GENERAL NOTES

More Returns from the Guanica Forest, Puerto Rico.—A recent paper (Faaborg and Winters, Bird-Banding 50:216–223, 1979) summarized the results of seven winters of banding in the seasonally dry Guanica forest of southwestern Puerto Rico. Further netting was done in this area in January 1980. Due to hurricane David in the fall of 1979, the area was lush and green, although resident bird populations were rather low. Only one of the 16-net lines was operated for a 3-day period, but a number of interesting recaptures of residents and winter residents were recorded.

Perhaps due to the relatively low population levels, only 9 recaptures occurred among the 69 resident birds caught. These included 3 Red-legged Thrushes (*Mimochichla plumbea*), 2 Pearly-eyed Thrashers (*Margarops fuscatus*), 2 Bananaquits (*Coereba flaveola*), 1 Puerto Rican Vireo (*Vireo latimeri*), and 1 Adelaide's Warbler (*Dendroica adelaidae*). All had been banded in January 1978 except for 2 of the Red-legged Thrushes. One of these had been banded in January 1975 and the other in June 1973 (6 years and 6 months earlier). These exceed the known longevity record for this species.

Of the 19 winter resident warblers captured, 5 had been banded in previous years. Two of the 8 Black-and-white Warblers (*Mniotilta varia*) and 2 of the 3 Ovenbirds (*Seiurus aurocapillus*) captured were banded in this location in 1978. A Prothonotary Warbler (*Protonotaria citrea*) banded originally in 1976 and recaptured in 1978 was captured again just one net away from its original banding site. This individual was the first ever recorded returning to a winter area and this new observation suggests that it is strongly attached to this location. No recaptures were recorded among the 4 American Redstarts (*Setophaga ruticilla*), 2 Prairie Warblers (*Dendroica discolor*), and 1 Parula Warbler (*Parula americana*) netted, although many individuals of these species have been banded here in previous years.

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The Ingestion of Grit by Nestling Barn Swallows.—The ingestion of grit by various bird species is well documented, particularly for granivorous and herbivorous species. Grit particles aid in the digestion of organic nutrients (Fritz 1937, Meinertzhagen 1954, Scott et al. 1962) and provide a source of essential soluble minerals (Hill 1971). Accounts of grit ingestion among wholly insectivorous species are sporadic. Jenkinson and Mengel (1970) discussed grit ingestion within the Caprimulgidae, suggesting that grit aids in the mechanical digestion of chitinous exoskeletons of beetles (Coleoptera) which form a large part of their diet. Hirundinids, like caprimulgids, are wholly insectivorous and feed on similar orders of insects (Beal 1918, Bent 1942). Barlow and Klaas (1963:439) mention swallows picking up bits of gravel from road surfaces, presumably for grit. Brown (1976) recorded Purple Martins (*Progne subis*) picking up grit material and suggested a similar function.

The purpose of this paper is to document and discuss grit selection among Barn Swallows (*Hirundo rustica*) nesting in central Washington. Dead nestling Barn Swallows were removed from nests after periods of inclement weather during 1976–77 in the vicinity of Ellensburg, Washington. These were aged (Barrentine 1978), preserved in 10% formalin, and later analyzed for stomach content by separating grit material from insect remains. Grit particles were air-dried and then separated on the basis of color (light, dark, transparent), size (selectively sieving using U.S. Standard Sieve Series, W. S. Tyler Co.,

TABLE 1.
Frequency and quantity of grit particles in the stomachs of nestling Barn Swallows.

Age of swallow in days	No. of stomachs examined	No. of stomachs with grit	No. of stomachs without grit	Mean no. of grit particles (S.D.)
<4	19	10	9	3.1 (1.66)
4	22	16	6	5.4 (5.07)
5	20	19	1	4.3 (4.19)
6	13	13	0	8.4 (7.99)
7	12	12	0	4.5 (2.84)
8	13	11	2	6.6 (5.47)
9	10	10	0	5.1 (4.25)
10	17	13	4	3.1 (2.22)
11	6	2	4	4.5 (2.12)
12	8	6	2	3.0 (3.03)
13	8	7	1	2.6 (1.90)
14	6	5	1	4.4 (3.51)
15	3	2	1	4.0 (4.24)
16	2	1	1	— —
Total	159	127	32	4.8 (4.49)

Mentor, Ohio), weight (to the nearest 0.0001 g using an analytical balance), and calcareous composition (using 0.01 N HCl).

I analyzed 159 stomachs of Barn Swallows between one and 16 days of age for grit (Table 1). Approximately 80% of the samples contained grit; the mean number of particles per stomach was 4.8 (SD 4.5). There appeared to be no correlation between swallow age and the quantity of grit ingested ($r = -0.037$), or swallow age and the weight of grit material ingested ($r = 0.066$).

A total of 634 grit particles were selectively sieved (Table 2) and segregated into three categories prior to weighing. These were as follows: (1) light-colored grit (quartz, granite, or pelecypod shell fragments), dark-colored grit (basalt, or pelecypod shell fragments), and (3) transparent grit (glass). Over 70%, by number, of the particles were light-colored

TABLE 2.
Distribution of particle size for grit found in the stomachs of nestling Barn Swallows.

Size of grit (mm)	No. of grit particles
4.00–6.30	10
3.36–4.00	23
2.83–3.36	61
2.36–2.83	107
2.00–2.36	119
1.68–2.00	105
1.41–1.68	95
1.18–1.41	67
1.00–1.18	17
0.84–1.00	30
Total	634

TABLE 3.

Analysis of grit particles for color and weight.

Grit color	Number of grit particles	Mean weight (g) of particles	Standard deviation
Light	450	0.0184	0.0201
Dark	121	0.0222	0.0204
Transparent	63	0.0192	0.0169
Total	634	0.0193	0.0210

and nearly 10%, by number, were transparent (Table 3). Other particles included two microtine cheek teeth fragments, one rodent incisor, one piece of porcelain china, and one lead shot.

Grit particles were tested for calcareous composition and approximately 36% were positive for calcium. Of the dark-colored grit, 18% (22/121) was calcareous and 50% (226/450) of the light-colored grit contained soluble calcium.

The use of grit for digestive processes and/or mineral supplementation appears to be common among Barn Swallows nesting in central Washington. Evidence suggests that adults select grit material and offer it to altricial nestlings before the age of four days. Grit particles vary in color, size, and composition; however, preference seems to be for light-colored objects between one and three mm in size. Half of such particles are calcareous.

Kopischke (1966) suggests that female pheasants (*Phasianus colchicus*) tend to select calcareous grit when available, particularly during the laying season when calcium reserves are used for egg shell formation. Huges and Wood-Gush (1971) suggest a similar observation for the chicken (*Gallus domesticus*).

Grit material probably facilitates the mechanical digestion of insects upon which swallows feed and so would not only be of importance to adults, but also young who are nourished on a similar diet. Nestling Barn Swallows, like other growing endotherms, have a high physiological demand for calcium (Fisher 1971) and thus it is probable that the selection for calcareous grit benefits the growing young.

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Communal Nesting in the House Sparrow.—During a study of House Sparrow (*Passer domesticus*) demography on a ranch near Calgary, Alberta, in 1977, I noted an unusual spatial distribution of nests. Nests and nest sites were closely grouped; in one row of 34 blue spruce (*Picea pungens*) trees, 110 nests were found. The mean distance from a nest to its nearest neighbor was 0.66 m. In some instances, up to 4 nests were joined into a single communal structure. Typically, House Sparrow tree nests are widely spaced (Summers-Smith 1963). Throughout the breeding season of 1977, while monitoring individual nests with a 20× telescope, I saw agonistic encounters between nest owners and intruding House Sparrows at 26 nest boxes on the ranch (mean distance from a box to its nearest neighbor = 3 m) but not at tree nests. The thick blue spruce foliage may have hidden intruders at tree nests both from me and nest owners; nonetheless, with communal nests, adjacent pairs of tree-nesting sparrows must have tolerated each other's presence to a degree not observed at box nests.

These observations led to the present study on tree-nest building by House Sparrows and the development of mutual tolerance in neighboring pairs. I followed nest building from 20 April to 4 May 1978 and noted (1) whether nest-building procedures at tree sites were different from those at box nests and described by Summers-Smith (1963); (2) whether birds reacted to neighbors (birds nesting within 1 m) differently from how they reacted to strangers; and (3) how it was possible for a pair to build a nest beside an existing nest.

Patterns of nest building at tree sites were similar to those described by Summers-Smith (1963). A dominant feature of the period was the frequency with which nest material was stolen from other House Sparrow nests. Usually, outer pieces of straw were taken, but on several occasions a bird entered another's nest and removed feathers from its lining. Both males and females did this but never in a neighbor's nest. Birds seen stealing nest material did so from nests in other trees along the row. Stealing nest material was not observed at nest boxes but it was described by Summers-Smith (1963).

If an intruding sparrow was detected in a nest tree by the residents, it was chased from the area, usually by the male. Any action of the intruder which increased its detectability increased the likelihood it would be chased. Yet, pairs of birds with nests in the same tree could perch and call side by side without obvious antagonism. In one instance where two nests were joined, the two males perched together on top of the nest, while their mates worked jointly on the structure.

In another case, two pairs of sparrows were working on nests about 30 cm apart in a tree. An intruding male approached and was immediately chased by one nest owner, *A*. When *A* returned, neighbor *B* was perched beside *A*'s nest. *A* resumed nest building apparently unconcerned by the presence of *B*, in direct contrast to *A*'s aggression a moment earlier against the intruder.

I observed a color-banded male, *C*, excavating a nest in the side and bottom of an established sparrow nest. This male avoided contact with the male resident, *D*, by keeping to the opposite side of the nest. That a bird could "hide" in this manner is partly attributable to the thickness of the blue spruce foliage. I watched these activities for 5 min until a neighboring male, *E*, (inter-nest distance = 0.5 m) returned and chased the intruder. However, *C* persisted, mated and initiated a clutch in *D*'s hollowed-out nest. The two neighbors *D* and *E* could coexist without interaction, but it was clear that the initial presence of the intruder bothered both of them. This implies that attempts to establish a nest site in or near an existing nest are repulsed by the nest owner, but that eventually the new pairs' presence is accepted and they are allowed to nest. Persistence by each new