Subliming and subverting:
A theoretical impasse on scientific rationality

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What is special about the theory of history when the history is about science? I shall focus on a theoretical impasse between two perspectives – one which seeks an ideal of rationality in scientific practices, and one which stresses the contingency of these practices. This impasse underlies some of the fractious relations within the History and Philosophy of Science. Since the late 1960s, this interdisciplinary field has been described, variously, as an ‘intimate relationship’, a ‘marriage of convenience’, a ‘marriage for the sake of reason’, a ‘troubling interaction’, a ‘precarious relationship’, or one still at risk of ‘epistemological derangement’.

My talk has three aims. (a) First, I characterise the sublimers and subversives, two perspectives in this impasse on scientific rationality. I explain their different aims and methods. Then I describe a dynamic underlying this impasse, in which each perspective dismisses and condemns the other. (b) Second, I propose that both sublimers and subversives tend to talk past each other. Their dismissals and condemnations arise, in part, because each perspective misconstrues the other’s claims. Each fails to see that the other is interested in different problems and interprets concepts differently. (c) Third, I briefly suggest two ways in which my analysis can be applied. These highlight its strengths and weaknesses.
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1 Introduction

What is special about the theory of history when the history is about science? I shall focus on a theoretical impasse on scientific rationality. To simplify, this impasse is between two perspectives – one which seeks an ideal of rationality in scientific practices, and one which stresses the contingency of these practices. It underlies some of the fractious relations within the History and Philosophy of Science. Since the late 1960s, this interdisciplinary field has been described, variously, as an ‘intimate relationship’, a ‘marriage of convenience’ (Giere 1973), a ‘marriage for the sake of reason’ (Krüger 1979), a ‘troubling interaction’ (Pinnick and Gale 2000), a ‘precarious relationship’ (Burian 2002), or one still at risk of ‘epistemological derangement’ (Rouse 2005).¹

I am a philosopher looking in, and learning from, this interdisciplinary field. But my experience warns against drawing easy lessons from it. As a graduate student in Oxford, I attended seminars in history and sociology of science, including some on their methods. I noted then how difficult it is for philosophers to talk to historians and sociologists who are interested in different problems and interpret concepts differently. In this talk, I want to take some of these conflicting interests and interpretations seriously. I will use them as tools to analyse part of the impasse on scientific rationality.

My three aims: First, I characterise the sublimers and subversives, two perspectives in this impasse. I explain their different aims and methods. Then I describe a dynamic underlying this impasse, in which each perspective dismisses

¹ I have also learnt from recent surveys by Zammito (2004), McMullin (2007) and Schickore (2011). Zammito’s book includes discussion of sociology, and science and technology studies.
and condemns the other. Second, I propose that both sublimers and subversives tend to talk past each other. Their dismissals and condemnations arise, in part, because each perspective misconstrues the other’s claims. Each fails to see, or forgets, that the other is interested in different problems and interprets concepts differently. Third, I briefly suggest two ways in which my analysis can be applied. These highlight its strengths and weaknesses.

2 Impasse about scientific rationality

This impasse is between sublimers and subversives. I use them as ideal intellectual types, akin to Isaiah Berlin’s hedgehogs and foxes. Each perspective is a blend of historiographical interests and commitments. Both present a simplistic contrast that should not be pressed too far, whether in classifying individuals or groups. An individual who engages with history and sociology of science may go through subliming and subversive phases. A group is likely to contain subliming and subversive perspectives, though one perspective may be dominant. A conjecture: currently, History and Philosophy of Science attracts more sublimers, while History of Science or Science and Technology Studies appeals to more subversives.

My goal, however, is not to classify. It is to use these ideal perspectives as a starting point – to identify, and then to interpret, a dynamic that appears in many debates on the contingency of scientific practices.

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2 Berlin (1953), 437: ‘like all over-simple classifications of this type, the dichotomy becomes, if pressed, artificial, scholastic and ultimately absurd...like all distinctions which embody any degree of truth, it offers a point of view from which to look and compare, a starting-point for genuine investigation.’
2.1 Aims and methods

So who are the sublimers? I borrow the term ‘subliming’ from Wittgenstein (1953), who speaks of ‘our tendency to sublime the logic of our language’ (§38).³ The sublimers I describe study scientific practices, not linguistic ones. Their aim is to discover an ideal of scientific rationality. This ideal will consist of norms that guide scientific practices, including framing hypotheses, conducting experiments, collecting data, constructing models and forming theories, etc.

To deduce these norms, sublimers use abstraction from scientific practices. They distinguish, in a successful practice, a pattern of reasons from its background of causal conditions. These reasons are explicated in terms of scientific norms. The conditions may be social, cultural, economic or material in nature – no matter, the point is that these conditions are not cited in the reasons used, implicitly or explicitly, by the scientists. Hence, from the subliming perspective, they are no part of the norms. They are as irrelevant as the scientists’ breakfast or bedtime. Once the appropriate norms are abstracted, they can be tested to see how well they explain, or at least clarify, other practices.

Subversives, on the other hand, want to uncover the contingency of scientific practices. To be contingent, in this sense, is to be dependent on some human interests. A contingent practice is one that would be otherwise if the relevant interests were otherwise. It is thereby subject to the accidents of human nature and history.

Their method is the contextualisation of scientific practices. They investigate the conditions under which norms guide practices – often the very conditions cast aside as irrelevant to the subliming perspective. According to the subversive

³ His example: When we study how names refer to things, we look for the ideal structure that some names must share. We thereby neglect how different things are also called names, and how these names have ‘many different kinds of use…related to one another in many different ways’. See also §89: ‘In what sense is logic something sublime? For there seemed to pertain to logic a peculiar depth – a universal significance. Logic lay, it seemed, at the bottom of all the sciences.’
perspective, the use of a norm depends on some of these conditions. Since the conditions are contingent, the practice enabled by them is similarly contingent. This inference is subversive in at least one sense: it challenges any conception of scientific rationality that denies a role to such enabling conditions.

Which conditions count as enabling? To distinguish them from other conditions, subversives look for slack in the reasons attributed to scientists. This appears where, in systematic instances, the scientists’ reasons are insufficient to determine their actual behaviour. So the ideal norms, by themselves, cannot fully account for the relevant scientific practice. This kind of underdetermination suggests that enabling conditions may be at work. Subversives then find a pattern of conditions that picks up the slack, helping to explain the scientists’ behaviour. Once these enabling conditions are identified, they can be tested to see how well they explain, or at least illuminate, other practices.

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<th>The subliming perspective</th>
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I will use Kitcher (1998) and Zammito (2011) as stalking horses in the rest of this talk. They are not meant to be the ‘average’ sublimer or subversive. Indeed, I see them as dissidents from their perspectives, both forging a middle ground for the critical study of science and its history.⁴ Kitcher works primarily in philosophy of

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⁴ Kitcher (1998) offers an illuminating view of science studies ‘from the marginalized middle’(50). He rehearses Mercutio’s cry (“A plague o’ both your houses!”), while noting that the latter is ‘closer to the Montagues than to the Capulets’ (n. 57). Zammito (2004) finds Kitcher’s position on
science, Zammito in intellectual history and historiography of science. Both criticise subliming and subverting, while retrieving insights from each perspective. I learn from, and agree with, much of what they say. My aim is to extend their middle ground by clarifying a dynamic that they neglect and, to some extent, reiterate.

2.2 Dismissals and condemnations

What is this dynamic? It is a series of mutual dismissals and condemnations. I begin with the dismissals. Sublimers are dismissed for being *scholastic* in their approach, while subversives are disdained for being *merely sociological*. From the subversive perspective, the sublimers’ ideal of scientific rationality looks too abstract. It is useless in the practical analysis of scientific practices. According to Zammito (2011), the ‘abstract-universal norms thematized in philosophy of science’ seem ‘increasingly irrelevant’ (409). This is how he criticises the ‘unified theory of science’ put forward by the positivists:

> The grand-scale “normative” prepossessions of the “Received View” in philosophy of science...have proven ultimately incongruous with any effective descriptive or explanatory investigations of concrete areas or problems. (391)

So he rejects positivist norms for being irrelevant to ‘concrete’ interests. In their place, he promotes a ‘far more disunified, situated, and contingent theory of empirical inquiry’, drawn from the fields of ‘historicized epistemology’ and science studies.

From the subliming perspective, some social conditions identified by subversives are poorly connected to scientific practices. For instance, Kitcher (1998) criticises science studies to be ‘thoroughly compatible’ with his (268). The quotations below from Rouse (1996) and Rheinberger (2010) are found in Zammito (2011).
a sociological approach in which scientists are conceived as ‘brain dead from the moment they enter the laboratory to the moment at which they leave’ (38).

Curious stories are then told about the ways in which class or gender, toilet training or religious education, political disputes in the wider society and large cultural styles determine the character of a researcher’s work. (39)

When subversives connect social conditions and scientific work with ‘so broad a brush’, they may be legitimately accused of ‘scientific ignorance’. It is not obvious how the conclusions are meaningful to philosophers and others who study scientific practices; they are, in this sense, merely sociological.

Next are the condemnations. Sublimers are condemned for being imperialist, while subversives are criticised for being irrationalist or relativist. From the subversive perspective, sublimers seem to impose their ideal of rationality on scientific practices. Thus, even as Zammito (2011) dismisses the relevance of positivist philosophy, he denies that it is ‘authorized to impose a priori rules upon empirical inquiry’ (391). He finds support from two others. First is Rouse (1996), who criticises the desire by philosophers to establish ‘epistemological sovereignty’ as ‘an impartial referee among conflicting claims’, acting ‘in accord with rules of rational method’ (403). Second is Rheinberger (2010), who echoes Gaston Bachelard’s view that philosophers ought not to ‘dictate to scientists the conditions of possibility and the norms of their knowledge’ (21).

From the subliming perspective, subversives appear seduced into various scepticisms about reason and reality. Kitcher (1998) cites the view that they are ‘dedicated to undermining scientific authority’ (33). Insofar as this view is accurate, he blames ‘some bad philosophy’ in contemporary history and

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5 A precursor: Hume may be interpreted as highlighting the enabling conditions for inductive practices. He has also been accused of being irrationalist, or at least sceptical, about induction.
sociology of science (39). For instance, the underdetermination of theory by evidence is ‘dramatically overblown’ by subversives (41). They use it to support a sceptical dogma: ‘no system of beliefs is constrained by reason or reality, and no system of beliefs is privileged’ (45).

3 Analysis of impasse

I have suggested that, underlying the impasse between sublimers and subversives, is a dynamic of dismissals and condemnations. Each perspective criticises the other for claiming too little, then for claiming too much. Both oscillate, in tone, between disdain and hysteria.

Now I propose an explanation for this dynamic. My proposal: sublimers and subversives often talk past each other because they are interested in different problems and interpret concepts differently. Each perspective construes the other’s claims in terms of its own interests and conceptual interpretations. Seen from the wrong perspective, such claims appear either trivial or false – thus, provoking dismissal or condemnation.

3.1 Being scholastic and imperialist

Consider why sublimers are dismissed for being scholastic. Their ideal of rationality is said to be too abstract for analysing scientific practices. But too abstract for whose purpose? From the subliming perspective, the ideal’s norms are used to explain how the practices of different scientists are guided in the same ways. The norms should be judged by how well they clarify this aspect of science. Abstraction, on its own, does not make them less useful. Indeed, any

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account of ‘concrete areas or problems’ that strains to avoid abstraction is likely to be overwhelmed by incidental detail – a different risk of scholasticism.

Subversives themselves resort to a degree of abstraction when they describe how the same social conditions enable the practices of different scientists. They too face the risk of obscurity that comes with abstract description. Kitcher (1998) highlights this with a slight parody of the subversives’ terminology:

Let us mix in some Lacan, some Lyotard, a dash of Deleuze. Let us play with Derrida. Let us have actor networks, mangles of practice, emergent dialectical surfaces, multivocalized polygendered postphallogocentric transcategorically sensitive discourses…’

He finds this kind of sociological discourse to be ‘as closed off from the phenomena that were once central to the field as some philosophical investigations of the 1950s with their exclusive obsessions with the blackness of ravens’ (45).

However, it is not surprising that the sublimers’ ideal appears irrelevant to some subversives. Rheinberger (2010) sums up an extreme version of their disdain: ‘Contingency intervenes in the actual course of history in a way that lies beyond any critical-rational schematism’ (63). Subversives often focus on the contexts in which official norms work. The norms cannot help to explain their own contexts. From the subversive perspective, they only form a framework in which interesting problems can be raised about the role of contexts.

Next, what about the condemnation that sublimers are imperialist – that they presume to impose norms on science? This is puzzling for two reasons. First, most sublimers do not claim any a priori or infallible authority over scientific rationality. They identify norms by studying how scientists behave. Even the positivists, so harshly criticised by Zammito, deduced norms from their substantial knowledge of how physicists theorise about the world. From the
subliming perspective, these norms need to be tested. And they can be rejected if they do not help to explain scientific practices.

Second, the sublimers’ method of abstraction does not, in principle, exclude any norms or practices from consideration. Others are free to propose norms that are drawn from neglected or new practices. Indeed, this task must be open-ended. As Kitcher (1998) points out, in science, ‘canons of reason and evidence also progress with time as we discover not only more about the world but also more about how to learn about the world’ (36). Over the past decades, scientists have learnt more about statistical inference and statistical methodology (37). Sublimers need to revise their ideal of rationality to reflect these evolving practices.

Why then do some subversives believe that the sublimers want to ‘impose’ or ‘dictate’ an ideal of rationality to others? One possible, if partial, answer: they are reacting to a practical, rather than logical, consequence of abstraction. In practice, abstracting a set of norms leads us to neglect related practices (or aspects of practices) that are not codified by them. This is, I believe, key to Wittgenstein’s worry about subliming. It is implicit in a complaint by two sociologists of science, MacKenzie and Barnes (1979):7

> Philosophical models of proper evaluation are irrelevant to the historian’s task. Indeed, with their typical stress upon the formal, abstract properties of verbal argument, they can even impede an adequate naturalistic understanding of actual judgments… (191-2)

Note how the basis of their criticism shifts from irrelevance to impediment. To non-logicians who are attuned to historical or sociological interests, this impediment may be no less significant than logical exclusion.

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7 They are quoted in Zammito (2010), 409.
Kitcher (1998) offers some evidence to support this subversive reaction. He describes how philosophers of science, between the 1930s and 1960s, fixated on the justification of true scientific beliefs. As a result:

Prevailing pictures of justification tended to identify relatively simple forms of inference that made it puzzling how any rational person could ever have opposed the great achievements in the history of science. (43)

The positivists neglected practices that explain why there had been ‘protracted scientific debates’ over these ‘great achievements’. These practices include taking measurements, making experiments and building models. They also focused on practices in physics, rather than those in biology. It is worth pointing out that, besides ‘rebellious sociologists’, the next generation of philosophers also criticised and tried to compensate for this neglect (Putnam 1979; Kitcher 2003; cf. Schickore 2011, 477).

3.2 Being merely sociological and irrationalist

What exactly do sublimers mean when they dismiss subversives for being merely sociological? First, they may be expressing disciplinary arrogance. Especially in informal settings, some analytic philosophers disparage details about the context of a practice as ‘merely sociological’. This suggests that the conditions forming the context are accidental to the practice; by default, they do not interest philosophers who want to know about what is essential.

But sublimers should not indulge this habit. Sociological inquiry can cast light on social dimensions that may be essential to scientific practices. Some philosophers of science focus on these neglected dimensions (Machamer and Osbeck 2004; Longino 2013). In his survey, Kitcher (1998) points to pioneering research about the roles played in science by ‘values of the broader society’ and ‘social relations and structures’ (45). To progress, this research needs ‘rich
descriptions of particular instances’. These may well be supplied by historians and sociologists with subversive interests.

Second, more charitably, sublimers may be raising a metaphysical challenge. Through contextualisation, subversives discover contingent conditions that enable scientific practices. But, for some sublimers, the metaphysical significance of these conditions still needs to be clarified. Are the conditions contingently or constitutively related to scientific knowledge? If they are constitutively related to scientific knowledge, are they related via scientific norms, concepts, objects or truths?

Both questions involve metaphysical distinctions between contingent and constitutive relations, and between their appropriate relata. Those who raise the questions are interested in a philosophical account of the enabling conditions. It is up to metaphysicians to decide how best to use ‘rich descriptions of particular instances’ to answer the questions. So far, I do not see any clear-cut criteria in philosophy of science for answering either; the burden of proof is simply set high on constitutive relations.

Are subversives interested in these questions? In conferences, some insist that the social conditions they highlight are ‘constitutive’ of scientific knowledge. Even more write about the ‘social construction’ of norms, concepts, objects and facts. Boghossian (2007) interprets such claims at their philosophical face value:

our social construction theorist is not interested in cases where, as a matter of contingent fact, some fact is brought into being by the intentional activities of persons, but only in cases where such facts could only have been brought into being in that way. In the intended technical sense…it has to be constitutive of a given fact that it was created by a society if it is to be called “socially constructed” (17)
I am not so confident that historians and sociologists who make such claims intend them in Boghossian’s ‘technical’, which is to say metaphysical, sense.

First, subversives tend not to distinguish sharply between knowledge and the process of acquiring knowledge. Zammito (2011) gives an example of this blurring, when he describes the study of scientists ‘as emphasizing increasingly the local and developmental character of their learning practices, thus making the conception of knowledge dependent upon historical experience’ (390). Without this distinction firmly in place, the metaphysical challenge loses its point. Second, they invariably explicate claims of constitution or construction in terms of the significant – rather than trivial – causal role played by social conditions in scientific practices. Third, some of them are explicitly sceptical of traditional metaphysics. Boghossian’s construal of social construction, which requires a concept of necessity, will not make obvious sense to Woolgar (1988), who disavows all forms of essentialism.

Similarly, it is not obvious that subversives are interested in the metaphysical distinction between the construction of norms, concepts, objects and facts. From their perspective, all these constructions signify the contingency of scientific practices – the main locus of their inquiry. This may partly explain why some subversives feel no need to distinguish sharply between different kinds of construction. Here Rouse (2003) moves, without qualm, from talk of norms to talk of reality:

Normativity arises from practical involvement in a situation whose subsequent development is not yet determined: there are real possibilities for making a (significant) difference in how things subsequently turn out. The difference those possibilities can make transforms the situation. (26)

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8 He is summarising Rheinberger (2010) on ‘thought about the nature of science...over the course of the twentieth century’.
9 Hacking (1999), ch. 1, discusses the tendency to conflate the construction of a concept with the construction of a phenomenon picked out by the concept.
Note that he does not ask whether these ‘real’ possibilities are contingently or constitutively related to ‘practical involvement’.

Some subversives also draw on a tradition in French epistemology of science that includes Bachelard, Georges Canguilhem and Michel Foucault. According to Rheinberger (2010), this tradition studies ‘the historical conditions under which, and the means with which, things are made into objects of knowledge.’ To do so, it focuses on ‘the process of generating scientific knowledge and the ways in which it is initiated and maintained’ (3). Why does this ‘process of generating scientific knowledge’ cast light on the making of ‘objects of knowledge’? Because, in this tradition, the objects of interest are shaped by the changing norms and concepts of the process. This is a different, also technical, sense of ‘objects’, not noted by Boghossian or Kitcher. As Rouse (1996) explains, such objects ‘only exist within phenomena’ (274); Rheinberger (1997) calls them ‘epistemic things’. The sublimers who follow this tradition are rarely interested in how ‘things’ are like in themselves.10

Next, consider the criticism that subversives are irrationalist or relativist. This is problematic for two reasons. First, very few subversives denigrate scientific rationality. Most subversives want to explain how scientific norms work amid contingent conditions. So they discover conditions that enable scientific practices. This discovery need not debase the success of those practices, nor threaten scientific rationality per se. From the subversive perspective, contingency in science does not entail its corruption. Even those subversives who are interested in reform are reconceiving scientific practices – rather than rejecting them – by proposing changes to their enabling conditions.

Here is a passage from Barnes and Bloor (1982), cited by Boghossian (2006) as an typical example of ‘postmodern relativism’:

10 That might be analogous to Kant being interested in the noumena. On this tradition’s connection with Kant, see Canguilhem (2006).
For the relativist there is no sense attached to the idea that some standards or beliefs are really rational as distinct from merely locally accepted as such. Because he thinks that there are no context-free or super-cultural norms of rationality he does not see rationally and irrationally held beliefs as making up two distinct and qualitatively different classes of thing. (27-8)

At first glance, this may read like a manifesto for irrationalism. But Barnes and Bloor do not deny that there are rational norms. Nor do they claim that norms bind us ‘merely’ because they are locally chosen. Instead, they challenge – as most subversives do – a specific conception of rationality that requires ‘really rational’ norms. These norms are supposed to be ‘context-free or super-cultural’, working without what I have called enabling conditions. Barnes and Bloor also do not say that ‘rationally and irrationally held beliefs’ are equally valid. Instead, they believe that both classes of beliefs are acquired through contingent practices; I take this to be one sense in which the beliefs can be seen as not ‘distinct and qualitatively different’.

Nothing so far supports a naive relativism about scientific norms. Barnes and Bloor do not say that the norms can only be ‘locally accepted’, in the sense that they are determined by one culture or constrained within one context. From the subversive perspective, enabling conditions need not be interpreted as a philosopher’s necessary conditions of possibility. Instead, a different set of conditions could enable the use of the same norms. So different cultures need not produce different scientific norms.

Second, the subversives’ method is misconstrued as their sceptical dogma. Kitcher (1998) blames this scepticism partly on a philosophical idea that is ‘over-interpreted’: the underdetermination of theory by evidence. He acknowledges that subversives reject ‘context-independent standards of good reasoning’ (41). But he interprets this rejection as an exaggerated claim about underdetermination. Why? He believes that subversives use this claim about
underdetermination to support scepticism. They supposedly infer that ‘the world can have no bearing on what scientists accept’ (41). So their ‘appeal to underdetermination’ is the ‘reformulation of a form of skepticism’ (42).

But subversives rarely claim that scientists are free from constraints exerted by the world. Some of them even explain how material constraints crop up in scientific practices as a kind of ‘resistance’ (Pickering 1995; Rheinberger 2010). Admittedly, for most subversives, these material constraints are not in focus – they are primarily interested in how scientific practices are dependent on human interests. Yet even those influenced by the French see themselves as uncovering the conditions under which ‘things are made into objects of knowledge’ – things that are, presumably, in the world.

So how has this misunderstanding arisen? Contrary to Kitcher, I do not believe that most subversives use underdetermination as a philosophical premise. Rather it is their methodological tool. As I explained earlier, they look for systematic instances in which scientific norms cannot fully account for a scientific practice. To them, this underdetermination suggests that the use of these norms may be enabled by contingent conditions. It is only a clue. To demonstrate that such conditions are at work, subversives must then find a pattern of conditions that help to explain the scientists’ behaviour in that practice and others.

4 Applications

To sum up: I have identified a dynamic of dismissals and condemnations from the impasse between sublimers and subversives. And I have explained this dynamic in terms of their misunderstanding of each other’s explanatory interests and conceptual interpretations.
My method is abstraction, used with some philosophical abandon. I highlight only those trajectories of thought and tendencies that clarify the dynamic I am interested in. Three caveats are needed. First, I neglect many methodological and conceptual differences between the philosophers, historians and sociologists whom I classify roughly into sublimers and subversives. Second, I do not claim that my analysis fully accounts for their dismissals and condemnations. It is unlikely that a persistent dynamic between two intellectual perspectives – with overlapping disciplinary, social and political angles – is just the result of mutual misunderstandings. Third, my analysis is not imposed on anyone. Of course, I hope that it elicits moments of acknowledgement from those who share, or sympathise with, either perspective. But, like any abstract analysis, its value lies in its potential applications.

I suggest two applications. First, more generally, does my analysis illuminate other aspects of the dynamic? For example, each perspective’s dismissal and condemnation can now be interpreted as responses to the other’s criticisms.11 (a) When subversives are dismissed for being merely sociological, it is not surprising that some of them are dismissive of sublimers in return. This is especially plausible if they interpret sublimers to mean that subversive interests are not significant per se – rather than not yet, or not obviously, metaphysically significant. (b) Subversives tend to focus on practices (or aspects of practices) that are not codified by the sublimers’ norms. Some of these practices (or aspects of practices) may be guided by hidden norms. If the sublimers hastily dismiss these subversive interests, then they may be unduly neglecting some scientific norms. This adds to why, from the subversive perspective, subliming arguments appear to be imperialist.

(c) When sublimers are condemned for being imperialist about scientific norms, some of them will interpret this to mean that subversives are cavalier or disparaging about these norms. (d) Subversives tend to neglect metaphysical

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11 This extends a line of reasoning in Kitcher (1998), which argues that one side’s over-extension of ‘genuine insights’ leads to the other side’s over-generalisation of ‘good points’ (49).
distinctions that matter to some sublimers. They do not draw sharp distinctions between knowledge and the process of acquiring knowledge, between contingent and constitutive relations, and between the construction of norms, concepts, objects and facts. If the sublimers insist on the importance of these distinctions, some subversives may accuse them of being scholastic. This reinforces why, from the subliming perspective, subversive arguments seem to lack rigour.

Second, does my analysis clarify specific disputes over the contingency of scientific practices? I conjecture that the analysis explains some current impasses about the roles of values, models and representations in science. I am interested to see if it can cast fresh light on old debates too. I have offered a brief example from Barnes and Bloor (1982), about the point of relativism in sociology. Consider, as another example, an earlier controversy over Kuhn’s claim that some new scientific discoveries bring us new worlds:

At the very least, as a result of discovering oxygen, Lavoisier saw nature differently. And in the absence of some recourse to that hypothetical fixed nature that he “saw differently”, the principle of economy will urge us to say that after discovering oxygen Lavoisier worked in a different world. (1962, 118)
Bibliography


