count is now 2321 Greater Shearwaters, 13 Sooty, 12 Manx, plus many others such as Gannets, Parasitic Jaegers, Red and Northern Phalaropes). In the Lurcher Shoals we pass several fishing boats. Harrassing gulls and shearwaters among them are two Skua. This is the high point for the Taxas birders. I wish there was some way the Arctic and Antarctic races of the Skua could be distinguished visually. Theory has it that the Skua seen in the Bay of Fundy in summer might be the Antarctic forms which would be biologically wintering as are the Greater Shearwaters and Wilson's Storm-petrels.

Sixth hour: The much lower Nova Scotia coast is now fully in view, 6 miles ahead. At this point the Purple Finches leave the boat and head for Cape Forchu at the mouth of Yarmouth Harbor. There are only three birds, the male and two others. No sign of the other two. The finches drop close to the water and pull away from the boat. About 100 yards ahead of the bow a Black-backed Gull sweeps around and knocks the male into the water. The gull quickly lands, grabs the inert male then flies down the side of the ship as we approach. A second gull hits one of the brown birds so hard that a puff of feathers erupts and drifts down wind. There is no sign of the third bird. This is not an unusual occurrence. Lobsterman have often reported this to me as occurring around their boats in fog when land birds often land on their decks. I only regret not having been able to get the band number. Someone would have had an interesting return.

Yarmouth Harbor: It is 2 p.m. Low tide and Willets, peeps, and many Great Blue Herons are standing on the mud flats close aboard either side of the ship as we slowly head into dock.

2:05 p.m. As we tie up to the dock 3 Starlings fly up from the parking lot and perch on the stern. Perhaps they intend to perch in some sheltered spot and ride across to Bar Harbor. If they are evolving any sort of intelligence perhaps they may realize that it would be the safest and logical thing to do.

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THE EASTERN BLUEBIRD PAIR BOND: COMMENTS AND CALCULATIONS

Benedict C. Pinkowski

The question of the duration of the pair bond among various bird species has long interested ornithologists, banders, and other avian enthusiasts. We all know that at least some individuals of certain species are known to enter into a union lasting for more than one breeding season. Such species are normally quite large and have a rather long life expectancy. A list of these species which remain faithful to the same mate for more than one season would include such diverse groups as the albatrosses and petrels, some geese, swans, terns, and gulls, eagles, certain owls, and many members of the family Corvidae.

Smaller species with a correspondingly shorter life expectancy are rarely observed to have the same mate for more than one season. Nice (1943) found that in the Song Sparrow (Melospiza melodia) a re-pairing of mates occurred in only 8 out of a possible 30 instances in which both adults returned for a subsequent nesting season.

Among those songbirds that raise more than one brood per season, it is not unusual for a pair bond to be dissolved after one nesting as both adults seek new partners for their second nest. Kendeigh (1941) reported that in only 40% of his cases did House Wrens (Troglodytes aedon) remain mated to the same adult for a second nesting. Nice (1930) summed up much published information on this matter by stating that in the majority of cases the mates stayed together, except for those species that leave a territory after the young have fledged.

During the past 4 years I have color-marked 80 AHY Eastern Bluebirds (Sialia sialis) at 4000-acre Stony Creek Metropolitan Park in southeastern Michigan. On only one occasion have I observed the same pair of adults to be mated together for more than one season. That observation gave me cause to wonder about the likelihood of that event ever having happened in the first place.

Of 34 adult males which I color-marked, 8 (23.6%) returned for at least one subsequent season. Four of these returned for one season and 4 returned for two seasons. The corresponding figures for females are 46 banded and 5 returned (10.9%), 4 for one season and only 1 for two seasons.

The reason for the lower percentage of female returns does not appear to be a result of greater mortality in that sex. Instead, it seems to occur because of the female habit of leaving an area following a nesting failure. This behavior is not nearly as common (but occasionally does occur) in males. All 5 female returns had previously nested successfully and it is noteworthy that every female that has left the study area following a nesting failure has never been seen again. Interestingly, this tendency becomes much stronger as the nesting season progresses and also is more likely to occur when a given nesting cycle is farther along. Despite the relatively higher nesting success in hole-nesters, as I reported earlier (1971) failures do occur in about half of all bluebird nesting attempts. Thus these female "desertions" do not occur infrequently.

According to the simple laws of probability, the chances (written as a fraction of 1) of two independent events occurring together is equal to the product of the chances of each occurring separately. Assuming the return figures I have obtained are a representative sample, we can conclude that the probability of a given male returning and his mate also returning would be .236 x .109, or .0256 (2.56 out of a hundred).

For a given pair of birds to be paired together for a second breeding season, however, it is obvious that they must not only return to the same place but must also be present at the same time and in the same physiological condition. For my returns the monthly frequency of arrival times for males was March (4), April (3), May (2), and June (0). Additionally, one male did not migrate but remained in the study area throughout the winter. For females, the arrival time frequencies were March (0), April (2), May (2), and June (2). Apparently the only time a pair of birds could encounter one another for possible pair bond formation would be during April or May.

Since I have noted that males rarely remained unmated for more than a week or so, the chances of a given male and his mate arriving back on the breeding grounds at the same time would be 1/8 x 5/10 (the male "component") x 4/6 x 1/8 (the female "component"). This assumes that the female also may remain unmated for only about one week, which may or may not be a valid assumption; I suspect that it is high. Nevertheless, the probability of a pair of birds returning at the same time calculates out to be .005, and since the probability of their returning to the same place is .0256, we can now see that the overall probability of a given pair of bluebirds being randomly paired together again for a second season is .005 x .0256, or .000128. In common parlance, this would be expressed as one chance in ten thousand!

So far during my study I have marked both the male and female at 17 different nests. According to the above calculations, I should not expect the return of both adults for some time yet. Also, at my current pace the remating of a given pair of adults for a second season will not occur within my lifetime. Since it already has (and did in only the second year of my study), it is reasonable to conclude that this event is not merely a matter of randomness, as some workers have suggested in the past.

The history of the pair of birds that returned and remated is interesting. Male 0622 had just reared a spring brood with female 0632 when female 0062, his mate from the previous summer, arrived. This male immediately commenced a nest in a nearby vacant nesting box with female 0062, and female 0632 was left alone to rear four fledglings on her own. Most (3?) of the young survived, and their mother soon was nesting again with a new male in the same box she had used for her first brood. Her second nesting was also successful, but male 0622 was not so fortunate. An agressive House Wren terminated the nest of female 0622, who promptly left the study area and has not been seen since. Ultimately male 0622 spent the remainder of the summer in the company of the juveniles he had fledged in the spring. It is quite noteworthy that, out of about 30 possibilities, this was the only instance I have noted of bluebirds changing mates following a successful nesting.

In only one other instance did both the male and female of a pair return during the following season. In that case male 0635 had remained on the nesting grounds throughout the winter, while his mate apparently migrated. He then attempted an early (and unsuccessful) nest with a new mate. By early May he had vanished and in early June his old mate had arrived onto a territory about a mile distant where she commenced a nest with another male.

Since the observation of one pair out of 17 being remated for a second season is much higher than the calculated odds would have us hope for, it seems reasonable to conclude that a given pair of birds shows at least some inclination to be bonded together for more than one season. Other evidence tends to support this conclusion. For example, I have kept several pairs of adult bluebirds in captivity for the last 3 years and can attest to the fact that it is nearly impossible (except during the molt or early in the non-breeding period) to fracture a bond as long as the subjects are within earshot of one another. Automatic breakage upon a nesting failure did not occur in my caged birds. In the wild I have seen innumerable instances in which a pair of birds will remain together well into the autumn and will often depart (on the fall migration?) together, frequently in the company of any juveniles

which they raised during the season. Finally, it is also noteworthy that most (65 to 85%) bluebirds arrive on the breeding grounds already paired.

All of these observations seem to suggest that the pair bond of the Eastern Bluebird is quite unusual for a songbird, and that, lacking mortality, nest loss, and severance caused by migration, this species may remain mated for a longer period than previously suspected.

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SURVEY OF EDUCATIONAL BANDING STATIONS

Many banding stations operate for specific reasons. Some devote their entire time to doing selective studies. Some operate solely for educational purposes, and still others do studies along with educational work. When we speak about an educational station here, we're referring only to stations where activities consist of teaching school children/boys/girls, not where banders teach prospective banders/subpermittees to band.

We feel EBBA News has an obligation to make such educational stations known, so that other banders/birders can refer interested persons/teachers/counsellors to contact such stations and their principal operators. Such contacts are important because one of the best teaching aids is a bird in the hand. This makes a lasting impression on a youngster, and we hope, initiates him/her to have respect for birds and other wildlife, become conservation minded, conscious of life around us.

In the colored page section of this issue (this is our tear-out section), you'll find a form with some specific questions about your station, if yours operates for educational purposes, fully, or as part of your operation. Please fill in this form as completely as possible, and mail it back to us as soon as possible. Thank you very much. Editor

EXAMPLE

PENNYPACK BIRD SANCTUARY ASSOCIATION. Located: Pennypack Park, near VERREE HOUSE, south of intersection of BLOOMFIELD AVENUE and VERREE ROAD, PHILADELPHIA, PA.

"LIVE BIRD SHOWS ARE HELD"; The station is open to the public. In 15 seasons, over 21,000 people, from sixteen states and five foreign countries have attended.

Information and descriptive literature is available from: PENNYPACK BIRD SANCTUARY ASSOCIATION, 1300 GLENNBROOK ROAD, HUNTINGDON VALLEY, PA. 19006.

Name of principal bander who submitted this information: MR. FRANK NEUMANN, 1300 GLENNBROOK ROAD, HUNTINGDON VALLEY, PA. 19006.