BOOK REVIEWS


Simply finding your study animal is often the hardest part of research, and the most important. Locating a known individual over time is at the very core of most zoological field research. Without it, it would be impossible to collect information on species density, individual survival, space use or resource selection – vital concepts for the basic understanding of the biology of a species, and for the design of conservation strategies for those at risk. While there are many tools field workers can use for this purpose, radio-telemetry is one of the most effective because it allows for the remote monitoring and locating of animals with minimal disturbance. Advances in radio-telemetry are typically driven by new technologies, including hardware breakthroughs for improved data collection and new computing technology for more sophisticated analyses. Keeping up with these advances through the primary literature is a difficult task, and zoologists should be thankful for two excellent new books that review and update the field of radio-telemetry, filling a decade-old gap.

A manual for wildlife radio tagging, 2nd edition (which here I call MWRT) has its strength in describing the ‘How’, while Radio tracking and animal populations (which I call RTAP) is aimed more at the ‘Why’ of radio tracking (i.e., what can be done with the data). This split is not absolute, however, since MWRT concludes with review chapters on analyzing telemetry data for space use and demographics, and RTAP has good review chapters on experimental design and recent technological advances. Both books start with insightful histories of the field of wildlife telemetry, and conclude with lengthy lists of equipment suppliers and literature cited. MWRT also provides a glossary of terms.

Clearly, the authors of both books have tried to salvage poorly designed telemetry projects in the past because proper experimental design and error estimation are major themes at the beginning of both books. By including the world ‘manual’ in the title, MWRT leaves no doubt about its main purpose, which is to teach the materials and methods of radio tracking. Kenward has reached a nice middle ground – unlike most ‘manuals’ we encounter in daily life – by writing in plain language, yet still including the abundant technical details needed to understand the field. These details are aimed at addressing the litany of questions expected from first-time trackers, as well as those from experienced field workers branching out to new techniques. He has excellent reviews of the mechanics of the hardware available and how it is best used in the field for various projects (e.g., What weight of tag can I use? How long will it last? How far will the signal travel? What antenna design should I use? What physiological parameters can be measured remotely?). The methodology covered includes the basic triangulation and homing methods familiar to most wildlife biologists, as well as more specific techniques such as aerial telemetry, GPS collars, non-traditional tag attachment. Beyond technological issues, Kenward addresses some of the crucial sticking points for proper experimental design (e.g., How many transmitters do I need? How often should I collect data? How do I report error? etc.). It is refreshing to see specific name brands mentioned in his review of materials and methods, and to see a consideration of budgetary trade-offs that will be especially relevant to smaller projects.

In contrast to MWRT, RTAP focuses more on the ‘why’ of radio tracking. What can be done with the data? What can we learn about the animals being tracked? Without actually going too deeply into the biology of different species, this book reviews the options for analysis of radio tracking data, and introduces a number of promising new ideas. Many people equate radio tracking with the study of home ranges, and RTAP gives this well-studied topic its due with a nice review of home-range measures. But raw area estimates are just the start, and this edited book continues to describe options for the analysis of movement paths and more detailed evaluation of resource selection. Telemetry is not just about the location of an animal, and both books conclude with chapters on using radio tags to estimate population sizes and animal survival.

Radio-trackers are always looking for the next big thing, be it technological or analytical, and RTAP offers a few early glimpses of fields that are young and still ripe for future development, including more integrated GIS analyses, fractal analysis, telemetric physiology, digitally coded tags, and detailed modelling of resource use and behaviour (or ‘high-tech behavioural ecology’). Both books have sections on the potential and pitfalls of automated telemetry systems, offering reviews of previous attempts, and suggestions for future efforts.

These two books are much-needed updates on wildlife telemetry methods, and have earned my recommendation. Anyone contemplating a new telemetry study should consult MWRT to get an idea of the methodological options. Even established telemetry research groups will find it a useful reference, as no other source covers this broad field in as much detail. As pointed out by both books, specific analyses should be planned early on in a study, before data are collected, and RTAP is an excellent resource for this planning. While most of the analyses described here are published in the primary literature, having all the options discussed together in one volume will make this a popular book.

Given the complementary nature of the two volumes, and their annoyingly high price, it would be nice to see Elsevier (the owner of both publishing imprints) offer them together at a discounted price.

Roland Kays
Curator of Mammals
New York State Museum


The life of Stephen Forbes spanned a seminal period for the study of ecology. When he was born, in 1844, his family were pioneers, scratching a living off a land that humankind had
barely begun to study scientifically. When he died at the age of 86, he had lived to see the USA become the most successful nation in the world, largely because it had harnessed the intelligence and innovation of men like Forbes, who understood the power of science to change people’s lives.

*Stephen Forbes and the rise of American ecology* is superficially a book about an important figure in ecological study during the nineteenth and early twentieth centuries, but is really a book about the economic, social, environmental and cultural importance of science in general, and evolution-based studies of ecology in particular.

For modern scientists, most of whom are forced to become increasingly specialised, the remarkable thing about Stephen Forbes was the liberating variety of his scientific activities. He initially trained as a medic, and then worked on insects, fish and plants, as well as integrating his research and teaching. He curated an extensive entomological collection, which he encouraged the agricultural community to use as an economic resource in their battle to understand the pests that damaged their crops. He was involved in the public engagement of science through his work at the Natural History Museum in the town of Normal, Illinois, and through public lectures. He was involved in professional ecology and amateur natural history. He was an intensely practical man, but used his theoretical skills to predict (correctly) that a harmful scale insect would spread to the orchards of Illinois by the mid-1890s.

He was also a successful political campaigner, and led the lobby for the development of state forests in Illinois, believing it to be a disgrace that two-thirds of the state’s native forests had been felled and that millions of acres of soil were ‘mismanaged and misapplied’. Forests could be used as a genuinely public service for ‘educational, recreational and esthetic purposes … preserves … of great interest and value to the student of science and his teacher and lovers of wildlife’.

What is clear is that the success he achieved was largely built on this liberating range of experience. He believed that his economic contribution, through agricultural entomology, was based in a ‘division of biological science … lately distinguished as a separate subject … called oecology’ and that the ‘whole Darwinian doctrine belongs to it’.

Many who want to read a book about the development of ecology will not particularly want to know about Forbes’s life in the Union Army during the American Civil War, but although there is probably too much military detail for most, this section helps to make clear how undeveloped American science was when Forbes began his scientific career as a medical student in 1866.

The wealth of America doubled in real terms during Stephen Forbes’s lifetime, and it had become an entirely different place. This development was due in no small part to the pioneering efforts of scientists like Forbes, who no doubt inherited a pioneering attitude from their parents. What Robert Corker has done in *Stephen Forbes and the rise of American ecology* is to document just how important ecology and evolution were to that process. In a world where the American political establishment seems intent on swimming against the tide on the biggest ecological issue of the day – global climate change – that seems like a useful lesson.

Peter Cotgreave
Save British Science, London