

GENERAL NOTES

Age Determination by Skull Pneumatization in the Field Sparrow.—Wood (1970, *A Bird Bander's Guide to Determination of Age and Sex of Selected Species*, College of Agriculture, Pennsylvania State University, University Park, Pennsylvania) instructs bird banders to age Field Sparrows by skulling "into September," yet many finch species can be aged by skull pneumatization much later into the fall. The problem is to determine the latest date when one can be certain recently pneumatized juveniles are not being lumped with fully pneumatized, after-hatching-year birds. Recent data suggest that in New Jersey at least, Field Sparrows with pneumatized skulls can safely be designated adults at least into November.

Field Sparrows were caught in mist nets and banded from May into mid-December at the Stony Ford Field Station in Princeton, New Jersey. No Field Sparrows were caught in September when the birds were molting and inactive. Prior to September the birds had either fully pneumatized skulls and adult plumage or unpneumatized skulls and juvenal plumage. By October there were no longer birds in juvenal plumage though some individuals still showed signs of molt.

I used water or saliva to part the feathers and examine the skull in good light. For each individual, I judged the degree of pneumatization using the technique described by Mellencamp (1969, *EBBA News* 32:109-111). Briefly, a bird's skull was divided into several sections representing different percentages of pneumatization (see Fig. 1). The por-

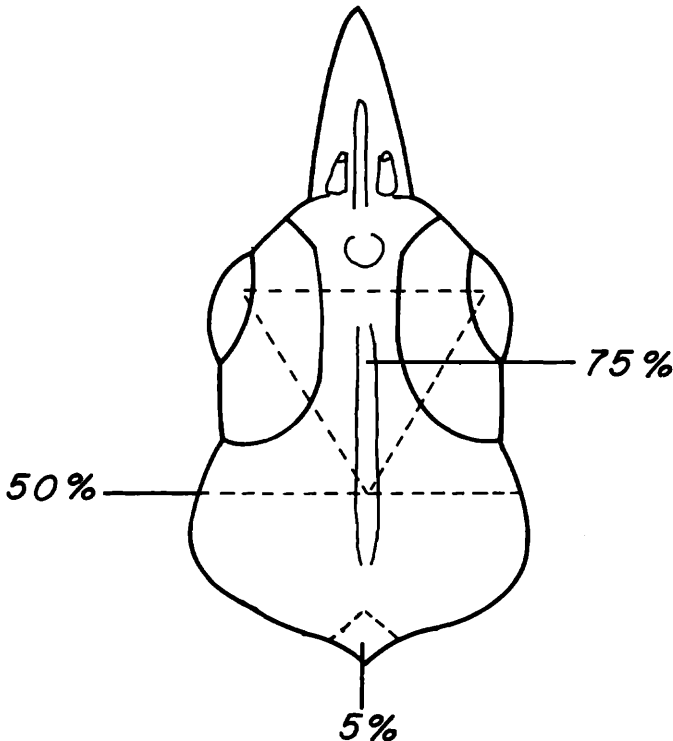


FIGURE 1. The technique for estimating the amount of skull pneumatization; dotted lines indicate percent guidelines.

TABLE 1. Distribution of individuals by percent skull pneumatization at two-week intervals.

Percent pneumatization	Date				
	8 Oct. 21 Oct.	22 Oct. 4 Nov.	5 Nov. 18 Nov.	19 Nov. 2 Dec.	3 Dec. 16 Dec.
0-9	6	4			
10-19	3	6			
20-29			1		
30-39			1		
40-49		2	3		1
50-59	5	7	3		
60-69	7	8	5		1
70-79		2	1		
80-89		2	1	1	1
90-99			1		6
100	8	14	7	2	3

tion of the pneumatization process that can be monitored by banders generally proceeds anteriorly in Field Sparrows—beginning as a small triangle at the back of the head. If only this triangle was filled, the skull was classified as 5% pneumatized. An imaginary line between the ears represented the line of 50% pneumatization. If the only unpneumatized area was within an equilateral triangle drawn by joining the eyes and the midpoint of the 50% line, the skull was 75% pneumatized. Intermediate percentages were estimated using these guidelines. Birds in late stages of molt sometimes could not be skulled and are not included in the analysis.

Table 1 shows the distribution of the amount of skull pneumatization over 2-week intervals from 8 October through 26 December 1978. Recaptured birds are included in these data. It should be clear that the determination of a cut-off date for the earliest date of pneumatization of juvenal skulls depends on the average variation in each estimate. From 8 to 21 October the birds appear to fall into 3 cohorts—adults and 2 groups of juveniles, perhaps reflecting early and late broods. The date at which pneumatized skulls can no longer be called adult depends on when pneumatization estimates for juveniles of the earlier cohort begin to merge with those of fully pneumatized adults—that is, when the observed range of juvenal pneumatization begins to include 100%.

If we assume that no significant pneumatization occurs in 5 days, we can estimate the amount of variation in the measuring process itself from unpneumatized birds recaptured within 5 days of their initial banding. The sample mean deviation is 5.6% ($N = 10$, $SD = 7.1$).

Figure 2 shows the degree of skull pneumatization plotted from recaptured birds that showed increased pneumatization scores over time. Though the data are few, the rate of pneumatization appears to be nonlinear with the birds showing a rapid rate in the early stages and a slower rate toward the end of the pneumatization process. If one arbitrarily divides the 9 recaptured birds into those individuals in early stages (recaptured at 60% pneumatization or less) and late stages (recaptured at greater than 60% pneumatization), the early, rapid mean rate of completion is 2.0%/day ($N = 5$, $SD = 0.6$) while the late, slow mean rate is 1.2%/day ($N = 4$, $SD = 0.3$). The mean rate of pneumatization for all birds is 1.6%/day ($N = 9$, $SD = 0.6$).

With these results there are 2 lines of evidence to support the hypothesis that the skulls of the oldest first-year Field Sparrows do not pneumatize completely until into November. The first comes from the estimates of skull pneumatization and the associated variance. Table 1 shows that with an average variance of 5.6% there is no danger of confusing juveniles and adults until the 2-week period beginning 5 November.

A second line of evidence comes from the calculations of the rate of pneumatization.

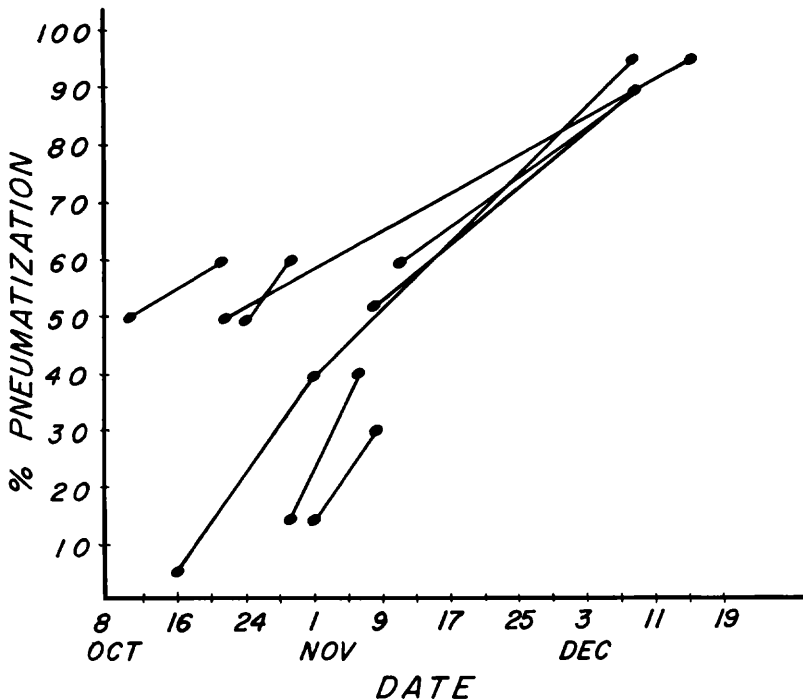


FIGURE 2. Pneumatization rates calculated from percent pneumatization of recaptured birds.

The most pneumatized skull of a first-year bird caught during the first 2-week period was 60% on 20 October. Using the slow, terminal rate of pneumatization of 1.2%/day, this individual would not be fully pneumatized until 33 days later on 22 November. Even if the mean rate for all individuals is used, 100% pneumatization is not reached until 14 November. With these facts in mind, it seems clear that Field Sparrows can be aged by skull pneumatization at least into November, much later than generally recognized.

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Head-scratching and yawning in Black Skimmers.—Several hypotheses have been advanced concerning the functions of avian head-scratching, including preening of the head plumage, spreading of uropygial oil on head feathers, and relief of local irritations on the head (Burt & Hailman, *Ibis* 120:153–170, 1978). A fourth hypothesis holds that head-scratching may help to alleviate pressure differences in the middle ear or eustachian tubes. This idea derives from Andrew's (*Br. J. Anim. Behav.* 4:85–91, 1956) observation that head-scratching often is directed at the external opening of the ear, and that it sometimes is associated with yawning. However, since Andrew's study I have found no published data that confirm this relationship between head-scratching and yawning.

On 20 Mar. 1978 I watched 15 to 20 Black Skimmers (*Rynchops niger*) head-scratching