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Preface

I have a visceral distaste for books that have been concocted by pasting together a collection of loosely connected, previously published essays. And I take a presumptive (though rebuttable) dislike towards the famous academics who foist such non-books on their unsuspecting readers.

So the reader may legitimately wonder: Am I not now publishing just such a compilation? Do I arrogantly conceive of myself as somehow exempt from my own strictures?

The answer, of course, is no. The essays collected in this book were indeed all published previously (with the exception of Chapters 4, 9 and 10), but they form, I believe, a coherent whole. At a superficial level the topic is the relation between science and society; but the deeper theme is the importance, not so much of *science*, but of the *scientific worldview* — a concept that I shall define more precisely in successive chapters, and which is in no way limited to the natural sciences — in humanity’s collective decision-making. Whether my targets are the postmodernists of the left, the fundamentalists of the right, or the muddle-headed of all political and apolitical stripes, my refrain is the same: clear thinking, combined with a respect for *evidence* — especially inconvenient and unwanted evidence, evidence that challenges our preconceptions — are of the utmost importance to the survival of the human race in the twenty-first century.

This book belongs to a fairly rare genre: that of a natural scientist writing for the general educated public on cultural issues that are only indirectly related to his field of research and teaching. No one nowadays, by contrast, bats an eyelash when academics whose training is in literary criticism hold forth on questions of sociology, economics and politics; indeed, such wide-ranging cultural critique has become an almost obligatory pursuit for literary intellectuals aspiring to public prominence. But we scientists tend to be more cautious when stepping out of our own field, and with good reason: for we know from personal experience how easy it is to make a fool of oneself even in a closely adjoining subject (say, chemistry for a physicist, or even solid-state physics for an elementary-particle physicist). I too lean strongly toward caution in interdisciplinary endeavors, as the attentive reader will no doubt perceive; despite this, I have decided to stick my neck out an inch or two,

because of the importance of the issues at stake.

I am thus well aware of the potential hazards — not just for the writer, but more importantly for his or her readers — of venturing publicly beyond one’s own domain of scholarly competence. As the eclectic conservative polymath Richard Posner observes in his often-illuminating, sometimes-infuriating book *Public Intellectuals* (2001),

the public gives more weight to credentials than it should when an academic is opining outside of the area of his expertise. One reason is the tendency to exaggerate the degree to which a given human being is a unity — a single, consistent self whose behavior follows a predictable pattern. He is “good” or “bad,” “kind” or “cruel,” “wise” or “foolish,” a “genius” or an “intellectual lightweight,” and so forth.

But, Posner continues,

Most people, including most academics, are confusing mixtures. They are moral and immoral, kind and cruel, smart and stupid — yes, academics are often smart *and* stupid, and this may not be sufficiently recognized by the laity. They are particularly likely to be both smart and stupid in an era of specialization, when academic success is likely to crown not the person of broad general intelligence but rather the person with highly developed intellectual skills in a particular field, and both the field and the skills that conduce to preeminence in it may be bulkheaded from the other fields of thought. The brilliant mathematician, physicist, artist, or historian may be incompetent in dealing with political or economic issues.¹

So, what to do? Shall we all stick to our own narrow field, all the better to avoid embarrassing mistakes? I do not think that Posner is suggesting that, and his own multifaceted career — as law professor and federal appeals-court judge, but also as philosopher, economist, literary critic and cultural commentator — shows the contrary. The only solution, I think, is to pay less attention to credentials and more attention — *critical* attention — to the content of what is said.²

I am immodest enough to think that my ideas on science, philosophy and culture may be of interest to the general public, and occasionally even to specialists in the fields I intrude upon. But I am also modest (or simply realistic) enough to recognize that my ideas could be mistaken. (How true this is, after all, even within my own specialty of mathematical physics!) It goes without saying, therefore, that I welcome critical commentary from

¹Posner (2001, pp. 50–51), italics in the original. The bibliography for this preface begins on p. xix below.

²This same point is made eloquently by Noam Chomsky (1979, pp. 6–7): see the quotation on pp. 54–56 below.

both experts and non-experts. For instance, Chapters 6 and 7 of this book constitute forays into the philosophy of science, a field in which I am entirely self-taught; and if I have made a botch of it, I would be most grateful for those better-trained in philosophy than myself to demonstrate where I have gone wrong. Likewise, Chapters 8 and 9 touch on broader questions of history and politics, and I will be happy if those who disagree with my ideas would come forward and give their counterarguments. That is how knowledge progresses.

Near the beginning of his book, Posner observes that, nowadays,

because of the information overload under which the public sweats and groans, to gain traction as a public intellectual an academic normally must have achieved, however adventitiously, a degree of public fame or notoriety. Without that it is difficult to arouse the interest of even a sliver of the nonacademic public in one's opinions on matters of concern to that public. Many public intellectuals are academics of modest distinction fortuitously thrust into the limelight, acquiring by virtue of that accident sufficient name recognition to become sought-after commentators on current events.³

Alas, this cynical but astute comment describes my own career as a “public intellectual” rather precisely (aside from becoming a “sought-after commentator on current events”, a trap I have studiously avoided). In the summer of 1994, having becoming acquainted — thanks principally to Paul Gross and Norman Levitt's *Higher Superstition*⁴ — with the phenomenon of post-modernist literary intellectuals pontificating on science and its philosophy and making a complete bungle of both, I decided to write a parody of post-modern science criticism, to see whether it could get accepted as a serious scholarly article in a trendy academic journal. A few months of library research later, I emerged with my masterpiece — bearing the enigmatic title “Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity” — and submitted it to the cultural-studies journal *Social Text*. I gave it a 50–50 chance of being accepted.⁵ Little did I know that the editors of *Social Text* were at that very moment preparing a special issue of their journal, entitled “Science Wars”, with the principal aim of attacking Gross and Levitt! In April 1995 my article was accepted for publication in *Social Text*; precisely a year later it appeared in print⁶; I revealed the hoax

³Posner (2001, p. 5).

⁴Gross and Levitt (1994). My own views on this important book can be found in Chapter 4 below.

⁵That my subjective probability was 50% is proven by the fact that I offered two friends a bet *in either direction*, at 1–1 odds, on whether the article would be accepted for publication. The prize would be dinner at a nice restaurant. Both friends chose to bet that the article would be accepted, and I had to pay up on both bets.

⁶Sokal (1996a), reproduced here with annotations as Chapter 1.

a few weeks later in another magazine, *Lingua Franca*⁷; and my life has not been the same ever since.

I honestly had no idea how big a hoopla my little “experiment” would stir up. I had expected it to be a significant but modest scandal within a small academic community, meriting a mention on page 10 of the *Chronicle of Higher Education*. It didn’t even cross my mind that the story could make the front page of the *New York Times* — granted, on a slow news day — followed in quick succession by the *International Herald Tribune*, the [London] *Observer*, and — seven months later, after the French realized that some of their own most celebrated intellectuals were a primary target — *Le Monde*.⁸ All this ferment led me to publish, the following year, in collaboration with my Belgian colleague Jean Bricmont, a book-length critique of the abuse of scientific concepts and terminology by prominent French postmodernists and their American acolytes.⁹

In retrospect, I now see that I underestimated the interest of the general public in intellectual questions. Nowadays, more than half the adults in the United States have attended college¹⁰, and many — despite the daily pressures of earning a living and raising a family — retain a lively interest in scientific, social and political questions. Moreover, there exists by now a not insignificant cohort of adults who recall having endured, as undergraduates, an English, cultural studies or women’s studies course overly filled with Lacanian or deconstructionist verbiage, and who may have doubted their own intellectual competence as a result. Who can blame them if they now feel a bit of Schadenfreude when the emperor is revealed to be at least partly naked?¹¹

Alas, much has changed in the past decade — and not for the better.

⁷Sokal (1996b). *Lingua Franca* (1990–2001, R.I.P.) was an irreverent and sometimes hilarious chronicler of the foibles of academia. Though it is now, sadly, defunct, some of its best work has been collected in Star (2002).

⁸Scott (1996), Landsberg (1996), Ferguson (1996), Weill (1996). This and much other commentary is collected in Editors of *Lingua Franca* (2000).

⁹Sokal and Bricmont (1998), originally published in French in 1997.

¹⁰As of 2005, 53% of the population 25 years old and over had attended at least some college. More precisely, 16.8% attended some college but obtained no degree, 8.6% obtained an associate’s degree, 18.1% a bachelor’s degree, and 9.5% an advanced degree. The figures are slightly higher for the cohorts under 55 years old. See U.S. Census Bureau (2007, Tables 214 and 216).

¹¹I stress that the nakedness of the emperor (and the empress) is *not* proven by the mere fact that my parody was accepted for publication; rather, it must be established by a separate argument. See Chapter 5 below for further discussion of this point; and see Sokal and Bricmont (1998) for detailed evidence of pseudo-scientific charlatanry in the writings of Jacques Lacan, Julia Kristeva, Luce Irigaray, Bruno Latour, Jean Baudrillard, Gilles Deleuze, Félix Guattari, Paul Virilio and assorted others.

Back in the 1990s, conservatives could still make rhetorical headway by insisting that postmodernist academics posed a dire threat to reason and scholarship.¹² This was always an exaggeration — even in those days, the pomo orthodoxy in a handful of elite literature departments paled in comparison with the capitalist orthodoxy in economics departments and business schools — but it did at least contain a grain of truth.¹³ Ten years on, that zeitgeist is unrecognizable. The assault on reason and science now clearly comes from the right, led by an unholy (and uneasy) alliance of big corporations seeking to escape environmental and safety regulations and religious fundamentalists seeking to impose their dogmas on education and health policy.¹⁴ Even some card-carrying right-wingers are now, it seems, having second thoughts about George W. Bush’s “faith-based Presidency”.¹⁵ The grand old man of American conservatism, Barry Goldwater, is assuredly turning over in his grave.¹⁶

¹²See, for instance, Kimball (1990), D’Souza (1991) and Himmelfarb (1994), to cite only the best-known of these jeremiads. For a detailed and brilliantly scathing assessment of both the conservative critics and their leftist academic targets, see Jacoby (1994).

¹³For my own part, I chose to critique postmodernist leftists not because I saw them as the principal threat to rationality and science — which they were not — but because I saw their ideas as undermining our shared commitment to the struggle for social justice. As Bricmont and I put it in the preface to our book *Fashionable Nonsense: Postmodern Intellectuals’ Abuse of Science* (1998), “our book is not against political radicalism, it is against intellectual confusion. Our aim is not to criticize the left, but to help defend it from a trendy segment of itself” (p. xiii). Or in the eloquent words of Michael Albert, editor of *Z Magazine*: “There is nothing truthful, wise, humane, or strategic about confusing hostility to injustice and oppression, which is leftist, with hostility to science and rationality, which is nonsense” (Albert 1996, p. 69). For further discussion, see Chapters 2 and 3 below.

¹⁴For an extensively documented account, see Mooney (2005).

¹⁵See Suskind (2004) for an extremely revealing account.

¹⁶Senator Goldwater’s views on the incipient American theocracy can be found in a trenchant 1981 speech:

There is no position on which people are so immovable as their religious beliefs. There is no more powerful ally one can claim in a debate than Jesus Christ. Or God, or Allah, or whatever one calls his supreme being. But, like any powerful weapon, the use of God’s name on one’s behalf should be used sparingly. The religious factors [*sic*] that are growing throughout our land are not using their religious clout with wisdom. They are trying to force government leaders into following their positions 100 percent. If you disagree with these religious groups on any particular moral issue, they cajole, they complain, they threaten you with loss of money or votes or both. . . .

I am frankly sick and tired of the political preachers across this country telling me as a citizen that if I want to be a moral person, I must believe in “A,” “B,” “C,” and “D.” Just who do they think they are? And from where do they presume to claim the right to dictate their moral beliefs to me? And I am more angry as a legislator who must endure the threats of every religious group who thinks it has some God-granted right to control my vote on every

It thus transpires that even sociologist of science Bruno Latour, who spent several decades stressing “the social construction of scientific facts”¹⁷, now laments the ammunition he fears he and his colleagues have given to the Republican right, helping them to deny or obscure the scientific consensus on global warming, biological evolution and a host of other issues:

While we spent years trying to detect the real prejudices hidden behind the appearance of objective statements, do we now have to reveal the real objective and incontrovertible facts hidden behind the *illusion* of prejudices? And yet entire Ph.D. programs are still running to make sure that good American kids are learning the hard way that facts are made up, that there is no such thing as natural, unmediated, unbiased access to truth, that we are always prisoners of language, that we always speak from a particular standpoint, and so on, while dangerous extremists are using the very same argument of social construction to destroy hard-won evidence that could save our lives.¹⁸

That, of course, is exactly the point I was trying to make back in 1996 about social-construction talk taken to anti-realist extremes.¹⁹ I hate to say I told

rollcall in the Senate. I am warning them today: I will fight them every step of the way if they try to dictate their moral convictions to all Americans in the name of conservatism. (Goldwater 1981b, p. 20590; see also Goldwater 1981a,c for similar sentiments)

Goldwater would equally be appalled at the spectacle of “conservatives” who assert the President’s prerogative to jail anyone he chooses, for as long as he wishes, without trial or judicial recourse — for in the same 1981 speech he stressed that

Being a conservative in America traditionally has meant that one holds a deep, abiding respect for the Constitution. We conservatives believe sincerely in the integrity of the Constitution. We treasure the freedom that document protects. (Goldwater 1981b, p. 20589)

¹⁷This is the subtitle of Latour and Woolgar (1979). For further discussion of Latour’s ideas on the nature of scientific knowledge, see Chapter 6 below.

¹⁸Latour (2004, p. 227), italics in the original. A similar change of heart seems to have overtaken (at least in part) Harry Collins, a prominent sociologist of science who in the 1980s was identified with radically constructivist positions (“the natural world has a small or non-existent role in the construction of scientific knowledge”, Collins 1981, p. 3; see footnote 9 in Chapter 5 below). Collins is now keen to defend the objectivity of science from misuse by political and commercial vested interests:

The ready acceptance of the idea that science is politicized through and through rules out the possibility of complaint when we find that certain scientific and technical arguments are hopelessly biased by their sources. For example, do we never want to say that the tobacco industry has for years falsified the implications of epidemiological studies out of a concern for selling more cigarettes? Do we want to say, rather, that this was just the tobacco industry’s point of view and that the only fight there is to be had with them is a political fight, not a scientific fight? (Collins and Evans 2002, p. 280)

¹⁹See Chapters 2 and 3 below.

you so, but I did. As did, several years before me, Noam Chomsky, who recalled that in a not-so-distant past,

Left intellectuals took an active part in the lively working class culture. Some sought to compensate for the class character of the cultural institutions through programs of workers' education, or by writing best-selling books on mathematics, science, and other topics for the general public. Remarkably, their left counterparts today often seek to deprive working people of these tools of emancipation, informing us that the "project of the Enlightenment" is dead, that we must abandon the "illusions" of science and rationality — a message that will gladden the hearts of the powerful, delighted to monopolize these instruments for their own use.²⁰

While the essays in this book are all animated by a common concern — namely, for the centrality of *evidence* in all matters of public debate — they apply this concern to different targets: first academic postmodernists and extreme social constructivists, then purveyors of pseudoscience in its myriad forms, and finally purveyors of religion (*all* religions, without the slightest deference toward the powerful mainstream religions). It is no accident that the essays in the last part of the book, which deal with the subjects of greatest political and social relevance, are also the longest.

Part I of the book sets the stage, so to speak, by dealing with a comparatively lightweight target (academic postmodernists). Chapter 1 reprints the parody article, together with a series of detailed (and heretofore unpublished) annotations in which I explain the various jokes and solecisms and quote from some of the cited references. Chapters 2 and 3 explain the political importance of the issues at stake in the debates over truth and objectivity. Chapters 4 and 5 return to academia, and focus on the flaws of extreme social constructivism in the social and cultural studies of science.

Part II of the book addresses in more detail the philosophical issues concerning truth and objectivity that were raised in Part I. Chapter 6 is an updated version of the philosophical intermezzo from *Fashionable Nonsense*; it is intended as an (opinionated) introduction to contemporary debates in the philosophy of science, aimed at the general educated reader with no special background in either philosophy or science. Chapter 7 addresses some subtler issues in the philosophy of science, but it still requires no background in philosophy or science beyond that provided by Chapter 6. These two chapters were co-authored with Jean Bricmont.

Part III goes on to treat weightier social and political topics using the same lens. Chapter 8 analyzes the paradoxical relation between pseudoscience and

²⁰Chomsky (1993, p. 286). See also Albert (1992), Chomsky (1992) and Ehrenreich (1992) for related commentary.

postmodernism, and investigates how extreme skepticism can abet extreme credulity, using a series of detailed case studies: pseudoscientific therapies in nursing and “alternative medicine”; Hindu nationalist pseudoscience in India²¹; and radical environmentalism. This investigation is motivated by my suspicion that credulity in minor matters prepares the mind for credulity in matters of greater import — and, conversely, that the kind of critical thinking useful for distinguishing science from pseudoscience might also be of some use in distinguishing truths in affairs of state from lies. Chapter 9 takes on the largest and most powerful pseudoscience of all: organized religion. This chapter focusses on the central philosophical and political issues raised by religion in the contemporary world: it deplores the damage that is done by our culture’s deference toward “faith”, and it asks how nonbelievers and believers can find political common ground based on shared moral ideas. Finally, Chapter 10 draws some of these concerns together, and discusses the relationship between epistemology and ethics as they interact in the public sphere.

My motivations in writing this book are thus both intellectual and political, but I have tried hard to keep the two questions separate. Sympathy with an author’s motivations (political or otherwise) can never constitute a valid reason for accepting his or her arguments, and opposition to those motivations can never constitute a valid reason for rejecting them; the arguments must be analyzed in their own right. The reader will judge how well I have done this.

Nearly every scholarly work is the fruit of extensive discussions in which the author tests and refines his or her half-baked ideas, and this one is no exception. But the general rule holds with extra force in a transdisciplinary endeavor such as the present book, in which I have strayed far beyond my own domain of professional expertise. I am therefore exceedingly grateful to those philosophers, historians and other scholars — some of them personal friends, others known to me only via e-mail — who have patiently answered my often-naïve queries and have saved me from numerous embarrassing blunders. (All blunders that remain should be blamed on my parents.) As these kind souls are thanked in the acknowledgements at the end of each chapter, I shall refrain

²¹In this section, one of my main goals is to help popularize the brilliant work of Meera Nanda, whose book *Prophets Facing Backward: Postmodern Critiques of Science and Hindu Nationalism in India* (2003) has been extensively debated in Science Studies and in South Asian Studies, but is not widely known outside of academia. The lessons of Nanda’s work go far beyond her native India; the bottom line is that abstract philosophical debates can have serious real-world consequences.

from repeating their names here (it would nearly fill the page). However, I wish to give special thanks to Jean Bricmont for a careful reading of the manuscript and for giving permission to include here two of our co-authored essays. Helena Cronin also made many valuable suggestions; the book would almost certainly be better if I had implemented more of them. Last but not least, I am grateful to Latha Menon for implanting the idea of this book in my head some years ago when we first met, and of helping bring it to fruition when I finally felt ready. (I also salute her courage in resisting the conventional publishers' wisdom that footnotes are the kiss of death for any book aspiring to a not-purely-academic readership.)

Finally, this book is dedicated to the two greatest joys of my life: Marina, who has read and commented on innumerable drafts; and Serena, who will read her daddy's book some day if she feels like it.

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