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NOTES & DÉBATS

TELLING THE LIFE OF A MATHEMATICIAN: THE CASE OF J.J. SYLVESTER

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Biography as a genre for studying the history of science increasingly came under attack as the social history of science began to dominate the field following the publication of Thomas Kuhn's provocative book, *The Structure of Scientific Revolutions* (1962). As is well known, the approach to the history of science that developed tended to stress the collective over the individual and to emphasize the *production* of scientific knowledge over an analysis of that scientific knowledge *per se.* Even more recently, social constructivists like Steven Shapin [1992, p. 352] have trumpeted the "*irreducibly social character of scientific activity*" and have argued for the analysis of science through observation of "the processes by which community judgement coalesces around one or other boundary-frame, including the deployment of more stable cultural elements" [Ibid., p. 353]. The emphasis here is clearly not on the individual and the idiosyncracies of the individual experience but on the culture at large.

Writing in 1979, American historian of science and biographer of Sir William Rowan Hamilton, Thomas Hankins already had a sense of this more extreme position when he lamented that "today's historian of science ... is either positively anti-biographical, immersing himself entirely in the subject matter of the science without reference to anything outside of it, or he seeks the origin of scientific ideas in a context much broader than the individual scientist's mind" [Hankins 1979, p. 3]. In Hankins's view, this dichotomy was a false one; biography does have a place in the history of science, "and it comes precisely at the juncture between science and its

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cultural and intellectual context" [Ibid., p. 4]. By focusing on an individual and that individual's life course, biography provides a cross-sectional view of historical development and "gives us a way to tie together the parallel currents of history at the level where the events and ideas occur" [Ibid., p. 5]. Moreover, "if biography is honest," Hankins argued, "we can learn a great deal about the way in which science works, and we can also be protected from too-hasty generalizations" [Ibid., p. 5].

Hankins was not alone in his defense of biography. Two years later in 1981, Larry Holmes also argued for the potency of biography as a methodology in the history of science, and he specifically cautioned against a one-sided emphasis on context over content. He stated "[f] irst, that the study of what is variously referred to as the 'intellectual' history of science, the 'internal dynamic', or the 'cognitive' side of scientific development is as fresh and new, as underdeveloped, as urgently in need of more concentrated, penetrating analysis as is the study of the 'social dimension'. Second, ... it is only through a profound understanding of these subjects that we can know what it is that the various contexts surround" [Holmes 1981, p. 60]. In Holmes's view, closely studying the individual provides the historian of science with insight into the creative process that the more sociologically oriented methodologies cannot. At the same time, he acknowledged that while "[t]he programme which Ihave outlined differs from those recently set forth by social historians of science who are directing our attention to institutions, the social milieu, prosopography, and the audience for science," "[i]t is not however a competitive alternative direction, for these are complementary endeavours. We can never return to the situation in which theories, concepts, and discoveries were followed without regard for these other dimensions" [*Ibid.*, p. 69.].

In 1988, Charles Rosenberg, then the editor of *Isis*, devoted an editorial to similar issues and concerns. Entitled "Woods or Trees? Ideas and Actors in the History of Science", the editorial stressed that "[a]n actororiented approach seeks to appropriate the individual in the service of transcending the individual and thus the idiosyncratic: it seeks to use an individual's experience as a sampling device for gaining an understanding of the structural and normative" [Rosenberg 1988, p. 569]. As Rosenberg was quick to add, however, "[t]his is not to denigrate biography as genre or prescribe a particular style of biography" [Ibid., p. 569, note 3]. He merely aimed to make the point that "unless the would-be biographer tries to reconstruct a protagonist's social world ...—to write a life in a very particular time—he or she will hardly succeed in explaining that subject's actions or evaluating the motives that impelled them" [Ibid.].

L. Pearce Williams, author of a ground-breaking biography of Michael Faraday, concurred, as he took the case for biography even further. Writing in 1991, he held that the history of science aims to come to an understanding of three basic aspects of science and its development the scientific culture at any given point in time, the process of scientific innovation, and the dissemination of scientific knowledge. He contended "that biography is absolutely essential in each of these stages, although it is curiously rejected by both historians and the social constructivists" as too particularistic [Williams 1991, p. 203]. Specifically, Williams argued that "[t] he description and explanation of the creative work of the giants of science ... [is] fundamental to the history of science. Quite simply," he continued, "the life of science depends upon minds with new insights and new theories" [Ibid, p. 209]. Although this may seem like a throw-back to the "bad old days" when the history of science only concerned itself with the "giants," Williams simply wanted to suggest that historians of science not allow the "giants" to be lost in what he immoderately termed the "social swamp" [Ibid., p. 204].

By 1996, then, there was a sense that biography was being or, in fact, had been passed by in the quest for the social construction of scientific knowledge at the same time that it was more and more in demand by a public "hungry for news about science" that "consumes scientific biography with relish" [Shortland and Yeo 1996, p. xiii]. This was how Michael Shortland and Richard Yeo described the seeming contradiction in the preface of their edited volume, *Telling Lives in Science: Essays on Scientific Biography.* Their quest, therefore, in bringing together ten historians of science to analyze scientific biography was to focus on it as a "genre, its status and influence" [Ibid.]. They sought to address questions such as: is biography a potent methodology for the history of science? what insights can it provide? what sorts of questions are beyond its methodological reach? how does it fit in the post-Kuhnian historiographical climate? how should it be done? But their over-arching

objective was to provide a forum for self-reflection. In their words, "very little criticism or comment has accompanied the recent resurgence of interest in scientific biography" [Shortland and Yeo 1996, p. xiii].

In perhaps the most thought-provoking and self-reflective essay in the volume, Thomas Söderqvist argued strongly for what he called "an existentialist approach to science biography" [Söderqvist 1996, p. 60]. In his view, "an existential approach does not mean a rejection of the importance of the social life of the individual, nor does it involve an uncritical individualist viewpoint" [Ibid, p. 61]. Rather, it is "an analysis of the life of a concrete, individual researcher, not a case study of what it means to be a scientist in general" [Ibid., p. 62]. Söderqvist also specifically contrasted existential biography with other predominant strains within the genre:

"An existential reconstruction of the subject's life is therefore made from the inside, in an attempt to narrate the development of his life 'as it is directly experienced by the biographical subject.' Hence, existential biography is distinct from (a) social biography, in which the individual is contextualised with reference to his 'situatedness' in a certain time, a certain culture, etc.; (b) psychobiography, in which certain traits of the subject's personality or his achievements are explained with reference to psychological theory; and (c) biographical case histories aimed to generalise about genius, creativity, or the life cycle. All such approaches are external to the experiencing individual confronted with his existential choices" [Söderqvist 1996, p. 73].

Whether existentialist biography in Söderqvist's sense can be achieved especially given the incompleteness of the historical record—is a question open for debate. Of importance here is the fact that he so thoroughly analyzed and considered various methodological approaches and made an argument not only for biography as what he called "an edifying genre" [Söderqvist 1996, p. 45] but also for the particular approach that best seemed to fit his subject, the twentieth-century immunologist, Niels Jerne.

It is this kind of self-conscious reflection about methodology that historians of mathematics have tended not to do enough of. Relative to biography as a methodology, Hankins, Holmes, Rosenberg, and Söderqvist each engaged in this kind of reflection, analyzing its strengths and limitations. And while they may not agree on one style of biography as the "best", on the precise ends that biography most naturally serves as a methodology for the history of science, they do all agree that biography is an important genre for the field because it allows us to comprehend the individual scientist and scientific accomplishments within his or her cultural milieu in ways that more sociologically oriented approaches cannot. It allows us, among many other things, to follow the scientist's thought, to see how he or she conceived of a theory, to witness science in the making. That said, biography has limitations as a methodology. It concentrates on one particular life. Clearly, how the subject interacts in scientific and in broader society is a part of the story. Institutions, community opinion, the formation of consensus, all of these play a role in biography, too, but they are secondary to the person's life story. Biography can illuminate how broader sociological forces shape an individual, but it does not analyze those forces *per se*. Other methodologies serve that purpose. Still, as Hankins, Holmes, Rosenberg, and Söderqvist also tacitly agree, understanding an *individual*—in contradistinction to the dynamics of a collective—is important. I will take this as my starting point as well in looking at biography as a methodology for the history of mathematics.

In his defense of biography, Thomas Hankins isolated perhaps the most important criterion the genre must satisfy in order for it to serve as a methodology for the history of science: "it must deal with the science itself" [Hankins 1979, p.8]. Consider the biography of a scientist that ignores the science. If it develops the scientist's personality or character, then it may be enlightening as a psychological study and hence as methodology for the psychology of science. If it illuminates the day-today aspects of the scientist's social—as opposed to creative—scientific life, then it may be a useful methodology for the sociology of science. In order, however, to be a fruitful methodology for the *history* of science, it must shed light on that aspect of a scientist's life that makes him or her a scientist and not a novelist or a business tycoon or a political figure. namely, the actual science done. This is not to imply that the psychology of science or the sociology of science do not or should not inform the history of science. Nor is it to imply that the aspects of the scientist that these subfields treat are easily separated and clearly delineated in the process of trying to come to terms with the individual as a whole. It is, however, to take a stand on the role played by the creative process of doing science and by the scientific ideas ultimately produced in the life of the