Book Review

Eric Scerri: *A Tale of Seven Scientists and a New Philosophy of Science*, Oxford: Oxford University Press, 2016, xxxiv + 228 pp. [ISBN: 978-0-19-023299-3]

by Thomas Vogt

Eric Scerri's new book makes strong claims that science proceeds in an exclusively evolutionary manner and that ideas of lesser known scientist and sometimes outsiders contribute to scientific knowledge and progress. Describing the contributions of seven scientists working at the beginning of the 20th century on problems related to atomic electron configurations leads him to reject both the notion of scientific revolutions as advocated by Thomas Kuhn (1962) and the importance if "some particular scientist was right or wrong. What really matters is that science, in the form of the scientific community makes progress as a whole" (p. 22). Part of his rejection of the concept of scientific revolutions is because "viewing theory change as revolutionary may mask the essential biological-like growth of sciences that I am defending in this book" (p. 196). The fact that biological evolution is described as a punctuated equilibrium by S.J. Gould (2007) is mentioned only once, in passing, near the end of the book. This could be the basis of a serious discussion as it could be the basis of an evolutionary epistemology which together with Kuhn's theory of the dynamics of disciplinary and sub-disciplinary changes can recognize the contributions of 'scientific foot soldiers' and famous scientists as well as accept evolutionary and revolutionary scientific changes.

It appears that Scerri struggles with some of his propositions as he tells us that "he [Janet] quickly arrived at a revolutionary view of the periodic system" (p. 152) or that "It might therefore not be an exaggeration to suggest that Main Smith took the fight to the physicist and won it – barring what I say about winners and losers in science, of course" (p. 104).

Proposing a *new* philosophy of science calls for linguistic precision and consistency, and not defining the continuously used adjective 'organic' does not help clarify the argument. Scerri relentlessly writes about "the organic manner in which sciences evolves", "the essentially organic nature of scientific progress" and that "science takes place in a more organic and interconnected way than is generally believed" (pp. 171), without ever laying the

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foundation of his 'organic epistemology'. The seven historical examples are taken from the early 20th century and from a scientific community working at the interface of chemistry and physics on atomic electron configurations. However, Scerri's claims are never confined to this period or academic subdiscipline.

The assertion that it does not matter whether a particular scientist was right or wrong is very unsettling in times where sound scientific concepts such as evolution and climate change are rejected as 'just another theory'. This paints Scerri's proposed new philosophy of science as a 'running blog' where 'anything goes' and scientific contributions are included regardless of being unsubstantiated, wrong, or part of the current paradigm.

The proposition to stop depicting science exclusively as 'heroic efforts' of a few famous scientists is the one I agree with the most. The complex history of scientific discoveries reveals many twists and turns which are often only appreciated by scientists working in the field at that particular time. Detailed historical facts bear witness to the importance of intuition, inspiration, chance, experimental mistakes, wrong turns, and dead ends. However, there are at least two important factors that deserve more study of how history is reduced to heroic efforts of a few famous scientists. One is the impact of disciplinary teaching which necessarily omits the twisted historical paths and presents a 'sanitized' version that cares very little about wrong theories, despite some of the useful and didactic aspects they might have. Another aspect, mentioned by Scerri, is that nationalistic, societal, and political pressures have influenced the histories of scientific discoveries and in some cases promoted wrong ideas such as Lyssenko's theories of environmentally acquired inheritance. More detailed historical studies will reveal the important contributions of 'scientific foot soldiers' and might be important input for funding agencies as both historical recognition and funding are too strong tilted towards scientists with strong name recognition.

I disagree with Scerri's claim that there are no scientific revolutions and that they mask the importance of 'scientific foot soldiers'. As a matter of fact one of the discussed scientists, Antonius van den Broek, played an important role in the scientific revolution, which radically changed the definition of a chemical element being based on atomic weight to being distinguished by its nuclear charge. The resolution of this 'isotope crisis' during the first 25 years of the 20th century had all the scientific, historical, and political complexities of a scientific revolution and is described in detail by Kragh (2000). At the end of this revolution a new definition of the primary building blocks of chemistry had emerged and two samples of the same element could now have different atomic weights, contradicting its earlier definition. After this scientific revolution chemists never saw Nature at the microphysical level as before. When asked if we can ever understand quantum mechanics, Niels Bohr

suggested yes but this understanding would also change what we call understanding – this is a good definition for a scientific revolution.

While I disagree with some of the strong claims made by Scerri, I enjoyed reading the historical details of these 'marginal scientists' as I have enjoyed reading all his other books. However, a more historically limited and disciplinarily focused contextualization of these seven scientists does not mean that their scientific impact can only be acknowledged by rejecting Kuhn's concept of scientific revolutions.

References

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