrids with the first two species have proved fertile in captivity. Captive-bred hybrids have also been reported with the red-crested pochard, the rosy-bill, the lesser scaup, and the New Zealand scaup.

General behavior. On the water, common white-eyes are, in general appearance and shape, rather more reminiscent of tufted ducks and scaups than of the two preceding species. The rapid Chin-lifting movements typical of the whole pochard group constitute the pre-flight signal.

Agonistic and sexual behavior: female. Inciting by the female is characterized by frequent overt attacks, after which the female swims back to the preferred male, neck-stretching and repeatedly calling *gak-gak-gak*. Females rarely perform Preening-behind-the-wing, but, surprisingly, frequently perform Head-throws (Fig. 68D). The Head-throw call is also a *gaaak*, and the bill is scarcely tossed back past the vertical. As in the Australian white-eye, females also perform a Kinked-neck call similar to the male's. Steinbacher (1960) has also recorded this and noted that the associated call is an *errr*.

Agonistic and sexual behavior: male. The courtship postures of this species are rather different from those of the preceding forms. The usual male posture is one in which the tail is depressed into the water, producing a triangular white pattern with the under-tail coverts (Fig. 67F). In this posture the male frequently moves with jerky forward and backward head movements in a Nod-swim. The Kinked-neck call (Fig. 67F) is frequently uttered and may be repeated several times as in the two preceding species, although the neck movements are not so exaggerated. I have written this call as *wheooooo*, but Steinbacher (1960) describes it as *wückwück*. Sneaking is very frequent, during which a similar call is uttered, and from the Sneak posture the male always goes directly into the Neck-stretching display (Fig. 68A, B). The Head-throw (Fig. 68C) is always preceded by one or more head-shakes, and the display is relatively rapid (lasting approximately $\frac{1}{3}$ second). The bill travels through an arc of about 135 degrees, and scarcely if at all leaves the vertical plane. The call is the same as that uttered during the Kinked-

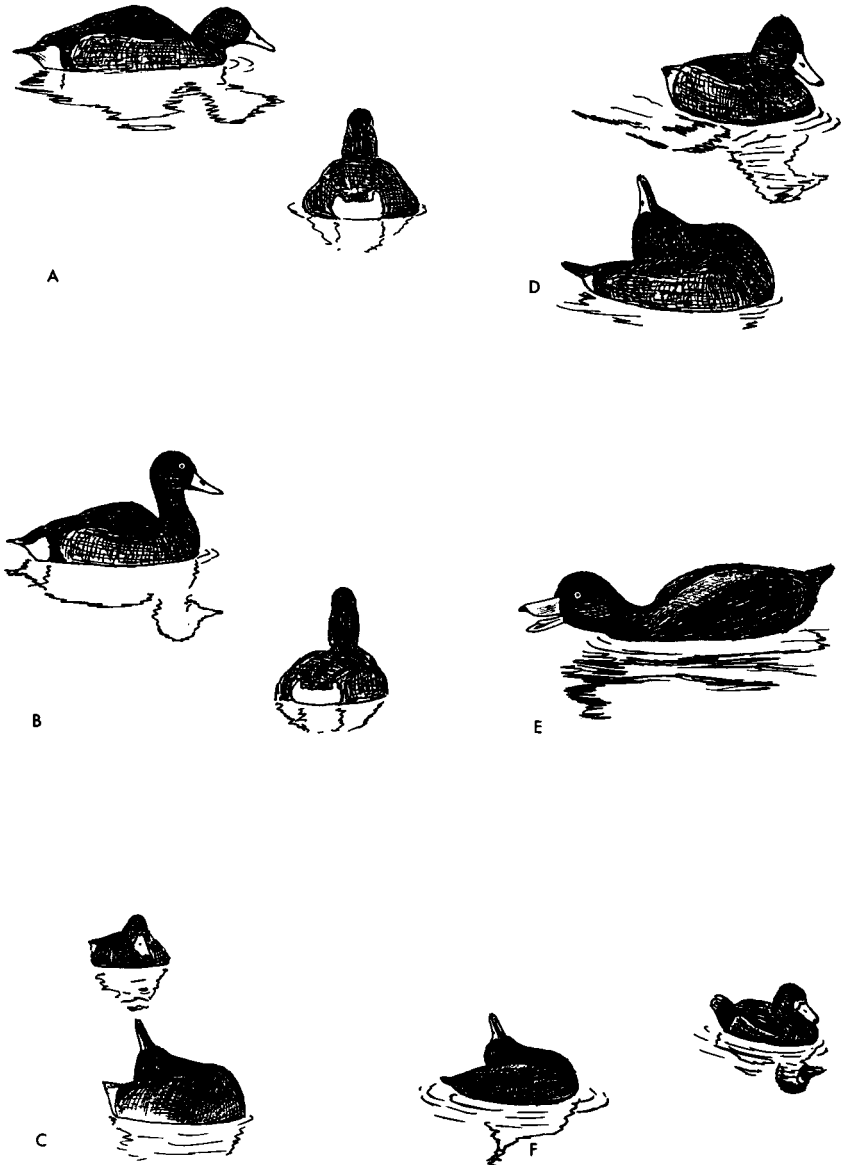


Figure 68. Common White-eye, New Zealand Scaup

A, B. Two phases of Sneak-Neck-stretching display of male common white-eye.

C. Head-throw by male common white-eye.

D. Head-throw by female common white-eye.

E. Male New Zealand scaup in Sneak posture.

F. Head-throw by male New Zealand scaup.

neck call. Coughing is fairly frequent and conspicuous in this species. It consists of rather high-pitched *wee'whew* and a noticeable rapid flick of the wing tips as the call is emitted. Males respond to female Inciting by swimming ahead and Turning-the-back-of-the-head. Preening-behind-the-wing is also occasionally performed by males.

Copulatory behavior. Thus far I have not observed a complete copulation, but I have seen obvious precopulatory behavior. This consisted of the male performing repeated Bill-dipping and Preening-dorsally, and the Head-pumping observed in the two preceding species was not evident. The female made no obvious response to the male's displays. According to Mr. Vincent Weir (pers. comm.) the postcopulatory display is like that of the other pochards.

Madagascan White-eye (*Aythya innotata*)

The Madagascan white-eye is a little-known species which is almost certainly an island derivative of the common white-eye. Its downy young are almost identical with those of that species, and the female plumage is likewise very similar in both forms. The adult male is rather darker throughout, and although it is said to have a more rounded head shape than the male of the common white-eye, this is questionable. The tracheal structure is, to my knowledge, undescribed. In captivity this species has produced fertile hybrids with the common white-eye.

General and sexual behavior. Delacour (1959) states that this species resembles the redhead in its general appearance and voice. I have not observed living specimens, but I doubt that the species differs markedly in behavior from the common white-eye.

New Zealand Scaup (*Aythya novae-seelandiae*)

The New Zealand scaup is a typical member of the last subgroup of *Aythya*, the scauplike ducks. Species in this group are typified by sexually nondimorphic iris coloration, downy young that are very dark in color, males with metallic head coloration and black breasts and under-tail coverts, and females which are generally brownish except for a white patch behind the bill. The bill is broad and bluish in both sexes. Downies of this species lack the dark cheek and eye marks typical of the remaining species, and also have some dorsal spotting, which is absent on the others. In addition, the males

are unusual inasmuch as they are almost entirely blackish, although, as in the other species, there is a conspicuous white speculum. The male tracheal tube is only slightly enlarged and the bulla is exactly like that of the tufted duck. The species was sympatric with the Australian white-eye, but the latter is no longer found in New Zealand. In captivity hybrids have been reported with the common white-eye.

General behavior. As in the other scaups, the preflight movements consist of very rapid Chin-lifting, which might be better described as upward bill-flicking.

Agonistic and sexual behavior: female. Inciting is similar to that of other scaups, in that it lacks overt threats and consists mostly of neck-stretching with occasional lateral and downward pointing movements of the bill (see Fig. 70A, B). The call is a high-pitched and repeated *errrrr*. As in the other scaups, Preening-behind-the-wing is frequently used as a display, but I have never observed a female Head-throw.

Agonistic and sexual behavior: male. The most frequent and conspicuous male courtship display is Coughing. This is a clear, high-pitched whistle that is audible for fifty yards or more. It is usually a three- or four-note call, *whe-whe-whe-whe*, with all the notes on the same pitch and the last note prolonged, reminding one of a Morse Code signal—dot-dot-dot-dash. Males also often perform a conspicuous Nod-swim similar to that of tufted ducks and white-eyes. The Kinked-neck call is frequent, but the neck is not strongly kinked, and the call is a double-note *whe-whe*. The Head-throw is less frequent, and is always preceded by one or more head-shakes. It is a rapid display (lasting approximately $\frac{1}{4}$ second), and the bill travels back only slightly past the vertical (Fig. 68F). The display is symmetrical, with the bill following the median plane of the body. This species differs from the other scaups in that Sneaking is a conspicuous and frequent display (Fig. 68E). A soft note accompanies this display, which is directed to males as well as females. Although females frequently Preen-behind-the-wing, I have not recorded this display in males. Males do Turn-the-back-of-the-head to Inciting females while swimming rapidly in front of them, and, as in the other scaups, the head feathers are strongly depressed during this display.

Copulatory behavior. The precopulatory behavior consists of the male Bill-dipping and Preening-dorsally, to which the female may or

may not respond in the same fashion. After treading, the male calls once, then swims away in the Bill-down posture.

Tufted Duck (*Aythya fuligula*)

The tufted duck is without doubt a very close relative of the true scaups, and could appropriately be called the tufted scaup. The downy young are practically identical with those of scaups, being very dark above without back spotting, and with dusky faces crossed with cheek and eye stripes. Juveniles resemble adult females, which have the typical scaup pattern of a brownish body and white face-markings. The male in nuptial plumage differs from scaups mainly in its occipital crest, which together with the dark back probably functions as a species-recognition signal that reduces confusion with the greater scaup. Unlike the ring-necked duck, this species has an iris which is the same color in both sexes, a white wing-speculum, and a broad, short bill. Males possess a distinct eclipse plumage. The male tracheal tube is only slightly enlarged and the bulla is of the usual scauplike type in that the right chamber is somewhat inflated. The species occurs over nearly all of Europe and Asia, and is broadly sympatric with several other species of *Aythya*. Wild hybrids have been reported with the greater scaup, the common white-eye, and the European pochard. Those involving the last two species have proved fertile in captivity. Captive-bred hybrids have also been obtained with several other pochards.

General behavior. Unlike the ring-necked duck, the tufted duck is a bird of large lakes and reservoirs. It is unusual in that nesting frequently occurs near or among gull colonies. Preflight signals consist of very rapid and repeated Chin-lifting movements like those of scaups.

Agonistic and sexual behavior: female. Inciting in this species consists of scauplike neck-stretching alternated with slight threatening movements, and a soft *kärrr*. Steinbacher (1960) has also heard a *quack* or *gack* sound uttered by female tufted ducks. Unlike other scaup females, the female of this species sometimes performs the Head-throw, and also Preens-behind-the-wing fairly frequently.

Agonistic and sexual behavior: male. In practically every respect the behavior of the male tufted duck is like that of male scaups. The Kinked-neck call is performed frequently, but, as in the scaups, the neck is not strongly bent during the call. The note uttered during this

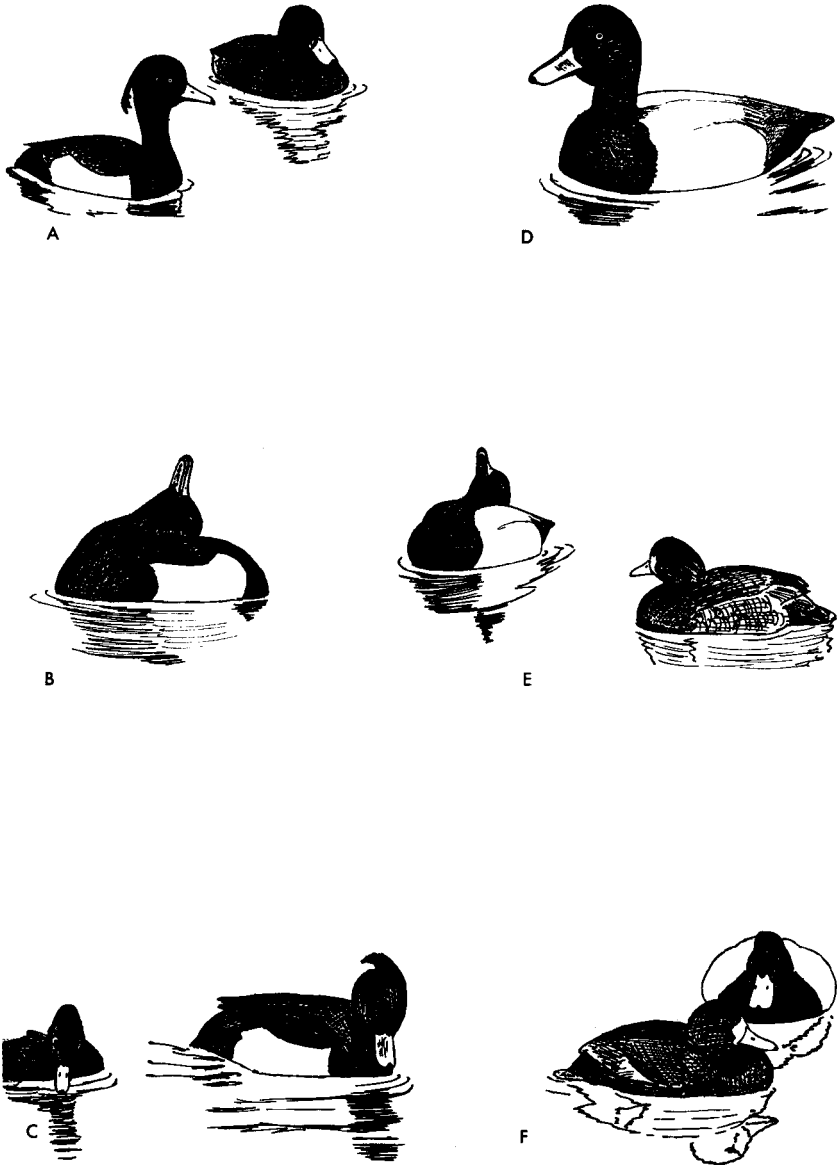


Figure 69. Tufted Duck, Greater Scaup

- A. Coughing posture of male tufted duck (*left foreground*).
- B. Head-throw by male tufted duck.
- C. Postcopulatory Bill-down display by male tufted duck, female bathing.
- D. Kink-necked call by male greater scaup. Note bulge in throat.
- E. Head-throw by male greater scaup.
- F. Sneak posture by male greater scaup.

display, and also during the Head-throw, is a mellow *whee'oo*. The Head-throw (Fig. 69B) is a relatively fast display (lasting approximately $\frac{1}{4}$ second), in which the bill is brought rapidly back to a point just beyond the vertical without being removed from the median plane. The Cough is very frequently performed, and as in the scaups, it is conspicuous for the distinct wing- and tail-flick that accompanies the call (Fig. 69A). This is a three-note whistle, much like that of the New Zealand scaup—a rapid and windy *wha'-wa-whew* with the first note highest and loudest, and the last most prolonged. I have not observed Sneaking in this species, but Hans Lind (pers. comm.) has noted it, and I suspect that it is as inconspicuous as it is in the greater and lesser scaups. Preening-behind-the-wing has been seen often, although it is perhaps not so common as in greater and lesser scaups. Males respond to female Inciting in the usual manner, by Turning-the-back-of-the-head while strongly depressing the head feathers. Males also at times perform a Nod-swim, a display which is typical of New Zealand scaup but not the greater and lesser scaups.

Copulatory behavior. Copulation is initiated by the male. Occasionally he Bill-dips, but mainly he Preens-dorsally and at times also Preens-behind-the-wing. The female may respond with some of these same movements; sometimes she suddenly assumes the receptive posture. As treading is completed, the male utters the usual Kinked-neck call and swims away in the Bill-down posture (Fig. 69C).

Greater Scaup (*Aythya marila*)

The greater scaup has the widest range of all the *Aythya* species, and is found throughout the Northern Hemisphere. The downy young are very dark all over and have slight facial striping as in the tufted duck and the lesser scaup. Females have the usual blue bills, white face-marks, and white specula of the group. The adult male has a rounded and green-tinted head plumage, but he is otherwise very similar to the male lesser scaup. There is a distinct eclipse plumage. The male trachea is enlarged throughout most of its length, and the bulla is large and has a markedly expanded right chamber. Although sympatric with numerous other species, the greater scaup is rather maritime in its distribution and contact with other species is thus probably reduced. Wild hybrids involving the redhead, the common white-eye, and the tufted duck have been reported, and several other combinations have been obtained in captivity.

General behavior. Because of the greater scaup's tendency to remain on salt water or on the largest and deepest lakes, there does not appear to be much contact between it, and the lesser scaup. Because of the great similarity of the two forms, it is not surprising that no wild hybrids involving them have been reported. Preflight movements are the usual rapid Chin-lifting of the scauplike ducks.

Agonistic and sexual behavior: female. Female Inciting consists mainly of neck-stretching, with occasional lateral movements of the bill (Fig. 70A, B). The associated call is a low *arrrrr*. I have never observed a female Head-throw, but Preening-behind-the-wing is very frequently directed toward males.

Agonistic and sexual behavior: male. As in the other scaups, the Cough is the most frequent and noticeable courtship display. This has the usual flick of the wings and tail, and the call is a soft and very fast whistle—*week-week-whew*. A rapid and very soft *wa'hoouo* (described as *kucku* by Steinbacher, 1960) is used in both the Head-throw and the Kinked-neck call. The Kinked-neck call is uttered with the neck slightly stretched, and the only obvious movement is the enlarging of the throat caused by the lowering of the tongue as the note is uttered (Fig. 69D). The Head-throw is always preceded by one or more head-shakes and is a very fast movement (lasting approximately $\frac{1}{6}$ second) in which the bill is brought back approximately to the vertical without leaving the median plane. In this species, as in the lesser scaup, Sneaking is reduced to little more than an intention movement (Fig. 69F), and is apparently performed without an associated call or with only a very faint one. One of the most common and conspicuous male displays is Turning-the-back-of-the-head while swimming in front of an Inciting female. This display is characterized by an extreme depression of the head feathers, which produces a very flat head profile (Fig. 70A, B). Males often Preen-behind-the-wing to females (Fig. 70C), and mated birds frequently direct this display mutually toward one another. The greater scaup apparently differs from the two preceding species in not having a Nod-swimming display.

Copulatory behavior. Copulation is initiated by the male as he Bill-dips, Preens-dorsally, and Preens-behind-the-wing. The female usually responds with these same displays and then assumes the receptive posture. After treading, the male utters the Kinked-neck call, then swims in the usual Bill-down posture (Fig. 70D). The female often swims a few feet in the same posture before bathing.

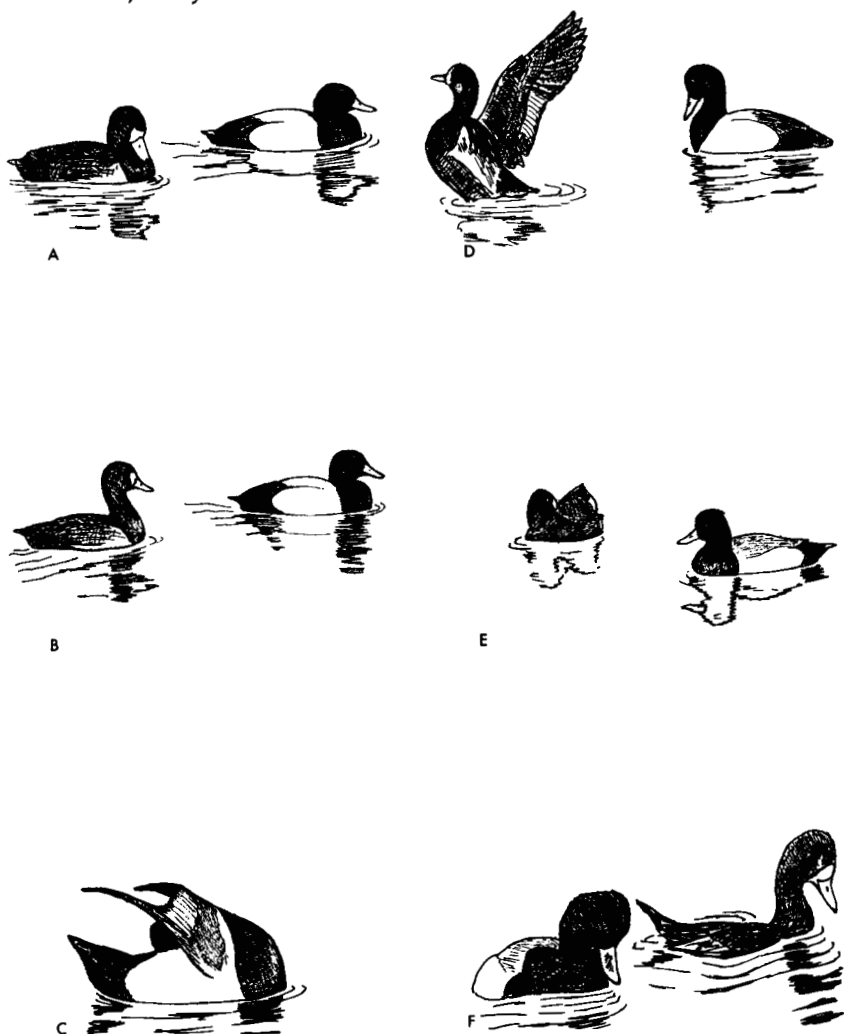


Figure 70. Greater Scaup, Lesser Scaup

- A, B. Male greater scaup Leading an Inciting female by 'Turning-the-back-of-the-head toward her. Compare male's profile with Fig. 69D.
- C. Male greater scaup Preening-behind-wing. Note speculum pattern exhibited.
- D. Postcopulatory Bill-down posture by male greater scaup; female wing-flapping after bathing.
- E. Female lesser scaup Preening-behind-the-wing to male in precopulatory situation.
- F. Postcopulatory display by lesser scaup. Both birds are in the Bill-down posture.

Lesser Scaup (*Aythya affinis*)

The lesser scaup of North America, like the tufted duck of Europe and Asia, is clearly a derivative of the greater scaup stock. Downy, juvenile, and female plumages of greater and lesser scaup are almost identical, and males in nuptial plumage differ mainly in that those of the lesser scaup have a more grayish back and a more crested and purplish-tinted head. There are also slight differences in the extent of the white wing-speculum. I have not observed the trachea of the lesser scaup male, but no doubt it too is very much like that of the greater scaup male. The species is restricted to North America and is sympatric with several other pochards. Wild hybrids have been reported with the canvasback, the redhead, and the ring-necked duck. As indicated earlier, hybrids with the greater scaup would be almost impossible to recognize with certainty.

General behavior. The pre-flight signal is Chin-lifting, which is performed even more rapidly in this species than in the greater scaup. The tendency of this species to feed on small lakes and marshes distinguishes it from the greater scaup, although both species consume a high proportion of animal material in their diets.

Agonistic and sexual behavior: female. Inciting takes a form practically identical with that of the greater scaup, although the Inciting call is even weaker than in that species. I have never observed a female perform the Head-throw, although Preening-behind-the-wing is a very frequent display.

Agonistic and sexual behavior: male. Displays of the lesser scaup are very similar to those of the greater scaup, differing mainly in the speed of performance and the associated vocalizations. The Coughing Call is frequently uttered, and, as in the greater scaup, the wings and tail are distinctly flicked. The call is a one-note whistle, *whew*. The Kinked-neck call and Head-throw call is a faint *whew-ooo*. As in the greater scaup, the Kinked-neck call is emitted with very little neck movement. The Head-throw is an extremely fast display (lasting approximately $\frac{1}{20}$ – $\frac{1}{30}$ second) which is rarely seen unless one watches for the special head-shakes that always precede it. It is probably significant that all the species with fast Head-throws have preliminary head-shakes which apparently serve to draw attention to the male, whereas those with extended Head-throws tend to lack such preliminary head-shakes. In this species the head movement is the

fastest of any in the pochard species; it is only a blur to the human eye. At times the bill appears to be thrown back to the vertical, but slow motion sequences (64 frames per second) suggest that the usual arc is less than 45 degrees. As in the other scaups, the bill is not tilted away from the vertical plane. In the lesser scaup Sneaking is exactly like that in the greater scaup and is easily overlooked. Males also Turn-the-back-of-the-head toward Inciting females in exactly the same manner as greater scaup males, with their head feathers similarly depressed to produce a remarkably low profile. Preening-behind-the-wing is frequently performed by males, and often this display is performed mutually with females.

Copulatory behavior. The male precopulatory display consists of Bill-dipping, Preening-dorsally, and Preening-behind-the-wing. As in the other scaups, the female may or may not respond with the same displays before assuming the receptive posture (Fig. 70E). After treading, the male, and usually also the female, swims in the Bill-down posture (Fig. 70F). No doubt the male utters his Kinked-neck call as well, but I have never been close enough to hear this.

TRIBE MERGINI (SEA DUCKS)

As constituted here, the tribe Mergini includes all the species which Delacour and Mayr (1945) originally placed in the group. Delacour later (1959) removed the four species of eiders and placed them in a separate tribe, Somateriini, between the dabbling ducks and pochards. This was done apparently as a result of Humphrey's anatomical studies (1955, 1958), which suggested that the eiders might be more closely related to *Anas* than to the other "sea ducks." I have discussed this problem elsewhere (Johnsgard, 1960f, 1964) and concluded that the original inclusion of the eiders in the Mergini seems to fit the facts more adequately. Woolfenden (1961) has reached the same conclusion using anatomical evidence.

The tribe includes 20 species of which two are extinct. Except for two Southern Hemisphere species, the group is of northern and arctic distribution. All species consume a high proportion of animal material, although they are by no means all "sea" ducks. All dive extremely well, although the manner of diving varies in that some species usually open their wings when diving and others never do. All the species except the isolated Southern Hemisphere forms exhibit considerable sexual dimorphism in plumage, voice, and behavior, and