

Steve Shapiro: Never True  
2010

CHAPTER I

## Lowering the Tone in the History of Science

### *A Noble Calling*

Some years ago, a friend summed up what it was I had supposedly accomplished over almost forty years of writing in the history of science. He said that I had *lowered the tone*. Lowering the tone, I've come to think, is a positive achievement in our field—but it's an achievement that belongs to the collective and not to any one individual. So my task is to figure out what my friend might have meant when he said I'd lowered the tone, then to share the credit by saying something about how tone-lowering has been a historically situated response to the times in which we live and changes in our objects of study, then, finally and very briefly, to say why this lowering of tone has some intellectual virtue associated with it.

It was several years ago that I was brought face to face with what it meant to lower the tone. I was reading *The New Yorker*, and there was a story in it by Woody Allen.<sup>1</sup> Posing as a historian, he said he'd come across a hitherto unknown text—*Friedrich Nietzsche's Diet Book*. "Who would have thought," Allen asked, that such a book existed? "Is there a relationship between a healthy regimen and creative genius? . . . The powerful will always lunch on rich foods, well seasoned with heavy sauces, while the weak peck away at wheat germ and tofu, convinced that their suffering will earn them a reward in an afterlife where grilled lamb chops are all the rage. But if the afterlife is, as I assert, an eternal recurrence of this life, then the meek must dine in perpetuity on low carbs."

I don't know what I was most miffed at. Was it that a profound intellectual argument about feeding and thinking had been reduced to a *shtick*? Lesley Chamberlain some years ago wrote a nice piece in *The Times Literary Supplement* about Nietzsche's views on Liebig's Beef Extract<sup>2</sup>—he liked it a lot—and I'd published an essay years before on the dietetics of pure reason, including brief remarks on the eating habits of Isaac Newton, René Descartes, Immanuel Kant, and Ludwig Wittgenstein. I'd even helped my-



self to Chamberlain's quotation of Nietzsche: "No more greasy, stodgy, beer-washed idealistic Christian German food for me! I shall curl up with gut pain, vomit if you don't give me Italian vegetables."<sup>3</sup> Turin supplied food for the philosopher's body and soul: "I never had any idea," Nietzsche wrote, "what either meat or vegetables or any of these Italian dishes *can* be like . . . Today, for example, the most tender *ossobuchi*—God knows how one says it in German!—the meat on the bones, where the glorious marrow is. Also *broccoli* cooked unbelievably well, and, to start with, the most tender macaroni."<sup>4</sup> And I'd meant the piece to be taken seriously. (Sort of a no-chicken non-joke.) Or was I miffed because I didn't get a chance to make the joke myself, since *The New Yorker* pays rather better than academic publishers? No, the problem is not the opposition between the humor of inversion and intellectual respectability: Woody Allen's story about the Nietzsche diet book versus proper academic seriousness. The very idea of the Nietzsche diet book may be profound, but it *is* funny.

It's funny in pretty much the same way that Monty Python's *Life of Brian* is very funny. The thing about the Sermon on the Mount was poor acoustics. What did he say? asked a Hebrew standing at the bottom of the Mount: "Blessed are the cheesemakers? What's so special about the cheesemakers?" The response was one of the earliest instances of New Testament hermeneutics: "Well, obviously it's not meant to be taken literally; it refers to any manufacturers of dairy products."<sup>5</sup> The Pythons' British joke was to imagine that Jesus was making a Yiddish joke. Now *that's* lowering the tone. Take something very high and juxtapose it to something very low—the sacred and the profane. That's either funny or treasonable, laughable or hangable. The German sociologist Ralf Dahrendorf once wrote that the role of the intellectual historically resembled that of the court jester: the condition of speaking Truth to Power was, if not "smiling when you said that," then at least not being in a position to be taken very seriously.<sup>6</sup> Power, as we now well understand from recent events, has a very dim view of Inconvenient Truths. And so at the core of religion—or at least a religion of belief as opposed to one of law—there is mystery—truths so incredible that you have to make an enormous effort to believe them, things so impossible that you *cannot* laugh at them. Life after death; the Trinity; the Virgin Birth. I suppose that's why Judaism never caught on: no sense of humor.

And while we're on the subject of the sacred, we might as well talk about science. It is a commonplace, or it certainly was a commonplace, in the late nineteenth and early twentieth centuries to say that science was the new re-

ligion, that it had supplanted Christianity or, at least, that it had succeeded to the cultural authority that religion once enjoyed. And so in the mid-twentieth century there appeared influential books with such titles as *Science Is a Sacred Cow* and *The New Brahmins*.<sup>7</sup> But the way for these was paved by the aggressive polemics of Victorian Scientific Naturalists and those appropriating Scientific Naturalism in defense of the secular control of education. For John William Draper and Andrew Dickson White, the warfare between science and religion, or at least between science and "dogmatic theology," was one between "the expansive force of the human intellect" and the obscurantism of restrictive religion. And it was one that religion was taken to be inevitably and rapidly losing: "The time approaches when men must take their choice between quiescent, immobile faith and ever-advancing Science." Faith belongs to the past; Science to the bright future: "Science, which is incessantly scattering its material blessings in the pathway of life, elevating the lot of man in this world, and unifying the human race."<sup>8</sup> Not just material benefits but moral: from warlike despotism to peaceable human freedom.

One need not say—and most advocates of science in fact did *not* say—that science was the New Religion. You could hardly say such a thing if you wanted clearly to juxtapose Reason and Faith. What one *could* say was that cultural authority had passed from religious to secular institutions, and some said that much of the moral authority of the priest had similarly passed to the scientist. That was the opinion of the great follower of Auguste Comte, and the founder of our discipline, Harvard's George Sarton. Comte's, and Sarton's, moral vision was one in which science drives history forward, in which science represents humankind's highest achievement, and in which science ultimately frees humankind from its historical shackles. Secular science is shot through with moral significance. The Naturalistic Fallacy noted that you could not logically move from Is to Ought, from description to prescription, but nevertheless the so-called triumph of science over religion signaled for many commentators a shift in the locus of *moral* authority.

As science was humanity's highest and noblest achievement, so the history of science was a celebration of what had been and remained best in human culture. Celebrating science was celebrating the small number of people who had made authentic and lasting discoveries. There were many drones in science but few heroes, and the heroes were the ones who count. The history of science, Sarton said, is "largely the history of a few individuals."<sup>9</sup> This is not like, say, political history, where collective action is more widely con-



4  
sidered to be the name of the game. The historian's job—or at least one major job—was to praise these few “famous men”—praising famous men is biblical<sup>10</sup>—and even to establish who deserved lasting credit and fame by sifting and evaluating a range of contributions “to establish the relative truth and relative novelty of scientific ideas.”<sup>11</sup>

It was *right* for the historian to be a hagiographer: “above all,” Sarton wrote, “we must celebrate heroism whenever we come across it. The heroic scientist adds to the grandeur and beauty of every man's existence.”<sup>12</sup> Although Sarton at times observed that scientists had the full range of human vices as well as virtues, at other times he insisted that great scientists represented fallible human nature at its highest stage of development: “truth itself is a goal comparable with sanctity . . . The disinterested and fearless search of truth is the noblest human vocation.”<sup>13</sup> Science is “the very anchor of our philosophy, of our morality, of our faith,” and it was our proper calling as historians to make that foundational role visible to the wider culture.<sup>14</sup>

Given all this, the possibilities of tone-lowering in writing about the history of science were rich and various, probably uniquely so. It is far easier to lower the tone in the history of science than it is in any other area of historical inquiry. Indeed, the thrust of much social and cultural history in recent years has been explicitly to *raise* the tone of what had once been deemed low: one thinks of the history of lay knowledge, of the history of medicine “from the patient's point of view,” of military history in the manner of John Keegan and Richard Holmes, and, notably, of the history of the body, of women, and of whatever counts as “the other.” We accept, largely as a matter of course, that the historian's job is not to celebrate—it was more than seventy-five years ago that the American medievalist Charles Homer Haskins said that no historian's task was “to distribute medals for modernity”<sup>15</sup>—and so what the anthropologists call “charitable interpretation” is *just what we do*. But it's understandable if we assume, at the same time, that the rich need no charity. In fact, that what they need is a good boxing round the ears. Hence the popularity, even in forms of biography far removed from science, of equating historical virtuosity with *exposé*.

There are, however, problems with the view that science replaced religion, and I will return to those at the end. Wherever and whenever it was maintained that science had rightly assumed the cultural and moral authority of religion, the forms of heresy became clear. What might you say about science that would—from this point of view—count as heretical? I can think of many things, but here is a selective list:

- 5
- You could say that science happens within, not outside of, historical time, that it has a deep historicity, and that whatever transcendence it possesses is itself a historical accomplishment.
  - You could say that science similarly belongs to place, that it bears the marks of the places where it is produced and through which it is transmitted, and that whatever appearance of placelessness it possesses is itself a spatially grounded phenomenon.
  - You could say that science is not one, indivisible, and unified, but that *the sciences* are many, diverse, and disunified.
  - You could juxtapose ideas of Method and those of genius, the former itself a tone-lowering gesture, as Richard Yeo has taught us,<sup>16</sup> or you could go further and say that there is *no* single, coherent, and effective Scientific Method that does the work that genius was once supposed to do, even that there are no supposedly special cognitive capacities found in science that are not found in other technical practices or in the routines of everyday life.
  - You could say that scientists are morally and constitutionally diverse specimens of humankind, that extraordinarily reliable knowledge has been produced by morally and cognitively ordinary people, and, further, that the ordinariness of *individual* scientists was not effectively repaired by any special virtues said to attach to their *communal* way of life.
  - You could say that Truth (in any precise philosophical sense) is not a product of science, or that it is not a unique product. Or you could say that the historian is not properly concerned with Truth but with credibility, with whatever it is that *counts as Truth* in a range of historical settings.
  - You could say that science is not pure thought but that it is *practice*, that the hand is as important as the head, or even that the head follows the hand.<sup>17</sup>
  - You could say that the making and warranting of scientific knowledge are *performances*, that those producing scientific knowledge can and do use a full range of cultural resources to produce these performances, and that these include displaying the marks of integrity and entitlement: expertise, to be sure, but also the signs of dedication and selflessness. The very idea of disembodied knowledge thus becomes a bodily performance, and Newton's, as well as Nietzsche's, diet assumes pertinence, food for thought.



We should understand, of course, that all of these heresies, all these lowerings of tone, are not mere possibilities; they amount to a short-list of the leading edges of change in the historical understanding of science over the past several decades, to some extent in philosophical engagements with science, and more strongly in sociological studies of science. They've become—at least most of them and to some extent—so accepted as just-the-way-we-do-things, and just-what-it-is-to-do-history-of-science, that it's sometimes hard to appreciate how much has changed and how quickly, and it's sometimes hard to recognize the heresy—unless and until weird outbreaks like the so-called Science Wars dramatically remind us. I will say little more here about all of these heresies, and I will draw out some detail for just a few. Then I'll try to say something about *how it is* we've come to write about science as we do, and, finally, why there's a modest sort of virtue in all this lowering of the tone.

The first thing to get out of the way is any idea that these heresies were devised by radical sociologists, or indeed by anyone necessarily concerned to *achieve* a tone-lowering effect, denigration or a reduced estimation of the value of scientific knowledge. So let's start with the historicity of science, remembering that it was the claims of High Criticism about the historicity of Scripture that had such an explosive impact on nineteenth-century intellectual life. (The late twentieth-century alleged "wars" between science and sociology had their parallel in late nineteenth-century wars *within* theology.)<sup>18</sup>

Thomas Kuhn said that the Eureka moment for him came when he looked out the window of his Harvard rooms and realized that Aristotelian physics was as wrong as wrong could be, but that it *worked*, that it was coherent. Past science had its historical integrity, and the task of the historian was not to celebrate its contribution to the future but to describe and interpret its historical situatedness. It was an insight he almost certainly owed not to any sociologist of science—there were few such academics around then—but to the philosopher-historian Alexandre Koyré.<sup>19</sup> Koyré was both enormously exciting—imagine: science as an authentically historical phenomenon—but the radicalism of his work was partly masked by his later recruitment as the Hammer of the Marxists. And so an authentically, and radically, historical sensibility about scientific thought was a marked feature of the new "internalism" associated with the work of such great post-World War II historians of science as A. Rupert and Marie Boas Hall, I. Bernard Cohen, Richard S. Westfall.<sup>20</sup> The standards by which historians should assess past scientific work were not those of the present but those of the pertinent past.

The most innovative, and provocative, work of the 1960s that normalized science as a historical object emerged from historians of scientific ideas at Leeds University or associated with them, including J. R. Ravetz, J. E. McGuire, P. M. Rattansi, Charles Schmitt, and Charles Webster. This was heady stuff, for example, interpreting early modern science, in its historical specificity, as a rich brew of nature study, millenarian Christian religion, mysticism, neo-Platonic philosophy, alchemy, and social Utopianism.<sup>21</sup>

That is one source from which Kuhn's work sprang, and a consequence of saying that science was a cluster of paradigmatic practices was a matter-of-fact acceptance of its disunity. If God is one, unchanging, unitary, and universal, then so is God's Truth, and so is science insofar as it is figured as the New Religion. For many historians of Sartre's generation that was indeed the case. Even as Kuhn's unity-shattering notion of multiple scientific paradigms appeared in 1962 in the *International Encyclopedia of Unified Science*, its Vienna Circle editors evidently neither noticed nor cared about the subversive effect Kuhn's views had on the "unity of science."<sup>22</sup> (The obsession with scientific unity that had its heyday in the early to mid-twentieth century has a bit of the Owl of Minerva feel about it: a systematic search for the grounds of unity was accompanied by a diminished concern among *scientists* about Science as a Whole and their general acceptance of the facts of its accelerating specialization and differentiation.) Historians of science have not, for the most part, had much to say about scientific unity, though the New Historicist impulse to assess past science according to past cultural concerns has had a radically destabilizing effect on notions of that unity over time. It has been left to philosophers—previously much invested in theories of the conceptual or methodological unity of science—to write books identifying the facts and implications of scientific disunity. (One thinks of work by John Dupré, Jerry Fodor, Nancy Cartwright, and Alexander Rosenberg, as well as Peter Galison's co-edited historical collection.)<sup>23</sup>

And now, while historians of science are institutionally content to be located in departments of the history of science, and to be published in history of science journals, those of us who teach introductory survey courses usually have to tell our students that "science" is not a self-evident historical category, that early modern "natural philosophy" was a different thing than "mathematics," that the "Scientific Method" is, and always has been, subject to diverse construals, and even that what counted (and counts) as "the mechanical philosophy" or "the experimental philosophy" varied enormously.<sup>24</sup> For many years, perhaps even since the 1950s, historians of science stopped



writing books called “the history of science,” not because they had any systematic argument to make about disunity but because they no longer felt at home with the major narratives that had once given their subject matter its integrity and that had supposedly propelled science forward through history. That situation has recently showed signs of being remedied—possibly in response to publishers’ pressure to produce works of greater scope, span, and saleability—but the synthetic responses produced so far display an admirable edginess. They are typically collections of case studies, fascinating in their serial individuality, but either bracketing the question of the integrity of science or turning topic into resource by injecting curiosity about ideas of scientific unity as a historical product:<sup>25</sup> so to speak, “There is no such thing as science and this is a history of it.”

From a pertinent point of view, this general silence about the overall identity of our subject matter is one of the crowning achievements of our field. We feel we’re *right* to identify the historical specificity and heterogeneity of whatever might count as science; we feel, even if we rarely celebrate it, that this specificity is a sign that we’ve “made progress,” but, under another description, that same sensitivity to specificity and silence about “science” is a disciplinary dirty secret. As we get, we like to think, better and better at doing the history of science, we know less and less about what makes it science and not some other differently designated form of culture.<sup>26</sup> The lowering of tone here is probably more apparent to those who are not members of our tribe than those who are: integrity and value go together. It is widely said that if truth has many faces, not one is worthy of respect.

The tone has also been lowered by our burgeoning fascination with the embodiment of science, with its “personae,” and with its performative aspects. Isaac Newton wrote in the General Scholium to the *Principia* that it was only by way of “allegory” that we say that God sees, speaks, laughs, loves, hates, and desires, and anyone who took such divine capacities literally was an idolater.<sup>27</sup> At about the same time, it was reported that the Marquis de l’Hôpital wanted to know much the same about Newton: “what color is his hair? Does he eat & drink & sleep? Is he like other men?”<sup>28</sup> Newton’s greatest modern biographer knew exactly what l’Hôpital was asking: “He has become for me,” Richard Westfall wrote, “wholly other . . . a man not finally reducible to the criteria by which we comprehend our fellow beings.”<sup>29</sup>

Now we have an appetite for knowing everything we can about scientists’ way of life—we can call it *habitus* if we’re feeling in need of a product

upgrade. And as we find out about, and write about, such things, we’re conscious that this too is going against the historical grain. Nineteenth-century sensibilities, in part reflecting a drift from ideas of genius to ideas of Method, deflected attention away from interest in *who the scientist was*. In 1845, the Scottish politician and man of letters Henry Brougham wrote that “when the studies of a philosopher”—and in this context Brougham included the natural philosopher—“and especially of a mathematician, have been described, his discoveries recorded, and his writings considered, his history has been written. There is little else to say of such a man: his private life is generally uninteresting and unvaried.”<sup>30</sup> In the same spirit, T. H. Huxley later wrote about an apocryphal Babylonian philosopher: “Happily Zadig is in the position of a great many other philosophers. What he was like when he was in the flesh, indeed whether he existed at all, are matters of no great consequence. What we care about in a light is that it shows the way, not whether it is lamp or candle, tallow or wax.”<sup>31</sup> Claude Bernard insisted on the irrelevance of the individual to the practice of science: “Art is I, Science is We.”<sup>32</sup> The supposed elimination of what Thorstein Veblen called the “personal equation” from science also eliminated any *substantive* reason to tell stories about who scientists were.<sup>33</sup> Hagiography, of course, could carry on, but without any significant association to the production or warranting of knowledge, without any epistemological bite.

If our recent fascination with, as the British political historian Sir Lewis Namier put it, “who the guys were” counts as a lowering of the tone,<sup>34</sup> we have our justifications for it. First, attention to scientists’ *bodies* is a feature of our increasing interest in scientific practice, in itself a tone-lowering move against the background of a contemplative conception of science as a transcendently intellectual enterprise, generating knowledge disembodied in its outcome and in its mode of production. We now want to know about the sharpness of astronomers’ vision, the dexterity of experimentalists’ hands, the acuity of chemists’ olfactory sense. Attention to tacit knowledge has made us curious about touch—*Fingerspitzengefühl*—even, and especially, if that too is a lowering of an idealist and rationalist tone.<sup>35</sup>

We have wanted to know about the embodied practices of securing and maintaining credibility. How did who you were figure in assessing the worth of what you said, even if that interest also was a lowering of the tone set by some sociologists’ mid-twentieth-century insistence on science as no respecter of persons? We have wanted, for similar reasons, to know about scientists’ social standing, their manner of living, whether they lived in private



10

or public spaces and how they moved about in the course of the day. *Who* was Charles Darwin? And how did his life at Down House figure in stipulations about the integrity, worth, and consequences of his theory? What do we learn about Darwin when we read that his “guts were noisy and smelly” or have quoted to us his own anxiety that excitement “brings on such dreadful flatulence that in fact I can go no where”?<sup>36</sup> We—and perhaps more among nonacademic than academic writers on science—have wanted to know about scientists’ sexuality, or lack thereof. And—here I have to claim a share of the blame—we have been interested in their *diet*. The answer to l’Hôpital’s question—did he eat?—would help him judge whether Newton’s knowledge was divine or mortal. Why else has the story about Newton’s chicken—that is, forgetting whether or not he had eaten it—continued in circulation for more than three hundred years?<sup>37</sup> Did our subjects, as Rebecca Herzig has written, “suffer for science,”<sup>38</sup> and, if so, what did their display of suffering signify for the status and worth of scientific knowledge and for the nature of the scientist’s vocation? In another cultural setting, concern with embodied persons could be understood as quite the opposite of *tone-lowering*: nineteenth- and early twentieth-century hagiographical traditions ran parallel with insistence on scientific impersonality. But, for us, pretty much all of this has just been part of writing about science as a human endeavor through and through. It’s the late modern normal.

So there are many ways in which the tone has been lowered in writing the history of science. But it would be claiming too much if modern historians took sole credit for that. The tone had *already* been lowered for them, and the academic history of science has been more in this respect a response to cultural and social changes than an inventor of new attitudes. First, there is some sense—only some, but significant enough—in which science was being transformed from a sacred into a secular enterprise from around the middle of the nineteenth century. Even while acquiring enormous social authority, including some of the authority that had been exercised by religious institutions, many scientists insisted that they were not, if they ever were, “priests of nature,” and that no moral consequences flowed from the investigation of natural phenomena. Max Weber may have gone a bit far when he described the cultural world of 1918 as being “disenchanted” or when he claimed that only certain “big children” then still believed that science contained any lessons about how one ought to live one’s life.<sup>39</sup> But insofar as it was accepted that one could not logically move from an “is” to an “ought,” from science to morals, scientists sought to divest themselves of moral au-

11

thority. After all, it was one thing to study God’s Book of Nature, quite another to document the pretty designs accidentally produced by atoms purposelessly bashing into one another. The former had the capacity to give moral uplift to those who studied nature, the latter had none. Secularization and the acceptance of the Naturalistic Fallacy were tone-lowering processes.

Second, the end of the nineteenth century and the early twentieth century witnessed a range of philosophical movements, some of them embraced by scientists, that were either skeptical of the notion of scientific Truth, or of certain absolutist conceptions of Truth, or, more generally, of whether science should be making metaphysical claims, about, for example, “correspondence” and “ultimate realities.” These movements go by various names, and in other contexts it would be important to distinguish between them: phenomenism, operationalism, positivism, conventionalism, and, above all, pragmatism. But equally important is what they have in common: each aimed to sever the links that bound early modern natural philosophy to religion by way of metaphysics and notions of God’s Truth. Just as the Scientific Naturalism of the late nineteenth century *lowered the case* of “nature,” so all of these characterizations of the quality and character of scientific knowledge *lowered the case* of “truth.” And some, indeed, quite explicitly identified the metaphysical tendencies of religious discourse as an intellectual pathology, to be cured by deflationary conceptions of the status of proper scientific knowledge.

By 1960, C. P. Snow was surely speaking for most scientists when he bumptiously stipulated that “by *truth*, I don’t intend anything complicated . . . I am using the word as a scientist uses it. We all know that the philosophical examination of the concept of empirical truth gets us into some curious complexities, but most scientists really don’t care.”<sup>40</sup> If the Science Wars of the 1990s were supposedly about hostile sociologists’ attacks on the idea of scientific Truth, it must be as jarring as it is pertinent to note the unpopularity, or just the irrelevance, of notions of Truth *among scientists themselves*.<sup>41</sup> If metaphysical foundations and a stable idea of Truth elevated the tone, then setting such things aside must be said to have lowered the tone. But this too has to be ascribed to changes taking place *within science itself*.

Third, the hagiographical tradition in the history of science celebrated scientists’ genius and character, even if the homage was rendered problematic by simultaneous insistence on the impersonality of science. Yet by early in the twentieth century, scientists themselves were repeatedly stipulating that they ought to be regarded as human, if not all too human. Many of



them wanted it clearly understood that they had the full range of human foibles, that they were not to be looked upon as paragons, and, when Robert Merton argued in the early 1940s that scientists were motivationally much the same as anybody else, he was actually falling in with sentiments repeatedly expressed within the scientific community.<sup>42</sup> The contexts in which these sentiments were expressed, and the reasons for expressing them, were very various, but they included the professionalization and routinization of science as a remunerated job, a job that was increasingly done not in ivory but in industry. And they included the wish—which acquired salience in the period from World War I to Hiroshima—to stipulate that scientists were not people to be feared, that whatever they were, they were not *worse* than the common run of humanity. One was to understand that neither poison gas nor the atomic bomb was produced by bad people, badly motivated. So if you had an academic reason to do so, you could be curious about who scientists were, freed from either a moral or an intellectual Gold Standard. The moral ordinariness of scientists, and historians' documentation of who they were as moral actors, might be taken as a lowering of tone, but that too was a sensibility arising outside of academic history.<sup>43</sup>

Finally, the very institutional *success* of science over the past century, and especially since World War II, effected wide-ranging changes in how the enterprise was viewed and evaluated. Writing in the late 1930s and the early 1940s, the scientific enterprise seemed—to Merton and to many others—vulnerable, frail, and delicate. If it was the lamp of civilization, its flame was weak, easily extinguished by the blasts of ideology, intolerance, and illiberalism. Threatened by fascism on the right, by communism on the left, and at home supposedly by industrial secrecy, command and control, science—as David Hollinger and others have shown—appeared in need of *protection and celebration*.<sup>44</sup> And its protection involved a proper description of the precise conditions in which it could thrive: autonomy from social forces, above all, but also an appreciation of its essential rationality and of its unique status among other forms of human endeavor.

But what success meant, especially in the West, and most especially in America, was that science became so closely enfolded in the institutions that produced wealth and projected power that accepted accounts of the nature of science and the conditions of its thriving lost their salience and cultural grip.<sup>45</sup> Did science need to be protected from illiberal forces, or had it become one of those forces? What did universalism mean when science became a

powerful weapon in state conflict, hot and cold? Conditions of insecurity had been replaced by emerging conditions of complacency, and that freed up historians and sociologists of science to tell all sorts of naturalistic stories about science, just because naturalism seemed no threat. What were the boundaries of science, separating it from other forms of human endeavor, when it had become so bound up with the institutions of business, politics, and war that the very notion of “external context” began to seem something between quaint and bizarre? We could continue to talk about science as a distinct form of culture, uneasily related to disturbing “external” or “contextual” forces only on the condition that we ignored the circumstance that, through much of the twentieth century, most science was done for or in industry, for or in state facilities. Science, in fact, has become so blended with a range of civic, economic, and military projects that we can only appreciate its importance by being puzzled about its identity.<sup>46</sup> And so we are. About the coherent identity of science, we are very much as W. B. Yeats wrote of religion: “The ceremony of innocence is drowned;/The best lack all conviction, while the worst/Are full of passionate intensity.”<sup>47</sup>

Historians of science were slow to come to terms with the civic success of science, and have done so only in part. Should this civic success count as a lowering of tone? Only if one identifies science with solitude and the contemplative life. Most citizens in our society, we should understand, regard this civic success wholly or largely as a positive accomplishment. However, if this success has amounted to a lowering of the tone, then that too happened outside of academic history, and historians have responded to it, slowly and indirectly. If I seem to downplay the culpability of academic historians in lowering the tone, I also downplay the credit we may take for initiating these sensibilities. We have reacted to those sensibilities, and we have done so in ways that make what we do *history*—not accusation or apology. That's just to say that we are historians and what we do when we do history is to try to tell it as it really was in the past. That is our institutionalized intention, and we're pretty good at recognizing when someone is trying to tell it like it was as opposed to distributing medals (or punishments) for modernity. But the terms and categories in which we can tell it like it was come from *us*, and from the culture we inhabit. And that was the sense of E. H. Carr's now half-century-old dictum that you “should study the historian before you begin to study the facts.”<sup>48</sup> The stories historians tell owe as much to the currents running through their culture as they do to those



rational method. It's our predicament.

14  
So, if nobility is too strong a term for lowering the tone, what is admirable, even virtuous, about this tone-lowering in how we now tend to write about the history of science? Here, Weber's lecture on "Science as a Vocation" gives us a model of what this might mean. As historians of science, we're committed to telling rich, detailed, and, we hope, accurate stories about science without believing that it is cognitively or methodologically or socially unique, without believing that it is integral and unified, without believing that it has a special set of values not possessed by other forms of culture, without believing that it is divinely inspired, without believing that it is produced only by geniuses, without believing that it is the only progressive force in history, or that its practitioners do not eat chicken.

It would be easier to maintain that commitment—to richness, to detail, to accuracy—if we felt that we were doing God's work, but it's more admirable, I think, if we feel that same commitment, that same sense of vocation, when we know that we are not on a divine mission. That we are telling stories—rich, detailed, and, we hope, accurate—about a tone-lowered, heterogeneous, historically situated, embodied, and thoroughly human set of practices. That is, when we are doing what now counts as the history of science.

## Methods and Maxims

Among historical specialties, the history of science has been more disposed than most to reflect upon its methods and objects. It is not hard to understand why, since science has traditionally appeared as uniquely resistant to the procedures historians now use to situate other objects of study in time and context. Is science, indeed, a historical object like any other, or does it stand outside of history? Does science require methodological "special-casing"—notions of divine intervention, inspiration, or genius—or does the usual range of human cognitive capacities and basic modes of interaction suffice for its historical understanding? Over recent decades historians of science have become more comfortable with at least an implicit embrace of the naturalism described in chapter 1 and commended in the programmatic chapters in this Part. But historical naturalism is not the end of inquiry. Resistance to naturalism in understanding science is itself a compelling historical object. What are the historical circumstances that have seemed to push scientific knowledge outside of history and that have made the history of science appear radically different from other sorts of history? Moreover, the struggle for naturalism in the study of science has been only locally won, and, as historians now appreciate, the methods and maxims of historical and sociological naturalism have provoked outrage from a few scientists, and more self-appointed Defenders of Science, who can only think of naturalism as that very unnaturalistic practice, denigration. Those eruptions have been irritating and uncomfortable for some historians and sociologists, but, more important, they are interesting indicators of the state of our culture and of the paradoxical sacredness of our secular.