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Experiments in interdisciplinarity[1]

'How do I account for my day?' This was said with a mixture of anxiety and resignation by a young knowledge worker,[2] a newly appointed 'network manager' – a title he had changed almost at once to Research Network Manager since people thought he was an internet servicer – attached to a newly named entity, the Cambridge University Interdisciplinary Research Network (CUIRN).[3]

Located in the natural sciences, the network makes explicit the need for interdisciplinary collaboration. Its day-to-day running falls to the Network Manager who is responsible to a Network Research Facilitator, whose new post is held jointly in the departments of Chemistry, Physics and Biochemistry. The post is designed to promote interdepartmental collaboration. For it is not sufficient to wait for collaborative needs to arise in the solving of 'problems' (problems within biology, say,

1 The paper published here is the spoken and thus truncated version of Marilyn Strathern, 'Social property. An interdisciplinary experiment', in *POLAR. Political and Legal Anthropology Review*, 27 (2004): 23–56 © by the American Anthropological Association. All rights reserved. This is a component of a Goldsmiths/Cambridge collaborative project with Andrew Barry and Georgina Born, called 'Interdisciplinarity and society. A critical comparative study', conducted under the wider auspices of the ESRC's 'Science in society' programme. Among those who I must thank are Monica Konrad for her perceptive comments on the text and for on-going conversations, David Leitner for the materials he kindly provided, Alison Stewart from the CGKP who keeps me grounded, Benedicta Rousseau, Ann Kelly and Samuelle Carlson for their observations and commentary, and Maryon McDonald, Cori Hayden, Monica Bonaccorso and members of the CBA [Comparative Studies of Biotechnology and Accountability] research group in the Department of Social Anthropology in Cambridge. Duncan Simpson should be thanked again. The Cambridge 2004 Social Property Seminar is a joint venture with my colleague James Leach. Inspiration for the topic of 'ownership' came from Bronac Ferran, director of Interdisciplinary Arts, Arts Council England. Ron Zimmern (director of Cambridge University's Institute of Public Health, and founder-director of the CGKP) provided an impetus with his interest in the combinations of funding, employment and secondment that make up each research node. The models for the IDW come from experimental associations between creative artists and scientists supported by an unusual collaboration between the British Arts and Humanities Research Board and the Arts Council England, and from industrial design. Here the genius belongs to Alan Blackwell, from the Cambridge Computer Laboratory, co-founder of Crucible. The work of Helga Nowotny (2001) (Swiss Federal Institute of Technology, Zurich) and her colleagues has laid out some of the conditions of modern knowledge production that is the starting point for the exercise. Final thanks to colleagues at Cornell and Princeton Universities who read earlier versions.

2 Duncan Simpson, 15 March 2004. I am very grateful indeed for his permission to quote so freely from our conversation. Much of what he said here was also the substance of a paper ('Creating – and owning – networks') he gave to Colloquium I of the Cambridge Social Property Seminar in the same month. ('Knowledge worker', after Newell *et al.* 2002; 'Everybody is a knowledge worker', in Wheatley 2002: 6.)

3 The following comes from the 2003 proposal to establish the network (thanks to Cait MacPhee).

that may be investigated within the context of physics); they must be actively pursued (so that the way in which biological problems are amenable to physical description becomes drawn into the science itself). The network's knowledge base will include papers written by the management team, designed to demystify complex areas so as to make them accessible to a broad audience across the sciences.

The bureaucratic structure makes the need for the management of such activity evident. Networks that were (and still are) instruments of collaboration between researchers have become newly expressive of the desirability of collaboration as such. Means become ends.

Formerly a microbiologist engaged in plant research, the Research Network Manager (RNM) sees his job as bringing together people and stimulating links where none might have been imagined. He was very aware that researchers might find him redundant – they would get on with collaborating when the need arose anyway – but what concerned him was less the fruitfulness of what he was doing than how to demonstrate it. He did not doubt that there would be interactions and outputs that could be attributed to his intervention. But how could he show that was the case? It was impossible to measure what he was doing.[4] How indeed was he going to organise his day so as to record he had done something?

Does this sound familiar? Aren't we all 'knowledge workers'? Isn't this a very kind of ordinary and humdrum experience? Well, yes and no. I use it to comment on some of the solutions being generated in response to what is felt to be poorly managed knowledge. For a new 'problem' is simultaneously emergent here: scientific knowledge that appears trapped so to speak within its original disciplinary nexus when it could be so much more productive in combination with others. These solutions, including the structure the CUIRN has put into place, are in part social ones. And something not socially dissimilar to this small local solution internal to one university's physical sciences is also happening on a large scale in Britain across the Life Sciences.

Objects of interest

I feel rather like the network manager in fact. He had to justify his activities – above all to himself – to be certain that they were meeting expectations. He was given considerable freedom to create his own job, but knew he was expected to facilitate interdisciplinary interactions. I find myself in the position of having to justify an anthropological interest in new practices of knowledge dispersal. And if I were to do it through creating an ethnographic object then I would have to demonstrate the interest of that object. Ethnographic objects are phenomena made interesting, that is, rendered worthy of description (and I subsume analysis and theory under description). They have become that through being studied (Riles 2000).

Yet being interested in something is a means to study – what am I trying to do in turning it into an end, by insisting that its interest is communicated? If I become anxious about whether or what I have to say is interesting, is it precisely because I am trying to create an object that will be expressive of the nature of the anthropological enterprise? If so, perhaps its purpose would be to appreciate the continuities between

4 Was he to count up all the conversations he had in a day and then mark which had led somewhere?

the ethnographer's situation and those she studies. As it happens, my anxiety rather directly touches on that of the network manager: he is a colleague I have drawn in to a seminar series I am organising, someone I have made part of my own network! Indeed I say 'studies' rather wryly, if only because there is too much rushing around to be encompassed by that sedate term. A great deal of contemporary scholarship, at least in my neck of the woods, seems to be engagement in networking activities. People run workshops, make contacts, organise meetings, all of which enrich the sense of social milieux in which they move. Ordinary enough, but it is part of the new political economy of knowledge production.

And I'm not advocating anything different. You will discover later in this article how absolutely typical of this phenomenon my own actions have been. Now my ethnographic object has nothing directly to do with the network manager. This is a consortium set up in Cambridge called the Cambridge Genetics Knowledge Park (CGKP). Many of the concerns of CGKP are to do with demonstrating output when a principal part of its *activity* involves facilitating interactions and collaborations. It is in a similar predicament to the network manager. He manages networking activities. Fine. Yet he cannot find simple performance indicators to gauge his success. And that, I suspect, is partly because he feels obliged (or the CUIRN for him) to render into an object expressive of a particular kind of endeavour what works perfectly well as an instrumental activity in and of itself.

In carrying forward its programme the CGKP creates its own form of social organisation. Borrowing from current investment in the ideas of interdisciplinarity and networking, it sees itself as at once localised (with a set of core activities and core staff) and distributed (across institutions, across spheres of interests). Moreover the CGKP does not leave the question of knowledge implicit – it explicitly addresses the question of how 'knowledge is put into play' by itself aiming to generate a special kind of knowledge. So let me attempt an initial description.

Ethnographic specifics

The CGKP is one of six such enterprises across Britain.[5] With funding for five years, it originates in the British Department of Health's desire to put research in clinical genetics into a specific relation with 'society' (cf. Nowotny *et al.* 2001). The idea is to promote at the same time public health and public awareness of the value of clinical genetics. They are thus designed to bring together multiple aspects of emerging medical developments, while taking into account the views and expectations of the public. The scheme is premised on effecting interactions between several sciences, between scientific and clinical applications, between academic and non-academic users, and between the consortia and the commercial community. The background is the antipathy in Britain towards science. This has grown despite 'public understanding of science' (PUS) programmes over the last twenty years, as is illustrated by the current scare over genetically modified food.

5 Newcastle [North East], the North West [Manchester, Lancaster], Oxford, Cambridge, London and Cardiff [Wales].

Why genetics? The Department of Health's own initial statement (DoH 2002) refers to the need to develop a dynamic national strategy to support research in clinical genetics where the public is brought in from the outset.

> The vision was for Genetics Knowledge Parks to work together to build a critical mass of expertise to undertake research, technology development, assessment and audit in human genetics. . . They will also work together to develop appropriate economic, ethical, legal and social frameworks for the effective delivery of genetics services and for a better public understanding of human genetics.

So what is peculiar about genetics that it should attract such attention? The North West GKP has a proposal to develop resources to help teachers address the ethical implications of genetics in the classroom. Their guide for teachers embeds genetics in the very project of bioethics. The first draft of the human genome sequence ushered in a revolution. 'Genetics' has become a principal fulcrum that links science and ethics. 'There is little doubt that many of the most pressing concerns in *science* are in biomedicine and associated reproductive technologies. The new biotechnologies raise huge *ethical* dilemmas that concern us all' (Levinson and Reiss 2003: 3, my emphasis).[6] The guide moves straightaway into the example of stem cell research as prototypical for the new bioethics. Clinical [human] genetics plays out on a smaller scale what is true of biotechnology in general. It contributes to two very visible arenas – the provision of health care, a justification that drives much development in science research in general, and the possibility of developing commercially significant applications.

So the new genetics is already conceived as marshalling different arenas together. Clinical medicine, with its focus on the patient as an entity that corresponds to no one set of practices, has always done this:[7] the medical team on the hospital ward round is thought of as a *multidisciplinary* one. Correspondingly, in the way in which genetics knowledge parks have set out to marshal skills and expertise, the axiomatic assumption is that this must be a multidisciplinary exercise.

Multidisciplinarity is embedded in the multi-institutional confederations that make up the knowledge parks. The Newcastle-based Northern Genetics Knowledge Park supports the International Centre for Life, also described as 'the UK's first biotechnology village', and coalesces the reference in its name for itself, as the 'Life Knowledge Park' (*http://www.nowgen.org.uk*). Its 'partners for life' comprise several organisations: the Life Science Centre, Life Knowledge Park, Life Bioscience Centre, Newcastle Fertility Centre at Life, Science and Industry Council, PEALS (Policy, Ethics and Life Sciences Research Institute) – not to speak of Life Conference and Banqueting.

6 Bauer and Gaskell (2002: 1) start their collection, aimed at a very different audience, in interestingly overlapping terms: 'Biotechnology is one of the fastest growing areas of scientific, technical and industrial innovation of recent times, and it is also one of the most prominent in public discussion. Following the developments of recombinant DNA techniques in the early 1970s, modern biotechnology has burgeoned in diverse areas' – and their list encompasses pharmaceuticals, diagnostics and testing, cloning and xenotransplantation, genetically modified food and environmental remediation. However, their focus is not bioethics as such, but rather the role that national and international opinion has come to play in research application. The 'widening range and growing intensity of public debates' has meant that public opinion is no longer 'after the fact' but part of the whole process of research development. The book has a chapter on the institutionalisation of bioethics.

7 As in the prototypical ward round (Latimer in press; presentation to Colloquium I of the Social Property Seminar).

These are institutions and organisations of very different orders of formality and orientation, and such mixing is equally evident in the Cambridge Genetics Knowledge Park.

You could never add up all the elements of the CGKP. Expertise is found lodged in bodies of diverse kinds – a veritable C21 encyclopaedia of cross-referring entities. These bodies are named[8] variously as *faculties, departments, research centres, research groups, research programmes, units, institutes, schools*, *laboratories*, across some 17 *disciplines* and areas of *expertise*, including another university *campus*, while outreach to industry brings in other entities, such as an *enterprise*, a regional *initiative*, and a transatlantic *company*; there are in addition named *participants, partners* and *sponsors*, and more diffusely *consumers* and *the public*. 'Organisation' is itself represented in the core staff under a *director*, a *supervisory board* and an *executive board*.

Its vision does not just require the organisation of knowledge (instrumentally speaking), it is *about* the organisation of knowledge (that is, expressive of the process of organisation). The CGKP's first remit is to 'establish an administrative structure that will actively and explicitly bring together the activities of academic research with those of the commercial sector, clinical and public health practice, and the views of both consumers of genetic services and the public'. And, 'Knowledge is only useful if others can have access to it. The [CGKP] will concentrate its efforts . . . on (a) health professionals; (b) policy makers; (c) scientist/entrepreneurs and commercial partners' (Zimmern 2001).

There are many answers to the question 'Why genetics?' Among them must be the perception that the new genetics encapsulates what is so multi-factorial, so hybrid, about the way knowledge is to be produced by, and disseminated across, institutions. So why *knowledge*? What is there about genetic knowledge that demands special treatment? Of course, knowledge about themselves raises many questions in people's minds that they have come to understand are 'ethical'. Fundamental to them is the question of ownership and use of personal genetic information, and issues that are immediately consequent on the knowledge of genetic risk. Apart from that, the knowledge parks' orientation towards the wider public implies both that their own knowledge practices will be under scrutiny and that they will be meeting diverse needs. Here the Cambridge version is explicit. It proposes a deliberately multi-factorial view of knowledge itself.

Of the six parks, the Cambridge plan goes furthest in responding to the invitation to develop appropriate economic, ethical, legal and social frameworks for the delivery of genetic services. It will offer visible evidence of the way society can be taken into science before, so to speak, it leaves the labs.[9] A process of validation will simultaneously involve disciplines 'not normally included' in the purview of science and 'interpret that science

8 Taken (in each case) from the Proposal to the Department of Health and the DTI, initiated by the Public Health Genetics Unit, with thanks to Ron Zimmern (2001). See DTI 2001; DoH 2002.

9 This is separate from the aim to 'stimulate the transition from research into clinical and commercial benefits through programmes and activities designed to promote intensive dissemination and sharing of genetics knowledge', which is oriented to clinical practice. From the CGKP website ('Genetics knowledge for the benefit of society') (May 2003), at *http://www.cgkp.org.uk/about.html/*

in a wide social context'.[10] For if the first specific remit of the CGKP was to establish an administrative structure, the purpose of the second is to 'create knowledge'. And knowledge in turn 'we define as information that has been validated through critical appraisal of research findings, and integrated with an ethical, legal and social analysis and the input of consumer views' (Zimmern 2001).

Now knowledge parks were conceived with the aim of helping restore an authority to science, specifically to genetics. One hope is to bring about a new robustness (Gibbons 1999) by building into the very concept of knowledge a mix of scientific and non-scientific expertise. Scientific information will combine with other kinds of information to produce validated knowledge. I do not know whether this vision of socially acceptable knowledge is a new parochialism – a sort of homeland security device – for one might wish to ask, 'Validated for whom?' De-universalising science? Or is it utopian?

If there is a dash of utopianism here, then that touches this anthropologist too. It is as though the GKPs were an absurdly concrete manifestation of a possibility only hypothetically conceived. The hypothesis (in a loose sense of the term) concerns one particular form of knowledge that the scientific revolution – I am talking of the European scientific revolution of the seventeenth century – put into place, and that is arguably still with us. This was a form of relational knowledge that meant that conceptual relations and social relations became mutually visible (Strathern n.d.).[11]

Finally, why *park*? The term derives from the numerous business parks and science parks to be found across Britain, whose attraction is the (commercially vibrant) concentration of diverse expertise in unexpected locations. The rural or open-space overtones are definitely not industrial in imagery: I have heard only bucolic interpretations, perhaps implying browsing or grazing [through information], not car parks or parks for supermarket trolleys. They possibly conjure up the kind of airspace in which ideas are free to circulate. Indeed the London consortium calls their knowledge park simply IDEAS (full title: the London Ideas Genetic Knowledge Park).

Unlike other parks that are a mix of located and dispersed elements, London IDEAS makes it plain that it is all virtual. 'The IDEAS park is a collaborative effort. It has people, machines, projects and ideas, but no buildings of its own' (press release, September 2002; *http://londonideas.org/internet*).[12] This puts me in mind of Daniel Miller's (2003) theorisation of bureaucratic virtualism. This is his modelling of a one-way[13] relationship between means and ends, where an instrumental relation is constantly converted into

10 As I have argued elsewhere (Strathern 2004, Working Paper 4), going across disciplines is bracketed with the idea of taking society into account – especially when the disciplines come from the social sciences. Appointments have been made in law, history and philosophy of science (public health ethics), social science (sociology), as well as primary care genetics.

11 Though needless to say there is a KM (Knowledge Management) version of this for the twenty-first century. Wheatley (2002: 7), talking about the hard time people have in sharing knowledge, says that it is important to remember that it is not technology that connects but relationships: 'We share knowledge because we are in a relationship, not because we have a broader bandwidth'. This normative reading of the 'value' of relationships is part of the phenomenon.

12 Embedded within the huge complex that is London University, its three partners – University College London, Imperial College and St George's Hospital Medical School – embrace hospitals, centres and institutes. Note that 'collaboration' across knowledge parks is signalled in the dissemination of information – the IDEAS website entry on a guide to on-line genetic resources points to the Cambridge Public Health Genetics Unit, a core element of the CGKP, in its listing.

13 In Riles's (2003) original formulation, instrumental and expressive effects can co-exist as distinct perspectives, in sequence or in oscillation, or as one 'containing ' the other.

an expressive one (Riles 2000, 2003). Miller defines bureaucratic virtualism as 'the successive replacement of actual consumers as the beneficiary of welfare and provision by abstracted models that come to stand in their stead'. (Numbers of meals delivered to the elderly as an index of home care is an example Tsoukas [1997] gives.) The abstracted models he has in mind are above all techniques of management audit – measurement becomes a stand-in for accomplishment, so that aims become focused on indicators or reaching the target becomes the goal. Here is one source, among others, for the anxiety of the network manager. And here the GKP's remit chimes with the academic remit of Britain's consortium of Higher Education Research Councils. These have collectively stipulated the importance of promoting a wider awareness of science as part of the fabric of society and of the importance of people understanding the new technologies (DTI 2001: 61). The explicit admonition to adopt a 'science and society' agenda, entailing consultation, engagement and dialogue, comes with the caveat that this is not meant be a passive matter of dissemination: rather, the views of the concerned public should be actively sought. Taking steps to secure such participation becomes part of the scientific researcher's role. The network manager observed that every research report these days comes with a 'public understanding of science' box to be ticked.

The GKPs' strategies of dissemination 'to the public' invariably deploy the media. Thus, London IDEAS has set up a public information centre. This is a counterpart to its training support for scientific and health professionals (for parts of which people must register or subscribe). The information centre is for direct consultation by patients, and offers leaflets that are freely downloadable. So for example, it reproduces the genetics reports put out in the Consumers Association's journal *Health Which?* over the last couple of years. Many of the reports focus on the marketing of tests. The relaying of such information clearly operates in a field in which any concern over disease may be translated into a concern with the possible genetic factors. The Consumers Association reports include very direct advice about products to avoid, by name, and show up the spurious claims of certain genetic 'lifestyle' tests and over-the-counter home testing kits.

Certainly the CGKP is conscious of its responsibilities towards the Department of Health and the Department of Trade and Industry, and of the need for there to be 'deliverables' at the end of the day. If how to make (genetic) knowledge usable is a fundamental premise, that process of conversion or transformation will have to be demonstrated. Yet to date its 'deliverables' – a series of reports, reviews, position papers, briefing papers and courses – are deliberately open-ended as to both form and content.

> Our view is that it is neither possible, nor advisable, to specify in detail the exact deliverables that will be achieved. . . [For experience has shown] that greatest flexibility and efficiency result when detailed objectives and deliverables are agreed . . . in response to the priorities and pressures of the time (Zimmern 2001: 4.33).

The observation is spelled out in the imagery of a shared social space, and it is an open space. When it comes to evaluating itself, in the director's words, the park's success will depend on achieving a degree of trust and a shared vision between its different partners, as well as giving each partner the opportunity to achieve his or her individual objectives.

Now when we are dealing with the relaying and publishing of information, those articles and papers and information sheets do not work quite like bureaucratic indicators

for the delivery of services. They *are* the delivery of a service – means, not just ends. Where indicators are expressive of quality of output, publications are in themselves instruments for purveying information. So nothing need be displaced here,[14] and that is not where these organisations are virtual. It could be that they are virtual in a very non-sinister – indeed possibly vitalising – sense, tantamount to no more than the kinds of displacement of other activities that self-descriptions always effect. We might ask, nonetheless, what it means to try to dislocate knowledge of an academic kind from its disciplinary base.

Interdisciplinarity

Given, in its own words, that the 'complexities of the modern world demand an approach that takes into account the need for pluralism, shared values, collaboration and public involvement', the Cambridge GKP proposal struck a note of caution: there is nothing straightforward about 'bringing together organisations with different aims and objectives and diverse cultures' (Zimmern 2001). We have seen the intention of involving academic, clinical and industrial communities. There is nothing straightforward about bringing together disciplines either. For in addition to the multi-disciplinarity that is taken for granted in collaborative research enterprises, the idea is to produce dialogue across expertise. In the same way as the public, for instance, is to be rendered sensible and receptive, so too disciplines should be receptive to one another.

Beyond multidisciplinarity, then – the lining up of different pools of expertise – it is assumed that there will be interactions of an interdisciplinary nature. Here the Cambridge GKP specifies its twin aims as 'fostering new research initiatives and collaborations and of working synergistically towards a common goal'.

This anticipated diversity may or may not lead to difficulties. Allowing individual parties to feel each has gained from an interaction is one solution. How to pinpoint the value of the interaction might be another. Yet here we would be moving from implicit, instrumental features of interactions to the requirement that they be explicit and expressive. Just such a move is surely behind the brief comment of the editor of the American journal *Science*: 'It is a terribly difficult issue', he said (quoted by Mansilla and Gardner 2003: 1). What he is referring to turns out to be nothing other than the virtualism of assessment procedures we have already encountered.[15] There seems widespread acknowledgement that what makes interdisciplinary work difficult is knowing how to recognise that it has happened, and beyond that knowing to what

14 However there is a quite different argument to be had in relation to the displacement of medical expertise exercised by qualified persons, with whom appointments have to made, by self-help medical advice, for instance over the internet. (My thanks here to Andrea Stöckl and her research on self-diagnosis; she contributed to Colloquium I of the Social Property Seminar). Another contrast would be with the role of publications in the reading networks of, say, literary societies. (The observation is prompted by Adam Reed's work and his contribution to the same colloquium.)

15 In Working Paper 4 (Strathern 2004: 78), which lays out some of the ground also covered here, I said I had not come across measures of interdisciplinary success. (Indeed this led me to make an argument about the role that interdisciplinarity plays as itself an indicator of *disciplinary* success [at communicating].) I have now come across attempts at assessment, although the number of items in Klein's (2003) beginning bibliography is very small [note 25]. This is all in contrast to the well established practice of, say, measuring 'intellectual capital' (Bassi and Buren 2002).

extent it has been productive – in short, how to pinpoint the value of the interaction. In other words, the same concerns about measurement that are raised in relation to the success of the GKPs as a project affects the assessment of one its tools, interdisciplinarity.

In an on-line discussion about interdisciplinarity put out by the CNRS, two contributors – Mansilla and Gardner – address 'the lack of available criteria to assess interdisciplinary work on its own terms'.[16] There is a general agreement that criteria for judgment do not exist, or at least cannot be agreed on. Mansilla and Gardner refer to an empirical study by the Harvard Interdisciplinary Studies Project, which collected views from researchers at the MIT Media Lab, the Santa Fe Institute, The Centre for Bioethics at the University of Pennsylvania, Research in Experimental Design at Xerox-Parc, and others. They found that researchers rely on indirect indicators such as publications or numbers of patents. 'Measures that directly address epistemic dimensions of interdisciplinary work (e.g. explanatory power, aesthetic appeal, comprehensiveness) were rarer and less well articulated' (2003: 1–2).[17]

Now it may be that this sense of difficulty applies across a science/humanities (social science) divide and is much less a feature of collaborations within natural sciences. There seem to be two models here. Certainly internal collaborations, as the network manager found, carry on to instrumental effect without having to be articulated as such. In science/humanities collaborations, on the other hand, an expressive element is invariably built in: they constantly point to themselves. There is also a further substantive reason. When different sciences contribute expertise to one another the accepted model is that they commonly do so through focus on a problem; perhaps they are more like design engineers in this[18] – the question is to solve the problem through whatever means. But when it is a case of interaction involving social scientists or people from the humanities, the model is often closer to that of the public understanding of science. The question is phrased in terms of one having an 'impact' on the other. Assessing impact is a dimension of assessment that reinforces the expressive aspect of interactions. It is not just that there are results but one result should be the interactional/interdisciplinary engagement as such.

A recent study carried out by a sociologist, Diana Rhoten (2003),[19] focused on research centres in the United States. All the centres were interdisciplinary by design, dominated by science, with the life sciences prominent and social science/humanities input low or non-existent. She comments on the intellectual or epistemological

16 This was a contribution to an on-line debate stimulated by a group headed by Helga Nowotny, Dan Sperber and others. The question of interdisciplinary – or transdisciplinary [a term I do not engage with here] – research evaluation and assessment, once aired,was clearly of considerable interest. Klein (contributing in December 2003) produced a short bibliography of texts in this area, citing Rhoten's text among others. See Nowotny 2002, 2003.

17 Interdisciplinary work is defined as purposeful means to a cognitive or practical goal (understanding, solving a problem), with the stipulation that 'disciplinary lenses be integrated in mutually informative networks of relationships rather than simply juxtaposed' (Mansilla and Gardner 2003: 2). The aim is to focus on *disciplinary integration*, rather than just the integration of multiple perspectives (as in 'multidisciplinarity').

18 Although those interested in industrial design (Alan Blackwell [pers. comm.], apropos the 'Interdisciplinary Design Workshops' (IDW) at the Social Property Seminar [see below]) may draw as sharp a line between scientists and technologists as scientists do (for example, speakers at the 'EC Modern Biology and Visions of Humanity Encounter', Genoa, March 2004).

19 I am most grateful for her permission for me to cite her work and quote from it.

commitment of staff, especially among younger staff and graduate students (2003: 6–7). She found that none of the centres had a unified or unifying theme, problem or product, a reason she hazards for there being more information-sharing than knowledge-creating activity. Revealingly, when I first read this, I gave these two concepts positive and negative values, where she is reporting neutrally on outcomes. Even more revealingly, I put the values round the 'wrong way'... if anything when a positive emphasis emerges in her account, the positive value falls on information-sharing, not knowledge-creating as I had assumed it.

> In the current academic structure, the value of research and researcher alike is usually measured by the production of new knowledge as published in learned journals. While such tangible forms of knowledge emerge from individuals and small communities of practice, networks of practice do not generally take action nor produce new knowledge either immediately or directly. However... the intangible information-sharing that occurs through such networks is perhaps the most central and creative aspect of the interdisciplinary research collectivity. It is the most common output of the interdisciplinary research process, at the same time that it is one of the most under-appreciated and unrewarded activities within the current academy (Rhoten 2003: 9).[20]

Now, when I got the values the wrong way round, I had fallen into the trap laid by the rhetoric of assessment and other objectifications. Information-sharing is invisible precisely because it is part of the ordinary nexus of interactions among collaborators, instrumental to their purposes, not expressive of them. They escape measurement. Information-sharing could perhaps qualify as one of the epistemic effects for which Mansilla and Gardner were looking in their search for criteria to assess interdisciplinary work.

Context

Now social anthropologists by convention put things 'into context'. Here I return to the problem with which I opened. The problem is just how to create a context for an ethnographic study that has not yet begun. Rather than set out a programmatic statement of what I ought to be doing, I take the liberty of observing what I have been doing.

Of course, in some senses the CGKP is obvious as an object of study. Its proposal, website and work plans conceive of CGKP as a coherent entity. Though by definition it embraces multiple possibilities under its umbrella (one of the director's images), it has theme, problem and products. It is a real-life organisation containing many different kinds of knowledge practitioners. It has a palpable social presence and is bound by material limits – time, space and resources. The question prompted by Rhoten is whether it can produce new knowledge.

If this is a question about the epistemic effects of collaboration, then it is also a social question. Rhoten observed with disappointment that people in the interdisciplinary research centres she studied more frequently took a multi- than an inter-disciplinary view. Rather than insisting on the 'integration' of different theories or methods, they talked about the 'inclusion' of this or that perspective (Rhoten 2003: 43). But whereas inclusion can be observed, I am not so sure about integration. Where and in what

20 Networks of practice and communities of practice, after the work of Brown and Duguid, cited at Rhoten 2003: 8.

would such integration appear? In the artefacts, analysis, theory, reports that were the outcome of the collaboration? Of course. But how are such artefacts, analysis, theory, reports to give this evidence? They won't bear testimony to collaboration unless they are *described* that way.

The evidence for such integration must lie in the testimony of those involved, that they had learned things that they had not done before, that their working practices registered an alteration as a consequence of interaction with others. *And that they were prepared to describe them that way*. I do not see how we can bypass the fact that we would need to be told.[21] As soon as one introduces the issue of description, however, one encounters representation. Like audit, many kinds of description require people to be ethnographers of a kind. And this is where we began, with description as a mode of objectification, an expressive act.

Ethnographers describe; that is their job. But not all description is ethnographic. Ethnography depends on the further specification of the context in which the description is generated. A context sets the epistemological boundaries. An ethnographic object thus requires a double objectification: a description contained within a description of its conditions of possibility, or at the least the implications contained in the circumference of, and manner of, the describing. That is where the 'discipline' in such work lies.

There is no agreement among anthropologists, however, as to the temporal point at which you lay out a context (Greenhouse 1996). Do you lay it out at the outset of the investigation, or will one emerge at the end?[22] When I look at how I have embarked on this work, an unkind epithet would be prevarication. I have seemingly deferred, put off, 'the study'. Instead I have engaged in other activities not apparently 'about' the CGKP at all. I did not in fact realise that I would go to such exhausting lengths to put off the moment of objectification.

Initially unclear as to what could be fashioned as an ethnographic object, I chose the route of indirection. I knew I did not want to approach the CGKP directly. That was partly because I did not want to reproduce the organisation of knowledge at the basis of its own sense of organisation.[23] But if I was to be interested in the epistemic effects of the kinds of synergies that the proposal for the park envisaged, then I also needed some training. Again, not in genetic science, for that would reproduce the learning processes that the park was setting out to inculcate. I put it to myself that it was necessary to create a context – less a context that would envelop or encompass the park, than a subject position from which to sally forth.

At this juncture, the network manager comes back into view – because of how he'd surprised me. Musing on his role and how he was to achieve the kinds of facilitations people were expecting, he said that he had realised that it was no good being too direct or being direct all the time. What he had to do was try to produce situations where collaborations would emerge as by-products; they would spring, indirectly, out of some other activity. One could thus create a purpose for people coming together – such as a discussion evening – from which they could derive benefit, even though his own ultimate interest would be in the interactions that might ensue. If I almost fell off the proverbial

21 Even if only indirectly, from future career choices or career trajectories.

22 Of course, on a small scale every activity will do both; there is no such entity as 'a (single) context'.

23 There was also a team of researchers from Warwick in 'knowledge management', by discipline, who wished to study the CGKP's organisational practices (cf. Newell *et al.* 2002; Swan *et al.* 2001).

chair, you must recall that I had lined him up to speak at a seminar. He had rumbled my ruse! For the seminar was designed precisely as that, as the anthropologist's indirection.

My fabricated context was to have both a conceptual and a social aspect. Conceptually, to foster an interest in interdisciplinarity *in myself*, for I knew practically nothing about it and needed training up. Socially, to involve people in interaction, and the idea of a seminar was a rather obvious strategy for an academic to light upon. So the result was – is – a set of four occasions, with the network manager invited to the first. Under the rubric 'social property and new social forms' it has became known as the Social Property Seminar. Let me sketch it briefly.

Each occasion, spread over two days, consists of a colloquium and workshop. Some of the core concerns of the CGKP provide substantive focus. The subtext was an experiment in collaboration, while the main text was a series of different models of ownership across disciplines. Ownership was chosen as the principal focus of the seminar – as a topic that belonged to no one discipline, but also as one that cut across any easy ideas about collaboration being imagined as some effortless flow of knowledge. So the hard word – property – was used in the title, prefaced by the epithet social. The 'social' here was both to remind people that we were dealing with interest and cleavages, and to distinguish this from earlier research in the Cambridge Department of Social Anthropology on cultural property.[24]

Avoiding some imitations, I have found myself imitating the way in which the park itself, a largely instrumental organisation of people with the knowledge to help promote public health and public awareness, is made expressive and representational. The knowledge park is rendered full of signification, by, for example, the politics of accountability and the politics of bioethics, and of course (on a small scale) by being turned into an ethnographic object.

Now running through all of this has been reiteration of how this or that phenomenon repeats or copies another phenomenon (usually on a larger or smaller scale). There are many ways in which one could analyse this apparent replication. Reflexivity on the part of the observer is one; the fractal behaviour of culture is another. But in this context there is something else to emphasise, although it is altogether too ordinary or humdrum for usual note. This is the process of imitation. When people talk of a common language emerging between disciplines, what is going on may be less a moment of exchange than of borrowing by imitation. Is imitation, an activity as modest and as likely to be overlooked as information-sharing, another epistemic effect of collaboration?

Conclusion

The tangible outputs of the CGKP have to date been quite various. They include reports specially prepared by the Park; discussion papers under the title of the CGKP but with authors separately named; the relaying of news items on the web from its associated body, the Public Health Genetics Unit; papers commissioned by outside bodies that

24 This is probably not how anyone else would have read it; an ESRC-funded research project under the title 'Property, transactions and creations. New economic relations in the Pacific' is the antecedent project.

engaged in collaboration with (named) members of specific Cambridge University faculties; press releases under the name of the CGKP Knowledge Officer, and so forth. It also puts forward a list of scientific and other publications authored or co-authored by CGKP team members under the names of the individual researchers.

One conclusion has been staring me in the face. I chose the topic of the interdisciplinary seminar I was running as 'ownership' in order to drop into the debate about the flow of knowledge a concept that divides as well as unites, that separates the products of interactions from the process of interaction. I had not appreciated at the time how plain lucky this was. For 'ownership' works in the world to instrumental effect. It sorts out relations between people in a particular way. So what is also interesting is the silent role it plays in the co-production of knowledge, as it is silent in much bioethics debate (apart from issues that directly confront the ownership of genetic information).[25] But suppose indeed it were distributed across the landscape of knowledge-making, quietly doing its work, what then might my description look like?

Let us go back to the contrast between knowledge-creation and information-sharing. Those research papers that appear under the CGKP list of publications belong to the field of knowledge-creation because they are authored and thus owned. Information-sharing also demands ownership of a kind, but a transient ownership, the person who possesses access to a source of information that he or she is willing to pass on.[26] It is appropriate that such transient ownership should be embedded in a structure that is more enduring, namely the relevant relationship or network. But in either case, collaboration is presented in a very straightforward way, whether it involves the park as a whole or its individual members, simply noted as so many authorial names. In fact this is a point at which collaboration need have very little expressive effect. These artefacts clearly signify multidisciplinarity: you can deduce that from the names of authors who are assigned to different disciplines. And I was wrong to say they tell us in themselves nothing about interdisciplinarity. In one small respect they do, for they tell you that the parties so named were able to co-author the publication, to 'write' it together.[27]

In talking about these experiments I have tried to reproduce some of the humdrum nature of the practices of knowledge I (have trained myself to) find interesting. On the one hand, this is to cut some of the issues down to size – we have met them already, in other places. This is why I began elsewhere, with the Network Manager, who was to contribute to my Seminar but at that point was wondering what best to say about his work, on which he had been asked to speak. Our conversation turned out in fact to be rehearsal. He spoke about exactly these issues in his presentation to the first colloquium. In other words, the instrumental conversation we had between us then became a description of what he did, an expressive object! On the other hand, I have tried to reproduce some of the humdrum nature of the practices of knowledge to aggrandise them, to put them into a larger context as a fascinating instantiation of the

25 In fact there is deliberate attempt to divest discussion over human tissue or the repatriation of human remains of the language of property.

26 The question of whether a thing has to be named to be owned was raised at Colloquium I of the Social Property Seminar. I note that the issue of information-sharing will be discussed at Colloquium II, and property at Colloquium III, though this is not quite how the rubrics were written.

27 Though clearly the authors whose names appear on scientific articles will be of very different status, and only one person may have actually penned the piece (Biagioli and Galison 2003).

relationship between what are perceived as 'new' forms of knowledge and appropriate social vehicles for their promulgation.

So here, to end, is another effect, though I don't know whether to characterise it as epistemic. Has this happened to you? It has been typical of the few collaborative efforts in which I have been engaged involving teamwork.[28] It is this. The first attempts at formulating a position in company, where everything seems in the future – a working paper perhaps, roughly sketched out – suddenly appears to have been a rehearsal for what is to come, suddenly becomes in retrospect *the* output or product. From looking forward one find one has swivelled round and is looking back. That temporal moment, when what could have been a prelude to the future suddenly appears as one's past contribution, work that has already happened, might be another kind of 'turn' from the instrumental to the expressive embedded in the very practices of working with other people. Is it that the presence of other people speeds up the process of objectification?

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Annexe

Rubrics for the 2004 Cambridge Social Property Seminar. Information made available to participants (adapted)

The seminar is intended to stimulate debate about interdisciplinarity. Its inspiration lies in recent moves both outside and within Cambridge to value collaboration as a special source of creativity, to forge alliances between cognate disciplines, and to experiment across the boundaries of academic disciplines and the performing arts. If the desire for dialogue between the arts and sciences is an ancient one, what is interesting about this moment in time is the *institutional* drive to embed such aspirations in new social forms. Three such enterprises in Cambridge provide the immediate impetus. Each has its own character.

The new Research Centre in Arts, Humanities and Social Sciences (CRASSH) acts as a sponsor and facilitator of projects that open up new fields, enhancing emergent constellations of interests wherever they might be, a galactic or network model of deliberately dispersed activity. The Cambridge Genetics Knowledge Park (CGKP), by contrast, draws numerous clinical, commercial and academic concerns – scientific, sociological, legal, philosophical – in towards its own central concern; this is to contribute to policy formulations in an arena that is very specific to our times – highly complex in its making, and of intense public concern – namely genetic knowledge. The third is the interdisciplinary network called CRUCIBLE, which among other things offers consultancies in interdisciplinary design; along with new collaborative

28 Notably in the research projects 'The representation of kinship in the context of the new reproductive technologies' (1990–1) and 'Property, transactions and creations' (1999–2001).

experiments between creative artists and scientists supported by the AHRB (Arts and Humanities Research Council)/ ACE (Arts Council for England), the two afford design models for getting from debate to deliverables.

Social forms (organisations, networks, alliances and such) invariably evolve according to their own initial conditions and the environments that nurture them; they develop their own properties. Among them may well be a sense of proprietorship. The theme of the seminar as whole is 'social property'. Thus the four colloquia focus on *issues of ownership*. These range from practices of belonging, possession and exclusion, to provisional forms of ownership exercised in transactions and primordial claims to the products of creativity. As a starting point, the colloquia will deal with different models of ownership across diverse disciplines and contexts; alert to changing conventions, its end point could well be some pointers to the role ownership practices play in the formation of new and old (unpredictable or highly predictable) social alignments. The four IDW attached to the colloquia will take each of the specific facets of ownership and attempts to work out its implications for the design project in hand. One intention of the seminar is to create an intellectual field (of discussion) and a set (or typology) of concrete studies against which to assess the *kinds* of synergies sparked off by the CGKP. The topics are as follows:

I. *Ethics, evaluation and observation*. Ownership: identification with a mission? How does one 'own' an enterprise? By acting in relation to its goals (ethics), giving it value (evaluation) and objectifying it through a narrative (observation)? What is the shared narrative of an enterprise such as the CGKP (Cambridge Genetics Knowledge Park), the enthusiasm it generates (how it 'owns' people)? What could be the role of evaluators and observers ('ethnography')?

II. *Incommensurability and scale, comparison*. An owner: somebody with something to transact? Transacting with partners from across different technologies/ commercial interests. Establishing the bases for comparisons of worth. Creating transactable goods. How far can one take the idea of trading zones? The role of commerce in evaluation.

III. *Owners, authors and inventors*. Owners as originators. Creativity and letting go of objects (creativity externalised). Evoking justification of origins. Copyright and patents: models of creativity. Interests in scientific authorship and recognition of collaboration and collective endeavours. Multiple employers/multiple agencies.

IV. *Output, accountability, and 'society' as the collaborative partner*. Can one speak of owners as curators or custodians (of public values)? Collaboration turned into social investment: what is due to 'society'? Academic work, intellectual property and demands from outside. The CGKP and its publics. Responsibility and the creative role of audit. The specific need for output: recognisable deliverables.

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