

Once out of the nest they are a useful source of food for the hen but may also attract predators. Tinbergen et al. (1964) describe how Black-headed Gulls remove egg-shells after hatching, and show that such behavior reduces predation. Perhaps the hen ptarmigan eats her broken eggs as an alternative to carrying them far from the nest. This behavior may offer a partial explanation for the claim that extremely few ptarmigan eggs fail to hatch (Johnsgard 1973, Myrberget 1975). A small proportion of eggs laid may be nonviable because of a thin, deficient shell. At the Wildlife Research Station these are all mechanically incubated, but some do not hatch, reducing our success rate. In the wild, they are more likely to be broken, removed, and eaten, never appearing on anybody's records.

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Altruism in nesting Yellow-Bellied Sapsucker.—Power (1975, *Science* 189: 142) presented the theory of altruism in describing experiments designed to test it on wild Mountain Bluebirds (*Sialia currucoides*). He considered his results negative, but they are pertinent to observations I presented briefly (Kilham 1971, *Wilson Bull.* 83: 159) but not in detail, on a natural experiment that involved another hole-nesting bird, the Yellow-bellied Sapsucker (*Sphyrapicus varius*). By Power's criteria, the outcome of this 'natural experiment' could be construed as evidence for altruism. My observations were as follows:

The male of a pair of sapsuckers (pair C) was killed on the night of 27 June 1967, seemingly by a raccoon (*Procyon lotor*) as evidenced by a pile of his feathers where he had been plucked and eaten just below the nest hole. The hole itself remained intact, although well gnawed by the raccoon. Female C (FC) now fed her well-grown nestlings alone at a rapid rate of 14 feeding visits in 30 min, but with only small amounts of prey in each visit. The begging notes of the young were feeble.

On the following day, 28 June, FC began a new type of behavior. In spite of the intense pace of her efforts to feed the young, she paused occasionally to give "kwee-urk" breeding calls. I wondered whether she was seeking a mate when I discovered that a new male had already arrived. I was soon watching him make repeated visits to the nest hole, not to feed the young, but to percuss the tree here and there as if prospecting a new nest site and to tap within the entrance when FC approached, then fly away in a winnow or courtship flight when she arrived, these activities all being characteristic of early courtship behavior (Kilham 1962, *Auk* 79: 31).

The courtship of the two sapsuckers progressed rapidly. By the following morning I heard displays soon after dawn when the new male drummed, then flew to FC, who flew away in courtship flight. These pairing activities were against a background of loud "chick-chick-chick" vocalizations coming from the nestlings. FC now fed her young at a slower rate of twice in 30 min, and by 0540 the new male, only 2 days after the death of the original one, was bringing food to the nest. This was to the nestlings, for there is no courtship feeding among sapsuckers. It now appeared as if FC would finish her nesting successfully, but the raccoon returned and killed both the new male and the nestlings on the following night.

Power (op. cit.) states that his male bluebird consorts were "reproductively selfish." They did not feed the young, they took no risks, and they were "clearly not altruistic." The male sapsucker consort, in contrast, not only fed the young at his adopted nest, but risked his life in doing so. By one hypothesis his chances of being killed were high. Male sapsuckers, like males of other woodpeckers, spend the night on nests. When a predator attacks, they stay by the young and, when striking out through a small hole in tough living wood

might have a fair chance of thwarting a raccoon or other predator. It would seem, however, that if one male were killed at a nest, a replacement would stand a high risk of being killed also.

Power further states that "a truly altruistic bird could be expected to provide care immediately." This seems a bit dubious. Under normal circumstances a sapsucker or other bird goes through a succession of stages in reproductive behavior, each one leading to the next and accompanied by hormonal changes as discussed by Emlen and Power (1976, *Science* 191: 808). A feature of the behavior of the male sapsucker consort was that he went through a series of behavioral changes in a remarkably short time. He perched the nest tree as if looking for a site to excavate, he tapped at the nest entrance, flew in courtship flight when female C came near, all of these being features of the early breeding season, but not of the period of feeding nestlings (Kilham 1962). The consort male reached this final stage after a day of becoming adapted to a new situation. If he spent the night on the nest and defended the young, as is suggested by the fact that his remains lay below the hole in the morning, then his behavior was, it would seem truly altruistic. From the exchange of views given by Emlen and Power (op. cit.) it would seem that the subject of altruism is a complex one, supported by few observations such as the present ones of situations in nature.

Instances of a widowed parent attracting a new mate that participated in either incubation or care of nestlings appear to be rare among hole-nesting birds. The only one I have found is that of Hamilton (1943, *Auk* 60: 91) on a male Eastern Bluebird (*Siala sialis*) that, having lost its first mate to a cat, attracted a new one within 2 days. This new female incubated the eggs (4 out of 6) to hatching. I have encountered 4 instances where one of a pair of sapsuckers lost its mate in the nesting season; the widowed survivor having been a female in 3 cases and a male in one. Lawrence (1967, *A.O.U. Ornithol. Monogr. No. 5*) mentions a widowed male sapsucker who, while feeding its young, was courted by a strange female, but she did not participate in care of the nestlings. My impression of studying sapsuckers for over 20 years in New Hampshire is that there is nearly always a floating population of lone, unattached males and females in the nesting season, due possibly to shortage of suitable nest trees. The male that came to widowed female (FC) and joined in feeding her nestlings may have come from this unattached group.—LAWRENCE KILHAM, *Department of Microbiology, Dartmouth Medical School, Hanover, New Hampshire 03755*. Accepted 6 Jul. 76.

Correction.—In my paper "Pectoral Appendage Myology of the Hawaiian Honeycreepers (Drepanididae)," *Auk* 94: 331–342, 1977, a muscle description is printed incorrectly. The correct form for the muscle following *M. abductor allulae* and preceding *M. abductor digiti majoris* on p. 341 is as follows: *M. adductor alulae* (*M. adductor pollicis*). This is a very small muscle, about 2 mm long and 0.5 mm wide. It arises fleshy from the carpometacarpus at the base of the extensor process and inserts partly on the first digit and partly on a branch of the tendon of *M. extensor digitorum communis* (which see for details) (Fig. 3).

Also, *allulae* will be spelled *alulae* in the final version of the forthcoming *Nomina Anatomica Avium*.—ROBERT J. RAIKOW

Correction.—Those puzzled by the abnormal phoebe nest in Fig. 1, page 367 of April *Auk* (as both my assistant and I were) have only to turn the picture upside down. The original photograph was mis-oriented, and the author failed to catch it in galley.—Ed.