On the Move

The reasons why animals migrate – more food, better climate, and safer places to raise young – may seem obvious, but how they do it is an enduring mystery.

Bird banding projects have demonstrated again and again that, from generation to generation, birds migrate to the precise locations that their ancestors selected. For many species, the journey is so well orchestrated that the traveling birds can be found at the same spot on the map, on the same day, from year to year.

Researchers have discovered that the gradual shortening of the length of day as fall approaches triggers hormonal changes in birds that tell them that it's time take flight. It makes sense that this type of reliable external cue would signal when to go, but how do they know where to go? And how do birds manage to not get lost when winging their way across vast expanses of open ocean or unbroken forest?

It might be in their DNA. Some young songbirds take their maiden migration flight by themselves, and they still make a beeline to the same wintering grounds their parents enjoyed. The youngsters are not just following the flock, so essential data about the direction and distance of their migratory route must be programmed into their genes.

Birds appear to be especially sensitive to the Earth's magnetic field, and those tiny bird brains come equipped with a compass to point them in the right direction. Some land and water based creatures, from salamanders to salmon, also respond to the subtle pull of the magnetic field. Starlings study how the sun moves across the sky during the day to plan their route, and stargazing mallards align their flight with the North Star.

Many migrants are so single-minded, they don't stop to rest or eat until they reach their final destination. Adaptations in their bodies and behaviors facilitate these amazing feats of endurance. Hollow bones, special stores of fat, and shrinking livers and intestines help birds stay airborne and conserve precious energy. For some birds, there is safety and comfort in numbers. The familiar "V" formation adopted by migrating waterfowl helps reduce wind resistance, and the individuals take turns leading the flock so no one gets too tired. Other birds travel in disorderly clusters to confuse and discourage predators.

Hummingbirds are incredible creatures in many respects, and their migration is no exception. Before the summer ends, the tiny ruby throated hummingbird guzzles so much nectar and slurps so many insects that it packs on more than two grams of fat, nearly doubling its body weight. It needs all the energy it can muster for each leg of its solo voyage, from the 20-mile-a-day jaunts over the fields, forests and cities of the eastern U.S., to the 500-mile non-stop flight across the Gulf of Mexico. When the hummingbirds return from southern Mexico in the spring, they stagger their departure dates over several weeks to prevent possible catastrophic losses to the species if severe weather strikes during their Gulf crossing.

Not all winged migrants are birds. Each summer, three or four generations of monarch butterflies hatch, feed, breed and die within four to six weeks. However, the last batch of monarch butterflies to hatch in the early fall lives six to eight months, so that they can make an epic journey. These fearless fliers flutter all the way to sunny central Mexico where they congregate for the winter amid the oyamel trees. As spring returns up north, this migrant generation of monarchs is in the mood to breed. They take wing again, this time heading north in search of the blooming milkweed that will provide the perfect nursery for hungry monarch caterpillars.

Some migrations simply defy our understanding. The puzzling squirrel stampede described in "Face Offs" (page 3) was a recurring event in the early 1800s. For unknown reasons, mass migrations of gray squirrels occurred in five year cycles for several decades, according to historical reports. Each time, significant numbers of the squirrels drowned in streams in their frenzied march. The squirrels seemed fat and healthy, and the forests provided an abundance of mast, so food did not appear to be the motivating factor. We may never know what caused each exodus, but they finally ended as Ohio's landscape was altered forever by the unstoppable progress of a state on the move.