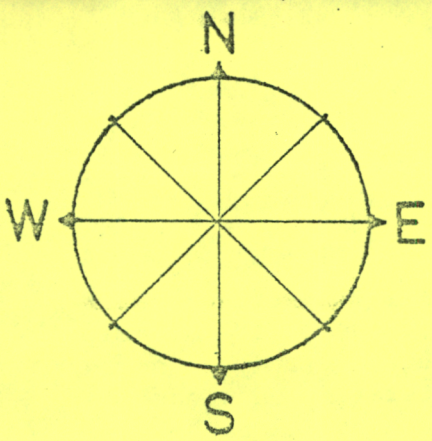
BIRD BEARINGS



At this time of the year, only a tiny fraction of our summertime bird population is with us still, and the vast majority has long since departed for sunnier climes. Everyone knows that migration, or the regular, annual movement of an animal population, is very important to many species of birds, but few of us appreciate the difficulties birds must overcome in order to reach their destinations.

When our favourite songbird leaves his post in our backyard in early autumn, for example, he faces a flight of several thousand kilometers, over terrain he has probably never seen, and often in conditions of high wind and near-total darkness. And yet the bird survives to reach his wintering grounds, and eventually returns to the same backyard for the next breeding season.

The mystery of how birds, with their relatively small brains and limited analytical abilities, can accomplish extraordinary feats of navigation, has engrossed scientists for many years. But what has been found is not a simple straightforward system, but something rather like the Oak Island treasure pit, with its multiple traps and pitfalls, each designed to reinforce the goal of confounding the investigator.

Among the first hypotheses in bird navigation research was that birds navigate by the sun. And yes, they can navigate by the sun: by "knowing" from what point on the horizon the sun should rise, and "remembering" how long it has been since sunrise, most bird species seem capable of setting their bearings with considerable accuracy. Similarly, night-flying migrants can set an accurate course by the stars.

But what if the day (or night) is cloudy? Well, it seems that it has to be very cloudy, at least for some species of birds that have been shown to be capable of deducing the position of the sun, even on moderately overcast days, by detecting plane-polarized light that passes through the clouds.

But when the sky is heavily overcast, birds continue to migrate, and often seem to find their destinations as quickly as they do in more favourable conditions. And this is where the picture is muddied. Recent research has uncovered a whole arsenal of systems and back-up systems, which seem to act as supplements to the primary technique of celestial navigation. At the present time we know little of how the hierarchy of techniques works, and we can only guess about many of its components. Some of the methods that have been suggested as auxilliary navigation aids are as follows:

Magnetism. There is strong evidence that some birds are able to detect the earth's magnetic field, and set a compass course by it. In one species of gull (the ring-billed) magnetic cues are thought to be even more important than solar ones.

Odors. Although most birds are believed to have no effective sense of smell, certain species of seabirds seem to be able to locate their nest sites, and possibly their food supplies, by odor.

Changes in gravity. Variations in the intensity of gravity, as influenced by the phase of the moon, seem to affect the orientation of pigeons kept under labratory conditions. How birds could use cycles of gravitational intensity to help in navigation is unclear.