A number of *Corvus* species, including the Carrion Crow (*C. corone*) (Wittenberg 1968) and the Rook (*C. frugilegus*) (Goodwin 1976) make shudder calls, Goodwin stating that when a Rook gets a stick jammed, it "often utters a long drawn out hoarse call with an almost human tone of exasperation and complaint," a characterization that fits the shudder call of the American Crow. Shudder calls, being loud and far-reaching, keep other crows of a cooperatively breeding group (Kilham 1984) away at a critical time of nest building. Pushing crooked sticks so that they will form a tight foundation locked into the branches of a tree is difficult and, perhaps, best done by a breeding female working alone. Nest calls coming at the beginning of egg-laying have been described for other corvids including Common Ravens (*C. corax*) (Warncke 1958), the Rook (Roskaft and Espmark 1982) and the Carrion Crow (Wittenberg 1968). The function of these calls is unclear. In American Crows nest calls may announce that a breeding female which is laying eggs and becoming broody is ready to be fed by her mate and helpers of her cooperative group (Kilham 1984). Lawton and Lawton (1985) have recently described a whine call of the cooperatively breeding Brown Jay (*Cyanocorax morio*). The whine resembles the nest call of American Crows in carrying well, but differs in being sustained over a much longer period.

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A New Technique for Individually Marking Gull Chicks.—This paper outlines a new marking technique used to identify gull chicks in the field. The method was used in 1983 during studies of Ring-billed Gulls (*Larus delawarensis*) (Fetterolf 1984) on the Eastern Headland, Toronto Outer Harbor, Ontario.

In studies involving gull chick identification, various marking techniques have been used; each has experienced limited success. Cuthbert and Southern (1975) glued numbered tags to the chicks' natal down but these tags often required replacement 7–14 d after hatching when the growth of juvenile plumage caused them to fall off. Harris and Plumb (1965) used dye in conjunction with colored leg bands; Parsons (1975) numbered soft plastic

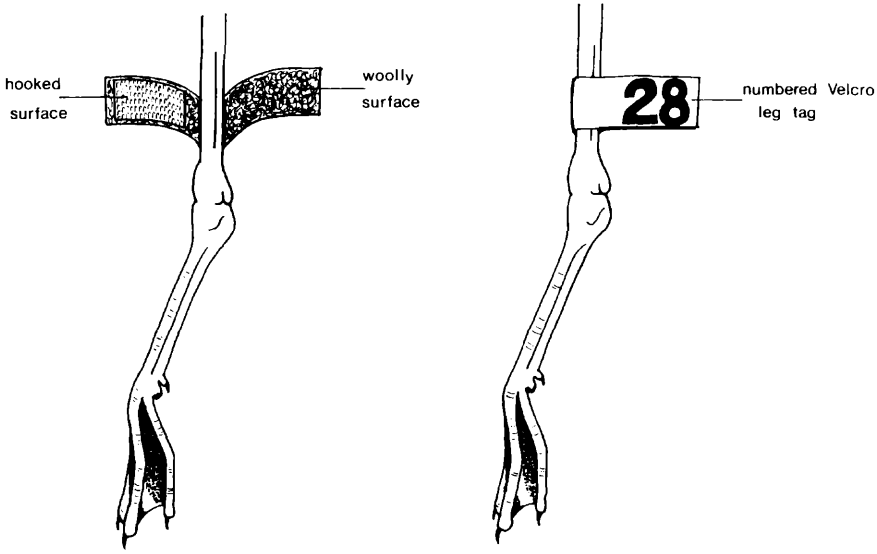

FIGURE 1. Placement and attachment of Velcro leg tag.

leg bands; Davis and Dunn (1976) stapled color-coded bands around the tarsus, and Ryder and Ryder (1981) fastened numbered fish tags through the foot web. Those markers also required replacement 7–14 d after hatching when the legs were thick enough to retain more permanent colored bands (Parsons 1975), longer lasting monel bands (Davis and Dunn 1976) or U.S. Fish and Wildlife Service aluminum bands (Ryder and Ryder 1981).

In this paper we describe experiments involving 243 Ring-billed Gull chicks on which we tested a new kind of leg tag made from Velcro (a registered trademark of Velcro Canada Ltd.). The major advantages of this technique are that the tags are easily and quickly applied, codes are large and easy to read, one tag can be used from hatching through to fledging and the tags have no apparent harmful effects on the chicks.

Velcro consists of two types of flexible nylon tape; one type is woolly on one side, having a surface of soft looped fibers, the other, more rigid type, has a surface of short bristly hooks (see Fig. 1). Both of these surfaces are backed with smooth tightly-woven nylon. When pressed together, the woolly and hooked surfaces adhere to one another. For this study, the woolly tape was used in conjunction with tape having back-to-back hooks, i.e., both sides of the tape are hooked.

From rolls of 2.5 cm wide tape, the hooked tape was cut into 1.5 × 1.25 cm strips, the woolly tape into 7.5 × 1.25 cm strips. An identification number was written in permanent ink with a black felt-tipped pen on the backing of both ends of the woolly strip.

To fasten a tag to a chick, a strip of woolly tape was wrapped around its leg (woolly side in) and the two ends joined with a strip of hooked tape (Fig. 1). Tags were placed on the tibia such that they could be moved freely up and down the shaft but could not slip over the tibia-tarsometatarsal joint. Such placement permitted growth of the leg without constriction and its position above the joint prevented fouling of the tape. The size of the opening on the leg was adjusted using the hooked strip joining the ends of the woolly tape. To prevent abrasion to the unmarked leg, the hooked tape was cut to lengths that did not project beyond the joined ends of the woolly strip. Nevertheless, these hooked strips were long enough to join most of the length of both ends of the woolly strip. Unjoined ends of the woolly strip tended to curl; such curling, if extreme, could obstruct the view of the identification number.

Chicks from plots in three different study areas were used. Study plots, 36–80 m^2 in size, were fenced with 61 cm high chicken wire (2.5 cm hexagonal hole size).

During egg laying, nests were staked with numbered wooden tongue depressors. Egg laying dates were recorded every 1–2 d; eggs were marked A, B, or C with the black felt-tipped pen to identify respectively the first, second, and third eggs laid.

We did not enter two areas frequently enough to determine which eggs in each clutch hatched because the disturbance may have affected our other studies (Fetterolf 1983). Hence, at the time the Velcro tags were attached, the exact ages of the chicks within these study areas were unknown. However, the laying dates of the first and last laid eggs within each plot and the known incubation periods (see Nol and Blokpoel 1983) were used to determine the maximum possible age-range of the chicks.

To ensure the recovery of tags before the chicks fledged, large chicks that may have been close to fledging at the onset of the experiment were not tagged.

During a single visit to area 1, 80 chicks, aged 4–29 d were each tagged on the upper leg with Velcro; these tags were removed after 7 d. In area 2, tags were similarly attached to 27 chicks aged 5–32 d and were removed after 13 d. In area 3, tags were loosely wrapped around the necks of 114 chicks on the days they hatched. An additional 22 chicks in area 3 were each tagged on the upper leg at hatching. Six chicks with neck tags entangled their mandibles within their 'collars' and so after the chicks had worn them for 2–9 d ($\bar{x}$ = 5.33 d, SD = 2.12 d) all neck tags were removed and re-attached to their upper legs.

Tagging did not seem to affect chick survival. Thirty-one of 136 chicks (22.8%) tagged in area 3, lived to an average of 27 d (range 21–30 d, SD = 2.98 d), at which time their tags were removed and their survival no longer monitored. This survival rate was not significantly different ($\chi^2 = 0.01$, df = 1, $P > 0.90$) from that in 7 control plots, where 80 of 350 chicks (22.9%), which were not tagged or disturbed, survived to at least a similar age.

A high chick mortality was observed in all areas during this study year (77.2% in area 3, 77.1% in control plots). We attributed a large number of these deaths to dehydration. During a prolonged heat wave in the post-hatching period, many of the larger chicks, which could not be shaded by a parent or could not find a shaded area on their natal territories, were observed panting to the point of collapse.

During the test period no chicks were known to have lost a tag and, with the exception of three tags in area 2, all tags were accounted for. The three missing tags were on chicks which, on the tag collection day, would have been close to fledging age. Rather than losing their tags, we believe that these chicks flew from the study plots. Improper placement of the hooked strip caused tags to fall below the tibia-tarsometatarsal joint on two chicks. However, with the exception of instances where chicks concealed their tags by sitting down, all identification numbers could be easily read throughout the study using 7 × 35 binoculars from a distance of 15–18 m.

Behavioral observations (approx. 40 h) by P.M.F. (Fetterolf 1984) showed that chicks were not adversely affected by the tags. One possible exception was a chick in area 1 which limped. This chick was captured at 35 d of age and examined. There was no evidence of abrasion on the leg. Several chicks pecked at their tags when first attached, but after a few minutes, the Velcro appeared to be ignored.

Velcro leg tags provide an efficient and effective method for identifying gull chicks in the field. The tags are durable, easy to make and can be attached in less than 5 s if properly prepared. Velcro holds virtually no water, it does not shrink, it is lightweight and the woolly surface compresses to allow for leg growth. During our 35-d test-period, the tags remained free from fading and fouling; once removed, the tags were washed and ready for re-use.

This study demonstrates that Velcro leg tags can be attached to newly hatched chicks and worn until fledging without being replaced. Velcro leg tags thus provide a valuable identification technique for many precocial and semi-precocial birds.

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Modified Milk Carton Nest Box for Studies of Prothonotary Warblers.—Some field studies of avian reproductive success require large numbers of nests. Nest boxes are useful for increasing densities of cavity nesters limited by nest site availability and for facilitating the location of nests.

In 1984, we undertook an investigation that required a large number of Prothonotary Warbler (*Protonotaria citrea*) nests. Expense, weight, and construction time were key factors that led to our use of a nest box assembled from milk cartons. We modified the milk carton nest box originally described by Davis (Eastern Bird Banding Assoc. News 31:271, 1968) and Woodward (Maryland Birdlife 21:151–152, 1973) to improve its durability for use in a riverine environment.

Each nest box was constructed of parts from 2 sealed, empty, 1.9 l (½ gal) plastic-coated cardboard milk cartons cut as shown in Figure 1a–b. Part B was forced into E by bowing the sides of B (Fig. 1c). This provided added strength and trapped a layer of air between B and E which may help to insulate. A hole of appropriate size (we used about 3.8 cm) was made with a sharp, pointed scalpel through both layers on one side, centered about 6 cm from the top of Part E. Standardized holes can be cut using a hole saw bit on an electric drill. Part C was taped (strapping tape) to A to form an overhanging roof (Fig. 1d). Vents (about 5 mm in diameter) were cut in the sides of the roof-cap (Part A + C) and drainage holes were cut in the floor. Then the roof-cap was forced over the top of Part E; a fastener was not needed. A climbing trellis for the young was not necessary because Prothonotary Warblers completely fill their nest cavity to the bottom of the entrance hole.

We obtained the empty, sealed, plastic-coated cardboard milk cartons from a dairy at a cost of 10 cents each in lots of 500. Assembly time was less than 5 min per box. Carton boxes weigh about 1% of the weight of wooden nest boxes of similar size and thus are easier to carry and place. They also are disposable and largely biodegradable.

We attached these boxes to trees by wrapping 2.54 cm wide (1 inch) strapping tape around both the box and the tree (Fig. 1e). The tape and the exterior of the box were then lightly spray-painted a flat gray or brown. A nontoxic paint is preferred. Paint was also sprayed into the box through the entrance hole to darken the cavity. The strapping tape made erection of the boxes a simple task. We encountered no problems with the failure of the tape under adverse weather conditions.

The boxes proved durable. We erected 145 boxes along the Tennessee River, Benton and Humphries Counties, TN, in early April, 1984 and checked them at 7–10 d intervals until the study ended in early August. Seasonal temperatures varied from 13 to 38 C. A flood in the study area inundated the boxes for about 10 d at the onset of the study. When