

migrations melvin a. traylor

This is the time of year when even the most case-hardened city dweller becomes aware that something is moving besides the cars on the expressways. In late August he realized without thinking of it that there were great flocks of martins roosting nights on the Bahai Temple and Aquarium; in September the calls of high-flying nighthawks drew his attention skyward, but in October the insistent honking of the geese as their lines and "V's" move southward over the city itself makes him realize that summer is indeed ended and the birds are on their southward migration. With his awareness thus heightened, he recognizes from the gentle rain of warblers and thrushes around "Big John" and the other tall buildings that this movement involves most birds, both big and small.

Although the migrations of larger birds, particularly the enormous flights of waterfowl, were understood by the ancients, the ability of sparrow or warbler-sized birds to travel thousands of miles a year was not accepted until the last century. They were generally believed to hibernate in hollow trees or in the mud of ponds, or else to hitchhike their way south on the backs of eagles or hawks. It is only through collecting in tropical countries during the northern winter, and by tracing the movements of individual birds through the use of numbered bands, that an accurate knowledge of the migration of each species has been determined.

The more one learns about migration, the more one is impressed by the amazing diversity of migratory patterns, and by the enormous distances that some birds travel. Some species, such as our familiar Song Sparrow and Blue Jay, move only as far as the severe weather forces them, and hardy individuals may even remain here during the winter. At the other extreme, the Barn Swallows and Bobolinks will leave here in late August, when the weather is still fine and food abundant, and travel 6000 miles to Argentina,



where they are among the more conspicuous birds of the southern summer. We like to think of these last two as our typical native birds, but the four months they spend with us are no more than the time that they spend in South America. As one goes further north, this discrepancy between time spent on breeding and wintering grounds becomes even greater. The shorebirds that breed on the arctic tundra have barely two months in which to rear their young, and individuals that we saw migrating north in May will be back with us on their southbound voyage in late July.

The routes followed by these long-distance migrants are not a simple south in autumn and north in spring. A glance at the map will show that the whole of South America lies east of New York, and our birds that winter there must make a southeasterly flight. Some may accomplish this by following the arc of Central America, but the majority make it by flying directly across the Gulf of Mexico or the Caribbean, even though this involves a non-stop flight of several hundred miles. The flights of European song birds to Africa are even more remarkable. Not only must they cross the Mediterranean, but immediately thereafter they are faced with 1000 miles of Sahara Desert, which offers

nothing but death by desiccation for birds that land there. It has been determined that many of the European song birds must make a minimum non-stop flight of 1200 miles, no small feat for a bird weighing an ounce or two. They are able to accomplish this by laying up fuel in the form of a heavy layer of fat just before they start their flight. When they take off, up to 30 percent to 40 percent of their weight may be fat, most of which will be expended by the time they reach subsaharan Africa. The most remarkable long-distance migrant of all is the Arctic Tern. After breeding in northern Canada, it crosses the north Atlantic, goes south along the west coast of Europe and Africa, winters in antarctic waters, and returns north along the coasts of the Americas, a 25,000 mile round trip every year.

Most people who have had birds nesting around their homes have wondered whether the same birds return each year or new ones arrive opportunistically. The general rule (no rule of behavior can be written that will fit all species) is that the same bird or pair of birds will return year after year to the spot where they nested previously. This was demonstrated many years ago with Purple Martins and later with many other species. But what has only

recently been appreciated is that each bird will have its own restricted wintering ground to which it returns year after year, even though the latter has none of the strong breeding associations characteristic of the northern home. Dr. Jocelyn van Tyne first demonstrated this in 1934 by banding Indigo Buntings in Guatemala one winter and finding the same individuals returning the following year. Since his pioneering efforts others have demonstrated the same for many species both in Africa and tropical America. Even more remarkable than this ability to find the same garden or field after a trip of several thousand miles is the proven ability to follow the identical route along the way. Banders trapping birds during migration are finding that the same birds pass through, autumn after autumn or spring after spring. One bander in Tunis on the north coast of Africa captured the same Redstart each spring for three years. For the Redstart this meant crossing a thousand miles of featureless desert and finding the same small garden in which it rested a few days the previous year before leaving for its nesting home in Europe. It would be like stopping at the same gas station on the way from Chicago to New York, but without any roads to guide us.

One can hardly study migration without wondering how the birds find their way. It was originally believed that they piloted by following natural features such as shorelines and major rivers, and these were frequently designated major flyways. There is no question that birds do take advantage of these landmarks, and there are often concentrations of migrants in favorable areas, but too much accurate navigation takes place in the absence of natural features for this to be the only means. The Bristle-thighed Curlew crosses a minimum of 2000 miles of open ocean from Hawaii to its only nesting place in western Alaska, and it must obviously navigate without landmarks. Experiments have shown



Migrations of the Bobolink. After making an enormous flight across the Americas, the Bobolink winters in eastern Bolivia, southern Brazil and northern Argentina.

that some species orient by the stars and others by the sun, and in both cases they have an inner clock that allows them to compensate for the rotation of the earth. Bird navigation is too large and uncertain a subject to be treated fully in an article on migration, but my own feeling is that birds will use all the means mentioned above, as well as others not demonstrated, such as the magnetic field of the earth.

The altitude at which birds fly is another aspect of migration for which many details are known, but for which no general rules may be laid down. Radar studies show that small songbirds may fly at any level up to 5000 feet above the ground, and the shore birds and waders up to 10,000 feet. Generally the migrants are higher on clear nights than on cloudy ones, and it is the low-flying birds on the cloudy nights that are confused by the lighted buildings of the city and fly into them. These dead and injured birds are usually the city dweller's only clue to small-bird migration. The absolute height records are probably held by migrants crossing the Himalayas, where even the passes are at 20,000 feet.

Whatever the means of navigation, the particular pattern of migration is genetically determined for each species. Among many of the shorebirds the adults leave as soon as the young can fend for themselves, and the latter make migrations of thousands of

miles without any experienced birds to guide them. One would expect that the evolution of such intricate behavior would take countless thousands of years, but those of our more northern migrants must have evolved within the last 10,000 years, because before that their breeding grounds were covered with ice. A suggestion of how present migratory routes developed may be found in the migrations of species that are at present rapidly extending their ranges. The Asiatic Arctic Warbler and Yellow Wagtail have crossed over and now nest regularly in Alaska, and our Gray-cheeked Thrush now nests in eastern Siberia, but in each case the birds cross back over the Bering Sea to return to their old wintering grounds, instead of going south to the much nearer tropical areas of their new continents. Apparently the birds are conservative in their habits, and new routes are built up by adding small increments to the old ones.

I have confined my discussion to bird migration, for that is my own field of knowledge, but migration is not confined to any one group of animals. Butterflies, of which the best known is our Monarch, may travel a thousand miles, and the former seasonal movement of the Buffalo on the plains was one of the most awesome sights of nature. Salmon are notorious for their breeding runs, and already the Coho in Lake Michigan have developed a predictable pattern that allows the fisherman to meet them on their way up the lake in summer. Even though we cannot fully understand how migration takes place, we can be enthralled by the beauty and intricacy of the patterns nature develops.

SUGGESTED READING

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