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Review: Jane Carruthers, *National Park Science: A century of research in South Africa*

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In this 512-page monograph, Professor Carruthers sets out to explain in scientific and political context the changing philosophies and shifts in focus of the research agendas shaping scientific research in South Africa's national parks. The focus is thus not on all conservation or conservation science in South Africa, although her discussions of the histories of the country's 19 national parks include many references to other parks and institutions. Within this framework of national parks, the dominance of the Kruger National Park in the history of national parks sciences and administration in the country means it occupies a significant amount of the discussion, though the other parks are each considered.

The preface introduces the rather fuzzy concept of a 'national park', and clarifies what author means by 'conservation science' and 'environmental history'. Although the author draws on her long experience as a pioneering environmental historian in South Africa, this book is not an environmental history of the parks. Rather, it addresses two important strands in environmental history; that is history of environmental sciences and the individuals and institutions shaping environmental management.

Carruthers' research questions for this historical project consider: the extent to which research agendas were driven by external or internal circumstances (including the political context); who the key scientists of SANParks have been, and the nature of their expertise and contributions; which important partnerships and collaborations developed over the study period; how the scientific outputs of this research have been communicated; and to what extent national and international developments influenced SANParks science. She points out that few professional histories of

conservation science have been written. A key aim of the book is to offer a critical perspective on conservation research, policy and practice in national parks, which is accessible to those working in this field.

In order to offer a coherent historical account of this complex trajectory, Carruthers organises her material into three periods. Each is identified with particular conservation philosophies and research agendas, as follows: (1) protecting, preserving and propagating (1900-60); (2) measuring, monitoring and manipulating (1960s-1990); and (3) integration, innovation and internalisation (1990-2010). This periodisation is also aligned to some degree with key developments in the political history of South Africa and developments in international conservation science. As the author cautions, these are not to be taken as 'absolutely sequential paradigms' with 'clean breaks between them,' but rather as a 'device' to introduce key ideas as they developed, and give prominence to influential personalities and institutions, both national and international (Carruthers, 2017, xi).

The three-part conceptual framework works well, and the characterisation of the research and management emphases of the periods it creates is convincing. The first section introduces the development of the protectionist ethos and policies in historical national, and international, context. We learn the surprising fact that Natal National Park (later Royal Natal National Park) was in fact the country's first (1908), though the literature always maintains it was Kruger National Park (1926). Royal Natal has always fulfilled national parks criteria, in a way Kruger didn't initially, in being open to the public and intended for study (primarily of the flora). Kruger wins on the technicality that it was the first established under National Parks Act 56 of 1926, and the first under the control of the new National Parks Board (NPB).

In terms of science, this was the period of the skilled (and often military) amateur, most notably Col. Stevenson-Hamilton, first warden of Kruger and a fine naturalist. On the whole, game wardens were employed to protect the wildlife, not study it. This section includes a useful overview of the development of life sciences in South African universities in this period. From 1948, Apartheid

shaped the direction of the NPB, and park scientists turned inward, with research becoming 'derivative and descriptive rather than innovative' (p.122). Although Kruger's first biologist was appointed in 1950, scientists were not supported by park management until Brynard was appointed warden in 1961.

Part 2 includes background on political developments in the country and how it shaped the environmental sciences in South Africa. There is a useful survey of the implications, and the links which persisted, with international institutions and initiatives like the FAO, UNESCO, ICSU, WWF, the IUCN and the International Biological Programme and SCOPE initiative on problems of the environment. While the 1960s and 70s brought political isolation (if not always scientific), these were prosperous times for South Africa, and the government funded universities and conservation studies benefited. The research emphasis shifted from botany to zoology, and particularly studies of larger mammals.

Until 1962, there was no mandate for the NPB to study nature in South Africa's national parks. Interestingly, it was the opposition MP Douglas Mitchell, drawing on his experience with the Natal Parks Board that got the word 'study' inserted into the revised legislation. This section outlines key international developments in ecology ('ecology' became a buzzword in South African environmental studies in the 1970s), and shows how they were developed in some quarters within the country, but largely resisted in practice by the NPB. Their continued focus on data gathering and descriptive studies was criticised as early 1977 by Brian Huntley.

The contrast between NPB science and contemporary developments in conservation biology is highlighted by some useful comparisons with developments in Switzerland and the USA. Innovative ecological research was occurring within South Africa, particularly through the Cooperative Scientific Programmes, but participation by the NPB was limited. The key NPB personalities in this period were Salomon Joubert and U. de V. ('Tol') Pienaar, and Carruthers provides details of their influence and contributions, along with other NPB scientists.

Part 2 includes an interesting section on fire ecology and management. Readers of this journal might have liked to have learned more about the importance of grassland research coming out of the 'Natal School' at UKZN during this period, which influenced the University of Pretoria academics so influential in Kruger, and informed Winston Trollope's thinking when he was invited to start working in Kruger. Other key research areas covered in this section include invasive species management, land use planning, climate, soil science, and histories of human occupation of the parks. A chapter is dedicated to zoology, with sections on translocation and modelling population dynamics, and culling. This last was a major issue, first discussed in Kruger in 1959, and Carruthers shows nicely how the ramifications of culling brought out the weaknesses in national parks science.

Part 3 shows how momentous political change in the country opened national parks science up to international influences and public accountability, introducing an era of increasingly sophisticated research characterised by the 3 Is: integration, innovation and internationalisation. The international context for conservation in the post-Bruntland era is outlined, its political and social emphasis summed up by the 'Benefits beyond Boundaries' theme of the 2003 World Parks Congress hosted in Durban.

National parks faced a twin threat in the New South Africa: of being abolished as socially unjust creations of the former regime and resources of land and natural resources for redistribution to the formerly dispossessed; and of competition from new private game reserves and lodges providing superior visitor facilities. In response, the NPB reinvented itself under the leadership of Robbie Robinson, an English-speaking non-savannah scientist who managed to reorient the NPB away from the dominance of Kruger. English became the language of formal communications and the NPB was renamed South African National Parks (SANParks) in 1996. Richard Bell's review of SANParks master plan with respect to Scientific Services (1995), which Robinson initiated, was influential in reframing the organisation's approach. Robinson was succeeded by Mavuso Msimang (1996), and he in turn by David Mabunda in 2004.

Political change also ushered in a shift in the guiding scientific paradigm of the park. A less hierarchical, more innovative research culture emerged, characterised by greater reflexivity and humility, encouraged in part by the need to reach out for international intellectual and financial support. Funding provided by the Andrew W. Mellon Foundation was crucial here, its leader William Robertson encouraging scientific project partnerships between U.S. and South African universities and SANParks in Kruger. The journal *Koedoe* took on an expert editorial advisory board and instituted peer review of its articles. New conservation sciences like invasion biology were prioritised, and new technologies like LiDAR were adopted.

Carruthers foregrounds Resilience Theory as the conceptual framework which displaced outdated notions of pristine nature in balance, and nature as a fragile system at risk of collapse from human impacts. Certainly, this has proved an influential way of thinking differently about natural systems, and has been particularly influential in Kruger through the influence of Harry Biggs and Kevin Rogers. Not all scientists working in the Park, or in conservation internationally, would see this as a dominant emerging paradigm however.

Another key development in this period was a move away from a 'command and control' approach to management, towards what SANParks call Strategic Adaptive Management. This recognises the limits of knowledge and advocates humility over the extent to which control can or should be exercised over natural systems. It also encourages wider participation in developing and prioritising management objectives. Harry Biggs and Hector Magome were key figures in SANParks in this period. The section includes discussions of Kruger, of river research, invasion biology, fire science, water and elephant management, as well as the somewhat neglected cultural, historical and archaeological dimensions of conservation science. The final chapter of Part 3 considers 'other national parks,' confirming the predominance of Kruger, but providing useful discussions of these parks nevertheless.

Carruthers has collated an enormously valuable resource for future historians and conservation scientists. Her archival work is second to none and students and scholars will do well to look first to this book when embarking on research on the history of conservation in South Africa. Despite the boundaries of its inquiry, and the inevitable focus on Kruger, Carruthers ranges widely over the intellectual and institutional terrain of conservation in South Africa.

In her concluding analysis, Carruthers notes the persisting lack of a long-term, durable environmental research strategy within SANParks, and the country as a whole. She considers South Africa's National Environmental Management: Protected Areas Act (2003), and suspects that the mandate of conservation science has reverted to 'preserve' and 'protect,' with only a vague obligation to do scientific research. The country has no national advisory body tasked with integrating conservation science and research.

Carruthers ends with a plea that we do 'not view conservation science as separate from the history of a country or from the international context, which have been the predominant shapers of ideas, and which have enabled opportunities and possibilities as well as set limitations' (466). This book certainly overturns oversimplified accounts of the country's conservation history, provides rich resources for local and overseas scholars interested in the history of conservation science in the country, and encourages South African researchers and practitioners to see their history and efforts in international and historical context.