

(double-layered). In passerines, this condition is usually found only in the sexually immature birds whereas, actually breeding adults have a completely pneumatized skull.

This condition of unpneumatized skull has been reported in individuals of several passerine species which were sexually mature or actually reproducing. Noteworthy are the following: *Loxia curvirostra* (McCabe and McCabe, 1933, *Condor*, 35:136-147); *Quelea quelea* (Disney and Marshall, 1956, *Proc. Zool. Soc. London*, 127:379-387); *Lepidocolaptes lachrymiger*, *Euscarthmornis granadensis*, *Elaenia obscura*, *Mionectes striaticollis*, *Myadestes ralioides*, *Molothrus bonariensis*, *Tanagra xanthogaster* (Miller, 1963, *Univ. California Publ. Zool.*, 66:1-78), *Synallaxis albescens* (Miller, 1955, *Acta XI Congr. Intern. Ornith. Basel*, p. 495-503). Grant (1966, *Amer. Midland Nat.*, 75:142-149) also observed the same phenomenon in *Myiopagis viridicata* and gave a good review of the genera and families in which retarded or arrested skull ossification has been reported.

According to Dwight (1900, *Ann. New York Acad. Sci.*, 13:73-360) and Nero (1951, *Wilson Bull.*, 63:84-88), the skulls of passerine species appear to pneumatize completely at about eight months of age. On the other hand, Miller (1963, op. cit.), indicated that in some of the tody-flycatchers there are single-layered regions in the skull that may prove to be permanent. Concerning the genus *Mionectes*, Miller (1963) said, "the skull either is slow in attaining adult double-layered condition throughout or never attains this state in some individuals." He also reported (Miller, 1946, *Bird-Banding*, 27:33-35) that complete pneumatization (doubling) may never be complete in some non-oscine families such as the Furnariidae. Since *Myiornis ecaudatus* is not biologically well known, we can not specify whether or not the incomplete pneumatization is the result of an arrested or a retarded process. Neither can we say that this phenomenon is of usual occurrence in this species. It also seems possible that individuals of this species are sexually mature or actually reproducing while still being very young as indicated by the presence of unpneumatized skulls.

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The gaping response of nestling Bank Swallows.—Because of the hole-nesting habit of Bank Swallows (*Riparia riparia*) the behavior of the young on the nest is difficult to observe. Beyer (1938, *Wilson Bull.*, 50:122-137) observed Bank Swallows on their nest by digging an observation hole behind their burrow. He reported that the parents gave a high pitched call when entering the nest. If this did not release gaping, the adults would nudge the young. In the summer of 1964 I undertook to study the gaping response of young Bank Swallows from an observation hole similar to that described by Beyer (op. cit.).

On 7 July 1964 near the W. K. Kellogg Biological Station of Michigan State University, Barry County, Michigan, I found a large Bank Swallow colony and began construction of an observation hole. The nest contained three young estimated from Beyer's fledging dates to be eight days old. Before completion of the hole I observed that the young birds gaped vigorously and gave begging calls when I darkened the nest chamber by placing

my hand over the burrow entrance, as they did when I brightened the nest chamber with a flashlight.

The young birds were 10 days old when I was first able to observe them inside the nest. The young gaped when the adults entered the burrow, even if the adults did not walk back to the nest chamber. Although I could hear the begging calls of the young, in none of the observation periods did I hear the adults give any call upon entering the nest. The nestlings lifted up their heads when a shadow from another bird passed across the burrow entrance, but they did not gape. The next day I noted the same behavior.

On the 12th day of the birds' life it was cloudy and rainy all day. The young were fed at intervals of 15 to 30 minutes. Perhaps due to the infrequent feeding, the young gaped at shadows that passed over the burrow; and once when I shined a flashlight through the glass plate between my observation hole and the nest chamber, they all turned and gaped widely toward it.

In all previous observations the nestlings did not move off the nest; on the 13th, 14th, and 15th days, however, two of the nestlings were continually off the nest and about one-third of the way down the burrow. A third nestling remained on the nest.

On the 16th and 17th days all three young were fed at the entrance of the burrow. They gaped whenever another bird hovered about them. On the 18th day the nestlings had fledged, and for the next three days I found them on the nest only at night.

Nestling Bank Swallows apparently do not gape in response to a call from the parents, but rather either to a change in lighting or to the approach of another swallow.—GEORGE W. FULK, *Department of Zoology, Michigan State University, East Lansing, Michigan*, (*Present address: Department of Zoology, University of Rhode Island, Kingston, Rhode Island*).

Seasonal variation in bill length of House Sparrows.—In the course of an investigation of geographic variation of House Sparrows (*Passer domesticus*), data were obtained which further demonstrate seasonal variation in bill length of this species. Specimens were collected at Kit Carson, Cheyenne Co., Colorado, in mid-October, 1964, and in late August, 1965. Measurements of the bill were taken from the anterior margin of the nostril to the tip of the mandible, and were recorded to the nearest 0.1 mm. Only adult birds (as determined by cranial ossification) were used in the present study so as to ensure that the samples are comparable. Statistical treatment was by analysis of variance (Steel & Torrie, 1960. "Principles and Procedures of Statistics." McGraw-Hill, New York).

A statistically significant variation in bill length among groups was indicated (see Table 1). However, no portion of this variation could be attributed either to differences between sexes ($P > 0.10$) or to an interaction component ($P > 0.10$). All of the variation in bill length could be assigned to effects of season of capture ($0.025 > P > 0.010$), birds obtained in August having longer bills than birds captured in October.

The results are in essential agreement with reports by Clancey (1948. *Brit. Birds*, 41: 115-116) and Davis (1954. *Condor*, 56:142-149) which indicate that bills of House Sparrows are longer in summer than in autumn and winter. Presumably this variation has as its basis seasonal changes in food habits of sparrows (Davis, *op. cit.*; Selander and Johnston, 1967, *Condor*, 69:217-258); wear to the bill is thought to be greater during late autumn and winter when the primary foods are seeds than it is in summer when a substantial part of the diet is soft-bodied insects.