HEINROTH, O. & K., Verhaltensweisen der Felsentaube (Haustaube), 
*Columba livia livia* L. (Behaviour of *Columba l. livia* L.). pp. 153-201, 
73 illustrations.

A masterly description of the complete instinctive behaviour pattern (see also 
“Archivfilm B 521”, 1945, of which the manuscript is still unpublished, and Fiat-
Review 52, 1948, p. 199), based upon exceptionally thorough knowledge and under-
standing. Descriptions of pecking, wiping and cleaning of the bill, drinking, bathing (be-
ginning with vacuum activity), preening, shaking, “Kroppfrichten” (the two last-mentioned 
ever as vacuum activities), stretching, sun-bathing, defecation (preceded by stepping 
backward). Elaborate description and discussion of courtship and the formation of pairs. 
When mates become well acquainted with each other, behaviour chains are much 
abridged. Before egg-laying, the male often drives the female to the nest, frequently 
carrying straws to the nest. Carrying nest material is continued by male when female 
incubates. Displacement of the nest causes disorientation especially in the bird that 
happened to be incubating. Copulation introduced by caressing, billing, and displacement 
preening. Description of post-coition display. In (not infrequent) cases of reversed 
mating no displacement preening in $\varphi$, also, $\varphi$ performs the female post-coition display. 
Coition is often disturbed by other individuals. Besides, there are cases of real jealousy, 
often leading to a breaking-up of pairs. Mates which are in the same state of motiva-
tion and reproductive rhythm mate for life, but remating occurs easily after removal 
of one partner. Determinate layer. Male incubates during daytime, female evening and 
night. After hatching, the large part of the egg-shell is removed. Crop-milk supplemented 
with grain from fifth day on. Young can be stimulated to beg by touching its bill. 
Older young flap wings during begging. The young are not covered after 8th day, even 
though necessary. Up to 10 broods may be made in succession; they overlap in time. 
Wild *livia* have only 2 or 3 broods. Young are conditioned to food. The calls are accurately 
described. Changes in territories are functions of the reproductive rhythm. The strongest 
fighters select the highest nest boxes. Territories shrink with increasing pressure from 
other pairs. Male never defends his mate, but defends his perch. Dominance phenomena 
on neutral ground. Embittered fights may occur when a male enters a neighbour’s nest 
by mistake. Threatening releases inferior attitude in opponent. Threatening usually 
along the territory boundaries. Weak individuals are relentless against still weaker ones. 
Young males often settle close to their father’s territory, presumably because he is more 
tolerant than strangers. The Turtle Dove has no posture indicating inferiority, the father
may kill his young when these have become independent because they can't stop him.


As a continuation of his studies on Astatotilapia strigigena (1940) and Hemichromis bimaculatus (1942) the author now gives observations on Tilapia heudeloti A. Dumeril and Tilapia natalensis M. Weber.

*Heudeloti*: in neutral condition the sexes are much alike in colour. The male can assume epigamic colouration by chromatophore action in a few seconds. The various components are supported by movements and act as social releasers in fighting, in mating, and during care of the young. Fighting in the males involves colour changes, spreading of fins, demonstration of the black patch on the throat. Opponents take parallel positions, raise opercula and deliver tail beats. They then swim around each other in circular motion, and finally attack frontally, grip each other's jaws, which are armed with teeth, and try to force each other down. When a male is beaten, it is chased by the victor and hit in the side, which may inflict wounds. In 200-Liter tanks, an inferior male gives up its attempts to flee and is killed. An attempt is made by the author to analysed movements into fixed patterns and taxis components.

Male *T. natalensis* assume deep black nuptial colours with white cheeks and throat, and red fin edges. Fighting behaviour is much like that of *heudeloti*, components can be considered homologous, but unlike in *heudeloti* repetition of fights does not coincide with simplification of the pattern. Threatening with open mouth, showing off the olive-coloured insides; this was seen to intimidate opponent.

Courtship is much the same in the two species. Male assumes epigamic colours and erects fins, female is passive (neither fights nor flees), male then turns, towards pit and shows white head markings, shaking the head. It then swims under the female until it is touching her genital papilla with its snout. After that it begins to dig and deepen the pit, where the female deposits the eggs. After fertilisation the female takes the eggs in the mouth. The male takes no part in care of brood. Females in egg laying condition may fight with each other.

Some comparative data are given, based on about 25 species. Some behaviour components, such as lateral and frontal threat and tail beating, are present in many species, others are typical for one or a few species only and are therefore valuable for taxonomic purposes. The females have few sexual reactions with releaser function, which corresponds with the absence of epigamic colouring. Also, males of both species court females of the other species, but the opposite does not occur. Isolated females occasionally accept males of the other species, and the mating of a male *natalensis* with a female *heudeloti* is described. The eggs did not develop; the male occasionally took some eggs in the mouth. A paper on 25 species, mentioned in the Fiat Review 52, 1948, p. 198 has not yet been published.

NEUHAUS, W., Untersuchungen über die Richtungsorientierung bei Mäusen (Studies on orientation in mice). pp. 236-260, with postscript by O. KOEHLER p. 260.

Various species of mice and voles were trained in a radial symmetrical maze consisting of regular hexagons so arranged as to leave an alley of 2.5 cm width between them. The entry was a vertical tube in the centre; the maze could be turned round a vertical axis. The ground plate was glass covered with graphite. Lighting central from above. The maze was covered with a glass plate covered with white paper. The observer was lying under the maze in the dark; the animals could not see him through the graphite covering but he could see their shadow against the white ceiling. The