science & serendipity

Research is often categorised as either fundamental – carried out to improve our understanding of the world around us, but with no immediate goal for the knowledge generated – or applied, where there is a specific application in mind. Most of the biggest scientific revolutions, often with major consequences for the way we live, have resulted from what was at the time perceived to be fundamental research. Yet despite this, there is increasing pressure for scientists to make their research more 'relevant' and to demonstrate direct societal benefits from their work.

Fortunately for the staff and students at the FitzPatrick Institute, the many and mounting environmental threats make it easy for us to justify our existence. Over the past decade or so there has been a shift in Fitz research projects towards those that address human impacts on birds and other biodiversity or that use birds as indicators of environmental health. That's not to say that we have turned our back on fundamental science; many of our flagship long-term studies address basic ecological and evolutionary questions. Indeed, it is these projects that not only generate the most public interest, but often also provide the best indicators of human impacts, through their long view of nature.

Another trend that has occurred over the past few decades has been a shift from curiosity-driven research to studies that aim to establish and test general scientific principles. The former is the way most knowledge was obtained originally. People would encounter something that made them think, 'That's odd!', and then delve into the reasons underpinning the phenomenon. Some researchers are dismissive of this ad hoc approach because it is perceived to be less 'scientific' than research that sets out to test specific predictions from general theory.

Of course, the two approaches are not mutually exclusive – we should design appropriate experiments to ensure that we understand the phenomena that pique our curiosity. The important point is to use a rigorous scientific approach to tackle interesting questions. In ornithology, good questions usually arise from time spent in the field and having sufficient experience to recognise when something is indeed 'odd'. We are fortunate to live and work in an exceptionally biodiverse region, where there is still much to learn. We must remain open to ask other questions, because that is the surest way to come up with novel approaches to understanding and ultimately conserving the natural world. Scientist and birder alike need to remain alert to unusual events and to share their observations.

My research career has seen its fair share of serendipitous events, but one example will suffice. During the recent Antarctic Circumpolar Expedition (ACE), rough weather forced the South African Environmental Observation Network's biological oceanographer, Tommy Bornman, to sample phytoplankton from the ship's water intake using a very fine mesh filter. When he examined the filters, he found they usually contained a couple of synthetic-looking fibres. My micro-plastics project, which was using a state-of-the-art neuston net to sample for plastic particles, was missing these tiny fibres because its 0.2-millimetre mesh was too coarse. Once we switched to fine-filtering surface waters collected with a bucket, we found microfibres in virtually every sample around Antarctica.

GUY PRESTON

Peter Ryan (left) and the RSPB's John Kelly celebrate the donation in Cape Town of three helicopters for use in mouse eradication attempts on Gough and Marion islands.

Serendipity can also play an important role in promoting conservation agendas. The ACE cruise marooned Frederik Paulsen on Marion Island for a night, where he heard about the impact of introduced house mice on the island's albatrosses. As a major supporter of the rodent eradication on South Georgia, he donated the three helicopters used at South Georgia and some seed funding to the South African Department of Environmental Affairs. Triggered by his generosity, an eradication attempt is now planned for 2020, following the mouse eradication scheduled for Gough Island in 2019.

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