

Reality Failures¹

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Note and Summary

The main text which is work in progress explores the following points empirically and theoretically.

On Performativity

1. Knowledge-practices are performative: they enact realities.
2. They do this in particular locations and circumstances using specific apparatuses.
3. In part they enact orderly realities that confirm their own validity; in part, however, they also and necessarily enact unruly and excessive realities that they do not see. (Order logically implies disorder)
4. Oxymoronically, excessive realities become visible when knowledge fails.

On Inquiries into Failure

5. Inquiries into failure are knowledge-practices that in an empirical and normative mix seek to diagnose and correct the origins of excesses that have become catastrophically visible.
6. Such inquiries assume that satisfactorily working systems are more coherent than is actually the case (3 above).
7. They typically underestimate the significance of unruliness and excess in preventing catastrophe.
8. They tend not to recognise that they themselves are generating further invisible and unruly realities, and hence, *inter alia*, new possibilities for further failure.
9. They typically further assume (3 and 6 above) that centralised and coherent knowledge is required if failure is to be prevented.

Knowledge-practices and their systems will fail less readily and/or catastrophically if

- a. They recommend against the creation of systems in which failure will lead to catastrophe.
- b. They recognise that orders, including especially their own, imply necessary excesses and forms of unruliness (3 and 6 above).
- c. They recognise the need for and become more tolerant of non-coherence (6 and 7 above).
- d. They recognise that they are the effect of specific circumstances and apparatuses (2 above).
- e. They devolve themselves in ways that recognise that knowledges and their realities are distributed and heterogeneous.

Notes on the Recommendations

- a, the first, though very important, is somewhat apart from those that follow it. It comes from Charles Perrow's analysis of 'normal accidents'.
- b, c, and d may be understood as expressions of 'permissive intelligence'. Importantly, they might immediately be implemented, both in particular failure inquiries, and in our own thinking about knowledge failures.
- e. is best understood as a long term recommendation for the creation of networks of knowledge spaces that might, in many cases, look quite unlike current forms of knowledge or understandings of expertise. This takes us to something like a political economy of knowledge

‘Do not adjust your mind, there is a fault in reality’

In the early 1970s Stephen and Hilary Rose, radical commentators on the state of science and the world, wrote a piece on the ideology of scientific reductionism in neurobiology. Their memorable tongue-in-cheek title, ‘Do not adjust your mind, there is a fault in reality’², sticks in my head. Ideology, they suggested, insists that how we think is right. This means that if the world doesn’t fit, then it is the world that’s got it wrong. It’s time, they were saying, to undo this. Self-validating knowledge that fails consistently is knowledge that is flawed.

What do I take from their aphorism? Two answers. One: if we systematically fail to make sense of reality – if reality seems to be running amok – then this is probably because we misunderstand something about the character of knowledge and how it relates to the real. And then two: this may also partly be because our realities are indeed failing. Already with this second point I betray the Roses’ position but perhaps they will forgive me for my target relates to theirs: it is the socially-situated and self-serving hubris that attaches to those currently hegemonic knowledge practices that insist there is or should be a single order in the world. So this is my passion and I think it strongly relates to that of Karel Williams and his colleagues: I would like to undo the hubris of such knowledge practices.

What, then, of ‘reality’? How might it be said that reality is failing in a way that does not fall back into the ideological trap described by the Roses? Of course there’s a strong sense in which it, reality, neither succeeds nor fails. It just is. If a Chernobyl goes up in smoke and deposits its fallout across half of Europe then that’s an exceedingly unfortunate fact of life, but it is a fact of life. This means that if we fail to understand and control events, then the fault has to be our knowledge, or at least in how we go about implementing it. There are whole libraries on epistemology and/or management studies that insist on this point one way or another, and instruct us on how to redouble our failing efforts when we get it wrong. But to talk in this way is to construct the link between knowledge and reality in a particular way. Specifically, in order to say that it is knowledge and its implementation that needs to be adjusted when the knowledge-reality link breaks down, first the two, knowledge and reality, have to be separated out.

But how well does this divorce work? My suggestion is: not very. In practice we know that knowledge has effects. (You’ll notice that I’ve smuggled this in above by talking of ‘knowledge and its implementation’.) But how to think about this overlap? We are scarcely short of social science responses to this question. For instance, it’s a sociological cliché that social knowledge is reflexive: that it weaves its web to and fro between understandings of the social on the one hand and social realities that are brought into being by those understandings on the other³. Students of Foucault have tackled the issue in a different register, noting that objectivities, subjectivities, structures, forms of power and knowledges may all be treated as expressions of patterned and strategic discourses. The basic message is that realities and knowledges of realities are always done together⁴. Versions of this unsettling and non-foundational weaving have been worked out in feminist theory⁵, not to mention anthropology and postcolonialism⁶. And if I move to my own

² Rose and Rose (1973).

³ In different variants see for instance Giddens (1990), Beck (1992) and Lash, Szerszynski and Wynne (1996).

⁴ See, inter alia, Foucault (1972) and Rose (1999)

⁵ See, for instance, Butler (1993).

discipline, writers in STS have similarly got in on the act. Memorably, for instance, Ian Hacking talks of the self-vindicating character of the laboratory sciences⁷. In this way of thinking labs are turned into reality machines that perform worlds fit for valid scientific knowledges, and scientific knowledge spreads, if it does, by turning other sites into small versions of laboratories⁸. If there is anything specific in this STS work, then perhaps it is first the claim that this reflexive logic works just as well for natural as for social objects so that teasing the two apart is tricky and not particularly productive⁹; and then it is the idea (though Foucault and the governmentality theorists also teach us this) that knowledge is material in the sense that it is located in, and an effect of, heterogeneous practices in particular locations and circumstances, and that these deserve specific study in their own right¹⁰.

So much for the backdrop: we know that knowledge practices are performative. How does this link to knowledge failure?

Like Karel Williams and his colleagues I have worried about the origins of catastrophe, though I've been more concerned with technical than financial collapse¹¹. In struggling about how to think about this well, one guiding principle has become clear. If knowledges are indeed performative, then responding to failure isn't just a matter of adjusting your theories and your control-capacities so that these are better tuned to reality. Such innocence belongs to a pre-performative world (though this pre-lapsarian condition never existed except in the imagination). Instead we need to work on the assumption that what we (or they, those who are in command) know most likely helped to generate the problem in the first place. In other words, we need to replace an attitude of innocence with the recognition that our knowledges are complicit and collusive in the real, both socially and materially. I don't believe in the 'knowledge society' (surely all societies are knowledge societies?) but whatever the terminology, it has become clear that knowledges are embedded in and enacted alongside realities.

'Complicit and collusive': I use these loaded words structurally rather than characterologically to insist that we can't step outside. Like the knowledges of those whom we study, our own knowledges are also performative. The issue then becomes what to do about this performativity – our own and that of our subjects – when things go wrong. And how to imagine it? I've prefigured the argument I want to make above, but to think about this well I now work through empirical materials drawn from a case study of a limited failure: the small foot and mouth outbreak that occurred in the UK in 2007. The inquiry report into this episode describes what I take to be a materially heterogeneous knowledge-reality mix. So far so good: things certainly went wrong in that mix and reality together with its complicit knowledges needed to be sorted out. But my particular interest is in how the failure inquiry imagined its own knowledge. My suggestion is that like other UK inquiries into failure, it fell down on the job. I want to suggest that this shows in two main ways. First, it didn't understand the unruly character of its own hidden performativity. And second (it seems likely that that the two

⁶ Samples references would be: Clifford and Marcus (1986), Strathern (1991), and Chakrabarty (2000).

⁷ Hacking (1992). But the point is also made, for instance, in Latour and Woolgar (1986), and in a devastating feminist version by Haraway. See, for instance, her (1989).

⁸ The argument is persuasively developed in Latour's (1988), where he shows how French farms were reconfigured to reveal the success of immunisation against anthrax.

⁹ There is a contrary view. See Barnes (1983).

¹⁰ Again, Latour's (1988) study of the Pasteurisation of France is exemplary.

¹¹ See CRESC (2009) and Law (2006).

points are connected) it worked on the assumption that reality can be (and is best) ordered in a single, centred and coherent, manner. This in turn suggests that it might be useful invert Hacking's aphorism and talk not (or not only) of the self-vindicating but rather (or also) of the self-defeating character of contemporary knowledge practices.

Pirbright 2007

On August 3rd 2007 the cows on a farm in Surrey fell sick and within a few hours it was confirmed that they had contracted foot and mouth disease¹². Remembering the epidemic of 2001, the press started to blather about illegal imports of infected meat, and the buying and selling of infected animals¹³. People in agriculture didn't know where the disease had come from, but eyebrows were raised by the proximity of the Pirbright animal health and disease laboratory. Only five miles from the infected farm, the Pirbright site housed both the publically-owned IAH (Institute for Animal Health) OIE world reference laboratory for foot and mouth disease, and a private agricultural pharmaceutical company, Merial, that was licensed to manufacture foot and mouth vaccine.¹⁴ The IAH itself quickly confirmed the suspicions: it very rapidly became clear that the virus had somehow leaked from the lab, and that the core UK facility responsible for agricultural biosecurity had itself therefore triggered the outbreak¹⁵. The HSE (Health and Safety Executive) was called in to investigate.

The HSE inquiry considered four possible sources of viral leakage: solid; liquid; by air; or through human movement¹⁶. Most of the possibilities – for instance air transmission – were ruled out. Interestingly however, as it excluded these, the HSE simultaneously turned up dozens of inconsequential breaches of regulations and procedures that might under other circumstances have undermined biosecurity¹⁷. Here are four typical examples;

- one, though the laboratories handling pathogens were supposed to be negatively pressured (air would flow in through any leaks rather than out) when the wind was misbehaving this didn't always happen;
- two, the digital code on the door of one of the lab buildings hadn't been changed for years, with the result that everyone and their dog knew the combination;
- three, the log of vehicles entering and leaving the site was incomplete and illegible;
- and four, solid laboratory waste was sometimes stuffed into over-filled bins.

¹² There were eight outbreaks of infection between August 3rd and September 28th, all in the vicinity of Pirbright. Department for Environment Food and Rural Affairs (2007a, 3). Department for Environment Food and Rural Affairs (2007c), Department for Environment Food and Rural Affairs (2007d) and Department for Environment Food and Rural Affairs (2007b)

¹³ Vidal (2007).

¹⁴ Two days after the outbreak was confirmed, Debbie Reynolds, the UK's Chief Veterinary Officer, told the press that they were: 'focusing on all possibilities: legal, illegal, lab-based, deliberate release – all those possibilities will be investigated and I wouldn't want to put any undue emphasis on any of those'. Revill, Jowit and Asthana (2007).

¹⁵ Note in passing that this gamekeeper-turned-poacher logic is unsurprising for students of disaster. It is well recognised that system safety features often make operations less rather than more safe. For discussion of this in a sociological mode see Perrow (1999).

¹⁶ Health and Safety Executive (2007, 3).

¹⁷ Technically, Pirbright is a high security 'Category 4' installation licensed by DEFRA under the Specified Animal Pathogens Order (SAPO) 1998 to handle dangerous animal viruses. Health and Safety Executive (2007, 11).

Unruliness, Invisibility and Excess

These inconsequential lapses are interesting for our argument a variety of reasons.

- First, they illustrate what I have been saying about **performativity**. Realities are being done at least in part in human practices, and these include knowledges (what is a vehicle log if it is not a knowledge practice?).
- Second, they suggest the importance of performative **unruliness**. To be specific, they suggest that the realities implicated in and enacted by human practices are both ruly and unruly. Bauman famously made a version this point. To garden, he taught us, is to grow not only flowers but also to create the possibility of weeds¹⁸. This is because practices of ordering also produce at least the possibility of disorder. Good vehicle logs produce the possibility of bad vehicle logs. Bins generate the possibility of bins that overflow. Neither exists without the other: they necessarily go together.
- Third, they tell us about **non-coherence**. If practices (including knowledge practices) enact realities that include both order and disorder, then this also means that they, the realities that are being done in those practices, are essentially non-coherent¹⁹. Specifically, it means that they do not and cannot have a single structure: that they are necessarily messy.
- Fourth, they suggest the importance of what, in a gesture to Merton, we might think of as **functional non-coherence**²⁰. The data I've described doesn't actually demonstrate this, but what I want to suggest is that unruly non-coherences also help to keep the whole system working. For instance, it is likely that in a stringent financial climate, not-quite-perfectly air conditioned labs are the (usually inconsequential) price to pay for having labs that function at all. Perhaps the alternative was closing them down. The argument, then, is that unruliness is often a good, or (if you prefer) that the best is the enemy of the workable²¹.
- Finally, there is a point about **in/visibility**. This is quite simply that like order and disorder, visibility and invisibility (or knowledge and ignorance) necessarily go together. Just as light casts a shadow, so visibility implies invisibility (or knowledge implies ignorance). Indeed the former generates the latter. At the gate the vehicles were supposedly logged but not (for instance) the ages of the drivers. In some sense this was a choice – and knowledge practices embed endless such choices.

Drains

Let me put these suggestions on hold for a moment and return to the failure inquiry. The HSE concluded that the virus escaped in liquid waste. Here's a quick version of their story.

Effluent from the labs was partially treated inside each building. Then it was carried to a final treatment plant through a network of on-site drains. But those drains leaked and some of their contents, not much, got into the groundwater. This might not normally have mattered, but in July 2007 there were two reasons why it did. First, July had been extremely wet. It had rained far more

¹⁸ Bauman (1989).

¹⁹ I explore this point in Law (2004).

²⁰ Merton talked of the functional – that is, the system-maintaining – importance of unknown and unplanned processes. He called the latter latent functions. See Merton (1957).

²¹ I explore a version of this argument in Law (1994). Note that that classic tactic of industrial action, the work to rule, makes effective use of the fact that systems work because people don't follow rules.

than usual, the ground was saturated, and there was lots of flood water on the Pirbright site.²² And second, there was building work going on too. The ground was being churned up by contractors that were excavating round various drains, and large quantities of potentially virus-carrying soil and subsoil were being deposited in a waste heap. Then vehicles were driving over that heap and carting it away to a landfill site that took them right past the farm where foot and mouth first appeared. Almost certainly the lorries dropped mud on the road which was picked up by the farmer's tractor wheels which carried it to the field housing the cattle. As it happened there were calves in the herd. Calves are particularly susceptible to infectious diseases because they're inquisitive (for instance about things like tractor wheels) and their gums are raw because they're teething.

But what of the drains? Why did they leak? The HSE hired Dynorod which discovered dozens of faults including (I select): debris in the pipes; deposits at pipe junctions caused by water leaking in; standing water; manholes with poorly fitting lids; defective and damaged mortar and brickwork; pipe joint misalignments; tree root damage; corrosion; 'dead' sections of pipe, condition unknown, connected to pipes in use; and spiders' webs which proved that insects could get in and out of the system.²³ This archaeological investigation was also an historical inquiry:

'The drainage systems on the site have developed over the site's history, since its formation in the 1930s, and developments in the intervening years. It is clear that management of the drains has not followed a clear protocol, rather individual projects have developed according to their own needs and connected into the extant system. In addition, when facilities have been decommissioned, there is evidence that remaining 'dead legs' have not been routinely isolated and so remain in place.'²⁴

And then there was another problem. The HSE discovered that the drains were being used in radically different ways. The scientific and publically owned part of the lab produced tiny quantities of possibly infected waste. The commercial part of the plant, grafted on much more recently was growing the virus in 6000 litre batches²⁵ and releasing commensurate quantities of much more infectious waste into the sewers. And then finally, there was a turf war going on as well between the (public) IAH (Institute for Animal Health) and Merial, the private sector firm. Everyone acknowledged that the drains weren't up to scratch, but who should pay for improvements? There had been deadlock about this for some time.

Moralising Failure

I don't want to quarrel with HSE report, or indeed with the second more general report on laboratory biosecurity that was also commissioned after these Pirbright events²⁶. I don't know about drains, pathogens, or laboratory design, whereas those who wrote the reports do. My question has to do with how such reports understand their task.

²² Health and Safety Executive (2007, 59).

²³ Health and Safety Executive (2007, 52ff).

²⁴ Health and Safety Executive (2007, 47).

²⁵ Health and Safety Executive (2007, 15).

²⁶ Spratt (2007).

First note that they work with a mixture of the empirical and the normative. The HSE report is based on an empirical inquiry that produced the kinds of conclusions I've just been discussing. These discoveries lead it to make a series of recommendations. Here's an example:

'We recommend the effluent drainage system on the Pirbright site is improved to ensure high level SAPO [Specified Animal Pathogens Order] requirements are met. In addition we also recommend better record keeping, maintenance and monitoring regimes in relation to the effluent drainage system.'²⁷

It is surely stating the obvious to note that both reports are structured to finger the empirical as a set of lapses, failures, and the operation of special interests. To put it differently, everything about the real is being known through a specific normative grid. That's what knowledge practices in failure inquiries do (though the point might be generalised – perhaps all knowledge practices work this way?²⁸). It is what they are meant to do. The empirical is normatively ordered as adequate or otherwise. So, post-Dynorod, it is discovered that the state of the sewers is a disgrace, that those concerned should have known this, that their condition should have been properly monitored, recorded, reflexively reviewed, and that appropriate corrective action should have taken. We also learn that the heads of Merit and the public sector should have been banged together. Finally we are reminded, in that wearisome set of tropes characteristic of UK regulatory discourse, of the need for better governance, risk management and the proper use of expertise.

Various points arise. For instance, it is useful to note that this is a form of knowledge-practice that does not simply enact realities in a particular normatively (and teleologically) ordered manner, but also and more or less stealthily re-does the necessity and inevitability of that specific form of normativity²⁹. Again, and as a part of this, it is clear that the frontier between visibility and invisibility is being shifted: that which was hidden (under topsoil in the case of the drains) is being brought into plain view. But what does the HSE itself know about the performativity of its knowledge practices?

Because it assumes that knowledge (or lack thereof) may shape reality there is one strong sense in which it recognises this. Better knowledge of the drains would have helped to prevent leaks. Reflexively, it is also assuming that its own recommendations will have effects. Put into practice, these will (it hopes) in future mean that the drains will not leak. But the HSE's recognition of the performativity of its knowledge practices does not extend much further. For instance, though the authors know that the world is unruly (they wouldn't be trying to set it to rights if they didn't) Bauman's insight that ordering always goes with disordering isn't in the frame. Disorder is something to be driven out. Okay, it's an endless task, but that's the aim: control can be extended, as it were asymptotically. This means there's another failure too: it doesn't know that enacted realities are necessarily non-coherent. Instead it assumes that non-coherence implies potential failure. The Mertonian-like idea that non-coherence might be functional and thereby reduce the possibility of failure, or that ordering might depend as a chronic condition on non-coherence isn't there. In this world, to order is to plan and to implement a single and consistent structure. Everything else is a

²⁷ Health and Safety Executive (2007, 5). My addition between square brackets.

²⁸ Latour (2004b) helpfully talks of 'matters of concern'.

²⁹ Elsewhere I have discussed such tacit enactments of the real as 'collateral realities'. See Law (2010, forthcoming).

source of potential failure. The unruly productivity of disorder is driven beyond the horizon of visibility.

Let me repeat that I have no specific quarrel with the HSE. I'm simply using its report to characterise what I take to be the standard features of UK failure inquiries. One: triggered by some collapse or other, they go looking for lapses from an order. Two: they discover them. And three: when they discover them they are diagnosed as real or potential causes of failure. This is a normatively-empirically ordered world in which ignorance is a bad and visibility a good. It is a world in which the idea that visibilities generate invisibilities isn't available. It is a world that can't imagine that ordering realities imply unruly and disordering realities that lie beyond the visibility horizon. It is a world in which failure becomes the absence of order because a command centre lost control. It is a world whose default response when faced with failure is to extend that order from the centre. And it is a world without the critical reflexivity that would let it see that knowledge practices – including the knowledge practices embedded in failure inquiries – work in this performatively complex way.

Coda

If the problem is the hubris that attaches to knowledge practices that insist there is or should be a single order in the world, then how might we think of and tackle the issue of knowledge failure? The initial answer is that there is no single answer. If knowledges are incomplete and disorderly, then to suggest otherwise would be to (try to) reproduce a single order. That said, I want to offer three proposals.

First, though I haven't discussed this here, if there are analyses that predict failure then surely it makes sense to take these seriously. My candidate here is Perrow's theory of normal accidents³⁰. In brief Perrow argues that systems with certain kinds of architectures are inherently prone to collapse. These are structures in which the relations between the parts are (1) complex (with lots of feedback loops) and (2) tightly coupled (linked up in ways that make intervention impossible)³¹. This is because when relations are configured in this way, small failures aren't contained but ramify, spread out of control, and result in system failure. This theory teaches us that it is unwise to build nuclear reactors, and no doubt applies just as well to the baroque inventions of financial engineers.

I want to suggest that we take what Perrow tells us seriously. But if order and disorder are stapled together in the way that I've been arguing, then I'm even warier than Perrow. This Bauman dis/order argument tells us that the potential for complexity and tight coupling is always there, just out of sight, in the excesses of the invisible, and this applies just as much to structures that seem on the face of it to be slow and simple. Interactions between companies, drains, contractors, lorries, tractors and calves? We are scarcely in the realm of nuclear (or financial) engineering here. This isn't rocket science. We're dealing with the mundane, the material, and the down-to-earth. Even so, as we have seen at Pirbright, these interactions suddenly became relevantly unruly – with visible failure as the consequence. To put it differently and in a more classic language, this reminds us that a system cannot be separated from its environment – but this in turn suggests that Perrow's logic

³⁰ Perrow (1999).

³¹ More specifically: if a system is complex (non-linear, with feedback loops) and tightly coupled (where relations cannot be controlled either because they are invisible or moving too fast) then it is prone to normal accidents. If the later are catastrophic then such systems should not be created.

needs to be extended. It applies just as much to structures that might otherwise seem to be simple, linear and slow-moving. The core question is: what will happen if they fail? Hence my extra caution.

Second, and returning to the core of my argument, it will also be important to rework our attitudes to knowledges and what it is that the latter do, and can or cannot do in order to foster what one might think of as permissive intelligence. What I've said above suggests the importance of recognising Bauman's point about the inseparability of order and disorder and of appreciating that practices, including knowledge practices, generate excesses and invisibilities. Obviously we don't escape this stricture ourselves. Our own knowledge practices generate their own excesses, forms of unruliness and invisibilities. So what does this imply? How might we conduct ourselves? What kinds of knowledge practices might we try to institutionalise if we wanted to think better about failure? What might go into a permissive intelligence? I have three provisional thoughts:

- First it appears that a degree of modesty is important. It will be wise to be cautious about the scope of anything we claim. And, a closely related point, it will be appropriate to remind ourselves that whatever we know is located in particular circumstances and conditions of production. To say this is not an admission of weakness. It is not to say that knowledges are bad. On the contrary, it is a serious recognition that since all knowledges are specific, our own included, they will also fail, they will need to be adapted, and they simply may not fit or work in other locations³². It is to take seriously the idea that knowledges, including good knowledges, are plural rather than singular.
- Next as a part of a permissive intelligence, it will be important to tolerate ambiguity and non-coherence in those plural knowledges. I've made the argument above. If realities are excessive, then this suggests that good knowledges of those realities, our own included, will often be non-coherent. This in turn tells us that consistency is not necessarily the good that it is usually taken to be. One implication of this is that we'll need to learn how to know well in tension ourselves. Another is that it will be wise to be less quick to denounce the non-coherences of the knowledges of others. Instead we might try, as Mol proposes in her work on health care, to cultivate the art of thinking of knowledge practices in action as located forms of tinkering or 'doctoring'³³. In this way of thinking, there is never a definitive or correct solution. Instead there is just constant and somewhat experimental adaptation. The conclusion is that non-coherence may be a good (only 'may', for this is not a rule either). As I've argued above, the non-coherences of Pirbright probably kept it working perfectly well most of the time. And no doubt our own non-coherences are more or less productive too as we tinker our way through our projects and practices.
- Finally as a part of a permissive intelligence, I suggest we need to recognise that skills, knowledges and their realities come both in different forms and are widely distributed across the social and material landscape. If we take this thought seriously it implies more or less profound changes in the politics of knowledge. In criticising the distributive coalition that has dominated the political analysis of financialisation Karel Williams and his colleagues make a version of this point³⁴. I suggest, however, that in addition to democratisation it will

³² The point can be found in several idioms in the STS literatures. See, for instance, Haraway (1997) and Law (1994).

³³ Mol (2008).

³⁴ CRESC (2009).

be important to find ways of recognising the salience of different forms of knowledge and their practices as these occur in different locations. What this might mean in practice is unclear, in part because it will in any case be field- and topic-specific. However, I assume that it will map onto the sense that skills, knowledges and competences are widely distributed across the social landscape in ways that are often uncredentialed and unarticulated³⁵. Surely there was more good knowledge at Pirbright than is caught in the HSE report, even if that knowledge went adrift in July 2007.

My first proposal is the straightforward suggestion that when we discover knowledge practices that predict failure we should attend to them very carefully. My second is that as we wrestle with the implications of the discovery that order brings disorder it will become important to find ways of fostering what I have called permissive intelligence. But as we think about the simultaneously self-validating and self-defeating features of contemporary knowledge practices and how these feed into failure, I also want to leave you with a third and longer term thought. Briefly, it is this. If practices and knowledge practices are performative then, as I have implied above, reality is also heterogeneous: it, the real (or they, the reals) is (or are) simply being done differently in different places. There isn't a world, a universe. Instead there are worlds, and we live in a pluriverse³⁶.

This thought is profoundly counterintuitive to hegemonic Western common sense which takes it for granted that there is a single world. Indeed, it is only recently that the possibility that the real might be heterogeneous has started to even partially thinkable within the dominant Western knowledge traditions. But, in anthropology, in feminist theory, in comparative philosophy, in STS, and especially in postcolonialism we now begin to see other straws in the intellectual wind. We begin to see attempts to recognise and craft ways of imagining different kinds of knowledge practices and knowledge spaces. And we begin (this is the most difficult part) to find ways of sensing the heterogeneity of the realities that go with those practices.

How to handle this heterogeneity well? The ability to think small, and situated, and material will surely be important. But there won't be general answers. The world will be excessive, but here is the hope. That we might find variegated ways of knowing and enacting realities, site by site, that allow us to go on together more or less peaceably, and do not fail in ways that are too dramatic.³⁷ Such is the challenge.

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³⁵ There is a tradition in STS on tacit and craft knowledges. For a classic statement, see Polanyi (1958).

³⁶ The term comes from William James via Latour (2004a). But the sensibility is available in other places, and most notably Mol (2002). For related commentary in a comparative philosophical mode, see Hall and Ames (1995).

³⁷ For postcolonial straws in this wind see Chakrabarty (2000), Verran (2001) and Escobar (2008)

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