

## MIGRATION MOVEMENTS SHOWN ON RADAR

By Mabel Gillespie

EBBA members who attended the annual meeting in April, 1962, were greatly interested in the paper by Jeff Swinebroad of Rutgers University which dealt with the detection on radar screens of spots indicating birds in flight. Perhaps some members have not seen an article which appeared in *Natural History*, 70(8), 1961: 10-17. Titled "The Migration of Angels" it was authored by W. H. Drury, Jr., I. C. T. Nisbet, and R.E. Richardson.

This article states that small spots on the radar Plan and Position Indicator which do not move as expected targets would be known to radar observers as "angels". "Most radar observers were (and still are) unwilling to believe that birds could have been responsible for the display of angels." The angels are considered instead to be meteorological phenomena. However, in 1957 a team of research workers at Lincoln Laboratory, Massachusetts Institute of Technology, devised a circuit that would fill out bird-sized targets. When this was used the angels disappeared.

Radar shows night and high altitude migration movements. In England most small northward migrants fly between 1500 and 6000 feet high, sometimes up to 10,000 feet. Birds migrating from England across the North Sea to the continent do not correct for drift - the effect of cross winds but are deflected laterally (Lack). In similar fashion birds are carried out to sea off Cape Cod.

The M. I. T. team "was able to relate daily movements of these targets (angels) to those of herring gulls and ducks that feed off Cape Cod." In March, 1957, there was a larger number of smaller angels moving northeast at night, indicating migrating land birds.

Three main problems were considered:

1. A statistical problem - the relationship between the true number of migrating birds and the density of angels on the screen. Many birds travel in small groups, and "night flocks must be a good deal more scattered than the large flocks of many daytime migrants."

2. Behavior of birds when they reach a coastline. "Conclusion has been drawn in many parts of the world that migrants come from inland to the coast and follow it as a migratory route." This has been believed particularly in the United States. Actually only one in four or five birds follow this pattern. "The turned birds will eventually be concentrated by accidents of topography." In the fall the radar pictures show songbirds pouring south out over the Atlantic. Daylight observations have shown birds coming in from the sea.

Radar shows between ten and fifty times as many small birds passing over inland Massachusetts as over Cape Cod. Coastal banding stations

report ninety-five percent of their captures in the fall to be immatures. "Probably the average bird passes over the coast without heeding it."

3. Effect of weather on migrating birds. "Wind at a height of 1000 to 4000 feet is more relevant to the movement of birds than surface wind."

It is possible to trace bird movements back to the approximate places whence they started, and determine the weather that instigated the urge to migrate. In general the findings of Wells Cooke (1888) are confirmed: nights of largest spring migration are those of clear skies and steady movement of warm, tropical air from the mid-Atlantic states.

Radar suggests that the grounding of even a small movement of birds may suggest a spectacular wave which bears no relation to the actual number of migrants at the time.

Radar reveals reverse migration both in spring and fall. This poses a further problem: "If birds can reverse movements so easily, what internal factors control orientation?"

This article was reviewed briefly by R. J. Newman in *Bird Banding*, July 1962, page 160. Since he speaks of the correction formula used to compensate for the thinning out of radar echoes at longer ranges, it will not be included in this review.

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A 'CALL-OUT' BY ANY OTHER NAME . . .

Edwin A. Mason, Director of Wildlife Management, Mass. Audubon Soc., writes, "Dr Worth's 'Call-Out' piece reminds me that we did this, but did not use the name."

"At the Massachusetts Audubon Society's Connecticut Valley Campout, it has been customary for some seventeen years to have a 'Call-Out' as described by Dr. Worth. All of the participants in the Campout would spend the Saturday in the field. After dinner, they would all gather in the trailside museum or natural science workshop. There we would hold the 'Call-Out', and thus compile the composite list, using columns to indicate the several trips that were involved, so that comparisons could be made.

"This social gathering feature of the Campout was eagerly looked forward to by all of those participating, and resulted in the gathering of a set of data on bird distribution of considerable value. We used to call this Saturday evening rite: 'Checking on the checklists, and the ones that got away.'"