tion of Richard F. Johnston. Partial support for this research has been given by NSF grant BMS 76-02225 and grants from the General Research Fund of the University of Kansas. Helpful discussions were conducted with R. F. Johnston and C. L. Cink.—PETER E. LOWTHER, *Museum of Natural History and Department of Systematics and Ecology, University of Kansas, Lawrence, Ks 66045.* Received 9 March 1978, accepted 29 September 1978.

Side-stepping and Side-hopping in Arboreal Birds.—Despite the extensive literature on avian behavior, some aspects remain little studied even for common species. I report here new observations on locomotion along branches and elevated perches. The data were obtained in many hours of observing wild birds and about nine hours of watching captives. In addition, I searched the literature extensively but found only a few pertinent references. I summarize here the limited available information on side-stepping and side-hopping in arboreal locomotion.

Although birds ordinarily fly, hop, or step between branches within a tree, at times they move in one of several ways along the long axis of a single limb. Hailman (1960) first used the term side-stepping for movement of a Song Sparrow (*Melospiza melodia*) along a dandelion stem which the bird had bent to the ground. I use the term side-stepping to refer to movement in which the legs are alternately lifted sideward along the perch so that one leg always remains ahead of the other in the direction in which the bird moves. The forward toes of both feet are bent over the same side of the perch, and the long axis of each foot is often at roughly a right angle to the direction of movement of the bird but can be at an acute angle. Side-stepping by definition involves no crossing of the legs and contrasts with switch-sidling in which a bird alternately places one foot, and then the other, forward along the perch (Hardy, 1974). Side-hopping refers to movement along a perch by a hop to the side with no crossing of the legs, with the long axes of both feet oriented in the same direction, often at a right angle to the direction of movement of the bird, and with both feet simultaneously off the perch during the brief hop. Unfortunately most published comments on sideward movements of birds have not clearly indicated the kind of movement used, and such terms as sidling are ambiguous unless further explained.

Side-stepping occurs in a wide variety of taxa (Table 1). In addition, I have seen side-hopping in four species, all in captivity: *Berenicornis comatus* and *Buceros hydrocorax* of the Bucerotidae, *Sitta castanea* of the Sittidae, and *Zosterops palpebrosa* of the Zosteropidae. For no species or family have I seen both side-stepping and side-hopping. Furthermore, I have not detected either side-stepping or side-hopping in hundreds of observations of many additional species on elevated perches, both in the field and in cages.

Records of side-stepping and side-hopping are too few to generalize on possible taxonomic differences, although in one case such a difference has been noted. Willis (1968) reported that the antbirds *Gymnopithys lunulata* and *G. salvini* side-step along branches "much more readily" than does *G. bicolor*. For many species side-stepping and side-hopping appear to be infrequent in the wild, as indicated by the small number of records in my own observations and in the literature (e.g., Hailman, 1973). In addition

TABLE 1.

Taxa seen side-stepping on elevated perches.

Ardeidae: *Bubulcus ibis*[1]; Columbidae: *Columba livia*[1], *Zenaida macroura*; Psittacidae: *Amazona ochrocephala*[1], *Ara macao*[1]; Ramphastidae: *Andigena laminirostris*[1], *Ramphastos sulfuratus*[1]; Formicariidae: *Gymnopithys* spp. (Willis, 1968); Sturnidae: *Sturnus vulgaris*[1]; Icteridae: *Cassiculus melanicterus*[1], *Agelaius phoeniceus, Quiscalus quiscula*; Fringillidae: Cardinalinae: *Cardinalis cardinalis, Passerina ciris*; Carduelinae: *Carduelis tristis, Carpodacus purpureus, C. mexicanus, Hesperiphona vespertina*; Emberizinae: *Junco hyemalis* (Hailman, 1973).

[1] = in captivity. Observations by the author unless otherwise noted.

to the families and subfamilies reported here to side-step or side-hop, probably many others also exhibit such behavior, which possibly occurs in all birds that perch. Side-stepping involves a sideward motion of the legs relative to the anteroposterior axis of the trunk, and an indication of a potential ability for such sideward movement is seen for many species in the varied separation of the legs and feet on different perches (pers. obs.). Ability to side-step does not preclude walking along suitably wide branches, as I have seen in the Common Grackle (*Quiscalus quiscula*). Furthermore, the use of side-stepping as opposed to side-hopping does not appear to be directly linked with the use of asynchronous (walking, running) versus synchronous (hopping) terrestrial gaits, as side-stepping occurs in species such as the cardueline finches that typically hop over the ground.

Most of my observations were made on wild birds, but watching captives yielded proportionately more records of side-stepping and all records of side-hopping. In watching captive Starlings I quickly saw side-stepping over short distances but obtained only one equivocal record of this behavior in many observations on perched wild Starlings. The relative scarcity of field observations of side-stepping and side-hopping is conceivably attributable to the difficulty in continuously viewing wild birds due to their often extended flights between perches, the effects of foliage and other objects in concealing movements, and the possibility that for some species caged individuals side-step or side-hop more frequently than do birds in the field.

LITERATURE CITED

HAILMAN, J. P. 1960. Song Sparrow feeds on dandelion by unusual method. *Auk,* **77:** 349–350.

———. 1973. Double-scratching and terrestrial locomotion in emberizines: some complications. *Wilson Bull.,* **85:** 348–350.

HARDY, J. W. 1974. Behavior and its evolution in Neotropical jays (*Cissilopha*). *Bird-Banding,* **45:** 253–268.

WILLIS, E. O. 1968. Studies of the behavior of Lunulated and Salvin's Antbirds. *Condor,* **70:** 128–148.

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An Artificial Nest Structure for Least Terns.—The Least Tern (*Sterna albifrons*) often nests on beaches just above the high tide line. Where the tidal range is moderate to great, spring tides wash out many nests. In five years of working with the species in northeast Florida, we have seen hundreds of nests inundated. Therefore, a structure that raises the nest even a few inches may be of significant benefit to some nests.

Our structure is a discarded tire. A nest is selected near the high water mark, one likely to be inundated before the young hatch. Study the area before you begin, to get an idea of the nesting substrate. Place the tire over the nest with the eggs in the center. Carefully remove the eggs and lay them aside in a safe place. Fill the tire with sand. Pack the inside of the casing tightly. If any space is left the sand will settle, the nest will sink, and the bird may desert. Level the platform and restore the area around the tire to its previous appearance. This may involve scattering shells or dry sand on top. In many cases we have gathered the shells lining the nest, set them aside with the eggs, and replaced them later. Bank sand up around the edge of the tire to hide it; make it look like a pile of sand with the nest on top. The banked-up sand also provides a ramp for the chicks to walk down when they leave the nest, rather than simply falling off the edge. Excavate a scrape the size of the original and replace the eggs.

Tests of this method were conducted in the summer of 1978 at a colony near Jacksonville, Florida. Three groups of nests were designated as: high nests (above the highest tide), low nests (in danger of inundation), and tire nests (low nests that we transplanted to tires). Nests where the final outcome was unknown were omitted from the study. We ascertained the final outcome on 21 high nests, 11 tire nests, and 24 low nests.