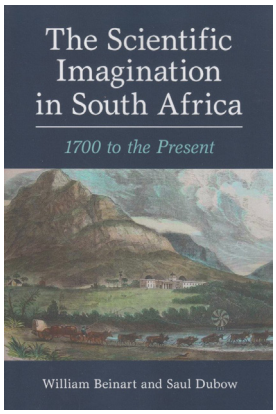
BOOK TITLE:
The scientific imagination in South Africa. 1700 to the present



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ISBN:
9781108945578 (ebook, 418 pp, USD27.60)
9781108940085 (softcover, 418 pp, USD33.98)
9781108837088 (hardcover, 418 pp, USD83.49)

PUBLISHER:
Cambridge University Press, Cambridge, UK

PUBLISHED:
2021

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HOW TO CITE:
Gevers W. A well-told history of science in South Africa. S Afr J Sci. 2021;117(9/10), Art. #11967. https://doi.org/10.17159/sajs.2021/11967

ARTICLE INCLUDES:
☐ Peer review
☐ Supplementary material

PUBLISHED:
29 September 2021

A well-told history of science in South Africa

It is wonderful when the mere title of a book already contains the ingredients for an interesting debate in one's mind. Is the specifically scientific imagination different from other forms of imagination? Can 'science' be done without imagination? Realising this, the authors of this extremely readable and informative book have discussed their choice of title and focus on page 3, starting with a definition of 'scientific imagination' as 'an expression of human curiosity, ingenuity, and the ability to make unlikely connections'. They go on to consider the role of the imagination in the inductive scientific method as commonly understood and practised, and the question as to how inventions and innovation come about. They admit to being particularly interested in the 'imbrication' of science with the shaping of society in economic and political terms. (Later in the book, one encounters something they call an 'imaginary'– a widely shared rather than individual imagining of a possible future brought about by scientific and technological progress.)

William Beinart and Saul Dubow are South African expatriates working at Oxford and Cambridge Universities, respectively; they have both made splendid careers in the UK while retaining firm intellectual-academic connections with South Africa. Their new book is a pleasure to read; it is well paced and organised, and highly informative despite covering a good deal of ground. The chapters are imaginatively named and framed in their main contexts. It is a *tour de force* of accessible and meaningful history. For South Africans who believe that the past is a reasonable guide to the future, I would say it is essential reading. (This is not to say that there are not any gaps – see below – or that the index is not a little annoyingly incomplete.)

The book begins with an introductory chapter that explores some of the considerations that have guided the authors in their choice of material and emphasis. They begin inter alia with the core problem in a colonised country of how indigenous or vernacular (orally) transmitted knowledge can approximate to systematic (published) science. They argue that because 'all knowledge organises or systematises information or observations', there are 'no hard and fast boundaries between science and indigenous or local knowledge'. Yet they write largely about 'published or written ideas by those with specialist training who were familiar with disciplinary developments and international thought'. From the point of view of practical history-writing about the 'dead' past, that is understandable, if one relies only on evidence available about vernacular or local knowledge in accounts left by scientifically informed observers (one omission in the book is the extensive work done by South African archaeologists on the origin and diffusion of indigenous metallurgy and farming). Beinart and Dubow make a point of including such descriptions, although few of the writers concerned were curious as to how transmission/dissemination and replication of knowledgeable practice took place, especially that concerning plant materials, or how much of the placebo effect underlay the apparent success of observed treatments and other techniques. It is gratifying that trained scientists such as Peter Kolb and Anders Sparrman were notably more sympathetic towards the knowledge spheres of the indigenes they encountered than were persons untrained in objective observation and analysis. It becomes clear from the book that the human mind adapts to situation and context in a remarkable variety of ways, and that individual and group survival requires the exercise of the brain in what may justifiably be called 'adaptive savantism', something which may even apply to the offshoots of mainstream Western science in a country at the margins like South Africa.

The authors are careful not to include excessive biographic detail but expand when key figures are described in their specific contexts. The 18th century field science 'scouts' who travelled extensively in Dutch-ruled South Africa and reported its wonders to an ever-more curious Europe are deservedly given good coverage, as are both the eminent visitors (John Herschel and Charles Darwin) and more settled notables of the British-ruled 19th century. The rise of colonial scientific institutions led to the kinds of 'imaginaries' in which shared aspirations were added to the individual efforts of a relatively small number of multi-talented locals such as Andrew Bain and William Atherstone who began to sow the seeds of later areas of major focus. The 'wake-up call' of the discoveries of massive sources of diamonds and gold from 1870 onwards were accompanied by science-based technological innovation in geology (prospecting) and mining, as well as agriculture. Sheep and ostrich farming were surprisingly significant in the latter regard, apart from the traditional pre-occupation with cattle. The authors do justice to the remarkable technical histories of both the diamond and gold mines, and the efforts by government scientists to control serious diseases of livestock, often in the face of resistance by both Boer and black farmers. Few things better illustrate the concept of 'scientific imagination' than the sustained work of Arnold Theiler in veterinary medicine and Hans Merensky in geological prospecting (the Wikipedia entry for the latter reads as follows: *He discovered the rich deposit of alluvial diamonds at Alexander Bay in Namaqualand, vast platinum and chrome reefs at Lydenburg, Rustenburg and Potgietersrus, phosphates and copper at Phalaborwa in the Transvaal lowveld, gold in the Free State, and the world's biggest chrome deposit at Jagdlust near Pietersburg.* Who could do more? How many South Africans know his name?). In the 20th century, figures such as Hendrik van der Bijl and Basil Schonland are deservedly highlighted, simultaneously world-class scientists and inspired institution builders, at the centre of the era called 'The Commonwealth of Knowledge 1930–1948', when Jan Smuts's far-sighted government laid many of the foundations of modern South Africa. The peculiar tendency of independent savantism in a country marginal to the scientific mainstream expressed itself in the globally prescient insights of Eugene Marais, Alex du Toit and Raymond Dart.

In the following period of Afrikaner hegemony and the intensification of apartheid, science and technology were selectively advanced to deal with defence and economic independence, with major developments in chemistry (SASOL, uranium enrichment) and applied nuclear physics. The authors are critical but fair in this section, recognising scientific achievements such as the leadership of yet another superb scientist-administrator, Meiring

Naude, and the invention of the internationally adopted tellurometer by Trevor Wadley and the Helikon vortex tube by Pierre Haarhoff, while deprecating the underlying political motives.

In the last chapter, the authors engage with the democratic 'New South Africa', post-1994. As always in reading a history, it is the present that finds the reader more active in 'comparing notes, as it were' on the lived experience. The authors address the issue of examining indigenous or 'local knowledge' in direct juxtaposition to conventional experimental science; they describe the onset and progression of the HIV epidemic and the denialist response and counter-response; they cover the considerable investment in astronomy and related 'big data'; and provide an excellent review of the work on human origins, both in its older palaeoanthropological and genetic aspects. What is almost completely missing, however, is any mention of the spectacular growth of high-level local expertise in the capacity to study infectious diseases such as HIV infection and TB, where South African groupings in a brace of research universities have earned the respect and support of major international funding organisations for the breadth and depth of their clinical and laboratory contributions. (This now applies also to the current COVID-19 pandemic.) The authors also fall short in their account of the establishment and significant activity of the Academy of Science of South Africa, misattributing the former, short-changing the latter, and failing to see the profound significance of forming a new science academy for all South African scholars, generating evidence-based advice for the whole nation, and embracing consiliently all disciplines which enquire open-endedly after elusive truths by evidence and argument.

Such quibbles do not significantly diminish the value of this otherwise excellent and extremely timely book by two highly seasoned historians who deserve the thanks of all who value the 'scientific imagination', especially here in South Africa but also elsewhere.