

are the peak egg-laying months." We agree with these findings and add that it is unlikely that many adults are on the breeding grounds in October, April, or May. On 5 November 1980, we could not find any birds during a fairly thorough one-day search of Nihoa, nor did we see any birds offshore. On Laysan, birds were vocalizing in burrows, but no eggs could be found on 16 November 1980. On 26 January 1981, eggs were being incubated on Laysan Island, but no young were found. In February 1981, every stage of development between eggs and fully-feathered chicks was found on Nihoa. Our surveys throughout 1978–1983 indicate that most adults and young are gone from the breeding islands by mid-May.

Morphometrics.—Adult Laysan Island birds (\bar{x} = 93.8 g, SD = 9.8, range = 79–108.5, N = 32) weighed significantly more than adult Nihoa birds (\bar{x} = 86.2 g, SD = 6.0, range = 74–94, N = 23) (ANOVA, $P \leq 0.01$) in January and February. Adult weights on Laysan in April and May averaged 83.6 g (range = 66–105, N = 61). The differences in weight may reflect seasonal and spatial food availability. The following mean measurements are from Nihoa: culmen length 1.86 cm (SD = 0.13, range = 1.64–2.29, N = 23); culmen width 0.94 cm (SD = 0.08, range = 0.79–1.06, N = 13); tarsi 3.03 cm (SD = 0.16, range = 2.71–3.40, N = 23) and wing length 11 cm (SD = 0.64, range = 17.5–19.5, N = 11). The single egg is immaculate white, not with spots as reported by Peterson (1961). Egg measurements were made from 9 eggs on Laysan Island. The mean length was 3.91 cm (SD = 0.11, range = 3.70–4.14) and the mean breadth was 2.87 cm (SD = 0.06, range = 2.77–2.96). Two eggs were measured in Nihoa. The mean length was 3.78 cm (SD = 0.18, range = 2.67–2.92). The egg volumes were calculated according to Stonehouse (Ibis 103:474–479, 1963) to be 16.04 cm³ and 15.06 cm³ respectively (ANOVA, $P > 0.01$).

Conservation.—The Sooty Storm-Petrel population is now known to be greater than previously suspected in the Northwestern Hawaiian Islands with the confirmed presence of a large colony on Nihoa Island. Nowhere, however, is this ground-nesting species common. The accidental introduction of rats or cats onto breeding islands could be devastating. Rats were responsible for a population decline at the Izu Islands, Japan (Hasegawa 1978). Additional research is necessary during the winter breeding season to determine the actual size of the colonies. To be effective, thorough surveys require the use of tape recordings of the Sooty Storm-Petrel call to determine the occurrence of birds in their deep burrows. A more accurate status assessment throughout its range will help determine what conservation measures, if any, are needed.

Acknowledgments.—We are grateful to the captain and crew of the NOAA Ship R/V *Townsend Cromwell* for their support of our field studies. A. Newman, E. Knudtson, B. Flint, J. Andre, R. Schulmeister, S. Schulmeister, and R. Ittner made observations that were used in this report. We thank R. B. Clapp and S. L. Olson for indentifying specimens. We also thank the U.S. Fish and Wildlife Service for their support.—MARK J. RAUZON, P.O. Box 4423, Berkeley, California 94704; CRAIG S. HARRISON, 46-024 Puulena, #614, Kaneohe, Hawaii 96744; AND SHEILA CONANT, Dept. General Science, Univ. Hawaii, Honolulu, Hawaii 96822. Accepted 1 Feb. 1985.

Wilson Bull., 97(3), 1985, pp. 392–395

Vocal imitation in a captive Purple Martin.—Kroodsma and Baylis (pp. 311–389 in *Acoustic Communication in Birds*, Vol. 2, D. E. Kroodsma and E. H. Miller, eds., Academic Press, New York, New York, 1982) list the Barn Swallow (*Hirundo rustica*) as the sole representative of the Hirundinidae known to show vocal imitation. Here, I report vocal

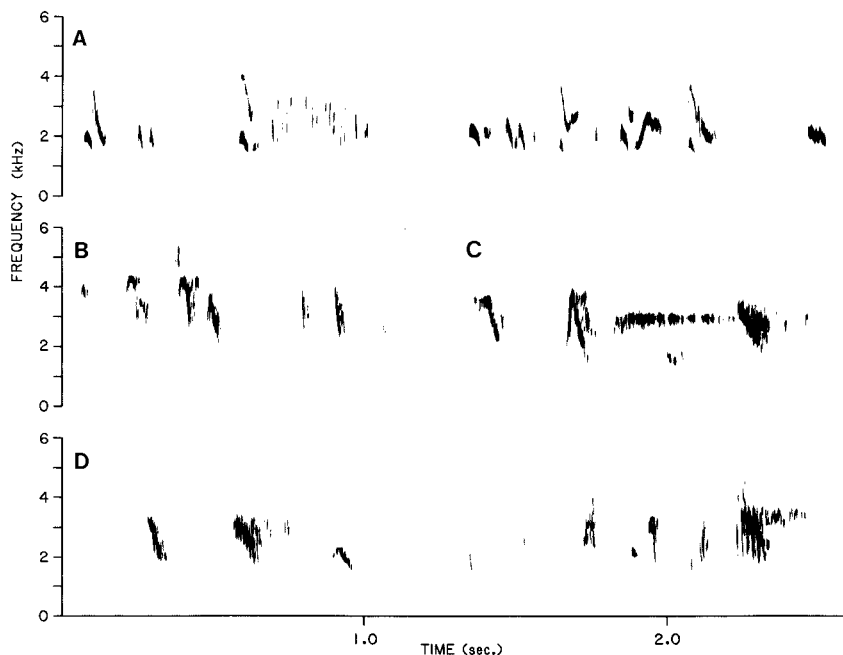


FIG. 1. Wide-band spectrograms of sounds of a captive male Purple Martin isolated as a nestling from visual or auditory contact with wild martins. (A) Sound recorded before exposure to heterospecific songs in the National Zoo's Bird Exhibit Building. (B) and (C) Imitations of a Golden-fronted Leafbird. (D) Imitation of a Red-crested Cardinal.

mimicry in a captive Purple Martin (*Progne subis*). In July 1980, six nestling martins were taken from a colony at 8–10 days of age and raised in the basement of the Bird Exhibit Building, National Zoological Park, Washington, D.C. They had no further visual or auditory exposure to wild martins, and were released into a large indoor "tropical rainforest" exhibit ($31.7 \times 39 \times 40$ m) in January 1981. Two survived until spring 1981, and one male remains, having been alone from September 1981 until an albino martin was introduced in August 1983.

The male martin shared the exhibit with one pair each of two exceptionally vocal and mimetic species, the Golden-fronted Leafbird (*Chloropsis aurifrons*) and the Red-crested Cardinal (*Paroaria coronata*), both of whose loud songs it incorporated into loud, variable, and lengthy (>30-min) songs of its own. The subsong of the survivor recorded before it was released into the exhibit resembled Purple Martin sounds more than recordings made after the bird had experienced heterospecific sounds (Fig. 1). Loud songs were heard every month but were most noticeable from January through August, when the bird was probably in breeding condition. The martin uttered call notes, including a liquid *cher* and *zweet* in flight, and a harsh *zwrack* in aggressive encounters with heterospecifics in the exhibit that were identical to my ear to the calls of free-ranging Purple Martins (cf. Brown, Condor 86:433–442, 1984.) Sound spectrograms of the imitative songs are unlike any given by free-ranging martins (cf. Brown 1984). As elements from sounds of two heterospecifics were incorporated in these sounds, I interpret this vocal appropriation as evidence of song learning.

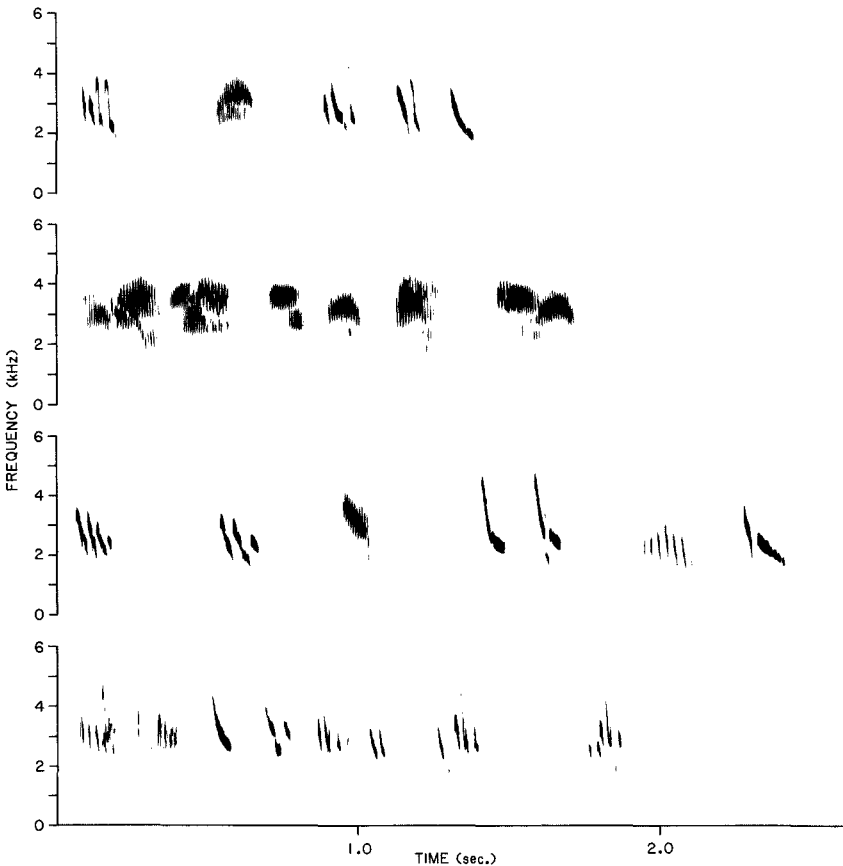


FIG. 2. Wide-band sound spectrograms of dawnsong of four male Purple Martins from the same breeding colony (Severna Park, Maryland). Note the distinctive syllables and cadences for each male's song.

Wild martins have two stereotyped songs, one given mainly during daylight hours at or near the nest cavity ("croak" song, Brown 1984) and a dawnsong consisting of a continuous (lasting from 04:15 to 05:30, late May to mid-June in Maryland, pers. obs.) rhythmic series of separate *chirp*, *chick*, and *chiree* sounds given in high circling flight during dark, predawn periods and occasionally while perched on the breeding box (Fig. 2). Each male at my study colony (pers. obs.) had an individually distinctive dawnsong, both with regard to cadence and note structure (Fig. 2).

I suggest that the captive male's mimicked song is a homologue of dawnsong found in free-ranging males. The dawn song of the captive male had a distinctive cadence, and was sung away from a nest site. Also, before exposure to heterospecific song, the isolated martin's dawn song strongly resembled that of wild martins in both cadence and in the structure of some syllables (Fig. 1A). The Barn Swallow, the other known hirundine vocal imitator, also has a distinctive dawnsong (pers. obs.). The function of dawnsongs in swallows, which

presumably do not defend feeding territories, remains unknown. Dawnsinging is performed by mated male martins with well-established nests (pers. obs.).—EUGENE S. MORTON, *National Zoological Park, Smithsonian Institution, Washington, D.C. 20008. Accepted 12 Apr. 1985.*

Wilson Bull., 97(3), 1985, p. 395

Observations of a Tufted Titmouse and a Cattle Egret associating with a black bear.—On 2 May 1980, in a bottomland hardwood forest in eastern Arkansas, I located a yearling male black bear (*Ursus americanus*) and his radio-collared mother in a water hickory tree (*Carya aquatica*) in one m deep floodwater. While preparing to tranquilize the juvenile bear, I observed a Tufted Titmouse (*Parus bicolor*) jumping about the bear's back and rump pecking at its fur. After a few minutes, I noticed that the titmouse was collecting hair in its beak, and carrying it from the site. During a period of approximately 30 min, an adult titmouse, presumably the same bird, returned to the bear twice to repeat this behavior. The third hair-gathering episode was interrupted, however, as I approached the bear.

It is likely that the titmouse was using the collected hair in its nest. The incident occurred during the nesting period of the Tufted Titmouse in this region (Douglas and Neal, *Arkansas Birds: Their Distribution and Abundance*, Univ. Arkansas Press, Fayetteville, Arkansas, in press), and this species has been reported to use the hair of a variety of mammals to line its nest (Bent, U.S. Natl. Mus. Bull. No. 191, 1946; Pielou, Ph.D. diss., Michigan State Univ., Lansing, Michigan, 1957). The Tufted Titmouse has been observed collecting hair from living mammals including red squirrel (*Tamiasciurus hudsonicus*), woodchuck (*Marmota monax*), and human (*Homo sapiens*) (Bent 1946), and opossum (*Didelphis marsupialis*) (Goertz, *Wilson Bull.* 74:189–190, 1962), but not black bear.

In the same forest on 13 September 1980, I saw a radio-collared adult male black bear wading in a shallow lake with a Cattle Egret (*Bubulcus ibis*) perched on its back. Cattle Egrets have been reported feeding alongside and atop a number of African ungulates including elephant (*Loxodonta africans*), rhinoceros (*Diceros bicornis*), and hippopotamus (*Hippopotamus amphibius*), where they prey upon insects stirred up by these mammals and, possibly, ectoparasites (Pitman, *Bull. Br. Ornithol. Club* 82:100–101, 1962; Brown, *The Birds of Africa*, Vol. I, Academic Press, London, England, 1982).—TOMMY R. SMITH, *Graduate Program in Ecology, and Dept. Forestry, Wildlife and Fisheries, Univ. Tennessee, P.O. Box 1071, Knoxville, Tennessee 37916-1071. Accepted 8 Apr. 1985.*

Wilson Bull., 97(3), 1985, pp. 395–396

Abnormal yellow eye ring on a Tropical Kingbird.—Abnormal yellow plumage occurs rarely among wild birds, and is generally known as xanthochroism (e.g., Pettingill, *Ornithology in Laboratory and Field*, 4th ed., Burgess Publ. Co., Minneapolis, Minnesota, 1970: 193; Van Tyne and Berger, *Fundamentals of Ornithology*, 2nd ed., Wiley and Sons, New York, New York, 1976:161; Terres, *The Audubon Society Encyclopedia of North American*