

145702	March 12	5:00 P. M.	147192	March 19	7:30 A. M.
147647	March 17	8:45 A. M.	145628	March 21	

To carry the experiment farther, twenty of the same species, captured at Claremont, were released March 18, ten miles east of Victorville, on the Mohave Desert and on the opposite (north) side of the San Gabriel Range, about fifty miles by air line northeast from Claremont. None of these have reappeared as yet, which is perhaps not surprising, since migrating waves of this species are now moving north.

The behavior of these twenty birds on being released is of interest. Five flew to the ground and immediately started feeding. The other fifteen flew up into the air 50 to 75 feet and headed out across the desert in the direction of Claremont.—WRIGHT M. PIERCE, *Claremont, California, March 23, 1925.*

NOTE. When sufficient time has elapsed for complete returns from this experiment, and it will not be complete until the life cycle of these birds is ended, it will be of interest to analyze the result in the light of the recorded residence of the birds at the Claremont station. Different results might obtain with birds removed when first captured (if approximately at their first appearance at the station) from those obtaining with birds which had long partaken of the bander's food table. In any case, the results here recorded indicate a definite and blind orientation toward a chosen winter habitat, whether or not the magnet be an attractive supply of food.—J. E. L.

**Remarkable Localization.**—Early reports from two groups of stations seem well worth summarizing. From a total of 153 Gambel and Nuttall sparrows banded in the winter of 1923-24 by John McB. Robertson at his station near Buena Park, California, 44 returns have already appeared; 211 more were banded in the winter of 1924-25, up to March 21. James A. Calder has actively operated a station approximately  $\frac{3}{8}$  of a mile northwest of Robertson's since September 23, 1924. Both stations are situated in the midst of an alluvial plain devoid of nearby topographic variation. Calder has banded 146 Gambel and Nuttall sparrows at his station during the 1924-25 season. Not one of Robertson's "Zonos" has been captured at Calder's station, and just one of Calder's has been taken at Robertson's station. In other words, of 510 sparrows banded only one has found the second station  $\frac{3}{8}$  of a mile away.

At Claremont, California, the stations of Wright M. Pierce, Ernest Osborne and Selwyn Rich form a triangle, the sides of which are about 3, 2, and 4 city blocks long, respectively. Of 898, 145, and 164 Gambel Sparrows banded at their respective stations to March 23, 1925,

Pierce has captured 1 banded by Rich and 4 banded by Osborne,

Rich has captured 5 banded by Pierce and 3 banded by Osborne, and

Osborne has captured 4 banded by Pierce and 2 banded by Rich.

In other words, out of 1207 banded in 13 months, only 19 have so far forgotten themselves as to register at a station four blocks, or less, away.

**The Pattern of Feathers.**—Perhaps no factor in the life economy of a bird exhibits more extraordinary intricacies and marvels of creative art than does the pattern of its feathers. We contemplate the blended ensemble with the utmost admiration. But one who has not plucked the feathers from a bird, feather by feather, and examined their pattern as separate feathers and in relation to other feathers in the same tract and in other tracts, has in store for himself a whole new story in nature.

Banders, handling birds in series unheard of in collections, naturally find themselves analysing color pattern, color tones, and individual variation, and many are already looking for standards by which these values can be appraised. Obviously, an ample series of study skins, ready at hand for use in comparisons, helps to tie in these differences. Obviously, too, no series of skins possessed by any one collection is ample for this purpose.

While it is too early to hope for conventional standardization of observations on color and pattern made from live birds in hand, one's ability to analyse his observations is bound to be enhanced by more intimate studies of the individual feathers. Anyone who comes into possession of a dead bird may spread the feathers, plucked in order of attachment, on white paper, and fasten them there by means of narrow strips of adhesive tape, and then study them at his leisure.

For my own mounts, I use smooth white sheets of a rather heavy ledger bond, cut  $8\frac{1}{2} \times 11$  inches (letter-head size). Perhaps document size,  $8\frac{1}{2} \times 14$  inches, would be better. Folders, such as are used in vertical files for letters, serve as containers, a folder for each species. Adhesive plaster, manufactured for chiropodists, can be obtained in  $\frac{1}{8}$ -inch strips wound on 2-inch spools. This tape can readily be cut into 1/16-inch strips for the smaller feathers. Strips of gummed paper might do as well and would perhaps be more permanent. A pair of slender tweezers and a pair of long scissors completes the outfit.

One can keep these mounts filed vertically in a tight box or drawer of proper size, but should bear in mind that insect pests, if not guarded against, will destroy the feathers. Fresh naphtha flakes liberally used in the box seem to be a deterrent, but will not drive out an insect once it has reached its food. Naphtha probably only obscures the scent by which insects find their food. One should fumigate occasionally with a thoroughly volatile carbon-bisulphide.

When one brings together in this way the same sets of feathers from different individuals of the same species, even when the birds come from the same locality, he is early impressed with the quantity and quality of individual variation. He must be impressed, too, with the independence in pattern and contour design between the sets of feathers from different tracts on a single bird, and with the prevalence, usually, of a certain pattern and contour type throughout any particular set. Shape or contour and pattern design of feathers exhibit almost endless variety, even on a single bird, and the shape, width, and length of any certain feather frequently differs appreciably in different birds that on casual examination would be pronounced alike.

Sample sheets, presenting certain interesting types of feathers, are shown herewith. One cannot, of course, be too careful in allocating the feathers he plucks to the proper tract series. For instance, the outer or tenth primary in many fringillids is smaller than its own tiny covert. In some species, one may easily confuse the tertiaries with their coverts and wonder whether the alula series are, a part of them, coverts.

**Molt.**—The study of feather pattern and of molt run hand in hand. Each set of feathers on a bird's body proceeds with its molt in a manner more or less independent of the other sets or tracts. Particularly is this true of the wings and tail.

We may assume that the order of procession follows a scheme formulated by the phylogenetic relationships of the individual under study. It is of value, therefore, in examining a molting bird, to record in one's note book exactly what appears, to the minutest detail, and to continue to record such details in bird after bird of the same species. Observations on a single individual had best not be accepted as conclusive without repeated confirmations from other individuals of the same species.

Note from which part of a series renewal begins and where it ends and the relative progress of the molt in different tracts. One has no trouble in differentiating the fresh-pigmented new feathers from the abraded and faded old ones. Some banders have been fortunate enough, already, to retake individuals more than once during a molt and thus to obtain data on the speed of feather growth.

One who seriously undertakes a study of molting birds will do well to use wide sheets, one for each species, with columns ruled off and headed for each feather tract. Thus, using a single line for a band number, comparisons are readily made between individuals, since data on any tract is all in the same column. Date, age, and sex should, of course, appear with the band number.

Then there is the progressive change of plumages, wherein the same follicle is called upon to produce, first, a down feather of the natal plumage, then a feather of the juvenal plumage, then one of the adult plumage. Some continue the change by providing a feather of an eclipse plumage, alternating between feathers of successive breeding plumages. Much is to be learned from accurate recording of exact feather patterns in individuals whose type of feather changes with age, and whose particular life changes can now be traced by repeated readings of their identifying bands.

Naturally, the feathers of the wing and tail are easiest kept track of. A ready method of recording these details, suggested by Mrs. Ella H. Ellis, of Los Angeles, California, is a rapid sketch of a conventional wing and tail on which one notes the proportionate size of each growing feather. If one lets the white spaces represent old feathers, and darkens spaces to represent the growth of new feathers, with an extensive "X" denoting absent feathers, he can visualize at a glance the molt condition of a wing or tail. In like manner he can record pattern details for comparison with subsequent plumages of the same bird.

The Western Bird Banding Association is preparing a sheet with a conventional outline sketch for each aspect of the bird, and with each feather tract indicated and named. If the response in membership to this new Association warrants the expense outlay, these sheets should be ready by the time this article appears. They will be distributed at nominal cost to those who desire to cooperate in the study of molts. One need only mark on the sheet the new and absent feathers. Pin or tiny feathers on any of the tracts can readily be indicated.—J. EUGENE LAW, *Altadena, California, March 28, 1925.*