

been a source of information to the public whose relationship with the bander has been one of mutual benefit. Not only has the bander told the public about his share of the banding program, but he has stressed the importance of the public's co-operation by reporting banded birds. The public has acted as his agent. Only in this way could the thousands of fine records have been built up.

In "Bird-Banding" Vol. XXVII No. 3, "Requirements for the use of Nets" prescribes that our neighbors and delivery men be not allowed to see or visit the netting site. There are good reasons why our neighbors should be allowed to visit any banding activities we are carrying on, for these are the people who will give us our records. If they are excluded from part of the banding program, we cannot expect them to look favorably on banding, or to trouble to report a band. All wild life belongs to the public. We are morally responsible for the safety of the birds we capture. For every bander there are thousands of bird watchers. These people have a right to know how we are operating our stations, and to know that the birds which we capture are given the best possible care. If we are using equipment which they believe is not suitable, they have the right to express their dissatisfaction.

Banders should find new ways in which to improve their catch, but this should be done in a safe way, as has been done in the past, by a method which will be acceptable to the ever increasing group of people who today are becoming interested in the bird life of their country.

The purpose of this article is to provoke discussions on the use of the Japanese mist net. In this way its use can be evaluated. We do not believe it will be accepted by the public. We believe that it is more harmful than beneficial to banders and to birds.     ★ ★ ★

(Since the stated purpose of the foregoing article is to provoke discussion on the use of nets, the Editor invited an experienced user of nets to contribute his thoughts. Mr. Bergstrom graciously accepted the task. His article follows.)

#### THE SAFETY OF BIRDS IN NETS

By E. Alexander Bergstrom, Editor of "Bird-Banding"

I welcome the opportunity to comment on the question of safety of birds in Japanese mist nets. The advantages and disadvantages of these nets should be thoroughly understood if they are to be used to best effect.

For the past four years I have used nets rather intensively, and now capture perhaps 1500 birds in them in an average year. Our banding station employs about 50 compartments of "winter finch" traps and a dozen large ground traps, but we place more and more emphasis on the use of nets where appropriate. In a suitable location they tend to make ground traps obsolete except in bad weather.

I feel some responsibility for the increasing use of nets, since Bird-Banding has encouraged it by the printing of papers and notes about netting, and I am now acting as agent for the Northeastern Bird-Banding Association in the sale of nets. Furthermore, I am responsible for the comments on netting in the paper referred to in the previous article (Bergstrom and Drury, "Migration Sampling by Trapping: A Brief Review", Bird-Banding, 25:107-120, July, 1956.)

We must recognize that there is no such thing as absolute safety for birds at a banding station, any more than there is absolute safety for humans in this imperfect world. Birds are inherently rather fragile creatures, and even under the best of conditions, accidents are bound to occur. We should inquire first whether birds are handled as humanely as possible and whether everything is done to keep injuries at a minimum. Secondly, are the injuries on a scale significant to the bird population, and do the results of banding justify them?

Injuries to birds at banding stations may occur in either traps or nets; some types of injury are characteristic of traps, some of nets, some may occur with equal frequency in either.

In making this analysis, we will assume that the traps are of sound design and careful construction, since the mist net design is highly efficient and even nets of mediocre construction are not inherently dangerous to birds. It should not be forgotten that many traps in use are inherently dangerous, because of design flaws (such as excessively heavy doors) or poor construction (such as protruding sharp ends of wire).

While traps can be used under some weather conditions too severe for nets, there are definite limits. A steady cold rain, or near-zero temperatures, will put exposed traps out of action. In direct sunlight, in the warmer months, traps may also be unusable for some or all species.

Danger from predators varies somewhat with the type of trap; it is lowest for a bird in a separate compartment, with wire all around, and

the compartment forming part of a trap too large and heavy to be moved by the predator. However, in a ground trap, a single predator may kill every bird. Many traps are ineffective in capturing a predator without giving it this opportunity, though a battery of single-cell traps with some cells set is quite effective. Perhaps it goes without saying that I do not consider predators as "vermin" to be killed to benefit other species, as a nineteenth-century gamekeeper might. I do feel the need of trapping shrikes and small hawks to minimize the disturbance they cause in the artificial concentration of birds (close to 500 at times) at our feeders; once trapped, they are banded and transported eight or ten miles away.

Traps may result in physical damage, such as relatively mild abrasion above the bill, or cerebral concussions (the latter is the leading cause of trap injuries at the Austin Ornithological Station at North Eastham, Mass.). Broken legs also occur: an illustration may be of interest. Recently over a period of months I used 18 cells of a widely sold Potter trap, without incident; then in the space of ten days, three birds broke their legs by catching the band over the end of a trigger wire that proved too thin. Of course, the traps were shut down and the weakness remedied, followed by a notice from the maker to other purchasers. It is noteworthy that I had caught several hundred birds of roughly similar size in these traps before any injury was sustained, and other purchasers had dozens of the same model in active use. The problem is, in kind if not in scale, like the discovery and remedying of defects in passenger aircraft; we cannot insure absolute freedom from trouble, but intend to reduce to an acceptable minimum the chance of the same trouble recurring.

Another trap hazard is the presence of two or more birds in the same compartment. While even the best single-cell trap will occasionally allow two or even three birds to be caught at once, this type of trap minimizes the hazard, compared to ground traps. To mix large and small birds, or aggressive and non-aggressive birds, may lead to injuries. It is for this reason that we recommend against the use of ground traps for grosbeaks.

Turning to nets, it is very rare for two birds to be close enough to each other to fight, and I have never seen a resulting serious injury. Like traps, nets cannot be used in steady rain or extremes of heat or cold; birds in nets are more vulnerable to cold or rain than birds in traps, but less vulnerable to heat. Birds in nets tend to be less

vulnerable to avian predators, at least if near the ground. While traps may produce cerebral concussions, or catch a bird by the neck under a falling door, a net mesh may become too tight around the bird's neck, or occasionally around its knee.

In my opinion, the rate of deaths or serious injuries should be no higher for nets than for traps, assuming both are properly handled. It is hard to measure this at the average station, partly because of the small size of the sample and partly because traps and nets may not be used for the same species at the same time. However, for the past 26 years the Austin Ornithological Research Station has used both nets and traps of all types, and has handled an average of 10,000 small birds annually. Based on actual records, the casualty rate is less than .2%, or one bird in 500, and this includes injuries as well as deaths. The rate is about the same for nets as for traps, and an analysis of return and recovery figures shows no significant differences between those captured by nets and those captured by traps.

It seems to me that net casualties represent human failure rather than net failure - in particular, too long intervals between visits, or attempting to use nets under severe weather conditions. As discussed briefly in our July paper, nets require a higher standard of attentiveness and competence than traps, and not every bander can meet this standard.

Mr. Brewer *et al.* take exception to my statement that "nets should not be placed where they can be seen at close range by the general public, and it is desirable to keep them out of direct view of deliverymen and neighbors." (*Bird-Banding*, 27:110). There are a number of sound reasons for this view. First, to the general public (or to bird watchers who lack experience in netting) there is something disturbing about a bird hanging quietly in a net waiting to be released, though they may not be perturbed about a bird in a metal trap banging its bill against the sides. Secondly, in general a large number of visitors at a banding station can best be handled by keeping them away from the immediate vicinity of the traps or nets, so that once birds have been removed, others can come and be caught in turn. An excellent example is the Washington Crossing station operated by EBBA's president, which is unrivalled in attracting visitors and showing them birds and preaching the gospel of conservation, but does not allow most visitors to visit the actual traps or nets. Thirdly, we must bear in mind that use of nets by certain foreign-born groups to catch birds for food was once a real problem in this country, and I prefer not to go out of my way to spread the news that nets are in use at a certain suburban location.

I do not share the view that loss of some feathers is necessarily an injury, or of any importance to the bird. Particularly in summer and early fall, most birds are in molt and necessarily losing some feathers. That they lose them in a net is in no sense an argument against the use of nets. When a bird loses feathers that were not due for immediate molt, the loss probably has no effect on its flight or warmth, and generally new feathers grow in without waiting for the next normal molt. Let us not forget that loss of feathers, particularly tailfeathers, is not at all uncommon in traps.

To weigh the significance of banding casualties to the species, we must relate them to mortality from other sources. Few bird lovers realize just how short-lived the average small bird is. The life expectancy of fledglings of most species, from the time they leave the nest until the following spring runs from 65% to 90%, occasionally even higher. Adult mortality ranges from 50% to 75% a year (for comparison, in a long-lived species like the Common Tern, the rate is 25% a year). In general, a pair of small birds which raises 8 or 10 young in a year will not add to the total population of the species, but will just about keep pace with deaths. Large broods and high mortality rates go together.

When even adult mortality ranges from 4% to 6% per month, and immature mortality appreciably higher, it is unrealistic to suppose that normal banding mortality has any biological significance. At a rate of perhaps one in five hundred under standard conditions, it can seldom rise as high as one in a hundred even under temporary pressure of predators or severe weather. An individual bird could, on the average, be handled several hundred times before sustaining severe injury; in practice, no bird repeats this often, but I have handled quite a few 50 to 100 and even 125 times in a season without incident, and even more frequent handlings are on record. Banding mortality is more likely to involve birds already infirm from injuries or disease, so that even the small percentage of deaths recorded from traps or nets overstates the actual effect of banding on mortality. Overall, the number of birds handled by banding stations is a minute percentage of all our small birds, so that for this population as a whole the effect on mortality of traps or nets is infinitesimal. Even if as many as one bird in a thousand were handled at banding stations (and that figure is too high, on the average), the mortality from traps or nets would be on the order of .001 to .005%.

That this mortality is so insignificant to the species does not justify any slackness in our efforts to minimize deaths arising out of our use of traps or nets. It does justify us in accepting this minimum mortality as the necessary consequence of our effort to extend man's knowledge of the world around us.

While the supply lasts, I will be glad to send, upon request and without charge, a copy of the July, 1956 issue of Bird-Banding, containing the article referred to above, with a discussion of the relative advantages and disadvantages of nets and traps. I will also be glad to furnish information on price and availability of mist nets. For the past year, a paper on the use of nets, in much more detail than anything yet printed, has been under preparation for Bird-Banding, and we expect it to appear in the 1957 volume.

Data on mortality at the Austin Ornithological Research Station were supplied by Dr. Oliver L. Austin, Jr., to whom I am also indebted for reading the first draft and offering suggestions. He is in agreement with the point of view expressed.

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#### HAND-REARED WOOD DUCKS NEAR UPPERVILLE, VIRGINIA

For several years, Mr. and Mrs. William Grayson have reared Wood Ducks in an outdoor cage on their 500 acre farm near Upperville, Va. This outdoor cage is roughly triangular, 80' x 60' x 60', 8' high, and contains a pool of water. In 1956, they reared approximately 30 Wood Ducks, comprising 3 broods. They put in a request to the U.S. Fish and Wildlife Service that 25<sup>00</sup> of their total of 37 Wood Ducks be banded - the remaining 12 to be retained as breeders. The request for banding was referred to Arthur H. Fast, Arlington, Va.

How were the ducks to be captured for banding? On August 11, Fast equipped with a dip net and a teen-age boy to operate it, drove to the Grayson farm. Ralph E. Lawrence, nature photographer of Washington, D.C. accompanied the expedition. On the previous night, Mr. Grayson had captured the ducks and put them in small cages; he did not get to bed that night until 3:30 A.M. The 25 birds were banded without delay, and were released on the farm pond. Some of them swam to cover; others flew away. Mr. Lawrence took some colored film of the banding operations and of the release of the ducks. The Graysons treated all present to a bountiful lunch. A short visit ended a pleasant and profitable day.

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