SOMETHING IN THE air

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Electrosmog may impact migrants

The phenomenal proliferation of electronics in human society has been accompanied by growing interest in whether the electromagnetic noise generated by large numbers of devices in urban areas – sometimes referred to as 'electrosmog' – has negative health consequences. Public opinions on this topic, however, are often based on sensationalised media reports rather than repeatable scientific data.

Against this backdrop, a team of German and British researchers was understandably cautious when their research first started turning up evidence that electromagnetic noise interferes with migratory birds' navigational abilities. Beginning in late 2004, they were perplexed to find, repeatedly, that migratory European Robins held in wooden huts on the campus of the University of Oldenburg in Germany failed to orientate correctly using the earth's magnetic field. Effectively, the birds' internal compasses were being jammed. The robins were housed in Emlen funnels, structures that for nearly five decades have formed the basis for studying how migrating birds navigate.

above *Electromagnetic noise may be a contributing factor to recent population declines of migrants such as this Lesser Grey Shrike.*

When grounded aluminium plates were installed to shield the huts from ambient electromagnetic noise, the robins were immediately able to orientate correctly. When the plates were removed, magnetic navigation was again disrupted. Commendably, the researchers did not rush to publish their observations. Instead, they carefully designed a series of rigorous follow-up experiments that thoroughly tested the repeatability of the initial results, and systematically eliminated any possible doubt as to their veracity.

The team began by confirming that the shielding effect (rather than the mere presence of the aluminium plates) was responsible, by comparing the effect of grounded versus ungrounded plates. Next, they checked that electromagnetic noise simulating ambient levels, but generated by equipment placed inside a shielded hut, caused the same disruption of magnetic navigation. They then ran a number of additional experiments, including housing robins in identical huts outside the Oldenburg city limits (and hence beyond the urban electrosmog), and found that these birds could orientate correctly. These various experiments were repeated by several generations of students working independently of each other.

Only when this scientifically exemplary body of work had been completed seven years later, and the findings were sufficiently watertight to withstand even the most critical scientific scrutiny, did the researchers reveal their findings in the august journal *Nature*. Not surprisingly, the paper made quite a splash. The findings have a host of far-reaching implications; for one thing, they suggest that urban areas have direct negative impacts on migrating birds by reducing their ability to navigate accurately. They also raise the worrying possibility that man-made electromagnetic noise may be a contributing factor to recent population declines of migrants.

It is difficult to see any gaps or weaknesses in the data presented by Engels et al. in their study. However, it is puzzling that this effect has never been noticed before now. Several of the major laboratories in which avian magnetic navigation has been intensively studied (including the one where the avian internal compass was first discovered) are located in urban settings. For now, the ornithological community will wait with bated breath to see whether the same effect is documented in other migratory species.

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Reference: *Engels, S. et al. 2014. 'Anthropogenic electromagnetic noise disrupts magnetic compass orientation in a migratory bird.'* Nature *509: 353–356.*