THE USE OF MIST-NETS AND A HELIGOLAND TRAP AT POINT PELEE[1]

BY J. WOODFORD

In the spring of 1954 a full-scale Heligoland model trap was built at Point Pelee. The following spring limited use was made of mist-nets. Since then both the trap and nets have been used during the spring and fall migrations. This article is a report on the use of a Heligoland trap in North America, in conjunction with mist-nets, with a discussion of some of the relative merits of mist-nets and Heligoland traps.

LOCATION AND DESCRIPTION

Point Pelee, the most southern point of the mainland of Canada, is situated at the extreme southwestern portion of the province of Ontario. (Latitude 41° 54′ Longitude 82° 31′). It is 6 miles wide at the base and extends out into Lake Erie for about 9 miles. The general aspect is that of two long, low sandbars meeting at the apex, where they are joined for a little over two miles, and then stretching out in divergent lines to the main shore. A great deal of the point is swamp, of varying degrees of wetness. The eastern shore is a single sand dune, with some deciduous trees and undergrowth. The western side is wooded with deciduous trees and evergreens, principally black walnut and red cedar. A medium sized hardwood forest of oaks, walnut, and buttonwood has been set aside as a nature sanctuary. All in all there is a wide variety of habitat—cedar thickets, brushy tangles, marsh, ponds, sand dunes, open fields, beach and hardwood forest.

THE MIGRATION

Since the days of the Great Lakes Ornithological Club (Taverner and Swales, 1907-08) Point Pelee has been widely known as an excellent place to observe visible and resting migrants. The point seems to act as a natural "funnel", concentrating the birds as they move south towards the end of the point. A feature of the spring migration is the occurrence of "reversed migration," that is, birds moving south rather than north (Gunn, 1948). Over 60 species have been known to exhibit this behaviour. No entirely satisfactory explanation has been offered, but it seems to occur when the wind is from the south. Extra-limital birds, or strays, of southern or western distribution are sometimes observed at the point.

The fall migration is sometimes more striking than the spring. Large numbers of hawks, mainly Sharp-shinned Hawks, up to 1500 in one day, move through. In late September and October large concentrations of many species of sparrows occur.

THE HELIGOLAND TRAP

Heligoland traps have been described in detail by Brownlow (1952) and Williamson (1957). They are simply a tapering wire-netting enclosure, open at the wide end and closed at the narrow end by a

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collecting-box, which has a transparent back, which appears to the birds which have entered the trap as a means of escape and induces them to enter the box. The Heligoland trap was originally developed from netting traps used by the Heligoland islanders to catch thrushes.

Description: The trap at Point Pelee follows the general plan in Brownlow*(op. cit.)* with minor changes to suit local conditions. (See Fig. 1). The original trap was described by Gunn (1954). Each year has seen some changes in the design as the result of experience. The site has been changed once and it seems likely that it will be changed again.

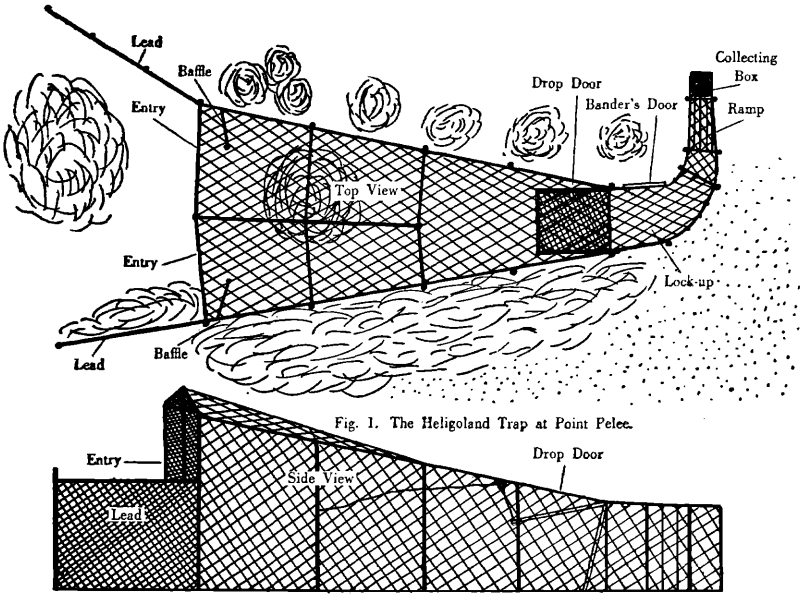

Fig. 1. The Heligoland Trap at Point Pelee.

The trap is 25 feet wide and 15 feet high at the entry. Over about 40 feet it tapers down to about 3 feet wide and 6 feet high at the collecting-end. The first 15 feet, from the entry, is covered with one inch wire-netting. The remainder is covered with one-half inch, with the exception of a part of the roof. A part of the area covered by one inch netting consists of two layers over-lapped.

On either side of the entry there is a wing or guide wall of one inch netting, about 8 feet high and 15 feet long. These tend to prevent some birds from by-passing the trap. For the first year there was no wing on the right side, a mist-net being set at right angles to the entry to intercept individuals which enter the trap and then attempt to fly back out. Just inside the entry there are baffles on either side which sometimes discourage birds which are trying to escape from the trap.

The lead to the collecting-box is curved to minimize "fly-back", that is, birds flying back out the entry rather than entering the collecting-box. The ramp leading to the collecting-box is made of rough lumber,

with "steps" of one by two inch strapping every foot. It is sloped up at about a 30° angle. Various sizes and shapes of collecting-boxes have been used. The present one is about two feet square and was constructed of five-eighths and one-quarter inch outdoor plywood. The back is sloped and grooves are cut in the sides to allow the glass back to slide in and out easily. Plexiglass was tried as a substitute for glass, but it discolored and was difficult to clean.

A shelf, extending to within two inches of the back, divides the collecting-box into two compartments. (See Fig. 2.) The birds enter the upper compartment and fly back to the glass. There they flutter against it and exentually slide down to the lower compartment. There are two exits, about six inches in diameter, in the side. Attached over these are collecting cages, about 6 by 8 by 15 inches, which have a door in the top so that the birds may be removed. If the birds do not enter the cages there is a "piston", which may be pulled across the lower compartment to reduce the area and force the birds into the collecting-cages.

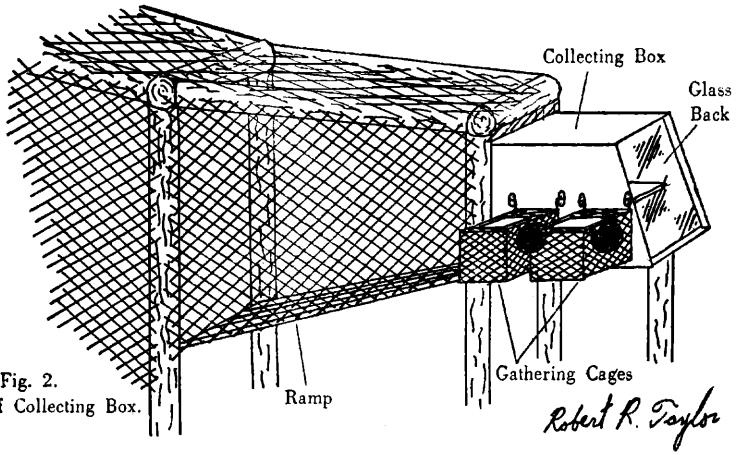

Fig. 2.
Details of Collecting Box.

About 8 feet from the curve of the collecting-end there is a drop-door, which is hinged at the roof and is controlled by a wire from near the entry. When a bird or birds have penetrated the trap as far as the lock-up the banders may lower the drop-door, thus confining the birds in a small area. If they do not enter the collecting-box a bander may enter the lock-up, via the bander's door, and drive the birds into the box or catch them by hand.

The original framework of the trap was one inch steel pipe. It was found that it was difficult to attach wire-netting to the pipe, so the pipe has been largely replaced by cedar posts as uprights and two-by-fours for cross pieces and braces. The doors are set into a framework so they will work easily and efficiently.

Operation: The trap is made operational by inserting the glass back in the collecting-box. There are then three alternatives open to the trappers: 1) the birds may be left to enter on their own, 2) they may be driven into the lock-up after they have entered the trap, and 3) a

"drive" may be made from several hundred yards up the point to the trap.

The first alternative is the ideal one, but often not too many birds are taken this way. This is due in part to the location of the trap. The second method is used when there is a good movement of birds down to the trap area. Often birds will enter the trap but then turn back. Two, or three, trappers may cover the entry and drive the birds towards the collecting-end by moving in quickly and clapping their hands or shaking the vegetation.

If there are few birds in the trap area a "drive" may be organized. Three or four trappers take up positions, a few yards apart, in a reasonably straight line, several hundred yards up the point. They move forward slowly, "beating" the underbrush with a stick or clapping their hands. Too much disturbance tends to make the birds fly up and over the trappers. They are also more likely to break back if the trappers do not keep in line. When the trappers reach the entry a sudden rush may be effective in driving the birds into the lock-up. Two or three "drives" a day may produce good catches. Just before dusk is an especially good time. Thrushes, sparrows and some sparrows make up the bulk of the catches from "drives". Too many "drives" seems to "disturb" the birds and they may move out of trapping range.

The best times seem to be in the early morning and the evening, although some days birds may be taken all day. Sharp-shinned Hawks have been trapped when they have chased a small bird into the trap.

MIST-NETS

The Japanese mist-nets in use at Point Pelee are either 9 or 12.5 metres long, 2 metres high or wide and have 4 shelves. Silk nets have one and one-half inch stretched mesh and nylon ones two and one-half inch. The silk nets were used for general netting, while the nylon nets were sometimes used to take hawks, shorebirds and gulls. Low (1957) has discussed banding with mist-nets and the procedures at Point Pelee are similar in most respects except as noted below.

Setting the net: The net is supported between two 10-foot lengths of one-half inch steel thinwall electrical conduit, which have been cut in half and are joined by a standard connector. The shelf-string loops are slipped over the conduit and the last (or top) one is looped so that it does not slip down easily.

In setting the net the bottom half of the pole is driven into the ground and the top section, with the net attached, is set in place. The bander then walks slowly away letting out the net. When the net is unfurled the bottom half of the second pole is pushed in and the top set in place. The shelf-string loops are then adjusted as is the distribution of netting.

In taking the net down all the loops are pushed up near the top of pole number one. Then the loops on pole two are pushed up and the top section is lifted off. The bander then walks back towards pole one looping the net in his hands, like a lasso, keeping the remainder taut so that it does not billow and occasionally pulling the mesh towards him so that it is not bunched at one end. The top halves, with the net attached, are laid on a three-foot square of plastic sheeting. The

TABLE 1. Species and individuals taken in mist-nets and the Heligoland Trap, Spring and Fall, 1956-57.

	Spring		*Fall*	
Species	*M. N.*	*H. T.*	*M. N.*	*H. T.*
Sharp-shinned Hawk	1		95	23
Yellow-billed Cuckoo	1	1	1	
Black-billed Cuckoo	1		9	1
Ruby-throated Hummingbird	6	4	23	14
Red-headed Woodpecker	1	1		
Downy Woodpecker			1	2
Eastern Kingbird	12	3	1	
Yellow-bellied Flycatcher	3	2		
Empidonax spp.	36	16	14	6
Eastern Wood Pewee	3	1	4	5
Tree Swallow	25	3		
Bank Swallow	458	82		
Barn Swallow	93	24		
Cliff Swallow	3	1		
Blue Jay	5	2	18	13
Red-breasted Nuthatch			2	4
Winter Wren	2	4	2	1
Catbird	26	13	19	8
Wood Thrush	4	1		
Hermit Thrush	3		11	3
Swainson's Thrush	23	13	85	74
Grey-cheeked Thrush		1	62	27
Veery	5	6	4	
Blue-gray Gnatcatcher	1	5		3
Golden-crowned Kinglet	6	4	3	
Ruby-crowned Kinglet	12	3	8	1
Cedar Waxwing			2	1
Solitary Vireo	4	1	1	
Red-eyed Vireo	21	10	5	3
Philadelphia Vireo		2	4	1
Warbling Vireo	4	2		
Black-and-white Warbler	4	10	3	
Tennessee Warbler	5	1	1	
Orange-crowned Warbler		1		1
Nashville Warber	19	8	1	1
Yellow Warbler	23	19	9	1
Magnolia Warbler	24	11	14	5
Cape May Warbler		8	1	
Black-throated Blue Warbler		2	2	
Myrtle Warbler	3	2		1
Black-throated Green Warbler	7	10		2
Cerulean Warbler	2	5		
Blackburnian Warbler	3	9	1	
Chestnut-sided Warbler	12	20	2	
Bay-breasted Warbler	1	7	1	
Blackpoll Warbler	1	1	31	15
Palm Warbler		1	10	6
Ovenbird	15	16	8	4
Northern Waterthrush	1	3	4	3
Mourning Warbler	3	2	3	
Yellowthroat	3	1		1
Yellow-breasted Chat	1	2	1	
Hooded Warbler	1	1		
Wilson's Warbler	2	5	4	1
Canada Warbler		5	4	2
American Redstart	2	5	17	5
House Sparrow	1	3		
Redwinged Blackbird	7	5	4	
Orchard Oriole	2			1

	Spring		*Fall*	
Species	*M. N.*	*H. T.*	*M. N.*	*H. T.*
Baltimore Oriole	8	5	2	
Common Grackle	1	1	3	
Scarlet Tanager	11	9		
Cardinal	1	1	14	2
Indigo Bunting	3	5	7	
American Goldfinch	3	2	3	1
Rufous-sided Towhee	2	2	1	
Savannah Sparrow	1	4		
Slate-colored Junco	35		3	6
White-crowned Sparrow	37	29	14	
White-throated Sparrow	8	8	23	2
Lincoln's Sparrow		5	2	
Swamp Sparrow		3	16	
Song Sparrow	6	3	17	1

bottom halves are collected and the whole thing is rolled up and tied—all ready to set up in a minute.

Net sites: Nets are used in a variety of situations. The most productive are across hedgerows or wild grape tangles. Lanes 3 to 4 feet wide are cut with machetes and garden cutters. Sometimes two nets are set in one lane—one set high, the other low. Some success has been had using nets at the top of 35 foot sections—the only problem being removing the birds. Nets are sometimes shifted to take advantage of local movements. An example of this was in May 1956, when severe cold weather forced many species, especially swallows, to feed along the beach. Several hundred swallows were taken in nets staggered along the beach. Up to thirty nets have been in operation at one time but the usual number is 6-12.

In April and October success has been had in catching sparrows by setting a line of about a dozen nets across an old orchard and moving the birds from one end of the orchard to the other. A number of shorebirds have been netted by setting nets along the beach, near the tip of the point at night. The best time has been from 11 p.m. to 3 a.m. A number of paths and roadways cut across the point on the west side; nets set along these have taken numbers of Sharp-shinned Hawks.

COMPARISON OF CATCHES

Information is available on 2,348 individuals as to whether they were taken in nets or the Heligoland trap. This is summarized in Table 1. Of these 1,647 were netted while 701 were trapped. Birds per trap and per net-hour, that is the trap operating for one hour or one net set for one hour, are 0.2 and 0.3 respectively. These totals represent about one-third of the 7,417 birds taken during the four years, 1954-1957 (Woodford and Wasserfall, 1958). A number of additional species were taken but definite information on them is not available.

Table 2 shows the catches by families. While the trends are similar the percentage catches are somewhat different. The trap is particularly effective for "ground" species, such as some of the warblers, thrushes and sparrows.

TABLE 2. Family percentages of birds taken in mist-nets and Heligoland traps.

Mist-nets		*Heligoland Trap*	
1—Hirundinidae	35.6%	1—Parulidae	28.5%
2—Parulidae	15.5%	2—Turdidae	17.8%
3—Turdidae	12.2%	3—Hirundinidae	15.7%
4—Fringillidae	12.1%	4—Fringillidae	13.9%

MIST-NETS VERSUS HELIGOLAND TRAPS

Williamson *(op. cit.)* has discussed the relative merits of mist-nets and Heligoland traps, when used on a wind-swept, barren island. He concluded that for general use traps were more productive, but nets should be available for emergencies—such as a rarity out of the trapping area.

There are many days at Point Pelee when the wind or rain severely limits netting activities. Several strategically located Heligoland traps would have greatly increased the daily catch. The best location for a Heligoland trap is along a low hedgerow or a fenceline where numbers of birds travel fairly regularly. A low entrance to the trap is desirable as the birds are less likely to fly back once they have entered. A trap in either of these situations would intercept the birds as they moved along and less "driving" would be necessary.

Some of the advantages and disadvantages of mist-nets and Heligoland model traps are listed in Table 3. Possibly the chief objection to the building of a Heligoland trap would be the initial cost—probably between two and four hundred dollars—and the time and labor involved. Most banding stations are manned by volunteers, who spend

TABLE 3. Some advantages and disadvantages of Mist-Nets and Heligoland Traps.

MIST-NETS

Advantages

1—portable
2—easily set up
3—large area may be covered
4—low initial cost
5—easily moved to take advantage of local movements

Disadvantages

1—affected by wind and wet weather
2—must remove each bird separately
3—must be taken down (or furled) when not attended
4—birds may lose feathers (about to be moulted) or parasites

HELIGOLAND TRAPS

Advantages

1—more 'weatherproof'
2—made operational by inserting glass back
3—birds easily removed from collecting-box
4—not as frequent inspection needed—more time for observation, banding, etc.

Disadvantages

1—high initial cost and time needed for construction
2—fixed position—small area covered
3—need crew (2 to 4) to operate
4—upkeep—repairs, etc.

their holidays banding, and most of them naturally want to spend as much of the time as possible actually catching and banding birds.

However, as more and more permanent stations, with some paid personnel appear, such as the one on Nantucket (Dennis and Whittles, 1955), consideration may be given to the construction of Heligoland traps. There is a point on Pelee Island which is overgrown with vines and tangles—most of which are under 10 feet high. During the spring migration it is literally covered by birds—350 were banded by two banders in one day—but due to the wind it is impossible to use nets about 85% of the time. One double Heligoland trap would take hundreds or thousands most springs. There are probably other places where one or two Heligolands would take good numbers, but where it is impossible to net every day.

So far most of the emphasis in North American banding has been to band large numbers in the hope of recoveries. As the recovery rate is very small more time may be spent examining individuals. At Fair Isle each bird is weighted, measured, examined for parasites, notes are taken on moult and many are identified to subspecies by comparison with specimens (Williamson, 1957). Emphasis is on catching, if possible, a number of birds each day rather than hundreds one day and none the next. The Heligoland traps produce birds even on windy, wet days when mist-nets would be useless.

The writer would be glad to discuss the building or use of Heligoland traps with any interested persons.

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SUMMARY

1. A full-scale Heligoland model trap was built at Point Pelee in the spring of 1954. Both the trap and mist-nets have been used since 1955.
2. Data are available on 1647 birds netted and 701 taken in the trap.
3. These are listed by species and by families.
4. Relative merits of mist-nets and Heligoland traps are summarized.
5. Possibilities of building Heligoland traps in North America are discussed.

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GENERAL NOTES

An Avian Predator Alarm of the American Robin.—Studies in and about Baltimore partly concurrent with those of Jackson in British Columbia *(Auk,* **69:** 466, 1952) support his finding that the high, thin, waxwing-like note of the Robin *(Turdus migratorius)* is an alarm note signalling the presence of an avian predator. I have also a few times seen Wood Thrushes *(Hylocichla mustelina)* give notes indistinguishable from the Robin's under circumstances suggesting that they had the same function. In "The Birds" (Univ. Mich. Press, 1958: 121) the Heinroths state that the European Blackbird *(Turdus merula)* uses "a repeated long, drawn-out 'Seeee'" to signal a flying enemy.

Further, I have once seen a Tufted Titmouse *(Parus bicolor)* give pretty similar notes, also under circumstances suggesting that they were avian predator alarms. Dixon *(Condor,* **51:** 116, 1949) records an apparently identical note of the Plain Titmouse *(Parus inornatus)* as a general fear note. Odum *(Auk,* **59:** 503, 1942) reports similar notes given by the Black-capped Chickadee *(Parus atricapillus)* "when a hawk appears or any large bird flies over or casts a shadow."

Have alarm notes of this nature evolved because they are inaudible to predatory birds? I can find no figures on the hearing range of hawks or Crows *(Corvus brachyrhynchos)*, but Edwards *(Auk,* **60:** 240, 1943) found that of another predator, the Great Horned Owl *(Bubo virginianus)*, to have an upper limit of about 7,000 cycles, and Brand *(Auk,* **55:** 266, 1938) found the range of Cedar Waxwing *(Bombycilla cedrorum)* song to be about 7,675 to 8,950 cycles.

Robin. In my suburban study areas hawks are seldom seen; here the Robin's note, which I have recorded as *eeee* and *eeeea*, signals the presence of Crows, and until Jackson made his report, dealing with hawks, I had believed it to be specific for Crows. I, too, have found that it is given almost exclusively during the nesting season—seldom, indeed, until first broods begin to leave the nest—and that fledglings, and sometimes other adults, "freeze" throughout the period it is given, which one one occasion that I timed ran to 15 minutes. The note has also sometimes seemed to cause Robins that were foraging on lawns to fly up into trees.

Observations on color-banded birds also confirm Jackson's finding that the note is given by both sexes. I have timed the rate, when it is being given steadily, at 8 to 12 notes a minute. It is given, from either the ground or a perch, when a Crow comes within about 90 yards or less, and whether the Crow is skulking through the trees, feeding on the ground, or simply passing overhead. In many trials at a number of Robin nests, I have been able to provoke the note only very rarely and very briefly by placing a mounted Crow near, or even directly beside, the nest, during the building, laying, incubating and nestling periods. Apparently, then, the alarm is directed primarily at fledglings out of the nest but not yet independent, and warns of an avian predator large enough to carry off a bird that size.

Five times that I have seen Screech Owls *(Otus asio)* being scolded, and twice that I have seen Sparrow Hawks *(Falco sparverius)* being pursued in the air, by Robins, it has been with the loud *peep* calls, not *eeee's*. Neither Blue Jays *(Cyanocitta cristata)* nor Common Grackles *(Quiscalus quiscula)* evoke *eeee's*.

(The Robin also has a shorter and much fainter *eee* note, audible for only a short distance in contrast to the good carrying power of the predator alarm. I hear this second *eee* oftenest in late summer. It is given, just once or twice, when the bird is surprised by the sudden appearance near it of another bird, a beast or a human, or from uneasiness when the beast or human approaches or watches it too closely. It is also frequently given by one Robin upon coming near my feeding shelf and finding another Robin already there.)