Heterogeneities_{DOT}net

ECONOMICS AS INTERFERENCE[i]

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Introduction

The range of chapters in this book suggests that there are many ways of thinking of cultural economy. Perhaps it has to do with the growth of the culture industries. Perhaps it has to so with what is taken to be the 'culturalisation' of activities that might previously have been more 'economic' in character. And/or perhaps it has to do with the so-called cultural turn in social science – the increasing preoccupation with the analysis of culture that has grown up with a parallel growth in the sense that culture is everywhere, and that what was previously taken to be economic was always, in addition, essentially cultural in character.

These three possibilities are not necessarily mutually exclusive. However, this chapter belongs more or less uneasily to the third approach, the so-called cultural turn. It belongs to this because it has nothing to say about culturalisation, and still less about the culture industries. Indeed, it has relatively little to say about any form of change in the character of economic activity. Instead, it proposes an analysis of economically-relevant activity which is cultural, at least in a broad sense. The assumption I work from, then, is that culture is everywhere and that little has changed in this respect. I assume that economically-relevant activity has always been cultural and that the tools of cultural analysis may be applied to which one might imagine as 'strictly economic' activity.

Nevertheless, though it firs with the cultural turn, the approach that I develop belongs only more or less uneasily to the cultural turn. This is because it is first and foremost an analysis of *material practices*, and of certain practices, orderings or discourses, which produce economically-relevant activity. Though in some loose sense practice is no doubt broadly 'cultural', the extent to which the term 'culture' is appropriate to an analysis of practice is uncertain. I take this to be the case for several reasons. First, to be sure, 'culture' is a term which covers such a multitude of sins – or approaches. Its initial significance is unclear. Second, in many of its more classic uses the term implies homogeneity in the meanings or beliefs held by a group of people. This is, to put it no higher, is distinctly uncomfortable, tending to reflect what one might think of as a 'bias to continuity' by seeking out similarities rather than

22 differences or tensions.[ii] Third, it exists, at least classically, as one of the terms in a series of unfortunate dualisms in which it is relegated to a more or less idealist world of beliefs, ideas and symbols. Culture as opposed to economy, that is one version of this division. Culture versus structure is another. Culture versus practice (where culture has to do with beliefs) is a third. Culture versus technical or practical efficacy (as in the analysis of ritual behaviour that cannot be explained in terms of its practical outcomes) is a fourth. And culture versus the material world, this is a fifth variant.

As is obvious, it is possible to use the term in other ways, and I entirely accept that the term is indeed widely used in ways that break down these dualisms. The increasing popularity of the analysis of 'material culture' bears witness to this, as does the general attempt, reflected in several of the other chapters in this book, to understand the economy in a cultural mode. So, though it largely avoids the term, the argument of this chapter should not be read as an objection to the possibility of a cultural analysis of economy. Instead, it should be understood in two ways. First, as an attempt to develop a toolkit for making sense of certain material practices that might be understood both as 'economic' and as 'cultural'. As will become clear, it is a toolkit that derives from semiotics and post-structuralism, and in particular version of these approaches from within the discipline of Science, Technology and Society (STS). And second, it should be understood as an argument about complexity: practices, it is suggested, carry and enact complex interferences between orders or discourses, and if we are to understand economically relevant practice it is important to investigate those interferences.

Office

I've got an image in my mind from about 1990. It's the office of the Director of the Daresbury SERC laboratory near Warrington in Cheshire[iii]. Picture this office. It's got a nice oiled-wood desk with a comfy working chair. It's got a conference table, again in a better class of wood, with about half a dozen well-upholstered upright chairs. It's got three low easy chairs and a coffee table. This is where the Director – I'll call him Andrew – meets with distinguished visitors. It's also where the ethnographer sits, the fly on the wall, when he listens in to the meetings of the Daresbury management board. And the room as a whole, without being luxurious – the director of a public establishment does not equip his office in the style of the better-heeled reaches of the private sector – speaks of comfort, privilege and command.[iv]

Part of the apparatus of command lies on the desk. It is interesting how the materials of discretionary power change as the generations pass. Gold pens and silver ink-stands like those on my grandfather's respectable middle-class businessman's desk? No. Instead there is a telephone, a Dictaphone, and a personal computer. The personal computer is networked. And it is, as we

23know, a versatile tool. For communication. For instance, Andrew has just told the other men who make up the senior management that if they don't check their electronic diaries then he's not responsible if they miss out on crucial meetings – because that's how they'll be told about them from now on. He reads his email here too. In principle he can send and receive faxes – though his secretaries in the next room, the gendered buffer room that surrounds many of the sites of power send and receive most of the faxes. For communication but also for word-processing, treating texts. And of course, for building spread-sheets, of which more in a moment.

Andrew is a powerful man. He is also a calculative agent. There are important differences between calculative agency on the one hand, and economic agency on the other. Yet, as is also obvious, they are also closely related. In this chapter I explore the character and some of the limits of calculative (and therefore of economic) agency and its practices by using STS tools and drawing primarily though not exclusively on empirical material derived from Daresbury:

- First, I argue that practices, subjects and 'cultures' (including those of calculation and economics) may be understood as *materially heterogeneous relations*. This is a particular claim of STS, though it resonates with other, for instance Foucauldian and feminist traditions
- Second, I suggest that these relations, subjects and cultures are *enacted or performed*, and that it is important to explore the strategies or styles of those enactments and performances. This is a claim which is again more or less consistent with a Foucauldian approach, though the turn to performance (and the exploration of its implications) take us far beyond Foucault. One of its implications is that performances are somewhat unpredictable, and that the relations, subjects and cultures are thus in some measure variable between different performances[v].
- Third, I suggest that if we are to understand economic practices in their different and multiple specificities, then it becomes important to understand how these *interfere* in different and specific performances with other, alternative strategies and styles. This, then, is a second form of heterogeneity. Economic subjectivities, while impeded by their Others in interference, are also constituted with and by those Others.
- And fourth, I argue that the calculative and discretionary agent required in economics is always *incomplete*. More precisely, I argue that in practice the logic of economic liberalism lives within and alongside other logics or discourses, and cannot survive without this irreducible excess.

Materiality

No doubt, ten years on, and caught in the eye of a storm about the future of synchrotron radiation research in the United

24Kingdom, the office that I remember at Daresbury has changed. Certainly the Director that I knew has gone as the generations of top managers replace themselves. And it would be astonishing if a Pentium III computer didn't grace the desk of Andrew's successor instead of what, a 386, a 486? But the details don't matter because my first point is not about change but about stability. It is that if we are to talk about culture at all, then it certainly *doesn't exist in the abstract*. It doesn't even simply exist as a set of discourses programmed into bodies – although bodies are, to be sure, crucial in the performances of culture. Instead, or in addition, *it is located and performed in human and non-human material practices*. And these are material practices which extend beyond and implicate not only human beings, subjects, and their meanings, but also technical, architectural, geographical, and corporeal arrangements.

This is or it ought to be old news. Perhaps Marx told us this. Certainly Michel Foucault and a series of feminist and non-feminist partial successors have done so[vi]. Many anthropologists, and social geographers too[vii] – though from my uneasy hybrid location somewhere between sociology and STS it seems to me that it still remains quite difficult to avoid the kinds of dualisms I touched on in the introduction. But what have STS and STS-influenced approaches to say about this? The answer is that in the recent past there have been a number of studies of economically-relevant practice, and in particular of the constitution of markets[viii].

One of the nicest, simplest, earliest and most straightforward studies is by French sociologist, Marie-France Garcia[ix]. Written in the tradition of Pierre Bourdieu, she describes the way in which a market for the wholesale buying and selling of strawberries was set up physically and socially (though her argument is precisely that the two cannot be levered apart). *Physically*, because a building was constructed where transactions were brought together, transactions previously distributed here and there around the countryside in specific negotiations between buyers and growers. A building where the strawberries to be sold were brought together, arrayed, made visible for inspection. A building with an electronic display to make the bidding visible to all concerned. A building where, though all could see the scoreboard and the auctioneer, the buyers could not see the sellers, or vice versa. Indeed a kind of panopticon. Physically, then, the new market was a place, a set of sociotechnologies, and a set of practices. But *socially* it was also a set of rules. 'Bring the strawberries here, to the market. Do not sell them on the side to wholesalers'. 'Grow recognised brands of strawberries – or they won't be accepted into the market'. 'Label them properly and pack them in an appropriate manner.' And so on, and so on.

In his edited book, *The Laws of the Markets*[x], Michel Callon has extended and developed this argument. He argues that markets aren't given but constructed. Which means, among other things, that there is not 'a

25market', or 'the perfect market', with various deviations from this natural state of grace in the non-platonic realities of the world. Instead he's saying that there are markets, and markets, and then there are more markets. Different forms, different material forms. His particular additional twist is that economic theory – for instance neo-classical theory – has been vitally important, indeed performative, for the formation of particular markets. Beware, he is saying. The old idea that social sciences are an ornament that freewheel around in mid air is quite wrong: they *do* make a difference. And this is a lesson that has been also been drawn by those who point (for instance) to the social engineering that has produced the 'single unified market' of the EC, or to the discourses enacted to produce the possibility of the massive exchange of commodities and currencies that constitutes the globalisation of economic activity[xi]. Or, for the case of the strawberries in the Sologne in France, the activities of a particular, economically proselytising, Enarchiste fresh from his Paris training about the necessities and benefits of economic liberalisation, on his first stint out in the real world to bring the benefits of marketisation to the French provinces. As if preposterously, somehow, liberalisation meant less rather than more.

Markets, then, or economics (note, as does Callon, that both appear in English in the plural) involve performing calculations, monetary interchanges, transactions and relations of all kinds. But what does this take in practice? Any answer to this question becomes an investigation of practice. It becomes an investigation of the *ordering of materially-heterogeneous sociotechnical economically-relevant relations, their enactment and performance*. It also becomes an investigation of the constitution of relevant forms of agency and subjectivity. To explore this further I am now going to return to Daresbury SERC Laboratory.

Manpower

Andrew is sitting at his desk. He's about to call an emergency meeting of the management board. He's bothered because the 'second Wiggler project', the so-called 'flagship project' for the laboratory, is starting to fall seriously behind schedule. But what is there to see of this second Wiggler project? Does it look as if it is behind schedule? The answer is, it doesn't. Not really. Not in any way that you or I could see. For as he sits, fretting in his office, it is nothing more than a hole in the ground, and a bunch of construction workers pouring concrete. There's no particular sign that anything is wrong: it's a mess alright, but only a mess in the way that all construction sites are a mess: hard hats, hard shoes, and mud everywhere.

So what does Andrew see of this project? The answer is that he sees something that no-one else sees, at least not easily: he sees some figures in a

26spreadsheet. And the spreadsheet tells him (forgive my use of the laboratory vernacular) that about 11 'man years' have been devoted to the project whereas at this stage the figure should have been 18. This is what he sees: that the project is not getting the effort that it needs. It is falling behind schedule. In fact, though this is invisible, so to speak, on the ground, the project has already used up all the contingency time built into the original schedule.

How does Andrew know about the inadequate manpower? To answer this question we need to follow the materialities of sociotechnologies – and in the present context, two of these, though they are intimately related.

- First, courtesy of the Microsoft Corporation, there is a spreadsheet. Obviously the spreadsheet is not some kind of accident. As with every calculative system from the invention of double entry book-keeping on, it works in certain ways, tending to create some possibilities and delete others[xii]. Without ignoring the possibilities of subversion and misuse (we have moved a long way from technological determinism in STS and there is a large literature on the subversion and re-appropriation of technologies[xiii]), to a fair extent it works in ways that reflect and perform the logics of power. But, at the same time, it constitutes, reproduces, *remakes* the needs of powerful actors, collective or individual. Locally, then, Andrew becomes some kind of visionary, someone who has seen the future and knows that it does not work. A particular kind of manager in a particular kind of organisation.

- Second, where do the figures come from, the 'raw material' for this virtual panopticon? The matter-of-fact answer is that the figures are put together in an organisational and textual apparatus which the laboratory (again forgive the vernacular) calls the 'manpower booking system'. Every month laboratory employees are supposed to fill in and return a form describing in half day chunks how they spent their time in the previous month . There are permissible categories – for instance, a series of projects, a number of administrative tasks, local or more general management – which means that there are impermissible categories too, activities that don't fit very well, not to mention the difficulty of what to do with those fragmented half days which feature so importantly in most organisations.

  In fact the figures are collected with some difficulty. A small but significant percentage of the employees forget to return them – some as an act of resistance. Others enter codes which make no sense – again sometimes as an act of resistance. The forms are returned to the accounting department, where they are checked and entered into the laboratory administrative computer. At which point they become arithmetically tractable, and produce the entries in the spreadsheet that I've already mentioned and with this a particular form of visibility – the discovery, for instance, that the second Wiggler project is seriously behind schedule.

27 Performance

That's the empirical story. But what to make of it?

There are, I guess, two ways of thinking about an apparatus like the manpower booking system and the spreadsheet. One is to treat them – and perhaps particularly the latter – as passive tools deployed by active agents. They may, of course, be interested tools, ideologies, but tools they are, enabling and constraining but essentially passive. The other is to imagine, in some version of a material semiotics, that we're dealing with a set of heterogeneous elements all of which are *performing* to produce relations – including managerial (and quasi-economic) subjectivities, organisations and culture. As in other parts of social theory, the fault-line in STS around this issue is deep[xiv]. As I implied earlier, I want to press the latter, semiotic, line. I want to say that a pattern, a micro-physics, a non-intentional strategy of calculative and quasi-economic power, is recursively performing itself in these heterogeneous relations[xv]. This means that it useful *not* to distinguish between humans and non-humans[xvi]. Instead I will deploy a semiotics of materiality to try to work out how they all perform together to produce the set of relations which gives them their shape, their style, or their mode of ordering.

Think, then, of the spreadsheet. If this is a 'thing', or a fairly stable set of relations (what people in STS sometimes call a 'black-box') it is also, at least in relation to its use, a performance. Together with the person using it, *it acts to produce effects*. The argument is that it is an actor in its own right. This becomes most visible when it crashes (which it may do without the intervention of a user at all). But its effects are just as important – indeed arguably more so – when it is actually running, when it doesn't crash. What, then, can we say about the *style* of relations performed in a spreadsheet?

One answer, the quick answer, is that it embodies and enacts a series of relations which tend to reflect and reproduce specific social and technical agendas. But what is going on here? What *is* that style? And how does it tend to (re)make economically-relevant relations? Any preliminary response to these questions would include the following:

- First, the spreadsheet is an agent of *homogenisation*. Thus in the first instance, what one might think of as a 'spreadsheet world' is created which takes the form of a set of cells bearing no particular relation to one another[xvii]. That is what one sees when one opens a program like Excel: a bunch of empty cells. But any *particular* spreadsheet involves two further additional conditions. First, some of those cells are specified as *operators* which relate other particular cells to one another in specific ways. It generates, that is, a set of similarities and differences between specific cells (or groups of cells), sets of possible relations. Second, it includes other cells (those to which the operators refer) which are given *values* either derived from outside the spreadsheet (for instance in the form of manpower booking figures) or as a result of the actions of the operators. To enter the spreadsheet-world at all, both

- 28operators and values have to take *symbolic form*. Indeed, they have take *definite symbolic form*[xviii]. There is no room for that which cannot be expressed or treated either in terms of symbolic logic, or in terms of arithmetical, statistical, or other mathematical operations.

- Second, since the kind of spreadsheet-world we're most interested in here is statistical and arithmetical, economically-relevant, we can specify this homogenisation further. The spreadsheet is also enacting *quantitative relations*: there is no space in the spreadsheet for that which cannot be counted or rendered into symbolic form (perhaps as the form of labels for particular figures to indicate their significance or meaning).

- Third, the spreadsheet is a major sociotechnology of *simplification*. As we have seen, there are heroic simplifications which go into the production of the figures in the first place. But the tide of simplification also runs strong after the values have been allocated to the input cells. Much is being turned into rather a little. Much, is of course, being deleted. (Though much, as I'll note in a moment, is also being created).

- Fourth, the spreadsheet is a major sociotechnology for *centring*. It is a strategy for producing a figure, or more likely a series of figures, which can be assimilated by a single person reading the spreadsheet in a more or less single scan. A spreadsheet that fails to do this is of no use in the construction of calculative agency.[xix] Technically, then, a spreadsheet performs a more or less complex series of relations which juxtapose values and perform operations to produce a *centre*. To use Bruno Latour's phrase, it *draws things together*, though, to be sure, it draws them together in a particular way – in a particular style – and there are, of course, many other ways of drawing things together.[xx] Or, if one prefers to put it like this, there are many other modes of calculative agency.

- Fifth: but as I noted above, this is not simply a matter of simplification. It is also one of *creation*. I need to press this point. The spreadsheet is *making new realities*, performing them into being. The loss of predicted man-years – this was not a figure, or even a reality, that existed outside the apparatus of the spreadsheet itself. Even the notion of a 'delay' is dependent on a sociotechnology of projects, project timekeeping, and all the rest. The straightforward and common-sense way of putting it – for instance that the spreadsheet offers an 'overview' of the distribution of effort between projects – while not wrong, is therefore also dangerously misleading. Overviews, simplifications, the mastery of time and space, are not given in the order of things. Rather, they are artfully performed into being. If Andrew sits in the tower of this particular panopticon, then this is an effect of a set of performing relations, and not because he sees further by himself. What I earlier referred to as the 'style' of the spreadsheet-world is one which generates a homogeneous, unambiguous, probably quantitative, summary form of visibility. It creates, or more precisely performs the project in a particular way.[xxi]

- 29 Sixth and finally, in creating this reality the spreadsheet performs a subject position that is potentially *discretionary*. Discretion, to be sure, exists in the possibility of selecting between alternative courses of action, and is usually seen as being intimately linked to social power[xxii]. But how does discretion get generated? One part of an answer is that, as has been widely noted, it is definitionally linked to a capacity for action. In the case in point, Andrew is able to act in certain ways with some degree of probability that his actions will indeed get carried on and through others. Again, then, this is a relational matter. But another part of an answer is that the *construction of options* is also important – for unless options can actually be generated and explored, then there is, indeed, little possibility of discretion: there is only one future possible course of action. And here the spreadsheet takes part in the action because the values and the operators can be readily manipulated. It is a simple matter of changing figures and formulae. In effect, then, the spreadsheet is a set of relations which can easily be used to perform 'what happens if …' possibilities[xxiii]. The creation of (im)possible futures. The performance of calculative subjectivities in a sociotechnology of simulation.

Real Costs

So far I've sketched an outline of some of the materialities and practices involved in the production a particular form of economically-relevant subjectivity. This is a subjectivity that homogenises or quantifies, simplifies, centres, and generates new realities and (as a part of this) discretionary simulations. The apparatus which produces this is performative – there is nothing natural about this calculative subjectivity. And it is also materially heterogeneous. But, as I also noted above, it is not the only mode of calculative subjectivity. Neither is it the only economically-relevant version of calculative subjectivity. So what additions or alternatives might one imagine? What else is embedded in the practices of calculation? Again, I want to tackle these questions empirically.

At the time I was finishing my ethnography the managers and administrators at Daresbury were working on an important sociotechnical innovation: they were seeking to integrate the regular laboratory accounting system with the manpower booking system that I have described above. What was the purpose of this exercise? The answer is that they were trying to create a sociotechnology which would tell them about the 'real' cost of labour. But what does 'real' mean here? The health warnings that I issued above in the context of the manpower booking system are equally in order here. The 'real cost of labour' is a construction, something enacted in the practices of a heterogeneous sociotechnical apparatus. In the present chapter I'm not going to describe the reality-producing strategy embedded

30in this putative apparatus in detail. But in outline what happened is that 'the project' had become the most important administratively relevant category.

Why was this? The answer is that 'the project' had become relevant because the laboratory was starting to sell its services to outside, often commercial, users. And as the managers frequently said to one another, 'we do not know the *real* cost of the services that we offer'. Indeed, more strongly, there was a widespread view that the laboratory had entered into a number of important projects at a bargain basement price, and that it was actually taking a loss on these. The idea, then, was that if the manpower booking figures discussed above could be converted into money, then it would become possible to calculate the 'real cost' of projects by adding the labour that they absorbed to the cost of materials and all the rest. Then it would, as a result, become possible to budget for services offered, and write contracts which reflected those 'real costs' rather than some 'imaginary' and possibly over-modest, estimate.

It would, of course, be possible to write an essay about the circumstances which made it important to create a full-blown cost accounting system. That essay would ring bells with any British public-sector employee who lived through and enjoyed the benefits of Thatcherism in the 1980s as it spread through the state apparatus. Thus by 1990 Daresbury laboratory was caught in the grip of a government-driven public-sector zeal for markets and enterprise. Like the universities, the laboratory had been originally conceived outside a market system. It was established and funded by the then Science Research Council (SRC), not co-incidentally close to the Huyton constituency of the then Prime Minister, Harold Wilson. Again like the universities, it received a recurrent grant to cover its running costs. But with the advent of the Thatcher administration, circumstances began to change. First, SRC/SERC funding tended to become less generous. Second, Daresbury was encouraged to find alternative sources of funding – several of the experimental stations were, for instance, co-funded with the NWO, the Dutch research funding body. And third, the laboratory was encouraged to sell its services to the private sector. Thus a number of high tech companies – for instance ICI which had major research facilities at neighbouring Runcorn – started to use the facilities, and became progressively more involved in aspects of the work of the laboratory.

It was in this context that the need for an apparatus for calculating 'real costs' started to become important. This version of 'real costs' had simply not been relevant under the previous administrative regime. Most of the time the laboratory wasn't selling anything in commercial terms, so it didn't need to think that way. Instead, it received a grant from one of the boards of the SERC. It was then responsible for making sure that it didn't routinely overspend that grant (though it was also considered very bad form to underspend too since this would send the wrong signals to the SERC). The

31result was that in general budgeting was an aggregate matter[xxiv]. If there was a projected surplus, recurrent or non-recurrent expenditure would be bumped up – employees would be taken on or new equipment purchased. If there was a projected deficit then the hirings would stop, and there would be a moratorium on purchases of all but the most essential supplies or equipment.

The lesson to be drawn from this is that the notion of 'real costs' only makes sense in the context of a particular purpose or aim. It is a strategic matter, or better, a reflection of *particular strategic concerns*. The pre-Thatcher orderings performed in the laboratory indeed produced 'real costs' – but these were real in a form that was different to those that came later. They related to different concerns. On the one hand, they generated costs in relation to the laboratory as a whole. And on the other hand, they produced figures in relation to individual items, purchases, wage bills and all the rest. With the advent of economic liberalism and the need to sell services and bid 'realistically' for the supply of particular projects, the definition of 'real costs' shifted to the level of the project – that is to say, they came into being somewhere between the level of the individual items on the one hand, and the overall cost of the laboratory on the other. And, as I have noted, this is what the managers were working on at the time I completed my study. They were attempting to create a sociotechnical apparatus which would perform this version of real costs, first by linking the cost of specific non-pay items to projects, and second (as I have noted) by trying to find a way of linking the salary and wage costs of particular individuals to the time spent by those individuals on particular projects. The conclusion we need to draw from this is that *they were re-creating 'the project' as an economic entity*, as well as one performed on the floor of the laboratory, and in the work of engineers and scientists.

How did this look from the point of view of project managers? The answer will again not be unfamiliar to those versed in recent changes in the education system – or indeed more generally the public sector – in the United Kingdom. Analytically, the answer is that a fairly dramatic shift in subjectivities was under way. Junior managers were starting to be told that they were responsible for managing budgets – and also, for staying within those budgets. They were being told that they were responsible for producing appropriate services (sometimes but only sometimes to outside paying customers) without exceeding their budgets. And they were (though to a variable extent) being told that they were also responsible for going out and seeking sources of income. For generally being co-effective.

This, then, was the creation of a new regime of subjectivity and responsibility. In effect, junior managers were being asked to calculate and perform as mini-entrepreneurs. But (this was acknowledged by all concerned) the practices of the sociotechnical apparatus that would allow them

32to perform in this way were lagging behind. For instance, as I have mentioned above, the integration of the manpower booking system with the cost-accounting apparatus was only starting to come into effect at the moment of my departure. Costs were not yet being drawn together, or centred. But there were other difficulties too. For instance at the time I was in the laboratory budget holders and project managers found that they were being issued with printouts, sometimes several inches thick, on a monthly basis, detailing the purchases relevant to their projects. The complaints were endless: how, the junior managers wanted to know, could they plough through two inches of a printout where every box of screws was itemised? This was a complete waste of time. Here too, then, costs were not yet being drawn together and centred. On might, following the analysis of the spreadsheet offered earlier, suggest that the *homogenisation* performed in the printout had not been matched by an appropriate *simplification*. There was, as yet, no centre to the panopticon. Indeed no panopticon. And the desire for an entrepreneurial subject had not been matched by its practice in a heterogeneous sociotechnical apparatus.

Forms of Calculation

I noted above that quantified, centred and discretionary calculation is only one possible strategy of calculation. Indeed, it is only one possible strategy of economic calculation. It is now possible to add further substance to this suggestion. For if we observe the administrative and management struggles to define and perform the new and project-relevant version of real costs at Daresbury laboratory it becomes clear that we are dealing not with one but with two forms of accountancy.

The first we might call standard *administrative accounting*. This was long-established in the laboratory. So how did it work? The answer is that though it was (as I have noted) a set of practices for drawing figures together to calculate income and outgoings for the organisation as a whole, administrative accounting was a sociotechnology that primarily embodied and performed a strategy of detailed legally-relevant surveillance. As in other organisations, it was intended to ensure that the right items were purchased – or at least that the right price was paid for them – and that those who supplied them were indeed paid. It ensured, correspondingly, that employees were paid what they were owed and no more. Again, it was a sociotechnology which worked to ensure that at least some fingers were kept out of at least some tills. It allowed and performed a procedural, administrative, as Max Weber might have suggested, legal-rational form of economically relevant calculation. And the subjectivities which go with this. Such, then, was the performance of a set of relations that produced printouts that were two inches thick. This was because the competent administrative accountant,

33 the competent calculator, the competent subject in this form of ordering, is precisely someone who needs to check the detail, to make sure that the bills have been paid, and all the rest of it. There *is* no need to draw things together in a discretionary manner. Indeed, to do so would defeat the entire object of the legal-rational subjectivity performed in this strategy for ordering.

All of which is quite at variance with the second project-relevant performance of accounting. This, as is obvious, is a version of *management accounting*, and enacts a quite different strategy, affording a quite different kind of subjectivity. We need not discuss this in detail again. However, in general, where administrative strategy demands detail, management accounting precisely effaces detail in its performance of necessary discretionary centring. The centring which, as we have seen, the managers were struggling to create as they sought to graft a new management accounting system onto the existing administrative accounts – and link these with the manpower booking system discussed earlier.

Conclusion

I have described two forms of accountancy, two forms of (economically relevant) calculation, two strategies, and two forms of economic subjectivity which interfere with one another. Indeed, they exclude one another (for detail is, in an important sense, the Other to the overview), but are, at the same time, also dependent on one another – because, at the very least, the strategy of management accounting includes the products of administrative accounting, products which become the values entered into some of the cells of a management accounting spreadsheet. The argument I'm making, then, is that the material practices and apparatuses of economic life and the subjectivities that they generate perform as a complex multiplicity that is neither entirely coherent, nor completely incoherent. Following an argument developed by Annemarie Mol in the quite different context of medical activities, I am saying that *economically-relevant activity is more than one and less than many.*[xxv]

One way of making the argument is to say that we are in the presence of two discourses of economics, two discourses of economically-relevant calculation. Mini-discourses. But if we build it in this way, the story does not stop here. For if we might name the two that we have uncovered as 'enterprise' and 'administration', there are others too. What, for instance, of 'vocation'? This, marginal and Other to both enterprise and administration, is also necessary to them. For, if we think of Daresbury laboratory, what is it all about? What is its rationale? I haven't explained this in detail – this is not relevant for the present argument – but the general answer is that it is about doing (what we might think of as) vocational science. The material orderings of the laboratory reflect and perform enterprise and

34 administration, but they also, and perhaps predominantly, reflect and perform a particular version of the vocation of scientific puzzle solving[xxvi]. So an ordering mode of vocation is essential to the working of the laboratory. Without the conduct of science there would be no administration, and no customers either. And it is possible to find others, for instance 'charisma'. But perhaps, for the present purposes, three will do. And this is the bottom line. For the study of Daresbury was motivated in part at the hubris of Thatcherite 'enterprise', but the conclusion, that I have tried to work through here for the formation of economically relevant and calculative subjectivities, suggests that the organisation, its management, and its economically-relevant actions, were (no doubt are) all constituted in a *complex set of balances, oscillations, power-plays, tensions, deferrals and displacements between practices carrying different economically-relevant strategies*. The corollary is that reduction to any one (in this case enterprise) is (and would be) impossible. Or, if one prefers to put it this way, that economic/ managerial/ organisational performances are irreducible to a single logic, but dependent on the non-conformability of Others. That, for instance, enterprise *needs* vocation and administration even though it cannot assimilate or know these in its own terms.

Clearly the relations between different ordering styles or logics are different in different economically-relevant performances. The attempted hegemony of enterprise (including administratively-imposed enterprise) was and is novel, at least in the public sector. There is no question but that it has reshaped the character of economically-relevant practice in public sector organisations – and that it continues to do so. What is colloquially known as the 'Thatcher revolution' has, in most respects, been pursued by subsequent administrations of either political hue. In the UK we live, as Michael Power puts it, in an audit society which seeks to mimic via administrative means certain paradigm conceptions of appropriate market-based relations and subjectivities[xxvii].

But. But there are limits, limits to the extent to which the balance can be pushed in the direction of enterprise – or indeed towards any single vision of ordering. Practice is larger, more complex, more messy, than can be grasped within any particular logic. To be sure, the limits to discourses or narrative forms have been well-rehearsed in the literatures on modernity. Reduction is not simply dangerous – as Zygmunt Bauman has so eloquently shown[xxviii]. It also, in the long run, experiences its limits. In the present context, then, the conclusion is both that it is hubris to imagine that 'enterprise' could order all of economically-relevant activity. It is also, and more generally, that 'economics' are well-named. This is because as well as depending on and reflecting non-economic strategies, economics themselves are also multiple, intersecting, supporting, but also undermining – or interfering – with one another. Which is why a notion of 'economic culture' doesn't work so well.

35 And why I prefer, as we think of economically-relevant activity, to talk in terms of the complexities of practices and the heterogeneous materials that produce and are produced within those practices.

References

Akrich, Madeleine (1992), 'The De-Scription of Technical Objects', pages 205-224 in Wiebe Bijker and John Law (eds), <u>Shaping Technology, Building Society: Studies in Sociotechnical Change</u>, Cambridge, Mass: MIT Press.

Barnes, Barry (1988),

   <u>The Nature of Power</u>, Cambridge: Polity Press.

Bauman, Zygmunt (1989), <u>Modernity and the Holocaust</u>, Cambridge: Polity Press.

Burchell, Graham, Colin Gordon, and Peter Miller (eds) (1991), <u>The Foucault Effect: Studies in Governmentality</u>, London: Harvester Wheatsheaf.

Butler, Judith (1990), <u>Gender Trouble: Feminism and the Subversion of Identity</u>, Thinking Gender, ed. Linda J. Nicholson, New York and London: Routledge.

Callon, Michel (1980), 'Struggles and Negotiations to define what is Problematic and what is not: the Sociology of Translation', pages 197-219 in Karin D. Knorr, Roger Krohn, and Richard D Whitley (eds), <u>The Social Process of Scientific Investigation: Sociology of the Sciences Yearbook</u>, 4, Dordrecht and Boston, Mass.: Reidel.

Callon, Michel (1986), 'Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of Saint Brieuc Bay', pages 196-233 in John Law (ed.), <u>Power, Action and Belief: a new Sociology of Knowledge? Sociological Review Monograph</u>, 32, London: Routledge and Kegan Paul.

Callon, Michel (1998a), 'An Essay on Framing and Overflowing: Economic Externalities Revisited by Sociology', pages 244-269 in Michel Callon (ed.), <u>The Laws of the Markets</u>, Oxford and Keele: Blackwell and the Sociological Review.

Callon, Michel (1998b), 'Introduction: the Embeddedness of Economic Markets in Economics', pages 1-57 in Michel Callon (ed.), <u>The Laws of the Markets</u>, Oxford and Keele: Blackwell and the Sociological Review.

Callon, Michel (ed.) (1998c), <u>The Laws of the Markets</u>, Oxford: Blackwell and the Sociological Review.

Callon, Michel (1999), 'Actor-Network Theory: the Market Test', pages 181-195 in John Law and John Hassard (eds), <u>Actor Network Theory and After</u>, Oxford and Keele: Blackwell and the Sociological Review.

Callon, Michel (2001), 'Writing and (Re)writing Devices as Tools for Managing Complexity', in John Law and Annemarie Mol (eds), <u>Complexities in Science, Technology and Medicine</u>, Durham, N. Ca.: Duke University Press.

Callon, Michel, and Bruno Latour (1992), 'Don't Throw the Baby Out with the Bath School! A Reply to Collins and Yearley', pages 343-368 in Andrew Pickering (ed.), <u>Science as Practice and Culture</u>, Chicago: Chicago University Press.

Collins, H.M., and Steven Yearley (1992), 'Epistemological Chicken', pages 301-326 in Andrew Pickering (ed.), <u>Science as Practice and Culture</u>, Chicago: Chicago University Press.

de Vries, Gerard (1995), 'Should We Send Collins and Latour to Dayton, Ohio?', <u>EASST Review</u>, 14: 3-10.

Eisenstein, Elizabeth L. (1980), <u>The Printing Press as an Agent of Cultural Change: Communications and Transformations in Early-Modern Europe</u>, Cambridge: Cambridge University Press.

Foucault, Michel (1976), <u>The Birth of the Clinic: an Archaeology of Medical Perception</u>, London: Tavistock.

Foucault, Michel (1979), <u>Discipline and Punish: the Birth of the Prison</u>, Harmondsworth: Penguin.

Garcia, Marie-France (1986), 'La Construction sociale d'un marché parfait: le marché au cadran de Fontaines en Sologne', <u>Actes de la Recherche en Sciences Sociales</u>, 65: 2-13.

Haraway, Donna (1991), 'Situated Knowledges: the Science Question in Feminism and the Privilege of Partial Perspective', pages 183-201 in Donna Haraway (ed.), <u>Simians, Cyborgs and Women: the Reinvention of Nature</u>, London: Free Association Books.

Latour, Bruno (1983), 'Give Me a Laboratory and I will Raise the World', in Karin D. Knorr-Cetina and Michael J. Mulkay (eds), <u>Science Observed</u>, Beverly Hills: Sage.

Latour, Bruno (1987), <u>Science in Action: How to Follow Scientists and Engineers Through Society</u>, Milton Keynes: Open University Press.

Latour, Bruno (1988), <u>Irréductions, published with The Pasteurisation of France</u>, Cambridge Mass.: Harvard.

Latour, Bruno (1990), 'Drawing Things Together', pages 19-68 in Michael Lynch and Steve Woolgar (eds), Representation in Scientific Practice, Cambridge, Mass: MIT Press.

Law, John (1991), 'Power, Discretion and Strategy', pages 165-191 in John Law (ed.), A Sociology of Monsters? Essays on Power, Technology and Domination, Sociological Review Monograph, 38, London: Routledge.

Law, John (1994), Organizing Modernity, Oxford: Blackwell.

Law, John (1999), 'After ANT: Topology, Naming and Complexity', pages 1-14 in John Law and John Hassard (eds), Actor Network Theory and After, Oxford and Keele: Blackwell and the Sociological Review.

Law, John (2000), 'Comment on Suchman, and Gherardi and Nicolini: Knowing as Displacing', Organization, 7: 349-354.

Law, John (2001), Aircraft Stories: Decentering the Object in Technoscience,, Durham, N.Ca.: Duke University Press.

Law, John, and Ingunn Moser (2000), 'Managing, Subjectivities And Desires', Concepts and Transformation: International Journal of Action Research and Organizational Renewal, in the press:.

Lukes, Steven (1974), Power: a Radical View, London: Macmillan.

MacKenzie, Donald (1999), 'Physics and Finance: S-Terms and Modern Finance as a Topic for Science Studies', , , 44-99, Edinburgh: Department of Sociology, University of Edinburgh.

Massey, Doreen (1997), 'Paper presented to the Keele University Geography Department', in   .

Mol, Annemarie (1998), 'Missing Links, Making Links: the Performance of Some Artheroscleroses', pages 144-165 in Annemarie Mol and Marc Berg (eds), Differences in Medicine: Unravelling Practices, Techniques and Bodies, Durham, NCa. and London: Duke University Press.

Mol, Annemarie (1999a), 'Cutting surgeons, walking patients: Some complexities involved in comparing', in John Law and Annemarie Mol (eds), Complexities in Science, Technology and Medicine, Durham, N. Ca.: Duke University Press.

Mol, Annemarie (1999b), 'Ontological Politics: a Word and Some Questions', pages 74-89 in John Law and John Hassard (eds), Actor Network Theory and After, Oxford and Keele: Blackwell and the Sociological Review.

Mol, Annemarie (2001), <u>The Body Multiple: Ontology in Medical Practice</u>, Durham, N. Ca., and London: Duke University Press, forthcoming.

Mol, Annemarie, and Marc Berg (1994), 'Principles and Practices of Medicine: the Coexistence of Various Anaemias', <u>Culture, Medicine and Psychiatry</u>, 18: 247-265.

Power, Michael (1991), 'Auditing and Environmental Expertise: Between Protest and Professionalisation', <u>Accounting, Auditing and Accountability Journal</u>, 3: 30-42.

Power, Michael (1994), <u>The Audit Explosion</u>, London: Demos.

Power, Michael (1997), <u>The Audit Society: Rituals of Verification</u>, Oxford: Oxford University Press.

Thrift, Nigel (1996), <u>Spatial Formations</u>, London, Thousand Oaks and New Delhi: Sage.

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[ii] See the argument developed in Chapter 6 of Law (2001).

[iii] SERC is the acronym for Science and Engineering Research Council, which was the major UK state funding body for academic research in the natural sciences at the time.

[iv] The study of Daresbury SERC Laboratory is more fully described in Law (1994).

[v] This is an argument that has been carefully developed in the context of medical practice by Annemarie Mol. See her forthcoming (2001).

[vi] Though most would avoid the term 'culture' for the reasons sketched out above. References here include Foucault for his work on medicine (1976) and discipline (1979), Judith Butler (1990), and the so-called 'English Foucauldians' (see for instance Michael Power (1991; 1994) and Graham Burchell (1991)).

[vii] This work is to be found, for instance, in the <u>Journal of Material Culture</u>, and <u>Society and Space</u>, and is represented in this volume by the chapters by Daniel Miller and Nigel Thrift.

[viii] I will consider some of these below, but they include work by Michel Callon (1998a; 1998b; 1998c; 1999; 2001), Marie-France Garcia (1986), Donald MacKenzie (1999), Karin Knorr-Cetina, and, in the context of STS-informed debate within geography, Nigel Thrift (1996).

[ix] Marie-France Garcia (1986).

[x] Michel Callon (1998c).

[xi] For instance by Nigel Thrift (1996) and Doreen Massey (1997).

[xii] On this see, for instance, the magisterial work by Elizabeth Eisenstein (1980).

[xiii] My favourite example derives from the electricity supply industry. See the writing of Madeleine Akrich on this (Akrich 1992).

[xiv] It turns around the distinction in STS between the social construction of technology (SCOT) which tends to the former view, and various semiotically influenced approaches, which reflect some of the concerns of post-structuralism. These include actor-network theory, which rigorously takes the latter view, insisting that action (and subjectivity) are better understood as effects of ramifying relations rather than as originating in particular (for instance human) locations. The difference is neatly

summed up in de Vries (1995), and somewhat acrimoniously in an exchange between Michel Callon and Bruno Latour (1992) on the one hand Harry Collins and Steven Yearley (1992) on the other. For a recent account of actor network theory and some of its successor projects, see John Law and John Hassard (1999).

[xv] I use Foucauldian language here, but a vocabulary that does a similar job has been developed in actor network theory, for instance in identifying strategies which produce large-scale effects (Latour 1983), or in talk about modes of ordering (Law 1994).

[xvi] The argument is pressed at length in Bruno Latour's (1987), but is also carefully developed by Michel Callon in his important paper on the fishermen and the scallops of St. Brieuc Bay. See Callon (1986).

[xvii] In talking of a 'spreadsheet world', I'm adapting the notion of the 'actor-world' developed by Michel Callon (1980; 1986). Arguably the actor network model here developed is Leibnizian, and actor networks may be understood as monads. On this see Latour (1988) and Law (2000).

[xviii] Though this is not always the case, the values are likely to be arithmetical. And the operators are either of the form 'if x then y, else z', or, probably more common, they perform arithmetical or other mathematical relations, deriving new cell values from old.

[xix] We will see shortly that in the context of Daresbury management, some of the paperwork signally failed to draw matters together, simplify, and render itself tractable.

[xx] This argument is beautifully developed in Bruno Latour's (1990).

[xxi] There are various other vocabularies for making this point. For instance, feminist technoscience student Donna Haraway talks of the impossibility of the God trick, the view from nowhere. See her (1991). The idea that 'the project' is a performed reality is explored at some length in Law (2001).

[xxii] For an introduction to the literatures on power, see Lukes (1974), Barnes (1988). For further discussion in the context of Daresbury and actor-network theory, see Law (1991).

[xxiii] Formally, since every value and operator can be manipulated, there are indefinitely many possibilities. In practice, however, the freedom for manoeuvre is more restricted. Some data values entered cannot be so easily changed (for instance, the number of man-years thus far devoted to the project – though this was indeed 'corrected' in the course of discussions on the management board). Again, some symbolic operators are more or less fixed (conversion of half-days into man years).

[xxiv] With some exceptions. For instance, particular large capital projects might be identified, as was indeed the case with the publicly-funded second Wiggler project mentioned above.

[xxv] This has been developed in a series of papers and at book length. See, in particular, Annemarie Mol (1998; 1999a; 1999b; 2001; 1994).

[xxvi] The argument is developed more fully in Law (1994) and Law and Moser (2000).

[xxvii] See Michael Power (1997).

[xxviii]. The classic case is his study of the Holocaust. See Bauman (1989).