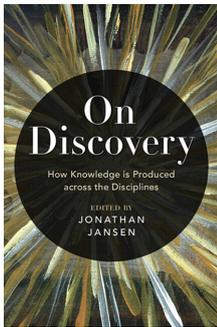




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On Discovery: How Knowledge is Produced across the Disciplines



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Comparing like and unlike: Discovery through knowledgeable commitment in every discipline

I greatly enjoyed reading all the chapters of this book, and suspect that many other readers will do the same. Jansen has chosen as a representative sample a relatively self-contained group of South African researchers who could be said to be internationally somewhat 'marginalised' or 'provincial' but are remarkably competitive all the same. They are also settled in the complex context of their home country, making it possible to draw some additional conclusions about positionality in knowledge discovery. Each of the 22 authors has been asked to write their account in the first person, bringing focused subjectivity to bear on the intended objectivity of the topic of how new knowledge is generated in a large number of sometimes sharply contrasting disciplines.

Traditional scholarly disciplines have in recent times become conceptual and methodological silos as their individual knowledge domains have vastly expanded and even fragmented internally to create sub-silos; the minds of their practitioners appear to have become so 'structured' that perspectives are shuttered and restricted to one way of looking at the world. Advocates of 'consilience' (all disciplines are dealing with but one reality!) and of multi-, trans- and cross-disciplinarity, as well as 'Mode 2 research', have an uphill battle against the entropic forces that drive specialisation. Readers of this book (and I hope there will be many) emerging from their own thought-worlds will at times be impressed, amazed, puzzled or horrified as they encounter the pre-occupations of their fellow researchers in other disciplines. As they all have in common a basic degree of common sense and intelligence, they may consider the questions to which answers are sought as intriguing, ill-conceived, trivial or even pointless. Alternatively, they may believe that they are able to devise a different way to reach the answer to a question being addressed in a particular way in a different discipline. As just an example, they may be unhappy when a distinguished moral philosopher (Thaddeus Metz) seeks to determine "the meaning of (human) life" when over 8 billion people on earth each have their own unascertained view on the matter and the words 'meaning' and 'life' are undefined to anyone's satisfaction in any case. Yet the scholar in question, through further reading and reflection, has been able to use the topic as a starting point for addressing, in a unique manner, important moral issues in multicultural human societies.

Some of the chapters (for example those of the surgeon Elmi Muller and the astronomer Justin Jonas) illustrate how technical breakthroughs (some 'in the hands' and some in high technology) are also 'new knowledge'. Scrutiny of lists of Nobel Prizes will bear this out as well: a new technique can open the floodgates of the elaboration of expanded knowledge about natural processes or diseases. A good example might be drawn from Jansen's citation of Frederic Holmes's brilliant description of Sir Hans Krebs's discovery of his eponymous metabolic cycle in the 1930s.² Major advances in techniques have confirmed the cycle's basic features but have permitted a massive elaboration of its workings in living cells in different situations and organisms, not the least being that the cycle often goes in the reverse direction when the emphasis is on growth and not on energy generation.³

Jansen's concluding chapter is a masterly synthesis, drawing on all 22 chapters (including his own) to sort the main issues under appropriate headings, some of them ingenious neologisms. These sometimes overlap but are helpful ways of putting together the bigger picture of how new knowledge is sought and found in different disciplines. They are, respectively, the "classical model of scientific discovery" (but see below), differentiability, positionality, serendipity, non-linearity, indeterminacy, technicity, foundationality and pragmatism. This analysis seems to be the last word on the book topic, but two quibbles may be worth mentioning. Firstly, one essential heading is missing – disruptiveness – where one person or group doggedly bucks prevailing ideas to establish a new paradigmatic notion that will enable previously unsolved issues to be addressed (one author – Thulani Makhalanyane – discusses this issue briefly in his chapter.) Secondly, Jansen's use of a clinical trial to exemplify the "classical model of scientific discovery" is not fully appropriate as it covers only those domains of discovery that deal with populations of similar but variably differing organisms. Much "classical" research, by contrast, deals with finding out how a particular process in nature works or, in the applied version, can be made to work reproducibly and efficiently to meet needs of many kinds. These discoveries are not so easily falsified by subsequent work in the Popperian or Kuhnian senses, but readily extended and elaborated upon to build a reliable edifice of knowledge.

It is noteworthy that Jansen, the immediate past president of the Academy of Science of South Africa, has overseen the conceptualisation and realisation of this book, with its remarkable assembly of contrasting chapters offering a genuine insight into the practice of science (in the broad sense of the word) in South Africa at the present time. This follows on the Academy's production of *The State of Science in South Africa* in 2009, which includes comprehensive descriptions of the principal pre-occupations in the country in each of the major disciplines⁴, and the publication of *Legends of South African Science* in 2017, which provides vignettes of scholars who have received certain prestigious awards⁵. The three books complement each other admirably, each bringing out a different important aspect of the country's overall knowledge-generating system.

I strongly recommend this very readable and significant book to all who are willing to widen their view, *consiliently*, to discover the world and its inhabitants and constituents in all their glory and complexity. They will agree with Jansen that the intrinsic value of research, grounded in deep knowledge and reflection and driven by curiosity, is its own reward irrespective of discipline.

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