BIOLOGY

North Sky Guides Birds

Star patterns in the area of the North Star are signals for migrating buntings—By Patricia McBroom

➤ THE SMALL indigo bunting apparently steers his way 2,000 miles south every year by looking over its shoulder at the northern sky.

This night-flying immigrant does not seem to rely on any one star or constellation for his direction, said Stephen T. Emlen of the University of Michigan. Rather he recognizes the entire pattern of stars within 35 degrees of the North Star, and can be confused only when that part of the sky is blocked.

Mr. Emlen's experimental results, reported at the American Institute of Biological Sciences meeting, College Park, Md., diverged from most theories currently used to explain bird migrations.

Birds supposedly find their direction from a single star or group of stars and then compensate for the time of night, Mr. Emlen said. In other words, they are thought to have a built-in clock for recognizing where the star should be at any one hour.

However, in testing this theory under artificial planetarium skies, Mr. Emlen found he could not confuse the bunting by moving the stars ahead as much as six hours. They still oriented themselves south in the fall and north in the spring, despite the fact the constellations were far west of their normal positions.

The birds were not much bothered by having the entire southern sky disappear even when they were headed in that direction. But when Mr. Emlen shut off the northern sky, the birds simply stopped orienting altogether and did nothing.

Mr. Emlen then proceeded to find out whether the bunting depends for direction on any single cue, such as the Milky Way, the Big Dipper, Cassiopeia or the North Star. He was unsuccessful, which leads him to believe the birds must take their direction from the geometrical pattern formed by all these cues together.

He also found that different birds take slightly different cues. Some were disoriented by one test, others by a second. However, the majority lost their direction when the circumpolar area was blocked.

At the same session on animal perception, William Herrnkind of the University of Miami, Coral Gables, Fla., revealed that fiddler crabs have an optical system whereby they can measure polarized light in the sky and find their way from sea to shore.

Polarized light is only one of three cues they use, but it is an important one, said Mr. Herrnkind. The other two are the shore itself and the position of the sun.

By putting the crabs in a pan of water and covering it with a polaroid filter, Mr. Herrnkind found he could make the crabs change direction according to the position of the filter.

PHYSIOLOGY

Body Has 24-Hour Clock

➤ A QUESTION plaguing space scientists is what will happen to man's daily rhythm of rest and activity when he travels outside the earth's sphere.

Will he maintain the normal clocks that tell his body when to slow down and speed up—that control fluctuations in heart rate, respiration, temperature, endocrine and liver activity? Or will he lose this rhythm altogether?

The jet age has shown all too well that these clocks, or the circadian rhythm, can be thrown off temporarily as people travel rapidly to new time zones. Yet something always resets the clocks. What is the timer?

A partial answer comes from work done at Northwestern University, Evanston, Ill., by Dr. Frank A. Brown, who has evidence that living creatures possess an exact 24-hour clock for rest and activity.

The clock is "extraordinarily" stable, he said, and seems to be responding to the earth's environment.

Physicists have established that the earth has a 24-hour cycle, he said. Background radiation, geomagnetism and the electrical field all fluctuate.

It is now clear, Dr. Brown said, that living organisms, including plants and animals, are sensitive to these elements. If they are responding or oscillating in rhythm to the earth's cycle, this could be what paces the biological clocks.

Without such a timer, the circadian rhythm would probably not be nearly as stable as it is, he said. Although traveling to a new time zone throws the rhythm off temporarily, bringing fatigue and distorted sleep patterns, eventually a rhythm is reestablished.

By studying the effects of radiation on mice, Dr. Brown was able to establish the existence of the 24-hour clock. He found that the mice were consistently active at six o'clock in the morning and at six at night. They were inactive about midnight and at nine in the morning. The mice responded to radiation in a rhythm that corresponded to these times.

If this 24-hour clock is the timer for body activity and it depends upon the earth's environment, then traveling in space might, indeed, have very major effects on living creatures.

Dr. Young H. Park and Joseph R. Zeno participated in the research reported in Nature, 211:830, 1966.

MEDICINE

Alcohol Causes Pain In Some Cancer Patients

➤ VIOLENT and agonizing pain after drinking was experienced by some of a group of 155 tumor patients, all of whom were found to be intolerant of alcohol by a Glasgow, Scotland, physician.

Two elderly women were distressed to find they could no longer take even the smallest sip of communion wine at their church. Many regular drinkers gave up alcohol completely and dared not resume it, but five men with Hodgkin's disease whose pain was not as severe said they took analgesic tablets before drinking.

Pain at the site of the disease was common. For example, pain occurred at peripheral lymph-node enlargement sites, including the neck, armpit and groin in 14 persons with Hodgkin's disease and in one with cancer of the nose and throat region.

Cancer of the mouth or tongue, of the breast, of the cervix and other tumor sites also caused localized pain. Bleeding from the site of the disease occurred in 14 patients after drinking alcohol. Two of them had noncancerous tumors.

Effects described by two other women with cancer were, a terrible sensation in arms and legs, and of a sudden "flapping inside her head as if everything was loose." The patients were reluctant to report the symptoms as they knew they sounded absurd.

Symptoms became less noticeable after the patients were treated with X-ray or drugs, Dr. T. B. Brewin, consultant radiotherapist of the Royal Infirmary and Belvidere Radiotherapy Center, Glasgow, said in the British Medical Journal, Aug. 20, 1966.

The onset of alcohol intolerance could lead to earlier diagnosis of cancer of the cervix and other curable tumors, Dr. Brewin suggested. Any of the forms of intolerance he found could appear as a very early symptom of local tumor change.