



History of Science

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Every historian would tell this tale differently, but here is one brief history of the history of science. History of Science can be traced back at least to the systematics-inspired histories of electricity and optics by the enlightened experimenter Joseph Priestley, and the nineteenth-century works of Cambridge don William Whewell, whose *History and Philosophy of the inductive sciences* (1837-40) forged an enduring link between history and philosophy of science.¹ Whewell claimed that his *Philosophy* was the “moral” to his *History*, mobilizing history to reveal an ideal theory of knowledge, namely induction. The link remains in many programs today teaching both history and philosophy of science, and has been a fruitful and distinctive combination, whose legacy has been to make the history of science notably reflective about issues of epistemology, and to make interdisciplinarity something of a natural instinct in the field.

For much of the 20th century, something of a state of cold war existed internationally in the history of science, with Marxists proclaiming the science of different periods as an expression of their social and economic conditions, and their opponents offering an alternative “history of ideas” which emphasized science’s detachment from its local conditions of production, making *theory* the principle object for the historian to study. Both traditions produced great works. Pioneer Bolsheviks such as Boris Hessen, writing in the 1930s, inspired Marxists in Britain including the historian of Chinese science Joseph Needham and J. D. Bernal, whose history introduced an enduring British interest in the relations of science and the industrial revolution.² In the other camp, in the 1950s Alexander Koyré and A. Rupert Hall established the notion of a “Scientific Revolution” in the 16-17th centuries, a “revolution in ideas” carried on by men of genius whose work marked the beginning of a progressive rise of science owing little to local context.³

In the 1970s and 80s, this cold war paradigm gave way to a new era which I will label “constructivist”. Since this time history of science has been marked by several important developments. First, in the 1980s, following the emergence of a school of sociology dedicated to expanding the insights of American philosopher and historian Thomas S. Kuhn, the history of science began to become increasingly *sociological*. A decade earlier, sociologists and philosophers such as David Bloor and Harry Collins in the UK had proposed the so-called “Strong Programme” in the sociology of scientific knowledge, which used the ideas of Kuhn and Ludwig Wittgenstein to argue against a traditional view of science.⁴ This held that while the success of successful theories was based on the fact that they were true, false theories such as phrenology or astrology had to be explained as diversions from truth caused by social factors such as bias or political or economic self-interest. SSK argued both true and false

¹ Joseph Priestley, *The History and Present State of Electricity* (London, 1767)

² On the Marxists, see Gary Werksey, *The Visible College: A Collective Biography of British Scientists and Socialists in the 1930s* (London, 1978).

³ A. R. Hall, *The Scientific Revolution 1500-1800* (London: Longmans, Green, 1954)

⁴ The key texts of the strong programme were David Bloor, *Knowledge and Social Imagery* (Routledge, 1976); H. M. Collins, *Changing Order: Replication and Induction in Scientific Practice* (Sage, 1985).

knowledge needed a social explanation, in which theory choice was not determined by evidence but rather evidence was assessed on the basis of other considerations – aesthetic, interpersonal, or political (usually with a small “p”). By the 1980s, studies of both contemporary and historical science adopting SSK’s ideas were regularly revealing the way science was “constructed”, developing in a process of social negotiations in which the shape of a given time and place’s knowledge was now very much linked to its historical and local conditions of production. One such work was the influential and controversial *Leviathan and the Air-Pump*, of Steven Shapin and Simon Schaffer’s which situated the origins of modern experimental science in the sociopolitical disputes emerging in the wake of the English Civil War, analyzing a controversy between Thomas Hobbes and Robert Boyle.⁵ Meanwhile, from the late 1980s, a constructivist ethos could be seen across many fields in the history of science, reflecting other analytical developments in different disciplines. Feminist historians, for example, drew attention to the role women had played in science and to the gendering of science and nature. Thus historians such as Evelyn Fox Keller and Londa Schiebinger argued that far from being a value-neutral enterprise as was often proposed, modern science had both restricted its practitioners to the male sex almost exclusively, and contributed much to the biologizing of women as submissive and inferior beings.⁶ Both constructivist and feminist historians thus drew attention to the locally-conditioned nature of scientific activity – all science was a human endeavor and reflected, indeed produced, particular human interests and cultures.

Another important development here was an increasing sensitivity to history itself. As historians of science sought to recover in finer detail the local, interpersonal, and often messy details of scientific practice in history, so they have also sought to be more sensitive to historical events. Whereas Koyré and Hall’s “scientific revolution” occurred with very little relation to the history of 16-17th century Europe – it could have happened anywhere at anytime based on the significance attributed to this time and place in the book – today’s historians will study the historical context of science in great detail – the politics, social history, economics, and culture of a locale all need to be carefully researched and understood in order to appreciate the subtleties of what is going on. Here Mario Biagioli’s *Galileo, Courtier* stands out as exemplary, being a study of the critical role of Medici patronage in shaping the form and fate of Galileo’s career in early-seventeenth century Florence.⁷ Such detailed “contextual” studies of science (as the approach is often referred to) are now considered essential in history of science, and one rarely sees in books or courses today the older histories telling of a progressive accumulation of neutral and disembodied ideas which were once typical. History of Science now studies science *in* history.

For a long time historians of science had focused exclusively on the history of successful science, and told stories of progress and the contributions of great individuals to that progress. By today however, this has changed. History of science is increasingly carried out by historians without a stake in the celebration of scientific rationality and progressive narratives, and who follow sociologists’ advice to remain impartial about the success and failure of theories in analyzing them historically. Consequently, historians now seek to bracket their present-day opinions about science and to understand past systems of natural knowledge more on their own terms. They have thus sought to draw attention to, and re-assess, many arenas of science which had been ignored or dismissed in the older “contributionist” history. The result has been, I think, a more historically sensitive history of science, which has brought to light

⁵ Steven Shapin, Simon Schaffer, *Leviathan and the Air Pump: Hobbes, Boyle and the Experimental Life* (Princeton, NJ: Princeton University Press, 1985).

⁶ Londa Schiebinger, *The Mind has no Sex?* (Harvard: Harvard University Press, 1989).

⁷ Mario Biagioli, *Galileo, Courtier: the Practice of Science in the Age of Absolutism*. (Chicago: Chicago University Press, 1993).

the importance of figures such as Natural Magicians, astrologers, and alchemists in the shaping of modern science (their activity is only just beginning to be revealed: see e.g. the works of Bruce Moran, William Eamon, Paula Findlen).

One effect of this approach has been to open up a growing bridge between history of science and other historical disciplines, and coincides with both a blossoming of history of science and a great diversification of analytical directions in recent years. Innovative work now regularly appears in the key journals in the field, *Isis* and *Osiris*, the journals of the History of Science Society in the US, and in the UK, the *British Journal for the History of Science*, and *History of Science*.

As far as future directions are concerned, I'm very optimistic. Science has been pervasive in all aspects of modern western culture and so understanding its history is relevant and useful for a very great number of fields. We know more about the history of science now than ever before, and the field of history of science remains an innovative and, since the days of Whewell, an interdisciplinary subject. In addition to history, philosophy, and sociology, anthropology has also played a big role in recent history of science, while geography is gaining momentum as the key to a whole new "geography of knowledge" based on a spatial, as much as temporal approach to studying science's past. To this could be added historical studies of the consumption and use of science, as opposed to its production, as well as the history of science's popularization; science in the media; the relations of science and the environment; a much greater emphasis on material culture and practice, a hallmark of constructivist history of science, but a route still requiring much more work; more work on the extensive role played by science in the history of imperialism; and a better appreciation of the different natural knowledge systems of western and non-western cultures, as opposed to a focus on 'science' alone.

Further Reading

John R. R. Christie, "The Development of the Historiography of Science," in *Companion to the History of Modern Science*, R. C. Olby, G. N. Cantor, J. R. R. Christie, M. J. S. Hodge (London, Routledge, 1990), 5-22.

Jan Golinski, *Making natural knowledge: constructivism and the history of science* (Cambridge, New York: Cambridge University Press, 1998) – an overview of recent trends in history of science, beginning with an appraisal of 'constructivist' historiography.

Peter Bowler & Iwan Rhys Morus, *Making Modern Science: A Historical Survey* (University of Chicago Press, 2005) – the most up-to-date textbook on history of science from Copernicus to the present, with emphasis on the 19th and 20th centuries.

The recent "science * culture" series by the University of Chicago Press consists of a series of short books on key historiographical themes in history of science and technology:

* Shapin, Steven, *The Scientific Revolution* (1996)

* Livingstone, David N. *Putting Science in Its Place: Geographies of Scientific Knowledge* (2003)

* Hughes, Thomas P., *Human-Built World: How to Think about Technology and Culture* (2004)

* Dear, Peter, *The Intelligibility of Nature: How Science Makes Sense of the World* (2006)

Questions for the SSNet Session on History and Philosophy of Science

What existing programs, research clusters, speaker series relevant to the history and philosophy of science are you already involved in (or know about) at UW?

What role would you like to see history and philosophy of science play in the Science Studies Network? What would make it most useful for you?

Have you published work on the history or philosophy of science? Please provide references to your publications.

Are there any other matters related to history and/or philosophy of science that you would like to see addressed in the network?

Thankyou for your participation.