

Admittedly, this explanation simply relegates the question to a "lower level" but it is not unreasonable.

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## A POLYGYNOUS HOUSE WREN

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In Baltimore, Maryland, in 1946, a male House Wren (*Troglodytes aëdon*) had two mates simultaneously in nest boxes about 45 yards apart. Kendeigh (1941:47) found that 6 percent of the males he studied in Ohio were polygynous and outlined the instances. There appear to be no other accounts in the literature, although Kessel (1950:112) mentions that polygyny has also been observed in New York state.

My male and his first mate were color-banded; I can only assume that the female at his second box was the same bird throughout the season. Each female nested twice and three of the nestings were successful. I watched the four for 105 hours—the first female's nest 29 1/2 hours, second nest 40 hours; second female's first nest 27 hours, second nest 8 1/2 hours. The boxes were at No. 4608 Springdale Avenue, where I then lived, and No. 4702, three houses west. Neither box could be seen from the other.

*The nestings.* The male first acquired a mate at 4608, on 9 May. During incubation of this one's first clutch (laid 22-27 May) he gave her much the most of his attention, and when her young hatched (8-9 June) helped feed them and almost ignored his still-incubating second mate, acquired 24 May. The 4702 female had to feed her young (hatched about 18 June) almost unaided until the 4608 brood took wing (26 June); then the male helped her somewhat until his 4608 mate was ready to renest (4 July), whereupon he again practically ignored the 4702 female.

At the beginning of the second 4608 nesting (eggs laid 11-16 July) the male was fully attentive to it, but when the 4702 female became ready to start her second nest (19 July) he concentrated on courtship and building with her. Then after what must have been her laying period he again turned his attention to the 4608 nest (eggs hatched 28-29 July) and paid only rare visits to 4702 through 7 August, when he was last seen. The 4702 female deserted by 9 August. The 4608 female brought off her second brood 12 or 13 August.

*Nesting success.* The clutches at 4608 were 6 and 6, and 6 and 3 young were raised (1 egg did not hatch, 2 nestlings vanished). The first clutch and number of young raised at 4702 are not known; when this box was opened after the female abandoned her second nest 5 eggs were found.

Only the male of Kendeigh's Territory 178 (*op. cit.*) matched my male's record of three successful nests. Only one of his birds attempted four nestings, and that one did so with three females in overlapping sequences of two.

*Male's attentiveness.* Tables 1 and 2 show quantitatively the difference in attentiveness by the male to his two mates.

The records summarized by Kendeigh (*op. cit.*) show that 3 of his 16 polygynous males likewise favored their first mates, 3 lost interest in their first upon getting a second (and one of those lost interest in the second upon getting a third), while 4 apparently divided their attention between the two; the attitudes of 6 other males are unclear.

Apropos the 4702 female's desertion within two days after the male disappeared, Kendeigh speculated whether one female in his Territory 138 deserted after laying 3 eggs because the male left her to attend to his other mate's brood.

*Male confused.* A few times it seemed that his possession of two nests confused my male. Once on 14 June he appeared near the 4608 box with food for the young, but sat for a minute and a half and then, still holding the food, flew west toward 4702, where hatching had not yet begun. On 23 June he once lit near the 4702 box with food and sat for half a minute facing east before making his feeding. On 24 June he again went near the 4608 box with food, but although the nestlings were calling he after one-quarter minute flew away westward.

TABLE 1. MALE'S ATTENTIVENESS: INCUBATION STAGES

	% of time ♂ sang while		% of my total watch- ing time that ♂ sang	absences
	♀ on nest	♀ off nest		of ♀ during which ♂ guarded part or all
4608 Nest I	11.1	34.4	20.5	25 (90%) of 28
4702 Nest I	0.4	2.0	1.06	6 (18%) of 33
4608 Nest II	5.8	18.8	10.7	33 (66%) of 50
4702 Nest II	0.37	0.82	0.65	5 (31%) of 16

TABLE 2. MALE'S ATTENTIVENESS: NESTLING STAGES

	Feedings by			Droppings removed by		
	male	female	unidentified	male	female	unidentified
4608 Nest I	119	166	13	12	19	2
4702 Nest I	22	263	0	0	25	0
4608 Nest II	59	30*	0	9	1*	0

\*Up to the time the male deserted.

*Territory.* To my knowledge, the 4608 female's westward foraging never took her nearer the 4702 nest box than about 30 feet. How far east the 4702 female went I do not know, but I believe there was an overlap of at least 20 feet in their ranges.

No other House Wrens nested in the neighborhood. However, on 11 occasions between 2 June and 6 August I saw an unbanded one go near, or actually to or into, the 4608 box, and once near the 4702 box. As it never sang, but song by the male once set it to squeaking, and as I saw it attacked by each of the nesting females, presumably it was a female. Once when he was approached by it the male moved away, another time he quivered his wings, and another time he displayed toward it.

"It" of course may have been more than one bird. Perhaps, even, it was sometimes the 4702 female, for I four times saw her end a period of incubation or brooding when the male sang at 4608; she must therefore have been aware that he was active in that direction and she may have been attracted there.

On 15 June, during an off-nest period of the incubating female at 4702, she and the strange wren lit on a wire near that box and did some sparring. During some of the pauses between bouts one of them held its wings slightly open and drooped, and its tail up vertically and spread. After some seconds of the sparring one entered the nest.

On 2 June, while the 4608 female was sitting, the stranger flew to the box hole and looked in, then dropped to the ground as if shot. On 21 July, again while this female was sitting, the stranger

after clinging briefly at the hole, entered the box, then in a quarter minute came out hurriedly. Presumably she was attacked each time. The two sittings had been under way for 9 and 5 minutes at the time of these occurrences, and were extended to 31 and 26 minutes, making them the longest sittings of the respective nestings.

On 20 July the male once flew onto the roof of the garage to which the 4608 nest box was fixed, and there moved about oddly, always just about half a dozen steps at a time, with his head somewhat raised, shoulder, rump and breast plumage fluffed out, and tail dragging. Soon I noticed the strange wren also on the roof, foraging normally, to all appearances. The male continued his display for about two minutes, then both birds disappeared as I jotted notes.

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## PATTERN AND TIMING OF SKULL PNEUMATIZATION IN THE RUBY-CROWNED KINGLET

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During fall bird-banding operations at Powdermill Nature Reserve (Carnegie Museum's field station in the mountains of southwestern Pennsylvania, three miles south of Rector, Westmoreland County), the skulls of most species are routinely checked for degree of pneumatization ("ossification") as an aid in age determination. The pattern and timing of pneumatization in several species has received additional attention.

In the fall seasons of 1967 through 1969, I examined (usually under magnification, and with the aid of artificial light) the skulls of over 1,000 living Ruby-crowned Kinglets (*Regulus calendula*). From these I made a series of 80 field sketches illustrating the patterns and stages of pneumatization observed. A review of these sketches indicates two common and basically different, if highly variable, patterns apparent in this species. In the first, designated as Type A, pneumatization takes place to the sides of the midline of the skull, leaving a pair of diminishing "windows" separated by