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Andrew Ede and Lesley Cormack

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Canons to Right of Them, Canons to Left of Them

Andrew Ede and Lesley Cormack

University of Alberta

Can or should the history of science have a master narrative? This is a question that has exercised the minds of many historians since the Strong Programme questioned the deep connection between a sort of philosophical success story and the nitty-gritty of scientific work.[1] Since the 1970s, most of the historians of science have spent our time in the micro-historical trenches, creating thick descriptions, examining winners and losers, problematizing all the events and labels we had handed us by the likes of Herbert Butterfield, whose *Origins of Modern Science* presents an interesting contrast with his *Whig Interpretation of History* (but more of this later).[2] And yet, as we taught our survey courses, many of us ended up relying on Stephen Mason's *A History of the Sciences*, first published in 1953 and in print until the 1990s.[3] To some extent, Mason avoided the problem of the master narrative by having no narrative at all—the text was often encyclopaedic; but it was clear that the organizing principle was based on the triumph of modern physical science. Herein lies the paradox of history: master narratives may become Whiggish by making the past a stairway to the present, while micro-histories may turn the past into a series of random acts without meaning or larger significance. The discussion of the place of the "Big Picture" in the history of science reoccurs with a certain regularity, with the *British Journal for the History of Science* devoting a whole issue to the topic in 1993, and Robert E. Kohler raising the issue in *Isis* in 2005.[4]

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1. Jan Golinski, "Tall Tales and Short Stories: Narrating the History of Science," Lecture at the Fourth British-North American Joint Meeting of the BSHS, CSHPS, and HSS (St. Louis, August 2000), online <http://www.unh.edu/history/golinski/paper6.htm>.
2. Herbert Butterfield, *The Origins of Modern Science, 1300-1800* (London: Bell, 1949); Idem, *The Wig Interpretation of History* (London: Bell, 1951).
3. Stephen Finney Mason, *Main Currents of Scientific Thought: A History of the Sciences* (New York: Abelard-Schuman, 1953).
4. James A. Secord, ed., "The Big Picture," *British Journal for the History of Science* 26, 91 (2005); Robert E. Kohler, ed., "Focus: The Generalist Vision in the History of Science," *Isis* 96, 2 (2005): 224-251.

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So what is a historian of science to do? How can we acknowledge the disconnections and yet introduce students and the public to a field so rich and important? A textbook must impose an order which is necessarily presentist, since the authors cannot be outside their own time and have the evidence of past events; but must also make clear that the people of the past did not act with us in mind, but rather to solve the problems of their own eras.

Our experience of teaching survey courses, often to classes as large as 150 or more students, was the challenge of how to convey such a large and complex body of information that represented the work of hundreds of scholars (both the historical figures and the historians who explored the subjects) in such a way that it was understandable; broad enough to actually introduce the topic, but not so broad as to either swamp the student or simply become an encyclopaedia of data.[5] In addition to the inherent challenge of writing a textbook, there are few exercises more likely to create controversy than to attempt to define a broad sweep of an entire subject, whether it is in history, engineering, psychology or organic chemistry.

Before beginning this project, we spent many hours discussing the philosophical and pedagogical meaning of textbooks, particularly for the history of science. We recognized that some of our colleagues would not only have different opinions than we did about the proper content, but some would object to the very idea of a textbook. The reviewer asks if the history of science has not passed the need for an introductory text such as *A History of Science in Society*.[6] The answer seems to us to be that there is a growing need for such introductory texts. The basic fact is that mature disciplines have textbooks. Whether it is organic chemistry, cellular biology, macro economics or American history, any subject that has developed to the point of significant pedagogical stature has developed textbooks. They represent both a convenience to instructors and students, and a scholarly statement. To deal with the more prosaic aspect of these two reasons, history of science had developed to the point were there are hundreds courses offered to thousands of students each year at the university level. Few of these students have any background in the history of science since it is not a subject taught in the lower grades, and further, many of the students will also lack a strong background in general history or general science or, lamentably, both.

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5. Andrew Ede and Lesley Cormack, *A History of Science in Society: From Philosophy to Utility* (Peterborough: Broadview, 2004).

6. See Arne Hessenbruch, "On the History of Science in Society: From Ivory Tower to Utility," in this issue of *Scientia Canadensis* 28 (2005): 51-56.

The best and most compelling way to introduce a lay audience to the intricacies of the history of science is through a continuous and complex narrative. Such a continuous narrative can never, of course, take the place of the intense research done in our profession. But it is important to us as a discipline that we attempt to step back and tell a comprehensive story. We are convinced that it is a compelling story—the wrestling of human beings with the meaning of the natural world around them, and the increasing interest they felt in controlling it for their own purposes. Our first task was to insist on the embeddedness of natural philosophy and science; that is, that the study of nature always takes place in a social, political, and economic context, and that in order to understand why scientists make the choices they do, you must understand this context. Here is the first challenge for authors of a survey. Their readers perhaps know neither the context nor the scientific issues. Putting this together in any meaningful way in under 500 pages is a challenge, but it is worth the effort.

Does telling a continuous narrative make us Whiggish? Whiggism, of course, was a charge levelled first at political historians, who started with the premise that the British form of government was self-evidently best, and then tracing an inexorable path to that end. But to acknowledge that a particular type of government now exists, and to look for its roots and the causes of its success, is not in itself an invalid enterprise. Stefan Collini, reviewing a reassessment of Butterfield and his critics, argued that on many occasions the charge of Whiggism has been used to negate or dismiss all historical work which seeks to understand how we got where we are.[7] Of course we start from our present situation; to claim that we study the past simply for the sake of the past is, we would argue, to reduce historians to chronologers and collectors of anecdotes reminiscent of Ernest Rutherford's famous quip about physics and stamp collecting. What is important is how we approach that problem, how we give the actors of the past their own lives and motivations, not assuming the triumph of modernity, while at the same time (especially in a book such as *A History of Science in Society*) trying to understand why it went one way and not another.

Some textbook authors have avoided the continuous narrative by presenting the history of science as a series of case histories. One of the problems of choosing this "vignette" approach is that is removes scientists and ideas from context, producing a more essentialist, atemporal account, in which scientists frequently become men (or very occasionally

7. Stefan Collini, "Whigissimo," review of C.T. McIntire, *Herbert Butterfield: Historian as Dissenter*, *London Review of Books* (21 July 2005): 24-27.

women) "ahead of their time." We want to insist that all our players are people precisely *of* their time.

A number of our colleagues have told us that they never use textbooks, but teach from primary sources. This is can be a wonderful approach, especially in classes small enough so that the instructor can do a close textual analysis and help students understand the complex work of scientists and natural philosophers by responding to specific questions. For large classes it is significantly more difficult to manage. This approach also poses its own philosophical and pedagogical problems. The number of documents that can be reasonably covered is often very small. Language problems arise from both the necessity of using translations and the general difficulty of archaic forms of presentation. Rather than understanding the place of the ideas presented in the documents in some larger context, deciphering the documents can become the overriding objective of the student. The primary source approach also privileges the chosen texts, leaving students with the sense that of all the thousands of documents produced by scholars in the past, only the small collection presented in class were historically significant, and that the grand edifice of science was based on these selected sources.

In addition to raising the question of whether history of science needs narratives, the reviewer also noted that we present science in an anti-metaphysical light, to which we reply that science is always an "interested activity." The story of the investigation of nature has been a story of the increasing emphasis placed on utility to the detriment of metaphysics. While it might be argued that this historical circumstance is not a good thing, and many of our scientist colleagues certainly lament the demands for utility in the funding of science, we would be deceiving ourselves if we thought that what happens on the other side of campus was not directed in part by such base impulses as profit, national defence and the desire for fame. It was precisely the fact that such concerns about utility/metaphysics go back to the Greek philosophers that made it such a powerful theme. This is not the only narrative guide possible, but we think it is fundamentally important that the citizens we are helping to educate have some grasp of how science actually works. History of science provides an ideal forum for such understanding, since it allows us to see that all science is deeply embedded in its historical context, that issues of interest are always important, that other interpretations and ways of doing science have existed, and that we could imagine a different world.

Is Plato to NATO the way to go? We would argue that pedagogically and scholastically it is. A final aspect of writing textbooks that should not be overlooked is the almost organic cycle in the scholarly world of

building up narratives that following generations absorb, question and tear down. In turn, they build up their own canon, and even if the philosophical stance is anti-narrative, that too will be assailed. Textbooks fulfil a number of functions, both overt and covert, and will continue to be a focal point for scholarly argument as long as there are scholars to write them and review them.