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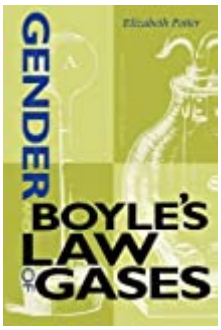

Elizabeth Potter. *Gender and Boyle's Law of Gases.* Race, Gender, and Science Series. Bloomington and Indianapolis: Indiana University Press, 2001. xiii + 210 pp. $39.95 (cloth), ISBN 978-0-253-21455-3.

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Gender Studies Abhors a Vacuum

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Academics seem to enjoy reading prefaces and the acknowledgments they contain. I, for one, enjoy thinking about the author as a person before encountering her as an authority. And sometimes the author has a particularly good story to tell about how she came to write the book one has just opened. The alternately hilarious and scathing preface to Rachel Maines' *The Technology of Orgasm* is a recent classic in this genre.[1] Only slightly less amusing is the introduction to Elizabeth Potter's *Gender and Boyle's Law of Gases.*

There, Potter, who is the Alice Andrews Quigley Professor of Women's Studies at Mills College, recalls an early 1980's meeting of the Boston University Philosophy of Science Colloquium. The meeting featured a two-day session on the then-emerging field of gender and science studies. At that point, only a few of the formative texts in gender and science studies had appeared: books like Carolyn Merchant's *The Death of Nature* and Evelyn Fox Keller's *A Feeling for the Organism.*[2] At the Boston meeting, Potter watched Keller, arguably the doyenne of gender and science studies, field the following objection from an audience member: "Yeah, but you'll never show that gender affects something like Boyle's Law!" (p. ix). If the comment didn't quite stick in Keller's craw, it certainly did in Potter's. Two decades later, Potter has successfully shown that gender analysis can indeed provide an importantly relevant context for understanding this mainstay of chemical law.

At first, second or even fifty-eighth blush, Boyle's Law does not seem the most promising subject for a feminist scholar. After all, where does one even begin to look for the gendered assumptions in k=pvt (in non-mathematical terms: the pressure, volume, and temperature of a gas remain proportional to one another)? And of all people, the seventeenth-century chemist Robert Boyle, often considered the father of modern experiment, ought to have made his work immune to the vicissitudes of politics.

It will come as no surprise to H-Women readers that this wasn't the case. It will also come as no surprise to all those historians of science for whom Steven Shapin and Simon Schaffer's *Leviathan and the Air-Pump* is a classic.[3] Shapin and Schaffer demonstrated that

Boyle's debates with Thomas Hobbes over his air-pump experiments–which, as it happens, were crucial to his law of gases–hinged on disagreements about Civil War-era politics rather than simply on differing but "objective" interpretations of natural phenomena.

Potter pushes this analysis one important step further. Boyle's views about the dangers of civil unrest in mid-seventeenth century England dovetailed with his views about appropriate behavior for women. Potter sums up this latter view: "Womanly women are chaste and modest, and serve men who, as manly, are chaste and modest experimental philosophers" (p. 9). By contrast, the radical sectarians whom Oliver Cromwell so bitterly disappointed not only welcomed women among their ranks but also supported their efforts to expand women's freedoms. Potter convincingly argues that Boyle's religiously tolerant but anti-sectarian position on women and Civil War radicalism steered him toward the mechanical philosophy rather than the hylozoism (belief in nature being infused with spirit) favored by radicals. The mechanical philosophy would undergird his gas law; thus we are circuitously, but nonetheless solidly shown the connection between gender and Boyle's Law.

Potter rightly situates Boyle's politics within his family's status as wealthy Anglo-Irish landowners. Along with influential friends like Samuel Hartlib and Katherine Ranelagh, Boyle believed that the best way to protect their class and economic interests was to "return men to reasonable religion" and counter-balance monarchical power with a strong landed lass (p. 65). Similarly, Boyle sought to strike a kind of bourgeois middle path between traditional aristocratic models of womanhood (too "bold and impudent") and radical sectarian models of womanhood (too "publicly disobedient") (pp. 77-84). In short, Boyle's Law was just one expression of his broader commitment to hierarchical order (if not exactly the traditional hierarchical order) in the face of grave uncertainty in seventeenth-century England.

As a philosopher, Potter also wants to assert something beyond the historical particulars of Boyle's Law and gender politics. Near the end of her book, she usefully argues that we cannot simply label scientific work "bad" if we find that it has been influenced by values–even values of the non-epistemic and non-cognitive type (p. 172). Boyle's interpretation of what happened in his air-pump and J-tube experiments was not the only plausible one (pp. 161-171); in fact, we frequently (some would say always) find that the available data do not determine how we interpret them. Something besides simple observation, then, must help scientists decide which interpretation makes the most sense. Potter, like so many feminist philosophers before her, argues that it's at those junctures that gender, racial, class, religious, and other values influence scientific decisions.[4]

I have two serious concerns about *Gender and Boyle's Law of Gases*, though I do not believe that either criticism ultimately threatens the validity of Potter's argument. My first criticism has to do with the cohesiveness of the text for the reader. At the level of individual points, Potter's prose is wonderfully clear. However, it is often difficult for the reader to see along the way how particular parts of the argument–sometimes even whole chapters–fit into the broader thesis. For example, chapters three and four, "Economics, Politics, and Religion: Stuart Conflicts with Parliament" and "Civil War Approaches" respectively, provide the reader with relevant background about the English Civil Wars. Nowhere in either chapter, however, does Potter make clear how precisely this background serves her argument. A knowledgeable, extremely careful reader will eventually see the point, but I believe it is the author's responsibility to provide more signposts. I also think readers would find it helpful to have more illustrative diagrams of Boyle's experiments. Potter's description of the J-tube experiment in chapter 15, for example, would have been far easier to follow had the author provided an illustration.

My other concern is that most of the material that Potter cites is not recent. Despite the abounding recent literature on the English Civil Wars and Robert Boyle himself, for instance, the author almost exclusively cites secondary material from the 1950s to mid-1980s. I do not mean to suggest that histories written more than fifteen years ago automatically have become obsolete. One just wonders how different this book might look if Potter had grappled with Lawrence Principe's 1998 biography or Michael Hunter's extensive research on Boyle and mid-seventeenth century English science[5]; or with recent analyses of gender and the mechanical philosophy, particularly in the work of Margaret Cavendish[6]; or with expanded knowledge about women's involvement in the Civil Wars more generally[7]. Again, from what I have read of this more recent literature, I do not think the basic validity of Potter's thesis would suffer. However, in its finer grains, the story perhaps should look different.

This book is the latest in the wonderfully produced Race, Gender, and Science series from Indiana University Press, edited by Anne Fausto-Sterling. The fourteen books that have appeared so far in this series have sub-

stantially expanded the field, and the ones I have read have been outstanding. Those instructors seeking texts for undergraduate students ought to look elsewhere first, however. Potter's book, and the others in this series with which I am familiar, would be rough going for an undergraduate, though potentially a good challenge for a senior seminar. By saying this, I do not mean to detract one iota from the importance of these texts for scholars. I simply hope to encourage the increasing trend toward *also* writing and publishing texts that undergraduate and lay readers can reasonably absorb.

Women's and science studies scholars ought to hope for more material on gender and the physical sciences (including physical and inorganic chemistry)–in other words, more texts like Potter's that dare to consider how gender values have molded even the "hardest" sciences. Ultimately, perhaps, we can rebut any comment that begins with the words, "Yeah, but you'll never show that gender affects something like…."

Notes

[1]. Rachel P. Maines, *The Technology of Orgasm: "Hysteria," the Vibrator, and Women's Sexual Satisfaction* (Baltimore and London: Johns Hopkins University Press, 1999).

[2]. Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution* (San Francisco: Harper & Row, 1980); Evelyn Fox Keller, *A Feeling for the Organism: The Life and Work of Barbara McClintock* (New York: W. H. Freeman, 1983).

[3]. Steven Shapin and Simon Schaffer, *Leviathan and the Air-Pump: Hobbes, Boyle, and the Experimental Life* (Princeton, N.J.: Princeton University Press, 1985).

[4]. For more on these points, see Helen Longino's magnificent book, *Science and Social Knowledge* (Princeton, N.J.: Princeton University Press, 1990).

[5]. Lawrence M. Principe, *The Aspiring Adept: Robert Boyle and His Alchemical Quest, including Boyle's 'Lost' Dialogue on the Transmutation of Metals* (Princeton, N.J.: Princeton University Press, 1998). For Hunter's work, begin with his *Robert Boyle Reconsidered* (Cambridge and New York: Cambridge University Press, 1994). Also see John Rogers, *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton* (Ithaca, N.Y.: Cornell University Press, 1996).

[6]. Anna Battigelli, *Margaret Cavendish and the Exiles of the Mind* (Lexington: University Press of Kentucky, 1998); Sarah R. Moreman, " 'Every Wise Woman Buildeth Her House': Margaret Cavendish's Rhetorical Strategies for Self-Authorization" (Ph.D. diss., Texas A&M University, 1998); Rebecca Merrens, "A Nature of 'Infinite Sense and Reason': Margaret Cavendish's Natural Philosophy and the 'Noise' of a Feminized Nature," *Women's Studies* 25 (1996): 421-438; Lisa T. Sarasohn, "A Science Turned Upside Down: Feminism and the Natural Philosophy of Margaret Cavendish," *Huntington Library Quarterly* 47 (1984): 289-307.

[7]. For example, see Stevie Davies, *Unbridled Spirits: Women of the English Revolution, 1640-1660* (Toronto: Women's Press, 1998).

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