History of Economics and History of Science
A Comparative Look at Recent Work in Both Fields[1]

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Margaret Schabas' "Breaking Away" manifesto (1992) called for the historians of economics to identify themselves more with their colleagues in the history of science and less with those in the discipline of economics. Her "Coming Together" update (2002) assessed what historians of economics had been doing since 1992, showing that some progress has been made toward her goal, but that much remained to be done. Central to Schabas' efforts is the claim that the history of economics needs to stop being simply the vindication of the discipline of economics (economists don't need it, so why chase after them?); implicitly her argument is that the history of science stopped providing a vindication of modern science some time ago. My own contribution to the debate over Schabas' manifesto (Emmett 1997) did not examine the existing literature on the history of economics in light of Schabas' manifesto, but instead focused on how one's understanding of the relation between the community of historians of science and scientific communities could assist with reconstructing the relation between the community of historians of economics and the scientific community of economists. Like Schabas, I argued that historians of economics, *qua* historians, share more with historians of science than they do with economists, although I simultaneously suggested the relation was more nuanced than Schabas suggests, given that the rational reconstruction of past arguments may be part of economic thought today[2] and that just as historians of science have used sociology and are beginning to use economics to explain the history of science, historians of economics may end up using the discipline they study to explain its own history.

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[1] Prepared for presentation at the "History of Economics as History of Social Science" workshop, L'École Normale Supérieure de Cachan, 19 June 2009.

[2] Is rational reconstruction a part of the history of science? The evidence of the books and articles covered in my comparison suggest that it is not. Perhaps here we come to a difference in our perception of the history of social thought and the history of natural science: many people, both in the social sciences and in society generally, believe that the ideas of past social and economic thinkers have relevance today, whereas few believe the same about past scientists. Whatever the relation of our recovery of their ideas may be, we all may be Keynesians once again, but we are unlikely to ever again be followers of Helmontian chymistry.

The philosophical and methodological vision behind Schabas' manifesto was fleshed out in Wade Hand's (2001) *Reflection without Rules*, which won the Joseph Spengler award for the best book in the history of economics from the History of Economics Society (HES) in 2002. Why did a book on economic methodology win the prize for the history of economics? If the rules regarding what constitutes scientific knowledge are contested, then, Hands argues, communities of scientists cannot turn to the philosophers of science to tell them what constitutes scientific knowledge or progress. They construct the rules themselves in their communities' theories and practices. Indeed, economists, like most scientists, don't spend their days wondering if their models constitute "good science" – they spend their days using and improving their models, which also means they spend time finding data, improving the tools they use to evaluate the models and data, teaching, seeking grant monies, persuading others that their improved models work well, etc. Contemporary science theory reminds us that scientists engage in the same types of activities we do, and have no special access to the progress of knowledge.

Historians of science and economics are also freed, because Hands' story allows us to stop telling the story of how and why scientific advancement occurred by the rules set by some undefined standard. Historians can focus on historical reconstruction – sorting out and telling how scientists and economics in particular time and places worked, what tools they developed to assist them with their activities, why they considered the products of their work to constitute contributions to knowledge, and how others were persuaded of the scientific status of their work. What were the rules by which "science" survived and thrived in the past? Such an endeavor is illuminating, even if we can't say that the rules were correct, or even that the conclusions scientists in the past reached helped us to understand better what the correct rules for scientific knowledge are. As Hands reminds us at the end of his introduction, a viewpoint such as the one he identifies, and which I will argue underlies much of the work currently being done in the history of science (if not always in the history of economics), "is not inconsistent with the basic Enlightenment commitment to science as a uniquely worthy form of life" (Hands 2001, 8). And I might add that it does nothing to deny that the historical study of scientific and economic knowledge in the past remains a worthy act of appreciation for that unique form of life.

One way to evaluate whether the history of economics has moved toward the history of science is to compare recent work in both fields. In order to narrow the comparison in two rapidly

expanding publication areas, I decided to examine two corresponding sets of literature in each field: the articles and books to which the HES and the History of Science Society (HSS) awarded their best article and best book prizes. An older organization, HSS has been awarding prizes for the best book in the field since 1959, and has awarded a prize for the best article since 1979. HES started in the mid-1970s, and began awarding its best article award in 1995.[3] The HES best book award was initiated in 2004, which provided the starting point for my comparison. The winners of the awards from both societies over the period from 2004 to 2008 form the basis for my comparison.[4] We have already met one of those winners – Hand's *Reflection without Rules*. Despite the appropriateness of the choice of Hands' book for the first HES Spengler Award because it identifies the historiographic vision which underlies recent work in the history of science, his book itself is not a history; not even a history of the recent developments in science studies. But if we cannot place it among the other studies, we can use the questions Hands raises for us as we examine the other winners. What do the new studies in the history of science and economics look like? Do they look increasingly alike as they depart from the quest to judge the growth of scientific and economic knowledge by some set of external standards? Are these fields, as Schabas desires, becoming unified? These questions will be addressed, but first, let's look at the authors.

The Authors

The history of science prizes have been awarded to 12 individuals (8 individual authors, and 2 sets of co-authors). The history of economics prizes have been awarded to 10 individual authors (no co-authored papers). Seven of the10 economics prize winners are located in economics departments; the others are in history[5]; business history (McCraw); and the history of political thought (Hont). Six of the 12 history of science prize winners are located in history of science programs[6]; four more are in history departments[7]; one is in a classics department[8]; and one is in a

[3] One difference between the societies' respective best article prizes is that, while the HSS limits its selection to articles published in the Society's journal *Isis*, the HES accepts nominations of articles published in any journal.
[4] See appendix 1 for a list of the award winners and more about the prizes.
[5] Carl Wennerlind, who has a Ph.D. in economics, is located in the history department of Barnard College, Columbia University.
[6] Two of the historians of science – David Kaiser and Laurence Principe – share their appointments with departments in the natural sciences (Kaiser in physics; Principe in chemistry). Kaiser, however, is the only active scientific researcher.
[7] Two of the historians have Ph.D.s in the history of science: Richard Burkhardt, Jr. and Scott Knowles.
[8] Daryn Lehoux –the classicist – has a Ph.D. in the history of science and technology.

geography department. Among the prize winners, then, the history of science is almost exclusively practiced by historians of science, whether they are in history of science departments or in history/classics departments, while the history of economics is primarily, but not exclusively, practiced by those in economics departments.[9] While departmental affiliations can be deceiving and ever-changing, clearly Schabas has not convinced historians of economics to abandon the discipline of economics.

The geographer K. Maria Lane (Price/Webster Prize, 2006) comes the closest among the history of science prize winners to a typical historian of economics: she operates out of a geography department, teaching regular geography courses, but her research is in the history of the field. Ironically, the one economist in our group of authors who now teaches in a history department is the only author in either group whose award-winning article was published in a leading journal in a scientific field – the *Journal of Political Economy*.[10] However, two of those who have won HES book prizes do not actively participate in the field: Thomas McCraw is a business historian at Harvard[11]; and Istvan Hont is a historian of Enlightenment political theory and political economy at Cambridge.

Two of the most prominent programs in the history of science are responsible for more than half of the HSS prize winners: seven of the twelve winners either received their Ph.D.s from, or are employed by, the history of science and technology programs at Harvard University and Johns Hopkins University. If one looks back over the entire history of the HES's best article award, one would say that Duke University and Cambridge University are both well-represented among the winners of the Society's prizes, with 4 each.[12] But the more obvious division among the winners of the history of economics prizes we are considering is that more than half are from outside the USA – Europe (4), Australia (1) and Brazil (1). In fact, only four Americans have won the best article award since its inception (and two of those were co-authors), and no member

[9] The author of this article has a Ph.D. in economics, and has been appointed in economics departments, but currently is appointed in an undergraduate liberal arts college of public affairs located in Michigan State University (James Madison College). I have adjunct status in both the economics and history departments.

[10] Wennerlind also happens to be Schabas' co-editor of a volume of essays on David Hume's political economy (Wennerlind and Schabas 2007).

[11] Winner of the Pulitzer Prize in 1987 for *Prophets of Regulation* (McCraw 1986). Note the similarity in title to his book on Schumpeter.

[12] If we add Bioanovsky (2006), which was written while the author was visiting in Duke's economics department, we have to give Duke the nod.

of an American economics department has won the award since 2002.[13] In the group we are considering, the only HSS prize winner outside North America is in Europe (Marc J. Ratcliff).

Two of the best article award-winning authors won their respective prize for the second time during the five years we are looking at here. Thomas Hankins of the University of Washington won the Price/Webster Price in its second year – 1980 (Hankins 1977). And Mauro Boianovsky of the University of Brasilia won the HES best article award in 1999 (Boianovsky 1998). Only one author has won both the best article and best book prizes from either society: Deborah Harkness (Harkness 1997, 2007).[14]

Recent research suggested that senior faculty members are likely to contribute primarily to anthologies or volumes of collected essays, while junior faculty members are likely to primarily publish in peer-reviewed journals.[15] Of course, unlike both economics and the natural sciences, the signature contributions for historians are books. Among our prize-winning best article authors, eight of the 11 could be classified as junior faculty, and the one co-authored article was written by a former graduate student and his thesis supervisor. Among the best book authors, only two of the authors could be considered junior faculty; most are senior fellows who are well-known for their previous work.[16]

Finally, none of the past five prize-winners of either the Spengler or HES best article prizes was a woman. Two women have won the Pfizer Prize in the last five years, and one woman the Price/Webster Prize.

A Simple Framework to Guide Our Comparison

I struggled to find an appropriate means by which to compare these works. Despite their commonalities, they are a disparate lot. They cross centuries: although most examine the economics or science of the mid-nineteenth to mid-twentieth centuries, one winner of an article prize examines optic science in the ancient Greeks, and several book awards have gone to

[13] In fact, the only members of American economics departments to win the best article prize since its inception are David M. Levy (2002) and Craufurd Goodwin (1998). Goodwin's co-author was a student who has become the partner of an investment firm.

[14] Lest one suspect that the HSS granted Harkness both awards for the same work, her earlier work on the Dee family plays only a small role in *The Jewel House* (Harkness 2007, 222-23), although it did become the basis for another book (Harkness 1999).

[15] I will have to find the reference to this research, which I read about on the *Chronicle of Higher Education*'s tweatstream.

[16] The latter group includes the two co-authors of the 2005 Pfizer prize: William Newman and Lawrence Principe.

histories covering the sixteenth and seventeenth centuries. Does geography matter? We not only have different parts of Europe at times when the differences mattered more than they do even today, but also some studies focused on urban life and other focused on rural life. One could even argue that changes in modes of transportation matter to the histories being told both for communication among scholars and the location of scientific endeavors. Our studies cross topics: from alchemy and chemistry to international trade, ethology, the combination of geography and astronomy, biology, mathematical economics, optics, equilibrium theory, physics, innovation and economic development, as well as graphs and diagrams of several types. One article even covers the location and design of corporate research facilities.

Several studies emphasize beginnings: the creation of a science, the initiation of a research program, new ways of envisioning natural and social phenomena, the invention of a graphing technique or a diagram. Others challenge claims to origins: are the claims for various revolutions in scientific and economic knowledge really valid? Who really was revolutionary? Who is responsible for a particular diagram? And some stories even record deaths: not only of people, but also of sciences and ways of doing science.

Philosophical and methodological concerns abound: the role of induction and empirical research in the creation of knowledge appears frequently, as do what we today often refer to as boundary concerns – where does one discipline end and another begin, what is the difference between science and non-science? There are biographies, and even some autobiographical material, but while most use biographical materials, their focus is usually not biographical. They also employ different types of historiographic approaches. Most of the studies fall under the rubric often described as historical reconstruction – the situating of theory, scientists and their tools in their contemporary environment. However, we have several studies which focus more on representational or rhetorical strategy, and at least one rationally reconstructs the work of the past for the purpose of improving our treatment of issues today.

One thing they all share is historical sources: with one quite understandable exception,[17] every winner uses primary source materials other than published texts in their research. Personal correspondence, unpublished drafts of papers and reports, oral history, diaries, scientific journals, laboratory reports, etc. all find their place among the award winners.

[17] Daryn Lehoux only uses extant texts from Greek philosophy.

So how can these award-winning books and articles be organized for comparative purposes that would be useful for the purpose of considering the progress of Schabas' call for historians of economics to become like historians of science? In the end, I decided on a simple heuristic which will allow me to address that purpose.

Imagine, if you will, a long table. Draped across the table is an even longer cloth. At one end of the table is a little sign that reads "Ideas." A similar sign at the other end reads "Practices." Halfway between the two is a third sign – "People." Admittedly crude, this imaginary table allows us to place the books relative to each other along a spectrum running from a primary focus on ideas to a primary focus on practices (see figure 1). The table also allows us to see that movement away from the ends inevitably moves us toward a consideration of people. The central role of people is also indicative of the role that people play as the mediators between ideas and practices; thus, studies which focus exclusively on ideas will seldom deal with practices (and vice versa), but those which do incorporate personal material regarding the scientist(s) will often do so in the process of describing how ideas and practices intersect. Finally, the heuristic raises the interesting question of whether the history of practices might not have more in common with the history of ideas than it does with biography. Or, to put it positively, to the extent that histories of ideas begin to incorporate the people thinking about the ideas, they may look similar to the histories of practices which also incorporate material about the people undertaking them. Words are deeds, as Wittgenstein said.

So much for the organizing heuristic, now let's use it to see if it helps work through the differences among our award-winning books and articles.

Ideas ↔ People

At the core of the old approach to the history of science and economics was the assumption that what mattered were the theories and ideas of scientists and economists, and that the history of scientific/economic knowledge was story of the development of better theories to replace previous ones through a rational process. A common heuristic device was the association of theories with particular people or groups, and historical information about those individuals or groups was accepted as useful background knowledge for historians to employ in constructing the sequence of theoretical development. The transition from Smithian "absolute advantage" to Ricardian "comparative advantage," and then to the Heckscher/Ohlin emendations of Ricardo,

leading to the Heckscher-Ohlin-Samuelson model, provides a common economic example. Problematize that model by introducing the Leontief paradox, and challenge it with Krugman's geography of trade, and you have a nice heuristic for remembering the development of international trade theory, capped at each post-1950 point by a Nobel prize winner. If the people behind the names were relevant to that development, the story often focused on how they came to their ideas, often against great odds. But this personal history, as George Stigler (Stigler 1965, 1982) argued, was incidental ultimately to the history of ideas, which were science itself.

A quick look at Figure 1 will show that the "Ideas" end of the table is less occupied than the "Practices" end is, and most of the works are arranged toward the middle of the table. But we'll start with the clearest example of a "history of ideas" approach among our award winners: Istvan's Hont's *Jealousy of Trade*. Hont tells us right up front that the purpose of his study is "to identify political insights in eighteenth-century theories of international market rivalry that continue to be relevant for the twenty-first century" (Hont 2005, 4). He goes on to remark that intellectual history is most useful when "it unmasks impasses and eliminates repetitive patterns of controversy" (Hont 2005, 4). *Jealousy of Trade*, he tells us, has its "eyes firmly fixed on the challenges of today" (Hont 2005, 5). Here is a history congruent with Cristina Marcuzzo's argument[18] that the history of economic thought is (to quote a historian of scientific thought) "one long argument" (Mayer 1993) and that a study of the essential components of the argument at some point in the past can illuminate our concerns today. In his essay on the "Rich-Country-Poor Country" debate (Hont 2005, 267-322), for example, he rationally reconstructs David Hume's argument in a 12-step process which those engaged in similar debates today over out-sourcing and international trade could easily use to defend a nuanced version of the free trade argument. Using historical documents unavailable to most of Hume's contemporaries,[19] Hont shows that the argument was indeed coherent and makes sense in the context of contemporary debate. Furthermore, he shows why the contributions of Scottish political economy (especially Hume and Adam Smith) ended the prospects of meaningful discussion of commercial society within the confines of the language of civic humanism. In other words, Hont's argument is built on the assumption that the Enlightenment project remains an integral part of modern discourse,

[18] In her presidential address to ESHET. I need to get the reference.
[19] Anticipating a point yet to be made, the use of archival materials is not enough to identify an author as a practitioner of the new history of economics/science.

and that rationally reconstructing the work of its earliest proponents can illuminate contemporary (in both senses of the word!) discourse.

Even though Hont's book is firmly in the "history of ideas" camp, you will notice that it is not at the extreme end of the table. Hont's work is in the Cambridge tradition of historiography (Skinner [1969] 1988; Tully 1992; Pocock 2009), which seeks to interpret work in the context of available meanings at the time, before seeking to consider how its ideas may be transplanted to today. Inevitably, then, Hont has to consider the thinker – in his case, usually David Hume or Adam Smith – and the context in which Hume and Smith operated. The Cambridge tradition has, in fact, prided itself on examining the meaning of ideas in their context. At the same time, the context Hont uses is more narrowly defined than it will be in the case of the other works at this end of the table.

Similar to Hont's historical concerns are those of two of the best article award winners, one each from the history of science and the history of economics. Careful textual analysis and awareness of the context of surrounding arguments distinguish the essays by Daryn Lehoux (2007) and Carl Wennerlind (2005) from other efforts to settle questions about the meaning of central themes in their respective subjects' work (for Lehoux, Gallen and Ptolemy; for Wennerlind, Hume). Yet both authors also have concerns about how contemporary theorists might appropriate their interpretation of past theorists. Lehoux begins and ends his essay with a discourse on the problem (optical and perspectival) of what we see when we look in the mirror. Wennerlind published his essay on Hume in the journal of the economics department at the University of Chicago, the foremost articulator of the quantity theory of money in recent times. While Wennerlind makes no comment about the connection between Hume's treatment of inflation and the quantity theory in the paper, the fact that he sought to publish the paper in the *Journal of Political Economy* makes the statement for him!

One other work deliberately makes a connection between the history of ideas and their present day use. Thomas McCraw's biography of Joseph Schumpeter, otherwise devoted to the historical reconstruction of a person's life and ideas, also focuses on the contribution of a past thinker to present problems. The title *Prophet of Innovation,* of course, is forward-looking, and McCraw tells us right at the beginning that "the phenomenon of capitalist innovation" is as much the subject of his book as Schumpeter himself is (McCraw 2007, ix). He also concludes the book with a chapter on Schumpeter's legacy for both modern economists and modern

innovators/entrepreneurs. However, his biographical focus, as we will see later, more often keeps his attention elsewhere. On our table diagram (Figure 1) McCraw sits on the "Ideas" side table in recognition of this dual focus.

The other three items on the left side of Figure 1 are placed between "Ideas" and "People" for slightly different reasons. Like Wennerlind, the articles by Mauro Boianovosky (2006) and Larry White (2004), focus on the interpretation of specific portions of the work of a past economist – Don Patinkin and William Stanley Jevons, respectively. While the primary focus of their work remains the historical reconstruction of the meaning of specific texts, they have no direct concern for the consequences of their findings on contemporary theory.[20] In Boianovsky's case, the problem is accounting for Patinkin's efforts to explain involuntary unemployment as a disequilibrium phenomenon as he struggled to write two key chapters in his *Money, Interest and Prices* (Patinkin 1956). Bioanovsky considers Patinkin's correspondence with other theorists, his reflections on Keynes and on the Chicago tradition of monetary theory, and his use of standard tools in monetary theory as he tells the story of Patinkin's writing task. White shows how apparent confusions in Jevons' marginal analysis can be clarified by considering changes in his understanding of the conservation principles in physics.[21] White's analysis requires careful comparison of the breadth of Jevons' scientific work, not only his economic concerns, over a multi-year period of time.

The other work included in this space is the article on consumer demand theorists by Ivan Moscati. Moscati's article is difficult to categorize for two reasons. On the one hand, his purpose is to provide an account of the economists' indifference to the early experimental findings regarding consumer demand that turns on their desire to protect their theory from attack, especially attacks which appear as weak as they see the experimental findings to be. Moscati's purpose could imply the need for a richly textured examination of the theorists' professional lives, the nature of the evolving relations between disciplines from the inter-war to the post-war period, and the type of epistemological claims that economists were willing to accept. He does provide accounts of the experiments the psychologists ran, and how the experiments arose from the psychologists interactions with the economists. However, although he admits that "the

[20] Although White does use the opportunity to criticize a current, widely known, analysis of the history of economics (Mirowski 1989), which contains the particular interpretation of Jevons which White claims to be incorrect.

[21] Part of the support for his argument comes from early versions of the work encapsulated in Maas' award-winning book (2005), which is placed elsewhere in Figure 1.

meager influence of the experimental research *may* be explained by bringing into play academic, social, political, or economic factors"(emphasis added), Moscati goes on to suggest a "purely epistemological" rationale: "empirical evidence contrary to a scientific theory can be always imputed to the failure of some auxiliary assumption" and "a scientific theory is rejected only if it can be replaced by a practical alternative" (Moscati 2007, 393). Thus, the explanation he provides, on the other hand, is the evolution of ideas by logical progression, stripped of any role for the people involved. While the epistemological claim may be logically sufficient, one wonders if the economists themselves ignored the experimental research on epistemological grounds, or whether an appeal to other factors would strengthen the argument made. Caught between an account which points to the role of the personal, but ends up considering only the logical relation of ideas to each other, I placed Moscati in the middle of the "Ideas" side of the table.

People

At the center of the table are two biographies: McCraw's biography of Joseph Schumpeter and the second volume of Janet Browne's 2-volume biography of Charles Darwin. As we have already seen, these two books are not the only works which have biographical material, but they are the only Spengler or Price/Webster prize winners which are full-length biographies. However, for all the reasons that the tension between context and progress are present in the histories told among our prize winners, biography is both welcomed and avoided. After all, historians and biographers have always had an on-again, off-again relationship. When intellectual development is emphasized, biography is denigrated, except to the extent that people like to hear stories about great heroes they admire.[22] When the context of people and ideas is emphasized, the role of an individual scientist's life seems too unique to matter; we want general trends, networks, tools and techniques, and institutional explanations. Is the biographer merely serving as champion or executioner, thereby setting up the present as judge of the past?

Despite these reservations, a recent conference, and subsequent supplement to the *History of Political Economy* journal, made the case for the use of biography and other forms of life-writing by historians of economics. Biographers seem to be helping restore the relationship as

[22] Even George Stigler, for all his antinomy to biography, wrote memoirs (Stigler 1988), and probably read early versions of the Friedman's *Two lucky people* (Friedman and Director Friedman 1998) with delight!

well, if our award winners can be taken as representative of their fields. Browne and McCraw are two very good examples of biographies that may aid historical interpretation. Surprisingly, these biographies are of two individuals who have, in many ways, resisted "the turn to the personal" as part of the interpretation of their work. After all, Charles Darwin stands as one of the two iconic figures of modern science – everyone knows the names Darwin and Einstein, even if they don't know much about evolutionary biology or physics. And Joseph Schumpeter's theory of capitalism as "creative destruction" has long survived what waning interest there may be in the titillating details of the life of a man who once said his three goals were to be the greatest lover, the greatest horseman, and the greatest economist in the world.

Browne and McCraw make the details of these two central figures of the 19th and 20th century respectively not only come to life, but also become crucial to the interpretation of their work. In the concluding volume of Browne's two-part biography of Charles Darwin (2003; the first volume was Browne 1996), she makes Darwin's own attachments to a life lived in a particular place, and to the social necessity of detailed correspondence that his time and location required, integral to the interpretation of not only the theory of evolution, but the central role of the theory of natural selection in it. The garden in Darwin's home, and his vast correspondence, become the settings in which "he transformed his daily activities into scientific knowledge" (Browne 2003, 202).

In McCraw's (2007) biography of Schumpeter, the story of his relationship with women does occupy a large amount of the book, but rather than just being the revelation of the details of his reputation as a womanizer, *Prophet of Innovation* portrays Schumpeter's relationships in a more complex, and hence more human, fashion. While seemingly unconnected with his economic ideas, these relationships end up defining key elements of the development of his intellectual life, making biography essential to understanding the meanings Schumpeter gave to his theoretical work: "Under a burden of almost unbearable grief [Schumpeter's mother, wife and newborn son all died within the space of two months in 1926], he again took up his mission of trying the unravel the enigmas of capitalism and human society. And over the next twenty-three years, often in the face of severe despondency, he produced a vast and incomparable body of work" (McCraw 2007, 140).

If our lives, our tools, our practices, even the warp and woof of our daily life, matters to the development of science, then studies of crucial junctures in that development, even though

often misunderstood at the time or in our standard histories, can re-enliven our sense of how science moves forward. Put differently, biography reminds us that our histories are not clinical trials or reconstructed logical arguments, but narratives, with both a strong sense of plot and a keen desire to admire the richness of life as the stories move along.

Practices ↔ People

The most succient statement of the historiographic vision behind the work at the "Practices" end of the table is provided by David Kaiser's history of the Feynman diagrams in postwar theoretical physics. In contrast to work focused on the historiography of the progress of scientific "Ideas" – the other end of the table – Kaiser argues that,

> … a rival vision of how to analyze work in theoretical sciences has begun to take shape. Building upon these studies, this book begins with a simple premise: since at least the middle of the twentieth century … most theorists have not spent their days … in some philosopher's dreamworld, weighing one cluster of disembodied concepts against another, picking and choosing among so many theories or paradigms. Rather, their main task has been to calculate. … They have accomplished [this task] by fashioning theoretical tools and performing calculations…. These tools have provided the currency of everyday work. (Kaiser 2005, 8-9, emphasis in original)

The histories on this side of the table in Figure 1, then, historically reconstruct the practices and tools of scientists and economists in their own settings. Just as tools and practices appear in the studies at the other end of the table as means by which to communicate ideas, ideas here provide the opportunity for scientists to engage in the tasks of measurement, calculation, persuasion, model-building, grant-writing, corresponding with others, and even teaching, and also appear as the consequence, often fleeting, sometimes unintentional, of those tasks.

Kaiser's history of the Feynman diagrams is a wonderful representative of what a focus on practices can achieve. Feynman himself makes few appearances in the book, because beyond the first chapter, it is not about his creation of the diagrams. Rather, Kaiser tells the story of how the diagrams were dispersed across the theoretical physics discipline, and how they were adapted by others in the process, sometimes for the own purposes, and sometimes in ways that clarified

or standardized them. In fact, the book is almost the biography of a tool. The people who appear in Kaiser's book are those responsible for the dispersion of the diagrams: Freeman Dyson, Tomonaga Sin-itiro, and Geoffrey Chew, to name just a few of the young theorists in whose hands the Feynman diagrams were put to use. But Kaiser's focus remains on the diagrams, almost as if the people become the instruments by which the diagrams take on a life of their own as they are passed around the world and across time. Much like Darwin's garden in the hands of Janet Browne, the physicists' lives and seminar rooms become the setting in which Kaiser displays the tool at work.

Another example will help strengthen our sense of the distance the literature at the "Practices" end of the table stands from not only from a focus on "Ideas," but also from the biographies located at the middle of our table. Deborah Harkness's *The Jewel House* examines scientific and medical practice in London at the beginning of the "Scientific Revolution." In a particularly effective chapter, Harkness points out that Elizabethan projects share some similarities with "Big Science" today – the royal promotion of "all good sciences and wise and learned inventions tending to the benefit of the commonwealth of our said Realm and Dominions, and serving for the defense thereof" (Harkness 2007, 143-44). Her real purpose in talking of "Big Science," however, is to goad us into realizing that Elizabethan projects did not stand at the beginning of a continuous line of scientific progress leading to "Big Science" today. Instead, they were the consequence of their context – the city of London. London provided the means and context within which the various tensions between private profits and the common good were worked out, often in unexpected ways involving the interests and actions of "vernacular practitioners" who have often been overlooked in constructing the history of science (Harkness 2007, 260). Scientific progress, if we can even use that term, occurs in her account quite decidedly outside the realm of research laboratories we know from traditional histories of science.

In Harkness' book, the scientists of our usual stories hold a backseat to the "vernacular practioners" she concentrates attention on, but they do remain actors. Slightly to the right of her book on our table lies an article which is the only work on the table in which scientists or economists matter almost not at all for the story. Scott Knowles and Stuart Leslie's (2001) examination of Eero Saarinen's corporate research campuses focuses on an architect who was commissioned by GM, IBM and AT&T to design research facilities in the post-war period. In

each case, the facility designed by Saarinen is more of a statement about the perceived status of scientific knowledge in society than it is a setting in which scientific knowledge can be pursued. Ironically, where a non-"scientific" setting assists the progress of science in Harkness' account of Elizabethan London, the "industrial Versailles" of Saarinen's research facilities hinder it in Knowles and Leslie's account. Turns out scientists don't work the way Saarinen imagined they did!

Between Kaiser's biography of the Feynman diagrams and the center of the table lie two groups: one of 4 books, and one of 4 articles. They are not grouped that way to keep the books (or articles) together, but rather because the two groups have somewhat different mixtures of practices and people. The books lie closer to the middle because they also show how a treatment of practices can intersect (through people) with our understanding of ideas.

All of the books are boundary stories concerned with transitions between types of scientific activity. Newman and Principe (2002) have a story about the birth of the Scientific Revolution that is similar to Harkness', although somewhat narrower in focus and breadth of vision. They focus on the origins of modern chemistry, complicating the usual story by looking in detail at George Starkey 's alchemical experiments and Boyle's metaphysical speculations to argue that the process of transition from alchemy to chemistry is far more complicated than many scientists would wish. Who really was revolutionary anyway?

Richard Burkhardt (2005) tells us the story of the emergence of the science of ethology by Niko Tinbergen and Konrad Lorenz in the 1930s. For Lorenz and Tinbergen, animal behavior was best studied in natural settings; their ethology was a radical departure from animal studies based on physiological investigation. Among other things, the ethologist had to go to the animals, rather than have dead specimens brought to them; ethologists, therefore, pioneered the creation of field stations and the practices of animal observation associated with them. But they also had to defend their science, both among within biology and in the general public. Burkhardt's story, therefore, tells us not only of the practices which Tinbergen and Lorenz adopted, but also the justifications they provided to defend their new science, and the conclusions they arrived at. His book is the closest of this group to a full-length biography (and located on our table that way), but all of the books in this group incorporate elements of biography.

Roy Weintraub (2002) examines how 20th century economists' use of mathematics reflected their understanding of what mathematics was becoming, and how different approaches to math infiltrated economics and econometrics. Gerard Debreu's mathematical economics was shaped by the prominence of Nicholas Bourbaki in French mathematical education when Debreu was trained at L'École Normale Supérieure. The mathematician Cecil Phipps and the economist Don Patinkin reached an impasse in regards to the econometric evaluation of Patinkin's work because they worked from different assumptions regarding the use of mathematics in economics. Sidney Weintraub (non-mathematical economist) asked his brother Hal (mathematician) for assistance in finding a mathematical means of expressing Sidney's economic theories. That collaboration (never quite successful) led Hal to suggest some ways in which new models of economics could be elaborated using work he was doing in physics. Through all these stories, Weintraub shows how the intersection of economics and mathematics was not as clearly marked as standard histories would suggest. Weintraub's book incorporates one other element that is not present elsewhere in the award winners: autobiography. His own story of how he came from mathematics to economics provided a fitting conclusion to both the story of his father's and uncle's uneasy relations over economics and mathematics, and to the story of how economics came to mathematics. What had been an uneasy relationship for those educated before World War II became easy for those educated in the 1950s and 1960s, because economics "had become a science of building, calibrating, tuning, testing, and utilizing models constructed out of mathematical and statistical-econometric materials" (Weintraub 2002). Sounds a lot like Kaiser! (Snide remark: if theoretical economists calculate like theoretical physicists, calibrate like theoretical physicists, and test like theoretical physicists, are they theoretical physicists?)

We have already met William Stanley Jevons in White's award-winning article on Jevons' use of the conservation principles in his treatment of marginal principle. Harro Maas (2005) takes up the larger task of examining the philosophical and scientific background of Jevons economics. Frequently, such a contextual work would be placed on the other side of the table in Figure 1: we would see Jevons' economic work in its intellectual context. But Jevons was a participant in scientific work in several fields during his lifetime, and Maas tells us a story that enriches our knowledge of Jevons' intellectual context with detailed consideration of his scientific practice and its relation to his thinking about induction, the mind and the world in which we live, including the economy.

The 4 articles form a separate group from the 4 books in this area of the table in Figure 1 because they all deal, in one way or another, with the problem of representation, a common theme today in science studies and the humanities. K. Maria Lake (2005) explains the role that geographers with experience in cartography had in creating astronomy's common perception of the surface of Mars in the late 19th century. Inexperienced in astronomical observation, but well-equipped with the cartographic techniques that had shaped the way people, including astronomers, understood the relation of geographic forms on the Earth's surface, the geographers were given the opportunity to assist with charting the surface of Mars at a particularly advantageous moment in the two planets' orbits around the Sun. While the geographers' drawings did not exactly match those of the astronomers, familiarity with the geographers' forms and public admiration of the geographers' exploration of unknown places on Earth, led to their adoption, which shaped the way we saw Mars for most of the 20th century. Lake's primary interest, therefore, is in the way the representation of Mars played a rhetorical function in social and scientific persuasion.

Similar types of argument are found in the studies by Marc Ratcliff (2004) and Charles Hankins (2006). Ratcliff's study of Abraham Trembley's generous dissemination of living specimens of polyps for others to observe and experiment on via dissection. Ratcliff argues that Trembley's generosity created wide-spread knowledge, both among scientists and the public, of a poorly understood creature; a willingness to allow experiments which had previously been viewed with some suspicion, and new techniques of both transportation of living specimens and experimentation. Thomas Hankins' most recent award-winning article uses a variety of biographical materials and correspondence to explain John Herschel's defense of graphical methods in debates during the 1830s with the likes of William Whewell. Back in the late 1970s, when the history of science was firmly in the "history of ideas" camp, Hankins opened the door for the development of historiographic methods with his defense of biography in the history of science (Hankins 1979). His new article is similar in style to history of economics articles which lie on the other end of the table, except that his focus is not on an idea, but rather on a graphical method. Hankins uses Herschel's defense of his graphical method for finding the orbit of double stars to bring together the common story about Herschel's place in the history of astronomy and his less well-known participation in the philosophical debate over the nature of induction and scientific knowledge. The interest of Herschel and other natural philosophers in graphs, Hankins

argues, came despite their disagreement on the nature of scientific method and nature of induction, because "graphs brought the hand and the eye to the aid of the mind. They gave shape to the numbers, shape that pictured the regularities hidden in them" (Hankins 2006, 633). Herschel's place in both the theoretical and philosophical stories was secured, Hankins argues, because of his graphical methods. Thus, Hankins' article shares similarities with both Kaiser and Maas and joins the other representational articles between them.

Loic Charles' (2003) article on Quesnay's *Tableau Economique* was awarded the best article award after a virtuoso performance at the History of Economics Society meeting. How appropriate that his article is the closest, among the history of economics award winners, to the science studies focus solely on practices. And yet ideas are not lost here, but illuminated by his overturning of the quest for the key to how Quesnay used his *Tableau* as a model (after Hankins and Kaiser and White, etc., might one not be forgiven for assuming that if it is a graph it must be a model? Charles response: no, not if you had bothered to figure out how images like the *Tableau* were used in France!). Charles argues that "the creation of the Tableau was of paramount importance in the development of Quesnay's economic thinking. It gave concrete shape to Quesnay's intuition of the economy as a set of economic variables interrelated by arithmetical ratios on the basis of which he was able to build a whole model" (Charles 2003, 544). But the *Tableau* itself was not the model: it was the representation of the economy that allowed Quesnay to begin.

Is the History of Economics Drawing Closer to the History of Science?

If we return to the table in Figure 1, we can make a preliminary response to question which introduces our conclusion.

Suppose you and I stand on opposite sides of the table in the middle, and take hold of the cloth at the mid-point, right between McCraw's biography of Schumpeter and Browne's biography of Darwin. Now let us lift the cloth up as if we were creating a pyramid, allowing the books and papers that had been sitting on the cloth to tumble toward either end of the table. What would be the result?

On the "Ideas" end of the table, we would find Hont, Lehoux, Wennerlind, Boianovsky, White, Moscati, and McCraw. Seven items in all: six of the 9 history of economics award winners (remember, Hands was already off the table), and only 1 of the history of science award

winners. On the “Practices” end, we would find Weintraub, Knowles and Leslie, Harkness, Browne, Kaiser, Newman and Principe, Lake, Charles, Ratcliff, Maas and Hankins. Twelve items in all: 9 of the ten history of science winners, and only 3 of the history of economics award winners.

The conclusion of our study of the award-winning works themselves is as clear as our result when we looked at the authors: just as historians of economics are not leaving economics departments to join Schabas in a history or history of science department, the works they are writing remain, by and large, histories of ideas. While historians of science now predominately write about scientific practices, historians of economics continue to write predominantly about ideas.

For those who would like to see the history of economics begin to move toward the history of practices, some hope can be seen in the increasing attention paid by historians of ideas to the role that the economist plays in the creation and dissemination of ideas, and to the interaction between economists and others (in our award winners, it is usually other social scientists or mathematicians) in the process of creating, defending and disseminating their theories. And, of course, they could also simply go out and write better histories, thereby winning the best book and article awards themselves!

Appendix I
Best Book Award Winners

	Pfizer (HSS)	Spengler (HES)
2004	***Charles Darwin: The Power of Place*** Janet Browne (Princeton University Press, 2003)	***Reflection without Rules: Economic Methodology & Contemporary Science Theory*** D. Wade Hands (Cambridge University Press, 2001)
2005	***Alchemy Tried in the Fire: Starkey, Boyle, and the Fate of Helmontian Chymistry*** William Newman & Lawrence Principe (University of Chicago Press, 2002)	***How Economics Became a Mathematical Science*** E. Roy Weintraub (Duke University Press, 2002)
2006	***Patterns of Behavior: Konrad Lorenz, Niko Tinbergen, and the Founding of Ethology*** Richard W. Burkhardt, Jr. (University of Chicago Press, 2005)	***William Stanley Jevons and the Making of Modern Economics*** Harro Maas (Cambridge University Press, 2005)
2007	***Drawing Theories Apart: The Dispersion of Feynman Diagrams in Postwar Physics*** David Kaiser (University of Chicago Press, 2005)	***Jealousy of Trade: International Competition and the Nation State*** Istvan Hont (Belknap Press of Harvard University Press, 2005)
2008	***The Jewel House: Elizabethan London and the Scientific Revolution*** Deborah E. Harkness (Yale University Press, 2007)	***Prophet of Innovation: Joseph Schumpeter and Creative Destruction*** Thomas K. McCraw (Belknap Press of Harvard University Press, 2007)

History of Science Society (HSS): The Pfizer Prize is awarded annually to the author(s) of a book that is viewed by the selection committee as an outstanding contribution to the history of science. The book must have been published in English during the three years prior to the year in which the Pfizer Prize is awarded. While books which contribute to the history of medicine and/or the history of science and technology may be considered, preference is given to books in the history of science because the Society for the History of Technology and the American Association for the History of Medicine each award their own prizes. The Pfizer prize is funded by Pfizer, Inc. The first Pfizer prize was awarded in 1959.

History of Economics Society (HES): The Joseph J. Spengler Best Book Award is awarded annually to the author(s) of a book that is viewed by the selection committee as the best recent book in the history of economics. The book must have been published in English during the two years prior to the Society's annual meeting at which the award is given. The Spengler Award was first bestowed in 2004.

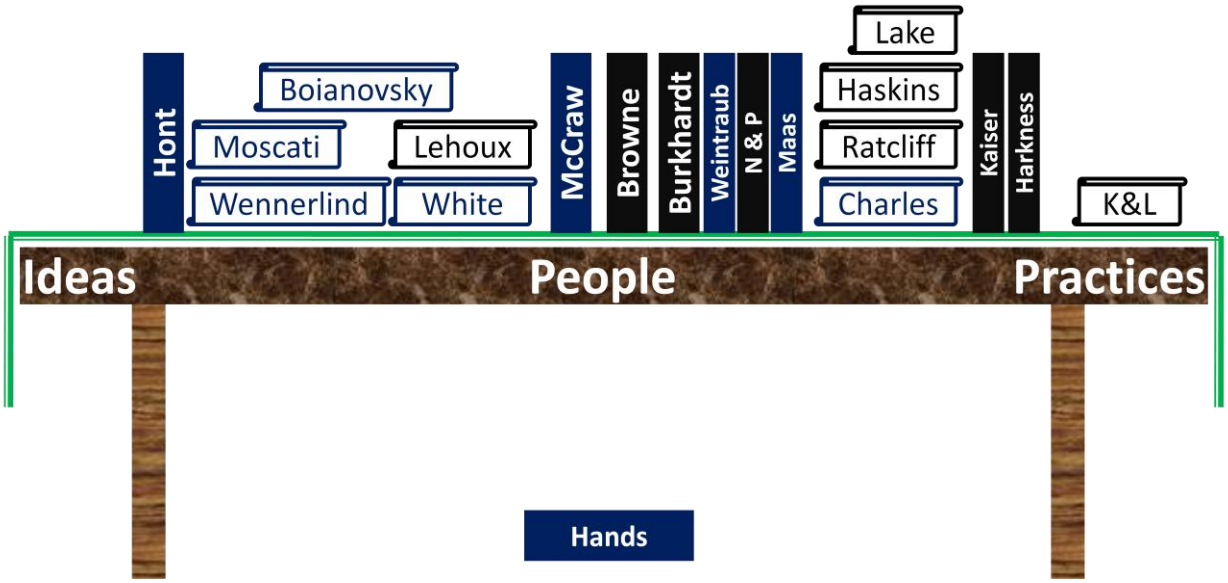
Appendix II
Best Article Award Winners

	Price/Webster (HSS)	Best Article (HES)
2004	**"Industrial Versailles": Eero Saarinen's corporate campuses for GM, IBM, and AT&T** Scott Knowles & Stuart W. Leslie (*Isis* 92.1 (2001): 1-33	**The virtual history of the *Tableau Economique*** Loic Charles (*European Journal of the History of Economic Thought* 10.4 (2003): 527-50)
2005	**Abraham Trembley's strategy of generosity and the scope of celebrity in the mid-eighteenth century** Marc J. Ratcliff (*Isis* 95.4 (2004): 555-75)	**In the lobby of the energy hotel: Jevons's formulation of the post-classical "economic problem"** Michael V. White (*History of Political Economy* 36.2 (2004): 227-71)
2006	**Geographers of Mars: Cartographic inscription and exploration narrative in late Victorian representations of the Red Planet** K. Maria D. Lane (*Isis* 96.4 (2005): 477-506)	**David Hume's monetary theory: Was he really a quantity theorist and an inflationist?** Carl Wennerlind (*Journal of Political Economy* 113.1 (2005): 223-37)
2007	**A "large and graceful sinuosity": John Herschel's graphical method** Thomas L. Hankins (*Isis* 97.4 (2006): 605-33)	**The making of chapters 13 and 14 of Patinkin's *Money, Interest, and Prices*** Mauro Boianovsky (*History of Political Economy* 38.2 (2006): 193-249)
2008	**Observers, objects, and the embedded eye: Or, seeing and knowing in Ptolemy and Galen** Daryn Lehoux (*Isis* 98.3 (2007): 447-67)	**Early experiments in consumer demand theory, 1930-1970** Ivan Moscati (*History of Political Economy* 39.3 (2007): 359-401)

History of Science Society (HSS): The Pfizer Prize is awarded annually to the author(s) of an article in *Isis* (the journal of the History of Science Society) that is viewed by the selection committee as a contribution of the highest standard to the history of science. The article must have been published in English during the three calendar years prior to the year in which the Price/Webster Prize is awarded. The Prize was known as the Zeitlin-Ver Brugge Prize from 1979 (when it was first awarded) to 1989, when it became the Derek Price Prize. In 2002, the name was changed again to honor Rod Webster.

History of Economics Society (HES): The Best Article in the History of Economics is awarded annually to the author(s) of an article that is viewed by the selection committee as the best recent article in the history of economics. The article must be published in English during the calendar year prior to the Society's annual meeting at which the award will be bestowed. The first Best Article award was bestowed in 1995.

Figure 1: The Books and Articles Arranged



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