

## Book Review

**Karine Chemla and Evelyn Fox Keller: *Cultures without Culturalism: The Making of Scientific Knowledge*. Duke University Press, Durham 2017, 424 pp., \$29.95, ISBN: 9780822363729**

Alfred Freeborn<sup>1</sup>

### The Cultural Ambivalence of Science Studies

In the closing pages of Evelyn Fox Keller's *Making Sense of Life* (2002), the renowned feminist science studies scholar argued that the modern sciences lack any foundational unity, but rather are built upon the 'disunity of human interests' and marked by our inherently limited cognitive capacities to model and explain the world (2002, 301). In her latest work, a collection co-edited with Karine Chemla, Fox Keller argues in the opposite direction: science may be driven by competing intellects of limited capacities, but through the forging of cultures of scientific practice the sciences produce consensus and expert knowledge. The central question of this new collection, *Cultures without Culturalism: The Making of Scientific Knowledge* (2017) is how these cultures are made and how they should be studied.

The collection's diverse case studies, which range over two-thousand years of 'making scientific knowledge', showcases an impressive breadth of scholarship, all of which relates to a convincing if often ambivalent claim that scientific cultures emerge directly from scientific practices and are fundamentally dynamic and open. The book offers both a positive and negative thesis. While the positive thesis of the collection remains provisional, roughly that culture is an epiphenomenon of practice, what unites the chapters is their collective rejection of 'culturalism', or as it is elsewhere called, 'cultural essentialism'.

In the introduction, the editors cite a 2009 article by Jens-Martin Eriksen and Frederik Stjernfelt, as a source for the term "culturalism" (2009, 23). Their article, 'Culturalism: Culture as Political Ideology', rejected culturalism as the erroneous 'idea that individuals are determined by their culture [and] that these cultures form closed, organic wholes.' Keller and Chemla similarly resist treating culture as closed and organic, but they do so in the context of the history and philosophy of science. They argue that scientific cultures are real – they capture the sameness and difference of scientific practices – but they are continuously growing, shifting and reforming. When studying scientific cultures, the science studies scholar must distinguish between actors' categories and analyst evaluations, and remain vigilant to culturalist attempts to misrepresent the plurality of scientific cultures.

Against this background, this collection aims to do two things: first, it intends to showcase the reality of the problem of culturalism in science studies, and, second, it aims to recover a rubric for the proper use of 'cultures' as an analytical term. The volume also critically addresses fundamental topics in the study of science, such as style, concept, cognition, and practice. The book is divided into four parts – I. *Stating the Problem*, II. *Distinguishing the Many Dimensions of Encultured Practice*; and III. *The Making of Scientific Cultures*; IV. *What is at Stake?* Sections I and II address the de-naturalizing of cultures as political discourses, and sections III and IV present case studies that directly

---

<sup>1</sup> Alfred Freeborn, Department of History, Humboldt-Universität zu Berlin, Unter den Linden 6, 10099 Berlin.

pursue scientific cultures *in situ*. The movement from political discourses to source analysis is not smooth. Each chapter introduces new connections and complexifies old ones. For this reason, rather than to stick to this structure religiously, I will attempt to draw together the most important commonalities between chapters, rather than emphasize their differences.

## I

In his chapter (I, ch. 1) on the analysis of behaviour in financial markets Donald Mackenzie argues that the risks taken by investment banks (based in NYC and London), which contributed to the credit crisis that began in June 2007, were due to a difference in cultures of monetary evaluation. While not explicitly addressing the concept of culture for the philosophy of science, Mackenzie proposes a general model of culture as ‘clusters of practices’. For Mackenzie, culture is important to the history and philosophy of science because it is an actor’s category that moves between the academy and everyday life: bankers observe their own cultural clashes.

In Kenji Ito’s chapter (I, ch. 2) on the different histories of physics in modern Japan, he first reviews the dangers of using ‘Japaneseness’ as an *explanans* for the activity of physicists and then offers an alternative method for assessing how ‘sameness’ across scientific practices conditions the transmission of scientific knowledge. He honestly reflects on his earlier work on the reception of Feynman diagrams in Japan, suggesting he over-emphasized the problems these posed for Japanese physicists. Rather, by paying attention to the existence of similar graphical practices in Japan before the arrival of Feynman diagrams historians can seek to explain the achievement of sameness. In closing, Ito offers the analogy of resonance in physics to describe the various possibilities for achieving sameness: resonance depends not only on the source, but also on the properties of the receiver. Ito reminds us that what appears to be imitation, can also be seen as creation at a distance.

Following on the discussion of national discourses of culturalism, Guillaume Lachenal’s chapter (I, ch. 3) tracks an (unresolved) controversy (2001-2011) between a Cameroonian medical professor, Victor Ngu, and his African, American and French colleagues over the development of an AIDs vaccine. This is accompanied by an analysis of the entanglement of Ngu’s fame, his theories and practices in discourses of diasporic ‘Afrocentrism’, Cameroonian ‘discouragement’ and entrepreneurial transnational biomedicine. Lachenal expertly positions himself between his actors to portray both how the denigration and mystery of Ngu’s vaccine reflects both substantive shifts in contemporary global biomedicine and the pragmatic manipulation of Ngu’s work in culturalist discourses. Most importantly, Lachenal explicitly acknowledges the academic’s potential to “culturalize culturalism” (72) by giving actors’ claims to cultural difference an explanatory role in the making of scientific knowledge. In contradistinction, he highlights rightly how such controversies have sufficient equivalents in Western contexts. For Lachenal, ‘culture’ is always performative.

In concluding the first section, Evelyn Fox-Keller (I, ch. 4) presents some reflections on essentialism, American feminism(s) and science studies. For Keller, the key term ‘cultural essentialism’ emerged out of American identity politics in the 1980s. Feminist theory played a large role in criticizing essentialism (the universality of ‘man’), but also in reproducing essentialism elsewhere (the universal ‘woman’). Keller compares this logic with the fate of science studies: the attempts to dismantle scientific universalism, such as Ian Hacking’s ‘styles of reason’, and Keller’s own ‘epistemological cultures’, inevitably emphasized certain differences and ignored others. As she clearly articulates, the issue is that drawing distinctions at one level, say between the epistemological assumptions of biologists, inevitably suppresses difference at another level, for example, their technical skill or writing

style. Therefore, rather than seeking a final analytical level, Keller seeks to give legitimacy to the diversity of levels which accompany scientific practice. On the question of what science *is*, Keller offers two mutually compatible answers: one either acknowledges the ‘peculiar culture of truth’, described by Hans-Jörg Rheinberger citing Gaston Bachelard, with its internally diverse ‘cantons’, or one takes a more pragmatic shift towards a “third wave of science studies”, in which a strategic allegiance with expert knowledge is an essential part of communicating the problems of global climate change.

## II

While the preceding chapters all remained within the second half of the twentieth-century, the next two sections (III & IV) span from ancient China to twenty-first-century biomedical engineering. In terms of content, there are roughly three clear groupings: those that focus on the social sciences, or at least science *in* modern society (Morgan, Rosental, Fan), those on the biological sciences (Nersessian, Rheinberger), and those on mathematics (Rabouin, Erhardt, Chemla). The two remaining chapters by Koen Vermeir (III, ch. 9) and Bruno Belhoste (III, ch. 10) focus on Jesuit pedagogical reform and Georges Cuvier’s creation of a ‘working space’ for the incipient discipline of paleontology, respectively. Vermeir describes a historical genealogy of the concept ‘culture’ rooted in the practice of pedagogy – culture is a way of teaching. Both of these chapters show how individuals were active in forming new regimes of practice and training.

Mary Morgan’s chapter (II, ch. 6) on the construction of the ‘glass ceiling’ – the phenomenon of gender biases capping female career prospects – as an object of study by journalists and social scientists in the 1980s gets to the heart of the question over cultures and norms. For Morgan, a culture is constituted by both facts and values: the labelling and naming of a ‘glass ceiling’, its codification, critique and adjustment, is a process whereby those affected and those responsible both came to recognise a common phenomenon and could therefore set about changing it. Fa-ti Fan’s (III, Ch. 12) study of large-scale earthquake monitoring by local residents in Mao’s China assumes the necessary scale to reveal how seismological observation, combined with Maoist politics of mass participation, contributed to a specific Chinese configuration of scientific practice. Yet the particularities of the context of practice tell us more than any recourse to culturalist notions of Chinese science. Morgan and Fan both speak to the earlier chapters by showing how the politics of culture can be separated from scientific practice, but how nonetheless the latter remains embedded with historically specific facts and values of a given society.

The next cluster of chapters addresses the practices of the biological sciences. Nancy J. Nersessian’s chapter (II, ch. 5) presents the results of an ethnographic study of ‘distributed cognition’ within two biomedical engineering labs in the USA, one focused on tissue engineering, the other on neural engineering. She discusses the common cultures of these labs of designing experiments using physical simulation models. For both labs, despite the diversity of experimental design outcomes, the norms and values of engineering dominated: hybrid in-vitro models simulate in-vivo phenomena and function as devices that embody the epistemic framework of the engineering design. Then, culture shapes cognitive processes through the construction of these artefactual devices.

Nersessian’s results combine nicely with Hans-Jörg Rheinberger’s chapter (III, ch. 11) on cultures of experimentation, which explicitly articulates the material component of culture in scientific practice, as opposed to its more familiar symbolic character. Rheinberger’s contribution is a sequel to an earlier article (see Rheinberger 2015). Whereas the first paper sketched the unique temporal dynamics of modern systems of experimentation within a predominantly theoretical framework, this one fleshes out the ‘meso-level’ at which

the material components of different experimental systems meet to form a new dynamic topology of experimental culture, which often redraws traditional disciplinary boundaries. To recap: the engine of the modern empirical sciences is the experiment. . What bind these experimental engines into a common culture are points of material interaction. The current chapter outlines the in-vitro ('test tube culture') experimental culture of biochemistry, in which the attempt to isolate and study biological processes outside the organism took various concrete forms, from Otto Warburg's test tube experiments on cell oxidation to the radioactive labelling of target molecules in biological samples mid-century, which aided the emergence of molecular biology after WWII.

The second half of the chapter shifts into a more reflective and theoretical register. Rheinberger outlines three conditions for identifying an experimental culture: an overlap in research technologies, a flow of matter among systems, and a circulation of scientists. The epicentre remains in the epistemic objects churned out by experimental systems, while cultures denote shared ways of dealing with these objects. Moreover, Rheinberger nicely articulates the shift from a dichotomy *between* nature and culture, by way of Mannheim and Bourdieu, to a descriptive culture concept that straddles both, at once historical and material. Returning once more to Bachelard, he re-emphasizes the importance of regionalization within the scientific landscape by which specification or specialization facilitates modification. Cultures of experimentation give shape to the periodization of the modern empirical sciences.

Finally, the largest cluster of contributions addresses the history of mathematics. Karine Chemla's chapter (IV, ch. 14) is built on slow and careful source commentary, but manages to simultaneously present an excellent argument for both a methodological and theoretical approach to the history of mathematics. She uses close readings to disentangle how readers were actually supposed to carry out operations in the texts, and how this characterised what was meant by the concept of equation. She traces a shift in the meaning of the concept of equation from one grounded in the use of a computational tool with a surface and rods, to one guided more by graphic representations placed in the texts themselves. Reading this next to David Rabouin's chapter on styles in mathematical practice (II, ch. 8), we can see how the history of mathematics offers unique insights into how scientific cognition is embedded in material practices. Moreover, they show how material continuities and conceptual discontinuities in scientific practices can be traced through careful source analysis. Rabouin argues that the style of writing in mathematics, such as Cartesian geometry, Euclidean geometry or Leibnizean calculus, did not entail specific ontologies or theoretical commitments, but rather enabled groups of practitioners to address these issues as shared problems.

This is exactly what Caroline Erhardt's chapter on the reception of Galois theory (IV, ch. 13) addresses. It shows how the status of a mathematical theory in its final and codified definition, is formed through a struggle amongst competing interpretations of shared practices of writing. Moreover, her paper powerfully reminds us of how individuals do not produce theories, and that scientific cultures are communal, if they are anything. However, we might want to emphasize the extent to which this picture is specific to the history of mathematics: these case studies on mathematical practices have sufficiently abstracted parts (articulated in numerical or algebraic signs), so that their histories can distinguish between style, practice, and conceptual elements. In the case of the social sciences, the 'concepts' of practice cannot be formalised this way, in fact, as Mary Morgan shows (and in an indirect way, so does Mackenzie) they are partly constituted by a resistance to formalisation (e.g. they speak to personal experience).

In summary, the chapters discussed offer exciting visions of cultures of experimentation in the biological sciences and of material cultures of writing in the

mathematical sciences. These visions show how practices create sameness without determining ontologies or concepts but rather enabling their emergence and contestation.

### III

The two goals of this collection, to showcase the problem of culturalism and forge new tools for studying cultures of scientific practice, are admirable goals and on the whole they are well met by the individual studies. Yet the connection between the two goals is often strained. As Keller notes in her chapter, the diversity of scientific practices treated in the collection ultimately exploded “the original metaphor of ‘culture’” (109) with which the project began. Moreover, it is not clear that culturalism as a political ideology, as Eriksen and Stjernfelt proposed, is the same thing as culturalism as a *scientific* ideology. Georges Canguilhem famously defined a scientific ideology as those ‘explanatory systems that stray beyond their own borrowed norms of scientificity’ which always precede the institution of science proper (1988, 38). While the political ideology of culturalism can be removed from explanatory accounts of scientific practice, this tells us relatively little about how culturalism functions as a scientific ideology – rather, this is a question which perhaps understandably remains to be determined in the context of each case study. The move from a critique of culturalism to a new theory of scientific cultures remains incomplete.

This move encounters problems that extend beyond science studies and relates more generally to whether the notion of culture is to be applied to the observation of cultural difference itself: as Lachenal succinctly puts it, ‘culturalizing culturalism’. While this collection fights against such a move, the diversity of its contributions suggests we do not have a unifying conceptuality that can replace culture, or now ‘multiculturalism’, as the catch-all term for describing a political vision of difference in society. The cultural ambivalence of science studies, caught between cultural essentialism and multiculturalism, is certainly not comfortable. However, it signals a recognition that the target of science studies is not just, as Evelyn Fox Keller writes, ‘the intellectual hegemony of universalism’ (109) but the self-defeating scepticism of some of its own tribe. This collection points to a future science studies that uses the values of science and expertise to unite understandings of cultural difference, for although “cultures may be separated by time and space [...] their worlds belong to a single planet – indeed, to a planet that grows smaller by the day” (112).

### References

- Georges Canguilhem (1988), *Ideology and Rationality in the History of Life Sciences*, trans. Arthur Goldhammer, Cambridge: MIT Press.
- Keller, E.F (2002). *Making Sense of Life: Explaining Biological Development with Models, Metaphors and Machines*, Cambridge: Harvard University Press.
- Eriksen, J.-M., and Stjernfelt, F. (2009). “Culturalism: Culture as Political Ideology.” *Eurozine*, January 9. <http://www.eurozine.com/articles/2009-01-09-eriksenstjernfelt-en.html>.
- Rheinberger, H.-J. (2015). “Difference Machines: Time in Experimental Systems.” *Configurations* 23(2): 165–176.

Similar books and articles. Karine Chemla and Evelyn Fox Keller: Cultures Without Culturalism: The Making of Scientific Knowledge. Alfred Freeborn - 2019 - Journal for General Philosophy of Science / Zeitschrift für Allgemeine Wissenschaftstheorie 50 (4):587-592. Evelyn Fox Keller, The Mirage of a Space Between Nature and Nurture. Durham and London: Duke University Press, 2010. Pp. Viii+107. ISBN 978-0-8223-4731-6. £12.99. Karine Chemla, The History of Mathematical Proof in Ancient Traditions. Cambridge: Cambridge University Press, 2012. Pp. Xv+596. ISBN 978-1-1-7-01221-9. £100.00. [REVIEW] Serafina Cuomo - 2013 - British Journal for the History of Science 46 (3):517-519. Lyn Schumaker. Cultures without Culturalism book. Read reviews from world's largest community for readers. Cultural accounts of scientific ideas and practices have increased. Start by marking Cultures without Culturalism: The Making of Scientific Knowledge as Want to Read: Want to Read saving! Want to Read. Currently Reading. Read. Other editions. Enlarge cover. Author: Karine Chemla and Evelyn Fox Keller, eds. Title: Cultures without Culturalism: The Making of Scientific Knowledge Publisher: Duke University Press Books Publication Date: 4/7/2017 ISBN: 9780822363729 Trade Paperback (English). Find in WorldCat - Find on Amazon.com. Manage this Post. Karine Chemla and Evelyn Fox Keller: Cultures Without Culturalism: The Making of Scientific Knowledge: Duke University Press, Durham, 2017, 424 pp, \$29.95, ISBN: 9780822363729. November 2018. Journal for General Philosophy of Science 50(2). Knowledge, especially religious and theological knowledge, was and still is an essential asset of distinguished types of people (e.g. the philosopher, the scientist, the presbyter): they all have been initiated to, and are able to recognize a specialised form of knowledge that is different from what lay persons possess. <https://content.sciendo.com/view/journals/ress/12/1/article-p158.xml>. View full-text. Article. The role of cultural knowledge in distorting recall for stories.