

Birds 'See' Earth's Magnetic Field

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European robins with lesions that disrupt a specialized light-processing part of the brain are unable to orient themselves using the Earth's magnetic field. Credit: Stefan Willoughby

When birds migrate over long distances -- sometimes thousands of miles -- they usually end up in exactly the same place year after year. Such accurate feats of navigation, accomplished by millions of birds every year, have long made scientists wonder how they do it. Now a group of scientists in Germany has experimental evidence that reveals an important part of the secret of birds' navigational success.

Birds navigate in part by orienting themselves with the sun and by

following physical landmarks. But these strategies alone are not enough. Birds must be able to navigate on cloudy days and find their way across huge swaths of ocean where there are no recognizable landmarks. Scientists have suspected for years that birds have an innate ability to sense the Earth's [magnetic field](#) and adjust their paths accordingly, but they still do not understand how.

Some scientists have hypothesized that the mechanism is rooted in a bird's beak, where iron-based minerals act as magnetic sensors that detect the bird's orientation, feeding this information to its brain via a special nerve. Other scientists have disputed this, proposing instead that the magnetic sensors are actually in a bird's eyes, where light receptors sensitive to magnetic fields feed data to the brain through optic nerves.

Henrik Mouritsen and his colleagues at the University of Oldenburg in Germany have now made a compelling argument for the eyes. They reported in the journal *Nature* that European robins with lesions that disrupt a specialized light-processing part of the brain are unable to orient themselves using the Earth's magnetic field. Birds with lesions disrupting the nerve that connects the beak to the [brain](#) do not have the same problem.

This strongly suggests that [birds](#) can "see" the Earth's magnetic field and orient themselves accordingly.

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