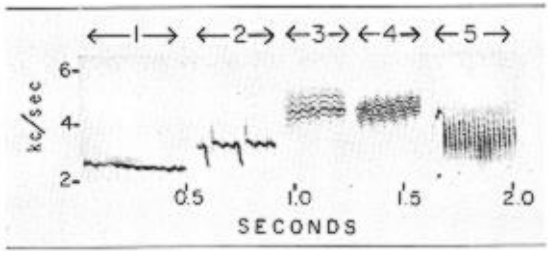

FIGURE 2. Sonagram of Gambel's White-crowned Sparrow song recorded by Leonard Peyton at College, Alaska, 20 May 1967. Compare terminal element (5) with that shown in figure 1. Smudges above elements 1 and 5 are artifacts.

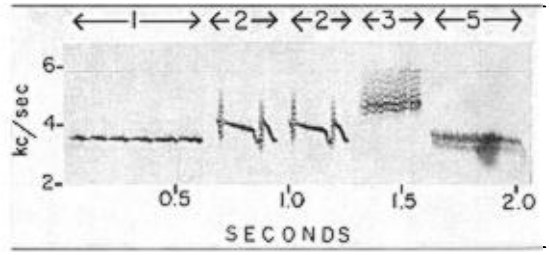

FIGURE 3. Sonagram of Gambel's White-crowned Sparrow song recorded by Leonard Peyton at Kenai Lake, Alaska, 31 May 1967. Note the doubled second element and omission of the fourth element. Smudge on element 5 is an artifact.

from one another. The difference in the terminal elements of the Glennallen and the College song patterns can be heard with the unaided ear. Kessel and Schaller (Biol. Papers Univ. Alaska 4:1–59, 1960) apparently heard Gambel's Sparrows in the Upper Sheenjek Valley in northeastern Alaska using both types of endings. They observed that individuals were consistent in the pattern they sang.

The distinctive pattern from southern Alaska. The songs of birds recorded near Anchorage on 30 May and at Skilak Lake and Kenai Lake on 31 May differ from all others that we have heard in that the second element is doubled and the fourth element is omitted. Figure 3 illustrates this pattern as sung by individuals at Kenai Lake. The Skilak Lake and Anchorage birds used the same pattern, with variations in the form of the frequency fluctuations in the second (doubled) element. A second distinctive song, apparently even more localized in distribution, was recorded at Skilak Lake. As in the Anchorage pattern, the second element was doubled and the fourth was omitted. To these two distinctive features was added a third: the terminal element was also doubled. Since a given individual using this pattern did not always double the ending, we cannot at this time say what significance such doubling may have. Suffice it to say that all the individuals heard at the Skilak Lake campground doubled the ending at one time or another.

Distinctive song patterns as clues to the movements of individuals. The birds near Anchorage, at Kenai Lake, and at Skilak Lake presumably continue to sing the same distinctive patterns while on their wintering grounds, and on the rarer occasions when they sing during migration. Therefore it should be possible to use these patterns as clues to the movements of individuals. Ornithologists who hear songs resembling those described above for the birds in southern Alaska are invited to write the authors and, if possible, to tape record such songs at either 7½ or 15 inches per second, so that sonagrams can be made.

We wish to thank Adrian Wenner, for invaluable assistance in the technical aspects of tape-recording and use of the sonagraph. We acknowledge with thanks helpful discussions with Pierre DeLattre, Project Director, Speech Synthesis Laboratory, University of California at Santa Barbara. Deborah Kaska prepared the sonagrams. This report is Publication no. 74 from the Institute of Arctic Biology.

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ANOPHTHALMIA IN THE AMERICAN ROBIN

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Anophthalmia (the bilateral absence of eyes) and microphthalmia (the reduction in development of one or both eyes) are fairly common anomalies in embryos of the domestic fowl (*e.g.*, 96 out of 11,797 unhatched eggs; F. B. Hutt, Proc. Fourth World's Poultry Congress, London: 197, 1930). Walter Landauer reported that anophthalmia may occur as one step in a series of malformations and is one of the more extreme expressions of "perocephaly" or "defective head" (J. Genetics 54:219–235, 1956). Dr. Landauer wrote (personal communication, 16 June 1967): "Bilateral anophthalmia of chicks, while much rarer than unilateral an- or microphthalmia, is by no means unheard of, especially under unfavorable incubation conditions. I have encountered a number of cases; they were not studied histologically and the diagnosis was, therefore, not complete."

As long ago as 1839, Weissenborn referred to a recently fledged common pigeon (*Columba livia*) "in which no vestiges of the organs of vision can be traced" (Proc. Zool. Soc. London, Pt. 7:175, 1839). Wallace (Wilson Bull. 68:151–152, 1956) described a case of microphthalmia in an American Robin (*Turdus migratorius*), and Wetherbee (Auk 75:101–103, 1958) described unilateral microphthalmia in a Common Grackle (*Quiscalus quiscula*) and synophthalmia (cyclopia) in a Mockingbird (*Mimus polyglottos*). Insofar as we have been able to determine, we are able to report the first example of complete eyelessness in a wild bird.

The circumstances concerning the discovery of this bird are as follows. Mrs. Howard found a Robin's nest containing four eggs in Lincoln, Massachusetts, on 8 June 1966. One of the eggs was inadvertently cracked and so was removed from the nest. Two of the eggs had hatched by 13 June. The fourth egg did not hatch; it was opened and contained no

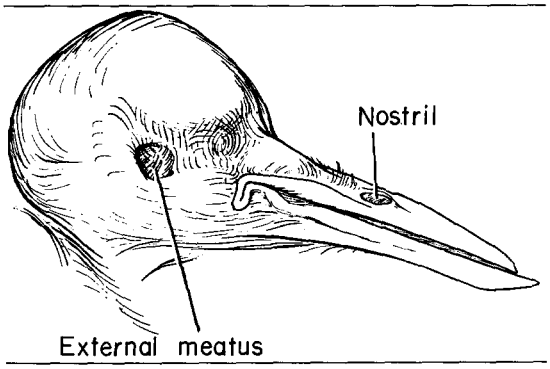

FIGURE 1. Lateral view of the plucked head of an eyeless American Robin.

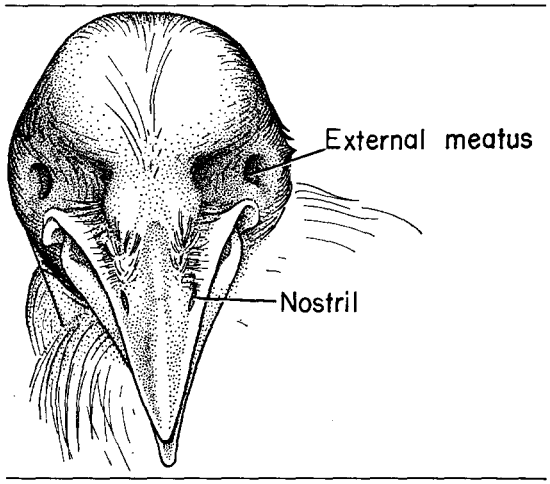

FIGURE 2. Frontal view of the plucked head of an eyeless American Robin.

recognizable embryo. On 20 June, the normal nestling weighed 51.6 g; the eyeless nestling weighed 51.7 g. These are normal weights for Robins at eight days of age.

Mrs. Howard returned to the nest on 23 June, finding the normal bird crouched down in the nest and the eyeless robin on the ground about two feet from the forsythia nest-bush. She put the eyeless Robin on the lawn and watched it from her car. The eyeless bird had difficulty maintaining its balance and repeatedly fell to one side or the other. Nevertheless, the bird was able to preen its feathers several times. The female fed the recently fledged eyeless bird once, and the fledgling also gaped twice when the female flew close to it. Mrs. Howard collected the eyeless bird that day and preserved it in 10 per cent formalin.

Figure 1 is a lateral view of the plucked head of the bird (it appeared normal except for the head). The upper mandible was slightly shorter than the lower mandible. A potential eye-slit between the incipient eyelids was about 1 mm in maximum length in the anteroposterior direction bilaterally. Figure 2 is a frontal view of the plucked head.

Because palpation revealed no suggestion of eyeballs on either side of the head, gross dissection was not attempted. The entire head was sectioned from the base of the bill posteriorly through the brain. These slides revealed the complete absence of eyeballs bilaterally, as well as the absence of any well-defined bony orbits.

Coulombre and Crelin (J. Phys. Anthro. 16:25–37, 1958) studied the role of the developing eyes in the morphogenesis of the bird skull. They reported that the growing eye exerts a mechanical influence on the morphogenesis of the chick's orbit, and that the alignment of the axes of the upper beak and the head is dependent, in part, on equal expansion of the two eyes.

In the present instance, both the eyes and the normal orbital configuration are absent. Nevertheless, the malformation of the two mandibles would appear to be minimal.

We are indebted to James I. Kendall for preparing serial sections and microphotographs of the head of the specimen, and to Mrs. Barbara Downs for the pen-and-ink sketches.

The serial sections have been deposited with the Armed Forces Institute of Pathology, Washington, D.C.

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STARVATION OF SPRING MIGRANTS IN THE CHIRICAHUA MOUNTAINS, ARIZONA

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Although in small birds death by starvation is rarely observed in nature, Lack (Population studies of birds, Oxford Univ. Press, 1966:280) believes that "starvation outside the breeding season is much the most important density dependent factor in wild birds. . . ." Most evidence supporting this contention indicates that it is the young of the year that suffer heaviest losses. Observations reported below suggest that starvation may occur among some spring migrants in years in which there is a late period of cold.

TABLE 1. Minimum air temperatures at the Southwestern Research Station for the first four days of May in a three-year period.

	Minimum temperature, °F		
May	1965	1966	1967
1	40	33	23
2	41	42	20
3	39	49	27
4	34	37	30
Mean	38.5	40.2	25.0

In early May 1967 an unusual freeze (table 1) killed much of the new deciduous foliage in the Chiricahua Mountains, Cochise County, Arizona. The effects of this temperature drop on some of the small insectivorous birds were apparent several days later (13–16 May) during our stay at the Southwestern Research Station of the American Museum of Natural