

## COURTSHIP AND COPULATORY BEHAVIOUR OF THE NEW ZEALAND GREY DUCK

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The displays of most Anatini are well documented (Lorenz, 1953; von de Wall, 1963; Johnsgard, 1965) but detailed references to Australasian species are few. This paper describes displays associated with social courtship and pair-formation, and behaviour associated with copulation in the Grey Duck (*Anas superciliosa superciliosa*). It is based on the observation of both wild and captive birds at the Mount Bruce Native Bird Reserve, Wairarapa, New Zealand.

### DISPLAYS OF THE MALE

*Head-flick* — The simultaneous tossing and rotation of the head reveals the cream-coloured chin in contrast with the surrounding dark plumage. During social courtship, a male will perform several Head-flicks in rapid succession with an Introductory-shake or major display following the last of such a sequence. Head-flicking may occur on land or water.

*Introductory-shake* — This is a ritualized swim-shake (McKinney, 1965) differing from the comfort movement only in having an exaggerated preliminary tail-wag. The movement, which I have seen performed only on water and with the male usually positioned to one side of the female, involves a vigorous tail-wag, rapid paddling of the feet thereby raising the body out of the water, and the upward stretching of the neck and head. It occurs frequently among Head-flicks and like them indicates increasing sexual excitement. This display shows qualitative variation; the intensity of the Introductory-shake increases with increasing excitement and the drakes rear higher from the water until the threshold of a major display is reached and subsequently performed.

Lorenz (1958) has used the term "Head-flick" to include both Introductory-shake and Head-flick as here used. My observations indicate that a clear separation between the two displays exists, and in this respect I follow McKinney (1965).

*Grunt-whistle* — This has the lowest threshold of the three major displays and is performed with the male's body broadside to the female's. The bill is first dipped into the water, the head flicked toward the female, sending an arc of water droplets high in the air. As the bill returns to the water, chest and belly are raised high so that at the peak of body erection, the neck is stretched far forward and the head held low. A shrill whistle and deep grunt follows, the head straightens up and the body sinks back on to the water (Plate IX): A vigorous tail-wag and head-shake (occasionally head-flick) follows.

*Head-up-tail-up (HUTU)* — This major display has the effect of shortening and heightening the performer. The rump is first curved upward, the tail feathers directed vertically and the elbow simultaneously raised. The head, with chin almost touching the neck,

is then thrust backward and upward, the peak of head erection coinciding with that of the wing (Plate X). A muted "raeb" note is uttered and the head is abruptly turned toward the female. Rump and wings are then lowered, head remains upstretched and the body turns through 90° toward the female. The drake is now in the Turn-toward-female (TTF) posture. The head is next lowered and stretched forward and the drake shoots across the water Nod-swimming (NS), often describing an approximate semi-circle about the duck.

All three components of the display are rigidly linked, the full sequence of HUTU + TTF + NS being almost invariably followed. On two occasions (from a sample of 400 displays), the HUTU component was performed alone, followed immediately by a Down-up (see below).

This display provides a striking visual stimulus, the effect being derived chiefly from two sources:— The drake is always positioned broadside on to the duck and the raising of the elbow exposes the full extent of the metallic-green speculum. As the head is upthrust, the medial crown feathers are raised giving the head a rounded silhouette. This accentuates the black crown, which contrasts vividly with the cream face.

Grey Duck frequently show an abbreviated form of this display. The initial raising of wing and rump is omitted, the crown feathers alone are raised and more than one "raeb" note given. The male is always directed toward the female and this orientation and posture is typically that of the TTF component. This TTF is held longer than in the full display but the NS which follows has only a weak nodding component and the bird does not swim far.

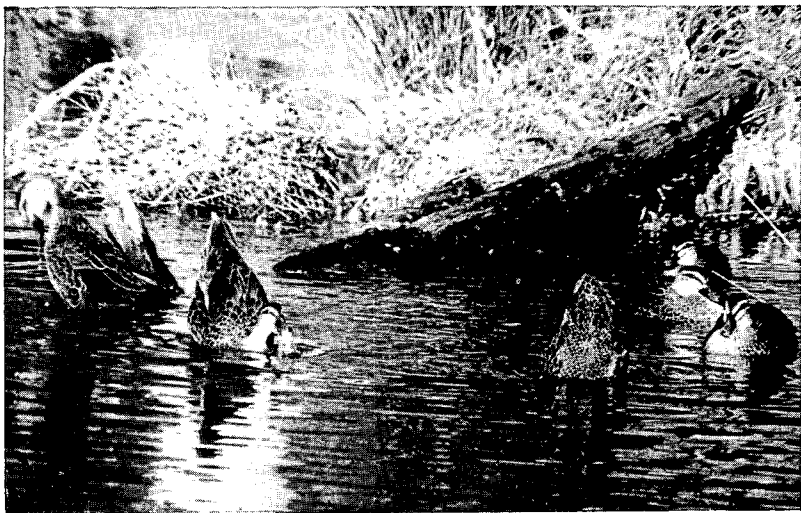


Plate IX — Social Courtship of Grey Duck. Simultaneous performance of Grunt-whistle (left) and Down-up (centre and right).

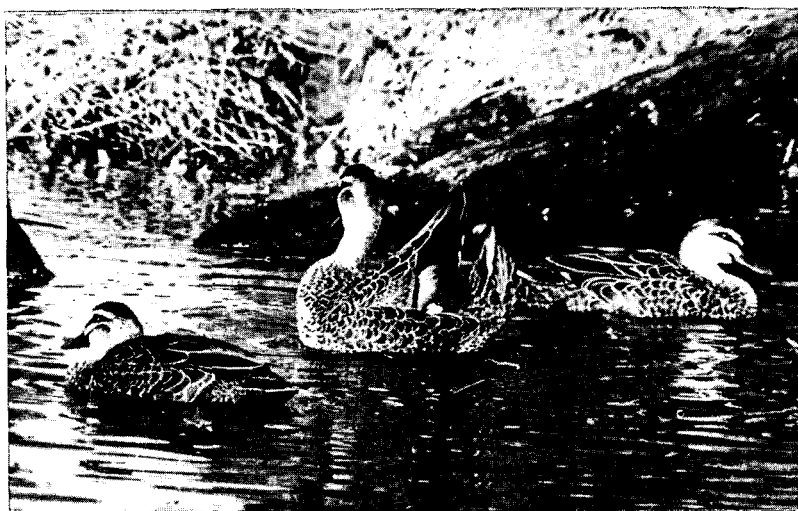


Plate X — Head up - tail up.

*Down-up (DU)* — The form of this display closely resembles the drinking movement which frequently follows the wing-flapping comfort movement. The chin is first lifted high, the head is then plunged downward until the bill makes contact with the water and at the same time the rear half of the body is lifted high (Plate IX). In the next movement, the head is flicked so as to lie horizontally and the neck upstretched — the result being that when the head is highest, the breast is deepest. So rapid is this upward head movement that a small fountain is raised. The body then resettles to the normal swimming pose.

The Down-up is the briefest and least gymnastic of the three major displays but has the highest threshold of stimulation, being usually performed only when two or more birds display simultaneously.

*Nod-swim* — Nod-swimming occurs as an independent display. During social courtship, drakes alongside the duck and facing the same way may suddenly swim directly away, moving the head rapidly backward and forward. This behaviour is not preceded by the adoption of any specific posture.

Johnsgard (1965) has referred to the "abbreviated HUTU" as an independent Nod-swim. I believe that a separation between the "abbreviated HUTU" and the Nod-swim not preceded by any specific posture does exist. The "abbreviated HUTU" has a typical TTF component and the bird must turn through 90 degrees before commencing the NS component. In the independent Nod-swim, specific body orientation also exists and the bird does not turn nor does it raise the head or call before displaying. Sequential analysis would confirm this separation.

Von de Wall (1963) described three types of Nod-swimming in the Mallard (*A. p. platyrhynchos*) and all are recognizable in the



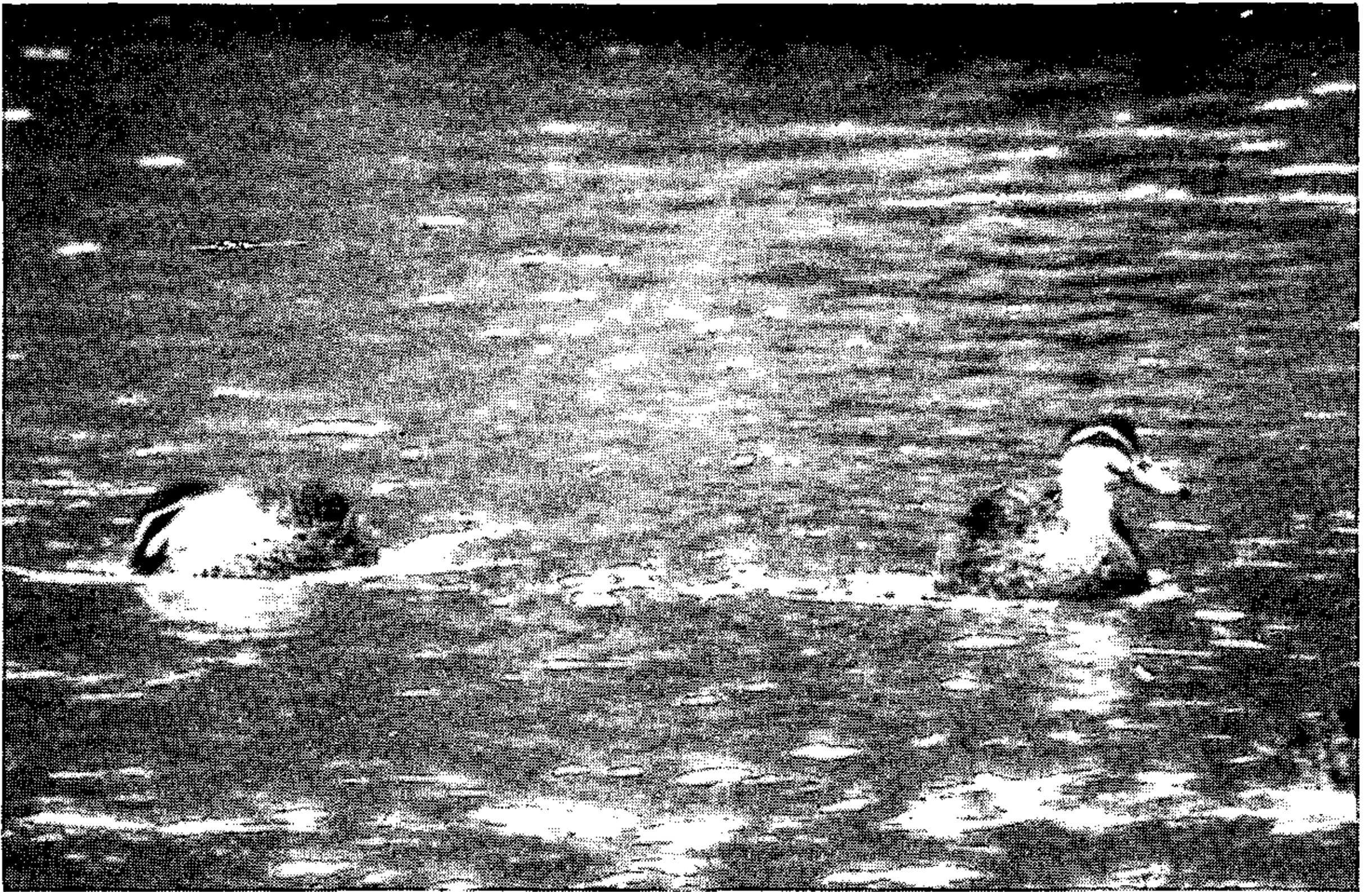


Plate XI — Male 'leading' in response to inciting female.

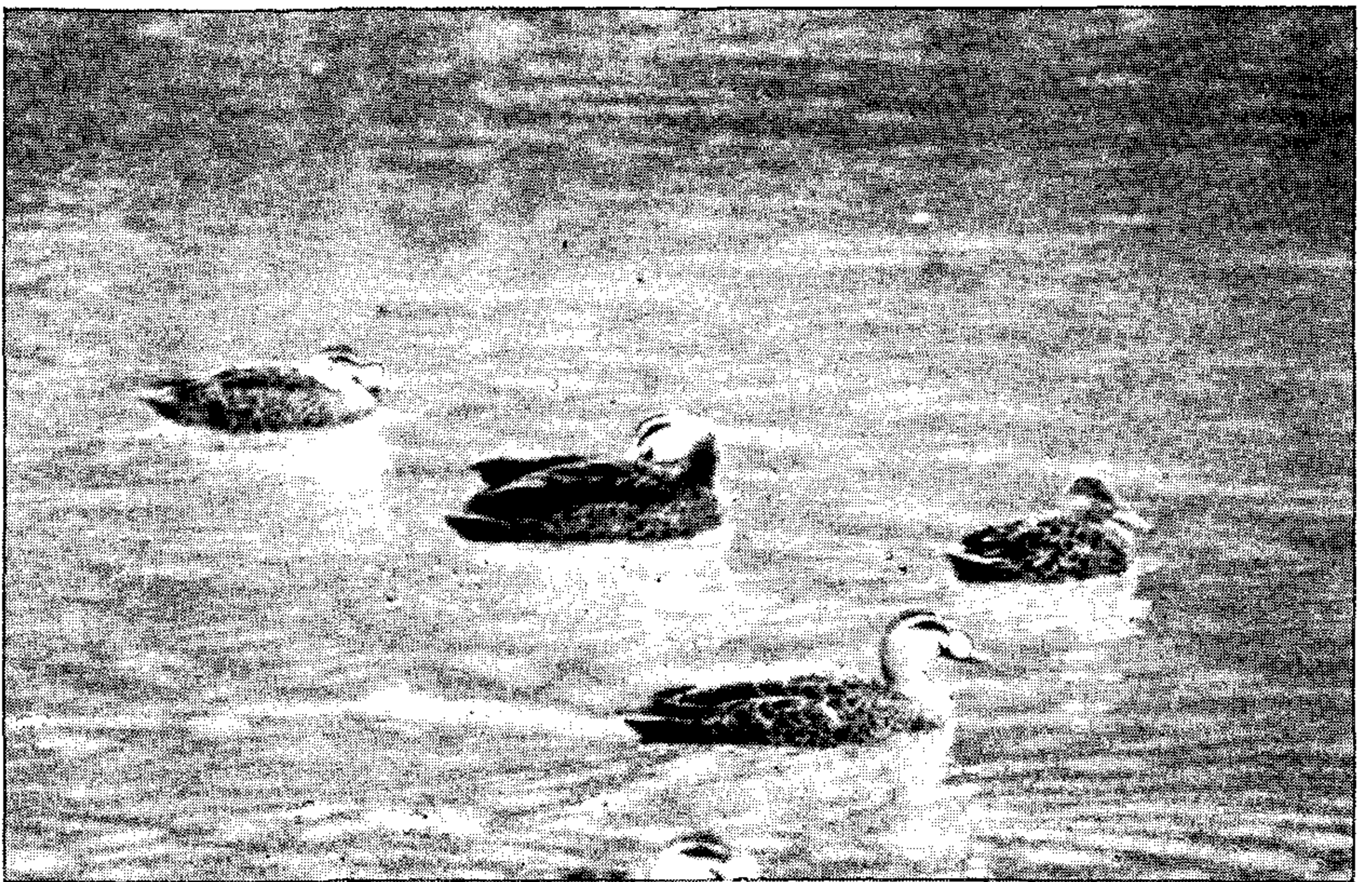


Plate XII — Male Preen - dorsal to female.

Grey, but restricted to specific displays. The first type, with weak nodding, is associated with the "abbreviated HUTU"; the second, with strong nodding is characteristic of the full HUTU + TTF + NS display and independent Nod-swim, while the third type, without nodding, but fast swimming typically follows the post-copulatory Bridle.



*Turn-the-back-of-the-head (TTBOTH)* — Often called "Leading," this display is the normal male response to female Inciting. The drake swims in front of the female holding his head erect and in such a position that the nape is directed toward her (Plate XI). It frequently follows the HUTU + TTF + NS display and the post-copulatory Nod-swim but may occur independently.

*Preening* — Two preening movements appear ritualized: Preen-dorsal (Plate XII) and Preen-behind-wing (Fig. 1). These are rarely observed during social courtship but occur frequently between members of an established pair. Such displays may serve to maintain or strengthen the pair-bond.

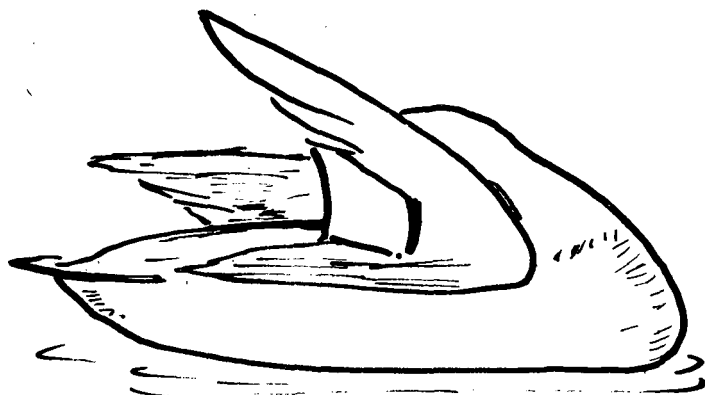


Fig. 1 — Preen-behind-wing

*Drinking* — Drinking is usually preceded or followed by some other display. The following associations were observed: preceded by Wing-flap (frequently), Down-up and Introductory-shake; followed by Preen-dorsal and Preen-behind-wing.

Drakes performing this display have their body broadside on to the female.

*Wing-flap* — This is frequently performed during social courtship. It is slower than the comfort movement and is always performed with the breast directed at the female (Plate XIII). On most occasions, Drinking follows.

*Chin-lift* — In the midst of social courtship, while other drakes are performing one of the major displays one or two drakes will lift the head and chin high. This movement appears identical to the initial movement of the Down-up and may be merely an incomplete expression of that display.

#### DISPLAYS OF THE FEMALE

*Inciting* — This is identical with Inciting in the Mallard, the duck swimming after her chosen drake and at the same time threatening others by movement of the head sideways and back over the shoulder. (Plate XI). The threatening is accompanied by a characteristic gabbering sound, each third syllable of which is stressed.

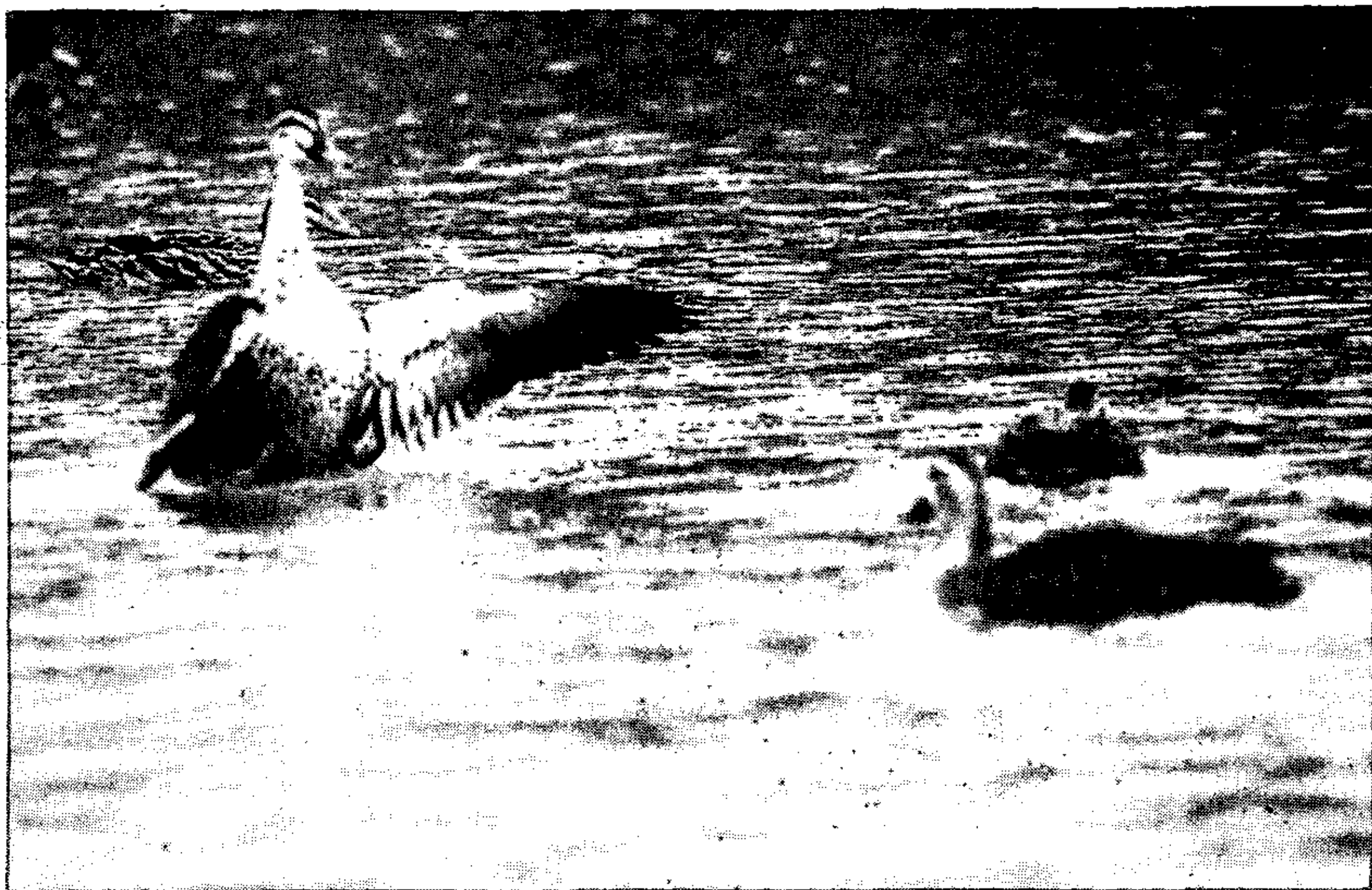


Plate XIII — Wing-flap.

Inciting may occur at almost any time, on both land and water. On water it frequently follows the male HUTU display. Male response to Inciting is the TTBOTH posture.

*Nod-swim* — This is an independent display identical in form with that of the drake. I have never observed a high-intensity (no nodding) Nod-swim by a duck. Female Nod-swimming during social courtship stimulates males to further display.

*Preening* — Two ritualized preening movements, Preen-dorsal and Preen-behind-wing, were observed. They were performed both during social courting and between members of a pair, particularly following copulation.

*Decrescendo Call* — This is a six-syllabled (sometimes more) call with the second syllable being the loudest and of highest frequency. On several occasions I have seen the drake swim back to the duck on hearing the call. Mutual Preen-behind-wing followed shortly after.

### SOCIAL COURTSHIP

Courtship in the Grey Duck is "social"\*, males gathering together in the presence of one or more females to perform the various sexual displays. Courting begins in late summer (February) after recovery from the brief post-nuptial and longer post-juvenile moults in adults and juveniles respectively. Such early social courtship groups, composed entirely of adults, persist only briefly and may form in the complete absence of females. Major displays are seldom recorded from such groups. When females are present, they may or may not

\* Strictly defined, "social" refers to **two** or more. A more correct term for these courtship groups would be "communal." However, for the sake of standardization of terminology, social is used here.



show obvious signs of stimulation, possibly because some birds are still in the regeneration phase of their gonad cycle (Marshall, 1961) and are therefore physiologically incapable of sexual stimulation. By late March - April all females are actively displaying, social courtship groups become more frequent and more persistent, and major male displays more numerous.

Most male displays require the body to be specifically orientated to the female. Activity within social courtship groups is therefore incessant, males competing with each other for the few favourable positions. Fighting is frequent. Females for the most part remain hunched and motionless. Their display stimulates an increased frequency of display from adjacent drakes but also causes more fighting because of a shift in position.

Courtship groups exert a contagious effect on other males. The sight of a courtship group in action will even attract already paired drakes to the scene. (Weidmann, 1956, has reported similar behaviour in Mallards.) Sexual stimulation is in some way derived from the competitive situation when males gather together; for early in the season, males will gather in the complete absence of females and perform some of the low intensity displays, e.g., Head-flick, and Introductory-shake.

Males display either singly or simultaneously with others (Plate IX). Single displays usually involve Head-flicks, Introductory-shakes and Grunt-whistles; simultaneous display bouts usually include Down-ups, Head-up-tail-ups and often Grunt-whistles. Johnsgard (1960) has demonstrated the relationships of these major displays in Mallards and Black duck (*A. rubripes*) and an almost identical relationship exists for the Grey duck (Williams, unpublished).

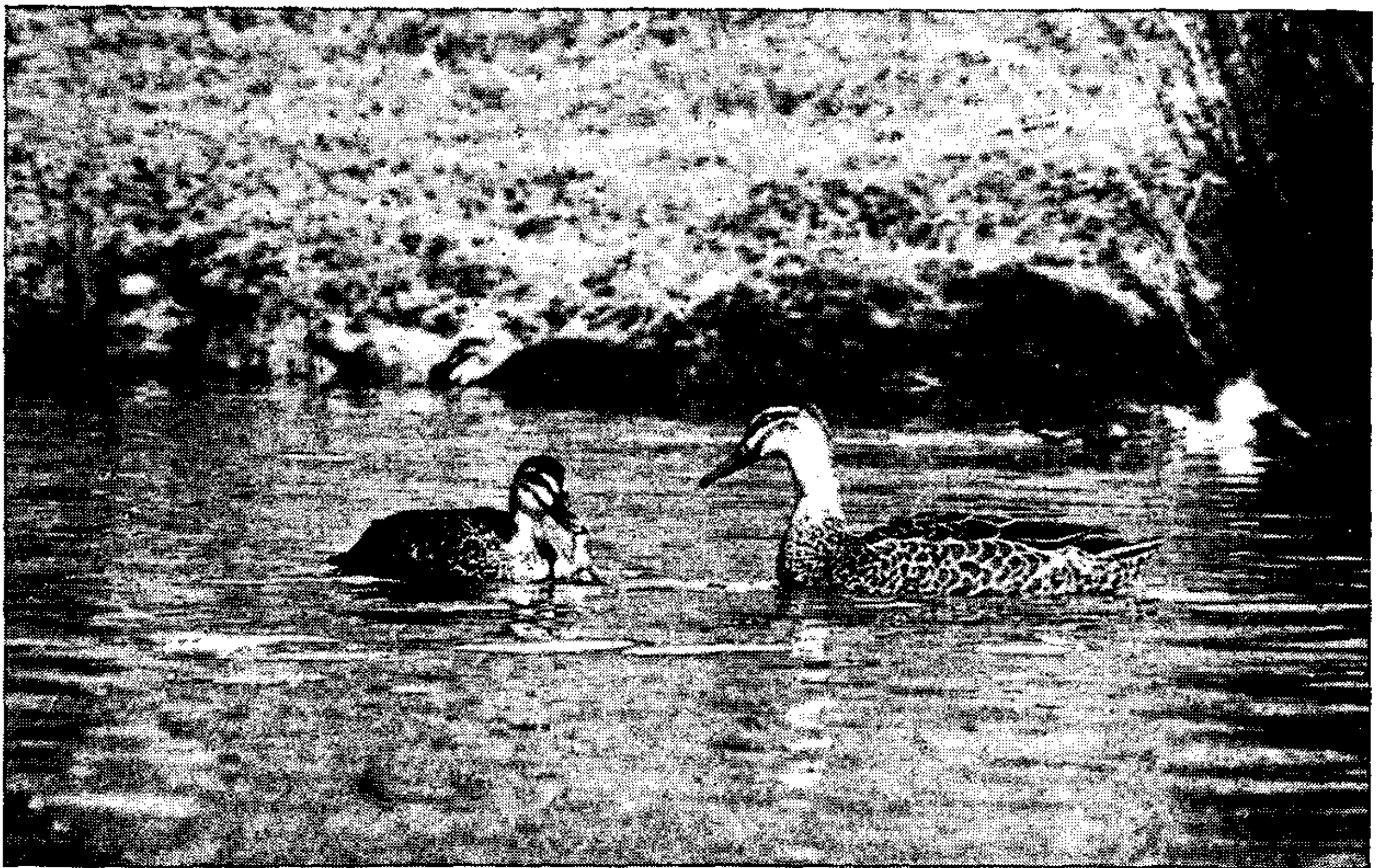


Plate XIV — Copulation I: Head-pumping. Drake on right.



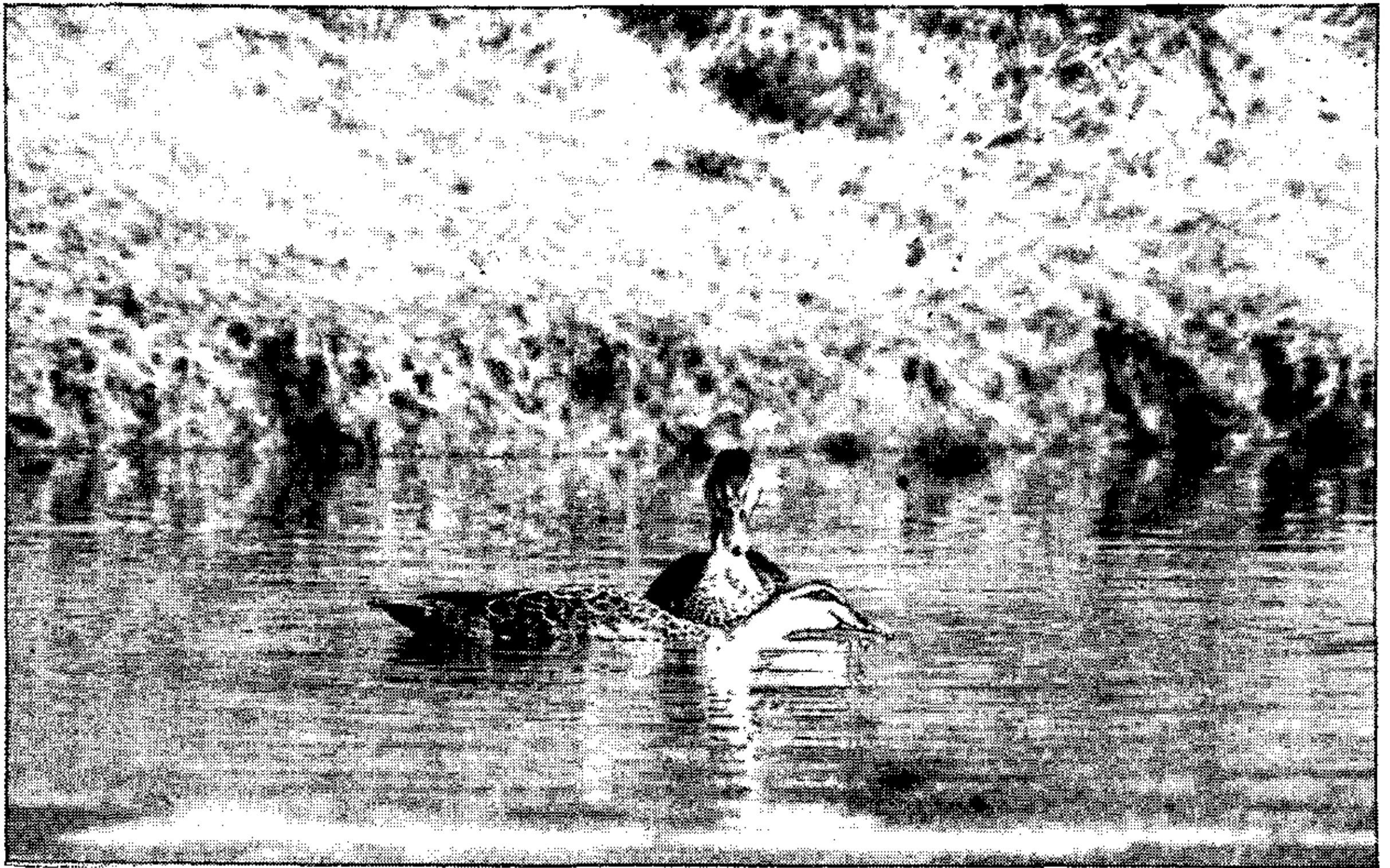


Plate XV — Copulation II: Female in prone position; drake about to mount.

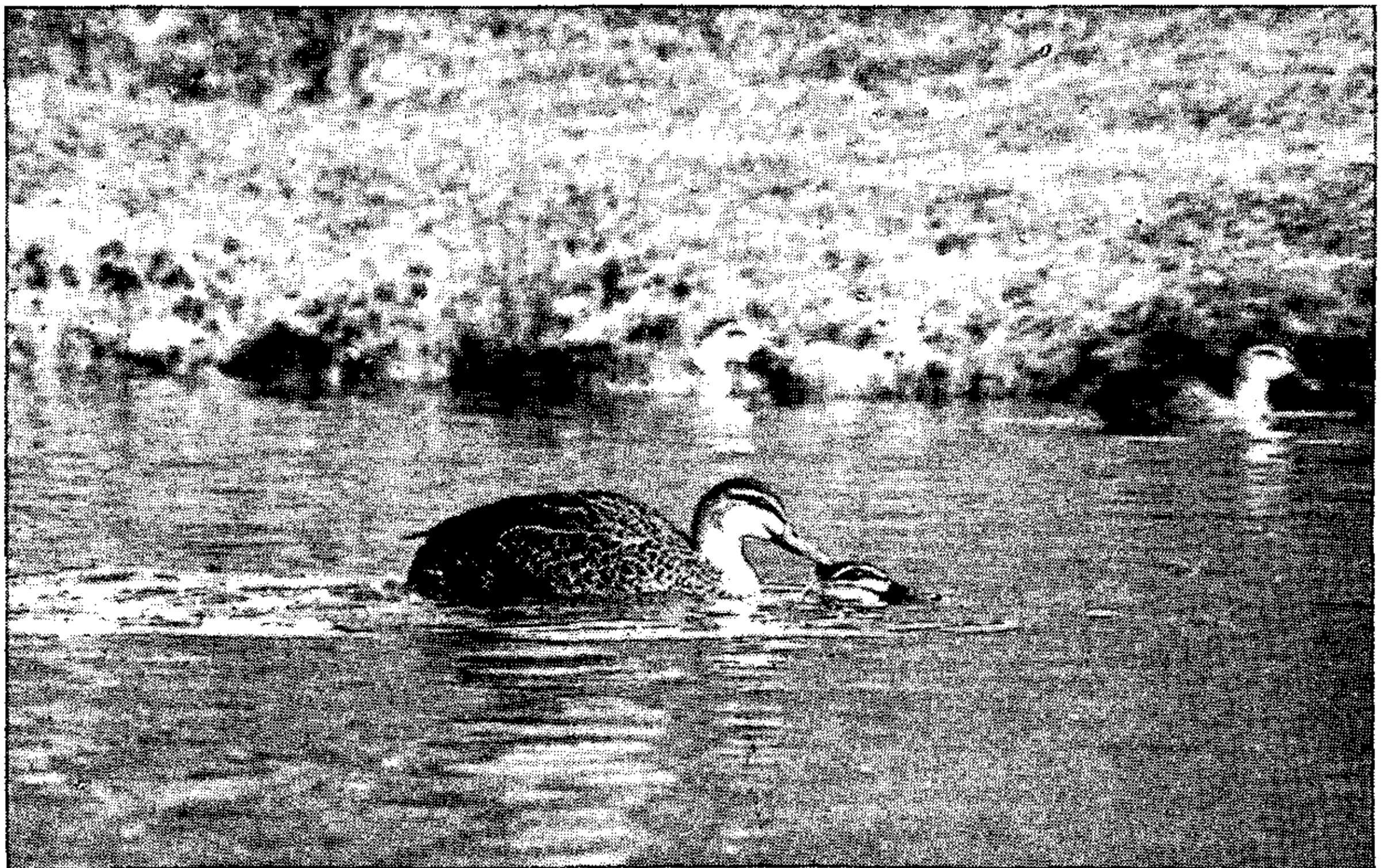


Plate XVI — Copulation III: Cloacal contact.

### COPULATORY BEHAVIOUR

Copulation was observed to take place only on water. The pre-copulatory display of both sexes is Head-pumping (Plate XIV), the head being moved up and down with equal speed but with a short pause in the erect position. It is initially of equal intensity





Plate XVII — Copulation IV: Post-copulatory Bridle by male.

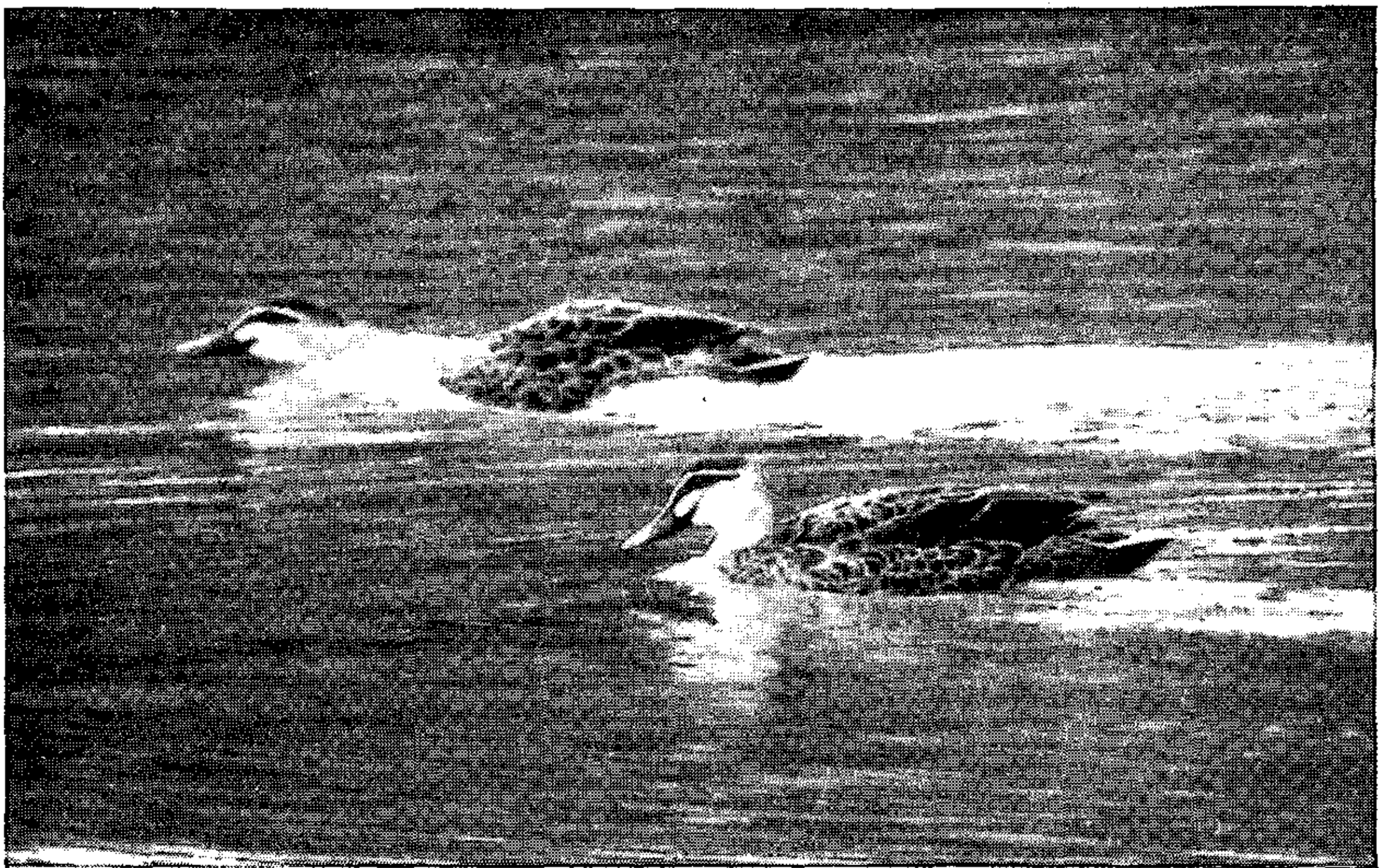


Plate XVIII — Copulation V: Post-copulatory Nod-swim by male (left).

in drake and duck but the female slows first, ceases the display and flattens herself into the Prone position (Plate XV). The drake mounts, usually from the side, and grasps the female's nape with his bill. Treading is characterized by a series of tail-wags of increasing exaggeration (this may assist extrusion of the penis), culminated by a sudden downward lunge at which time cloacal contact is presumably



made (Plate XVI). One such tail-wag-lunge sequence per copulation is normal although two or three sometimes occur. Dismounting, the male performs a strong Bridle (Plate XVII), a movement which involves the upward flinging of the chest well clear of the water. The Bridle is followed immediately by a high-intensity Nod-swim (lacking the nodding component) during which he swims in a broad semi-circle about the duck (Plate XVIII).

Female post-copulatory behaviour is variable but usually involves bathing (head-dip or somersault type — McKinney, 1965). Wetting of plumage during treading apparently provides the stimulus for this bathing.

Subsequent male behaviour is dependent on that of the female. Following the Nod-swim, the drake becomes erect in a typical TTF posture. The female may cease bathing and begin Inciting. The drake then assumes the TTBOH posture and Leads. Should the female persist in bathing, the male will also bathe, although with considerably less vigour. Mutual Preen-behind-wing displays frequently follow.

### SUMMARY

The displays and copulatory behaviour of the New Zealand Grey Duck are briefly described. Courtship is "social," males gathering together in the presence of one or more females to perform the various sexual displays. Some displays (e.g., ritualized Preens) occur more frequently outside the social courtship groups, between members of a newly-established pair. Qualitative identity exists between displays shared by the Grey Duck and the Mallard.

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