

Jon Agar*Science in the Twentieth Century and Beyond*

Cambridge: Polity Press, 2012, pp. 614

Massimo Mazzotti *University of California Berkeley*

Jon Agar's latest book is ambitious, thought provoking, and a veritable tour de force. For one thing, it far exceeds what is currently considered the standard scope for a study in the history of science. Since the felicitous interaction with science studies and the practice turn, historians of science have indeed tended to concentrate their attention on relatively narrow settings, steering away from grand narratives and great heroes. This move, among other things, facilitated the control of relevant parameters and the empirical reconstruction of scientific knowledge as the outcome of social processes. Hence the wealth of microhistorical narratives, and their paradigmatic status for the history of science of the last three decades. Well-crafted microhistories have certainly brought delight, but also raised some important issues. Has the field become too specialized and less open to interdisciplinary dialogue? Is the fragmentation of the historiographical landscape irreversible? Does it mean that we have lost the ability to discern and write about large-scale features of scientific life? For example: does it still make sense to talk about the "scientific revolution" as if it were some kind of unitary phenomenon? In short, historians of science have found themselves wrangling with a version of the micro-macro problem. We need to leave behind the comfort zone of small-scale case studies, some have argued, and search for larger patterns, especially if we want to open up conversations with emerging fields such as the history of capitalism and globalization.

Agar's book addresses the question head-on: how can one write about "science in the twentieth century and beyond" in our post-Kuhnian world? The logical structure of scientific theories has long lost its appeal as an analytic tool set, while narratives of major ruptures and revolutions have always been too otherworldly for historians. Steven Shapin offered an intriguing model of large-scale social constructivist narrative in his concise history of the scientific revolution, a book about something that, as he says, didn't quite happen – and yet is worth writing about. Shapin's anti-essentialist approach looks explicitly at microsociology (e.g., Barnesian performativity) for strategies to write about the changes in the way knowledge was produced and legitimated between the sixteenth and eighteenth centuries. Agar, by contrast, filters the rich social constructivist repertoire through the interpretive notion of "working worlds". Drawing on authors such as Thomas Hughes – who certainly did not shy away from tackling large-scale systems – Agar uses the notion of working worlds to refer to: "arenas of human projects that generate problems" (p. 3). These problems can hardly be solved directly but, once they are fully

articulated, they can be treated scientifically. That is to say, science can build simplified, abstract models that can be represented and manipulated through an array of techniques. The outcomes of these manipulations are possible solutions to the original problems. Such is the sophistication of the techniques involved that, in the course of this process, the very actors might become oblivious to the fact that the models and theories they are manipulating and deploying originated from concrete working worlds. This notion is thus designed to do some heavy lifting, including connecting the most esoteric theoretical knowledge to the material dimension of scientific practice. Yet Agar leaves his own articulation of social constructivism via working worlds rather open and flexible, more of a gesture in a certain direction than a fully developed analytic concept. Note, for example, how he does not elaborate it further in the concluding section.

The working worlds give Agar a handle on crafting a narrative of the history of twentieth-century science. He recognizes four partially overlapping working worlds that have dominated the century: the construction and maintenance of technological systems, the mobilization of fighting forces, civil administration, and the maintenance of the human body. The book, however, is not organized around a thematic structure, but follows a fairly traditional chronological one. The first part focuses on continuities and discontinuities between nineteenth- and twentieth-century science, focusing on the emergence of the new physics and the new life sciences. The laboratory is introduced as the distinctive site of these new sciences, while their practices are related to the modes of emerging mass production industry. Here Agar deals also with the new sciences of the self. In this case the relevant working world is the administration of institutions such as the asylum, the school, and the army. The second part of the book examines what we might call the co-production of science and warfare, a well-trodden area in the historiography of recent science. Agar discusses the effects of mass mobilization in the First World War, the American scientist-entrepreneurs of the interwar period, Weimar science and the Forman thesis, Nazi science, and science in the Soviet Union. This part ends with the dawn of a new generation of large-scale scientific instruments, especially in California. The third part is indeed devoted to Big Science, from its emergence and institutionalization during the Second World War to the ways in which it transformed the sciences during the Cold War period. Typical Cold War sciences such as electronic computing, cybernetics, particle physics, information theory, systems ecology, and molecular biology are examined in some detail. Finally, in part four, Agar focuses on "our world", identifying the forces and factors that are re-shaping scientific life at the opening of the twenty-first century. De-regulated markets, social movements, informatization processes, and the Internet are the main protagonists of these last few chapters. In his concluding remarks Agar fleshes out four main cross-cutting themes that run through the book: the extraordinary importance

of warfare, the rise of the United States as scientific superpower, the shift of funding from physics to biology in the second half of the century, and what Agar calls the “missing stories”. This term refers to the historiographical gaps that characterize the existing historiography, from the many connections that are not pursued, to the scientific ideas that are not mentioned because they died out quickly, to neglected analytical tools such as those that reveal the specificities of national research systems. But missing are also those stories that did not break through post-war regimes of secrecy, what Peter Galison called the: “classified universe...[which] very probably is much larger than...[the] unclassified one” (p. 508).

While always effective and highly readable, Agar’s narrative is, perhaps inevitably, uneven in terms of originality and depth. This has to do with expertise as well as the current status of historiography – which is very sketchy for some areas, e.g., the most recent trends. Agar is at his best when discussing post-war digital computing and the many paths not taken – which is hardly surprisingly given his own groundbreaking work in this area. But the specialist reader will find other insightful and though provoking sections, such as the discussion on science and social movements in the 1960s.

Agar has produced a truly impressive piece of scholarship, synthesizing a vast amount of secondary literature – this alone would make for an invaluable contribution to the history of science. But this book is not just interesting and useful as a survey. Most intriguing is the way it provokes the reader into reflecting on the possible modes and implications of scaling up the level of our analyses to identify larger patterns in contemporary scientific life.

References

Shapin, S. (1996) *The Scientific Revolution*, Chicago University Press, Chicago.

* * *

Felipe Ortega and Joaquín Rodríguez

El Potlatch Digital: Wikipedia y el Triunfo del Procomún y el Conocimiento Compartido [The Digital Potlatch: Wikipedia and the Triumph of Commons and Shared Knowledge]

Madrid: Ediciones Cátedra, 2011, pp. 212

Lucía Liste Muñoz Norwegian University of Science and Technology

Wikipedia is an unexpected miracle. The contemporary experiment of management by the common has turned into a very efficient and success-