although the feet showed no sign of disease. This bird repeated four times in 20 days, appearing to be in good health each time, with no evident signs of wear on the hooked upper mandible. Junco 46-34826 had a small reddish spot on the upper mandible approximately 2 mm. in diameter, the only instance of this kind observed to date. Another unusual specimen, 46-34818 captured on January 18, 1948 and not seen again, had a few white feathers making a white band about 5 mm. wide across the back of the neck. It was not quite symmetrical, extending a little further on the right side, when viewed from above, than on the left.

Seven of the 60 (11.6 per cent) Juncos banded during the winter of 1946/47 returned the following winter. Beals and Nichols (1941) did not obtain any returns at Elmhurst, Long Island, from 1609 Juncos banded while Wharton (1941) did have 8 of 347 (2.30 per cent) return at Summerville, S. C. No explanation for the higher percentage of returns at Bridgeton can be offered at the present time.

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HOW MUCH DOES A TRAP CAPTURE?

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Having experienced some difficulty in the design and siting of traps owing to lack of concrete information on performance, I venture to suggest some ways in which this lack may be remedied.

We need to know for each trap a figure for which I borrow the term "coefficient of capture," designated by C. This is the ratio of the number of birds actually captured, c, to the number entering the zone of attraction of the trap, a. Hence, $C = c/a$. The gross coefficient C is usefully treated as the product of three subsidiary coefficients for which we define two auxiliary variables: i, the number of birds inspecting the trap at close range (alighting on it or walking around it) and p, the number of birds entering the trap far enough to operate (failure to capture resulting from non-operation of the trap). The subsidiary coefficients are:

Coefficient of inspection	$I = i/a$
Coefficient of entrance	$E = p/i$
Coefficient of operation	$Q = c/p$

Hence, $C = IEQ$

In some cases it may be desirable to use a coefficient of attraction, $A = IE = p/a$.

A little observation of the action of birds around traps will show clearly that a, i, c, and p represent real and rather distinct categories of activity. These quantities are also hierarchical, conforming to the sequence: $a \geqq i \geqq p \geqq c$. It is also obvious that, in any coherent set of cases, if any one of the quantities is zero, then $C = O$.

In general, traps fall into two classes, maze and mechanical. The prototype of the former is the Government sparrow trap and of the latter the flat trap. Since the barrier to retreat offered by a maze trap is psychological, it is to be expected that Q will run lower for mazes than for mechanical traps and this is certainly true for intelligent birds, such as chickadees. With mechanical traps Q should be practically 100% or the trap is either poorly designed or badly set and maintained. Hence, under ideal conditions for mechanical traps, $C = A = p/a$ or c approaches p as a limit. The values of A, I or E depend more on the species than on the construction or baiting of the trap. However E tends to be low for those traps which can be entered at only one point.

There are three situations from which data may be gathered. (1) Observations of the variables a, i, p, and c may be made on an isolated trap. There is no control in this case. (2) An operable and an inoperable (dummy) trap may be placed close together. The dummy for a maze trap would have only the entrance funnel. (3) Two traps of different sorts may be placed fairly close together. Although this is not a controlled experiment, it is the only feasible way to secure a real comparison between the different traps.

In any setup involving two traps special care must be taken to have the siting not only the same but such that as large a proportion as possible of the birds which enter the zone of attraction of one trap are at the same time within the zone of attraction of the other. My own observations convince me that the zone of attraction is largely a geometrical entity which depends more on the arrangement of vegetation, the bait, and the trap than on the kind of bird.

The sort of information obtained may be illustrated by some results of a comparison experiment (situation 3) in which one trap is a single cell Chardonneret and the other a two-cell Potter type with the two cells back to back, the entrances about 4½ inches square. Each has water dropping into a shallow pan. The two traps are nearly six feet apart, otherwise the siting is quite similar and it is common to see a bird inspect first one trap and then the other.

I. Tables of variables for 13-19 October 1947

	Chardonneret				Potter			
	a	i	p	c	a	i	p	c
Blue Jay	1				1			
Eastern Robin	19	8			27	19	3	3
Hermit Thrush	8	4			9	5	4	3
Ruby-crowned Kinglet	2	1			2	1		
Black and White Warbler	1				1			
Myrtle Warbler	11	6	1	1	11	4	1	1
Blackpoll Warbler	1	1			1	1	1	1
Slate-colored Junco	3	2			3	1		

The table of variables simply gives the raw data as obtained by direct observation and below I tabulate the coefficients for the same period lumping all species together and another set which is for warblers alone.

II. Table of coefficients for 13-19 October 1947

	Over-all		Warblers only	
	Chardonneret	Potter	Chardonneret	Potter
Inspection, *I*	0.47	0.56	0.54	0.38
Entrance, *E*	0.05	0.29	0.14	0.40
Operation, *Q*	1.00	0.89	1.00	1,00
Attraction, *A*	0.02	0.16	0.08	0.15
Capture, *C*	0.02	0.15	0.08	0.15

It is apparent from the over-all coefficients that there is a slightly greater tendency to inspect the Potter than the Chardonneret but I do not know why this is so. The difference is largely accounted for in the reactions of the two turdids. The difference in the capture coefficients is mostly due to the difference in the coefficient of entrance. Here again the thrushes play a major role but even among the warblers the ratio is about 3:1 in favor of the Potter type.

Because it has been generally supposed that warblers do not tend to enter traps at ground level, I present a table showing all the captures by the two traps, from 26 August to 19 October, 1947 from which it appears that the ratio of capture for warblers is again nearly 3:1 in favor of the Potter trap. Since the two cells of this trap operated simultaneously on only two occasions and the coefficient of entrance is nearly six times as great as for the Chardonneret, the superior record of the Potter trap is due only in small part to its having two cells.

III. Comparison of captures by the two traps 26 Aug.-19 Oct., 1947

	Chardonneret	Potter
Black-capped Chickadee	5	
Catbird		2
Robin		8
Wood Thrush		1
Hermit Thrush		8
Olive-backed Thrush		1
Veery		3
Blue-headed Vireo		1
Red-eyed Vireo		(1)*
Tennessee Warbler		2
Nashville Warbler		1
Black-throated Blue Warbler		1
Myrtle Warbler	1	1
Black-throated Green Warbler		1
Chestnut-sided Warbler	1	(1)
Blackpoll Warbler	2	2
Pine Warbler		1
Ovenbird		3
Mourning Warbler		1
Northern Yellowthroat		1
Redstart	1	(1)
Cowbird		1
Towhee		6

*Numbers in parentheses show entries without capture.

It may be objected that since a comparison of captures alone will give the relative value of two traps, no more elaborate method is needed. My intention has been to propose a method by which absolute values may be obtained even under conditions where no comparison is possible and some insight may be had as to the reasons why traps work or fail to work.

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GENERAL NOTES

Transatlantic Arctic Tern Recoveries.—Up to this time, only three records of Arctic Terns, *Sterna paradisaea* Brunnich, banded on this side of the Atlantic Ocean and recovered on the eastern side have appeared in the literature. Frederick C. Lincoln has summarized the data on these birds (U. S. Dept. Agr. Cir. 363, Oct., 1945), so brief reference to them here will suffice. One banded July 3, 1913, at Eastern Egg Rock, Maine, was found dead in the Niger River delta, West Africa, in August, 1917. The other two birds were banded on July 22, 1927, and July 23, 1928, at the Red Islands, Turnevik Bay, Labrador, and were recovered near La Rochelle, France, on October 1, 1927, and at Margate, near Port Shepstone, Natal, South Africa, on November 14, 1928. All three birds were banded as downy young.

Three additional records follow: The first (no. B-354279) was banded as a juvenal, at Machias Seal Island, New Brunswick, on July 20, 1935, by F. Burton Whitman, Jr. It was captured near St. Nazaire, France on October 8, 1935, and was reported by Daniel Ruiey. The other two birds were banded by me on Machias Seal Island. No. 48-327338 was banded on July 18, 1948 as a non-flying juvenal probably not over twenty days old. It was picked up dead toward the