Aggressive foraging behavior in House Sparrows.—Analysis of aggressive foraging behavior in House Sparrows (*Passer domesticus*) recording at a feeding station in Lawrence, Douglas County, Kansas, in the spring of 1964 showed that relatively high levels of aggressive behavior occurred in both sexes when individuals were under mixmal stimuli to procure food, but that at any time females were more likely to be aggressive at the feeder than males.

Over a period of 66 days from 5 March to 10 May 1964 (but excluding 4–11 April) Mrs. Dorothy S. Anderson made a series of 36 sets of observations of aggressive foraging. This consisted of chases, directed pecking, gaping, directed lunging, and wing raising. She recorded each such instance as a unitary act of aggression, with the sex of the aggressor and of the individual attacked. Length of observation periods varied from 5 to 50 minutes ($\bar{X} = 19.0$), and each ended when the sparrows left the feeder, often as a result of interruption by Blue Jays (*Cyanocitta cristata*), Common Grackles (*Quiscalus quiscula*), or waxwings (*Bombycilla*), essentially random events relative to our watching sparrows and useful in determining the end of an observation period.

Table 1 summarizes relative aggressive behavior of females, relative aggressive behavior of males, and the proportion of all heterosexual aggressive behavior by females toward males. Females generally are more aggressive than males when feeding at this season, and they account for 62 per cent of all instances of aggression at feeders (927 of 1,495 instances, $\chi^2 = 86.8$, $P = 0.005$), which is highly significant. Of the female activity, 404 instances were of female:female, and 523 of female:male ($\chi^2 = 15.0$, $P = 0.01$), a significant difference suggesting a persistent, low-level dominance over males at feeders.

Female aggressive feeding shows two peaks in time (Table 1): the first peak is associated with laying of first clutches and the second with laying of second clutches (cf. Johnston, Univ. Kansas Publ. Mus. Nat. Hist., 12: 575, 1968). No relationship is apparent between level of female aggressive feeding behavior and parental feeding of young birds.

Male aggression occurs throughout the time that males have maximal spermatogenic and androgenic capacity (R. K. Selander and R. F. Johnston, MS), but the frequency of aggressive acts varies during this time period. Male aggressive behavior (Table 1) is almost equally distributed toward males and females (269 male:female and 299 male:male, $\chi^2 = 1.56$, $P = 0.10$), the small difference not being significant. There

TABLE 1

FREQUENCY OF AGGRESSIVE FORAGING BEHAVIOR OF HOUSE SPARROWS AS A FUNCTION OF SEX AND OF TIME

	Total Aggressive Acts			*Total Heterosexual Aggression*	
Time	*N*	*% M:F*	*% F:M*	*N*	*% F:M*
1–9 March	120	21.9	27.2	59	55.0
10–18 March	261	18.0	36.4	142	66.6
19–27 March	353	19.0	40.2	209	67.8
27 March–6 April	470	15.9	36.8	248	69.6
7–15 April	19	0.0	31.5	6	100
16–24 April	203	24.4	21.9	94	47.3
25 April–3 May	32	6.4	37.3	14	84.6
4–12 May	37	19.4	34.2	20	63.2
Totals	1495			792	

seems to be no basis for assuming that males vary their aggressive feeding behavior either because of hormonal changes or as a result of differences in attitudes toward females or other males.

Male aggressive feeding also shows two peaks, the first in March when reproductive behavior was being initiated, and the second in late April, roughly coincident with parental feeding of first broods of young. Only at this time, 16–24 April, were males recorded as more aggressive than females (48:46), but the difference is of course trivial. Thus the most aggressive foraging behavior by males is only sufficient to match levels of females, not to exceed them.

In the time preceding the period under consideration, roughly November through February, we know that females are more aggressive at feeders than males; but we have too few quantitative records to allow direct comparison with the present data. Even so, this represents an important departure from modes of behavior of a number of cardueline finches (Hinde, Ibis, 98: 1, 1956), in which males are dominant over females in winter, with reversal of dominance only at the time of primary sexual behavior. The present arrangement of aggressive behavior is consistent with the long-term pair bond and early pairing behavior of House Sparrows. As pairs exist through winter (Summers-Smith, The House Sparrow, London, Collins, 1963), characteristic high level aggression by males might be disruptive to pair bonds, because of the likelihood of males responding aggressively to female attack. That males direct some aggressive behavior at females at feeders is not inconsistent with these observations, for members of a pair do not necessarily visit feeders at the same time.

Partial financial support by the National Science Foundation (GB 4006) is hereby acknowledged.—Richard F. Johnston, *Museum of Natural History, The University of Kansas, Lawrence, Kansas 66044.*

A string-pulling Tufted Titmouse.—While idly watching a mixed flock of Tufted Titmice (*Parus bicolor*) and Black-capped Chickadees (*P. atricapillus*) feeding in a large Virginia pine (*Pinus virginiana*), the following events attracted my attention. It was late afternoon on 30 September 1968, near Bryson City, North Carolina, when the flock moved into a pine in the front yard of our summer cottage. The birds were feeding briskly—small bits of bark kept filtering down and the noisy chatter could not be completely ignored. Suddenly I realized that a titmouse had dislodged a caterpillar (sp. undet.) and that it was hanging from a limb by about 18 inches of its quickly unreeled silken thread. I continued to watch, enthralled, as only a few days before I had been rereading Archie Carr's recounting of the tale of the "String-pulling spider" in his "Ulendo" (New York, Alfred A. Knopf, 1964, p. 199, et. seq.). As I watched, the titmouse leaned over the limb, grasped the thread with its bill, and in thoroughly seamanlike fashion quickly heaved 'round and hauled the caterpillar up, transferring the thread to its feet while reaching down for another purchase. The maneuver was completely successful, ending in the consumption of the caterpillar. The entire series of events took only a few seconds, just long enough for me to call Mrs. Dickinson's attention to what was going on above our heads. She looked up just in time to see the last heaving in and the fate that befell the caterpillar.

Although string-pulling by various species of trained titmice is generously documented, I have been unable to locate any record of its occurrence in the wild such as I have recorded here. Perhaps in this observation lies a clue to the ease with which titmice are trained to perform an act that appears quite foreign to their usual behavior.—J. C. Dickinson, Jr., *Florida State Museum, Gainesville, Florida 32601.*