feasible under modern conditions of transportation in many parts of the breeding range of these birds.

The two recoveries of passage Red-necked phalaropes in the U. S. S. R., taken in conjunction with what is already generally known about the seasonal distribution of this species in Eurasia, would appear to indicate that birds breeding to the S. E. of the mountainous "spine" of the Scandinavian peninsula, in Sweden, Finland, the Baltic area and adjacent parts of northern Russia migrate in autumn towards the Caspian and no doubt onwards beyond this to the Persian Gulf.

If this is so, phalaropes of this species which migrate in part along west European shores and winter in the eastern Atlantic off North and West Africa must come from what may be termed a Northeast Atlantic breeding area which would comprise the Greenland east coast, Iceland, the Faroes, the northern British Isles and Norway.

I wish to express my thanks for their cooperation to the individual informants whose names appear in the table.

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MOVEMENTS OF STARLINGS IN RELATION TO A ROOST NEAR HANOVER, PENNSYLVANIA

By Don P. Fankhauser

During the years 1959 through 1962, 9,284 starlings (*Sturnus vulgaris*) were banded and released at a roost near Hanover, Pennsylvania. Many more than this number were trapped, and nearly all were checked to see if they had been banded previously. Trapping and banding were done during the period between January 1 and April 5 of each year; 20 operations were conducted during the 4-year period. The Hanover roost was considered a major roost by wildlife biologists of the U. S. Fish and Wildlife Service who estimated it contained from one to several million birds (unpublished reports).

The migration of starlings to and from the Hanover roost during the months of January, February, and March was studied using information for starlings either banded at the roost and recaptured elsewhere, or for those banded elsewhere and recaptured at the roost. The recoveries of starlings in April that had been banded at the roost also were studied to gain information on where the birds

nested. Field observations by biologists of the U. S. Fish and Wildlife Service (unpublished reports) indicate that starlings generally do not range more than 50 miles from their roosting site. Therefore, starlings banded or recovered over 50 miles from the Hanover roost were assumed to be using a different area for roosting. Those banded or recovered within 50 miles of the Hanover site were assumed to be roosting at Hanover.

The recoveries of starlings banded in January indicated that the starling constituency of the roost was quite stable in midwinter (January). During January no banded starlings were found to move over 50 miles from the roost or to the roost from over 50 miles. Specifically, 8 starlings banded at the roost in January were recovered in January, and all were found within 50 miles of the roost. One starling was taken in the roost in January that had been banded elsewhere in January, and it had been banded within 50 miles of the roost. A larger percentage of the banded starlings that were using the roost in January were found using it in February than March, indicating progressively more migration from the roost as spring approached (Table 1). The recoveries also indicate that individual starlings returned to the Hanover roost each winter, since all starlings banded at the roost in January and recovered in subsequent Januarys were recovered near the roost (within 50 miles). February 10 was the earliest date a starling was recovered over 50 miles from the roost (Cortland, New York).

TABLE 1. MOVEMENTS OF BANDED STARLINGS OBSERVED IN THE ROOST IN JANUARY

Period	Number found less than 50 mi. from the roost	Number found more than 50 mi. from the roost	% found less than 50 mi. from the roost
January 1-31	6(3)*	0	100%
February 1-29	(3)	2	60%
March 1-31	2	1(3)	33%

*Numbers in parentheses are birds banded and retaken within 1 year.
Numbers not in parentheses are birds retaken 1 or more years after banding.

Banded starlings observed in the roost in February also indicated progressively more migration from the roost as spring approached (Table 2).

TABLE 2. MOVEMENTS OF BANDED STARLINGS OBSERVED IN THE ROOST IN FEBRUARY

Period	Number found less than 50 mi. from the roost	Number found more than 50 mi. from the roost	% found less then 50 mi. from the roost
February 1-29	2(3)	(2)	71%
March 1-31	1(2)	1(3)	43%

The total number of starlings using the roost did not necessarily decrease as spring approached because while some starlings were migrating from the roost to the north, others were migrating to the roost from the south. For example, a starling banded in Alabama in January was taken at the Hanover roost in late March of the same year. Two starlings trapped in the Hanover roost in the last week of March 1960, also were observed in South Carolina in the first week of February 1962. Banded starlings observed in the roost in March indicate that a larger percentage of the starlings that used the roost in February were using it in March than those that used the roost in January (Table 3).

TABLE 3. MOVEMENTS OF BANDED STARLINGS OBSERVED IN THE ROOST IN MARCH

Period	Number found less than 50 mi. from the roost	Number found more than 50 mi. from the roost	% found less than 50 mi. from the roost
January 1-31	4	2(1)	57%
February 1-29	2(3)	(2)	71%

Starlings begin nesting in early April. Therefore, recoveries in April (Table 4) indicate that many of the starlings using the roost, especially in March, nested nearby (within 50 miles). However, the majority were taken over 50 miles from the roost in a widespread area to the north. The starlings taken in April over 50 miles from the roost were taken in Quebec (6), Pennsylvania (4), Ontario (2), and in Maine, Vermont, Massachusetts, and New York (1 each).

TABLE 4. MOVEMENTS OF STARLINGS BANDED IN THE ROOST IN JANUARY, FEBRUARY, AND MARCH, AND RECOVERED IN APRIL

Banding period	No. recovered less than 50 mi. from the roost	No. recovered more than 50 mi. from the roost	% recovered less than 50 mi. from the roost
January	1	2(3)	17%
February	0	2(2)	0%
March	3(1)	5(2)	36%

CONCLUSIONS

This study shows:

1. That some individual starlings returned to the Hanover roost in subsequent winters.
2. No evidence of starling migration during mid winter (January) to the roost from distant areas or from the roost to distant areas.
3. That as spring approached, some starlings migrated to the roost from areas to the south and others migrated from the roost to areas to the north.

4. That some starlings, especially those present in the roost in March, were still within 50 miles of the roost site in the nesting season after the roost had broken up.

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IDENTIFICATION OF EXPERIMENTAL BIRDS WITH THE AID OF FEATHER AUTOGRAFTS

By RAYMOND P. COPPINGER and BERNARD C. WENTWORTH

This paper describes a technique for permanently marking birds by grafting feathers on the birds' heads or elsewhere on their bodies. During a long-term study of the ecology and physiology of avian sterility, it was necessary to provide long-lasting marks that could be instantly identified on various treated groups of gulls (*Larus argentatus* and *L. marinus*). Several different methods of field marking had been tried; feather dyes, wing tags, nare rings, and colored leg bands (Wetherbee *et al.*, 1964). Since none of these are permanent tags, feather autografts on nestling gulls were tested.

The following procedure was used on Muskeget and Nantucket Islands, Massachusetts, during the summer of 1965. The chick's pollex (thumb) was snipped off with small surgical scissors, and a small hole was snipped in the skin of the crown. With chicks less than a week old, the pollex was held by forceps; with chicks over a week of age, the developing alula feathers were held by thumb and index finger. The excised pollex was inserted through the incision in the skin of the head with the alula feathers (if any) protruding in the desired angle. The area over and adjacent to the incisions were then covered with spray-on-bandage (Alberto-Culver Co.). The entire procedure, once perfected, required about one minute. Plate 1 illustrates a 10 to 11 week-old Great Black-backed Gull chick that was feather grafted when it was a few days old.

The pollex was selected as a transplant because it allowed the rapid removel of feather follicles without damage to the chick. Bleeding was minimal or nonexistent. Theoretically, any feather

This study was part of the Ecology and Physiology of Avian Sterility Project conducted by the Massachusetts Cooperative Wildlife Research Unit (supported by the U. S. Bureau of Sport Fisheries and Wildlife, the Massachusetts Division of Fisheries and Game, the University of Massachusetts, and the Wildlife Management Institute) and the Massachusetts Agricultural Experiment Station.