

Setting the Record Straight

A Response to Gita Chadha

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The debate sparked by the publication of my parody article in *Social Text* [Sokal 1996a] and my book *Intellectual Impostures*, co-authored with Jean Bricmont [Sokal and Bricmont 1998], continues to be plagued by numerous misunderstandings, as exemplified by Gita Chadha's recent analyses [Chadha 1997, 1998]. For readers who have not had the opportunity to read the primary documents, Chadha's account of the debate has the ring of plausibility. The only trouble is, Chadha's 'Sokal' bears very little resemblance to the real one: she repeatedly attributes to me views which I have never expressed and which I do not in fact hold. Perhaps, by setting the record straight, I can contribute to lowering the volume of debate and to shedding light on our real areas of agreement and disagreement.

Chadha repeatedly characterises me as an 'orthodox Marxist' who is opposed to 'new leftist discourses' such as feminism and cultural analysis; at one point she even attributes to me "a belief in ...the ethical supremacy of scientific communism"! For what it is worth, let me say for the record that I am not a Marxist of any kind, orthodox or otherwise. I have respect for Marxist tools such as class analysis, but it seems to me that Marxists have radically underestimated the difficulty of developing an empirically validated 'scientific' theory of any significant part of human behaviour – not to mention a theory of the 'inevitable' global sweep of human history. Moreover, far from being opposed to non-Marxist progressive currents such as feminism, I have specifically characterised myself as a leftist and a feminist [Sokal 1996b]. Perhaps Chadha was misled by my wry confession that "I'm an unabashed Old Leftist who never quite understood how deconstruction was supposed to help the working class" [Sokal 1996c], having missed its sardonic tone. Of course I recognise non-class oppressions such as those based on race, gender, sexuality, caste and religion – who nowadays could fail to do so? My point was simply that Derridean deconstruction and kindred sophistries won't do much for the working class or for women or for African-

Americans or for gays and lesbians or for dalits or for any other oppressed group. You are welcome to agree or disagree with my judgment of post-structuralist theory, but please do not portray me as an 'orthodox Marxist'.

Chadha likewise characterises me as an epistemologically naive scientist; I urge readers to examine my writings on epistemological issues and to judge for themselves [Sokal 1996c, 1997, 1998a, 1998b and especially Sokal and Bricmont 1998, Chapter 4]. In particular, Chadha accuses me of 'positivist bias' without ever bothering to define the term; apparently she uses 'positivism' not in the accepted philosophical sense, viz, the contention that scientific theories should refer only to directly observable quantities, but rather as a vague and pejorative epithet roughly synonymous with 'naive empiricist'. Suffice it to say that I am not a positivist in either sense. (Hardly any thoughtful scientists these days are.)

Similarly, Chadha alludes frequently to 'scientific rationality' and in particular to its alleged 'ideological stranglehold', without bothering to clarify what she means by this ambiguous term. Is she referring to the application of human reason in an effort to obtain accurate knowledge of the natural and social world? If so, I fail to understand why she thinks that is bad. More likely, however, she is referring to the application of scientific knowledge and human reason for various ethically undesirable ends (making the rich richer, making mass murder more efficient, etc). In that case, she and I have no quarrel, so long as it is recognised that the culprit is not 'rationality' *per se* but rather the objectives toward which that rationality is directed.

More generally, Chadha uses freely the term 'science', without bothering to recognise that it has at least four distinct meanings: it denotes a worldview giving primacy to reason and observation and a methodology aimed at acquiring accurate knowledge of the natural and social world; it denotes a corpus of currently accepted substantive knowledge; it denotes the community of scientists, with its mores and its social and economic structure; and it denotes applied science and technology. Very frequently, valid arguments against

'science' in one of these senses are taken to be arguments against 'science' in a different sense. Thus, it is undeniable that science, as a social institution, has been closely linked to the economic and military powers-that-be and frequently plays an odious role. It is equally true that technology has complex (sometimes disastrous) social effects and that it rarely brings the miracle solutions promised by its most enthusiastic advocates. (Nevertheless, technology is often blamed for effects that arise more from the social structure than from the technology itself.) Finally, science, considered as a body of knowledge, is always fallible and subject to revision, and the errors of scientists are sometimes due to all sorts of social, political, religious and philosophical prejudices. I am in favour of reasoned critiques of 'science' understood in all these senses. But such critiques provide no support whatsoever for an attack on science understood as an enterprise aimed at acquiring objective (albeit incomplete and revisable) knowledge of the world. In particular, they provide no support for epistemic relativism.

I therefore agree fully with Chadha when she states that "critiques of science can neither simply be pushed into the political left or right nor can they simply be interpreted to mean pro- or anti-science" [Chadha 1997: 2194]; rather, each critique has to be analysed on its own merits. I also concur with Chadha's search for a 'middle ground' between the traditional historiography that viewed science as an activity somehow isolated from social influences, and the social-constructivist dogma that sees scientific knowledge as the mere encoding of social forces.¹ Lest the reader imagine this latter view to be a caricature that no one seriously advocates, let me cite a few claims made by prominent science studies theorists:

[T]he validity of theoretical propositions in the sciences is in no way affected by factual evidence [Gergen 1988:37].

The natural world has a small or non-existent role in the construction of scientific knowledge [Collins 1981:3].

Since the settlement of a controversy is the *cause* of Nature's representation, not the consequence, we can never use the outcome – Nature – to explain how and why a controversy has been settled [Latour 1987:99, 258, emphasis in the original]. Science legitimates itself by linking its discoveries with power, a connection which *determines* (not merely influences) what counts as reliable knowledge... [Aronowitz 1988: 204, emphasis in the original].

The list could be extended.

The problem, clearly, is to set out the precise content of this 'middle ground', in particular, to distinguish the different types of social influences that can occur such as those affecting what problems get studied versus those affecting what theories get accepted and to distinguish between descriptive and normative analyses. And it is on the details of this middle ground that Chadha and I differ.

Let us begin with the areas of agreement. The following propositions are, I hope, non-controversial:

(1) Science is a human endeavour, and like any other human endeavour it merits being subjected to rigorous social analysis. Which research problems count as important; how research funds are distributed; who gets prestige and power; what role scientific expertise plays in public-policy debates; in what form scientific knowledge becomes embodied in technology, and for whose benefit – all these issues are strongly affected by political, economic and to some extent ideological considerations, as well as by the internal logic of scientific inquiry. They are thus fruitful subjects for empirical study by historians, sociologists, political scientists and economists.

(2) At a more subtle level, even the content of scientific debate – what types of theories can be conceived and entertained, what criteria are to be used for deciding between competing theories – is constrained in part by the prevailing attitudes of mind, which in turn arise in part from deep-seated historical factors. It is the task of historians and sociologists of science to sort out, in each specific instance, the roles played by 'external' and 'internal' factors in determining the course of scientific development. Not surprisingly, scientists tend to stress the 'internal' factors while sociologists tend to stress the 'external', if only because each group tends to have a poor grasp on the other group's concepts. But these problems are perfectly amenable to rational debate.

(3) There is nothing wrong with research informed by a political commitment, as long as that commitment does not blind the researcher to inconvenient facts. Thus, there is a long and honourable tradition of socio-political critique of science,² including antiracist critiques of anthropological pseudo-science and eugenics [Gould 1996] and feminist critiques of psychology and parts of medicine and biology [Fausto-Sterling 1992; Tavis 1992]. These critiques – at least those that are most convincing – typically follow a standard pattern: First one shows, using

conventional scientific arguments, why the research in question is flawed according to the ordinary canons of good science; then, and only then, one attempts to explain how the researchers' social prejudices (which may well have been unconscious) led them to violate these canons. Of course, each such critique has to stand or fall on its own merits; having good political intentions does not guarantee that one's analysis will constitute good science, good sociology or good history. But this general two-step approach is, I think, sound; and empirical studies of this kind, if conducted with due intellectual rigour, could shed useful light on the social conditions under which good science – defined normatively as the search for (objectively valid) truths or at least approximate truths about the world – is fostered or hindered.³

But Chadha's aim is more radical: she wants to call into question the goal of seeking objectively (trans-culturally) valid truths – even approximate, fallible and provisional ones – about the world. She writes:

[T]he premise that "truth is a social construct" need not become the relativist monster undermining progressive social movements... Epistemic relativism need not necessarily mean that 'anything goes' nor does it have to mean that there is no truth (i.e., the space for truth is vacuous). What epistemic relativism does is that it makes the space for truth a contested one, allowing truths to have only provisional and partial validity either in the form of standpoint epistemology or in the form of the strategically held 'elusive' or 'imagined' centres of the deconstructions [Chadha 1998:2968].

The problem is to unravel what this muddled rhetoric actually means.

First of all, what could be meant by "truth is a social construct"? If I assert it is true that several million native Americans died of disease and starvation during the century following the European invasion, I mean that, as a matter of historical fact, several million native Americans really did die of disease and starvation during the century following the European invasion. If I assert it is true that the planets and comets move (to a high degree of approximation, though not exactly) as predicted by Newtonian mechanics, I mean that they really do move in this way. My assertions are true or false according as they do or do not correspond to historical or physical reality. In particular, their truth or falsity is independent of the beliefs or other characteristics of any individual or social group. Truth – at least for factual assertions about the world – is not 'relative', nor is it 'constructed' by anyone.

Of course, perhaps Chadha means only to say that our beliefs about what is true are the result, in part, of a social process. But then why does not she just say so, rather than confusing truths with beliefs?⁴

Similar ambiguities pervade the rest of the passage. What does it mean to say that "the space for truth [is] a contested one"? Does it mean simply that different people have different beliefs about what is true, and that they argue publicly about those beliefs? If so, Chadha is right, but it is hardly a novel insight. What is meant by "truths have only provisional and partial validity"? If Chadha means that what we believe today to be exactly true may turn out, upon closer examination, to be only approximately true – or even to be grossly wrong – she is again right. But this view is in no way 'relativist': it is nothing more than fallibilism, a key tenet of the scientific worldview for at least the past 250 years.⁵

Chadha repeatedly vulgarises well known ideas from the philosophy of science. She alludes to "the theory-ladenness of facts and the context-dependence of observations" [1997: 2196] without stopping to analyse what they do and do not entail. Yes, inference from telescopic observations to astronomical conclusions requires assumptions about optics (as physicist-philosopher Pierre Duhem observed as early as 1894); so, by the way, does inference from my seeing Gayatri Spivak in front of me to the conclusion that she is in front of me. But these optical theories are not arbitrary; they can be tested by numerous independent experiments. We do need to make the 'metaphysical' assumption that the world is not perverse – that the laws of optics do not suddenly change when I cast my gaze on Spivak – but this is so in everyday life just as it is in science. Our observations are not merely encodings of our prior beliefs.

Likewise, Chadha observes that "the development of scientific knowledge... cannot be understood as a matter of adding more detail or theoretical sophistication to a stable base", and she cites Thomas Kuhn's analysis of "times of scientific revolution when paradigms conflict and compete for supremacy" [1997: 2196]. No problem there (though it would have been more accurate to say "cannot always be understood"). But if Chadha is asserting (as Kuhn sometimes appeared to) that competing paradigms – for instance, Newtonian mechanics and general relativity – are incommensurable in the sense that there is no rational way to decide between them on the basis of observations and experiments, then she is simply mistaken. As the philosopher of science Tim Maudlin as-

tutely observed:

If presented with a moon rock, Aristotle would experience it as a rock, and as an object with a tendency to fall. He could not fail to conclude that the material of which the moon is made is not fundamentally different from terrestrial material with respect to its natural motion. Similarly, ever better telescopes revealed more clearly the phases of Venus, irrespective of one's preferred cosmology, and even Ptolemy would have remarked the apparent rotation of a Foucault pendulum. The sense in which one's paradigm may influence one's experience of the world cannot be so strong as to guarantee that one's experience will always accord with one's theories, else the need to revise theories would never arise [Maudlin 1996:442].

But Chadha's fundamental error is a misapprehension of the nature of science, which she portrays as a kind of secular theology:

[I]t seems absurd to me to extract a temper, i.e. the scientific temper, out of a method which is valid only in referential terms, i.e. within the axioms of science... [Chadha 1998:2967].

But science is not a self-contained system, somehow disconnected from everyday rationality. Quite the contrary: modern science is nothing more or less than the deepest (to date) refinement of the rational attitude toward investigating any question about the world, be it atomic spectra, the aetiology of smallpox, or the Mumbai bus routes. Historians, detectives and plumbers – indeed, all human beings – use the same basic methods of induction, deduction and assessment of evidence as do physicists or biochemists. Modern science tries to carry out these operations in a more careful and systematic way, by using controls and statistical tests, insisting on replication, and so forth. Moreover, scientific measurements are often much more precise than everyday observations; they allow us to discover hitherto unknown phenomena; and they often conflict with 'common sense'. But the conflict is at the level of conclusions, not the basic approach. As Susan Haack lucidly observes:

Our standards of what constitutes good, honest, thorough inquiry and what constitutes good, strong, supportive evidence are not internal to science. In judging where science has succeeded and where it has failed, in what areas and at what times it has done better and in what worse, we are appealing to the standards by which we judge the solidity of empirical beliefs, or the rigor and thoroughness of empirical inquiry, generally [Haack 1998:94].

Let us examine next the epistemological

insights that Chadha claims for feminist critiques of science. But before doing so, it is necessary to clear one red herring out of the way: the appropriation of the label 'feminist epistemology' to denote the views of certain feminist theorists of a generally social-constructivist bent (Evelyn Fox Keller, Helen Longino, Sandra Harding, Carolyn Merchant, Ruth Hubbard)⁶ to the exclusion of others whose politics are equally feminist but whose epistemological views are closer to the mainstream of analytic philosophy of science (Noretta Koertge, Susan Haack, Janet Radcliffe Richards, Meera Nanda).⁷ In point of fact, there is no canonical feminist 'line' on epistemology, and no feminist has the right to dictate to another what her (or his) philosophical views must be. For simplicity, I shall refrain from placing the phrase 'feminist critiques of science' always in quotation marks, but emphasise that I use this phrase solely as a shorthand to designate the thinkers cited favourably by Chadha – not feminists in general.

According to Chadha, feminist critiques of science show the need

not only to critically examine mainstream research in science but also to reconstruct the notion of 'reason' itself. While feminists like Hilary Rose have argued for a more 'embodied notion of reason' where 'head and hand' are better integrated, others like Keller have argued for a more 'self-reflexive reason' [Chadha 1997:2195]. What, exactly, does this mean? Are we merely being admonished to become more aware of our possibly implicit preconceptions? That is surely good advice, but hardly a novel contribution to the epistemology of science, much less one requiring us to "reconstruct the notion of 'reason' itself". Chadha continues:

Elaborating further, Keller believes that "a first step in extending the feminist critique to the foundations of scientific thought is to reconceptualise objectivity". She suggests that the objective effort of science – the quintessentially human effort to understand the world in rational terms – need not be abandoned but could be refined. She states that "we need to add to the familiar methods of rational and empirical inquiry the additional process of critical self-reflection, attending to the features of the scientific project that belie its claim to universality" [Chadha 1997:2195-2196].

Now, I am all in favour of critical self-reflection, but might not we have a few more details of which features of the scientific project allegedly belie its claim to universality? Are Keller and Chadha claiming that quarks and haemoglobin

behave differently in Europe and in India? And if not, what precisely are they claiming? Forgive me my scepticism, but I have the distinct impression that the 'insights' so vaunted by Chadha come down – once one removes the ambiguities and examines concrete examples – either to banalities or to falsehoods.

It is beyond my competence to comment on the specifically Indian socio-political issues raised in Chadha's most recent article [Chadha 1998:2966-2967]. But I would like to point out a key ambiguity in her use of the word 'science'. Among the causes of "a generation's disenchantment with science", Chadha enumerates the following: "technocratic bias which led to the bulldozing of slums and family planning programmes... the Bhopal gas disaster... the proposal of constructing the Narmada dam". Please note that all of these are public-policy issues concerning the application of scientific knowledge (i.e. technology) in specific social situations. Even if we grant that Chadha's view on each of them is correct – and I am perfectly happy to do so – why on earth should that lead anyone to be 'disenchanted' with science as a methodology aimed at acquiring accurate knowledge of the natural and social world? In particular, what support does it provide for 'epistemic relativism'? The answer, quite simply, is none. On the contrary, activists who wish to challenge public policy need a scientific worldview: when opponents of a project argue, for example, that it will have (or will most likely have) deleterious social effects (e.g. increasing the inequality in the distribution of wealth), they are making claims about the natural and social world – claims that need to be taken seriously only to the extent that there is evidence that the assertions are objectively true. Epistemic relativism, I submit, is suicidal for progressive political movements.

Notes

- 1 For excellent outlines of such a 'middle ground', with which I am in almost complete agreement, see Kitcher (1998) and Haack (1998).
- 2 I limit myself here to critiques challenging the substantive content of scientific theories or methodology. Other important types of critiques challenge the uses to which scientific knowledge is put (e.g. in technology) or the social structure of the scientific community.
- 3 Of course, I do not mean to imply that the only (or even principal) purpose of the history of science is to help working scientists. History of science obviously has intrinsic value as a contribution to the history of human society and human thought. But it seems to me that history of science, when done well, can also help working scientists.
- 4 The same sloppiness of thought and language

- can be found in the citation from Ruth Hubbard (1988: 1) that Chadha cites approvingly: "Every fact has a factor, a maker." This confuses facts – situations in the external world – with our knowledge of them or our beliefs about them.
- 5 Susan Haack (1993b, 1998), who illuminatingly analogises science to the problem of completing a crossword puzzle, summarises fallibilism by the comment that it is prudent to work in pencil rather than in pen.
 - 6 Contrary to Chadha's (1997: 2195) assertion, I make no "implicit equation...between feminist critiques of science and postmodernism". I am perfectly aware of the divergent points of view among 'feminist epistemologists', and I take care to analyse each theorist separately.
 - 7 See Koertge (1980); Haack (1992, 1993a, 1998); Radcliffe Richards (1996); Nanda (1996).

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