

Scientific Biography: Still Fertile Soil for Cycling History¹

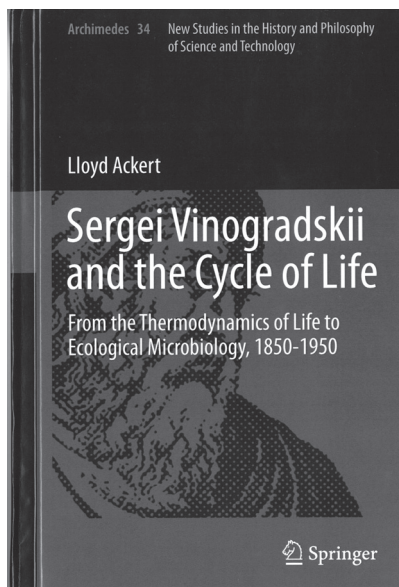
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Biographies are curious creatures for historians, serving as they do dual functions as both historical source and a way of doing history itself. It is the latter that this essay is most concerned with, because the former function, as historical source — albeit with the proper precautions — is relatively unproblematic. Where the value of biography as a way to doing history is concerned however, the question lies wide open. On the one hand are historians such as Robert Rotberg, himself the author of four biographies, who would have it that “Biography is history, depends on history, and strengthens and enriches history. In turn, all history is biography” (2010, p. 305). Citing a 1994 poll on reading habits in Britain that revealed biographies to be the most popular category of non-fiction, another distinguished member of our ranks, Mary Jo Nye noted that such writing thus offered historian of science — an admittedly small crowd within academia — “an opportunity to reach a potentially broad audience” (2006, p. 322). According to the historian of molecular biology Soraya de Chadarevian, “The biographical format seems well suited to bring science to broader audiences by providing a human dimension to what might seem like a daunting or arcane subject” (2011, p. 408).

Yet, despite such claims for its value and popularity, biography as history draws much criticism from the profession. A colleague pointed out recently that biography is a genre that teachers often discourage graduate students from undertaking, at least as a dissertation project, for it “poses challenges and risks to emerging scholars” (Davis, 2014, in press). Its uses notwithstanding, another historian acknowledged, “the biographical study of scientists <...> has mostly seemed anodyne rather than profound” as a historical tool (Porter, 2006, p. 314). Even as she lauded the biographical format, de Chadarevian admitted that in the history of science it “has been the subject of animated debates, as the format may seem to reinforce a narrative around great (mostly male) scientists from which the field has tried to distance itself” (2011, p. 408).

Evident in these statements is a tension in the historical community, sharpened I venture to say among historians of science, in the perceived values and risks of biography as a way of doing history. Despite the publication and popularity of biographies of eminent scientists — Darwin is ever a staple and not just because of his now 3-year-old bicentenary² and Galileo is



¹ Review of book: *Ackert L. Sergei Vinogradskii and the Cycle of Life: From the Thermodynamics of Life to Ecological Microbiology, 1850–1950*. Dordrecht, Heidelberg, New York, London: Springer, 2013. 191 p.

² Rotberg (2010, p. 310) points out that even before she embarked on her research for her magisterial two volumes of Darwin’s biography (1996; 2002), Janet Browne “drew on the thirty or so earlier biographies”.

another perennial favorite³ — there has persisted a need to justify the genre in this latter guise. As far back as 1979 for instance, the historian Thomas Hankins titled his essay on the uses of biography as a “defence”, on the grounds that scientific biography was not enjoying a very good reputation at the time (p. 1). As the historian of science Mott Greene observed, “Biography is and always has been one of the principal narrative modes of the history of science, and reflection on biography, and its role in scholarship, is also an ongoing tradition of our discipline” (p. 727). Defining historical biography as a specific way of doing biography, in which the “biographer tries to see through the personality to obtain a better understanding of contemporary events and ideas” Hankins argued that it presented “particular problems for the historian of science, because of the great difficulty of integrating science into the rest of human intellectual endeavor” (1979, p. 2). The author of a very well-regarded biography of the enlightenment-era figure Pierre-Louis Moreau de Maupertuis, Mary Terrall (2006, p. 307) admitted that in the early phases of her research on Maupertuis’ scientific works, she was quite resistant to the biographical approach, regarding it “as too restrictive and redolent of the outmoded emphasis on great men or, more especially, great minds”. Eventually, however, she did go the route of a historical biography, realizing that it was “the most obvious solution” to her problem of wanting to “ground the ideas and theories I was deciphering in the life and experiences of their author” (Terrall, 2006, p. 308).

Neither Lloyd Ackert, the author of *Sergei Vinogradskii and the cycle of life*, nor his doctoral advisor Dr. Daniel Todes seem to have harbored any doubts or misgivings about the value of biography in the history of science as made clear at the outset of the prefatory acknowledgments of the book. This is not to imply that they are oblivious of the ongoing discussions about biography itself — indeed, Ackert cites Hankins right in his preface (p. xv) — but simply that they chose the approach for its many merits as a way of doing history of science. We should be grateful for this fact, because rather than waste time and space justifying his choices, Ackert gives us a slim (under 200 pages) yet detailed account, not only of the life of his chosen scientist, the Russian microbiologist Sergei Vinogradskii (1856–1953), but through that lens also, a history of soil microbiology and ecology, the rich histories of which fields have all too often been overlooked by historians of the life sciences in favor of more “fashionable” biological fields such as genetics, molecular and evolutionary biology. Such a rescue is timely indeed in an age when most students of biology, “might never even *hear* of the existence of soil microbiology” except as it pertains to the origins of antibiotic research, according to James Strick who teaches the history of science within the context of a department of earth and environment (personal communication, 2014).

“Who is/was Sergei Vinogradskii and is he deserving of a scientific biography?” a historian of science might well ask. After all, despite the dangers noted by Terrall and others of the undue emphasis on ‘great men’ placed by biographies, “the ‘little man’ never finds his way into biography. If he did the biography would never be read” (Hankins, 1979, p. 11). But does Vinogradskii qualify as a ‘great man’ in science? The answer depends somewhat the person to whom the question is posed. Having majored in microbiology as an undergraduate student and thus, learned about Vinogradskii early on as a matter of course, I can personally attest to the fact that he was no ‘little man’. His name is virtually synonymous with such important ecological phenomena as the nitrogen cycle and microbes that we call the sulphur and iron bacteria. My recognition notwithstanding, there’s no denying the fact that Vinogradskii is relatively unknown to most English-speaking folk outside the fields of microbiology, ecology

³The following is a sampling of Galileo biographies published within the last decade alone (Biagioli, 2010; Heilbron, 2010; McNeese, 2009; Wootton, 2010).

and soil science. But it is precisely because of his importance within his field and relative obscurity outside of it that Vinogradskii is an ideal subject for a biography. Ackert's particular background and skills — notably but not exclusively, his proficiency in Russian — makes him the ideal person to be tackling an English-language scientific biography of Vinogradskii.

For his part, Ackert offers this biography as a contribution to the recent improvement in the efforts and achievements of historians of science to pay due attention to the largely neglected area of soil science:

“Through his biography, I begin to explore the growth of this science at the turn of the century when it was first becoming an established discipline. Introducing the concept of autotrophism and the elective culture method into soil science, Vinogradskii brought that science into contact with microbiology. As these disciplines expanded divided into subfields in the twentieth century, his contributions facilitated their transformation into ecological sciences” (Ackert, 2013, p. xvi).

Ackert thus, uses the life and times of Vinogradskii to reconstruct two parallel histories: one of the scientists' personal trajectory — very broadly speaking, his transformation “from a botanist to an ecologist” (2013, p. xvi) — and the second, the history of the transformation of the “cycle of life” concept from its inception as a “popular, quasi religious holistic view of nature into an experimental method applied in plant physiology, then microbiology, soil science, and ultimately in ecological microbiology” (2013, p. xiv–xv). Both in this book and his other publications (e.g. Ackert, 2006), Ackert has portrayed the cycle of life as something of Vinogradskii's leit-motif, a vision of nature that he was introduced to by the Russian botanist Andrei Famintsyn (1835–1918), his first mentor, but which he took ownership of and developed in his own fashion over the course of half a century. First through his studies of fungal nutrition in a laboratory of plant pathology and later through his investigations of different soil bacteria, he developed an ecological sensibility that permeated his broader view of life and transformed his notion of the cycle of life, which in turn, had very wide-reaching influences.

The parallel stories of the lives of Vinogradskii and the cycle of life are rendered concisely yet skillfully into ten chapters (in five parts) sandwiched between a brief introduction (p. xiii–xviii) and a conclusion (Ch. 11, p. 173–178). Rather than reveal too much more of the content here — interested readers can and should just go to the mother lode for their information — I will spend the remainder of this essay reflecting on the effectiveness of this biography as history and particularly, as history of science.

According to Hankins, if a biography “is honest, we can learn a great deal about the way in which science works, and we can also be protected from too-hasty generalizations” (1979, p. 5). The type of honesty referred to in this passage is the biographer's willingness and ability to accept and describe those “perversities” of human nature that make an individual — who comes with “scientific, philosophical, social and political ideas wrapped up in a single package” — to be keeping “two provinces of his mind completely distinct (usually at that precise point where we are looking for a connection)” (Hankins, 1979, p. 5). Or to quote another veteran, Stanley Wolpert, whose turf is South Asian history, “Biographers should always question their own biases when selecting a subject, and continue to challenge their prejudices at every stage of their research and writing” (2010, p. 409). In my view, Ackert fulfills these criteria of honesty more than adequately. Although he obviously holds Vinogradskii in high esteem, the book never slips into hagiography and does not skim over the junctures of its subject's life where the package that was Vinogradskii contained its share of “contradictions, blind-spots and irrelevancies” that Hankins claimed are likely to be present in any individual (1979, p. 5).

One might expect that an autobiography, which is after all a sub-category of biography, should be held to the same standards of its parent genre, and yet for precisely the reasons of an individual's ability to separate different provinces in his or her mind, the type of honesty Hankins demanded of biography is not always possible in a first-person account. Certainly it would seem from Ackert's description of Vinogradskii's synthetic and autobiographical treatise, *Soil Microbiology*⁴, which the latter began at the age of 93, that it was susceptible to the pitfalls of Whiggism that Hankins especially warned historians of science against: "In no other field of history does knowledge seem to build so obviously upon previous knowledge, events upon previous events" (1979, p. 5). Despite the subject-oriented title of his book, Vinogradskii had, as Ackert describes

"revealingly, structured [it] in order to highlight his unique contributions to the history of ecology. Arranging it thematically rather than chronologically, it is clear that <...> he meant it as a reformatory call to action — at once reminding readers of his own legacy and directing them to the progressive ecological significance of his work" (p. xiii).

Ironically, this objective analysis of Vinogradskii's motives in writing *Soil Microbiology*, is the earliest and clearest, but by no means the only, example of Ackert's intellectual honesty in describing his biographical subject, whom he otherwise, evidently admires.

Admiration is often a reason for choosing a biographical project even if, as Nye (2004) pointed out somewhat self-effacingly it is "hardly an objective view" (2006, p. 328), in her case, for choosing to write a biography of the physicist Patrick Blackett (1897–1974). Of course Nye had good reasons, well-grounded in the area of her expertise — the history of physics — for her attraction to Blackett as a subject: "for the originality and breadth of his scientific work, for his principled socialist politics, and for his courageous stands against wartime civilian bombing and against postwar development of nuclear weapons" (Nye, 2006, p. 328).

Even the successful outcome of Nye's biography of Blackett, however, leaves open the question as to whether or not admiration is a good enough reason to embark on such a venture. "Hagiography is probably the most common potential pitfall for any biographer, since all of us probably choose our subjects because we admire them" warns Wolpert (2010, p. 410). In addition, there is always a chance that the biographer might find material that causes an about face, or at least a tempering of his or her initial enthusiasm for the subject. When he embarked on his research into the Indian statesmen Bal Gangadhar Tilak (1856–1920) and Gopal Krishna Gokhale (1866–1915), Wolpert remembers doing so with a "decided initial preference for the "revolutionary" Tilak and a radical student's distrust of the "conservative" Anglophile Gokhale". But sometime during his year of primary-source research in India his views were reversed: "At one point, I was suddenly surprised to realize that I had come to admire Gokhale's secular humanitarian sagacity far more than Tilak's traditional Hindu religiosity and advocacy of political violence" (Wolpert, 2010, p. 409–410). Closer to home, i.e. in scientific biography, Thomas Söderqvist, the author of a biography of the Danish immunologist Niels Jerne has admitted, "True, I admired Jerne's intellectual capacity and abilities as a life scientist, but I rapidly became much more critical of him as a human being". In fact Söderqvist added, "It was breakthrough: I allowed myself to not like Jerne" (2006, p. 117–118). Also to keep in mind, is that in Söderqvist's case, admiration was not the initial impetus for his biography. As he has recounted on more than one occasion (1996; 2006, p. 100–102; 2011) he came across Jerne serendipitously. "I actually had been on the lookout

⁴Title in text provided in translation from French; citation for original edition: Winogradsky, 1949.

for an interesting person (indeed any subject of some intellectual interest!) to write a biography about when Jerne showed up by accident" (2006, p. 100).

That Ackert, unlike Söderqvist, retained his admiration for his subject is not in much doubt from this book, but it is not clear whether this regard was the prod for or product of his research. My suspicion would be the latter, for other than the opening credits thanking his advisor for helping him in choice of topic and approach (Ackert, 2013, p. vii), Ackert does not spell out details of the circumstances that led him to Vinogradskii. I must admit that this is a unconfirmed suspicion that may never be resolved one way or another. But the unique package of qualities that Vinogradskii represented might provide some better clues to discern Ackert's choice. For one, there are the geographic reasons: Vinogradskii was from Russia, a part of the world that has a rich history in the sciences, which is largely inaccessible to Western graduate students due to the language barriers. Ackert's advisor, Todes is a scholar of Russian science — the premier Pavlov scholar in the English language (see e.g. 1981, 1997, 2001, 2003) and has also written about Darwinism in Russia (e.g. 1987, 1989) — and so it's not surprising he would point a graduate student, and one with prior knowledge of language, toward a Russian scientist. But there are other Russian scientists, some probably better known than Vinogradskii, and it's likely that it was the fact that Ackert also had a background in evolution and ecology that made him the right biographer to tackle the life of a microbial ecologist.

I may be somewhat precipitate in labeling Ackert as a biographer, for unlike Söderqvist, history of science and not biography seems to have been his primary goal here. That is to say, for Ackert the biographical approach was evidently (harking back to Terrall) the "obvious solution" to integrating the histories of Russian science, soil microbiology, ecology and naturally, the story of this one scientist. Indeed he has composed two biographies, the second one being that of Vinogradskii's cycle of life concept. The final chapters of the book (Ch. 9 & 10) are devoted to the impact of Vinogradskii's contributions and ideas, not only in his immediate circles but beyond. As the title indicated the time-span covered in this book, is an entire century, 1850–1950 CE, which exceeds not only the normal life span of most humans, but also — even granting that Vinogradskii lived to the age of 97 — well beyond the career span of any single individual. By tracing the history of the cycle of life beyond Vinogradskii, Ackert has shown us how to successfully harness biography to do history, a valuable lesson for those who might be tempted by this approach, but reluctant to adopt it for the various reasons cited earlier. Paradoxically perhaps, this biography also mitigates the very problem discussed earlier as one of the strongest criticisms against the biographical approach to history, for by focusing on Vinogradskii, Ackert has illuminated an important chapter in the origins of modern ecological thought that is from a separate intellectual lineage than the foundational contributions of 'great men' such as Linnaeus and Darwin told by other historians (Worster, 1994).

Ackert's success in making his biography work as history of science is, in large part I believe, due to the fact that it meets the first of the criteria of a scientific biography that Hankins identified, namely that it "must deal with the science itself. <...> What the reader needs to know is how the scientist went about his task, how his ideas developed, and how he tested them" (1979, p. 8). Or as Mary Terrall put it, "If a biography is also to be a work of history of science, it must analyze ideas, intellectual sources, training, controversies, calculations, experiments, and so on and put these elements into the life" (2006, p. 309). Every reader will leave this book with a very tangible sense of Vinogradskii's scientific world, for Ackert offers a wealth of detail about the intellectual, material and technical aspects of the different stages of his subject's research life. In the beginning, for example, there was his apprenticeship in Famintsyn's plant physiology laboratory where his mentor had "designed and built several complicated pieces of laboratory equipment, which he had used effectively in his

investigations of photosynthesis”, and where Vinogradskii himself had access to the relatively rare “microscope camera to observe for a prolonged period the development of single isolated cells” (Ackert, 2013, p. 14–15). We find out that during this time, because of his “need to see himself as an innovator and virtuoso” in his chosen pursuit, Vinogradskii began to expand his horizons beyond the work in the lab through independent reading, to which he attributed “his awakening of his interest in Pasteurian microbiology” (p. 13), which as Ackert has shown, greatly influenced the conceptualization of his cycle of life. We also learn about the specialized glassware, e.g. Geissler chambers, and recipes for the media called Pasteur’s Liquid, which Vinogradskii used in his studies of fungal nutrition (p. 30–31) as well as about the “snow white *Beggiatoa-velvet*” (p. 44) that he encountered growing near sulphur springs during expeditions to various German and Swiss spas to find new organisms for his research. I have mentioned examples from the first part of the book only, but rest assured this level of detail is sustained till the end. And yet, Ackert has succeeded in integrating the material into his narrative skillfully enough that a reader will not leave with a sense of being overburdened with irrelevant details, and no coherent bigger picture.

One final feature of scientific biography that I would like to touch upon before concluding my piece is that of audience, discussed by various historian either explicitly as such by Nye for example (2006), or by Hankins under the heading of “readability” (1979, p. 9). To be sure *Sergei Vinogradskii and the cycle of life* is not a work of high “literary art” which Hankins dictated (overreaching somewhat in my opinion) as an unquestionable attribute of writing biography, but then, Ackert does not profess to such ambitions. His work is eminently readable, written clearly and directly in easy-to-understand English, without the excessive use of insider’s jargon. That said, however, it may not be entirely effective in reaching out to wider audiences than historians of science in the way that Nye (2006) and others, including the historian John Heilbron (1987), have proposed. While I heartily agree with their suggestions, I do think that the demands of academia vis-à-vis publishing — especially the push to publish with academic presses — do not make it easy on scholars to realize such goals, especially early in their careers. For example, Vinogradskii’s biography, which is Ackert’s first book, is published by Springer as Volume 34 of their Archimedes series on the history and philosophy of science, technology and medicine and at 129 USD (99 USD for the electronic version) is simply too expensive even for a captive audience of graduate students let alone for the casual browser. But for the professional historian of science, especially one with access to a library budget, it is a must-have, not only as a solid work in a less represented area of science, and as an exemplary model, but also as proof positive that genre retains currency as a way to do good history.

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