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Pseudomale Behaviour in a Female Bengalee¹⁾

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The copulation of birds is usually performed by cloacal contact between female and male in which the latter mounts on the crouched female after the courtship display characteristic of the species. On the contrary, however, reversed mounting in a pair has been often recorded in the domestic pigeon, common tern, shag, little grebe, moorhen, and also in the woodlark. Moreover, observations have proved the occurrence of homosexual mating behaviour in such birds as the ruff, pigeon, laughing gull and lesser scaup duck.

Recently, it was reported that some males in the unisexual society of the zebra finch displayed pseudofemale behaviour and copulated with other males (Morris, 1954). During the course of the present author's study on the behaviour of the bengalee, *Uroloncha domestica* Flower, it was observed that in a homosexual pair a female copulated with another female, showing masculine sexual behaviour, or *pseudomale behaviour*. The present paper deals with observations on the pseudomale behaviour, together with certain aspects of its causation.

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Observations

A large wire cage was divided into two equal compartments with wire net. A normal pair (B group) were maintained in one compartment and two female bengalees (named PF and F) in the other respectively. As food, cereal grains were supplied them sufficiently. Fresh vegetable, mashed shell and water in a regular bottle were placed also in the appointed parts of the cage. An artificial straw nest was given and a few branches were set as perches in each compartment.

While observing the behaviour of these birds, the observer took a position from which both 'pairs' could be equally well seen and compared. The observation has been carried out during the period from May to July, 1956. Duration of observation varied from one hour to four hours daily.

Normal sexual behaviour: Courtship. Male. Previous to his mounting the male sings his jingle and shows a peculiar courtship display.

a) Vocal. The jingle of the male bengalee, as a whole, can be easily divided

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into three phrases; the first part is composed of low and repeated notes, the second higher and the third the highest with sudden whistling up and down. These phrases are repeated frequently as a unit, though the first of them is often omitted.

b) Visual. Having raised up the head and thrown out the chest and belly, the bird holds himself in an entirely upright posture, with the feathers of the chest and belly fully fluffed out. Upon seeing the attractive female, the male takes this upright posture and singing his jingle, approaches to her hopping inch by inch along the branch; he waves his body from right to left rhythmically (zig-zag dance).

Female. The female courts in a simple manner. When she is perching on the branch separated from the male, she stays there immovably and places her body in a horizontal posture and begins to cause her tail to quiver rapidly with sleek feathers without making any sound.

Copulation. The male, which has advanced to his mate with jingles, jumps upon the female's back, then returning to a sleek posture, he stands there a moment quietly; while leaning his body backward and beating his wings to maintain his balance, he brings his cloaca into contact with her and thus insemination is performed. After a few seconds, he dismounts beside the female and again jingles or advances to her. In the post-copulation, the female responds either positively to the courtship of the male with a horizontal posture and tail-quiver or negatively by escape from the male with succeeding self-preening.

Abnormal sexual behaviour: Courtship. Pseudomale. Of course the female does not jingle as the male. In certain cases, however, when a female (P.F) advanced to the other (F) in an imperfect male fashion, she (PF) pronounced low ordinary calls, though indistinctly. The pseudomale posture does not form a perfect masculine courtship pattern, but a mere low upright posture, lightly raising her head and tail, and the feathers of her chest and belly are fluffed out slightly. A noticeable action of pseudomale courtship is the zigzag dance which reminds an observer of the male courtship pattern (towards the female). This action has not yet been observed in normal female behaviour. The pseudomale zigzag dance, however, differs from the male dance in regard to intensity and clearness of action, and resembles more the zigzag dance of juvenile or drive fallen males rather than that of a male in the breeding season.

Copulation. The pattern of mounting and actual cloacal contact is identical with the normal heterosexual copulation and also beating of wings at the copulation is seen in the pseudomale. But in this case the dismounted pseudomale does not show a bit of attitude of advance to her mate. Courtship display and copulatory behaviour of the female mounted by the pseudomale are not different markedly from those of the normal copulation in detail.

Course of sexual behaviour: Though the jingle, a part of the male display, is brought out frequently in spite of the absence of his mate, the tail-quiver of the female is produced only in the presence of her mate.

Tail-quiver of PF was observed first in early May. At that time, having watched for advance of F which had emerged from the nest, PF flew up on a branch and soon eagerly invited her mate with tail-quiver. As yet F had begun to preen herself nonchalantly, so PF stopped her display in a few seconds and preened her feathers too. On another occasion PF flew up actively from a lower branch to the front of the nest and held a horizontal posture, while F came out from the nest and then PF revealed tail-quiver display to her. F, however, only slightly responded to this invitation with little interest, and remained preening her belly feathers.

Frequency of tail-quiver display in PF increased in due time. In parallel with the display the attention of F gradually increased. In a few days after the first tail-quiver was observed, F advanced, showing pseudomale courtship display, close to PF which had been inviting her mate with vigorous tail-quiver display. F did not, however, attempt to mount on PF, but held the ordinary sloping posture, thus PF suppressed her display. During the same period, on the contrary, the pair in the other compartment had many chances to perform their courtship display and to complete copulation. The two females in the homosexual pair (A group) were attracted strongly by those sexual phenomena in the neighbours; then F and PF, wherever they were, flew to the intermediate wire net of the cage or hovered in front of this net, as if they were *jealous* of the neighbours' sexual behaviour. As a result of such troublesome actions, the copulation of B group was interrupted occasionally.

The tail-quiver display of PF continued about a week and then decreased gradually. Shortly after the disappearance of her tail-quiver, PF laid three non-inseminated eggs in the nest. Then she incubated those eggs industriously, but F rarely did. All eggs were kept in the nest for nearly two weeks. In the last week the incubation behaviour of PF decreased slightly, although she entered and crouched in the nest more frequently in this period than usual.

Those eggs being removed from the nest, F paid attention to the tail-quiver display of PF and advanced to her to within a short distance (tail-quiver of PF was activated also by the advance of F), then she took a horizontal posture and showed normal female courtship display, tail-quiver. The two birds, each, kept up their tail-quiver display about 4 seconds soon after which the behaviour of both birds was switched to self-preening. The concurrent tail-quiver, tail-quiver occurring simultaneously in both females was recorded more often in this week, although PF usually began to quiver her tail before the other did; masculine courtship display and copulation did not occur in either of the birds. The concurrent tail-quiver disappeared at the last of this week. Then after two weeks the act was observed in the birds in A group again.

It must be noticed that the birds mutually inviting their mate with concurrent tail-quiver pay attention to each other by turning their heads to the mate, whereas the normal female takes no special notice of her male mate. Homosexual copulation aforecited, was displayed by A group early in July. At the copulation, PF

behaved as a pseudomale and five days after this behaviour she (pseudomale) performed her second egg-laying.

Discussion

The sexual behaviour of birds as well as other animals is caused by the action of endocrine substance. As to the quality and quantity of these hormonal substances which influence their behaviour experimental studies have been made in several birds. But their sexual behaviours are not only controlled by the activities of hormones, but also by the psycho-social relationship. It is, for example, known that when the strong drive of an individual is thwarted in a particular way, the animal is frustrated by this thwarting and often exhibits abnormal behaviour as the result of this frustration. In this case pseudomale behaviour of the female seems to be abnormal.

There are some hypotheses on the causation of the pseudofemale behaviour in male homosexual or heterosexual circumstances. Few discussions have been reported, however, in regard to the pseudomale behaviour of the female in homosexual situation. As stated above, only PF showed at first her tail-quiver and the pseudomale courtship activity was displayed only by F. Judging from the facts, it seems probable that the female which possesses less mating motivation is invited by the tail-quiver of the mate and when she has a large mating motivation, she does not advance towards the mate but shows the natural courtship display of herself. Therefore, in the latter case the tail-quiver display (inciting the male to advance normally) stimulates to release her primary female mating display. As her mating motivation, however, is less strong, the tail-quiver display of other females is admitted functionally to her as if it were a sign of the male courtship display. As actual copulation did not occur in the first period, PF seems to have been frustrated by the lack of response of the mate.

In the male generally, whose mating drive is not sufficiently strong, he can hardly contact his cloaca with the mate's in spite of success in his mounting. Because of this evidence it is possible to say that his advancing to the mate or mounting on the female differs from the accomplishment of cloacal contact in nature. The latter derives probably from some internal source, or copulatory drive. The former, however, is induced usually by the exhibition of tail-quiver as an external stimulus, even though the male may have slight internal drive. But in the female a weak copulatory drive seems not to inhibit this masculine courtship but strong drive appears to thwart this dormant courtship of herself as a result of the inherent difference and to raise her natural courtship display. It cannot, however, be decided whether the pseudomale behaviour has been produced from the neurotic switch-over of the center as a result of frustration, or whether it has been caused by the increase of activity of anti-estrogenic substance or by that of absolute quality of those on account of frustration. Masculine behaviour of the female due to increase of androgenic hormone has been found experimentally in such birds as in pigeons, canaries, and herring gulls, and

naturally in starlings.

Finally, the sexually frustrated female possibly expresses a masculine courtship display and mounts on the female which is demonstrating a tail-quiver display to the frustrated female. Moreover, when the pseudomale has a large copulatory drive at the successful mounting, the actual cloacal contact is performed by both females.

Under the homosexual copulation in which one behaves as a female and the other as a male, there are two foundations, physiological and psychological; the former is based on the difference of effective quantity of their endocrine substance and the latter on their status in social order. Of course in all individuals the two phases mingle variously and produce complex sexual behaviours. In the case here observed, if both females were frustrated evenly by the thwarting of their mating behaviour, it will be probable that one of the differences of their behaviour is based on the difference of inherited character between PF, active, and F, more inactive.

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