A DISTINCTIVE SONG PATTERN IN GAMBEL'S WHITE-CROWNED SPARROW

LEONARD J. PEYTON
Institute of Arctic Biology
University of Alaska
College, Alaska 99701

and

BARBARA B. DEWOLFE
Department of Biological Sciences
University of California
Santa Barbara, California 93106

The purpose of this communication is to report a distinctive song pattern of Gambel's Sparrows (*Zonotrichia leucophrys gambelii*) recorded in southern Alaska during the summer of 1967. It is well known that the songs of White-crowned Sparrows breeding in different localities differ in pattern, or dialect. Banks (Univ. Calif. Publ. Zoöl. 70:1–123, 1964) reviews references in the literature to geographic variations in White-crowned Sparrow songs. Marler and Tamura (Science 146:1483–1486, 1964) found that the dialect patterns of males of the permanently resident Nuttall's White-crowned Sparrow (*Z. l. nuttalli*) develop through learning from older birds in the first month or two of life. If *gambelii* is similar to *nuttalli* in this respect, the songs described below represent local dialects characteristic of specific breeding populations. Also, the song pattern of a given individual should, once it achieves adult form, be constant throughout life, whether uttered on the breeding grounds, in migration, or on the wintering grounds.

A year ago, with support from the Institute of Arctic Biology and the Arctic Institute of North America, we began a study of variation in song pattern in the Gambel's Sparrow. To date one of us (Leonard Peyton) has tape-recorded the songs of this race in early summer in Alaska at College, Gulkana, Glennallen, Anchorage, Skilak Lake, and Kenai Lake. The other author (Barbara DeWolfe) recorded songs in fall, winter, and early spring at Santa Barbara, California, and during spring migration at Watson Lake, Yukon Territory. Sonagrams of the recordings were made, and analysis of the variations in song patterns is under way.

The birds near Anchorage, and at Skilak Lake and Kenai Lake on the Kenai Peninsula, uttered songs that are similar to each other in basic pattern and that differ from all songs of Gambel's Sparrows we have heard or recorded elsewhere. At this early stage of our study we do not know how localized this distinctive pattern is. We describe it below in hopes that, once ornithologists are alerted to its existence, this same pattern may be detected either at other points in the vast breeding range of this race or, even better, on migration routes or in the wintering range. Fortunately, the pattern is sufficiently distinctive to be recognizable with the unaided ear.

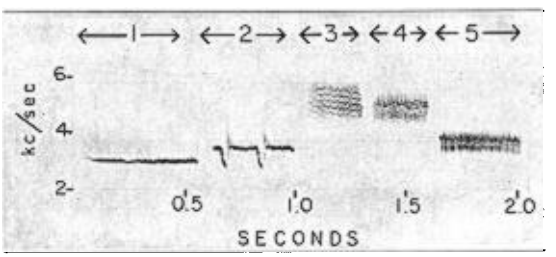

FIGURE 1. Sonagram of Gambel's White-crowned Sparrow song recorded by Leonard Peyton at Glennallen River, Alaska, 5 June 1967. The five elements of the pattern are numbered consecutively (see text).

Description of a common song pattern. Before describing the unique characteristics of the songs of birds in southern Alaska, we shall describe a much commoner pattern we have recorded from several localities. Songs of Gambel's Sparrows recorded at Glennallen River on 5 June 1967 are used to illustrate this pattern. Only its gross features are described here. Detailed analyses of frequency, duration, and amplitude of the notes, syllables, and phrases making up this and other patterns are in progress. The Glennallen song pattern consists of five elements, numbered consecutively in figure 1. The first element is a note (in the sense that the term is used by Marler and Tamura in Condor 64:368–377, 1962) of constant or nearly constant frequency. It corresponds to the introductory whistle of Nuttall's Sparrows in Marin County, California, as shown, for example, in figure 1 of Marler and Tamura (*op. cit.*). The second element consists of a note with rapid fluctuations in frequency. The third and fourth elements are phrases with relatively wide frequency ranges which correspond in general pattern to Phrase B of the Nuttall's Sparrow songs shown in figure 1C of Marler and Tamura (*op. cit.*). The fifth element of the Glennallen song consists of a fast trill or vibrato with narrow frequency range. In its terminal position, but not in its structure, it corresponds to the trill portion of the Nuttall's Sparrow song. Localities where we have recorded songs of this pattern are, in addition to Glennallen, Gulkana, Watson Lake, and Santa Barbara. In choosing this song as our model we do not imply that it is the commonest pattern. Recordings from many other places must be made before we can work out the geographic distribution of this pattern and the relative abundance of individuals using it.

A second common pattern. Figure 2 shows a song pattern recorded for several Gambel's Sparrows at College and vicinity in Alaska, and at Watson Lake and Santa Barbara. The pattern is similar to that described above except that the fifth element, or trill, has a much wider frequency range than that of the Glennallen song, and consists of units which in the original sonagram appear as syllables distinct

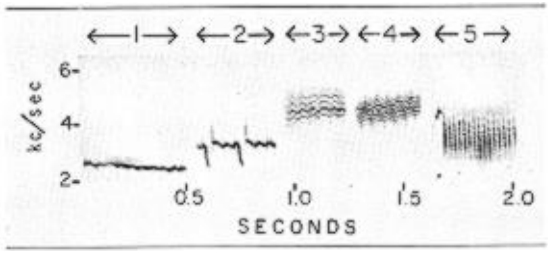

FIGURE 2. Sonagram of Gambel's White-crowned Sparrow song recorded by Leonard Peyton at College, Alaska, 20 May 1967. Compare terminal element (5) with that shown in figure 1. Smudges above elements 1 and 5 are artifacts.

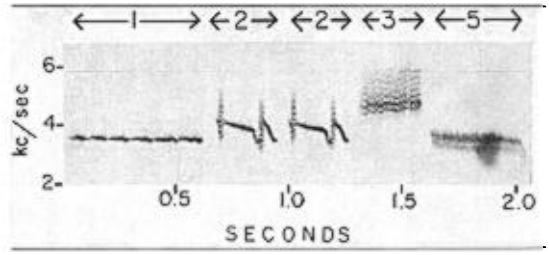

FIGURE 3. Sonagram of Gambel's White-crowned Sparrow song recorded by Leonard Peyton at Kenai Lake, Alaska, 31 May 1967. Note the doubled second element and omission of the fourth element. Smudge on element 5 is an artifact.

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.

Accepted for publication 28 September 1967.

ANOPHTHALMIA IN THE AMERICAN ROBIN

ANDREW J. BERGER
Department of Zoology
University of Hawaii
Honolulu, Hawaii 96822
and
DEBORAH V. HOWARD
Massachusetts Audubon Society
Lincoln, Massachusetts 01773

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