Extending Contexts, Making Possibilities

A Report on the Arts and Humanities Research Council/Arts Council England 'Art and Science Research Fellowships' (first round, inception date, Sept 2003)[1]

James Leach, King's College, and the Dept. of Social Anthropology, University of Cambridge

[1] This report was funded as part of research commissioned around the fellowships by Arts Council England, and the Arts and Humanities Research Council.

Contents

1. Introduction: Emerging possibilities and the work of the imagination **1**

1.1. Conceptual framework motivating the research behind the report **3**
1.2. Building on the work and knowledge of others – an example of productive collaboration used explicitly to frame the planning of the Scheme **4**
***1.3* Collaboration and Research: Questions of Value** **7**
***1.4* Outline of the report** **10**

2. *Methodology. The work of an 'Attached Observer' to the Arts and Humanities Research Council and Arts Council England 'Art and Science Research Fellowships Scheme.* ***12***
***2.1* Ethnographic Engagement** **12**
2.2 Ethnography, participant observation, and evaluation procedures **16**
2.3 Network Meetings **20**
2.4 Interviews and Fieldwork **23**
2.5 Conference: Description and Creativity. Approaches to Collaboration and Value from Anthropology, Art, Science and Technology **26**

3. Other observations and conclusions emerging from the 'attached observer' process **27**
3.1 Collaboration **27**
3.2 Finances/Institutional **31**
3.3 Ownership **33**
3.4 Two models of working **34**
3.5 Contexts **37**

4. Conclusion **40**

5. References Cited **42**

1. Introduction: Emerging possibilities and the work of the imagination

In 2003,The Arts & Humanities Research Board[2] and Arts Council England (through their Interdisciplinary Arts Department) established the 'Arts and Science Research Fellowships' scheme, with the aim to support collaborative research in arts and sciences. In this report, I refer to 'the Scheme' as shorthand. As the application information related: 'A report published by the Council for Science and Technology on the arts and humanities in relation to science and technology concluded that "the greatest challenges for UK society… are all ones in which the arts and humanities and science and technology need each other… In the circumstances of modern society and the modern global economy, the concept of a distinct frontier between science and the arts and humanities is anachronistic… the relationships between the arts and humanities and science and technology need to be strengthened further….Many of the most exciting areas of research lie between and across the boundaries of the traditionally defined disciplines."'[3] The Arts and Science Research Fellowships aimed 'to support collaborative research specifically between the fields of the creative and performing arts and science and engineering which is likely to have a *wider impact within the subject communitie*s and *beyond*, as well as providing opportunities for individual researchers within the arts to work alongside those working in a scientific context. It also seeks to *explore wider questions about whether and how art and science can mutually inform each other*.'[4] To this end, the aims of the scheme were set out as follows.

• To provide opportunities and support for individuals working in the creative and performing arts seeking to engage in a process of research in collaboration with scientists, thus working across disciplinary boundaries.
• To encourage individuals working in the areas of creative and performing arts and science and engineering to work together creatively on new projects towards the achievement of mutually agreed research aims.
• To enable higher education institutions to enhance cross-fertilisation of ideas through innovative approaches to collaboration between

[2] (AHRB – which was soon to become a full Research Council – the AHRC – in 2004).
[3] Council for Science and Technology, C.F.S.a. 2001. *Imagination and Understanding. A Report on the Arts, Sciences and Humanities in Relation to Science and Technology*. UK Government/Department of Trade and Industry.
[4] My emphasis. These aims have been kept in mind when choosing the material which makes up this report.

individuals working in creative and performing arts and science and engineering.
• To support collaborative research in the creative and performing arts and science and engineering which will lead to advances in creativity, insights, knowledge and understanding of interest and value to the research community and beyond.

This report describes a series of interrelated activities that occurred within the Fellowship Scheme and takes an overview of the process and its outcomes. The inter-related activities within the auspices of the scheme included new research on the social processes of knowledge production and collaboration among the Fellows and collaborators of the Art and Science Research Fellowships. The rationale for including this research as an aspect of the working of the scheme itself, and the methodology utilised (which demanded close interaction with the people and process) is outlined at some length. The report describes and comments upon the organisation of 'exchange and learning' meetings for collaborators on the scheme, and the staging of a major conference (*Description and Creativity. Approaches to Collaboration and Value from Anthropology, Art, Science and Technology*) that brought together interdisciplinary collaborators, social scientists working on knowledge production and processes of innovation, and those with an interest in how ownership regimes and models for recognition and reward figure in processes of creativity.[5] The report returns to the aims of the scheme and evaluates the achievement of those aims in conclusion.

[5] See www.nomadit.co.uk/dnc

1.1 *Conceptual framework motivating the research behind the report: Emerging possibilities and the work of the imagination*

New ways of investigating, thinking, and communicating all build upon previous research led structures which themselves were only imaginative projects at the beginning.[6] Worlds open out before the efforts of people to explore them. Where we choose to explore becomes all important. Although there is always the possibility of a dead-end in any true investigation, it is essential for research and innovation that such moments are seen as aspects of wider processes. The attention to and analysis of one aspect of our interaction with the world makes clear where potential lies in that mode, and promises to open up possibilities we have not yet imagined. Possibilities that could not be imagined in the past suddenly look plausible as these investigations proceed. To extend the spatial metaphor, the territory explored tends always to open out into wider vistas, and on different levels of scale, increasing in complexity, the more attention is paid to it.

During recent years there has been a sense of excitement and therefore increased attention paid to new forms of technology that allow rapid communication, of new avenues for the exchanges of more than just ideas. That is, forms of expression and elements of technological systems - the building blocks, and content, of advancing communication technologies – are now rapidly transferable and transact-able. 'There is an emerging, global race to establish effective, sustainable clusters of IT-enabled creative activity at local, regional and National scales' (Mitchell et al. 2003: 27).

What kinds of possibilities are provided by these developments? How are they related to culture, both in the sense of cultural productions, and in the sense of social systems? How might we look to understand, map and therefore harness the potential of them? More specifically, how might such changes influence the way science research is approached, or the ways in which artists work and add value to society?

[6] Beer, G. 1983. *Darwin's plots : evolutionary narrative in Darwin, George Eliot and nineteenth-century fiction*. Cambridge: Cambridge Univserity Press.

1.2 *Building on the work and knowledge of others – an example of productive collaboration used explicitly to frame the planning of the Scheme*

The contemporary possibilities for collaborative working and value creation are nowhere more obviously demonstrated than in a phenomena which has received much attention from people working at the interface of arts and sciences. That phenomenon is Free/Libre or Open Source software (DiBona et al. 1999; Ghosh 2005a). F/LOSS software is computer software code produced collaboratively by people who donate their time and expertise to making highly functional, highly valuable software products. There are many aspects that catch the attention here, not least some rather romantic interpretations of this mode of working which suggest a utopia based on free information circulation and a 'withering away' of private property and changes to the conception of the self-interested individual as the agent behind economic growth etc. Utopian indeed, but even sober analyses of the growth and importance of this way of producing code have tended to view the development as highly significant. The political scientist Steven Weber, for example, has written recently that, '[b]y experimenting with fundamental notions of what constitutes property, this community has reframed and recast some of the most basic problems of governance' (Weber 2004).

F/LOSS software has significant global and economic importance, and it only works because people are willing to add their contribution to those of others to make a wider whole in which the value of any individual input is magnified out of all proportion to their effort by its combination with others inputs (Ghosh 2005b: 8; Leach 2005c: 38). For the focus of this report, aspects of the organisation and structuring of open source projects are perhaps the most significant background (http://www.cl.cam.ac.uk/CODE/). Non-proprietary or free approaches to creating and distributing digital tools and content have come increasingly into the public eye because the value produced is explicitly generated by many peoples' diverse inputs and expertise, from which all come to benefit.[7]

In other words there is a kind of creativity apparent here which has direct economic benefits, and which apparently proves the worth of developments in Information Technologies for innovative collaborations. The model, or versions of the logic of the model, have

[7] See for example the Creative Commons Initiative, and such offshoots as ccMixter (http://creativecommons.org/, www.ccmixter.org)

been adopted by leading scientists such as Sir John Sulston and prominent members of his group at the Sanger Research Centre, responsible for the first complete mapping of the human genome. This group published the results of their research on the Internet in order that it was established in the public domain, could circulate freely, and be used by and built upon by others (Sulston & Ferry 2003).

There is an interesting inter-fertilization of ideas and practices apparent in the conjunction of interests and disciplinary concerns around notions of collaboration, and building upon the work of others. The model of F/LOSS, where addition to and modification of code allows new applications and expanding possibilities has been understood as a metaphor, for example, of how creativity operates in choreographic practice (deLahunta 2003). The strong version, then, of F/LOSS is as a model: a model for its own success and the successful development of useable, robust and valuable computer code, and as a model for the practice of science, where each individual discovery has a far greater value if it can be verified and then built upon by other researchers (Stallman 1999).

Less immediately obvious, yet highly significantly, the model has provided a guide and a provocation to creative practitioners in the arts. It delineates a way of working and collaborating among practitioners. While there has been inspiration taken from the model as a metaphor for a more open, shared and collaborative process *in which* each person retains their rights over their work while gaining value from the combination: it has provided a reference point for contemporary artists who want to use others images and productions to make work, while also wanting a level of recognition for their own labour and creative input; it is less clear how interdisciplinary collaborators successfully share knowledge, and work together to produce common outcomes. The notion of donating one's work for free for others to make use of and modify according to their needs also presents challenges for many researchers and creative practitioners who need recognition in both social and economic currency.

When it comes to the highly visible and important demand that research should be interdisciplinary, the model of F/LOSS software production may be inspirational, yet it needs consideration. By definition, different disciplinary actors do not share the same spheres of working, or of recognition of their work. Research scientists may be in an (economic) position to make their results freely available as they have an income which is not tied directly to the utility or popularity of their outcomes. Self-employed artists may not be in the same position.

Thus for the much vaunted process of interdisciplinary collaboration to work, consideration was given in the Fellowships to the social and cultural aspects of successful interdisciplinary working to 'open up new creative possibilities' (Mitchell et al. 2003: 2). The emphasis in F/LOSS on alternative models and practices of ownership over knowledge was vital background to the research around the Scheme.

1.3 *Collaboration and Research: Questions of Value*

With collaboration obviously at the heart of what drives value forward in the 'information society' and the 'knowledge economy', the Fellowship scheme addressed the question of what *are* the possibilities for bringing together radically different approaches and ideas (Ghiselin 1952) and thus exploring 'creativity'?

If the old productive models for research, design and implementation have been successful, this is because they have adapted and changed to fit new circumstances, and moreover, have been able to incorporate change and dynamism. When a new discovery in science spawned new hypotheses, investment and energy were poured into infrastructure and research time in order to test the validity of that hypothesis. Once knowledge has been made robust in this way, it is put to many uses. These uses become quotidian, 'naturalised' one might say. We start to take for granted, for example, that radio waves can carry information, and that we all have receiving devices for making that information available. In fact the technology, and certainly the science behind technology, becomes almost invisible to us. Social consequences and possibilities emerge on the back, as it were, of this process of naturalisation. And we live now in a time when, as we are repeatedly told, what will become naturalised and quotidian is the rapid exchange of information, ideas and forms (Broers 2005).[8] But this suggests that exchange, networks and connections between people; and *collaboration*, must also be re-emphasised as the purpose and value-generator *behind* the technology. What social norms and precedents will such developments take place under?

As Bronac Ferran has articulated clearly (2006), the time has seemed ripe in recent years for research into the possibilities afforded by new forms of collaboration. Manuel Castells has argued in a number of writings that the new information technologies have transformed global society as radically as the industrial revolution of the nineteenth-century (see also Ascott, 2000). In what he dubbed the 'network society' he identifies one of the major effects of these technologies as the forging of new networks. Among other things, these networks reconfigure labour relations, politics and economic activity (Castells, 2000). There is little doubt that new possibilities *and*

[8] Sir Alec Broers. 2005 Reith Lectures: The Triumph of Technology, esp Lecture 2 'Collaboration'. www.bbc.co.uk/print/radio4/reith2005/lecture2shtml?print

new dangers (Vaidhyanathan, 2001;Lessig, 2004) for exclusion are part and parcel of current trends (Ghosh, 2005).

There are two main areas in which the AHRC/ACE Fellowships have contributed to work around this contemporary set of concerns. One is in promoting novel collaborations in the hope that new and interesting pieces of research will be produced. The other is in generating an overview of how the process itself can be treated as a form of research object. What vistas and possibilities have been opened up by the sustained attention to collaborative and cross-disciplinary relationships? Where might we want to lead the process in order that, if it is productive as a mode of engagement, it becomes everyday and mainstream?

The first questions are about whether such a series of collaborations is productive. But that is a complex question in itself, depending on where one sees value. Because if the scheme is as radical as it appears, then maybe there is no ready context available in which to slot the outputs, and thus see them as having a simple utility. It is for this reason that the title of this report is 'Extending Contexts, Making Possibilities'. The second (set of questions) are about collaborative work in itself, and how and why they might produce new and novel outcomes. The scheme is responsible for defining and opening up future areas of potential value, and this report is an attempt to describe some of these as they emerge in order that they might be recognised *as* value creation.

The scheme is one of several initiatives that look to address such questions. It has pioneered possibilities for ways of working that others are already using as a model. In fact, the work of the Interdisciplinary Arts Department at ACE has been a catalyst for change in the Research Councils, many of which came to regard the possibilities of these kind of research led collaborations between arts and sciences as a fruitful area for funding.

Research funding is a dynamic area, and one of the new territories that has opened before Research Councils because of developments in social and technological systems is in this interdisciplinary realm. One of the Fellows on the scheme's wrote as part of his reflection upon his collaboration that creativity is an outcome of 'radical pattern recognition' (Alan Wall: n.d.) What patterns are common to both art and science? What innovative forms can be envisaged and built from the possibilities provided by the wealth of patterns and material in both? My observations lead me to suggest that it is because of the

very basic workings of current technological change, reliant as it is on *digital* systems, that the growing perception of correspondences between art and science arises.

Merely by re-describing the basis of complexity as something reduce-able to mathematical symbols, and ultimately to a common underlying reality of binary, digital structure, possibilities that were previously unimagined are emerging. As a social scientist, the author of this report would point out that the work of investigation, and description of what is found, is not separate from the generation of the investigative form itself. An autopoeitic process (Biggs & Leach 2004) may be apparent here in which as actors investigate the world in terms of its deep structures, we make our own world resemble more and more closely this imagined idea of what actually exists beyond us (Leach 2005a). More functional and effective interventions in the world through digital technologies tend to encourage our perception of the world as *already* structured in this way (Nafus et al. 2006). Thus investigation, where we put our exploratory energy, can truly be seen to both open new vistas, and in doing so, rationalise an approach that began as only an element of the imagination.[9]

[9] For a discussion of how 'fictions' become 'truths' through this process of description and iteration, seeBeer, G. 1983. *Darwin's plots : evolutionary narrative in Darwin, George Eliot and nineteenth-century fiction*. Cambridge: Cambridge Univserity Press, Strathern, M. 1987. Out of Context. The Persuasive Fictions of Anthropology. *Current Anthropology* **28**, 251-281.

1.4 *Outline of the report*

In what follows, I begin with a detailed description and justification of the methodology adopted in this research. This is because the research (as framing, as context itself, and as a medium for communication between project participants) was a central element in the success of the first round of funding. Following this, short statements about each of the funded projects will allow the reader to grasp the range, and indeed the interest encompassed, by the Scheme. This feeds into a discursive section in which various aspects of the working of the scheme are pointed out and re-described from the point of view of an observer with a brief to consider the social and cultural context and how this influenced the outcomes. That is, substantial points gleaned from fieldwork and observation, points about the internal workings of the scheme as an institutional development, and how this effected the kind of communication and collaboration possible, are elaborated. Observations and distilled points pertinent to the conception, execution and outcomes of the Scheme follow, and notes are offered on certain moments or events in the life of some of the projects.

The main focus for this report in terms of input for future planning comes in the form of comments upon context. This is both the context provided by aspects of the scheme itself; by the conceptual and material structures, the role of facilitators, institutions, and social scientists. Secondly the external context of funding and reception, disciplines, and spaces in which art is shown are considered. As indicated already, one of the main factors that made the Scheme exciting and innovative is the fact that there is no obvious context, or site, for the reception and valuation of outputs. While an advance in science may be an outcome, or the production of a new art work, seeing the outputs in terms of these existing categories makes us consider whether such outcomes could have been achieved in more conventional ways. There is a value for money issue here (although I conclude that in this case, work has been produced which would not have been otherwise possible, and that indeed this has been produced at minimal cost.) But a question should also be asked about whether the scheme aimed to contribute to one side or the other of the disciplinary divide, and if we are content with this model. In order to bring some order to the multiplicity of possibly observations, I look to abstract a couple of simple models of collaborative working from the processes I observed, and discuss the kinds of output and value which might be achieved from each

The report concludes with a focus on positive outcomes, possibilities that have been opened up for future work and research, and some tentative ideas about what kinds of project seem to work.

It is important for the reader of this report to realise, however, that observations informing description of the process permeate the whole of the report. Conclusions and observations are not brought together as a single section, but inform the text as a whole, including what has already been said.

2. *Methodology. The work of an 'Attached Observer' to the Arts and Humanities Research Council and Arts Council England 'Art and Science Research Fellowships Scheme.*

2.1 *Ethnographic Engagement*

A major objective of this programme of research for the 'Attached Observer' was to develop understanding of the process of creativity in relation to the 'ownership' of outcomes. What impact does the differentiation and specialisation of disciplines have on collaboration between them? A part of this question was to evaluate collaborative work across disciplinary boundaries. As set out in section 1.2, because of the innovative nature of the collaborations, the scheme, and indeed, the open and experimental space made available for emergent outcomes (which was integral to the scheme's conception), required that notions of value, and the measurement criteria used to judge value emerged from within the process of making and observing itself. In a very straightforward way, this document amounts to a description of the process of value creation itself. And as that value was explicitly not specified in advance, part of the task here is to divine where it lay.

It is this aspect that has been the specific contribution of having an anthropologist undertake the research. For the strand of contemporary anthropology in which I have been trained, and of which this report is a part, takes *ethnographic engagement* as its mode of knowledge production.

Ethnography is a technical term developed by social and cultural anthropologists during the last century. As might be expected in any discipline, different practitioners have different approaches to their core theory and methodology. For readers unfamiliar with ethnographic work I highlight some of the salient points of ethnography as the epistemological vehicle through which I have made my evaluations. Although ethnography has been appropriated into other social science disciplines as shorthand for detailed observational work, in the original sense used here ethnography additionally implies both an interpretive epistemology, and reflexivity. Recently, in industrial design contexts (for example) ethnography has come to mean something akin to market research. But I use the term in a specific sense that is not amenable to such simplification.

'Ethnography' in this report (and its spin-off 'attached observation')[10] refers to a process whereby an observer participates within the overall context of specific social actors' endeavours in as thorough and long-term a manner as possible. The purpose here is to actually think oneself into the position of other people, embedded and engaged as they are in a series and network of social relations, which in turn reciprocally structure and are structured by a network of conceptual relations.

This was not the first time I had undertaken 'fieldwork' among artists and scientists engaged in collaboration. Indeed, working on a pilot for this scheme[11] in 2002-3 clarified my own interests in how ownership of knowledge effects collaboration in contemporary UK society. As an anthropologist with experience in charting how people's ideas about their connection to the objects they produce and transact inflect production itself, my involvement has thus been over a number of years to date.[12]

What prevents the observer 'becoming' one of the people under study is the need to maintain analytic distance. Traditionally in social and cultural anthropology, this distance has been given by the position of analyst in possession of a theoretical apparatus that lies outside the frame of reference of the social actors themselves. The contemporary strand of ethnographic work to which I have referred takes a slightly different line. And that is, analytic distance is provided by previous experiences in being embedded in (other) social and conceptual worlds. In my particular case, this means the two and a half years of fieldwork, and subsequently five or more years of analysis, on generative and creative social processes in rural Papua New Guinea (Leach 2003). On an abstract level, this 'other place to stand', or perhaps, more accurately, these other conceptual resources, allow the observer to see underlying principles and assumptions which structure the interactions and outcomes of social relations, principles which the actors may only be vaguely aware of, and which they may not

[10] A term coined by Bronac Ferran and myself in May 2003 to describe the particular role I was to play in the scheme, a role which combined observation and analysis of social processes with real time input to both the structuring and working of the scheme overall, and also specific real time input to several of the projects taking place(becoming a collaborator myself, in other words.

[11] See www.junction.co.uk/ntaf

[12] and see Leach, J. 2005a. Being in Between. Art-Science Collaborations and a Technological Culture. *Social Analysis* **49**, 141-160, —. 2005b. Disciplinary specialisation and collaborative endeavour: some challenges presented by sci-art projects. In *Creativity and Practice Research Papers* (ed.) W. Gunn. Dundee: Creativity and Practice Research Group.

consider there to be alternatives to. There is a strong rationale for this particular move, which has recently been characterised as 'distinctive as a way of doing ethnography in its insistence that theory be made out of materials that one finds in the same place one finds one's data' (Robbins 2006).

The classical period of British Social Anthropology (from the 1920s until the 1960s) took its task as analysing social worlds through various kinds of theory produced in the academy, not in the field. Ethnography then came to be the material whereby social scientists could examine the validity of their theoretical abstractions. We studied 'others', defined as such in part by their distance from the academy. In turn, material collected during ethnographic fieldwork was made comprehensible through the application of this (externally generated) theory. There has always been the potential, however, to learn more directly from ethnographic engagement itself. That is, as I mention above, to develop a position on one social and conceptual world by looking at it, analysing its workings, through the abstracted principles of another social and cultural world (Strathern 1988).

A reliance on theoretical models imposed from outside has clear limitations because there is no 'outsider' to social and conceptual worlds. Such a position must always be a fiction. Not necessarily a dangerous or damaging one, but nonetheless, it seems equally plausible as methodology to take the observers inevitable embedded-ness within social relations as the starting point for analysis as a fiction of detachment. Our theory was not seen as a part of (our) culture, you might say, but could be used to analyse other people's culture as if it allowed objective revelation of underlying human truths.

One has to take some things for granted in order to ask any questions. The 'underlying human truth' in my approach is a *methodological assumption* (see Gell 1998: 4-5). This is that social relations are everywhere fundamental to forming our perceptions, understandings, and creations, that these relations are always particular, and thus human social worlds are potentially infinitely variable. Nevertheless, the commonality of relationships themselves, conceived in the complex whole that is the inter-relation of the social and the conceptual (in fact, their inseparability) allows one to gain knowledge of any social world through entering into those relations oneself, and then reflecting upon them in their variation. Social Anthropology is thus a fundamentally comparative endeavour. The commonality here then is in how we can suitably approach human social creations: and that is, by an analysis of the inter-relation of social and conceptual networks

which give form to the reified moments of creation or formation which we call cultural production.

Unlike survey data, where claims to generality can be made via mathematical operations, generalising from ethnographic work is done via interpretation as in the humanities. The strength of ethnography is in identifying assumed positions and concepts, but it is important to emphasise that this does not mean that its significance is limited to the cases it studies. Instead, interpreting what the researcher observes and experiences involves drawing out the connections between the field site and the models produced by other researchers in other locations (Strathern 1999).

2.2 Ethnography, participant observation, and evaluation procedures.

When theory is perceived as existing outside, and determined prior to, the interactions of ethnographic engagement, there was always a fear that the data would be tainted by the observers own input. To have data for the theory to work upon, it had to remain separate, in the model of the scientific method. However, this is not a concern in the model of 'attached observer' for the following reason: our subject and our method of gathering data are one and the same. That is to say, social relations themselves constitute both our method of gathering our research data, and the material which we analyse (Riceour 1970; Strathern 1988; Weiner 1995). There is no data collection possible in an ethnographic mode that is not already an engagement with the people themselves. To actually give oneself the chance to think with other people then is the promise of ethnography. But not in a naïve way. Thinking with people is to bring one's previous understandings and perspectives to interactions in order to reveal, through reflection upon those interactions, principles that facilitate certain kinds of conversation and understanding to be generated, and which obviate the possibility for others. It is this 'situated' reflexivity, a reflexivity that is wholly about interactions and relationships, not about oneself as an isolated entity, which is the great value of the approach.

In the instance of this research, that specific value was particularly apparent. The scheme was a novel and innovative moment in itself. As such, there could be no sensible imposition of a exhaustive series of measurements or criteria that would determine success. One was not sure what success would look like, and that was built in. In fact, the measurement of value, and the evaluation of success *necessarily* takes into account the value that the participants see in the scheme, how it feeds and assists their concerns, interests and objectives. And that was an *emergent* series of values.

So ethnographic work here amounted to working with people, thinking with them, and understanding *at the same time* something of the way in which value was emerging from the relationships themselves for the participants. It *included* the wider context of value measurement in which this scheme was located.

If method and theorisation are part of the same dynamic of social connection, the scheme needed to be given a form in which interactions between all the elements, including the facilitators and designers of the scheme, the attached observer, the wider academic

and artistic context, and participants' experiences, interactions and desires, were taken into account as valuable nodal elements. To this end, convening and facilitating a 'teaching and learning network', and an experimental conference, were part of the work of the 'attached observer'. Direct input then, rather than external observation, was a key part of the 'research'. Much of the outcome of the research existed in the interactions themselves, and not in conclusions which make a weighty report.

The work thus took place at several levels at once. From detailed observations about two collaborative partnerships, to wider surveys of attitudes and approaches from a wider sample. The mechanics were undertaken as follows:

- over-night research visits to each of the projects for interviews/discussion of questions including
    - communication and translation aspects of the projects
    - how the value of knowledge is made apparent in the space between disciplines
    - where and when value becomes embedded
    - how collaborative outcomes are negotiated

Structured and unstructured interviews were employed here as methodology. These interviews focused upon

- the progress of the collaborations
- ease of communication between collaborators
- ownership and property in the context of inter-disciplinary work
- ideas about creativity in relation to the scheme.

They were designed to ascertain the nature, progress and potential outcomes of the collaboration. Particular focus was on the interaction of disciplinary specialists and thus of kinds of knowledge. These were tackled through questions about issues of ownership, belonging, and the valuation of aspects of the emerging partnerships (i.e. object outcomes, knowledge outcomes, networks and relationships, learning experiences and so forth).

Observations over 16 projects facilitated tracking between levels and scales: from the micro observation of actual research interactions between particular artists and scientists, to the embedding of these observations in a wider understanding of the collaborative processes as they emerged. Data gathered in this phase was used to contextualise the specific observations of the more detailed fieldwork with two projects based in Cambridge.

The two projects subject to detailed observation were very different, although sharing some common elements which I will suggest below make for successful outcomes (longer term engagement than the funded period, a facilitator taking an active and interested role in the research process itself). The first was Choreography and Cognition, an ambitious collaboration between the Choreographer Wayne McGregor (Fellow) and five psychologists drawn from several universities. The second involved research into a material (a silicon elastomer) at the Cavendish Laboratory in Cambridge.

There were limitations to this method. Ethnographic fieldwork usually entails a much longer period of time spent with informants, and ideally is not based upon meetings in the workplace alone. Spending time socially with the participants of several of the projects, specifically including the two based in Cambridge, assisted here, as did the understanding that the ethnographic engagement was with the scheme as a whole, as it were. There has been a long term and sustained series of relationships which has made something of the overall context visible through long term observation and interaction with organisers and their wider networks. This report is not about any specific project, but the overall scheme. Indeed, the Evaluation/Report is to be necessarily considered as only a part of the value added by the process of undertaking the role of 'attached observer' .

What became clear from the fieldwork on the Fellowships was that the very presence of an ethnographer, and one asking questions at a tangent to the actual concerns of the collaborators (that is, I was not evaluating or judging their work for its outputs) was in itself providing a useful external reference. The very different kinds of work collaborators were engaged in were given a wider context: that of an investigation into the very workings of collaboration. The third position provided by my experiences as an anthropologist who has worked on knowledge production and transaction in Papua New Guinea cast the value of the interactions in a light that itself opened up possibilities. And that in turn allowed the scheme a coherence, a reason for putting diversity together, which many participants cited as significant.

What then were the mechanisms for engagement and learning which were both an aspect of the research, and an output from it? Firstly, with the inspiration and encouragement of the Interdisciplinary Arts Department, a network of fellows and collaborators was established. Importantly, this network was based on face to face meetings, a combination of intense discussion and the sharing of experiences and

ideas, and on unstructured time over meals for participants to follow up their particular interests. The possibility for utilising recent social scientific practice, as described in sections 2.1 and 2.2 in order to better facilitate, reflection upon, and support, collaborative working relationships was seized upon. By facilitating 'Network Meetings', and structuring them to both provide assistance and support to the individual collaborations alongside insights into the obstacles, success, and execution of the projects, an overview emerged for the participants themselves.

2.3 Network Meetings

Two meetings were held in Cambridge to allow the ACE/AHRB Fellows and their collaborating scientists to form an exchange and learning network. They were successful in forming a productive network of research and information exchange. The meetings also aimed to provide a context in which support for the collaborative process was provided at a number of levels. This support was focussed initially on understanding and developing models for the attribution of credit in the schemes, that is, thinking about Intellectual Property in non legal or formalistic ways to encourage consideration and good practice among collaborators, focussing on knowledge transfer and mutual learning experiences. Secondly, support was provided in the form of discussions of specific projects aims and methods from which other participants drew both reassurance about their own working, and inspiration for their continued collaboration. Descriptions of effective collaborations were central here.

The further aim to these meetings was to form launch pads for the development of a condensed description of the creative processes in the various fellowships. These descriptions, and the process of their production, laid the ground for some of the Fellows and collaborators to present their work at a major conference with the title 'Description and Creativity' held in July 2005.

Meeting 1. July 2004.
This meeting fell around 9 months into the fellowships, once the working practices of the collaborators had been established.

It had three main elements, and the overall aim of facilitating communication, building a learning network, and fostering further collaborative relationships. To this end, the meetings began with an informal evening in which dinner was provided. The following day contained the business of information exchange. A series of issues or questions which participants were given to participants which revolved around the value of different contributions and the attribution of value within and beyond the various disciplines that participants had experience of. The intention was to encourage conversations about the progress of the collaborations that all participants were able to benefit from. It was also a forum for discussing the work that had been undertaken by the collaborators, and both focussing their minds on what they had achieved, and providing feedback. To this end, each collaborative group was asked to briefly present the work they were doing to the group in the morning. During the afternoon, a couple of

projects selected by the attached observer gave slightly longer presentations on ownership models and attribution within the collaboration.

The meeting went extremely well, mainly because of the focused and lucid presentations from the participants. There was a high level of intellectual engagement, reflecting the very high quality of the work being produced under the scheme. It was evident that on many levels the collaborations were going well. Particularly notable points included: interesting collaboration methods, diversity of approaches, the variety of outcomes, discourses of joint authorship and joint production and how these figure in institutional structures and public perception. There was a useful discussion which assisted participants in locating places that have a remit to receive the kinds of outputs that the fellowships were producing. Focus was also usefully directed to the languages used by collaborators, and how languages have changed during the projects. The role of the vector or mediator/ information carrier, or indeed attached observer/facilitator were also discussed at some length, with a formal published output and practical suggestions recorded for this role (deLahunta 2006). Other topics which emerged as of interest to participants were the issue of 'Good art' being based on 'bad science' (and vice-versa) and what implications that might have, particularly on how science gets represented in the Scheme. A significant discussion took place on the differences in kinds of art, and how this affects the collaborations that are possible with scientists. Differences in scientific disciplines were also pointed out, and how they can effect the possibilities for collaboration.

Meeting 2: September 2004
This meeting built on the experience of the previous one by taking on a single issue: the articulation of the *value* gained by working in an specifically interdisciplinary collaboration. This then lead to a discussion of the future of the scheme, articulating its value for participants and the possibilities for similar funding initiatives.

Participants talked about the value of the work as they experienced it. In doing so, they were encouraged to look beyond the technicalities of individual projects, and situate them in a wider arena. The answers to question of value were arranged around four thematic areas or contexts.
'How would you outline the value of the project you are involved in to the following groups of people?'
1.Society/General Public
2. (other) artists

3. (other) scientists/technologists
4. Funding bodies and Government. agencies.
Participants were encouraged to form small groups to discuss responses in each area in the morning, and then given ample time in the afternoon to hear them elaborated and discussed.

What was achieved with this structure was to focus collaborators minds on the future possibilities for their projects, and also for potential new ones. It also meant we considered, as a group, the value and use of the scheme as a whole, and begin to translate interest, energy and enthusiasm into a specification of outputs at a level above the individual. It highlighted for them the importance of context, reception and effect.

The network meetings then, and its resultant 'network' gave fellows and collaborators a context in which to realise their connections. People's interest was piqued by the relation to Papua New Guinea. I always introduced my presence and questions, and our meeting, with descriptions of other kinds of creative process, and of collaborations based upon different assumptions about appropriate attribution and reward, drawn from previous work in PNG. It says much for the quality and energy of participants that they engaged with this work in a reflective manner.

2.4 Interviews and Fieldwork

Undertaking interviews with participants was based on a series of questions (set out below). These questions were used as starting points for discussion, and in all cases, follow up questions and dialogue was crucial. It was also crucial that the attached observer situated himself and his work, so that interlocutors understood the impetus behind, and purpose of the research, and also why questions were focussed on notions of collaboration, exchange, ownership of knowledge and creativity. Thus I prefaced each interview with a little of my own background as an anthropologist with published research on creativity and collaboration, and on the ownership of knowledge, in a very different social and cultural context to their own. There was a palpable sense of reassurance shown by most of the interviewees who both feared a rather impersonal and critical 'audit' of their project (and were pleased to find this was not the intention) and were interested in the work I have done in its own right. This latter element is testimony to the high level of interest and engagement shown by all the participants on the scheme that I met. I also assured them of the anonymity of their words, should they wish for it.

The basic template for questions was as follows. Interviews and resulting ongoing conversations rarely took less that two hours, and on several occasions, began a dialogue which took many more hours, and was continued through letters and telephone conversations after the first meeting.

Guiding Questions:

1. Please explain your own work, and provide some examples.

2. What are you doing here together?

3. How did you come to this point?
What are the previous connections?
How did the mutual interest come about?

4. Mechanics of the collaboration? How do you go about it on a daily basis, how much interaction and co-work? How much time have you allocated?

5. How much has each of you had to learn? How easy has that process been?

6/7. Successes in communication? Insights gained etc?

Problems, hindrances? Practical, person, intellectual, institutional?

How important is the individual approach? The disciplinary approach?

8. Desired outcomes – of what kind? Where will they have their impact?

Projected outcomes? Things in pipeline? How do these relate to ideal objectives? Where will they be displayed/made known?

Has there been a direct input from this collaboration into your own research work?

9. What is the value of the other collaborator's expertise in your own work? How has this been realised?

Have you seen your work/ideas misinterpreted? Used? Misused? How does that feel?

10. General questions on art and science.

Could you characterise each endeavour for me?
Differences? Similarities? Promise from the combination?

Why might they combine? Common factors that underlie both and make them compatible, or not?

Are you doing art or science?

11. Anything about the political/institutional context that you want to add, that you feel strongly about?

12. Creativity. Where and how does it figure in science? In art? In their combination?

These questions were then supplemented as appropriate with the following areas of interest made explicit:
Communication and translation between collaborators as disciplinary representatives, and as people (if distinctions could/should be drawn).
How the value of each other's specialised knowledge was realised.
Is there a space between disciplines? How have you become aware of that space?

When and where have collaborative outcomes appeared? How are they negotiated?

2.5 ***Conference: Description and Creativity. Approaches to Collaboration and Value from Anthropology, Art, Science and Technology.***

The conference offered an opportunity for Fellows and Collaborators on the ACE/AHRB scheme to translate into a new context what they had achieved. It offered a chance to consider new working relationships and new kinds of description of those working relationships. It was a well attended, international event with prominent academic speakers, artists and technologists on the program. The conference, apart from advertising and showcasing some of the projects supported by the Fellowship Scheme situated them within a wider current discourse about knowledge production, creativity, and interdisciplinary working. It encouraged collaborators to reflect on their working processes and outcomes and to compare those with other concrete examples provided by other delegates, and also to see their work recognised and valued by influential social theorists. In a strong sense, the conference and the working towards it provided a wider research context in itself. As a public event, it made available to a much wider group the value of the network of projects and people that had been formed. It thus served, in the context of the Fellowship scheme, as a focus for exposition of certain projects, a focus for a common outcome jointly produced by collaborators other than their art or technological output, and chance of visibility. Being situated in wider trajectory of research, of current trends and interests in wider academia served as a culmination point for the fellowship scheme from those who were involved. For more information on the conference, please see www.nomadit.co.uk/dnc

3. Other observations and conclusions emerging from the 'attached observer' process

3.1 Collaboration

In many cases, fellows and their institutional hosts or collaborators had known one another for some time prior to their current project. Indeed, willingness to work with the artist fellows was in many cases built on the fact of previous work together, applications were made on the basis of long-gestating ideas and previous experience of each other's approach. In some cases the relationships had been for many years, in others, only a couple. 'Track record' was often cited for people's willingness to enter into these relationships, and trust between collaborators, built up over years, was often cited as important. It seems significant that in so many cases, teams were already established, with the funding call providing an avenue for work they had wanted to do for some time.

Another aspect of this was that scientists were often impressed by the dedication and personal commitment shown by the artist, and this was crucial in their acceptance of them and willingness to collaborate. In several cases, it was the willingness of the artist to engage, initially without funding, to show interest, and thus to stimulate the scientists, which meant they were willing to devote time and energy to the application and project.

Many scientists emphasised the importance of the personality of the artist in deciding to work with them, and for the success of the project. Many spoke of how engaging the artist was as a person, how persuasive, hard working etc. They also often made a point of their organisation skills.

On the other hand, personalities caused difficulties in some cases. The positive benefits of having a very dynamic and even demanding artist as the instigator and agent in the project meant at times hosts felt they were having to deal with unrealistic expectations and demands on peoples' time and resources.

Being 'very focussed on the creative process' thus had both positive and negative outcomes for the collaboration. There was one rather extreme case among the projects of personality and approach causing tension, however, this was interestingly one of the few projects in which the artist and scientists were new to each other. Problems were many, but revolved around the desire of the artist to free himself from

institutional constraint, objections that grant money was being shared with the host institution. In that case, there were also difficulties due to the(scientifically) controversial nature of the artists ideas. He explicitly wanted recognition as a scientist as well as artist.

One general observation here is that problems occur when one party to a collaboration tries to pre-empt and take over the role of other collaborators.

The process of writing the application itself was a very significant moment in many of the collaborations, both in establishing the approach and objectives of the project, and also as a time of intensive co-work and negotiation which set the foundations and tone for the activities during the funded period.

Interestingly, many of the scientists involved also thought of themselves as artists, or had a painting as a hobby. None of the artists whom I interviewed or observed seemed to feel threatened or defensive in any way over this.

The interests and the personalities of the scientist and hosts were equally significant. In a large number of the projects, scientists described the central importance of their desire to communicate science to others. Their enthusiasm not just for their work, but for publicising it and educating people, was clearly vital to their wiliness to engage.

It was also often repeated (most likely because of my emphasis on the ownership and transaction of knowledge and on collaboration) that scientists have what was described as 'a helpful ethos' and as 'a culture of collaboration'. In a few cases this was to be understood as in contrast to their image of the artist as a lone figure, reliant wholly on their imagination and internal capacity. Several people thought that value in the scheme lay in the chance for misperceptions such as these to be overcome on both sides.

In several projects, and rather undermining the sense of this collaborative culture, the presence of the artist worked as an effective catalyst to bring research groups together and understand better what each other did. That was cited in several projects as a major source of value.

It was often repeated that the scientists involved were not getting any benefit for their core research work in science as such from the

collaborations. Yet that was not true at all for scientists in other projects. Below I will elaborate on two projects in which scientists did find benefit directly for their own research.

The wide variety of projects was one reason for this variation. Some explicitly concerned themselves with illustration or demonstration, commentary or a revealing perspective on the scientists and scientific knowledge which they engaged with. These tended to be projects where a young artist engaged with a large team of experimental scientists who were led by an enthusiastic communicator with a desire to popularise or disseminate their work. In the majority of these projects real value was seen by the scientists in what they learned about presentation, about imagine, in some cases about the history and assumptions of their practice in general. Not adding to the actual progression of scientific knowledge was therefore not a problem (and was expected rather) in such cases.

Several of these scientists also expressed frustration with the structure of scientific careers which meant they were taken progressively further away form the actual 'bench science' which they loved, and into more administrative and bureaucratic roles. The fellowship scheme gave them a welcome alternative to such activity and provided refreshing stimulation.

For younger members of large teams of scientists the value of the interactions with the artist were more straightforwardly educational in a broad sense. Several expressed appreciation for learning about how an artist works, for the skills in visualisation or software, for example, that they brought, and even for the way the artist rendered the information they were being given as a step forward in the possibilities for thinking through the material these people worked upon on a daily basis. One project (Extremities of Perception) made the metaphorical basis of language used in science a central focus. Several people in other projects expressed the value the collaboration had for them as being given new metaphors to think through, and thus new possibilities for exploration made apparent. This aspect should be seen as a core source of value running across all the projects.

Concerns were expressed that because of the often critical nature of science practice, and the need for complete accuracy in specifying and describing physical processes, that artists were likely to feel inadequate. This however did not seem a common experience. There is a cultural or entrenched institutional attitude here through which is worth mentioning. 'If I look at science and I don't understand

it, I don’t doubt the quality of the science. If I look at art and don’t understand it, I do doubt the quality of the artist’, as one collaborating scientist put it. That is, there is a tendency to trust the objectivity of science and give it value for exactly that reason. This attitude often does relegate art to a secondary importance in the view of scientists, and undermines the possibility for equal exchange.

3.2 Finances/Institutional

There was some disappointment expressed by several people over their University's failure to take on board the significance and potential of the fellowships they were hosting. That is, they saw huge potential for the communication not just of science, but of an aura of exciting, challenging and cutting edge research, through reference to the scheme. This was part of a wider perception apparent from all whom I spoke with, that the scheme and its aims were both amazingly innovative and exciting, and thus potentially a great resource for the institution in which they worked. One thought more should have been made available in the budget for the communication and display of the projects.

Almost all the hosts said that they had committed resources from their own budgets to the project (many said they would not want this to be known specifically). As a sign of commitment and interest, this must surely be taken very positively. However, there was repeatedly a sense that much more time and input was required than could be budgeted for in the application if the project was to produce a meaningful result, and that scientists, particularly those who led large groups, were contributing resources from other areas in order to make it possible for projects to come to fruition. While this demonstrates commitment, it is not necessarily sustainable as a policy.

Many of the scientists were clearly contributing not only resources but also large amounts of time, not foreseen in the budget or application, to the collaborations. That these additional burdens could be borne perhaps results from the high levels of support afforded to science in current institutional structures, yet the sense was that the level of additional input required from many meant the collaborations were a temporary and probably unrepeatable experiment. This aspect could be addressed in future through more emphasis in the application literature of how much the scientist is likely to have to contribute to make a successful project.

Some saw the rigidity of the structure of funding as a cause for concern and difficulty. That is, as emphasised elsewhere in this report, deliberately open ended investigations such as the projects targeted under this scheme are by definition unpredictable. In several cases, as the teams worked together, they found new possibilities opening up which they wanted to pursue. In some cases this was not possible because it required employing a different kind of expert, or using the designated budget in some other way than had been specifed at the

outset. While funding bodies were given credit for being flexible over timing, there was apparently less flexibility over how to allocate funds once projects were up and running.

Innovators need to communicate and to receive feedback on their work. One aspect of the fellowship scheme which all commented positively upon was the way projects were brought together and given an overall context by the work of the attached observer, the network days, and the conference. One expressed it as fulfilling the need for a peer group.

This relates to another aspect very clear in the Scheme as a whole – the role of facilitators in the process of collaboration. Although not all projects had such a figure, those that did clearly benefited. Facilitators in these cases were interested third parties to the main dialogue between Fellow and host. They had expertise and interest in both sides work, and acted to ensure not only the practical needs of each were met through structuring meetings, adding guidance and advice, and drawing in additional experts or even funds. They also acted in their own right as translators, catalysts and drivers of the process. For a modest and insightful discussion of this role, see (deLahunta 2006).

The scheme, although generous in its funding and timescale as far as arts research projects go, could perhaps never be long enough to see all its consequences and outcomes appear within its time scale. Many of the participants spoke enthusiastically of how ideas and approaches were available to them now which may well bear fruit at a later date and in unpredictable ways. This should be understood as a success of the project, even if it is not one that is easily quantifiable.

3.3 Ownership

Issues and conflicts over the ownership of outcomes was not a major aspect of the experience of collaborators. This in part was due to the fact that the application form asked teams to say how they would treat intellectual property and the ownership of outcomes produced. However, IP issues may be more than 'content'. That is, digital creations made by one artist required a particular machine bought from the project budget to run successfully. The University claimed this machine after the project ended, leaving the artist with a perception that her work itself was being appropriated, or rather, that she would not have effective control over the outcome of the collaboration because she did not have the hardware to store and execute the files. The institution had clear contract, anything coming through hardware belongs to University.

There is a vital element in these collaborations: good will. The artist does not always see infrastructural contribution that allows artist to take part.

There was a feeling, perhaps borne out by observation across the projects that certain areas of research are more apt for the kinds of collaboration supported by these fellowships than others.

Imaging the results of science in various ways was common in the projects, with in several cases, those images showing possibilities for either new research avenues, or new pedagogical and communicative possibilities.

Music and mathematics 'already have a tendency to interact' and were thus seen as compatible.

Virtual environments, and interactive environments based upon new media and new technological developments were also seen as a fruitful avenue for collaborative research involving artists and scientists.

An overall impression of the fun, excitement, stimulation and pleasure almost all took from their work in the scheme emerges strongly from the fieldnotes.

3.4 Two models of working

Choreography and Cognition
This was a project organised by an experienced arts researcher, and carefully managed by him as a kind of professional facilitator and go-between. It is worth pointing this out.

This project brought together psychologists, neuro-scientists and the innovative choreographer Wayne McGregor and his dance company. Sessions and meetings took place in both scientists laboratories, and in the dance studio. McGregor had a clear aim in mind. His established method of working is to expose himself to a lot of stimulation, often through forays into various disciplines, and then make his dance pieces as a kind of reprocessing of his impressions and understandings. He had already signed up to make a piece called Ataxia, and the collaboration with five very different psychologists was his research period for the piece before it was made.

Each psychologist was given the opportunity to join in group discussions, observe dance material being made, talk with Wayne and his dance company and plan investigations if they so desired. Some of them used time allocated to them in the overall structure to perform experiments: motion capture equipment was used by one pair to investigate motor control. Others asked dancers to perform movement tasks while also speaking, or reading, etc. to generate data on which parts of the brain control which kinds of activities.

The project was widely seen as a great success. There were multiple outputs, including the critically acclaimed work *Ataxia*, and scientific papers.

The objective was clearly to provide a collaborative space in which different disciplinary actors felt comfortable to pursue their interests through their usual methodology, and to view the collaborative time together as a commonly constituted resource from which each party could then draw data and undertake analysis, or make dance, in their own sphere and through their own skills and techniques. So although there was a collaboration, and many outputs from the project, there was never a suggestion that there would be a common outcome, a single object or event which would encompass all of the participants and represent all their different expertise and input. So people worked together to generate data through their interactions. This was then organised into information by particular disciplinary players. It was

useful to other participants to see processes of its organisation in specific disciplines.

So several of the projects took as their working model the idea that the interactions would be a source of *general* value, a kind of mutually produced ongoing resource from which each participant could draw down value for themselves and give it an acceptable form it in the context in which they usually operate. In Choreography and Cognition the intention was never to make five psychologists into dancers, nor was a hybrid outcome planned. The time spent together as a group was carefully managed and structured so that each scientist could operate according to the requirements of their discipline. Some took something away from the novel situation, and translated it into value in a specific and much narrower domain, by publishing detailed papers of research data and analysis. The dancers involved also took things from the experience that shifted the direction of the dance material they were currently working on.

This is one model, dependent in this case upon careful orchestration of time, people's interests, personalities and needs. The number and quality of outputs and speak for themselves.

What of projects which try to carve out new domains through novel kinds of output, outputs which like their creation, cross disciplinary and institutional boundaries? One example of such a project was the research on new materials – liquid crystal elastomers – that was undertaken by Simon Biggs and Eugene Terentjev. Here, the intention was to find a common interest that sustained a collaborative output rather than a series of individual ones. (In many ways, one might say this has happened for some time in the arts. That is, technicians have been drawn into artists' projects and developed their own expertise and technologies in response to the vision of artists. The output in such cases are usually art works, installations or performances.) Biggs and Blackwell made explicit that artists have often been clients of technologists rather than full contributors to the research process. They were determined not to follow that route. It points to how easy it is to find actors defined by their expertise and thus enclosed in a context. The possibilities are limited by ingrained expectations and roles.

In Biggs and Terenjtev's work, the artists investigation of, and novel demands on the new material was just as likely to provide the scientist with new experimental data and new ideas as his own work was. In other words, a genuine reverse -- from the artist demanding technical

support -- to the artist pushing the scientist to redirect and rediscover his own trajectory. I observed this project closely, and believe the scientist was genuinely surprised at this outcome, but also genuinely pleased. More-over, the collaboration has taken the potential of liquid crystal elastomers in new directions, and those new directions, perhaps more than any finished physical output, are a genuinely collaborative product, unimaginable without the particular relationships between those involved.

The same could be said for many of the projects, another example being the Metamorphosis and Design project, where scientists' understandings of their own subject of study was productively re-framed. Elements of both models could be found in most of the projects (I observed the psychologists in the Choreography and Cognition project to be truly astounded by the physical control of dancers, and re-formulating their ideas about how and *what* one might research as 'scientific psychology' in the light of this experience, for example.)

The common element in all the projects was that value creation was not narrowly focussed on pre-specified outputs in the singular, but that benefits were spread among participants, and were realised in different arenas.

3.5 Contexts

Contexts are a vital aspect of the work around these fellowships. The given contexts of University departments and disciplinary structures are very concrete for academics. The art gallery or performance space may be seen as equally concrete, and unavoidable, for artists. An important aspect of the scheme was the degree of flexibility accorded to the collaborators. As many made clear, investigation, exploring different avenues, and sometimes reaching points of impasse, were all central to the productive nature of their work.

And what of the scheme as a whole? That is, if there is a chance for mutual learning and more than that, the mutual generation of a new kind of context for value to emerge within, how was this realised? One role that I have discussed was to develop a network between the participants within which they could share experiences, exchange ideas, learn from each other, and plan new ventures together. The network was achieved through hosting two residential weekend meetings at which collaborators in the scheme were asked to come and talk about their work. However, it was central to the planning of these meetings that a common focus outside any particular work was identified. We chose the notion of collaboration itself, of the ownership of ideas and of transactions in knowledge, and of the value each recognised in others' disciplines. One central question was that of how one could translate value from one domain or context into another domain. How did they understand the value of their collaborators' inputs, what had changed in this understanding?

In addition we asked participants to think about outputs that might fall outside the normal context for the reception of their work, and what value they could realise from such outputs. The meetings were a chance to make explicit the constraints and demands that different people, placed in different contexts, faced, and increase the possibility for success by generating empathy and understanding between collaborators.

The fact that all the projects represented here have an ongoing vitality (that is, none have just dissolved, and outputs and new collaborations are still emergent) speaks perhaps of the success of the overall arrangements.

By the time people attended the first network meeting, I had managed to visit many of them, and all had already been asked to think quite hard about how they had experienced the collaboration, what effect

claims over ideas might have in this context, and how they found value in their work together. In other words, the third position was already established as a common focus and interest for what thus already began to look like a 'group' with more than circumstantial connections. This wider context perhaps meant that although each project was highly unusual, participants were not left feeling like mavericks, out on a limb, but part of a current and a movement. This inspired the confidence to continue.

The question remains though of where the outputs of such collaborations are to find their audience and therefore their value. The obvious routes for academics to gain from their work, through journal publications and conference papers, would tend to look at the context *for* knowledge production as secondary to the particular disciplinary form that the *outcome* takes. Technologists would expect the utility and popularity of their productions to be the arbiter of worth. Yet this is a model that does not facilitate the kind of collaborations supported by the fellowship scheme. Indeed, there are very few contexts in which these kinds of novel combinations, and novel outputs, have immediately recognisable value. An example is the obvious worth that scientists found in the 'Little Earth' project from re-examining the developmental history of their field and which complemented, in more than a co-incidental way, the utility of new forms of computer animation. Joelson and Cowley mentioned a 'widening of horizons' (Joelson & Cowley 2006). I believe we must find ways to describe such processes that locate these relationships, and the space for new thinking within them, as the core source of value. Another example here is Dahlstedt and McBurney's work with agent based computing systems(Dahlstedt & McBurney 2006). Discovering the immaturity of the 'agents paradigm' in computer science is positive knowledge, although not a product one can point to .

The work of the network days was brought to fruition in the international conference that brought concerns about collaboration, ownership and transactions in knowledge to the fore. While fellows and collaborators on the scheme were only a part of these conversations, their work, and the scheme as a whole provided the impetus to open up questions of how collaboration works, how value can be achieved, and what role interlocutors, observers, and description/observation itself plays in creative work of various innovative kinds.

As we are well aware, there is constant emphasis on innovation and creativity in current economic conditions. These collaborations have found their moment because of this emphasis. The scheme has

pioneered possibilities for ways of working that others are already using as a model. However, on a less hopeful note, there is also a perception apparent that spaces already exist for the kind of work represented here. I am sceptical about this. The role that I have outlined here, where an anthropologist was called upon to situate the diverse projects, and make a context (in the sense of a conceptual terrain all collaborators could engage with), and in facilitating meetings and a conference, seems to reflect the fact that there are not ready made contexts in which the value of these kinds of projects are readily apparent.

4. Conclusion

The major insight available through anthropological work isto show in concrete detail how value lies in the relationships established in themselves. Making relationships is to make possibilities for people. In this instance, there could be no determination in advance of these outcomes – this what makes creative and innovation possible. Indeed, the value of the Scheme is apparent at many levels – personal, disciplinary, interdisciplinary, in establishing firmly a new set of emergent possibilities and the need for innovations in modes of recognising and rewarding such developments and so forth. The skill of the organisers and instigators was in making the Scheme open enough to allow people to find value for themselves at various and multiple levels. Context does shape this, so it was vital that those involved maintained awareness of how science is funded, where recognition can occur and the reward structures in which artists conventionally operate.

Let us return to the objectives.

• To provide opportunities and support for individuals working in the creative and performing arts seeking to engage in a process of research in collaboration with scientists, thus working across disciplinary boundaries.

This was fully realised.

• To encourage individuals working in the areas of creative and performing arts and science and engineering to work together creatively on new projects towards the achievement of mutually agreed research aims.

Again, this objective was fully realised.

• To enable higher education institutions to enhance cross-fertilisation of ideas through innovative approaches to collaboration between individuals working in creative and performing arts and science and engineering.

This was demonstrated over and again in the scheme, although the inertia of institutional structures perhaps limited the full realisation of this objective.

• To support collaborative research in the creative and performing arts and science and engineering which will lead to advances in creativity, insights, knowledge and understanding of interest and value to the research community and beyond.

The outputs from the various projects certainly demonstrate that these objectives, objectives relating to process and to ongoing development of understanding in and around collaborative research, are still having significant effects.

5. References

Beer, G. 1983. *Darwin's plots : evolutionary narrative in Darwin, George Eliot and nineteenth-century fiction*. Cambridge: Cambridge University Press.

Biggs, S. & J. Leach. 2004. *Autopoeisis: novelty, meaning and value* (Transmission: The Rules of Engagement. London: Artwords Press.

Dahlstedt, P. & P. McBurney. 2006. Musical Agents: Towards Computer-Aided Music Composition Using Autonomous Software Agents. *Leonardo* **39**, 469-470.

deLahunta, S. 2003. Open Source Choreography. In *Code: The Language of Our Time. Katalog zur Ars Electronica 2003*. Ostfildern-Ruit: Hatje Cantz.

—. 2006. Willing Conversations. The Process of Being Between. *Leonardo* **39**, 479-481.

DiBona, C., S. Ockman & M. Stone (eds) 1999. *Open Sources: Voices from the Open Source Revolution*. Sebastapol CA: O'Reilly & Associates.

Ghiselin, B. (ed.) 1952. *The Creative Process*. New York: Mentor/New American Library.

Ghosh, R. (ed.) 2005a. *CODE: Collaborative Ownership in the Digital Economy*. Cambridge MA: The MIT Press.

—. 2005b. Creativity and Domains of Collaboration. In *CODE: Collaborative Ownership in the Digital Economy* (ed.) R. Ghosh. Cambridge MA: The MIT Press.

Joelson, J. & S.W.H. Cowley. 2006. Little Earth: A Solar-Planetary Investigation. *Leonardo* **39**, 452-454.

Leach, J. 2003. *Creative Land. Place and procreation on the Rai Coast of Papua New Guinea*. Oxford and New York: Berghahn Books.

—. 2005a. Being in Between. Art-Science Collaborations and a Technological Culture. *Social Analysis* **49**, 141-160.

—. 2005b. Disciplinary specialisation and collaborative endeavour: some challenges presented by sci-art projects. In *Creativity and Practice Research Papers* (ed.) W. Gunn. Dundee: Creativity and Practice Research Group.

—. 2005c. Modes of Creativity and the Register of Ownership. In *CODE: Collaborative Ownership in the Digital Economy* (ed.) R. Ghosh. Cambridge MA: The MIT Press.

Mitchell, W.J., A.S. Inouye & M.S. Blumenthal (eds) 2003. *Beyond Productivity. Information Technology, Innovation and Creativity*. Washington DC: The National Academies Press.

Nafus, D., J. Leach & B. Krieger. 2006. *Free/Libre/OpenSource Software Policy Support. Gender Track*. European Commission.

Riceour, P. 1970. *Freud and Philosophy*. New Haven, CT: Yale Univserity Press.
Robbins, J. 2006. Review Article: 'Creative Land' by James Leach and 'Papua New Guinea's Last Place', by Adam Reed. *The Contemporary Pacific* **18**, 171-175.
Stallman, R. 1999. The GNU Operating System and the Free Software Movement. In *Open Sources: Voices from the Open Source Revolution* (eds) C. DiBona, S. Ockman & M. Stone. Sebastapol CA: O'Reilly Associates.
Strathern, M. 1987. Out of Context. The Persuasive Fictions of Anthropology. *Current Anthropology* **28**, 251-281.
—. 1988. *The Gender of the Gift. Problems with Women and problems with Society in Melanesia*. Berkeley: University of California Press.
—. 1999. *Property Substance and Effect*. London: Athalone Press.
Sulston, J. & G. Ferry. 2003. *The Common Thread: A Story of Science, Politics, Ethics and the Human Genome*. Washington DC: National Academies Press.
Council for Science and Technology. 2001. *Imagination and Understanding. A Report on the Arts, Sciences and Humanities in Relation to Science and Technology*. UK Government/Department of Trade and Industry.
Weber, S. 2004. *The Success of Open Source*. Cambridge M.A.: Harvard University Press.
Weiner, J. 1995. *The Lost Drum: The Myth of Sexuality in Papua New Guinea and Beyond*. Madison, WI: University of Wisconsin Press.