

SYNOPSIS OF BEHAVIOUR TRAITS OF THE RING NECK DOVE

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A knowledge of normal behaviour of a species is of great value in interpreting results of experimental studies. For some purposes, it is desirable for a student to be free of preconceived ideas when he begins a study of natural behaviour. Nevertheless, it is useful in other cases to acquaint a worker quickly with the units of behaviour for any particular species so that he may go on to more advanced studies. This may be accomplished by concise descriptions of the voice, postures, and movements of a species of bird, for example, with a brief indication of how such traits fit into the general life history. Such an outline also would help other biologists and animal caretakers in handling and understanding their experimental animals. The following brief synopsis presents original observations on the ring neck dove, *Streptopelia risoria*, a domestic dove also known as Barbary or blond dove. The senior author has maintained reproductively active groups of this dove in captivity for the past fifteen years and has made continuous observations during six years on the large dove colony maintained by the Department of Genetics, at the University of Wisconsin.

The various displays and postures are grouped under six headings indicating the phase activity in which they occur. The units listed are heterogeneous but in a number of cases (e.g. B 1, 2, 3, 9 and C 1, 8) it seemed more prudent to group a number of related traits than to list each separately. The names are primarily descriptive but at times include reference to the situation of occurrence. An attempt has been made to minimize subjective interpretation in reporting observations; however, often it seems desirable to indicate the apparent function of these movements.

A study by Craig (1909) on "emotion" in this species has been published. This work was stimulated by the earlier observations of Whitman (1919). Goodwin (1952) supplemented the earlier studies with a report on doves kept

at semi-liberty, and presented comparative studies in 1956. The present authors were pleased to find so many points of agreement with Craig and Goodwin. There are a few minor areas of disagreement, but these are relatively unimportant to the present approach. In an outline such as this, it is difficult to indicate properly the sequence of postures in a given situation; therefore, the reader is urged to read the more fluent but less complete reports by Craig and Goodwin. Another pertinent study is that by Lehrman (1955) which is concerned mainly with parental feeding behaviour. A few disagreements of the present authors with statements in the latter paper have been reconciled by personal communication. The studies by Bennett (1939, 1940) on behaviour in ring neck doves are also interesting and significant, but are not pertinent to the approach of the present study.

This list of "unit" behaviour movements is not regarded as complete. For example, the authors are aware that parent birds may assist their young in hatching, resulting in a "T-shaped" shell breakage line. The frequency and details are not known sufficiently, however, to describe it satisfactorily.

A. Infantile and Juvenile Behaviour (in approximate order of development)

1. *Clutching*. The newly hatched squab clutches the nest sticks or the toes of its brooding parent with its feet, and hangs on tightly if disturbed. This behaviour persists until the squab is nearly fully fledged (about 3 weeks). It might serve in providing a solid purchase for the sometimes vigorous regurgitation-feeding (B 9).

2. *Head Waggle*. Very young squabs (decreasingly true for older ones) may shake or waggle the head as if the muscles were unable to properly manoeuvre the head. It apparently occurs when the squab is searching for food or seeking a new position.

3. *Squab Note*. Apparently when hungry, the squab will give a prolonged shrill, sometimes ascending whistle of low intensity. Rarely the whistle tends to descend the scale. The duration

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is 1-3 seconds, but it may be longer in older squabs and repeated several times. It is usually accompanied by the squab wing shake (A 4) and bill searching (A 5). A very faint "peep" occasionally may be heard in the pipping egg, and the strength of this squab note increases with each day of growth.

4. *Squab Wing Shake*. The squab may shake its wings rapidly (perhaps two to four shakes per second) for a few seconds and repeat intermittently in food begging movements (A 3, A 5). It becomes increasingly obvious beyond the first week after hatching.

5. *Bill Searching*. Accompanying A 3 and 4, an older squab thrusts its bill towards the parent's body in rapid "wiggling" movements. The squab learns to aim at and thrust its bill near and into the parent's mouth (see B 9), but very hungry older squabs will thrust at the tail, rump, legs, or wings of the parent, the nest mate squab or even at their own wings. It may represent a more advanced form of the head waggle (A 2).

6. *Nest Defecation*. As the squabs grow they tend to back toward the edge of the nest to defecate. Not until the pin feathers are well developed do the squabs manage to defecate out of the nest.

7. *Bill Snapping*. Squabs and immatures may "click" or snap their bills one or more times when closely accosted by an unfamiliar object or movement. It develops rather suddenly (as the pin feathers open) as does the fight or flight stance (see D 4) which appears with bill snapping and hissing (A 8). Bill snapping may be given by nesting adults in an extremely soft version.

8. *Hissing and Puffing*. Squabs and immatures may fluff the feathers, especially those of the breast, and "hiss" when accosted as above. The wings may be raised as in the fight or flight stance (D 4). Nesting adults may express a faint hiss.

9. *Squeaker Notes*. Immature birds about four to eight weeks of age are termed "squeakers" by fanciers. Their voice is "squeaky", somewhat harsh and variable. As they become older, a similarity of the squeaker notes with the adult alarm note (E 6), "challenge" note (D 3) and the bow-coo (C 1) becomes evident.

(Reproductive maturity may occur from the end of the fourth month to the tenth month, averaging about six months. The voice is usually mature by the sixth month of age.)

B. Reproductive Behaviour (Non-sexual)

1. *Stick Nest Building*. (May belong with sexual behaviour C). Either sex, but more often the male, may walk around the ground picking up "suitable" (small, irregular shaped) sticks with its bill. Many sticks are discarded. The sticks are carried, a single stick at a time, to the nest site and placed near the partner. Usually, a longer section of the stick as held by the dove is carried projecting forward and down. Sticks beneath the nest site are ignored. The female predominates in arranging the sticks. However, a reversal of the roles occurs to some extent. Frequently the partner will "grab" the stick before it is placed and a short "tug-of-war" usually results. Juveniles have been observed to "play" with sticks.

2. *Egg Laying*. During oviposition, the female will stand and slowly raise the forebody. She appears to be straining for perhaps half a minute before the egg drops. She may ease the straining briefly and start again with a faint "ptk" expressed. During the straining period and especially near its termination, the eyes may be partially closed, or covered by the nictitating membrane. Also, the wings may droop, perhaps to assist the bird to maintain balance. As the egg drops, the head may be thrown up and back. The bird usually "rests" five to ten minutes standing over the egg before leaving the nest, or before starting incubation, if the second egg was laid.

(Usually the female will lay the first egg late in the afternoon and the second egg about 42 hours later. In this species a clutch usually consists of two eggs, occasionally one.)

3. *Incubation*. The parent crouches over the eggs, more or less orients them in a fore and aft position with the aid of the bill, the sides of the legs, and the keel, fluffs the ventral feathers which exposes bare skin, and then settles down on the eggs. Eggs in an unsuitable position may be retrieved by gently placing the bill over the egg until the egg can be rolled carefully underneath the bird.

(The female parent sets during the night and contiguous light periods. The male sets six to fourteen hours during the middle of the day, 9.30 a.m. to 4 p.m. being typical, the duration depending largely on the photoperiod. The length of the incubation period to hatching is 14 days).

4. *Faeces Retention*. During incubation, the faeces of the setting parent are retained until the

bird has departed from the nest, when a relatively enormous load may be released.

5. "*Hiding*." When closely approached either sex may remain motionless (crouch and freeze) on a nest of eggs or very young squabs. The head is drawn in and the feathers held tightly. This may be an alternative to the fight-or-flight stance (D 4) which also may be exhibited by a nesting bird. It is characteristic for any one bird to exhibit only one of these reactions in a situation.

6. "*Squared*". When hiding (B 5) either sex may further tighten one wing (occasionally both) to the body so that the wing and back nearly form a right angle and tiny coverts near the shoulder are *not* smoothed to the rest of the wing but stand out.

7. *Broken Wing Ruse* or Injury Feigning. (Very rare.) When its nest was disturbed by the senior author, one white ring neck female clearly exhibited this behaviour common to mourning doves and other birds in which one or both wings are held awkwardly extended and shaken as the bird hesitatingly moves away from the nest site.

8. *Shell Removal*. After emergence of the squab from the egg, a parent frequently removes the two shell parts one at a time with the bill and flies some distance from the nest before dropping them.

9. *Regurgitation Feeding*. Either parent may feed one or both young together by opening its mouth and receiving the bill of the young in its bill. The parent usually lowers its head as it "pumps" food from its crop to the throat by violent "shivering" of the wings and crop. Nearly always the head is raised and the "pumping" process is repeated several times. Regurgitation feeding is sometimes initiated by a parent which may very gently peck or preen a newly hatched squab. During this process the head of the parent is often lowered and the bill partly opened. This pecking and preening usually stimulates the young squab to head waggle and bill search (A 2 and 5), although these may occur without detectable parental stimulation. See Lehrman (1955) for additional comments on this process.

C. Sexual Behaviour

1. *Bow-coo*. (The most frequent of coos.) The neck is inflated ventrally, the head and body held high; then the head is brought low suddenly with the bill pointed at or touching

the ground. The pupil of the eye contracts. The first "note" of the call usually starts immediately as the head comes down. The first "note" is short; the middle notes form a rolling coo; and the last "note" is 2-4 times the duration of the first note, sometimes slightly descending the scale. If the observer is close, a strident, low, "appendix" note (one or two) is often heard at the end of the last note in the coo, as if the bird were regaining its breath or redistributing its air. The call may be indicated as huk' prrrrrooo wah (wah). The bow-coo is always directed to or at a particular bird. It may be repeated as rapidly as 5 per ten seconds but usually a longer interval occurs between calls. One bow-coo averages about 2½ seconds per call. Between repeated bow-coos the male always "stamps" his feet lightly or steps toward the object-dove. However, sometimes one foot is only slightly raised and replaced. This call, occasionally given by unmated females, was never observed to be given by mated females.

2. *Perch-coo*. The notes are nearly the same as in a bow-coo (C 1), but they are given less hurriedly than the sometimes "frenzied" bow-coo. The perch-coo may be given with the eyes open, or nearly or completely closed and is the only coo also given at night. It is never obviously directed at any particular bird in sight.

3. *Nest-coo*. The notes of this call are nearly the same as in a bow-coo (C 1), but the call is softer, less forceful, and more intermittent. It is always accompanied by wing "flipping" (C 4). The head may "nod" at the beginning of each nest-coo. In a potential nest site males give this call more frequently than the female before a nest site is chosen, but afterwards the female may give it more frequently. (Apparently, doves sometimes consider a thin perch as a nest site and may even carry sticks to it, B 1).

4. *Wing Flip*. Either or both sexes in a nest site or more rarely on a perch may jerk their shoulders so that the wing, especially the tips, flip. Rarely only one wing is so flipped. Wing flipping may be constantly repeated and maintained intermittently for several minutes with a frequency of approximately two flips per second. Nearly always the head is held low and the tail high when the wingflip is given.

5. *Hetero-preening*. The male and female of a pair may "preen" each other, especially about the face and neck or head. Hetero-preening may be somewhat ritualised since the preening

movement is often more cursory than in homo-preening. Parents may hetero-preen their young, apparently assisting the feathers to break out of the sheath.

6. *Billing*. Billing occurs in a situation similar to hetero-preening (C 5). Billing is often initiated by the female which preens the neck and face of the male. After variable amounts of this hetero-preening the male may reciprocate and then take the bill of the female in his and apparently feed her as he would a squab. (It is not clear whether or not food is actually passed.)

7. *Sex-crouch*. The sex-crouch usually follows billing (C 6). The female squats, lowers her head, and raises her shoulders which will support the feet of the male.

8. *Sex-mount*. (Treading). The male's posterior feathers fluff out and he repeatedly "cranes" his neck above the female. He may "preen" or place his bill between his wing tips and rump. Then he mounts the female (both facing in the same direction) which is in a sex-crouch and maintains his balance by fluttering his wings. The tail of the male bends antero-ventrally and swings from side to side until copulation. Normally, the sex-mount is always followed by the "laugh" or challenge note (D 3) by both sexes. The sex-mount takes about 5 to 10 seconds for completion, but the "preening" and "neck craning" by the male may be prolonged. Females very rarely try to mount mature males but may mount a partner frequently if paired with another female.

9. *Driving*. A few days prior to the female laying the first egg of a clutch, the male tends to follow her wherever she goes with occasional incomplete pecking movements (D 5a). Driving in ring doves is much less distinct than in *C. livia*. Goodwin (pers. comm., see 1956a) believes that driving normally occurs only if the potential sexual rivals are present.

10. *Display Flight*. (see F 16d).

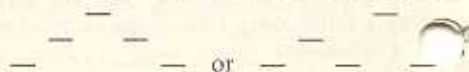
D. Aggressive Behaviour.

1. *Attack Posture*. The head is held low and horizontal and drawn close to the body. Sometimes the head is jerked up and down just before or after challenge notes (D 3) are given. The rump feathers are fluffed, and the pupil of the eye may contract and expand.

2. *Rush*. Maintaining an attack posture, the dove often runs or rushes at the opponent. At times the dove will fly toward the opponent

but cage conditions tend to inhibit a rush by flying.

3. *Challenge Note*. Kah or "laugh." This note is nearly always given from an attack posture (D 1) and is often preceded or followed by a forward hop or jump. It consists of a series of similar high pitched, rapid, short notes (often five notes), hinh-hinh, hinh-hinh-hinh, frequently in one of the following ways:



They may ascend and descend the scale slightly or alternate notes may go higher; other combinations are more rare. The higher notes are accented. The challenge note given by a male often leads to bow-coos (C 1) if the "opponent" is a female and to a fight or flight stance (D 4) if the opponent is a male. Females usually give it only to newcomers, mates or territorial transgressors.

4. *Fight or Flight Stance*: Fear-threat display. A position nearly broadside to the opponent may be assumed with the wing opposite the opponent half raised. Initially the forebody is often raised slightly. Either escape (E 2, 3, 4, 5) or fighting (D 5a, b) may ensue from this position. It is especially easy to observe contrasting "intention" movements of the aggressive escape "conflict" within a dove in this posture.

5. *Fight*. (Intermittently accompanied by challenge notes, D 3).

a. *Pecking*. The aggressor dove pecks intermittently at the head, neck and shoulders of the opponent who may return pecks and wing blows.

b. *Wing boxing*. From the fight or flight stance (D 4) the opponent may be hit with single or multiple wing blows more or less directed to the head, neck and shoulders. It is the wing nearest the opponent which does the "boxing". Sometimes the opponent is hit by the wings of the aggressor in flight.

c. *Standing on opponent*. The aggressor often flies or hops to stand on the back of the opponent. Thereupon pecking or wing boxing may ensue; but strangely enough these are minimized and standing alone may satisfy the aggressor.

E. Escape Behaviour

1. *Alert Stance*. The body is held erect by straightened legs with the tail low, neck stretched

and the head high. The plumage is tightened close to the body. It is usually accompanied by the alarm note (E 6). The alert stance and the alarm note may be stimulated by the appearance of hawks, unfamiliar moving objects, or by humans, cats, rats, and snakes.

2. *Flight Stance.* The bird crouches, stretches the head forward, and raises the tail somewhat. It may follow an alert stance (E 1).

3. *Avoidance.* The head is held low and away from the attacker with the body in a crouch and sometimes leaning to one side; or, less often, the head may be held high, as the bird attempts to climb out of reach. It may be an intermediate form of the flight stance (E 2).

4. *Flight.* (See F 16). Outright flight often occurs immediately after an aggressor approaches, as when one dove is in another's territory. Flight usually terminates any persistent attack. When frightened from the ground by a hawk, the dove most commonly flies forward and upward with a noisy clatter of wings, according to Goodwin (1952).

5. *Wings Vertical.* Adults, juveniles or older squabs may spread the tail, fluff the feathers, and hold one or usually both wings vertically over the body which is sometimes inclined away from the attacker. It may follow a fight or flight stance (D 4).

6. *Alarm Note.* A soft "hinnnh" may be given, often repeatedly. The character of this note may vary from time to time in the same individual, occasionally approaching a louder harsh quality. The latter may occur during feeding of the young. The duration of a single note is nearly one second, but a repeat note may be given every 5 to 10 seconds.

F. Other Behaviour

1. *Sun Bathing.* In direct sunshine, a dove may head the tail, incline the body to one side and lift the wings, alternately holding one aloft during a few seconds or minutes.

2. *Water Bathing.* Doves may step into shallow water or sit on a perch near water level and fluff the feathers, crouch, and flutter the wings so that the water is "sprayed" throughout the plumage. The head is rapidly dipped or passed through the surface of the water a few times in a "sideswipe" motion. Often the wing is held vertical, but the tail is seldom spread. This response may also occur at the beginning of a light rain or spray of water. The bird always preens and shakes afterwards, if undisturbed.

3. *Relaxed Resting.* Beyond the usual "perching" a dove may lean its body to one side so that one wing is partly laid upon. Sometimes both wings are at an unusual angle (shoulders out, wrists in near feet). It occurs frequently in immatures and more rarely in adults.

4. Stretch

a. *Gape.* The neck is stretched forward and the mouth opened widely and moved forward and up.

b. *Back Stretch.* Both wings are held vertically over the body but not spread. The tail and head are depressed. It frequently precedes or follows a foot stretch.

c. *Foot Stretch.* (or foot and wing stretch). One foot and leg are stretched backwards; the tail and one wing are spread and extended toward the leg being stretched.

d. *Upper Mandible Stretch.* The terminal half (distal) of the upper mandible is sometimes lifted above the lower bill while the mouth is held closed.

5. *Rapid Peering.* The head is moved more or less up, forward and back in what appears to be visual "searching" movements. The head also may be turned from side to side allowing each eye in turn to see the object of attention.

6. *Questioning Bill.* When no escape behaviour is exhibited and when the bird is watching action or objects seemingly peculiar or unfamiliar to the bird, a "silent" rapid opening and closing of the bill occurs singly or repeatedly.

7. *Huddled.* When cold, ill, or "frustrated" (?) the bird may fluff the feathers, draw its head in very close to the body and perhaps even close its eyes. It may remain thus for hours in extreme cases.

8. *Shivering.* When very cold, ill or "ill at ease" (?) a shivering of the body and especially of the wings may occur.

9. *Sneeze.* The bird may be stimulated by illness or by unknown factors to "sneeze" in a sharp "pttk" accompanied by a sudden sideways jerk of the bill and head. If the bird does have a "cold," the sneeze may be followed by a wheezing sound.

10. *Preening* (homo-preening). The dove may arrange its feathers and their parts with the bill, each feather being passed between the mandibles in turn. A dove cannot reach its own head and many of the neck feathers for preening. The uropygial gland is used relatively infrequently.

11. *Ruffling and Shaking*. Practically all the feathers of the body are raised or "fluffed" and the wings and body are shaken vigorously. The feathers smooth down quickly afterwards. It often occurs during or after preening (F 10).

12. *Tail Wag*. Often after preening or ruffling and shaking or if an object drops on the bird's tail, the dove may shake the tail sideways somewhat like a duck but with only one or two shakes.

13. *Scratching*. The dove scratches its head and neck with its toes. The leg is not held dorsal to the wing as occurs in some birds when they scratch.

14. *Eye Wipe*. When a feather or foreign object adheres to the eye or when illness affects it, the dove may wipe its eye on its shoulder.

15. *Flight Exercise or Wing Fanning*. Immatures and adults after a period of relative inactivity may beat their wings somewhat as in flight but remain grasping the perch or at most hovering a few inches above the perch or floor.

16. *Flight*

a. *Pen Flight* or "hovering flight." The characteristic details of a dove flying in a pen or for short distances of a few feet have not been adequately distinguished. However, there seems to be a "hovering" quality distinct from distance flight.

b. *Distance Flight*. Since this species is usually caged, such flight is only rarely observed, but it is swift and direct according to Goodwin (1952).

c. *Gliding Flight*. The distance flight may be interrupted by gliding or sailing aspects with the wings held nearly motionless.

d. *Display Flight*. The male flies upward wing-clapping, then with the wings and tail spread widely he glides down, often in a half-circle (Goodwin, 1952). In wing-clapping, common in the domestic pigeon but less marked in the ring neck dove, the wings meet above the body in flight, producing a clapping sound.

17. *Defecation*. In normal defecation the vent feathers are fluffed, a semi-solid mass is expelled and the vent muscles are rhythmically contracted a few times.

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