

I believe that pull traps are easier with less effort per bird, and, particularly with snow on the ground, volume banded per hour can be greater. Single-handed on a good day I can handle as many as 50 birds in an hour.

With a regular resident population such as chickadees, the problem arises as to how to recognize newcomers and strangers and particularly how to recognize a bird banded last year. For this purpose I have been using color marking (See *Bird-Banding*, 32: 228).

With my present "Drimark" technique, it takes only a second or two to apply a bright red spot to each cheek on a chickadee, which will be easily seen for from eight to sixteen weeks.

Now, with the majority of my "regulars" marked, these birds enter and leave the trap at will, and feed in the trap constantly. When strangers appear, they are led into the trap by the regulars, and when I see an unmarked bird in the trap, I pull the string. I am able with very little effort to maintain well over 90 percent of my birds stained and to quickly recognize any new birds that arrive at my feeders.

In November, 1961, I had 30 to 40 regulars around the house, all stained, when there was a small snowstorm, and I immediately noticed some new unstained chickadees. These birds sat in the trees and were very shy about going into the traps, but after a day or two they were led into the traps by the regulars, and I was able to catch five birds, three new and two not seen since the previous spring.

I have noticed two classes of chickadees who are "trap wary" and more difficult to trap: one is unbanded individuals, presumably first-year birds, unfamiliar with the traps; the second group included wise old birds who have been around five or more years and are very familiar with the traps. In order to obtain balanced statistics on mortality and life span, both groups are very important.

I do not believe that either mist nets or automatic traps can give as complete or as accurate data on a local population. Since using this technique, I believe I can accumulate data of much greater validity regarding mortality, life span, and migration of my chickadee population. The technique has also been useful in studying other species, such as white-breasted nuthatches and woodpeckers.

I therefore recommend it as a most valuable technique in the study of local populations of seed eating birds about one's house. — John H. Kennard, 182 Tarrytown Road, Manchester, N. H.

Further Thoughts on Pull-string Traps.—Dr. Kennard's comments (above) are a stimulating reminder that no one trap or trapping technique is ideal for all banders and under all conditions. It may be useful to comment further on the differences between automatic and pull-string traps, with side comments on the use of mist-nets on winter resident populations.

In most of the northern states, winter mist-netting is impractical, particularly for birds like the chickadee. The low temperature and "wind chill" are too hard on the birds, particularly this species — which prefers some shelter from the wind, to help in maintaining body temperature. Low temperature also makes it harder for the netter to manipulate the mesh of the net in removing birds. Occasionally conditions may be right for taking chickadees with nets, such as a sunny day with little wind, operating only in the warmest part of the day and standing by to remove birds at once. I know nothing quite as effective in taking old, wise chickadees as a net set occasionally across their path to a feeder; those which shun any trap whatsoever can often be netted. However, this winter netting should not be undertaken lightly; the netter needs more than average dexterity and patience, considering the species' talent for wrapping itself in a ball of net mesh.

Comparing injuries in various types of traps or net is difficult. We can say quite firmly that no type is warranted free of possible injury. An occasional bird may succumb to shock at time of capture, regardless of method. In traps with movable doors (automatic or pull-string), an occasional bird is hit by the door, usually not sustaining any serious injury. While the bander can pick his time to drop the door of a pull-string trap so as to reduce the chance of injury, this method does involve some time-lag, during which a bird with reflexes as fast as those of the chickadee may turn and get half-way out the door. The actual drop mechanism is somewhat similar in both types of trap, though I have not seen any pull-string trap in which the door will drop as quickly as in the (automatic) McCamey chickadee trap (see *Bird-Banding*, 32: 51-55). The pull-string trap also requires time for the operator to respond to his visual perception that the bird is in a desirable position, and time

for the cord or wire to transmit motion from his hand to the trap itself. These times may be very short, but perhaps significant for a species like the chickadee, which typically takes food from the feeder to eat elsewhere, and which moves rapidly. The other chief element of injuries in traps occurs after the bird has been taken and before the bander removes it. Here I see no difference between automatic and pull-string traps; in either type, the bander may remove birds immediately after capture or somewhat later. Injuries during this period are normally only superficial at worst, if the trap is properly constructed and finished, without sharp edges or protruding wires.

Dr. Kennard implies that automatic traps cannot be left open and used as a feeding station. It is true that some automatic designs have overlooked this point, but even those designs can be modified to take care of the problem. In my opinion, no automatic trap which is to be left outdoors should be used without a built-in provision for keeping the trap open as a feeder when trapping is not going on. The high number of birds per trap hour achieved by so many week-end banders comes primarily from the familiarity of the birds with the trap as a feeder, during the week. Traps with a vertically-sliding door need an overhead frame with a loosely-fastened hook for the door when the trap is to be left open, high enough to be out of the way in normal resetting of the trap, and high enough so that the bottom of the sliding door comes above the top of the door opening (so that a large bird or animal cannot force the door up — and off the hook — with its back). It is true that a few banders (such as Parker Reed in Lexington, Mass.) have had good results with automatic traps which are kept indoors except while in use. This approach requires that the feeding shelves be designed so that their entire surface is covered by the traps while in use, and this may be a disadvantage (to set against the fact that the traps aren't covered by snow or ice between times when they are in use).

Volume of birds per hour is particularly difficult to compare. Certainly handling 50 an hour is striking; in my best winter day at my own station, only 240 were handled all day, using a battery of 40 to 50 cells of automatic traps. Such figures of course imply a minimum of notes on weight, plumages, and the like.

It seems to me that volume is harder to achieve with pull-string traps than with automatics, type for type. That is, Dr. Kennard's hourly totals involve use of a pull-string trap taking a number of birds in one trap at one time, while my maximum is based on automatic traps with (normally) only one bird taken at one time in each cell. A comparison of pull-string single-cell with automatic single-cell would probably show no striking difference, nor would a comparison of birds taken in an automatic maze-type trap (such as the Mason, or Low all-purpose) with those in a pull-string trap taking several at once. It is true that chickadees may find their way out of a Mason trap, yet be taken readily in a large pull-string type.

However, the usual problem in achieving volume with a pull-string type is lack of suitable sites. Each has to be near enough to the house (or other shelter) for the cord or wire to work easily. Each must be in full view so that the trapper can time the shutting of the doors properly, preferably with the door facing the trapper. This may be hard to reconcile with ideal placing of a feeder; for example, for chickadees an ideal spot is on the south side of evergreens, covered on top, back and sides, for shelter from snow and ice. Some houses, such as those with glass walls, make it difficult to place feeders right at the window or close to it, considering the hazard to many species in hitting the glass. By contrast, automatic traps can be placed readily, and need not be visible at all from the house if regular visits are made; no particular limit applies to their number.

A multi-cell automatic trap is ideal for taking birds like shrikes or small hawks without harm to the other birds already trapped in other cells. For many species, birds of that species already taken will attract others, and build up the total taken beyond the maximum number which would have been in a pull-string type at any one time.

One of the basic problems in taking winter birds at a feeder is that we cannot expect maximum utilization of any one trap, for species which travel in flocks. Banders of Evening Grosbeaks are familiar with the way an active feeder may be visited by several different flocks in a day. For any one flock, the most the bander can take on any one day is limited by what he can capture at one time (or at least over a relatively brief period). Once the bander goes out to remove birds from traps, the flock may leave. Therefore a station which can take a sizeable number at one time is likely to take many more different birds in a day than one depending

on a limited number of traps, even though the take per trap may be higher for the second station (mostly because of species which don't tend to move in flocks, or at least in such large ones).

Another problem to consider in deciding how many traps should be in use is disturbance. Many stations have room enough around the house to place groups of traps in two or three places, on different sides of the house, so that usually a disturbance (such as the bander making his rounds) will affect only one group at a time. This is valuable in retaining flocks that might otherwise leave the area entirely, and in giving maximum feeding time for species which need a long day in order to get enough food, such as some which winter only as stragglers.

In considering relative efficiency of the two methods, time spent by the bander is one factor. On busy days, banding tends to be a full-time job either way. Relatively inactive days may produce some valuable results, while taking only part of the bander's time. The automatic traps take less time than the pull-string, unless the latter is controlled from the spot where the bander is spending his time anyway (this in turn limits the number of potential pull-string sites further).

Relative efficiency of the two trap types in taking wise, old birds may be hard to compare. At my station, using Potter-type or McCamey automatics kept baited at all times, three recent half-days of mid-winter banding produced 1 chickadee out of 20 banded in 1956, 1 out of 10 from 1958, 2 out of 10 from 1959, and 7 out of 25 from 1960. This seems to me to be a respectable showing, considering the short *average* life of the species. Admittedly I took none out of 42 banded in 1957, but that year's total was weighted with birds taken in early fall, probably largely immatures without a strong attachment to the area. I do not know how many wise, old birds I missed, but rather doubt that the same effort with pull-string traps would have yielded a radically different result.

I do not mean to take issue with the central theme of Dr. Kennard's comments, on the great value of a pull-string type of trap for selective trapping, especially where individuals are identified with color markings. Without the color markings, the bander may find it hard to be selective. Certainly we would not suggest passing up birds already banded so as to take only unbanded birds. Apart from the value of the data that can be obtained from repeats, it is often hard to guess at the time of banding from the appearance of the band. My chickadees often surprise me, either by keeping a band shiny for years or getting it dark within a few weeks of banding.

Each bander should consider trap types and placing in the light of his own needs. Intensive study of a resident population, as illustrated by Dr. Kennard's work, is one of the most rewarding approaches, and should be in far wider use than it is now. — E. Alexander Bergstrom, 37 Old Brook Road, West Hartford 17, Conn.

A Bird Skin Drying Form for Field Use.—An improvement on the Hurley drying form for bird study skins has been presented in this journal by Wood (1956, *Bird-Banding* 28: 156-157). Considerable field experience using the Hurley and types of cardboard drying forms in the southern United States and eastern Mediterranean prompts me to present a few cautions and suggestions.

The main drawback to using the Hurley form in the field whether in dry or damp, cool or warm climates is the lack of air circulation and therefore drying on the dorsal surface of the specimen. Often considerable moisture in muscle or fat, especially in the wings, is left in this area when the skin is put together. This moisture forms condensation on the aluminum surface during drying. This is true especially for large specimens and particularly so when heat is applied from below the form. Flies, always a serious field pest on warm days, have a way of finding this damp undersurface for laying eggs and it is often too late when the maggots are discovered. Once maggots have started it is nearly impossible to dry a skin without artificial heat. For this reason, a small amount of Paradichlorobenzene or naphthalene may be placed inside the back of the skin before closing the specimen, the form should be sprinkled with PDB or naphthalene, and birds drying in forms should be kept in insect-tight containers if possible.

A further improvement suggested on the Hurley form is the use of hardware cloth or screening (aluminum is especially good) instead of sheet aluminum. Not only does air circulate better and the dorsal surface of the skin consequently dry faster, but one can see the dorsal plumage and quickly rectify any faulty feather arrangement before the skin dries entirely.