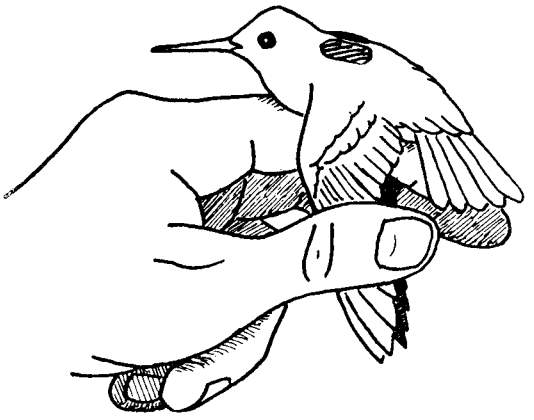

FIGURE 1. Position for holding hummingbird during application of back paint.

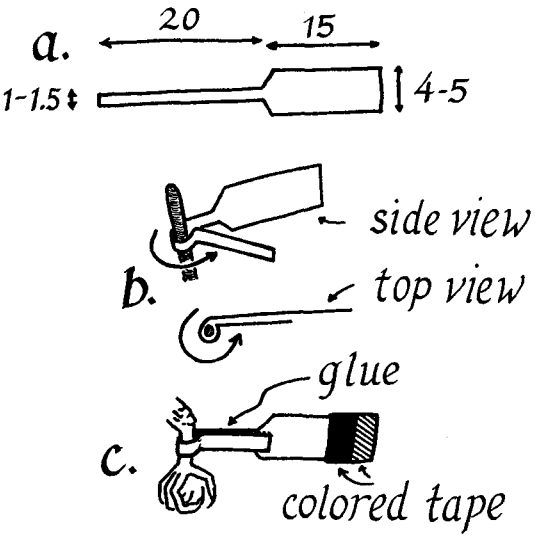

FIGURE 2. Design and method of attachment of plastic tag: a. dimensions of tag in millimeters; b. crimping the tag around some object of approximately the same diameter as the bird's leg; c. tag attached, showing placement of glue and colored tape.

plastic we have used is colored acetate, which comes in translucent sheets in a variety of colors ("Roscolene" is a good brand). Tags should be stored flat and crimped (fig. 2c) just before being attached to the bird. The crimping forms the "tail" of the tag into a ring that fits around the bird's leg. The plastic should be thick enough for strength, but thin and flexible enough not to snap during the crimping process. The main requirements of the glue are that it must dissolve the acetate to give as strong and permanent a bond as possible, and that it be fast-drying. We have had best luck with Bond's Adhesive, but Duco Cement is fairly adequate. To get two- and three-color combinations, plastic tape can be added to the tip of the tag; Scotch brand tapes give the best service. (We have found no paint that will stick to acetate under field conditions.) Although potentially longer-lasting than back paint, tags may become brittle or bent, or glue may crack with age. It is important that the tag be able to rotate rather freely on the leg, and to slide up and down without passing over the foot or the tarsal joint. A tag that is too tight will cut off circulation to the foot and cause swelling, deadening, and eventually loss of the foot.

During our current studies in Costa Rica, we marked each bird with both back paint and a tag. The same color combination is used for both sets of markings; paint spots are read left to right across the back, tag colors were read from the base to the tip of the tag. Using both sets of markings gave us a chance to identify the bird in the field from more different angles; the bird can lose one set of markings and still be identifiable.

As an added precaution, we measure bill, wing, and tail lengths of all birds we mark. Thus, if a bird is recaptured after it has lost most (but not all) of its markings, it can sometimes be identified by measurements.

The color-marking techniques we have described here do not appear to affect the behavior of the hummingbirds in any way. Territorial defense by male *Calypte anna* in California (Stiles, op. cit.) and *Panterpe insignis* in Costa Rica (Wolfe and Stiles, op. cit.) was unchanged by marking with back paint, and a female *Panterpe* similarly marked continued to carry on nesting chores in a normal manner (Wolf and Stiles, unpubl. data). Male *Phaethornis superciliosus* marked with both paint and tags have been repeatedly watched and filmed interacting normally with each other and unmarked bird on leks in Costa Rica; we have even observed copulations by marked birds.

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CEDAR WAXWINGS IN CENTRAL ALASKA

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The Cedar Waxwing (*Bombycilla cedrorum*) reaches the northern limit of its range in extreme southeastern Alaska where it is an uncommon summer visitor (Gabrielson and Lincoln, Birds of Alaska, The Stackpole Co., 1959). In central and southern Alaska the Bohemian Waxwing (*Bombycilla garrulus*) commonly breeds in forested areas and occurs in southeastern Alaska only as a migrant or winter visitor.

On 17 June 1969, while camped with a field party by Hess Creek at 65°42′ N 148°35′ W, a few miles upstream from its junction with the Yukon River, two of each species of waxwings were observed together near camp. The habitat where the birds were seen was spruce forest and willows, bordering an arm of the creek. In the evening both pairs were observed making "flycatching" flights from the tops of tall spruce trees. The close proximity of the two species made the differences between them very apparent. The Cedar Waxwing was smaller with whitish rather than rufous under-tail coverts. It

lacked the white tips to the primary coverts and white and yellow tips to the primaries that are such a conspicuous feature of the Bohemian Waxwing.

The occurrence of the Cedar Waxwing in central Alaska well over 700 miles north of its recorded range in the state is quite extraordinary. The likely explanation is that the two Cedar Waxwings joined a flock of migrating Bohemian Waxwings and accompanied them north to the Hess Creek area. From the recorded range of the two species, it seems that there is some degree of overlap in winter and undoubtedly also at certain times during migration.

It is unlikely that this record represents a northward extension of the range of the Cedar Waxwing in Alaska, but that possibility exists. A similar problem occurs with the Rufous Hummingbird (*Selasphorus rufus*), whose range is given by Gabrielson and Lincoln (op. cit.) as southeastern Alaska north to Prince William Sound. It is now known to occur as far north as the upper Yukon River area (White and Haugh, Can. Field Nat. 83:257, 1969).

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OBSERVATIONS ON THE URBAN FEEDING HABITS OF THE ROADRUNNER (*GEOCOCCYX CALIFORNIANUS*)

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During the years 1970 and 1971, extensive observations were made of a pair of Roadrunners (*Geococcyx californianus*) and their young. The birds were frequent, almost daily visitors in the backyard of a home in Woodland Hills, Los Angeles County, California. The home is located on the northern slope of the Santa Monica Mountains at an elevation of about 1200 ft, and the backyard is contiguous with the chaparral growth native to this region. The yard, planted to dichondra with a border of shrubs and annuals, has a population of introduced European snails (*Helix pomata*).

Roadrunners were first noticed in March 1970 (sometimes alone, sometimes as a pair) feeding on the snails, and they have been observed many times during the folowing months. The bird forages under the shrubbery and flowers in the garden for snails which it carries in its beak to the nearest large rock (sometimes several meters away). With a sideways, snapping motion of its head, it hammers the snail against the rock until the shell is broken into fragments. The soft body is then eaten. After feeding, mucous from the snails is carefully cleaned from the beak by rubbing against the soil. In both 1970 and 1971 parent birds were seen feeding snails to their half-grown young. This previously unreported feeding behavior may indicate an unsuspected ability of these primarily chaparral- and desert-adapted birds to find acceptable food even after man has altered their normal habitat. A somewhat similar behavior has been reported for the Blackbird (*Turdus merula*) which uses rocks as anvils.

The Roadrunners were also observed capturing small birds. A cement block wall separates the yard from a steep slope which is covered with dense chaparral in the upper portion and cleared of brush in the lower portion. Just beyond the wall a bird feeder, kept supplied with chicken scratch, is utilized by many passerine birds, Mourning Doves (*Zenaidura macroura*), and California Quail (*Lophortyx californicus*). A Roadrunner, attracted by this bountiful prey, takes a position a few feet from the feeder and waits until a group of birds is within about 6 ft of its position, at which time it makes a sudden rush, head down, wings slightly extended. If the attack is successful, the Roadrunner kills its prey with a few stabbing motions of its beak and carries it to the dense chaparral above. On three occasions when prey could be identified, a House Finch (*Carpodacus mexicanus*) and two young quail were captured. Zimmerman (Condor 72:475, 1970) has also described predation on passerine birds by the Roadrunner.

Although many new homes have been built in the immediate area in the last few months, the Roadrunners are still present. Hopefully they may be able to supplement their customary diet with the snails and adapt to the man-made changes in their environment.

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TONGUE STRUCTURE OF THE PLUMED WHISTLING DUCK (*DENDROCYGNA EYTONI*)

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The eight species of whistling or tree ducks (*Dendrocygna* spp.) form a closely related group whose phylogenetic status is unchallenged (cf. Delacour 1954:26; Johnsgard 1968:6; and others). Despite their taxonomic similarity, however, a significant degree of ecological and behavioral diversity exists among these forms as shown in the functional anatomy of the North American species discussed by Rylander and Bolen (1970).

Our observations of the feeding apparatus of this group indicate a general uniformity with regard to the tongue structure consistent with a basic similarity in their diets (i.e., seeds from either aquatic or terrestrial sources). We were thus surprised to note the presence of a remarkably developed fimbriated lateral margin on an anterior process of the tongue of the Plumed Whistling Duck (*D. eytoni*). This condition, not previously reported elsewhere, was discovered on specimens kindly sent to us from Australia by H. J. Frith. A fimbriated tongue margin in this position has not been reported for anatids, and