

eggs. This unusually late set of four eggs was collected by Mr. Wilson C. Hanna and is now in his collection (no. 5939). On July 6, 1939, two nests were found, and on June 13, 1940, one nest was found and two or three pair of birds were seen. There is one previously published record of stilts breeding at Lake Elsinore. Florence Merriam Bailey records finding three pairs and three half-grown young on July 26, 1907 (Condor, 19, 1917:157).

Ten or fifteen stilts were observed at San Jacinto Lake, July 4, 1937, with the Avocets and their actions indicated that they were also breeding here.—HAROLD M. HILL, *Redlands, California, September 17, 1940.*

The Buccal Food-carrying Pouches of the Rosy Finch.—Carrying of food in quantity by adult birds engaged in feeding their young ordinarily is facilitated by a crop, by expansion of the undifferentiated oesophagus, or by simple distention of the floor of the mouth. A special food-carrying device in the Rosy Finch (*Leucosticte tephrocotis*) appears to be highly unusual, if not unique, among birds, and to my knowledge it has not been figured before. The only author whom I have found mentioning it is A. K. Fisher (N. Amer. Fauna, 7, 1893:82). He reported E. W. Nelson's observations on breeding leucostictes in the White Mountains of California as follows: "He noticed when skinning the birds that they had a double craw. One located in the usual place [presumably a distended oesophagus] and the other in the form of a double gular sac divided by a median constriction. The latter when full hangs down like a lobe of bare skin outside of the feathers."

Knowledge of this observation led me to look for sacs in breeding leucostictes taken in the Willowa Mountains of Oregon in 1938. Although one female possessed sacs, the mouth region was not in a condition that would permit exact determination of the plan of the structures. A female *Leucosticte tephrocotis littoralis* (Mus. Vert. Zool. no. 76205), taken on Mount Shasta, California, on July 15, 1939, provided the opportunity to dissect the gular sacs carefully. The accompanying figure is based on notes and measurements made of this individual.

The two sacs are well formed chambers, with definite openings connecting to the buccal cavity, and are not merely fissures or open pockets in the mouth lining. There is an opening on either side of the tongue and glottis in about the region of the median mandibular gland (see Anthony, Zool. Jahrb., Abt. für Anat., 41, 1920:573, fig. H a). These lead downward, each to its own sac which is lined with moist buccal epithelium. The two sacs are loosely joined anteriorly by connective tissue in the median plane but there is no communicating passage between as might be inferred from Nelson's account. Each sac extends backward and laterally between the external integument and the floor of the mouth. When fully distended, it presses against the infra-auditory region of the skull and the posterior part of the ceratobranchial bone. The distended pouches measured from orifice to posterior end about $1\frac{1}{2}$ cm. and were $\frac{1}{2}$ cm. in diameter. The sacs resembled the cheek pouches of kangaroo rats when they were first encountered in skinning over the bird's neck and head.

Nelson's statement that the sacs hang down as a lobe of bare skin outside the feathers is misleading. There could at times be distention

coupled with loss of feathers such that the skin of the throat might be visible, but the sacs could not themselves protrude externally. A bird with filled sacs does show a bulging throat and the feathers may stand erect as a result.

The gular sacs that I have examined have been packed full with insects; there may have been small amounts of other types of food that were unnoticed. Obviously, the food was being carried to young birds. Only females with brood patches and ovaries in post-laying condition have thus far been found with gular pouches. I do not know that males develop them although I think they may.

In surveying the breeding habits of leucostictes, the adaptive value of this special device for carrying large quantities of food becomes apparent. The nests which are always placed in alpine cliffs or rock slides often are far from feeding places. A concentrated supply of food at a distance may be utilized without expending time and energy in numerous long trips to and from the nest. Howard

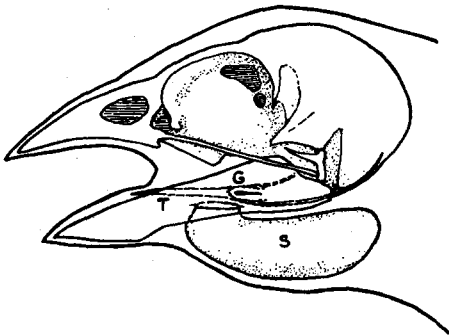


Fig. 23. Skull and outline of head of a female Rosy Finch (*Leucosticte tephrocotis*) showing gular sac (S) of left side with opening in floor of mouth lateral to tongue (T) and glottis (G). The tongue apparatus is shown in broken lines, in its position behind (medial) to ramus of lower jaw.

Twining's observations (MS) at the nests of Sierra Nevada Rosy Finches (*L. t. dawsoni*) show how the feeding routine is adjusted in relation to carrying ability. He found that throughout the day each parent comes to the nest on the average of once every 45 minutes during the period of greatest growth of the young. This is a long interval between feedings for young passerine birds that are supplied insects primarily (compare the Song Sparrow; Nice, Trans. Linn. Soc. New York, 4, 1937:130). Concomitantly, the food delivered to young leucostictes at one feeding is great and the situation is remindful of the copious feeding at a single visit of young of species where the nestling food consists of vegetable material held for a time in the crop or oesophagus of the adult. Twining noted that as many as twenty-five deliveries of food to the group of young might be made by a leucosticte on one visit to the nest.

The question may be raised whether the gular sacs are any better suited than an enlargement of the oesophagus would be for carrying insects to the young. It is possible that they are not. Leucostictes may have evolved the sacs correlative with a tendency to crowd large numbers of insects into the mouth. It probably is instinctive in rosy finches to hold most of the insects intended for the young in the mouth rather than to pass them down the gullet. This seems generally to be the case in passerine birds which I have observed. In the presence of such an instinct a gular sac might more readily evolve through selection than would a true crop, provided the necessary mutations occurred.

In the matter of the relation of the genus *Leucosticte* to other snow finches of the Old World, particularly *Montifringilla*, Sushkin (Bull. Brit. Orn. Club, 45, 1924:36-39) has shown that important differences exist in the palatal structure which argue for the inclusion of *Montifringilla* with the weaver-finches (Ploceidae) and retention of the leucostictes with the true finches. Mayr's demonstration (Jour. für Orn., 75, 1927:596-601) of differences in the completeness of the postjuvinal molt further emphasizes the distinctness of these two groups of snow finches. Had Sushkin known of the peculiar gular pouches of *Leucosticte*, it seems unlikely that he would have failed to use this anatomical evidence one way or another in working out the relationships of these genera. Considerable interest attends, therefore, the result of search for gular sacs in other alpine finches supposedly related to *Leucosticte*. In fact much of importance remains to be learned about the situation in the rosy finches themselves with regard to seasonal occurrence of the sacs, their histology, and their presence in the male.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California, December 15, 1940.*

Colorado Nesting Records.—On June 3, 1940, we found nests of Western Grebes (*Aechmophorus occidentalis*) and White-faced Glossy Ibis (*Plegadis guarauna*) on Trites Lake, Saguache County, Colorado. Sclater (Hist. Birds Colorado, 1912, p. 77) reported that Aiken had found the glossy ibis nesting on San Luis Lakes on July 1, 1875, but gave no authority for the statement, and we have failed to find anything in the literature regarding Aiken's observation. W. W. Cooke had access to Aiken's notes and he states specifically (The Birds of Colorado, 1897, p. 60) that he did not know of nests of this species having been taken in Colorado. San Luis Lakes are in a dry alkaline area and are not bordered with aquatic vegetation necessary for such birds at the present time. Judging from the appearance of the country, we doubt that conditions in the past seventy-five years would have been favorable.

If Aiken actually found nests, it was probably on some of the smaller ponds of San Luis Valley. There are many early records for the ibis from the valley, but it has only been in recent years, comparatively, that conditions have been favorable for nesting water birds.

This broad valley has long been known for its fertility, wherever water was available for agricultural purposes. Flowing wells dot the landscape in many sections, forming ponds in an otherwise arid country; these have become bordered with marsh growths. The entire region reminds us of the area surrounding Great Salt Lake, with extensive alkali flats grown with spiny shrub (*Coleogyne ramosissima*) and rabbit-brush (*Chrysothamnus patens*).

Trites Lake is the property of the Saguache Gun Club, a few miles south of the village of Saguache. The lake has the finest nesting cover we have seen in Colorado. The western edge is grown with a thick tangle of cattails and tules in which we found many nests of Cinnamon Teal (*Querquedula cyanoptera*) and Mallards (*Anas platyrhynchos platyrhynchos*). Nowhere have we found the Western Marsh Wren (*Telmatoodytes palustris plesius*) so common. Literally hundreds of males were heard singing, and dozens of nests, many with eggs, were found. With the wren so common in this place, it seems strange that no nests have been found along the many fine marshes of eastern Colorado or in any other section outside the San Luis Valley.

The Western Grebe was a common form on the lake. Fifteen or twenty birds were observed when we first reached the shores, and after a casual investigation, we found nine nests with eggs ranging from three to seven in number. Nesting had been going on for some time, for several sets were badly incubated.