

imaginary diseases, and in his own words 'doglike,'" (69) Kepler, or Albert Einstein, both a searching genius and a misogynist, who once wrote to an admirer: "where you females are concerned, your production center is not in the brain" (cited on page 187).

Additionally, because Wertheim is not bound by the conventions of academic writing, she is able to speak to bigger issues than often cannot be discussed in academic writing. This has two sides. For example, could any academic countenance writing a book about twenty-five hundred years of the history of science in Western culture in a scant two hundred and fifty pages? Because she has not written an academic piece, Wertheim can be given over to sweeping conclusions, and to vague and tantalizing connections. For example, is physics essentially mathematics? (As she points out, today about half of the degrees granted in math go to women, while the percentage is vastly different in physics. This indicates that "mathematics" and "physics" are not coterminous.) Yet the scale of the issues tackled, and their accessibility, could not have come from an academic work. To be sure, a wider audience will be able to engage these critical issues only through an accessible book, such as *Pythagoras' Trousers*. I look forward to further, more careful work by Wertheim in tackling this cautious, painstaking, and less ambitious, task.

So back to the question: Does she prove her thesis? I break it into two parts: i) Religion and physics are tied together in the history of Western thought; and ii) Physics, in looking for a transcendental, mathematical basis for understanding the universe, thereby excludes women, since women are seen as bound to the material. The first part is proven more successfully, especially in her profile of the founders of classical physics. It is less convincing with the modern physics of Einstein and Hawking, whose use of "God" sounds more like a final dispensing of the accumulated religious capital in a reasonably secularized society. As to the second part, it would be difficult to disprove that women have been excluded from the story of physics. Certainly one reason is the vision of science as transcendent, but a general patriarchal exclusion of women from power and from education is no less responsible.

This book is actually most successful in attaining its original intention: "an accessible, readable, 'internalist' history of physics" (vii) for intelligent laypersons. She unfolds this history within a larger context, one which includes both patriarchy and religion. Because the book mirrors a novel, by sustaining a continuous narrative through significant characters, its work as a proof is less convincing than as a recounting of a significant and fascinating story. To be sure, this is no small accomplishment.

A way to understanding this book, is the question of how to make sense of our universe and thus God. There's a Chinese proverb I've seen quoted: "Women hold up half the sky." Unfortunately, the story that Wertheim tells is one of women being told to hold up the entire sky by themselves, while men contemplate its nature in order to comprehend the God of these heavens. This inequity forms a tragic element in an otherwise exhilarating narrative. Wertheim's book may exhort readers, especially those who look at the heavens both scientifically and theologically, to write some new chapters.

—Greg Cootsona, Ph.D.

¹ Michael J. Buckley, "The Newtonian Settlement and the Origins of Atheism," in *Physics, Philosophy and Theology: A Common Quest for Understanding*, ed. Robert John Russell, William R. Stoeger, and George V. Coyne (Vatican City State: Vatican Observatory, 1988), 81-102.

Cosmopolis: The Hidden Agenda of Modernity. By Stephen Toulmin. New York: Free Press, 1990; reprint, Chicago: University of Chicago Press, 1990. xii + 228 pages. Bibliography. Index. Paper \$13.95.

Reviewed by Wesley Wildman

The aim of this book is to disclose the character of modernity so as to orient ourselves to the future. It is a work of historical and cultural criticism that leads out into constructive social policy suggestions. Though inevitably full of generalized judgments, Toulmin's discussions are poised and judicious. As a result, reading *Cosmopolis* is akin to being led by an expert storyteller through a familiar museum: Toulmin's insight and wisdom weaves each artifact and episode into a masterful narrative, by means of which his readers are equipped to detect formerly overlooked patterns, and to appreciate the force of his recommendations for the future. The book is a wonderful achievement, and should be read by all those who think that negotiating the future depends upon understanding how the past led us to our present.

Toulmin's intuition about the present, one shared by many, is that something about Western culture is ending, and that high stakes attend the choice about which path we

tread from here into the future. Better to move into the future with clear ideas and a determination forged through self-understanding, he thinks, than to back into it cluelessly, with disaster inevitably to follow. The way he takes this forced option, with the seriousness it deserves, is to look to the origins of what it is that is now ending; there to understand what commitments were expressed; and what prior patterns were overthrown.

That is a good strategy, I'd say, and the natural question is: What is ending? Modernity is ending, Toulmin says. There is nothing to get excited about there—that claim and a dollar can get you a dollar's worth of junk bonds these days. But the interest, as well as the devil, is in the details, and so Toulmin goes in search of the beginning of Modernity. His argument turns crucially on an historical reassessment of European life in the sixteenth and seventeenth centuries, that has gained momentum after 1950.

The received account of this period has modern science and modern philosophy (represented *par excellence* by Newton and Descartes) as the products of increasing prosperity, a loosening ecclesiastical grip, and the rise of nation states. Toulmin argues that they should be interpreted rather as defensive, counter-revolutionary moves to an early seventeenth century Europe in a protracted period of crisis. Religious intolerance was horrifying, religious authority extremely constricting, economic conditions disastrous, public safety dangerously low—and life was unsettled, with one upheaval following another throughout Europe. While this contradiction of the received account expresses the consensus of general historians, the interpretations of the history of science and philosophy at the beginning of Modernity are still for the most part dominated by the seriously misleading received account.

When this error is recognized, Toulmin thinks, the rise of modern science and modern philosophy appears to be a grand and spectacularly successful attempt to constrict the domain of rationality, while increasing standards for justification to the level of mathematical demonstration, all with a view to taming the wildness of the seventeenth century European environment, through making the discoveries of science and philosophy *independent of contextual considerations*. The origins of Modernity, on Toulmin's account, lie in the attempt to forge a harmonious world of rational consensus in the mind, thence to be transferred by the authority of rational consensus to society—to create, in other words, a *cosmopolis* whose political order was a reflection of the universal rationality of the cosmos itself. At the time, no price seemed too high for such an achievement: Not the narrowing of the set of preeminently rational disciplines to mathematics and the natural sciences, nor the abandonment of the interdisciplinary and pluralistic modes

of inquiry that characterized the Middle Ages, nor the forsaking of the richly variegated and highly integrated intellectual life of the Renaissance, which was the cultural soil out of which Modernity grew.

Developments in subsequent centuries partially confirm the judgment of Modernity's midwives, for Modernity has powerfully transformed the world. But the weakness of that judgment is also evident at the end of Modernity, and the strengths of Renaissance humanism correspond to the weaknesses of us late moderns: Comfort with intellectual pluralism, skill at interdisciplinary inquiry, and the ability to relate rational debate to shifting circumstances. We need to recover those features of the Renaissance left behind in the steaming road-train of Modernity. Toulmin's recommendation is that we critically reverse some of the transformations at the origins of Modernity, without making the mistake of swinging the pendulum back too far. He would have us return from rationalism's "theoretical ambitions and intellectual constraints" to humanism's "practical modesty and intellectual freedom" (42); from the written to the oral; from the timeless to the timely; from the general to the local; from the universal to the particular; from stability, rigor, and system to functionality and adaptability. "It is unrealistic as things stand," writes Toulmin, "to imagine a future that preserves the hallmarks of Modernity: the intellectual autonomy of distinct sciences, a confident reliance on self-justifying technology, and separate independent nation-states with unqualified sovereignties." (203) That path, he thinks, leads to cultural collapse and self-destruction.

The abrogation of the modern boundary separating religious reflection from the natural sciences—perpetrated incessantly by contributors to and readers of this journal—typifies the interdisciplinary richness Toulmin urges us late moderns to recover. Reading this book casts the science-theology enterprise into a fascinating light, accordingly. Most importantly, however, Toulmin's book drags the future closer than it often seems to us, in these decades of dark questioning, subjecting it to the kind of close scrutiny that illumines our social policy options, and begins to suggest the new kinds of institutions that might have a chance to extend the human project a while longer. There is nothing quite like a careful look at the past to train the eyes to envision a realistic future.

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