

Laura Watts (BSc.)

A Future Archaeology of the Mobile Telecoms Industry

submitted in fulfilment of the requirements for the
Degrée of Doctor of Philosophy

PhD Sociology

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Centre for Science Studies
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Finally, this thesis is dedicated to the memory of Rosemary Watts, who always believed.

Declaration

I declare that this thesis is my own work, and has not been submitted in any form for the award of a higher degree elsewhere.

Abstract

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A Future Archaeology of the Mobile Telecoms Industry

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March 2007

In 2000, five consortia spent twenty billion pounds on UK radio spectrum licences for 3rd Generation mobile telephony or '3G'. They were investing in a future, in a specific story of the future, a story of ubiquitous wireless telecommunications. The thesis addresses questions raised in social studies of science and technology as to how such a future is made in everyday practices inside the industry, and how this future might be made otherwise.

The research draws on Donna Haraway's method of 'interference' into the making of technoscientific knowledge. Rather than simply critique the future of the mobile telecoms industry, the thesis develops two methods that enact two different interferences into the making of the future in the industry.

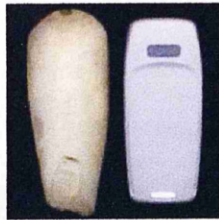
Both methods begin with a four month ethnography at a design studio of a major mobile phone manufacturer, extended interviews with key informants throughout the industry, and a substantial documentary archive. This forms a necessarily partial and fragmentary set of evidence from which multiple accounts may be reconstructed. The first method is ethnographic, and draws on the evidence to form an account of the industry and its futures situated close to London. The second method is archaeological, and draws on the evidence to form an account of the industry and its futures situated close to the 'Heart of Neolithic

Orkney' World Heritage Site on the archipelago of Orkney, Scotland – a method of Future Archaeology.

Through these two methods the thesis explores and demonstrates the effect of location and landscape on the making of the future in the mobile telecoms industry. And it demonstrates the important role of writing-as-method within social studies of science and technology.

Keywords:

Science and Technology Studies; Mobile Telecommunications; Ethnography;
Archaeology; Method.



A Future Archaeology of the Mobile Telecoms Industry

by

Laura Watts

Prologue

All kinds of seeing with the mind's eye is allowed me here. I can stand here in the old pasture, where there is nothing but sun and rain, wild oats and thistles and crazy salsify, no cattle grazing, only deer, stand here and shut my eyes and see: the dancing place, the stepped pyramid roofs, a moon of beaten copper on a high pole over the Obsidian. If I listen, can I hear voices with the inner ear? Could you hear voices, Schliemann, in the streets of Troy? If you did, were you crazy too? The Trojans had all been dead three thousand years. Which is farther from us, farther out of reach, more silent – the dead, or the unborn? Those whose bones lie under the thistles and the dirt and the tombstones of the Past, or those who slip weightless among molecules, dwelling where a century passes in a day, among the fair folk, under the great, bell-curved Hill of Possibility?

Extract from 'Towards an Archaeology of the Future'

in 'Always Coming Home' by Ursula K. Le Guin

Here I stand, beneath a sky filled with clouds of luminous water, in the archaeological remains of a huge circular Neolithic dwelling; a five thousand year old place inscribed in glittering wet stone. Nebulae of fine rain drops hang, swirling, over the surface of a loch beyond; a world of hills and water silver-plated in the damp light. Shimmering in the rain-mist, I see, through my imaginings, a vast semi-circular window of a mobile telecoms design studio, I feel the warmth of a fire burning in the stone hearth. Here, on the far Northern archipelago of Orkney where the Atlantic and North Sea meet, the vast metallic sky presses down intimately upon me, and I hear voices of designers and anthropologists at Sand14, the design company whose dome of possibility I stand within, whose window I stare through. This thesis is the story of that possibility...

The story begins with another mobile telecoms design studio, another archaeological site. This is the design studio near London where I worked for a telecoms company: the kitsch black and pink décor, the spot-lit posters advertising fake future devices, the masses of accumulated sketches covering the walls of a project room, the animated videos of future lives. For five years as a designer and business strategist I made mobile telecoms futures in this place, in PowerPoint charts, in video-conferences, in corporate presentations. Became bloodied by being taken aside and told I was too aggressive, too opinionated; I was too young; too inexperienced; if only I wore make-up. The story begins with these memories for they form the beginnings of my ethnographic archive for this research project on the future of the mobile telecoms industry. My concern with the future of the mobile telecoms industry is personal, not because it is a continuation of those industry experiences, but because it evokes those old experiences within a different realm and through a very different practice. I am infused with academic literatures and knowledges that re-make those memories in different ways, and interfere with their futures.

Interfere.

Interference.

My thesis is, at heart, a project of interference. To interfere is to interpose, to meddle, hinder and obstruct (as my Collins English Dictionary tells me); it derives from the old French *s'entreferir*, to collide. The collision between my memories of how futures were made in the mobile telecoms industry, and my critical sensibilities of such future-making as ethnographer and Science and Technology Studies (STS) practitioner, is one sense in which this story is an interference. A simplistic approach to my thesis might therefore suggest that classic STS themes, such as heterogeneity (Law 1992) and multiplicity (Mol 2002), collide with a technologically-determined version of how the future is made in the industry, as told by those within; as though heterogeneity and multiplicity were solely the provenance of academic theory. Such a thesis would be a critical story, a collision-commentary on the mobile telecoms

industry. Donna Haraway, however, reminds me of a much more interesting version of interference, one from my undergraduate degree in physics: interference is an optical metaphor for when light waves superpose (see Ohanian 1989: 947-970). It's the effect of a combination of several waves that meet at one place, for optical waves do not collide like solids, but add together, combine, join, constructively and destructively. The crucial difference in this version of interference is that what comes together is mixed and altered, transformed into something new, unlike a collision between immutable solids. Haraway develops her metaphor of scientific optics in her work on technoscientific vision and the privilege of a partial, rather than an all-seeing God-trick, perspective (Haraway 1991b). In this well-known paper, she develops an optical metaphor for technoscientific knowledge-making to emphasise how vision is situated and located, as both an embodied and epistemological practice. This metaphor of technoscientific knowledge as light alludes to the well-worn enlightenment allegory of the *light of knowledge*. Haraway works, as she fervently admits, with the scientific tropes she has inherited from her past, such as x-ray crystallography (Haraway 2000: 101-108), and she has been passionate concerning the role of optical metaphors as part of a new semiotics for thinking through, and most crucially rematerializing, connections and local responsibility. Her point "is not to just read the webs of knowledge production; the point is to reconfigure what counts as knowledge in the interests of reconstituting the generative forces of embodiment" (Haraway 1994: 62). Bluntly, to take the gloves off and work on cross-infection; and the importance of infection versus purity is another theme of Haraway's elsewhere (Haraway 1997: Chapter 6). Yet, despite her tropic inheritance, my own tropic past association with optics suggests she plays too fast with the metaphor of the optics of technoscientific knowledge. There is more to see.

For Haraway "diffraction does not produce 'the same' displaced, as reflection and refraction do. Diffraction is a mapping of interference, not of replication, reflection or reproduction" (Haraway 1999: 320). Diffraction, reflection, interference: the optical metaphors flash along almost too fast to see, almost too entangled to gather anything other than fleeting glance at

their meaning. Yet, it is the semiotics of diffraction, “the non-innocent, complexly erotic practice of making a difference in the world, rather than displacing the same elsewhere” (Haraway 1994: 63), which Haraway particularly emphasises as her favourite optical metaphor; it is the semiotics of diffraction that is the mechanism for refiguration, in contrast to the mechanisms of reflection and sameness. But what work is diffraction doing here? I need to disentangle the optical metaphors, lower the frequency of ideas, to see this. Here, then, is a slower version of the optics of technoscientific knowledge:

Reflection occurs when a wave collides with the surface of a solid and is reflected away, leaving the solid unaffected. The wave and the solid are both knowledges at different scales, for the solid is also, ultimately, made of waves (for matter is light, is knowledge). But the difference in scale leads to both solid and wave engaging as immutable objects.¹ One remains unmoved, the other is reflected, displaced; both knowledges remain ‘the same’. Reflection is an effect of scale, micro to macro, local to global. So, the endless reflection of local critique perpetuates as it bounces back and forth against grand narratives, globalisation, universal truths.

Diffraction is also an effect of scale, one that causes a wave to bend around the edge of an apparent solid; as in the diffraction patterns from x-ray crystallography. As an optical mechanism, diffraction has similar effects to reflection, for there is a solid that remains ‘the same’ as the wave transforms around it. The wave is translated in shape, it is no longer the same, it no longer remains a line (or rectilinear, as physicists say) but is bent, curved, like ripples spreading out from a breakwater. Yet the politics of this translation are asymmetric, for the solid crystal remains unchanged, unmoved, it is the barrier around which other knowledge flows. There are no mutually diffracted knowledges here, one is diffracted, knowledge is

¹ By immutable, I am alluding to the notion of objects as *immutable mobiles*: an object is something that holds its heterogeneous relational shape as it translates through the world (Latour 1987).

translated, but the other remains immutable.² Haraway's insistence on diffraction as her favourite optical metaphor, as the portrayal of the semiotics of making differences rather than sameness, is therefore slightly confusing. Perhaps she is forgetting the apparatus of science, the diffraction grating, the solid crystal, in her focus on the visual patterns of optical transformation. Despite emphasising the importance of a *material-semiotics* and *materialized refiguration*, the material apparatus of diffraction is always absent in her optical metaphors. But, as Karen Barad discusses, light *intra-acts* with solid apparatus: set up the apparatus one way and light is a wave (and there is a diffraction pattern), set it up another and light is a particle (and there is no pattern). Knowledge is interdependent on the apparatus of knowledge-making (Barad 2003: 815-816). Diffraction seems a poor metaphor for the material refiguring of technoscientific knowledge. It seems to retain the impossibility of mixture, retains the asymmetries of scale. I believe that the more potent metaphor is that of interference.

Interference is about place. It is about location. It is the place where knowledges of the same scale superpose, mix, entangle. Interference does not require a solid crystal, an immutable grating. It is not about the translation of a single beam of light, but about a location where, and a moment of superposition when, multiple waves meet; when multiple knowledges become inseparable and, crucially, add together to make something else in the world, something different. It is patterns of ripples overlapping with ripples, light combining with light, knowledge infusing with knowledge; the effect of a shared scale makes knowledges mutable so that they are able to coalesce into each other. In interference there are only ever multiple local knowledges, for you need at least two waves to superpose in the same location; you need two knowledges at the same scale in the same place. There is nothing of the singular, nothing of the immutable in the metaphor of interference. This is why I find interference such a potent

² By 'translation' I am referring to the approach of a Sociology of Translation (Actor-Network Theory) where knowledge is understood not as a singular object but as an effect of heterogeneous relations that shift as they move or translate between locations (see especially Callon 1999; Law and Hassard 1999).

metaphor for the refiguring of knowledge and the production of different technoscientific knowledges, it is imbued with the principles of situated knowledge and generative difference. When Haraway speaks of “diffraction as the mapping of interference” she is referring to the pattern of waves superposed at a point, seen on a screen; the visible manifestation of interference. This is an effect that occurs as a result of diffraction (as the waves bend around a solid crystal), but not necessarily. This is not an attempt to split scientific-hairs, it is an attempt to attend to this powerful metaphor more carefully, see how it might do more compelling work. So, it is patterns of interference not diffraction that “record the history of interaction, interference, reinforcement, difference. [Interference, not diffraction] is about heterogeneous history, not about originals... [Interference, not diffraction] is a narrative, graphic, psychological, spiritual, and political technology for making consequential meanings” (Haraway 1997: 273). You do not need a solid crystal or immutable universal truth to generate different technoscientific knowledges in the world, for interference stories of difference are only ever situated, only ever an effect of multiplicity.

My accounts of the future of the mobile telecoms industry must always be at a local scale; practices of future-making in the mobile telecoms industry must always be situated. It is through such a located and always partial account of the industry that I can enact an interference, here, in this thesis, into the future of the mobile telecoms industry. Interference as difference. Interference as generative of a different technoscientific knowledge. So, this thesis will attempt not just a reflection of the future, but a future interference; the telling of a different future.

There is another important aspect to interference that Haraway flashes past, but which is evoked more intensely for me by another tropic history: an internship at a radio astronomy observatory. Radio astronomy is often conducted on the basis of the interference between multiple radio signals received by a series of radio telescopes in an array, a mechanism called interferometry. The superposition of the multiple radio signals (and here I am slipping

between optical and electromagnetic waves) with computational and human knowledges combine to form arresting images of cosmic incidents, remote galaxies. Multiple knowledges interfere to create a very powerful story, the picture of a new object; a story that, in the form of glossy images of the Solar System, Haraway rightly critiques as views from nowhere, the presentation of objects as “indubitable recordings of what is simply there and as heroic feats of technoscientific production” (Haraway 1991b: 189). Yet, this is an effect of interference, the production of patterns of light and knowledge that have not been imagined before. Those patterns can be seductive, erotic, enchanting; they tell unheard stories. I am not proposing interferometry as a path to universalism or immodest heroism, quite the reverse. What is important to me is the enchanting effect of the stories that interferometry creates, it is a mechanism for doing that “non-innocent, complexly erotic practice of making a difference in the world” (Haraway 1994: 63); it is an example of the extraordinary creations interference can make. What is absolutely crucial is retaining the moment of interference, the inherent multiplicity; remembering that the towering parabolas of the radio telescopes are located on the ground in a place, that they are a number of monumental white metal structures, standing in a dotted line on the fields of Cambridgeshire or the deserts of New Mexico, that they are part of a landscape.

Landscape.

Place.

If interference is about place, then place matters. So, in this thesis, place (not unmarked space) must be a central theme. Given moves to situated knowledge and the locatedness of actors, knowledges and epistemologies, how have technoscience studies explored the effects of the material specificity of location: the landscape, the places in which technoscience occurs? A useful example is Bruno Latour’s discussion of Pasteur’s development of an anthrax vaccine, where the differences in place between the laboratory in Paris and the farm in Pouilly le Fort are central; Pasteur must displace his laboratory environment into the agricultural field. Here

the difference in landscape is acute, “no two places could be more foreign to one another than a dirty, smelly, noisy, disorganised nineteenth century animal farm and the obsessively clean Pasteurian laboratory” (Latour 1983). The landscape is a central actor and part of the apparatus in the development of the anthrax vaccine.³ Although Latour’s point is the topological transformation necessary to translate the laboratory elsewhere (to other farms and other countries), another reading of his paper could emphasise the topographical transformation, how the clean laboratory washed away the farmyard mud, and made the place of the farm more like the laboratory; this was a transformation not simply of practice but also of landscape. Similarly, Annemarie Mol and John Law’s consideration of the difference in anaemia between the Netherlands and Africa is a difference enacted, in part, through a difference in laboratory landscape: the difference in the road surfaces effects the transportation of apparatus, batteries circulate in one landscape and not in another, local food and meals and thus iron intake are wildly different (Mol and Law 1994). The laboratory does not move effortlessly from place to place, as Latour suggests, rather, it is embedded in local landscapes that alter the laboratory as it moves. As Mol and Law explain, anaemia is a fluid object because of its inseparability from divergent landscapes; it retains its invariance through continual local transformation. However, these studies barely look up from their laboratory practices, look through the doorway to the mountains and horizons, monuments and trees that are intrinsic to the technoscientific worlds they describe. Surely there is more to say of the landscapes of farmyards and field hospitals? The question for my thesis is, then, what happens to the future of the mobile telecoms industry as its sites of production move from place to place? What effect does landscape have on the futures that are made by the industry?

³ The symmetry of landscape and human, nature and culture, and their inseparability (people do not walk through Cartesian space, their feet mark footprints in the sand), is why I do not regard the discussion of locatedness as synonymous with context. Discussions of the context of activities reinforce the distinction between foreground human practice and background natural environment, a distinction explicitly reworked in situated knowledge.

When I say *landscape* I do not mean the invocation of an apolitical romantic idyll, but rather “something political, dynamic and contested” as Barbara Bender says of the landscapes of Stonehenge (Bender 1998). Landscapes are ongoing technological and social, natural and cultural experiences; they are visceral, when you walk, your feet hurt. When I say landscape I mean “the world as it is known to those who dwell therein, who inhabit its places and journey along the paths connecting them” (Ingold 2000b: 193). Landscape is lived. Tim Ingold is adamant that landscape is not land, it is not nature, and it is not space. It is not simply the weight of soil, nor purely natural, nor a surface from which maps might be made, or representations created. The most succinct description of landscape for me is Ingold’s brief inscription: “the landscape tells – or rather *is* – a story” (*ibid*: 189). When you walk you remember, you rehearse a story, and you see the world; or as Ingold says “we know *as* we go” (Ingold 2000c: 230).⁴ It is this sense of landscape-as-story that holds in my question of the effect of place on the future of the mobile telecoms industry. For the practices of future-making are always part of a landscape; landscape-stories and future-stories must therefore be intertwined. If the landscape-story changes, if the practices happen in a very different kind of place, what different future-story might be told.

Story.

Storytelling.

In his work on the knowledges performed by megalithic monuments on Malta, David Turnbull argues for the need for a sensitivity to landscape in the making of technoscience

⁴ This sense of the world as remembered story also resonates with Charles Goodwin’s work on vision as a socially situated activity: “The ability to see a meaningful event is not a transparent, psychological process but instead a socially situated activity accomplished through the deployment of a range of historically constituted discursive practices” (Goodwin 1994).

knowledge (Turnbull 2002). He discusses the Maltese megaliths in terms of narratives that are an effect of archaeologists telling, or performing, the experience of the monumental structure, its acoustics, orientation towards the sun, nearby mortuaries, and so on. These narratives, as particular archaeological knowledges, are an effect of archaeologists moving through the place, a place that extends from stone chambers into excavation trenches. Turnbull develops this notion of knowledge as a performed narrative – he is reminded by Ingold that knowledge is never *in* a location or a place, as though it can be simply gathered up or sucked into a database, but is instead synthesised through movement (Turnbull 2004). The powerful imagery that both Turnbull and Ingold use for this synthesising of knowledge, this performance approach to knowledge-making, is that of rhythmically weaving a story. Storytelling and weaving; text and textile (*ibid*), this is a metaphor of *weaving the world* (Ingold 2000a) where knowledge is an ongoing performance in a place, more storytelling than story. It is this sense of weaving knowledge through place that resonates with my concerns for the future of the mobile telecoms industry. What mobile telecoms industry future-stories might I weave when wandering through its places? What different future-stories might I weave if I wander elsewhere? And more particularly, how might different storytelling performances weave different stories? For storytelling is as much style, as it is substance.

The weaving of technoscientific stories is an already thread-bare trope in science studies (see for example Martin 1997); Haraway especially has promoted a cats cradle metaphor for refiguring the strands of technoscience (Haraway 1994). But the sense of technoscientific knowledge as storytelling rather than story; technoscientific knowledge as a weaving whilst wandering through places, is less familiar. There is a sense, for me, that the stories of the places where technoscience knowledge gets done are often drowned beneath tides of epistemological situatedness and accounts of socio-cultural location. In a sense, location in its prior sense of place needs to be renewed alongside its other work.

The sense of weaving worlds as you wander, and knowledge as a storytelling performance, also resonates with the optical metaphor of interference, discussed earlier. For waves are threads that weave together. Interference is the momentary weaving together of multiple local knowledges that materialise as patterns, as images of galaxies, as stories of technoscience. Interference happens in a place, at a moment, and then it cascades onwards, moving elsewhere. The effects of interference are always a synthesis, a superposition, as new waves are woven into the effects of the previous pattern. Pattern upon pattern; knowledges synthesising with knowledges. Moving, moving. Interference is not a static, fixed metaphor. It has a strong sense of endlessly patterning, experiencing, telling, re-telling, wandering.

I stand in the archaeological remains of a Neolithic monument, and see in my imaginings, a vast semi-circular window of a mobile telecoms design studio; see tables deluged with magazine pictures, unfamiliar shapes carved in plastic and stone. As I weave this world, I walk through a heterogeneous landscape that is social, material and imaginary. Water drips from my fingers onto the archaeological remains, but my weaving of the world is not simply made from standing here, as though my embodiment were empty of past and future. It is made from how standing here remembers standing in other places, imagines standing in other times, and how all those places and times fuse. Perception is always an act of remembrance (Ingold 2000b: 189). Yet perception is also always an act of inspiration, drawing on the present and the future as much as the past. Imaginary and materiality are inseparable parts of knowledge-making.

Imagination.

Imaginary.

The imaginary has a bad reputation from the enlightenment. In the light of knowledge the imaginary is cast into the shadows as unreason, unempirical, poetical. However, Michel Serres, poetic philosopher of science, has long looked deeply into both reason and the

“shadows borne by the imaginary” (Serres 1995c: 92). As a reader of science, mathematics and literature he argues that “the poems of La Fontaine, Verlaine, or Mallarmé, require as much rigour as a geometric theorem, and a demonstration of the latter can sometimes deploy as much beauty as those poems themselves” (Serres 1995b: 31). The imaginary may be lyrical and poetic, but such stories have their own rigour, and their own beauty by which they might be judged. Poetic stories are no less rigorous and no more beautiful than empirical ones.

An imaginary story, a fantasy or science fiction, is not a divine intersection into mortal life, nor given by an ethereal muse into the Kantian mind, it is made in heterogeneous practices of bodies, computers, pencils and printers. A science fiction story is an assemblage of social and material relations; pace George Orwell’s socio-political commentary of *Nineteen Eighty Four*. An imaginary may be surreal but it is always woven in a particular time and a place; it is local, part of a locale. So, the mobile telecoms industry is not just socio-material, it is socio-material-imaginal. And, as the social and the material have agency, so too does the imaginary: the fantasies of technological desire, the science fictions, the expectations for the future in the mobile telecoms industry have effects on what is imagined for the future, what is considered possible, and what is therefore made. In the places of the mobile telecoms industry, these imaginaries are palpable, and I may weave them in to the futures that I tell.

The mobile telecoms industry and I are part of what Haraway long ago called the “ferociously material and imaginary zones of technoscience” (Haraway 1997: 49). This sense of the technoscientific or industrial imaginary has a long history in both anthropology and science studies (Marcus 1986; Strauss 2006), and does implicit work to create a sense of social cohesion, a located shared imaginary. It is this imaginary that is Helen Verran’s basis for making hybrid ontics, local knowledges that are construed from both Aboriginal Australian and European Pastoralist imaginaries of land-ownership (Verran 1998). Verran promotes the notion that imaginaries are “ontically and epistemically potent”, that their role is crucial in making and re-making knowledge. Imaginaries are potent sites where knowledges may be re-

negotiated, mixed, interfered with. The future in the mobile telecoms industry is a particular knowledge rich in imaginaries. The practices of future-making in the industry construe, or weave, local knowledges into designs of devices, expectations, stories of what is to come, plans for what will be. Following Verran, it is the imaginaries woven into those futures that are the potent sites for my work.

My thesis will speak of imaginaries that are woven into the futures of the mobile telecoms industry in the particular places where I work. But it will also go further. As I said at the beginning, this is, at heart, a project of interference. My thesis will not just wander through the landscapes of the mobile telecoms industry and weave together its imaginaries into an account of the future and how it is made. It will also wander elsewhere, into a different landscape, and weave a different imaginary for the future and how it is made; weave an interference into the future of the mobile telecoms industry. This project takes seriously Haraway's call for a material refiguring of technoscientific knowledge. It will attempt to do that work and attempt to refigure the future of the mobile telecoms industry. The thesis is perhaps an answer to Haraway's urgent question: "What if the study and crafting of fiction and fact happened explicitly, instead of covertly, in the same room, and in all the rooms?" (Haraway 1997: 110) .

And so, with the themes of *interference*, *landscape*, *storytelling*, and *imaginary* framing this opening prologue, themes which suffuse this writing, on to the work of refiguring the future knowledge-making in the mobile telecoms industry.

NOTES TO THE READER

The work of this thesis is done in two sections: the *Figurations* and the *Reconstructions*.

The *Figurations* form the warp strands and the framework of this thesis. They construct the key figures and voices who act. In particular, the Figurations develop two distinctive methods-as-figures. The construction of figures is done to emphasise how important voices in the thesis are constructed and partial; parts that speak from multiple locations rather than from a single coherent position.

The *Reconstructions* are the weaving together of evidence through the figures of my methods. They form patterns constructed from always partial fragments of evidence. Each reconstruction assembles a different set of evidence through one of the two methods, and reconstructs an account of how the future is made in the mobile telecoms industry through that assembly.

Finally, a brief note on typography.

Typography is used to emphasise the different voices and figures who speak in this thesis. Different fonts create a slightly different impression for each voice. There are three voices as well as a typographic highlighting of voices from secondary-sources.

Author:	serif font
Ethnographer:	sans-serif font 1
Future Archaeologist:	sans-serif font 2
Evidence:	monospace font

Figurations

Figuration 1

Blood, sweat, silicon, and sand; evidence, artefacts, handsets and histories. I am made of such stuff. My autobiography is one, not only of flesh, but also of high-technology, of a Physics with Computer Science degree, of 6502 microprocessors, of undersea optical fibre, and of mobile telecommunications. We are inseparable, high-technology and I, have been woven together through the always social and material, soft and hard practices of programming and prototyping. I am not just a woman at the loom of high-technology, as Sadie Plant seats her weaving figure of Ada Lovelace (Plant 1995), I am of high-technology, a part of the fabric of different devices, past mobile telecoms devices. What follows in this chapter is an unravelling of the figure of the mobile telecoms industry. This figure is a pattern of which I am a part. It is where the mobile telecoms industry and I have been woven together, in conversation, in writing, in memory. We are entwined in bits of muscle and pieces of coax the industry and I; bits and pieces of similar size, at a similar scale. My experience of the mobile telecoms industry, and the pattern of the industry woven in this thesis, is therefore very particular, specific. When I say the *mobile telecoms industry*, I mean my version of the mobile telecoms industry, the one woven from my own embodied encounters throughout my life; the mobile telecoms industry on my scale. Its passions are only those passions I have shared, its histories are only those I have heard.

Histories and industries are largely smooth and impervious, their stories have had the corners knocked off, solidified, and made into the semblance of completeness so many times, that they are worn smooth by their own re-telling. My version of the mobile telecoms industry and its history is rather too dense, too compressed with knowledge whose accountability has long since been lost to memory. The industry and I, as we are woven together, are neutron-black with the *weight of history*, as John Law names it (Law 2006b). I can no longer say how I know, when I knew, all I can say is that I know. I am weighed down by my industry

knowledge. I am filled with knowing: I was soldering my first modem at the age of fourteen and spent ten years woven into the pattern of a mobile telecommunications industry. I could write a solid, smooth stream of industry knowledges. But rather than polish the corners further on the stories of the mobile telecoms industry, I want to unravel their threads, and open up the gaps. They are never whole and I want to make sure something of their incompleteness is made present. To do this, to pull apart the solid mass of my own industry experience, I need to attend to the many different threads that comprise my experience, the many voices who speak from memory and in text. Each voice is located slightly differently: a manufacturer of mobile equipment compared to an operator of mobile networks, for example. Between these different locations there are gaps, spaces, discontinuities. I speak for one place, to be sure, but there are many places from which to speak in the mobile telecoms industry; its stories are then patterns, woven together from these diverse voices.

I will take my lead from an anthropological account of diverse locations within the heritage industry, an industry concerned with technologies of the past. In her account, Barbara Bender provides a series of dialogues with the many political voices associated with the prehistoric stone circle, Stonehenge (Bender 1998). Crucially, she creates a fictional, yet sensitive, dialogue with one of the most central voices in the controversy over access to the site, English Heritage, who declined to participate in her study. Her artful collage of cartoons, newspaper clippings, dialogues, and a reflexive account of her own active participation in the controversy as anthropologist and archaeologist, highlight the wealth of conflicting knowledges, as well as intense politics, associated with the monument. In a similar way I will write my voice into dialogue with that of other voices inside the mobile telecoms industry. All those who speak in this chapter are either part of the mobile telecoms industry in some way, or strongly connected, including myself. But through writing a dialogue between distinct voices, I hope that the diversity of situated knowledges (Haraway 1991b) within the industry will be made apparent.

Each voice will be unthreaded from my own experience, primarily from a series of extended interviews conducted during my research with four variously located long-standing members of the industry, a journalist, a venture capitalist, a market researcher, and an innovation advisor. In addition, these voices will be augmented from secondary sources, such as industry and academic journals, industry magazines, corporate websites, as well as my own memory, experience, and a dash of imaginative flair.

What follows are three sets of dialogues that attempt to unravel particular stories in the mobile telecoms industry that are central to my study of its futures. Through these conversations I hope that the figure of the *mobile telecoms industry*, central to this thesis, will be made both whole and part. This figure of the mobile telecoms industry will be knitted from the particular sources and particular places I weave together in these stories, forming a partial, yet whole, pattern. Some of those places will be visually present at the beginning of the dialogues, with each of the three stories including a theatrical backdrop, to set the scene for the sensory locations in which these dialogues did, at times and for moments, take place.

CAST OF CHARACTERS

Author	Author of this thesis. Previously a business strategist and interface designer for mobile devices inside a telecoms manufacturer.
Consultant	From secondary-sources. Offers strategic reports, predictions and workshops on the future of the telecoms industry.
Journalist	Interviewed by the author. Many years experience working in journalism in the telecoms sector.
Manufacturer	From secondary-sources. Executive within a multinational vendor of telecommunications equipment.
Operator	From secondary-sources. Executive for a national operator of mobile telecoms services.
Academic Analyst	From secondary-sources. Located in a Management School, specialising in marketing analysis of the ICT business sector.
Venture Capitalist	Interviewed by the author. Fund manager for a venture capital firm in the mobile gaming industry, previously a program manager for mobile telecoms manufacturer.
Historian	From secondary-sources. Academically trained historian specialising in the history of technology, currently based in North America.
Innovation Advisor	Interviewed by author. Independent advisor on mobile telecoms innovation, particularly mobile devices and applications.
Prophet	From secondary-sources. Well-known guru figure in the industry, may not have a heritage working inside the mobile telecoms industry.
Futurist	From secondary-sources. Employed by a professional forecasting agency or consultancy, trained in economic forecasting techniques and/or future studies methods.

GENEALOGY STORIES

Setting:

Inside a café bar or lunchtime restaurant, a few miles radius from Heathrow airport, somewhere within the 'M3/M4-Triangle' close to most of the major mobile telecoms companies in the UK. A place on the river Thames, where telecoms executives (who live nearby) meet colleagues and competitors for coffee and for lunch.



Journalist:

Looking back on it, it was very much like a special telecoms edition of Supermarket Sweep. Operators rushed around Europe in a bid to fill their wireless trolleys with all the 3G licences they could get their hands on. In the spree to end all sprees, money was no object -- you just grabbed what you could in the time allowed... Except that money was an object... Datamonitor... advised operators to ditch their 3G plans [for the

⁵ Photograph of location of interview with Innovations Advisor 7/5/2004.

future] at the first opportunity, regardless of how many billions they may already have invested. A 3G licence is a "licence to lose", Datamonitor intoned [in] its vision of the 3G apocalypse.⁶

Author: 3rd Generation mobile telephony, 3G, has probably been one of the most well-discussed and divisive stories of the future in the mobile telecoms industry. But where to start this tale, by turns, of both apocalypse and desire? Perhaps the best place is simply with its genealogy.

First Generation mobile telephony, 1G, were the voice-only analogue systems, such as AMPS in the 1980s, where anyone with a receiver could tune in, as with analogue radio.

Second Generation mobile telephony, 2G, such as GSM, is a *step up* to a digital system but is still circuit-switched, the same as the everyday land-line telephone system. You can transfer data for internet-style access to content on a separate channel but only very slowly. In two-and-a-half-G (2.5G) this data channel is overlaid with a faster packet-data network, which transfers packets of data in the same manner as the internet.

Third Generation mobile telephony, 3G, is a *step up* to a fully packet-switched digital network, where voice and data are treated as packets of information in exactly the same way. Overall, the data rate is also much faster.

⁶ Source: 'The Informer' (2002) A Week in Wireless 66, Telecoms.com, 23rd August 2002.

<http://www.telecoms.com/itmgcontent/tcoms/search/articles/1029744660142.html> Accessed 29/8/02.

This notion of technological generations in the industry is strongly related to the discourse of *paradigm shift*.

Operator: Absolutely. The development of GSM almost coincided with a huge paradigm shift in the business of telecommunications: leaving the age of monopolies and entering the age of the liberalised markets.⁷

Author: You're borrowing from Thomas Kuhn's account of scientific revolutions (Kuhn 1962), but largely flattening the term into marketing jargon. Kuhn's paradigm shift was explicitly referring to transformations in scientific understanding, a process he regarded as particular to science. Your version is more a neologism for rupture, for a break with the past, parcelling up time into the old and the new. Bruno Latour would pronounce this insistent rhetoric of making and breaking with the past, as a typical constituent in the belief in modernity (Latour 1993: 67-70). Your modern paradigm shifts are also synonymous with the passing of technologically-determined ages, following time and technology's irreversible progress from the Stone Age to the Bronze Age, from the Space Age to the Silicon Age to the high-speed cellular age⁸. This practice of defining the passage of time on the basis of technology, derives from a Nineteenth Century system for categorising ancient

⁷ Source: Trosby, Finn (2004) SMS, the strange duckling of GSM. *Teletronikk 3* (Telenor Nordic Mobile).

⁸ Source: Possi, Petri (2005) UMTS / 3G History and Future Milestones. UMTS World.

<http://www.umtsworld.com/umts/history.htm> Accessed 09/07/2005

museum artefacts⁹; a categorisation system that, thirty years ago, actually placed telecommunications as only the fifth technological age behind the sixth age of transportation (McHale 1969: 74). Are you are still convinced of generational progress and paradigm shifts, Consultant?

Consultant: Yes. In January 2001 we published an industry report called *Third Generation Wireless: The Continuing Saga*, and our second chapter was called *The Shift in Wireless Paradigm*. If you would like to read the chapter, the report costs \$3,495 for a paper version¹⁰.

Author: Your future is priced out of my reach, I'm afraid. Why did you write this report?

Consultant: It is difficult to understand 3G. Concepts are fraught with ambiguity and terms are ill defined. Discussions rest on unstated, unexamined, and tenuous assumptions. The competitive environment, technologies, economics, and markets of wireless... are undergoing cataclysmic changes. Together, these require companies to plan their competitive futures in a world of increasing chaos.¹¹

⁹ The Danish scholar, C.J. Thomsen is widely credited with first publishing the Three Age System (Stone, Bronze, and Iron) in 1836, as part of a guidebook to artefacts at the National Museum of Copenhagen. (Renfrew and Bahn 1991)

¹⁰ Source: Shosteck Consultancy (2001) *Third Generation Wireless: The Continuing Saga*.

<http://www.shosteck.com/studies/3gcontinue.htm> Accessed 04/04/2004

¹¹ Ibid.

Author: *Cataclysmic changes* seems a little overdone. Along with *apocalyptic* the coming of 3G seems to have gained biblical proportions, a mythological, world-changing event (and as with all end of the world prophecies, has failed to come to pass). But I do agree with you about the *tenuous assumptions* surrounding this myth. As 3G was being defined and tested as a technical standard in the late nineties, I was a fringe participant in the process; working first as an interface designer, then as a business strategist for a manufacturer. I remember an in-joke that a colleague had created the only known PowerPoint slide of actual applications this new 3G technology might make possible. The assumptions on the services 3G might make possible for the paying consumer were extremely tenuous, usually little more than a list: gambling, location-based, games, email, and so on. I heard almost no discussions concerning how this enormously expensive new network infrastructure would pay for itself. All I heard was the importance of high bandwidth, 384 kbps. When we, the manufacturer, demonstrated the network at an industry conference in 1999, just a few months before the operators purchased licenses for the radio spectrum, we enrolled a huge *fixed* video screen, hooked up to a behind-the-scenes computer, to demonstrate a *mobile* video service.

Journalist: 3G has got its own more intense set of problems... I could design you a GSM radio network on the back of a fag packet. 3G is a lot more complex... [the radio cells don't stay the same size], the little bastards breathe in and out... Plus it is consistently inconsistent. GSM is ... you know you've always got a dead spot there, but

with [3G] you can have a deadspot there one minute and it'll work the next day...¹²

Manufacturer: It's because of this complexity that handsets were always going to be a problem. And we had to make sure that handsets were backwards compatible with GSM, so they would switch down when there was no 3G coverage. All this, and make the handset smaller than before. It was tough. And it took time. For example, Nokia's first GSM/3G handset was not available until the end of 2002.¹³

Author: But the European licenses for radio spectrum were sold in 2000. In the UK, five consortia paid £22 billion to the government in return for the spectrum rights to operate a 3G network; that's roughly £300 per capita¹⁴. And they still had to pay billions for the actual network infrastructure equipment. With no handsets for two years, and so no customers, there was no way of repaying those vast debts. What happened?

Academic Analyst: Some analysts estimate that today US and European [operators] have as much as £370 billion in debt. In retrospect, it might be said that the financial burden caused by European 3G licensing auctions was one trigger of the global economic slowdown.¹⁵

¹² Source: Interview with Journalist, 2004.

¹³ See Nokia Press Release <http://europe.nokia.com/investor/2002/4Q/> Accessed 22/5/06.

¹⁴ See (Cheng, Tayu et al. 2003).

¹⁵ See (Cheng, Tayu et al. 2003).

Journalist: I reckon over the last three/four years something like a million people have left the telecoms industry. About two and half years ago the FT [Financial Times] was quoting a quarter of a million people had been made redundant globally... And just thinking we've had a few more years of recession... downsizing is still going on... it must add up to a million people easily...¹⁶

Author: I remember at the time no-one could quite believe that the auctions went as high as they did. Everyone seemed to be critical of the hype over 3G, and yet the juggernaut continued. Every operator had to be seen to be bidding for a license. 3G was the future. Without a license, the company had no future as a mobile operator; no future implied no worth, no shareholder value, and ultimately no company. The future of the mobile telecoms industry, an imagined future of a 384 kbps 3G network, for that was the parameters by which it was imagined, was having wide-ranging social and economic effects. Ultimately, all the investment (and its consequences) appeared to be on the basis of nothing more than a vague and unquestioned belief in the continual revolution and evolution of mobile technology. The phenomenon of the 3G auctions appeared to be the effect of industry-wide subservience to Moore's Law, the oft-misquoted prediction by Intel-founder Gordon Moore, of the exponential doubling of components per integrated circuit¹⁷ colloquially understood to imply the eternal, exponential increase in processing power.

¹⁶ Source: interview with Journalist, 2004.

¹⁷ See (Moore 1965).

- Consultant:** The key drivers [for the future of handset batteries] are Moore's Law... process and power goes up at an exponential rate.¹⁸
- Journalist:** Forget Moore's Law because it is unhealthy. Because it has become our obsession. Because high-tech has become fixated on it at the expense of everything else - especially business strategy... It is a runaway train, roaring down a path to disaster, picking up speed at every turn, and we are now going faster than human beings can endure.¹⁹
- Author:** Technological development that is *faster than human beings can endure*? You have separated technology completely from society; the many human bodies and social networks involved in technology design and development have been simply erased. How is it that such extreme technological determinism is commonplace in the high-tech industry? Bruno Latour argues that it is the too-easy, and forgotten, assent given to the diffusion of objects, machines and facts, which creates technological determinism.²⁰ Machines and their practices are transmitted only because people agree to transmit them, but when that permission is effortless and taken-for-granted, then it seems as if the machine alone determines its own path. The lack of resistance to well-worn stories of the future, such as Moore's Law and the next-generation of mobile telephony, therefore produces (in part) the industry's technological determinism. Those future

¹⁸ Source: Ethnographic notes from a presentation at a closed industry association meeting, June 2004.

¹⁹ Source: Malone, Michael S. (2003) Forget Moore's Law. Red Herring magazine, February 2003.

²⁰ See (Latour 1987: 132-144).

stories that are unquestioningly accepted become incontrovertible, and so 'magically' come to pass. However, following Latour and the moves of a sociology of translation, technology is always socio-materially translated, always made through human and nonhuman practices. The heavy juggernaut of the 3G auction is an effect of the socio-material assemblage that is 3G, which includes the weight of belief in Moore's Law and the high-speed cellular age.

This unquestioned belief in the exponential increase from 2G to 3G, from 9.6 kbps to 384 kbps of bandwidth, also suggests a very linear approach to technology development. The only future imagined is one that moves from 1G to 2G, from 2.5G to 3G. The spatiality of this story is not even flat, it is limited to a one-dimensional line. I am invoking John Law's claim that spatiality is not neutral, but has its own politics – a network of connections has different effects to a fluid region, for example.²¹ In the point-to-point story of 2G to 3G there is no fluidity, no rhizomatic criss-crossing of possibilities and imaginaries, if there ever were, they have been firmly erased. The future has been pruned to a line of ever-increasing bandwidth, whether that line be stepped (in the form of paradigmatic shifts), straight, or an exponential curve (in the form of Moore's Law). And the politics of this topology is not one of innovation but its inverse, one of risk-aversion; following a line is a relatively safe, predictable future strategy for risk-averse business; increase in time equates to increase in technological progress.

²¹ See (Mol and Law 1994; Law 2002b).

Journalist: It's all very well being critical but if you hadn't got [a 3G license] you'd have been slated at the time.²²

Author: But was 3G really worth £22 billion?

Venture Capitalist: No. There you go, just quote [me]. I said, no...²³

Author: So why were the 3G licenses valued so highly? How do you believe it happened?

Venture Capitalist: No one ever believed 2.5G was going to be any good... we all believed it was always going to be rubbish... [With 3G] the smart people all saw... Voice Over IP... And the not so smart people just saw this fantastic, high bandwidth data traffic... That's the technical reason why.

And we all bought into that. We all said, yes, you're right. And even after [the auctions]... and everyone was having some doubts about 3G we all said the same... So even when doubts were creeping in about the amounts people had paid, and the amount the networks cost to build out, even then we were then looking at it, saying: ...hurry up with 3G. And quietly in the background everyone has gone away and made 2.5G a lot

²² Source: Interview with Journalist, 2004.

²³ Source: Interview with Venture Capitalist, 2004

better... And then on the side of that there has been this explosion in Wi-Fi, which genuinely is big fat pipe... So then if you look... we had all these ideas about fantastic services that were going to be delivered, video clips, gambling applications, all sorts of things that were going to require a 3G network. What it comes down to in the end is streamed video. There are even people now who say they can do streamed video over 2.5G... it's not great, but it's possible... [Now] you can store more [on the handset], which always going to be the other reason why you would stream... Now you can store, so why stream? A load of the consumer reasons that we thought, and I think rightly thought at the time, were going to be absolute imperatives to have these [3G] networks have gone away. So... I am now not sure what 3G is.²⁴

Author: Hmm. My memory of the pre-auction years did not include much discussion of the consumer. That single PowerPoint chart, created by a colleague for the UMTS Forum, was the sole reasoning that I was aware of for 3G services. The future was seemingly imagined, and drawn, as a hermetic engineering system of servers and switches, a network diagram on a blank page, existing just for the sake of itself. We forgot for a moment that the mobile network does not exist in isolation. 3G was imagined free-floating on the page, separate from the socio-materiality of its development and use, in a world of its own. So what's next on the page?

²⁴ Source: Interview with Venture Capitalist, 2004.

Consultant: [We] have identified what's mostly likely to come next [after 3G]: HSDPA or (take a breath now) High Speed Downlink Packet Access [which is five times faster than 3G]... will be the 3.5G choice of operators... [We] forecast a combined user base for these [3.5G networks] of 9.1 million by 2008... this... is one of the vital stepping stones to 4G.²⁵

Author: So, despite all the appalling social and economic effects of the 3G auctions the industry remains committed to a linear future from 3G to 3.5G to 4G; the high-speed pursuit of a one-dimensional dream.

Manufacturer: No, we are talking about a seamless evolution... with backward compatibility. We are not talking about disconnecting to get to the next generation network. We are not talking about 4G.²⁶

Author: Okay, it may not be a paradigm shift, but it is still a line, it's still exponentially increasing bandwidth. What are your predictions for this evolutionary future?

²⁵ Source: Prediction made by ARC Group. Reported in: Hallet, Tony (2004) What's beyond 3G? 3.5G, stupid. Silicon.com, March 29 2004.

<http://www.silicon.com/networks/mobile/0,39024665,39119604,00.htm>

²⁶ Comment made by Rob Conway, CEO of the GSM Association. Reported in:

Tan Ee Sze (2005) No 4G. Computerworld, 12(1), 7-20 October 2005.

<http://computerworld.com.sg/ShowPage.aspx?pagetype=2&articleid=2720&pubid=3&issueid=67>

Accessed 05/10/2005.

Consultant: We stated to a closed industry meeting in December 2003, that there will be 2 billion 3G subscribers worldwide by 2006.²⁷

Author: According to the UMTS Forum, there were only 50 million 3G subscribers in January 2006²⁸. You over-estimated by 4000%. Any other predictions?

Manufacturer: [We said that] broadband third-generation (3G) telephony will grow faster than previously expected... By early 2004, 100 million people will use 3G technology for voice and data.²⁹

Author: Hmm, I heard that there were only 600,000 people at the end of 2003³⁰, which means that you managed to over-estimate by 16,000%. The manufacturers of the network equipment stood to gain substantially from these extremely optimistic predictions. Yet, given the lack of controversy or comment at the time, they seemed an acceptable, very believable future. How was it possible that this vast optimism for the future, magnitudes apart from the eventual occurrence, was repeatedly sustained?

²⁷ Source: Ethnographic notes from presentation by ARC Group, at Mobile Data Association industry meeting, December 2003.

²⁸ Source: UMTS Forum press release 9th February 2006: http://www.umts-forum.org/servlet/dycon/ztumts/umts/Live/en/umts/News_PR_Article090206 Accessed 23/5/06

²⁹ Source: Prediction made by Ericsson. Report at Wireless World Forum, Hall of Hype: <http://www.w2forum.com/item2.php?id=14303> Accessed 21/12/03

³⁰ Source: Statement made by Analysys Research. Report at 3G.Co.Uk, 5 Million 3G European Users in 2004, 30th April 2004: <http://www.3g.co.uk/PR/April2004/7002.htm> Accessed 23/05/2006

Journalist: The first generation of marketing people did not understand it, and there was a disconnect... a cultural, functional, communication disconnect between the engineers, who, yes, were caught up in their own hype because they were just thinking - My God, look at what we could do with this! Unfortunately the marketing people were in the room while they were talking like that. So the marketing people got together with all the creative people and charged off...³¹

Author: So, the hype is, at least in part, an effect of the translation of futures from one group (engineers) to another (marketers). This translation of futures and technologies from one location to another, is something I need to pay attention to. I've thought about the engineers predictions, made in the white pages of PowerPoint charts - networks floating in free-space. But what of the marketers predictions. How are those numbers arrived at?

Consultant: We are predicting by 2008, a 7 billion [dollar] worldwide [market for mobile data]... This assumes... frequency of use, number of game downloads, number of handsets game compatible. But not all data is available for all markets. We are asking the operators to release figures to do that forecasting better.³²

³¹ Source: Interview with Journalist, 2004.

³² Source: Ethnographic notes from presentation at closed industry association 2/6/2004.

Author: May I slow that down a little? Your figures are read from a graph, as I remember the meeting. The curve of your graph is derived from some forecasting equation, which includes the parameters for number of game downloads, handsets and the other variables you mentioned, variables themselves that are forecasted from the Operator figures. So, your prediction is an effect of prior predictions, assumption upon assumption, no matter that they are manipulated mathematically. To be crude, you are making (forecasted fact) claims, on the basis of fiction. The mathematics and graphs do the work of translating fiction into fact (of a particular sort). It's in the politics of all those assumptions and forecasting models, where the hype and over-optimism of your predictions occurs. Crucially, your predictions are opaque, you present the future as a scientific *fait accompli*, which provides your story with sufficient legitimacy that it's easily believed. No matter that it's never supported by any methodological evidence, that you have been consistently wrong, and continue to perform a hyped-future, you still present the numbers as flat facts; a solid basis for industry decision-making.

Manufacturer: You're just being naïve. The predictions are an ideal. We know they are wrong, that the reality will be different. But the flat facts, as you call them, provide us with political leverage. We all know in the industry that the technology is going to develop, get faster, more bandwidth, whatever. The predictions just say what we all believe will happen, eventually. When they predict x number of subscribers for mobile video, it's nothing to do with the number of subscribers, it's about selling the technology for mobile video to the rest of the industry. We need those facts so that we can mobilise the shareholders, can get the financial resources to develop the technology, can influence the purchasing of our customers. Mobile

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video, 3G, HSDPA, it's all going to happen, sooner or later. Who cares that the actual predictions are wrong? We don't believe them. No one really believes them, if you ask them off-the-record. Why are you so worked up about it? In five years everyone will have a 3G handset and it will all be over.³³

Author: But what about you, Operator? How do you feel about these predictions that herald the sale of new network infrastructure, and new mobile services?

Operator: Operators are frightened to death of technology. It comes at us like missiles. Many [of us] are investing out of fear... so that if it works, we are prepared, if not we are sunk.³⁴

Author: We're back to 3G, right? Operators purchased 3G licenses at considerable financial risk, to the point of bankruptcy in some cases. But the technology was still being developed and was not delivered commercially by the manufacturers until at least two years later.

³³ Fictional reconstruction from my experience of working inside a mobile telecoms manufacturer.

³⁴ Source: Comment by Lim Chuan Poh, CEO of SingTel Mobile. Reported in: Tan Ee Sze (2005) No 4G. Computerworld, 12(1), 7-20 October 2005.

<http://computerworld.com.sg/ShowPage.aspx?pagetype=2&articleid=2720&pubid=3&issueid=67>

Accessed 05/10/2005.

I suspect that your fear of technology is an effect of the instability inherent in its development, the prolonged uncertainty over when 3G would be stable enough, coherent enough, to be a product that you might purchase, build, and ultimately charge customers for using. Yet your fear, operator, is fuelled not just by this uncertainty but also by sheer exhaustion. Exhaustion from hanging on to the runaway train of Moore's Law, a terror of the next-generation, evolving, giving birth to the next-generation, and the next; gathering speed, gathering bandwidth, inexorable, relentless. Fear of seemingly unbidden, technological creation: *deus* induced, like Athena springing fully-formed from the head of Zeus, as Latour puts it (Latour 1987: 105). But what if the infrastructures evolved more slowly, or more precisely, what if the rhetoric of high-speed r/evolution reflected the much slower, more difficult, specific social and material work of infrastructure research and development? The eternal technological solution to the future of the mobile telecoms industry seems to be a perennial *deus ex machina* approach to future story-telling, science fiction more in the Victorian style of H. G. Wells than in the contemporary, rather more socio-technical, science fiction style of Ursula Le Guin. What would happen if the mobile telecoms industry was more, dare I say it, honest in its stories of the future? What if its futures were less grandiose and technologically heroic, and were instead more socio-technical, more subtle, intriguing, perhaps more emotionally enchanting? Would that not give operators a chance to reduce their grip on Moore's Law? Perhaps Moore's Law might not be the only future after all...

Journalist:

In my slightly darker moments, I sometimes see the last ten or fifteen years of high-profile telecoms as

being an aberration. Perhaps, ten years from now, most of it will have sunk back below the water line as the grey utility that nobody much cares about until it goes wrong.³⁵

Author: You're voicing the fear of commoditisation, the fear of becoming as undifferentiated and as rhetorically slow as household electricity. I sense, however, within this fear the smell of jealousy: why is it that all the celebrity high-tech CEOs, Steve Jobs, Bill Gates, even Alan Sugar and Clive Sinclair, are all in the IT industry? Telecoms and mobile telecoms have no celebrity status. And why should the IT industry remain the sole recipient of shareholder dreams of high-tech growth, fuelled by its celebrity CEOs? In all the talk here of Moore's Law and of exponential, evolutionary futures, there has been no mention of profit. An exponential increase in the rate of technological development equates to an exponential increase in products and services, and an exponential increase in shareholder profit. Within Moore's Law there lies what John Law calls an *absent presence*, the necessary absences made through the presence of another.³⁶ The presence of Moore's Law includes, but makes absent, the highly motivational actor of profit; it is perhaps pertinent to remember that Moore's Law was written by the CEO of Intel. Within your fear of greyness, Journalist, is the fear of losing speed and losing money. Inside the future story of high-speed mobile telecoms is the speed of a quick buck and fast profit.

³⁵ Lewis, Alun (2005) The raw and the cooked. Stream magazine, June 2005: 36.

³⁶ See (Law 2002a).

My work in this research is to act more slowly. By slow I do not mean with inflexibility or with resistance or lethargy, but rather with an intense, methodical attentiveness. If I am resistant, then it is to high-speed one-dimensional thinking. Rather than a rhetoric of fear, what rhetoric of hope might there be in the development of mobile telecoms technologies and futures? In slow, attentive work I may make the socio-technical connections present in the stories of technology development; calmly locating the fearful missiles of technology in particular practices and in particular places. I have no fear of speed, or of research and development, I have spent too many hours programming demo software, days attempting to conduct elaborate experiments with optoelectronic transmission systems, months detailing user interfaces for mobile devices, we will always resonate together, bonded for life. This bond is crucial for my accountability as an author of high-technology for, in words of Donna Haraway, '*[I] rage against what I love*'.³⁷ Haraway rages in her love for science and scientific knowledge-making, and in so doing constructs potent possibilities for more empirical, and located scientific practices. She argues that rage and love are part of the discipline and rigour of a generative critique. In my desire to write enchanting, socio-technical futures for the mobile telecoms industry, in an impassioned challenge to the dominant discourse of one-dimensional technological determinism, I believe, with Haraway, in the hope that '*there can be an elsewhere, not as a utopian fantasy or relativist escape, but an elsewhere born out of the hard (and sometimes joyful) work of getting on together in a kin group*'.³⁸

³⁷ See (Haraway 2004b: 3).

³⁸ See (Haraway 2004b: 3).

So, manufacturer of mobile telecoms technology, that I both love and am enraged by. How do you respond to the fears of the operators? Rather than fear, what hope and joy might there be in your research and development?

Manufacturer: 3G was just an aberration, it was part of a global recession. Sure, we were far too bullish in the late nineties. But we've taken the heat, the bubble has burst, we've learned. We're much more cautious now. Growth is going to be evolutionary, not revolutionary. But the technology is evolving, and fast, that's the joy of it. It's called progress.³⁹

Author: I am not going to argue with you, this thesis will not argue with you. Who can stand in the way of progress, right? But what you call progress seems to be just a locked-in, one dimensional, more or less predictable future, 2G to 3G. The hype surrounding 3G was perhaps an effect of the lack of other possible futures, no movement except forward from 2G to 3G; an effect of future-myopia. But what of other futures? For example, your story of the future is always told in terms of the network, the infrastructure, a future that then suffuses into other areas of mobile telecoms, such as the handsets, server farms, basestations, and the landscapes the network inhabits. What if the future was, instead, located elsewhere? What if the future was re-located?

I will not stand in the way of progress, but I will attempt to sing that story off-course. *En chant*, enchant, the song of the siren, that will be my ploy; what Donna Haraway might call trickster-tactics. I will attempt to enchant

³⁹ Fictional reconstruction from my experience of working inside a telecoms manufacturer.

those that constitute the mobile telecoms industry with a magical,
empirical and imaginative future, one filled with hope, passion and élan.

ORIGIN STORIES

Setting:

After an industry meeting and small workshop, suited business people huddle in quiet conversation before an elaborate array of drapes and dining table, a décor rather reminiscent of a National Trust estate. The conference room is part of a select golf club somewhere in the 'M3/M4 Triangle' minutes from the motorway.



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Journalist:

"Call me Marty," said the self-effacing Dr. Martin Cooper, a trim, white-haired dapper septuagenarian who holds eight patents, most of them in wireless communications technology... The twinkle in his blue eyes suggests that he'd be a fun dad... Cooper, however, can also accurately be called the father of the cell phone.⁴¹

⁴⁰ Photograph of location for closed industry association meeting 2/6/2004.

⁴¹ Ferranti, Marc (1999) Father of cell phone eyes revolution, CNN.com, October 14, 1999.

<http://www.cnn.com/TECH/computing/9910/14/cellphone.father.idg/index.html> Accessed 15/05/2006

Author: Our-father-of-the-cellphone has become a technoscience Christian patriarchal origin myth, as Donna Haraway recounts them.⁴² Origin stories in technoscience too-often evoke a gendered genealogy, as Judy Wajcman has summarised, “the history of technology represents the prototype inventor as male”; so the origins of technology are told in terms of hunting rather than gathering, the weapon rather than the string-bag or digging stick.⁴³ But origins in technoscience also concern time’s arrow, an ordered linear flow of progress from then to when, a singular epistemological point in the past from which it all began. Origin stories evoke “the myth of original unity, fullness, bliss and terror” as Donna Haraway says in her figure of disruption of these stories of purity, innocence and once-upon-a-time imaginaries - the cyborg.⁴⁴ So what of the father of mobile telecoms, how does his tale go?

Journalist: It's not a moniker he particularly likes, but 74-year old Martin Cooper is the father of the mobile phone. And it's all down to an event that took place on a pavement in midtown Manhattan on 3 April, 30 years ago... Marty stuck a kilo weight of plastic... to his ear and started talking into it, becoming the first person to ever place a public call on a handheld cellular telephone.⁴⁵

⁴² See (Haraway 1997: 175-187) ..

⁴³ See (Wajcman 1991: 15-17) .

⁴⁴ See (Haraway 1991a).

⁴⁵ Shiels, Maggie (2003) A chat with the man behind mobiles. BBC News, 21st April 2003.

<http://news.bbc.co.uk/1/hi/uk/2963619.stm> Accessed 08/06/2005.

Author: Martin Cooper, the white-haired dapper septuagenarian creator of the Motorola DynaTAC cellular mobile phone network, and the first cellular mobile phone handset nicknamed *the brick*. The picture of middle-class white Euro-American venerability, grey hair, white beard. His paternity is legend in the industry, I remember it particularly well at the start of the industry journalist account of “the birth of a wireless world”.⁴⁶ Although he might resist the title, he has been interpellated into the trope of self-birthing technology, well-worn in stories of technoscience. He is just “like the traditional masculine figures in the reproductive imagery of technoscience, who have brain children all the time...”.⁴⁷ Bruno Latour tells it as the Athena-invention springing fully-formed from the head of the Zeus-inventor, as I have already said. In this birth, by Martin Cooper, of the first cellular mobile phone, the rest of the industry derives its issue. Yet, the history of technological systems are never that flat. Origins explored in science and technology studies are always rather more diffuse, rather more complex.⁴⁸

Journalist: This is how Martin, himself, tells it: “The time was the late 1960s. There was one telephone company in the US, one in Britain and one in Japan and so forth. In our case it was AT&T and they were the largest company in the world and they had invented this thing called cellular. Their invention was car telephones. Can you

⁴⁶ See (Galambos and Abrahamson 2002: 3).

⁴⁷ See (Haraway 1997: 186) .

⁴⁸ See (Bijker, Hughes et al. 1989)

imagine? We believed... people wanted to talk to other people and the only way we at Motorola... could prove this to the world was to actually show we could build a cellular telephone".⁴⁹

Author: What a great national story: America as the origin of cellular telephony. A couple of small points, though. Firstly, there are eight names on the Motorola patent for a Radio Telephone System submitted in 1973.⁵⁰ You were the project manager, as I understand, what about the seven other people on the team? At the manufacturer where I was project managed inside a mobile handset design team, every team member's name was placed on any patent or design registration, regardless of who had done the work, who had laboured long with the patents office to make the submission, who had been inspired, who had fought, who had raged or been silent. The patent upon which my name is inscribed was fought for by the industrial designer who made it happen. The project manager did little but garner political points for increasing the patent output of the design group. How is it that seven people (at least) become one person? Secondly, there is the 1972 paper by Fumio Ikegami at NTT in Japan, a year earlier than your U.S. patent, concerning an experimental Japanese

⁴⁹ Ibid.

⁵⁰ "On October 17, 1973, Motorola filed a patent entitled 'Radio telephone system.' It outlined Motorola's cellular radio system and was given US Patent Number 3,906,166 when it was granted on September 16, 1975. Inventors on the patent were Martin Cooper, Richard Dronsuth, Albert J. Mikulski, Charles N. Lynk, Jr., James J. Mikulski, John F. Mitchell, Roy A. Richardson, and John H. Sangster". Source: Farley, Tom (1998-2006) Privateline.com: Mobile Telephone History.

<http://www.privateline.com/PCS/history.htm> Accessed 05/07/2005

cellular system.⁵¹ Why have the Japanese developments been silenced in your account?

Historian: That's just the tip of the iceberg... Since [David] Hughes [in London] moved his experimenting [in electromagnetic induction] from the lab to the field he had truly gone mobile. Although these clicks were not voice transmissions, I think it fair to credit Hughes with taking the first mobile telephone call in 1879. ...**And car telephony is not an AT&T invention, as the Journalist and Cooper claim.** From 1910 on it appears that Lars Magnus Ericsson and his wife Hilda regularly worked the first car telephone [in Sweden]. Yes, this was the man who founded Ericsson in 1876.⁵²

Author: The story of America as the origin of mobile telecoms, seems to have unravelled. I don't think that you are being dishonest, Journalist, I just think your politics of storytelling, largely a desire for straightforward completeness, necessarily absences much of the tangled mess of technological development. Anyone else?

Futurist: My version of the origins of mobile telephony begins in the UK... the first land mobile services were introduced in the 1940s [in the UK] and [later] commercial mobile telephony began in the USA in 1947 when AT&T began

⁵¹ See (Ikegami 1972).

⁵² Farley, Tom (1998-2006) Privateline.com: Mobile Telephone History.

<http://www.privateline.com/PCS/history.htm> Accessed 05/07/2005

operating a [car-based service] between New York and Boston.⁵³

Author: You're suggesting that it's a British invention. Hmm, I think that will do for origin myths, I am not in the business of mapping all the historical intricacies and international intrigues of the development of mobile telephony. Suffice, its origin may be flattened into several nationalistic stories: American, British, Swedish or Japanese (and no doubt others, too). Marty Cooper of Motorola Inc. performs America as the site of innovation in mobile telecommunications, which easily rehearses the lineage of Alexander Graham Bell, alleged inventor of the telephone, progenitor of Bell Labs and AT&T. Other storytellers allude to other lineages, the Historian to the electromagnetism work of Michael Faraday, for example. In each origin story those actors that do not fit are silenced, made absent. In each story time is extruded into a simple line, from the origin to the present-day. This has the effect of making mobile telephony a story of linear progress, a one dimensional plot-line, a story with a beginning, a middle, and (as I have discussed earlier) a more or less predictable end. This production and maintenance of a story of a single origin and an uncomplicated history of technological progress is crucial. An origin point and linear history makes a linear future possible. Moreover, these origin stories are knee-deep in the politics not just of the national but of the multinational. Journalist, I would say you are implicitly writing a Motorola Inc. branded history of mobile telephony, participating in a corporate mythologizing of the past and perhaps more crucially, in the potential ownership of not just the past but technologies

⁵³ See (Lacohée, Wakeford et al. 2003).

of the past; writ large and jealously in patents and intellectual property rights. As Marilyn Strathern has noted, patents attach inventions to inventors and produce origin stories of creativity.⁵⁴ And, I would argue, vice versa. Be careful whose ownership your story makes present, for ownership of the past affects ownership of the future.

Historian: I agree. Multinationals appropriate to themselves credit for significant technological accomplishments, deliberately divorcing them from the individuals, companies, and countries that, in fact, brought them into being. Cryptohistory is creating a new past to go along with the new future that multinationals are ushering in. Such Cryptohistory is disseminated... insidiously by unwitting... third parties, particularly journalists.⁵⁵

Author: I am on your side, Historian, in terms of the political effects of telling history. But there are only ever multiple accounts of the past. Countering corporate history on the basis of singular historical truth is problematic. Your position is just as political, has its own epistemological location as an academic; history is being re-written, rehearsed, all the time. I think I would say that it is the silencing of actors through the Motorola Inc.

⁵⁴ See (Strathern 2001).

⁵⁵ See (Schiffer 1991: 225). Michael Brian Schiffer's extensive monograph on the long history of the portable radio is an explicit counter to the ongoing promotion of Sony as the inventor of the pocket transistor radio. This corporate mythology, which removes several decades of commercial pocket radios manufactured in America and Europe, has gained such momentum that it is even perpetuated in an undergraduate cultural studies textbook (Du Gay, Hall et al. 1997).

origin story, which is what is at stake: the removal of undesirable politics, such as the entanglement of technological development with other companies and other countries, and the extrusion of temporal incoherence into a neat line. This is what matters to me, rather than it being a true history versus a cryptic history. I would agree with Michel Serres who says that “every historical era is... multitemporal, simultaneously drawing from the obsolete, the contemporary, and the futuristic...”.⁵⁶ The mobile phone draws on both electromagnetism and optoelectronics, on both coppersmith and glass blower, on both dreams of telepathy and the voices of angels in the sky.⁵⁷ A mobile telephone is both ancient and futuristic or as Serres explains “the ensemble is only contemporary by assemblage, by its design, its finish, sometimes only by the slickness of the advertising surrounding it”.⁵⁸ The mobile phone has no origin, rather each particular mobile device has its own gathered (and branded) temporality, a heterogeneous assemblage of times. So, rather than simply origins, tell me more of all the times in your story of the mobile phone...

Journalist: Well, the history of cellular mobile telephony really centres around AT&T and its collaborator, Motorola: As a result of... regulatory resistance to change, AT&T did not begin testing [its] cellular concept until 1962... [Together with] Motorola [they] put up the first full-scale demonstration cellular systems in the United States in 1979. AT&T

⁵⁶ See (Serres 1995b: 60).

⁵⁷ See (Serres 1995a)

⁵⁸ See (ibid: 45).

launched its system known as Advanced Mobile Phone Service (AMPS) in Chicago.⁵⁹

Historian: I disagree. You're focusing too much on America. In 1979 the first commercial mobile phone network was opened for business in Tokyo.⁶⁰ In 1982 Groupe Spéciale Mobile (GSM) is formed... to design a pan-European mobile technology.⁶¹ [It wasn't until] 1983 the first commercial operation of AMPS [began in] Chicago.⁶² You need to focus on GSM, that's the worldwide standard for digital mobile telephony.

Author: There appears to be at least two distinct temporalities for mobile telephony here, a North American one and a European one. There is a technological schism between North American *cellular* and European *mobile*. In the US you own a *cellphone*; in the UK you own a *mobile* phone. In the US you are likely to be using the Personal Cellular System at 1900MHz; in Europe you are likely to be using the Global System for Mobile communications (originally Groupe Spéciale Mobile) at 900MHz. In Europe you can roam to other countries and networks and the calling-party pays the roaming charge; but in the US, until recently, the

⁵⁹ See (Galambos and Abrahamson 2002). Pp31-32.

⁶⁰ Source: Possi, Petri (2005) UMTS / 3G History and Future Milestones. UMTS World.

<http://www.umtsworld.com/umts/history.htm> Accessed 09/07/2005

⁶¹ Source: GSM Association (2006) Brief History of GSM & the GSMA.

<http://www.gsmworld.com/about/history.shtml> Accessed 28/05/2006

⁶² Source: Possi, Petri (2005) UMTS / 3G History and Future Milestones. UMTS World.

<http://www.umtsworld.com/umts/history.htm> Accessed 09/07/2005

receiving-party pays, so paging has developed to receive incoming messages. How do you justify your insistence on the pre-eminence of the temporalities, and technologies, of European GSM?

Historian: The GSM standard was established at an international level, as a Memorandum of Understanding between over a dozen European operators. This group eventually became the GSM Association whose first conference, the GSM World Congress, was held in 1990 - where the world comes to do business.⁶³

Author: I know it well. I attended the conference twice, presenting future handset concepts on the company exhibition stand. The scale of the GSM World Congress - 50,000 industry visitors in 2006⁶⁴ - is without doubt the manifestation of the influence of the GSM standard.

Innovation Advisor: I'll say! You know, the closest I ever got to those guys, the executive board of the GSM Association, was infiltrating a cocktail party being held in a bar, downstairs, in the hotel where they were meeting.⁶⁵

Author: I need to pay close attention to the GSM World Congress, and to the GSM Association, later in my work, then.

Manufacturer: You're forgetting that European GSM is not the basis for the 3G standard, instead it's American company Qualcomm's CDMA technology. CDMA

⁶³ Source: 3GSM World Congress 2004, Conference Guide.

⁶⁴ Source: 3GSM World Congress 2006. <http://www.3gsmworldcongress.com/> Accessed 30/07/2006

⁶⁵ Source: Memory of telephone conversation conducted with Innovation Advisor in 2004.

is being backed not because it's a better product, but because the Americans hate the fact that GSM is European.⁶⁶

Author: So there are many versions of the mobile phone and the mobile telecoms industry. Each with different politics, different temporalities, and different geographies. Your comments, Manufacturer, seem to polarise the debate and the versions rather too far: into either a shared GSM Association standard or a proprietary standard from Qualcomm. GSM versus CDMA is a geo-political conflict between different origin stories of the mobile phone, conducted in the form of technical standards. These standards are not only a multiplicity of origin stories and technologies, but standards also foreclose possibilities and versions of the future.⁶⁷

The GSM standard was created by a technical committee derived from a number of member companies. I remember the huge tome of paper rather too well, since my role was once to turn those disparate specifications of features and technical requirements into a coherent interface for a mobile device. An oft-cited effect of this supposedly purely engineering-led specification (whose politics have long since been flattened into obscurity) was the Short Message Service, SMS, colloquially known as text messaging. The origins of this feature are now mythical.

⁶⁶ Source: Interview with senior design manager inside a European manufacturer, March 2004.

⁶⁷ Geoffrey Bowker and Susan Leigh Star have conducted a detailed study of standards and classifications and their effects in medical technoscientific systems. They argue that the specification of a standard necessarily blocks off both future developments of the standard itself, and possibilities for future knowledge-making (Bowker and Star 2000).

Innovation Advisor: SMS [just] works... SMS is a teleservice that was defined by ETSI [the European standards body for telecoms]... Now, nobody interfered because nobody thought it was good for anything. It was just one guy, probably, was the champion of it. He drove it forward. It was easy to write into the whole thing. And he woke up one day and everyone was using it.⁶⁸

Futurist: Text messaging was an accidental success that took the mobile industry by surprise... costed per character it is currently one of the most expensive ways for a user to communicate text across digital networks.⁶⁹

Author: But now everyone wants to repeat that success, right? Following the predictable, myopic development trajectory of mobile telecoms, discussed earlier, there has been a move from low bandwidth to high bandwidth messaging, from text messaging to picture messaging. Multimedia Messaging Service (MMS), as it is termed, is not part of the original GSM standard and its politics have not yet been flattened out. They manifest in multiple, conflicting, proprietary versions of the MMS standard.

Innovation Advisor: MMS doesn't fucking work... Because big companies will be big companies and [one manufacturer] will try and make their MMS slightly different from someone else's...

⁶⁸ Source: Interview with Innovation Advisor, 2004.

⁶⁹ See (Lacohée, Wakeford et al. 2003).

There's about three levels of incompatibility...
 Mysteriously when you send an MMS to somebody else
 most of the time you don't get the results you expect...
 and the operators are a little bit disappointed at the
 take up. Well, they should be... [MMS] was defined by
 people who now had seen the dollar signs [from SMS],
 and now they only want to protect their own piece of
 the pie.⁷⁰

Author: Your frustration with the dollar signs versus the implementation sounds very familiar. Marketing and engineering are different orderings in the mobile telecoms industry.⁷¹ My everyday frustrations as part of a handset design team were about mediating the demands of an engineering specification and the business requirements from marketing. It was in the design studio, where I worked, that the imaginaries of the marketing team and the engineering team were often negotiated. Handset design was a matter of condensing, always problematically, the different politics of marketing and engineering into an artefact. It was a site at which the materialities of a mobile device, so easily faded into the white background of a PowerPoint slide, pushed back; where their agency was palpable: the plastic had to remain a certain thickness or it became too brittle, the antenna could not be moved inside the electro-magnetic shielding, you could not place nine individual buttons in too-small a

⁷⁰ Source: Interview with Innovation Advisor, 2004.

⁷¹ John Law discusses social orderings in technoscientific organizations in his ethnography of the Daresbury Laboratory (Law 1998). I am not suggesting that his particular classification of *modes of ordering* map directly on to mobile telecoms organizations, rather there were distinctive social, material and spatial practices ongoing in marketing and in engineering in my experiences of the industry.

space. It therefore seems pertinent that my ethnography include a design studio of a handset manufacturer, where the socio-materialities are mediated into an artefact; at a site where future-making work gets done in everyday frustration and practice. But how crucial are handsets in the industry?

Consultant: I think this summarises it. [Reading out an industry newspaper article] "By 2010 every man, woman and child on earth will own a mobile phone".⁷²

Operator: Handsets are crucial. We are very excited about the future, but we can't really turn the future on before we have handsets that are, frankly, at least as good as, if not better, than the... handsets that we have today.⁷³

Author: So, handsets are central to the mobile telecoms industry. Marty Cooper is, after all, hailed as the creator of the cellular mobile phone, not the cellular basestation, or cellular antenna. Handsets seem to be highly visible in the industry.

Manufacturer: No, there is no way you can say handsets are at the centre of the industry. The infrastructure is always located at the centre. On any diagram of a mobile network, the infrastructure's the network cloud at the centre of the page, connected to the handsets at the edge of the network.

⁷² Source: Ethnographic notes from presentation at closed industry association meeting 2nd June 2004.

⁷³ Source: Excerpt from television interview with Arun Sarin, CEO of Vodafone, quoted in TelecomTV.com (2004) 3GSM World Congress 2004, Day 5.

Handsets are the network *Terminals*, remember? They're at the ends, where the messages are finally received by the subscriber.⁷⁴

(Operator: You mean, our customer.)

Author: The metaphors you are using establish a very distinct topology for the network.⁷⁵ Is it a co-incidence that the most expensive part of the network, the infrastructure, is located at its centre? Moreover, you represent that centre of innovation, the origin of invention in the industry from which innovation spreads outwards, as an opaque network cloud, a space as impenetrable to scrutiny as your high-security R&D laboratories. You're a manufacturer, so you have a very particular location in the industry, you make both handsets and infrastructures, operators have a whole different relationship to them. More importantly, you often sell the two together as a network bundle to the Operator. During my years inside a manufacturer in the late 1990s, a new national infrastructure, the thousands of antennae, basestations and servers, was worth billions, whereas the handsets were so cheap in comparison they were almost thrown in for free. Does everyone in the industry see infrastructure as so central?

⁷⁴ The *network cloud* is a colloquialism used for all the different aspects of the infrastructure. It derives from its representation as a fluffy cloud common on high-level network schematics. The *edge of the network* is a colloquialism for network equipment such as handsets and content provision located, schematically, close to the subscriber. *Terminal* is the technical term for any network equipment used by a subscriber to receive or send a message, for example, telephones, fax machines and modems.

⁷⁵ Sally Wyatt notes that the metaphors used in the description of technological configurations say much concerning its politics and possible futures (Wyatt 2000).

Venture Capitalist: The Operators want to go [to the conference] to be winned and dined by the handset guys [the manufacturer]. The handset guys don't want to talk to anyone who wants to sell into them. They only want to sell. They only want to go and sell into people, not to be sold into. If you're further down the food chain, [the conference] is not the place to do it.⁷⁶

Author: You call the manufacturers Handset guys, that's a very different orientation. The shape runs from Manufacturers to Operators to Content Providers to Consumers: the mobile telecoms industry food chain, otherwise known as the *value chain*. Simplistically, this begins at the Manufacturers who are at the top (Ericsson, Motorola etc.) who sell network equipment to Operators (Vodafone, Orange etc.) . Operators then sell access to their service to Content Providers (Manchester United, MTV etc.) who then sell their content on to the Consumer, who is at the bottom. This widely accepted account of the value chain has extraordinary effects, not least, in common with much else in the industry, it reinforces a one-dimensional spatiality and prunes away other relational possibilities. As with its processual biological metaphor, it is a hierarchy of predatory power; it literally determines who pays for lunch, and who may talk to talk who, and where. But, to be pedantic, what, aside from the nebulous trope of value, is moving down this imaginary line in the mobile telecoms industry?

⁷⁶ Source: Interview with Venture Capitalist, 2004.

Innovation Advisor: It's putting the cloud into the pocket.⁷⁷

Author: Explain?

Innovation Advisor: [Gets out his handset] This is a monster, isn't it?

It's the Motorola, this one. I can't always tell if

I've got coverage... [anyway]... It's a connected device.⁷⁸

Author: Okay, I get it. What's translating from the Manufacturer all the way down to the Consumer is the network itself. Inside the network, the network cloud (the infrastructure) and the handset are inseparable, but their relationship changes. At the start of the value chain, the network cloud is at the centre of the network, and the handset at the edge. At the end of the chain, the network cloud is inside the handset, it's in the pocket of the Consumer. That's a much more interesting spatial story than those I've heard before, it suggests that there is more to say concerning the relationship between handset and infrastructure. I've heard about the beginning so tell me more about the end of the story, the part about the Consumer.

Futurist: Business user ARPU in 2004 will be \$60-\$80. In 2009 it will be \$100.⁷⁹

⁷⁷ Source: Interview with Innovation Advisor, 2004.

⁷⁸ Source: Interview with Innovation Advisor, 2004; Extract from promotional video, 3GSM 2004 Cool and Connected Wearable Technology Fashion Show.

⁷⁹ Source: Ethnographic notes at forecasting event, closed industry association meeting 2nd June 2004.

Author: I'll have to slow that down. ARPU, Average Revenue Per User, is the metric by which an Operator quantifies the Consumer. But it's a very particular translation of a person, not least that it's an average Consumer and therefore has no specificity. It's an imaginary, non-existent person, although he/she/it must have a mobile phone, and may play mobile games, send text messages, and make calls. ARPU, as a process of quantification, has some peculiar effects on what counts as a Consumer. Firstly, this generic person is in the act of using their mobile handset, and more than that, they must be in the act of using the mobile network through their handset (so the Operator can bill them). To summarise, the Consumer is a collage of fleeting un-marked bodies at the moments when they are using their mobile phone and the mobile network.⁸⁰ The Consumer only has meaningful interaction with the mobile telecoms industry, and particularly its future, when in conjunction with their mobile handset and the mobile network. So, in 2009 the business Consumer is predicted to variously make calls and send text messages to the tune of \$100 of Average Revenue Per User. The Consumer is an irreducible assembly of bodies, handsets and infrastructures in particular practices (making a call, downloading a game etc.). What other practices count?

Consultant: [In] 2004, drivers of [network] traffic are email, intranet, internet. Seems remarkably similar to 10

⁸⁰ Although these bodies are un-marked as Consumers (as determined by ARPU) they are not neutral universal bodies, they are only those who have access to a mobile phone. There are politics of access, so that only some bodies and not others are more likely to be part of the Consumer.

years ago. [In] 2009, [the drivers are] email, SMS, internet.⁸¹

Author: Hang on, when you say drivers of the network, you are talking about Consumer practices, someone sending an email, someone sending a text message. In essence, then, Consumers appear to be the service community that maintains the mobile network and its economy⁸². The Consumer (body+handset+cloud) translates that body into another network component, the part that pays to keep it alive, keep it evolving, or rather pays for technicians and a wealth of other specialists, including handset designers, to drive revenue and build the network of the future.

Innovation Advisor: Exactly. And we both know that without getting the handset right the industry is therefore screwed.

Have you seen these? I've got two '3' phones (free by the way, a friend got me in on an early trial)... Oh, this little thing is a wireless eBook. It's got Bluetooth, a web browser, all that good stuff. Have you seen this? It's an optical-keyboard, you project the keyboard on to the table, and tap away. I've got these in the 'Gadget Gallery' I'm running at next year's conference.⁸³

⁸¹ Source: Ethnographic notes from presentation at closed industry association meeting, 2nd June 2004.

⁸² Claire Waterton and Rebecca Ellis have developed a similar notion of the person as component in a technological network, in their work on the role of naturalists in supporting environmental database networks (Ellis and Waterton 2005).

⁸³ Source: Ethnographic notes at impromptu interview, London Kings Cross, February 2006.

Author: What is this obsession with gadgets in the industry? The origin story of the mobile telecoms industry begins with a mobile handset, not an antenna or a switch. And it appears to end with a mobile handset, since that's the material shape the future seems to take. For example, when I helped create the company exhibition stand at 3GSM World Congress 1998, it was based around a series of future handset demonstrations, no matter that what was being sold through the promise of those demos was beige-boxes⁸⁴, the colloquial name for network infrastructure equipment. Few become genuinely excited over a box of rack equipment trailing cables, but many are seduced by a model handset, spot lit within a glass case, or displayed in an exhibition wall (and connected to a hidden computer) for them to play with. Handsets and gadgets are the enticing, sensual boxes that contain the possibilities and relations of the rather more dull beige-boxes; the handset contains the mass of infrastructure, the handset contains the network cloud, puts it in the pocket of the people in the industry.

Even though I worked for a manufacturer, who regarded the infrastructure as central, when it came to artefacts and materials, they (usually people in suits) still shoehorned their view into the only artefact, literally, at hand. Antennae, basestations, servers and switches are not generally at hand, their operation depends on geographic stability, they tend to stay still and are hard to move. Moreover, their aesthetics are designed to engage with their environments, with field engineers, air-conditioned rooms and lightning strikes. Handsets, however, are designed for non-specialists, meeting rooms and cafés, the landscapes of business. It is therefore

⁸⁴ From memory as well as interview with Venture Capitalist, 2004.

handsets that do the work of opening the box of the network for the majority of the industry, for those people who have almost no interaction with its everyday socio-material life; who never experience the hilltop masts they sell, the air-conditioned rooms of humming switches they agree to install.

And so I can tell a classical origin myth for the mobile telecoms industry: *In the Elder Days, Our-Father-of-the-Cellphone, Marty Cooper, dreamed of the cellular mobile handset, and it sprang from his inventive mind into his hand, and he held it, and made a call to bring forth a vision of the future. And into this handset, all the Gods and Goddesses of telecoms world spoke their dreams and their nightmares, all their gifts of visions for the future.*

This is a version of the myth of Pandora's Box. And the handset is such a Pandora's Box, full of global infrastructures, invisible and eternal telecommunications, the labours of installation and maintenance, the fear of 3G license apocalypse. But the handset like Pandora's Box is also full of hope, *Elpis*, as the Greeks name it, that hope which is anticipation, foreknowledge, expectation, and dread.

Bruno Latour also speaks of the machine that holds together relations of technoscience knowledge and practice as a Pandora's Box, full of turmoil and trouble; but also, as with Hesiod's origin myth, finally with hope.⁸⁵ In the myth I have woven for the mobile telecoms industry, I have taken the analogy further. The handset is a black box machine that stabilises the

⁸⁵ See (Latour 1987: 1-17).

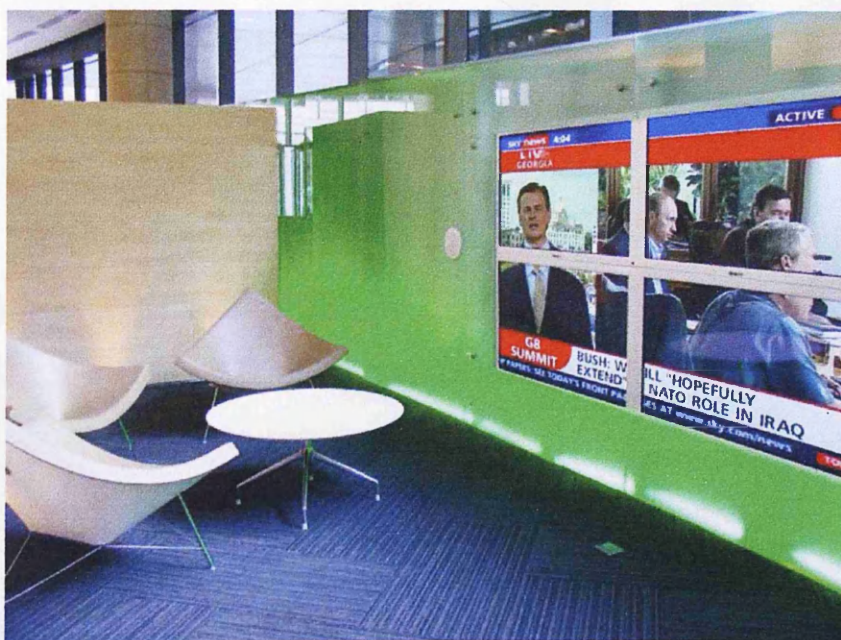
entire network as an object, for not only does it require that the network hold in order for it to function, it is also theatrically opened to reveal the mobile network where necessary. In addition, as I have discussed, the handset also holds the origin of the industry, and its dreams (and nightmares) of the future. The mythical Pandora's Box held a particular form of hope, one mixed with fear and dread, and it is that sense of hope/fear for the future that seems to be present throughout the industry.

Mobile handsets are the machine of hope, fantasy, and fear in the industry. They are the enticing box of curiosities, the artefactual site of anticipation for the future. So that is where I must focus my attentions, and where my years of expertise lie. That is where the possibility of influence, the possibility of seduction, lingers.

FUTURE STORIES

Setting:

Inside the foyer of futures consulting company in central London; a small waiting area, at the boundary between the public street and private corporate office. The opulent display of flat-screen televisions and green-illuminated wall creates a sense of electronic theatre, of watching an informatic world, of the building as a centre for digital bits rather than the mess of experience.



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Operator: [Arriving from elsewhere in the building]... Hi, I'm part of the Prophecy team here in the UK.⁸⁷

⁸⁶ Photograph of company foyer where discussion with industry analyst took place, 2004.

⁸⁷ Source: Ethnographic notes from meeting, 2003. Note that this group has since been re-named much more prosaically as a 'project team'.

Author: Interesting title. A prophecy is usually a matter of religious belief, even righteous fervour; a matter of God-given truth. A prophet is divinely inspired, as perhaps all good technological determinists are, their creations springing-forth unbidden from their minds. I wonder to what extent your title is part ironic statement on the science of economic forecasting, part challenge to any ongoing disbelief by others (one remembers Cassandra), and part ideological authority; prophets speak with the authority of a higher power, perhaps that Grand Oral Disseminator, the CEO. Or are you alluding to the predictive heritage of Arthur C. Clarke and H. G. Wells, what a 1969 book calls “free-lance prophets... brilliantly pioneered by utopian novelists and science fiction writers”.⁸⁸ Are you religious or literary?

Operator: Just read this. This is our bible on the future inside the company. Our charismatic CEO used to quote it.

[He hands me a paperback book entitled ‘Visions’ authored by ‘an internationally acclaimed physicist’].⁸⁹

Prophet: This book is about the limitless future of science and technology, focusing on the next 100 years and beyond... most predictions of the future have floundered because they have reflected the eccentric... single individual. The same is not true of Visions... I have had the rare

⁸⁸ See (McHale 1969: 241).

⁸⁹ See (Kaku 1998).

privilege of interviewing over 150 scientists... during a ten year period.⁹⁰

Author: I think that's what Donna Haraway calls mobilising the optics of scientific truth.⁹¹ You, Operator, are borrowing these visions, borrowing the apparatus of science and the God-trick of omniscience, to present your prophecies as part of the project of scientific truth-making, and to resist any relations with the questionable project of divination. It's a similar move to that of the Consultant, who earlier used graphs and equations to translate assumptions into predictions, fictions into *fait accompli* facts. This book performs a similar role, a scientific citation of the future mobilised to support your own claims. So, tell me of your visions, scientific prophet, what scientifically-drawn futures do you whisper in the ear of the mobile telecoms operator?

Prophet: In 1851 American novelist Nathaniel Hawthorne... went beyond [the invention of electricity and the telegraph] to envision a wondrous day when electricity would endow the planet itself with cosmic intelligence... In the twenty-first century the telecommunications revolution, ignited by the microprocessor and the laser, will finally make Hawthorne's vision come to pass.⁹²

⁹⁰ Book that was handed to me by a mobile telecoms Operator during negotiations for ethnographic access in 2003: (Kaku 1998: ix) .

⁹¹ See (Haraway 1991b).

⁹² See (Ibid: 43-44).

Author: I rather missed the scientific moves in that prediction. Indeed, it read more as a literary reference to Victorian science fiction, from which the technological dream of the “Intelligent Planet” (as you name it elsewhere) is drawn, or at least related; a network “whose range is the planet itself, its subject matter is the sum total of human knowledge”.⁹³

Operator: Exactly... Imagine a world without wires; a seamless, limitless world of verbal and visual communications... [We are] dedicated to turn that vision into reality by promoting and driving the global platform for GSM mobile communications.⁹⁴

Author: Seamless, limitless, global communication, this powerful vision is no simple night-time dream of an Operator, it has histories; I cannot map them fully here, but I can suggest parts of that topography. For example, the book of *Visions* by Michio Kaku claims that Marshall McLuhan, that most technologically deterministic of prophets, was inspired by Hawthorne’s global electronic brain in his own global dreaming.

Prophet: We now live in a global village of our own making, a simultaneous happening... It is created by instant electronic information movement... the global village is

⁹³ Ibid: page 51.

⁹⁴ Source: Rob Conway, CEO of the GSM Association. Conway, Rob (2004) Welcome... About the GSM Association. <http://www.gsmworld.com/about/welcome.shtml> Accessed 06/11/2004

as big as a planet and as small as the village post office.⁹⁵

Author: Hawthorne, McLuhan, Kaku, mobile telecoms Operator, the same vision translates through all of these. Inspired by science fiction, then translated into unassailable truth through the honeyed-words of a scientific prophet, and rehearsed in the mobile telecoms industry as a technological *telos*, the vector and direction for the future. This is something of how prophetic visions come to shape the industry. Hawthorne has become written in the stars, a navigational beacon for the industry to follow (even if they do not know his name) – and I use the metaphor of starlight deliberately, for the industry follows the light of knowledge and technoscience. Yet this science is inseparable from science fiction, it is science fiction.

Prophet: What's wrong with science fiction? If I ever had a dream of mobile communication it was fuelled by my Tuesday night experiences as a student in the 1960s. Tuesday nights were special; the TV room would be packed with anticipation, people waiting to see James T. Kirk beam down to some unknown planet. His first act was always to confirm safe arrival through his flip-top communicator... Thirty years later Jean-Luc Picard just wears a badge – and a stroke of his hand is all it takes to contact anyone... All the technology now

⁹⁵ Marshall McLuhan, 1966. Quoted in book found in design studio of mobile telecoms manufacturer: (Benedetti and DeHart 1996).

looks ripe and the Star Trek badge communicator is feasible.⁹⁶

Author: The potency of *Star Trek* as an imaginary in the mobile telecoms industry is difficult to determine, but the enormous popularity of clamshell and flip phones is perhaps testament to Kirk's flick-of-the-wrist; a science fiction vision made into artefact. Science fictions, such as Kirk's communicator and Hawthorne's global brain, create powerful imaginaries. They participate in establishing the conditions of possibility for the futures rehearsed by the industry. But who is it that rehearses these fictions in the mobile telecoms industry, translates them into pawns of industry prophecy, foreclosing its future?

Prophet: My job, my life, and my mission is to live in the future... at least 5 years ahead of any other human, and 10 years ahead of most⁹⁷... I manage my work as an investor, consultant and speaker across three continents and six time zones. In short I have become a tech-nomad.⁹⁸

Author: You call yourself a "tech-nomad", I would call you an expenses-paid executive or consultant, a denizen of trans-Atlantic and trans-Pacific flights, with the politics of a figure of wealth and mobility. Your future

⁹⁶ Source: Book found in design studio fieldsite during ethnography: (Cochrane 1997: 77-78) .

⁹⁷ See (Ibid: 1).

⁹⁸ Source: Cochrane, Peter (2005) Peter Cochrane's Uncommon Sense: Life as a tech-nomad, silicon.com, January 06 2005. <http://management.silicon.com/itdirector/0,39024673,39126882,00.htm>
Accessed 12/01/2005

life is therefore relevant only for that self-same, very select, group of people. Crucially, you're preaching to the executive decision-makers in the mobile telecoms industry, whom form part of that clique; those who are located in positions where rehearsals of the future have widespread influence across the industry. They are in a position to live a similar life in the future, they believe it, translate it, and spread the word. You claim to literally bring back your word from the future; a future vision that will come to pass because you have seen it, have already lived it as technological fact. However, the story you tell of the future contains nothing of this future life, only an anecdote of the historical importance of science fiction (*Star Trek*). It's the same moves as the *Visions* of the physicist, Michio Kaku. Science fiction is presented, wrapped in the legitimacy of scientific and technological knowledge.

Prophet:

We have only one certainty: the future depends on creation and innovation. Knowing as we all do that the future does not belong to those who talk about it, but those who make it.⁹⁹

The best way to predict the future is to invent it.¹⁰⁰

Author:

But speech is generative, it has effect; talking and telling stories about the future effects the conditions of possibility for the future.¹⁰¹ Telling the

⁹⁹ Source: Gérard Laizé, quoted in book found in design studio of mobile telecoms manufacturer during ethnography: (Tasma-Anargyros and Loeb 1998).

¹⁰⁰ Source: Alan Kay, regarded as a pioneer of personal computing. Quoted in: Cochrane, Peter (2005)

Blog: Don't hold your breath for 3G, silicon.com, June 02 2005.

<http://networks.silicon.com/mobile/0,39024665,39130911,00.htm> Accessed 03/06/2005

one about the global intelligent network, is not an innocent act. The future, therefore, must belong as much to those who imagine and prophesise its possibilities, as to those who make its artefacts; and, no doubt, these practices are deeply entwined. The imaginary has just as much agency as the social and material, and is just as heterogeneous. Science fiction and literary visions of the future are always deeply contingent on socio-materials, on the locations and things from which they are drawn and are inspired: *Star Trek* requires the Cold War space race to fuel the solidity of the Starship Enterprise; Hawthorne requires the thread of electricity through copper wire. Future imaginaries always draw together multi-temporalities from past, present and future (as I have discussed earlier). The future is not sprung from the mind nor from the hand, but is grafted from bits and pieces into a story. If it is well-made it might even be a good story, an *immutable mobile* as STS theory names such cohesions, a story that has its corners knocked off and is condensed so many times that it travels and holds its shape as it translates through the world¹⁰². Hawthorne's global brain is, I would argue, such a successful story. It has translated far through time and space and yet has

¹⁰¹ See (Foucault 1972).

¹⁰² The immutable mobile was conceived of as a mechanism for considering universalism in science. If heterogeneous relationships of apparatus and people can hold their shape as they move through the world, then a scientific experiment can be conducted anywhere, and scientific knowledge is translated into universal knowledge. Although this is told as a mechanism for empire-building, I would suggest that in the mobile telecoms industry the politics may be more complex than such imperialism. Given that there is no single mobile telecoms industry but only partial and disconnected groups of interest, I suggest that immutable mobiles are sites of contestation; potent stories of the future do not circulate innocently in the industry between different interests, but are branded, adopted, rejected, coerced into other relations and so on; see (Law 1986; Latour 1987: 223-228).

remained recognisable in its contemporary re-telling; its relationality has held even though its labelling has changed (from global electronic brain, to global mobile network). I suspect this particular story may have held together because it began as a big global idea, which makes its universalism relatively straightforward.

Journalist: It's important to be able to say to people that you've got some idea coming down the road, and futurologists are a way of doing this. The problem is that if you're a futurologist there's no point in playing it safe. You have to be revolutionary and radical, you have to sell a big idea, or else what's the point of you? The problem is revolutionary, radical, big ideas very rarely come true.¹⁰³

Futurist: The goal of futuring is not to predict the future but to improve it.¹⁰⁴ ...We're a continuation of the age-old human quest [of futures] that will lead to the flourishing of human society.¹⁰⁵ ...Utopian writing [like Thomas Moore's Utopia] is the progenitor of modern future studies.¹⁰⁶ ...Utopia was the Star Trek of its day.¹⁰⁷

¹⁰³ Source: Tim Phillips, technology journalist, quoted in: Kelly, Spencer (2006) The business of future gazing, BBC News, 3 February 2006.

http://news.bbc.co.uk/1/hi/programmes/click_online/4676874.stm Accessed 04/02/2006

¹⁰⁴ See (Cornish 2004: 65).

¹⁰⁵ See (Bell 1997: xiv) .

¹⁰⁶ See (ibid: 172).

¹⁰⁷ See (Bell 2004: 14) .

Author: So utopian science fiction is more important to you, prophets and futurists, than accurate prediction. It's about telling the big idea. But I worry about who is telling these utopian fictions, who gets to say what's a better future. Feminist futurists, Milojevic and Inayatullah, have explored futures writing from diverse cultural locations, such as China, Asia and Africa, and note that "western science fiction is particular even as it claims universality... [It] has focused on the good society as created by technological progress, while non-western science fiction and futures thinking has focused on the fantastic, on the spiritual, on the realization of eupsychia—the perfect self".¹⁰⁸ What counts as a better future is always contingent and local, there is no universal utopia. So, does the multi-national mobile telecoms industry have a single utopian tale?

Operator: [Mobile telecoms] ranks alongside other profound technological phenomena because of its power to change our lives... We are freeing people from the physical constraints posed by their immediate environment... bringing basic [mobile] services, such as voice calls and text messages, to people who have never experienced the benefits of communications.¹⁰⁹

Author: A technologically-determined vision, as ever. And more specifically, the assumption that mobile telecoms is always progressive, that no other form of long-distance communications exists; the industry is blinkered to the

¹⁰⁸ See (Milojevic and Inayatullah 2003).

¹⁰⁹ Source: Rob Conway, CEO of the GSM Association. Conway, Rob (2004) Welcome... About the GSM Association. <http://www.gsmworld.com/about/welcome.shtml> Accessed 06/11/2004

diversity of well-developed communication technologies outside of its own, very local, domain e.g. bullroarers, drums, and other musical instruments whose sound/messages are designed to propagate through a very large area.¹¹⁰

Operator: So how about you, Author, are you going help make the world a better place with your research? Just what is your project about? I'm interested in the leadership position your research might give us. My role is about establishing new brand strategies for the Customer perspective. I'd be really interested if you could re-examine our internal process for why strategies reach a barrier and are not externally adopted.¹¹¹

Author: I would be looking at the relationship between your internal process and the wider industry...

Operator: We really want to know about the end-user perspective, what's the barrier between us and them.¹¹²

Author: There's already a large and growing number of researchers considering the mobile phone in everyday life, and mobile telecommunications as a social phenomenon.¹¹³ This project is more about how you begin to

¹¹⁰ See (Tuzin 1984).

¹¹¹ From ethnographic notes taken during discussions with a potential industry partner.

¹¹² Ibid.

¹¹³ In particular, the INCITE project and Digital World Research Centre at University of Surrey have several industry funded projects considering patterns and locations of mobile phone use (Brown, Green et al. 2002); the Centre for Mobile Communication Studies at Rutgers University, has conducted

formulate the end-user, how the barrier has been made and might develop, for example, through yourselves as a company, and through the mobile telecoms industry more generally.

Operator: Exactly, we need to know how we are getting it wrong. We need to know about our brand, what needs fixing. For sure, both internally and externally.

Author: I am not really interested in conducting research on Consumers. *My research [a Future Archaeology of the Mobile Telecoms Industry] will be about the connection between corporate architecture, technology and everyday life, for it is here that the corporate brand is made and has effects; this will be an excavation into the everyday life of your company, into the coffee cups, chairs and cubicles; it will be an archaeology of the mobile telecoms industry.*¹¹⁴ Does this work for anyone?

Manufacturer: You come highly recommended by a previous colleague of yours. And my brother is an archaeologist, so I get the part about excavation, and I like it. There's some internal politics we need to negotiate, and I don't have any money I can give you, but as the Head of the Design Studio I can get you in the door here. We'll let the legal departments agree any

extended research on the changing role of cellphones in North America (Katz and Aakhus 2002); and Heather Horst and Daniel Miller, alongside others, have conducted a detailed comparative ethnography of the mobile phone and its social and cultural relations in Europe and the Caribbean (Horst and Miller 2006).

¹¹⁴ Quote from original proposal to manufacturer, Blue, where I conducted my ethnography of a mobile telecoms design studio.

small-print, but I tend to take the line that we just get on with things, keep it as informal as possible. It shouldn't be a big deal with confidentiality.¹¹⁵

Author: I like the informality. There are no formal obligations between us, and my research does not need to satisfy any corporate interests. I'll draw up a list of our respective accountabilities to the project, what you will do, and what I will do.

Manufacturer: That's fine, but I suggest you keep some permissions, like photography, audio recordings and collecting artefacts, off the list of your accountabilities, as they will immediately stir up security. We don't normally permit cameras on site. We can explore what's acceptable at the time.¹¹⁶

Author: Okay, so my fieldwork toolkit will be principally composed of notebook and pen. Given that I will be self-funding the project, the politics of my work will be largely determined by myself, the academic requirements of a thesis, and (always) the specific socio-material engagements within this fieldsite of a design studio at a handset manufacturer. My imaginaries for the future of the industry, and my methodology, will be bound by those constraints. I only hope that I can offer something of my imaginaries back.

¹¹⁵ From memory and notes taken during negotiations with ethnographic site.

¹¹⁶ Taken from ethnographic notes during negotiations with my liaison at Blue.

Journalist: I don't think anyone is sufficiently *avant-garde* in the industry to get what you are doing... I am a bit like a digital anthropologist... I get paid to talk to tribes... the ATM tribe, the software engineering tribe... I read *The Company Savage* by an anthropologist¹¹⁷... who brilliantly contrasted CEO interviews with headman meetings.¹¹⁸ Do you know that book?

Author: No, but I recognise your language. Since (and perhaps even before) Marshall McLuhan's call to understand "the total and near instantaneous transformation of culture, values and attitudes [through electric media]" and his insistence on the *tribalism* of the *global village* the technology industries have sought rapprochement with anthropology.¹¹⁹ Lucy Suchman, herself once an anthropologist working in a high-tech multinational, problematises the uneasy mediation, noting how anthropology is commoditised and interpolated as both an exotic, and as productive of the exotic; "the anthropologist as rapporteur of the exotic" ultimately participates in the differentiation of the corporate brand.¹²⁰ In contrast, Naomi Klein names the *cool hunters* who unashamedly package their cultural research for consumption by the brand.¹²¹ Between these poles of reflexivity, corporate anthropology continues in various guises; a magazine for the urban anthropologist, by turns literary, poetic and

¹¹⁷ (Page 1972).

¹¹⁸ Quote from ethnographic notes, taken during a telephone discussion on 19th February 2004.

¹¹⁹ Marshall McLuhan, 1966 and 1974. Quoted in book found in design studio of mobile telecoms manufacturer: (Benedetti and DeHart 1996).

¹²⁰ See (Suchman 2000).

¹²¹ See (Klein 2000: 72).

graphic, is one current fashionable incarnation.¹²² Yet, within its pages, I have yet to read any disciplinary anthropology, nothing recognisably anthropological. In here, and in what you say of your work, *Journalist*, the term seems to have collapsed in on itself, to become literally, as Suchman puts it, *anthropology as brand*. To identify myself as an anthropologist, or associate my work too closely with anthropology, within the mobile telecoms industry is therefore highly problematic, despite the temptation to short-cut explanations using the current vogue for pop-anthropology.

Futurist: There is another possibility you've missed. What of the genre of *anticipatory anthropology*, where anthropologists apply their perspective, theories, models, and methods of anthropology in an anticipatory manner, so that individuals, citizens, leaders, and governments will be better able to make informed policy decisions.¹²³ Is that not your intent, to inform the mobile telecoms industry of your futures, to offer them back?

Author: I am not an executive prophet, neither am I utopian futurist, nor any form of applied anthropologist. The politics of the future imaginaries that I will weave are not intended to support any policy-making or brand strategy. But I do have some small hope of making a difference in the mobile telecoms industry.

¹²² *Stimulus Respond* is an e-Zine that declares itself to be *the first magazine to weave together anthropology and art with the flair of a style magazine and the attitude of street culture*.

<http://www.stimulusrespond.com/> Accessed 06/8/2006.

¹²³ See (Razak 2000).

Futurist: How will your possible future compare with the constant work of industry trend monitors?¹²⁴ With trends such as Infinite Reach, the collision of cellular and AI where technology puts us within reach, anywhere, any time, and in multiple ways?¹²⁵

Author: I think we have come full circle in this conversation. What you call *infinite reach*, is what I have called the translation of the immutable global electronic brain. But the question of how I might tell different futures is a pertinent one. I have already discussed how old futures, Victorian and Cold War science fictions, traverse through the mobile telecoms industry, re-labelled, re-predicted, but never new. How to make different sets of relations? Elizabeth Grosz believes the production of divergent futures is linked to a sense of anxiety: “how is it possible to revel and delight in the indeterminacy of the future without raising the kind of panic... that surround the attempts of the old to contain the new, to predict, anticipate, and incorporate the new within its already existing framework?” Languages of the new, innovation, revolution, become wearily tied to discourses that can only mean predictable transformation. She reminds me that unpredictable movement and transformation often involves mutation and metamorphosis, beyond the control of an author or idea.¹²⁶

¹²⁴ See (Cornish 2004: 78).

¹²⁵ Quote from book found in design studio during ethnography: (Hill 2002: 52).

¹²⁶ See (Grosz 1999).

The mobile telecoms industry is awash with futurists and prophets, with trend monitors and forecasters, but their politics is one of prediction and predictability. Their desire is to reduce the risk of the unforeseen and the unplanned, to reduce possibility; to hold the industry to a single line of Moore's Law, to a line of exponential increasing bandwidth, to utopian fictions that are already well-rehearsed. Unpredictable futures, however, require the courage to face the unexpected, imaginaries that are perhaps more playful, respond eagerly to being taken up, and are wont to metamorphose. Such stories, if they are well-made, should travel, but rather than being immutable, like the tale of the global electronic brain, they should be contrived to travel in the manner of a *mutable mobile*.¹²⁷

Like Marianne de Laet and Annemarie Mol's bush pump such future tales should be authored to adapt to locales in the mobile telecoms industry, not translate a universal utopia. De Laet and Mol argue that the bush pump is a fluid technology designed for "travelling to unpredictable places"; it remains a bush pump even though what holds it together, the mechanical parts and the people, may alter, metamorphose. Similarly, the future imaginaries that I hope to tell should create possibilities rather than attempt to control them. They should be designed to hold themselves together as a particular story of the future, yet still travel to unpredictable places. I hope to do this by constituting my stories with a few built-in *snagging technologies*, parts that snag on particular politics, and prevent the story from becoming too smooth, too whole, too immutable.¹²⁸ I do

¹²⁷ See (de Laet and Mol 2000).

¹²⁸ This notion of a *snagging technology*, as a piece of an object designed to prevent its translation into an unproblematic whole, was developed at a workshop with Marilyn Strathern, at the Centre for Science Studies, Lancaster University 2006.

not want to simply write another star in the sky, another starlit vector for the industry to follow. Rather, I return to the need to be modest in tales of the future, the need not for single ownership or patents, but an acknowledgement of the shared work ongoing in making such extraordinary technologies as cellular mobile networks.

Consultant: It's about vision. The future of the cellular and wireless... industries is far from certain... Having a vision of the future takes more than straight-line analyses and optimistic assumptions.¹²⁹

Author: Or, in the words of the modest author of the bush pump, *sometimes you cannot tell.*

¹²⁹ Zweig, Jane (2004) Visions of the Future. Herschel Shosteck Associates.

Figuration 2

This figuration is the making of the two voices that speak in this thesis. Two voices who speak from two different positions, with their own particular situated knowledge – they know different things concerning the mobile telecoms industry, and have different methods for knowledge-making. There is the *Ethnographer* and the *Future Archaeologist*. Together, through their distinctive methods, these two voices are able to weave two different accounts of the future of the mobile telecoms industry.

There is one embodied author and two voices in this thesis, a multiplicity of positions that needs some explanation. Firstly any author is always situated - even the rhizomatic threads of an actor-network or cats cradle (Haraway 1994) must be strung between a pair of hands; move the hands and the whole knot changes, may even be pulled apart and lost. But this image tends to evoke a marionette, an embodied author pulling the strings of two puppet characters. There is something of the fake, something of the Wizard-of-Oz, and a sense of misdirection in this image, which is absolutely not what is happening. A better metaphor for imagining the staging of these voices is less puppetry and more optical special effects. The voices of this thesis are a performance of Donna Haraway's method of *split vision*: "The split and contradictory self is the one who can interrogate positionings and be accountable, the one who can construct and join rational conversations and fantastic imaginings that change history" (Haraway 1991b: 193). This is part of Haraway's optics of technoscientific knowledge, a slower version of which I explored in the prologue. In her powerful argument for a partial perspective in the making of technoscientific knowledge, Haraway also considers the practice of *splitting* as a mechanism for producing difference; situated knowledge derives from heterogeneity, in contrast to the purity of truth. Again, I want to reduce the frequency of Haraway's rapid arguments, and harmonize them with my earlier thoughts on optics.

Splitting is an effect of a diffraction grating, the permeable apparatus through which a light shines, and which splits the light into several beams. In x-ray crystallography (Haraway's own model metaphor) the diffraction grating is formed by the lattice structure of a crystal.

Splitting light through a diffraction grating creates multiple light waves at a similar frequency, which are then able to interfere. As I argued earlier, interference is a particularly rich metaphor for refiguring knowledge, for interference is an effect of situatedness and generative difference. If I am to interfere in the futures of the mobile telecoms industry, that is, generate differences, then I need multiple knowledges that will superpose in different places. When Haraway writes the 'split and contradictory self' I read a method for conducting a literary-optics experiment¹³⁰:

This thesis is the literary-optical experiment. Myself, the author, is the diffraction grating, a permeable, fixed and fleshy body. And through me passes (transformed) much knowledge of the world. Pertinent to this thesis are knowledges of future-making practices within the mobile telecoms industry, but also knowledges drawn from different disciplines, including ethnography, physics and archaeology. Even more crucially, I am able to transmit imaginary knowledge, highly-crafted ideas, fictional creations, or 'fantastic imaginings' as Haraway calls them. So, I have split-vision, I only see the world in parts. And as an effect of this splitting all these knowledges interfere, mix, make differences, and move on, mixing and moving and interfering. This thesis is a controlled experiment, however, designed to focus on and develop just two moments of superposition, two sites of interference. These are broadly described as: a site of interference between futures of the mobile telecoms industry, and an

¹³⁰ It seems important to note this method developed in conjunction with my fieldwork rather than prior. The voices of Ethnographer and Future Archaeologist are an effect of their locations being enacted, they developed through my embodied engagement with the future of the industry. Split vision is not a purely theoretical move, not simply clever semiotics, but is what happens, it is material-semiotic.

ethnographic and science studies method; and a site of interference between futures of the mobile telecoms industry, and an archaeological and science studies method. At these two sites there is both an interference in method, and an interference between method and evidence.

These are not the only knowledges present at these sites, of course, for no knowledges are inherently pure or complete. But these are the predominant knowledges, the predominant activities. The result of this literary-optical experiment should be accounts of these two sites in the mobile telecoms industry. The two voices who are located at these two sites of superposition are the *Ethnographer* and the *Future Archaeologist*. They weave the threads of multiple knowledges together at these places. These figures are situated at the places where the interference occurs. They are the ones who speak, who are accountable to their positions.

It is only by attending to this splitting of myself as an author and the located interferences that produce these two figures of my method that I am able to “construct and join rational conversations and fantastic imaginings that change history.”

What follows is the making of the two figures-as-methods who act in this thesis. It will mark a shift from this authorial position to their sites of interference. From their respective locations these figures explain their disciplinary knowledges, the parts of science studies, ethnography and archaeology that they weave together. This is how they account for their practices as an *Ethnographer* and a *Future Archaeologist* of the futures of the mobile telecoms industry.

ETHNOGRAPHER

Who I am is a matter of what I do. And what I do is make and re-make locations - a definition that I will explain in a moment. Writing this now, at my desk in my home office many months after writing at my office in the field, I can also add that my most important work is to make and re-make landscapes. To begin a description and explanation of my work, here is one location that I need to make clear:

It was a forty minute walk from my company flat in the suburbs of the town where I worked for telecoms company in the 1990s. Down the boulevards that surgically separated each concrete village community of houses, over two grassy roundabouts, right at the third – like most new towns roundabouts bred incessantly – and finally down an unlit country lane, the thin pavement overflowed by prickling bushes and sun-shrouding trees. Then I turned right into the curving drive (a brief homage to English country estates) that led up to the security lodge and the wired fence that contained the R&D campus where I worked for a multinational telecommunications company. Except that we didn't call it a campus, that North American terminology from Microsoft in Redmond had yet to permeate the UK, we simply called it 'the site'. More specifically it was one of several company sites in the country; this was the nineties, the telecommunications boom, and the company seemed to be spawning throughout the world.

The twenty or so buildings on site were pebble-dash soil surfaces, whose fungal Ethernet-threaded interiors were eating away at the original electronics laboratories. As I sat at my standard-issue Herman Miller birch desk in one converted lab building, I sent my PowerPoint presentations to a printer room at the base of a squat tower whose dimensions had been determined by a Van der Graaf generator. I stared at my standard-issue Herman Miller pin board, my Mac screen, my folders of plastic wallets, my standard-issue Meridian telephone.

This site was twenty miles or so from the M25, the London orbital motorway. Its location was less a satellite of London and more a part of its stratosphere, banished to the thin air of the periphery; accessible, connected, but not too close, not actually on the London Underground, the local marker of the city boundary (Vertesi 2005). As poet and author Iain Sinclair notes in his walk around the landscapes of the M25, it was here, at the edges of London, that the Victorians located their asylums; at what would be later affirmed by Foucault as the optimum distance of twenty miles from the city (Sinclair 2002). Here the Victorians located their country estates for the forgotten, where red-bricked walls kept the clinically mad separate from the clinically sane. And now these liminal landscapes were where the futures of the mobile telecoms industry were being made: Maidenhead, Slough, Farnborough, Basingstoke, Newbury, Bracknell. These were the locations of the major mobile telecoms industry companies, the UK headquarters and R&D sites of the multinationals: Motorola, Sony Ericsson, Nokia, O₂, Vodafone, Nortel, Siemens.

It was this world that I inhabited for my research. I was forced to return to the asylum, to those anaemic, standard-issue tarmac and barbed-wire landscapes I had purposefully left when I had left the industry. My experiences of employment there over many years had left me highly, perhaps even overly, sensitive to their effects; sensitive to the bedlam of London liminality. All the places where I practiced my ethnographic work were in these suburban landscapes of psycho-architectonics, as Sinclair refers to them, architectures of psychosis (*ibid.* 134). He is self-admittedly following the footprints of author J.G. Ballard, who walks the cracked fly-overs and mecca of multi-storey car parks that comprises the Heathrow corridor. Ballard, a denizen of Shepperton, locates many of his stories of suburban breakdown and psychosis around the M25 (Ballard 1973, 2006). For him these landscapes are where the mundanity of corporate life and contemporary consumption are limned by the psychopathic, by an easy slippage into insanity. Throughout my ethnographic work in this landscape of electrically-fenced in/off futures within housing estates of white-windowed bungalows and commuter boxes, I was continually haunted by Ballard's famous quote:

"I would sum up my fear about the future in one word: boring. And that's my one fear: that everything has happened; nothing exciting or new or interesting is ever going to happen again... the future is just going to be a vast, conforming suburb of the soul" (Ballard 1984).

I, too, feared for the futures made in the glassy corporate headquarters of the Heathrow suburbs. What effects might these boxed-up landscapes have on the futures that were made there; might conforming suburbia create conforming futures? It was an Orwellian thought ('keep the aspidistra flying' was his litany for the suburban imagination; Orwell 1936). What futures might be made in places such as this one, from Sinclair's description of the hi-tech industry in the M25 corridor:

The Xerox building is designed to look like office machinery... the windows are an enigmatic blue-green. Like chlorine. Xerox... is a swimming pool on its side; from which, by some miracle of gravity, water doesn't spill. That's the concept: intelligent water. X marks the spot. Uxbridge is made from X's. Lines of cancelled typescript. Fields planted with barbed wire (Sinclair 2002: 180).

The image that this conjures in my mind is too similar to the photographs of the site where I did the majority of my ethnographic fieldwork. Photographs that I cannot reproduce to protect the anonymity of that site and those who were unfailingly supportive towards my work. This is a textual version made from a collage of photographs, taken by me, as I stood outside the site with a camera:

...The buildings of the company campus are three ice boxes, facing inwards towards a bare tree-thin car park. The boxes are alternating layers of white china and blue-green water, a super-conductivity experiment in chlorine and ceramic. Two stone white towers at the front of each box clamp the frozen layers in place, squeeze them together. I and the unmarked world, without access, are kept safely at bay behind thick metal stakes; a Faraday cage to encircle the experiment, which tries to stop any information leaking out, and the muddy grass verge,

the bus stop, the street lights, and the red-brick walls of the housing estate across the road, from leaking in...

I make this landscape of the M25 stratosphere from my memories, here, because my ethnographic work was imbued with a concern for location, landscape and locale. This concern for the landscapes of the mobile telecoms industry, as well as my concern with its futures, were an effect of my protracted experience of those locations, my long involvement in landscapes of the London orbital, and in future-making. As Charles Goodwin states: "The ability to see a meaningful event is... a socially situated activity accomplished through the deployment of a range of historically constituted discursive practices" (Goodwin 1994). Goodwin's examination is of professional vision, how communities of people teach and learn to see as a socio-material activity. My perception of the M25 corridor is not a professional vision, in the sense that I have not been formally taught to see the landscapes that so possess me. But they are, for sure, historically-constituted and socially situated, and an integral part of my professional ethnographic vision.

It is this role of 'location' as both an epistemological site, as made by my particular socio-cultural history, and as embodied site of my everyday experience during the months of my ethnography, that is important to my work, and which I need to explore and reflect on.

Marilyn Strathern discusses ethnography as an immersion in the 'double location' of both the field and the desk (Strathern 1999: 1). There is a prolonged period of immersion and writing, in the field and at the desk, neither are separate practices but each partly informs and is included in the other. She emphasises how ethnography is a matter of movement (as well as immersion) between these locations. Ethnography as defined by travel between home and fieldsite is a metaphor also well-rehearsed by James Clifford (Clifford 1997a). He argues that "spatial practices of travel... have been crucial to the definition and representation of a topic; ...the translation of ongoing experience... into something distanced and representable" (Clifford 1997b: 189). For Clifford, travel and spatial separation between home and "some

other place" are crucial to creating an ethnographic field. Rather than ethnography as immersion or dwelling in a static field, however, he promotes fieldwork as a travel encounter. Yet, this model still retains the classic anthropological distinction of self and other; it performs the ethnographer as a separate figure, a stranger (Agar 1980). The fieldsite is the site of the other, home is the site of the self, and the spatial segregation of these is necessary for the formation of some objectivity. Clifford's travel encounters are all one way, there is little symmetry in his account, and he is critical of ethnographies where the other comes visiting; for example, he questions how Karen McCarthy Brown was able to "pull back from her research" with a Haitian family in Brooklyn, when her informant regularly called her at home, only a short subway ride away, to talk, or to ask a favour (*ibid*). Although I resonate with Clifford's concern with the spatial, and with (not necessarily embodied) movement as a crucial aspect of ethnographic work, I do not share in his desire to enact a boundary between my home and my fieldsite, as though these were separable and coherent entities. I travelled, yes, I took the train from Lancaster to the periphery of London every week for four months; and I moved through relevant websites and through phone calls to helpful informants and previous colleagues. But it's hard for me to cite any moment during these activities when I arrived at my fieldsite in the mobile telecoms industry.

Breakfast in building 1 [the alleged engineering building]. Here people look more North American. Polo shirts, chequered shirts, blue collar shirts. 1 woman, 17 men and me.

The receptionists greet me as though I belong. Friendly, joking, they remember my morning breakfast ritual [which involves having to get a special pass to go to the other building]. I am issued with my pass for two days. I still cannot use the cash-less card system.

Breakfast [see a] guy with... hair... spikes. There are three [travellers] caravans parked on the verge opposite [the company's]

green metal fence. Building 3 has run out of security passes...
Frustrated as I can't get in to a Design Board meeting.¹³¹

I did not arrive at a fieldsite, I made a fieldsite as I moved through different locations; locations that were distributed, that included changing parts of the company campus in the M25 Heathrow corridor, but also the blue, black and white pages of corporate websites, and the endless stream of plastic-wrapped free industry magazines and conference brochures that collected in my little wooden mailbox on the university campus; and, finally, the social-material and imaginative landscapes comprised of ASCII codes that I tap into the word processor on my laptop. The mobile telecoms industry and its futures only exist in this thesis at my scale, are an effect of my embodied encounters throughout my life. I would say that my ethnographic work is not simply tacking back and forth between the 'double location' of desk and field, but involves the weaving together of multiple locations. As ethnographer, I travel, but the topology of that movement is not between two distinct poles, but through a landscape I must continually work at.

This version of ethnography as a practice of making locations is not new, but has been suggested by Akhil Gupta and James Ferguson in their discussion of location in anthropology (Gupta and Ferguson 1997). They agree that ethnography's strength is its sense that knowledge is ascribed to a somewhere and, particularly relevant for me, that "the knower's location and life experience are somehow central to the kind of knowledge produced." (*ibid.* 35). They frame ethnography not as a matter of *bounded fields*, but as a matter of *shifting locations*; the crucial reflexive questions become who shifts locations and why, rather than the determination of differences between fields.

As an effect of this approach, the question of my being located as a native anthropologist of the mobile telecoms industry, a figure produced in a cultural discourse of a bounded

¹³¹ Extract from ethnographic fieldnotes taken during March 2004.

community of insiders/outsiders (Narayan 1993; Weston 1997); or the question of auto-ethnography, where I might be described as problematically studying 'at home' (Strathern 1987), or conducting ethnography through autobiography (Reed-Danahay 1997); these questions of objectivity and separation are transformed into questions of movement. Rather than a discussion of my similarity to, and prior knowledge of, the mobile telecoms industry and its futures, more pertinent is the question of my translation between the locations involved in my ethnographic work.

There is no singular mobile telecoms industry. There are only multiple positions from which to speak colloquially 'inside' and 'outside' the industry. I was, therefore, constantly on the move as an ethnographer. During my work I shifted endlessly between the site of my memories of the industry, previous colleagues, network operators, manufacturers, CEOs, journalists, academic commentators, industry associations, and the many different locations within the design studio where I conducted the bulk of my study. As Gupta and Ferguson state, "a location is not just something one ascriptively has... it is something one strategically works at" (Gupta and Ferguson 1997: 37). I had to move and make and re-make my location: there were times when I was asked for my opinion in design meetings, as though merely an adjunct to the multi-disciplinary group, and decided to downplay my experience; in other moments I had to leave a meeting before a conference telephone call, as my position was considered too complicated to explain, and the discussions too delicate to impose upon. To frame it classically, I was not studying up in a multi-billion pound, multinational industry, rather I had to negotiate studying upwards in a management meeting, studying slightly less upwards over lunch with the designers, and negotiate studying sideways when talking with previous colleagues.

Ethnography as a practice of location-making also resonates with Haraway's optical metaphor of generative interference. Rather than ethnography as the collection of data from a field site, it is a location for "situated intervention" (Gupta and Ferguson 1997: 39). As an ethnographer, my interference is made in the making of my locations, and it is the practice of

interference in the futures of the mobile telecoms industry that is at the heart of what concerns me.

Location also encompasses the sense of landscape that I am particularly sensitive to; around the M25 sites of the industry. But landscape and location are not synonymous. Location, in the sense of a socio-cultural and epistemological locality, has been well-rehearsed in anthropology (as I have outlined), and particularly in STS through Haraway's work on situated knowledge (Haraway 1991b). Although it includes a sense of the local, it does not generally include the specific socio-materiality of a locale. Landscape and its effects, and its participation in knowledge-making, has been less well discussed.

In anthropology, landscape has been conceived of as a cultural and material process (see for example Hirsch and O'Hanlon 1995; Ucko and Layton 1999). In the well-known edited collection on *The Anthropology of Landscape*, articles by Maurice Bloch and Alfred Gell in particular highlight the material effects of landscape on local knowledge-making. Bloch reflects on the importance of 'good views' and being able to see 'clearly' for the Zafimaniry of eastern Madagascar, who live predominantly in a cloud-enshrouded, thick forest (Bloch 1995). He suggests that this perception of clarity is part of their positive disposition towards the cutting down of the forest, and its transformation into rice fields; it frames their understanding of the transformation of the forest. Gell is also interested in the effect of perceptions on a forested landscape, but for him it is the dominance of sound as the principal sense in perception of the visible and distant (Gell 1995). If one heard something in the forest, then it was there; in contrast to Euro-American reliance on visibility to verify presence. In Gell's account of the Umeda, Papua New Guinea, an effect of their densely forested location was that, what was visible was *ipso facto* close; Gell suggests that when they first saw the sea, they perceived not a distant ocean horizon but a vertical wall of water, an immense wave that might engulf them. These anthropological accounts begin to explore the

effect of landscapes on how local knowledges are made, suggesting that the locality of the mobile telecoms industry might, similarly, effect its future-making.¹³²

An alternative approach has been developed by Tim Ingold, an account that begins with the statement that "landscape is not 'land', it is not 'nature', and it is not 'space'" (Ingold 2000b: 190). He writes against romantic notions of landscape as some pure mass of material (rock, soil), or as a natural backdrop, or as some spatial and Cartesian emptiness; it is not, as another seminal description defines it, a "cultural image, a pictorial way of representing or symbolising surroundings" (Cosgrove and Daniels 1988: 1). His version of landscape is firmly natural-cultural and embodied. Perception (sights, sounds, smells and so on) are gathered from the landscape as an effect of particular activities there, rather than meaning simply attached to a location. Ingold also insists on a Heideggerian *dwelling* perspective (Ingold 1995), which I find difficult to unite with his notions of landscape as an ongoing effect and as a story; for me, there is no phenomenological 'ground' possible, the turtles go all the way down. But it is his particular notion of landscape as an effect of situated action (borrowing that more familiar term from Suchman 1987), which I want to work with.

STS has been frequently concerned with 'the missing masses' as Bruno Latour calls them (Latour 1992), a symmetrical study of knowledge-making that is socio-material. However, landscape rarely figures as an actor, despite locality often being central; the missing masses do not seem to include much of the world around them. Karen Barad, a proponent of the effect of materiality in making the world (what she calls 'agential realism'; Barad 1999), argues that things 'intra-act' rather than simply interact, materiality pushes back, the apparatus alters the laboratory knowledges that are made during an experiment (Barad 2003). Similarly, the materiality of landscapes, the roundabouts, the fly-overs, the red-brick

¹³² This statement is not intended to be read as a comparison between knowledge-making by the Zafimaniry, Umeda, and the Mobile Telecoms Industry. Rather, I am comparing Euro-American ethnographic accounts of these, and therefore their shared theoretical relations.

houses, the birch forests, the M25, must also 'intra-act' with the activities in which their agencies are involved; activities that include the making of the futures of the mobile telecoms industry in those places.

As an example of thinking-through landscape as situated action and as an 'intra-action' I want to re-read Helen Verran's interference into the knowledge-making of Australian settlers and Australian aboriginal landowners (Verran 1998). In her accounts of land ownership by these two groups, the landscape of the Northern Territory figures strongly as an actor. Verran's ethnographic and philosophical work is to mix the ontics of both pastoral settlers and Aborigines. Settler imaginaries involved in 'land' that are derived from Kantian notions of representation, are hybridised with Aborigine imaginaries of 'land' as lived, to very briefly summarise a much more detailed argument. What is crucial here is that, not only are imaginaries ontically potent, but the specificity of the landscape is also potent. "Not all places/lands are equivalent," explains Verran in her interference. A pastoralists homestead, farm machinery, paddocks and the activities there, constitute a particular place, in a similar way (in this hybrid ontics) to the Aboriginal sacred sites and the activities involved in constituting and maintaining them as places. Other places are constituted differently, and, consequently, are meaningfully different; different landscapes have different effects on the ontics of land ownership.

Verran's hybrid version of land ownership creates a version of landscape that is dynamic, political, and contestable; landscape that is not categorically fixed but is an effect of ongoing situated actions. This resonates with Ingold's version of landscape but is far more potent. Verran's landscape has ontic effects, it can make and re-make the world. This, for me, is less landscape as a performance, and more landscape as work, as a practice of care.¹³³ In this

¹³³ 'Care' is Annemarie Mol's term for the attention to life (and death) provided in medical contexts (Mol 2006). I am appropriating it here both to suggest attentiveness and the politics of landscape maintenance. Not to care creates a very different landscape to places that are cared for; care does not

interference, two ontics and, as an effect, two different places are partially (and dangerously) mixed; for an Aboriginal landowner and a settler experience two different landscapes, even if standing side-by-side (as Verran's paper on the ontic differences between scientific and Aboriginal firing regimes demonstrates; Verran 2002). Although I am not an Australian pastoralist, I find Verran's interference into enlightenment and representational approaches to landscape enormously insightful. And it is her version of landscape as maintained, which requires attention to its constitution and maintenance over time (and in the Aborigine case over many kinds of time), that I will use throughout the rest of this thesis, as part of my ethnographic approach.

There are still other aspects to landscape that none of the approaches so far seem to include, and which may be particularly important for an interference into futures of a wireless telecommunications industry: landscapes of infrastructure, and landscapes of absence.

Adrian Mackenzie, in his ethnography of a telecommunications software infrastructure system, also considers Verran's approach to landscape as crucial (Mackenzie 2003). His interest is in the 'imaginary' as a situation for practice, and therefore as a mechanism for understanding the locality of infrastructure whose practices of constitution and maintenance constantly resist localization. Mackenzie argues that the infrastructure was complexly located in the imaginaries of those who laboured to constitute it as a distributed set of software codes, computer equipment, air-conditioned rooms, etc. Connected places around the world that the developers had never visited "were strongly imagined in and around [the infrastructure system]". Mackenzie describes the offices, server room, and café where the developers

simply denote environmentalism, but any form of attention, including legal ownership, planning designation, company branding, and so on. Care also attempts to suggest that landscapes are situated and multiple in their constitution: a pedestrian might not care at all for the grey kerbside box that they walk past everyday (and probably do not notice it at all), but a telecoms engineer who regularly re-wires and maintains the mass of connections within, cares very much for its ongoing life.

conducted much of their programming work, but the infrastructure itself was only partially visible; it could be made partly material through painstaking labours connecting code and cables across a wall of equipment. The landscapes of large-scale infrastructures, such as telecommunication systems, are only ever partly socio-material; they are partly locatable in dispersed network exchanges, server farms, network management softwares, and basestations, for example. But as connected landscapes, they require additional attentiveness to the situated practices that constitute them, practices in which their location is, necessarily, imaginary. In this sense, the landscapes of infrastructure may be irreducible from the programmers that constitute and maintain them; an argument that follows on from Lucy Suchman's concern for the irreducibility of robots and their programmers in the constitution of meaningful practice (Suchman 2007a).

In a different vein, Stefan Helmreich is also concerned with the status of landscape in large-scale software systems. In his ethnographic study of the Artificial Life scientific community at the Santa Fe Institute, New Mexico, he explores the politics of landscape when "the word for world is computer" (Helmreich 1998). His are landscapes of code that are no less socio-material or imaginary than infrastructures, but his concern is not with the location of the code, but more its politics. He notes how the artificial landscapes of these software worlds are constituted by highly gendered and Judeo-Christian imaginaries of creation and exploration. An attentiveness to the politics of landscapes, no matter their material or imaginary status, therefore seems crucial.

Another particular form of landscape politics is its absence. John Law notes that the UK Chief Vet marked the absence of landscape specificity from the computer systems that modelled the foot and mouth epidemic in 2001; an absence that may have had life and death consequences for millions of animals that were slaughtered as an effect of that modelling (Law 2006a).

Yet, perhaps the most famous absent landscape remains Area 51 in the Nevada desert. This is an area that does not officially exist according to the U.S. government, but whose landscape of nuclear testing, air defence technology development, secrecy, and intensive security, have had extraordinary effects. Susan Lepselter listens to the narratives of alien abduction and conspiracy that rush in to fill this uncanny absent-presence as she talks to those who live in the nearby town of Rachel (Lepselter 2005).¹³⁴ Here “government radiation monitors click discretely behind old-fashioned... gas pumps, decorated with paintings of UFOs”. Lepselter listens because she hears how the narrative of a frontier landscape (Rachel was a mining town) has grown stale, crumbled, and been displaced through colonisation and loss; the landscape has been colonised by the military, and lost to those who live there. This is pertinent to my own constitution of a fieldsite, for colonisation of the landscape by the mobile telecoms industry is also a widespread activity. According to the Ofcom website in December 2006, there are 52,000 mobile telecoms basestations in the UK.¹³⁵ Many are attached to pre-existing buildings, but many are isolated cell sites, the antenna high up on a mast and the basestation surrounded by a barbed-wire fence. These cell sites colonise the landscape, not only through their visible presence, breaking the skyline on hillsides and standing over a herd of Friesians besides the M25, but also through an invisible presence, their electromagnetic radiation.

¹³⁴ For a discussion of absent-presence see (Law 2002a).

¹³⁵ See <http://www.sitefinder.radio.gov.uk> (select ‘table of basestation totals’ for current figure). Note that this figure also includes TETRA basestations, used by police, taxis, network rail, and other private radio infrastructures.



Reading, Berkshire UK, a town close to many of the mobile telecoms industry headquarters and very much part of the London stratosphere. This photograph is one of the many materials, collected over several years, that now form part of my ethnographic archive.

Despite significant public controversy, a government report, and ongoing scientific negotiations funded by industry and by government, the effect of electromagnetic radiation from mobile telephony equipment on the human body has yet to be agreed.¹³⁶ The colonisation of landscape by the industry through antenna equipment and (invisible and therefore often uncanny) wireless signalling, has been, at times, strongly resisted by those who care for the places they appropriate. I therefore need to be sensitive to the colonial impetus of the mobile telecoms industry, not just to the constitution of its landscapes, but to the appropriation and re-constitution of its landscapes; places that may be partly imaginary (in the case of infrastructure), but may also be partly invisible.

¹³⁶ 'The Stewart Report' was issued by the Independent Expert Group on Mobile Phones (IEGMP) in May 2000. Its recommendations include a "precautionary approach" and "attention" to auditing cell sites located near schools. The report can be viewed online at <http://www.iegmp.org.uk/>

Returning to the Nevada desert for a moment it is also worth noting that, in addition to Area 51, the desert holds another landscape whose politics is one of absence and colonisation: Yucca Mountain. This volcanic ridge is to be the principal nuclear waste storage site for the United States. It's a landscape officially appropriated by the Department of Energy for the next ten thousand years, for that is the length of its operating plan; an appropriation that has been widely contested, not least by native peoples, the Shoshone and Paiute, who experience the mountain as sacred, and a central part of their spiritual landscape (Bloomfield and Vurdubakis 2003). But, as Joseph Masco realises as he talks with one of the tunnel engineers, it's a plan that has a problematic relationship (to say the least) with engineering tolerances and the material specifications necessary to transform the landscape from a sacred mountain into a permanent nuclear waste repository: "I'll guarantee this tunnel for one hundred years. After that I hope they'll have someplace else to put this stuff," says the engineer, dismissing the ten thousand year time frame as an effect of a political rather than a technoscientific process (Masco 2005). Within this notion of landscape as maintained, then, is a sense of duration, or a sense of lifetime. The land as lived, as I put it earlier, also suggests that land has a lifetime; when it is no longer maintained, it dies, or rather is transformed into a different landscape through different practices. Some landscapes have been alive for considerable millennia, the native peoples in Nevada claim to have maintained Yucca Mountain as a sacred site for twelve thousand years (Bloomfield and Vurdubakis 2003). This is not a version of geological time, for landscapes may geologically alter and yet remain meaningfully the same.¹³⁷ Yucca Mountain is itself geologically unstable; as a Shoshone spiritual leader says, "it's not a mountain... it's a rolling hill" (*ibid*) or as the tunnel engineer puts it, "this is bad rock" (Masco 2005). So my ethnographic sensitivities to landscape and location need to retain a sense of their temporal stability, particularly in the future. How do socio-material practices constitute locations as stable (Law and Mol 2001). How do places alter as the practices that constitute them alter. And, conversely, what effects do they have on the constitution of the future landscapes of the industry.

¹³⁷ For a social discussion of different temporalities, including geological time, see (Adam 1990).

As I said at the beginning it is attention to location that binds my ethnographic work together. It was the location of my ethnography that I worked to cohere as part of an interference. My knowledges as a prior employee of the industry were strongly affected by the chlorinated waters of corporate life around the M25.

Below are the distinct landscapes and locations of the mobile telecoms industry that I made, some of which coalesced early in the project, and others emerged later from the mêlée of materials:

1. Design Studio in a Manufacturer (M25 Stratosphere, UK)

This involved a four-month period, during 2004, of immersion in a design studio of a manufacturer of mobile devices (cameraphones, mobile phones, future mobile devices). I spent three days of every week either at the design studio on a mobile telecoms company campus (discussed earlier), or with the designers at another location. These experiences also overlapped with my memories of working as a user interface designer near London, at a design studio of another telecoms company during 1997-1999.

2. International Industry Conference (3GSM World Congress, Cannes, France)

I had already attended this important annual conference in 1997 and 1998, working on the company stand as a designer of future product concepts. In addition to these memories, I conducted unstructured, lengthy interviews with four attendees of 3GSM World Congress 2004: a Venture Capitalist, Innovation Advisor, Journalist and Market Research company CEO. I also gathered the full conference pack, and substantial print and web material from within the industry concerning the conference (magazine coverage, newspaper articles, web television coverage, corporate websites, press releases and photography and so on).

3. Closed-Meetings of an Industry Alliance (M25 Stratosphere, UK)

I attended three closed meetings of an industry alliance in 2003 and 2004, at a variety of places around the M25. They were members-only events concerning current industry issues, usually comprising a day-long seminar of presentations. These were combined with memories of my experiences as a member of a similar industry association in 1998-2000.

4. A mobile telecoms industry exhibition (Mobile Commerce World 2003, London, UK)

I attended one day of a three day exhibition held at ExCeL centre, London Docklands in September 2003. Here, I explored the exhibition stands, demonstrations, and interviewed a small number of exhibitors. This was augmented by my memories of attending several, considerably larger, industry exhibitions during my employment: CeBIT 1998 and 1999 in Hanover (a European centric consumer and industry IT and telecoms show), and CES in Las Vegas in 2000 (a North-American centric Consumer Electronics Show). In addition, I collected a large number of brochures from the many annual and individual industry exhibitions and conferences held throughout the year.

5. Black board (Lancaster, UK)

An ongoing assembly and re-assembly of my archive of primary and secondary sources, stuck to a large black board in my home office. This archive of hundreds of items was collected both prior to, and during, the research. The board variously related: photographs, transcripts of interviews, ethnographic notes and drawings, extracts from websites (captured with PDF), transcripts/images from television programmes and adverts, transcripts/images from online video sources, magazines, brochures, flyers, press releases, emails (both personal and from newsgroups), postcards of inspirational artworks, poetry, sticky notes, words and brief ideas:



Black board, Lancaster UK

What happened next in my home office dominated by my black board, was the evocation of those landscapes into this thesis; the translation of the socio-material, imaginary and invisible into text and pictures on a page.

My choice of location as a writer effects how my assemblage of materials is translated, and what interferences are made in my text. Ethnographic writing has long been argued to be a generative practice, in which attention to the politics and effects of the account is crucial (Clifford and Marcus 1986; Geertz 1998). Writing location, as it manifests as POV (the Point Of View of the author) effects how I am held accountable by my readers, industry and academe; ethnographic writing is always allegorical, that is, a moral translation (Clifford 1986). I will not and cannot write in the style of a 'realist tale' - an account written with an absent and omnipotent author position (van Maanen 1988), for my location is central to all that I do. Instead, I will, more appropriately for my concerns, write a series of *situated accounts* as Kamala Visweswaran calls her carefully woven array of literary styles. Her ethnographic approach, comprising fragments of stories from many locations told in many

voices, allows her to presence silence and resistance, differences and incoherence (Visweswaran 1994). Similarly, in my desire to give voice to absence and instability, to presence and fixity in the futures of the industry, I will not take a single writing approach but will be attentive to what I wish to translate, what interference I hope to make; for different styles of writing, including narrative, are able to translate some things and not others. Although I do not share his Derridean approach to the signification of texts, which tends to forget the agency of the socio-material, my desire to evoke rather than represent my ethnographic landscapes does resonate with Stephen Tyler's concern for expressing the unspeakable in ethnographic writing (Tyler 1986a, 1987). For Tyler ethnography does not present knowledge but rather evokes what cannot be known discursively; ethnography is "a co-operatively evolved text consisting of fragments of discourse intended to evoke... an emergent fantasy of a possible world... It is in a word poetry..." (Tyler 1986b: 125). What matters is the effect that the writing attempts to create rather than the representation of a singular, coherent account of ethnographic locations. What matters is that the world is *possible*. Tyler suggests that such writing should always be collaborative and polyphonic, which I translate as multiply situated. I am also interested in writing with multiple social and material locations, with multiple voices included in the narrative. This is part of a politics of effect on the reader, the politics of poetics. I will write on the basis of attention to *situated effects*, the evocation of landscapes of persons and things rather than a single, nowhere authorial voice. This attention requires multiple and moving locations to connect fragments of futures of the mobile telecoms industry, rather than one piece of writing. The author, Ursula K. Le Guin, recognises the distinctive effect of connected stories: "a book of stories linked by place, characters, theme, and movement, so as to form not a novel but a whole... It does things a novel doesn't do." (Le Guin 2002: xi). She suggests such a form a writing might be called a *story suite*. The stories that I write in this thesis, are part of a story suite concerning the people, places and practices that form the futures of the mobile telecoms industry.

FUTURE ARCHAEOLOGIST

On a walk through a Thames Valley business park, I am drawn to a particular campus of high-tech industry buildings, enclosed by a low earthen bank. The landscaped bank of well-cut grass seems to be a symbolic enclosure, delineating a separation between myself and the cars, buildings, people and property on the other side. Another high-tech industry building is enclosed by a ditch of water on one side, and a railway line on the other. The building itself is located on a slight rise so that as you approach, the glass and silver panels extrude into the sky. In neither case is there a formal wall or fence around the buildings, nothing to prevent a determined intruder, the separation of property (intellectual and material) is maintained through an orchestration of subtle landscape features and effects, not dissimilar in form to a Neolithic henge. The world around these buildings, ditches and embankments also includes traces of these monuments beneath the ground. So, I walk over concrete panels labelled *BT*; sockets that mark the threads of fibre optics that suture these companies into place, as the stone sockets of the Ring of Brodgar suture that monument into its extraordinary landscape of earth and sky (Richards 1996). The archaeologist, Christine Finn, during her year in Silicon Valley walks and drives through the high-tech world in a similar vein, noting the practices of landscaping in both buildings and digital artefacts (Finn 2001). Her fieldwork includes landscape photography of monumental buildings, interviews with museum curators of antique computers, and with inhabitants of the orange orchards and social landscapes of San Jose, before it became subsumed as part of Silicon Valley. What kind of archaeology are these fieldwork practices? Are they recognisably archaeological?

Michael Shanks, a key theorist in the disciplinary turn from processualism to post-structuralism, is adamant that "archaeology is the practice of archaeologists not a methodology" and that the power to act as an archaeologist, to negotiate and adjudicate the past, derives from being a member of the community of archaeologists (Shanks 1992: 44). The temporality of the data and the peculiarity of the practice is less critical than the politics of disciplinary power. This particular archaeology, known as post-processual archaeology (Hodder 1989), acknowledges the locatedness of archaeological data, that archaeological

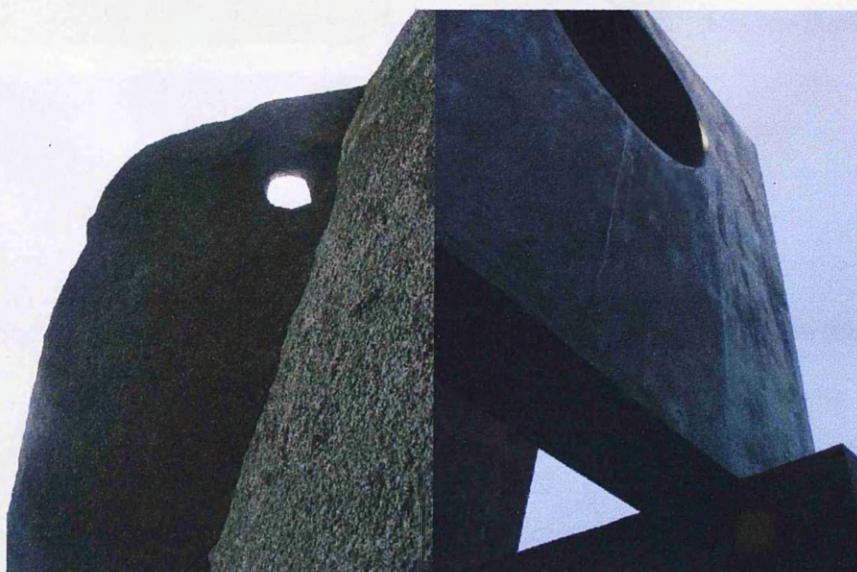
knowledge is made in ongoing situated practice: "the past exists as part of the present in terms of the aims, assumptions and conceptual frameworks of the archaeologist" (Shanks 1992: 27). In this sense, and for this reason, I cannot simply call myself an *archaeologist* for, unlike Finn, I and my practice have not been acknowledged within that disciplinary field. My language, as you have just heard, is suffused with Science and Technology Studies (STS) disciplinary knowledge. I am something else. I am an interference between both these disciplines, and much more. My location is entirely a matter of an 'STS-flavoured' archaeology of the future of the mobile telecoms industry, and to acknowledge that, I bear the label of the *future archaeologist*. For there is something undeniably archaeological in my engagement with the landscapes of the business park, my senses are attuned to an archaeological resonance, a sensitivity that has been developed and finessed through my archaeological experience.

The prehistorian Richard Bradley argues that although excavation is often considered the defining characteristic of archaeological practice, it should always be in dialogue with field survey techniques, extended and prolonged immersion in the landscapes of a site (Bradley 2003). In recent years, landscape archaeology studies have proliferated, developing from an initial phenomenological approach to places (Tilley 1994) into a dissolution of natural-cultural distinctions between monument and landscape, artefact and raw material. For example, one I tantalised you with earlier, Colin Richards transforms the Ring of Brodgar, a stone circle on the islands of Orkney, from a monument rising from the shores of a loch on the banks of an isthmus, into an orchestration of stone, water, earth and sky, all of which together perform the experience of a circular landscape; the Ring of Brodgar is not a monument, but a particular place that performs an experience of a circular world (Richards 1996). Walk away from that place and the experience is lost, the lay of the land has changed, the horizon shifted, the relationships between earth and water different. It is a performance that does not easily transfer into text, but one that is transformative of the senses. I have stood in the Ring of Brodgar and been taught to see archaeologically, to experience that circular world, to experience that giddy moment when the whole world seems to shift, and suddenly I am no longer standing in a heritage site, but standing in awe of the circular symphony of stone and

sky that is happening all around me. Similarly, I have wandered over the boulder-strewn landscapes of Leskernick, on Bodmin Moor in Cornwall, with a photocopy of a journal paper on the circular structures in amongst the boulder fields (Bender 1995; Bender, Hamilton et al. 1997). I have been shown rings of stones that the authors photographed wrapped in cling-film and painted white, for they are invisible amongst the sheer mass of granite boulders. I have been shown gaps in these rings where the authors have held a wooden doorframe, to imagine and photograph the view out across the moor. What was a boulder field has been transformed for me into a prehistoric settlement whose circular foundations comprise a mixture of altered and un-altered stones, my senses taught to blur the now meaningless categories of archaeological and geological; for as much as there are ruined buildings, there are also ruined stones (Bradley 1998).

Charles Goodwin calls it professional vision, a taught, socially-constituted practice of perceiving the world (Goodwin 1994). He follows how an archaeologist on an excavation learns to see soil strata using a colour chart, making what was invisible now visible in the dirt. This is a particular archaeological vision that I do not possess. My training in archaeological perception is, in contrast, entirely landscape related, and entirely located in British prehistory (landscapes of the Neolithic and Bronze Ages predominantly). I have attended only one university undergraduate course in archaeology, and never an excavation. My archaeological perception is almost entirely an effect of dwelling amongst the monuments, of telling the stories of landscapes as I move and engage with the world (Ingold 2000b: 189). Its diversity of teaching locations includes acting as research assistant, with tape measure and microphone in hand, on numerous lengthy archaeo-acoustic projects inside passage grave monuments, learning to hear the sound effects of monuments (Watson and Keating 1998; Watson 2001); several days fieldwalking, learning to see worked flint in the dark, ploughed soils of the Cherhill Downs, near Avebury, becoming sensitive to signs of retouch and the bulb-of-percussion, the signifiers of flint and stone knapped in prehistory; and standing with a camera and tripod for a night-time television reconstruction of ritual activity at Stonehenge, replete with dry-ice and arc lights, learning to see the politics and particularity of contemporary versions of prehistory (Bender 1998).

All of this creates an archaeological perception that has ongoing effects, no matter the age of the landscapes in which I am immersed, as my wanderings through the business park earlier suggest. So, when I see the abstract sculptures of Barbara Hepworth, I also see the cup-marked stones of the Yorkshire Dales and the portal dolmen on Cornwall's Bodmin Moor, Neolithic landscapes and forms that Hepworth herself was deeply immersed in (Gale and Stephens 1999; Bowness 2003).



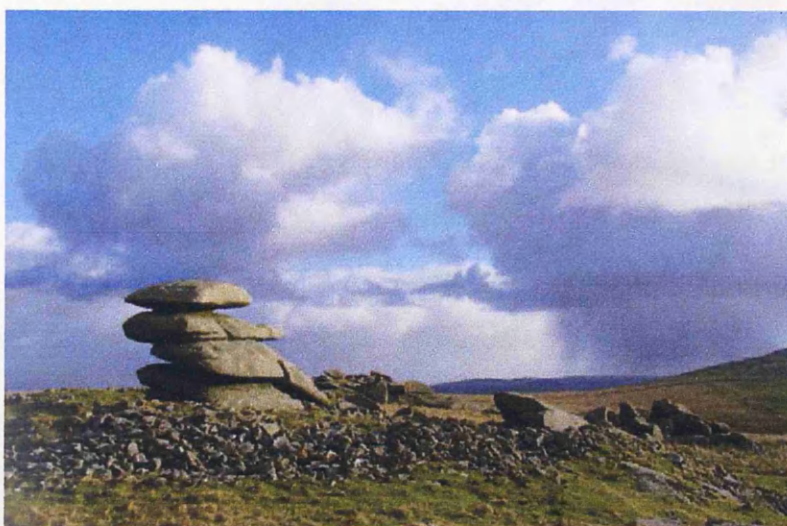
Trevethy Quoit, prehistoric portal dolmen (Bodmin Moor, Cornwall), and *Four-Square (Walkthrough)*, Barbara Hepworth (Barbara Hepworth Museum, St Ives).

For me, a mobile phone antenna standing atop a Bronze Age round barrow is as monumental and as fascinating for its landscape performance, as a stone tor above a (rather similar) Bronze Age cairn. And a mobile phone is a portable artefact as fascinating as a Neolithic polished stone axe, a comparison I will return to later.



Monumental...

a mobile phone mast
embedded in a Bronze
Age round barrow
(Dorset Ridgeway, near
Maiden Castle).



Monumental...

a granite tor embedded
in an Early Bronze Age
cairn (Showery Tor,
Cornwall).

Archaeological vision is inherently partial, however. It sees potsherds, pieces of charcoal, bone fragments, fallen stones, sea level shifts, eroded rock art, layers of stratigraphy. Traditional processualists would argue for the presence of a past in this partiality, that such parts are always incomplete parts of a whole; that this always partial archaeological evidence can be reconstructed into the-past-as-it-was. Other archaeologists note that structured depositions of fragments of bodies and artefacts, placed with some evident care, are often incomplete, not in the sense of missing pieces but in the sense of being only partially connected: sometimes they are mixed bones, or bones of several people arranged as though a complete skeleton; sometimes sherds from different pots are placed together, sometimes stone axes were broken before they were placed (Chapman 2000). Fragments of an

assemblage that are parts that are not part of any whole, that cannot be reconstructed into a single thing-as-it-was.¹³⁸

Archaeology is not a matter of impoverished and incomplete materials, but of the ongoing assembly and re-assembly of fragments, the past as it is made in the present. "There is and can be no monolithic past. Rather, there are multiple and competing pasts constructed in accordance with ethnic, cultural and sexual, social and political values" (Tilley 1989: 114). In the language of STS: the past is always situated; evidence is situated, partial, contested, without certainty; there are more than one and less than many pasts.¹³⁹ In short, the past is fractal.

Archaeology is therefore not about the past but about the present, and may even be about the future. In archaeologies of the contemporary and recent past the political effect of an archaeological vision that necessarily presences some materials and absences others becomes central. Victor Buchli and Gavin Lucas, key proponents of this approach, argue that an *archaeology of us* (Gould and Schiffer 1981) is an archaeology of the future, not in the sense of premeditation, but "in the sense of creating the future by being actively engaged in the materialisation of the present – as much as designers" (Buchli and Lucas 2001: 8). They suggest that archaeology can therefore make some absences present, through fragments that can be assembled, creatively and with a particular politics, into new discourses, new accounts, new futures. I would want to add that this is possible and meaningful with prehistoric fragments such as Stonehenge, whose assembly variously includes megaliths, earthen banks, round barrows, an avenue, a barbed-wire fence, twenty-four hour security patrols, painted circles on a car park marking Mesolithic post holes, and the midsummer sunrise, all of which are part of the future and whose assembly is heavily contested, most

¹³⁸ This phraseology deliberately evokes Marilyn Strathern's definition and approach to partiality (Strathern 1991).

¹³⁹ I am explicitly paraphrasing Annemarie Mol on multiplicity. In her work on atherosclerosis she argues that, through multiple practices of different medical practitioners, there are more than one and less than many atheroscleroses (Mol 1988, 2002).

visibly during the 'Battle of the Beanfield' in 1985 between 'free festivalers' and riot police ringing the monument to 'protect' the stones (see Bender 1998); in the famous assertion of Jaquetta Hawkes, "every age has the Stonehenge it deserves – or desires" (quoted in *ibid*: 114). *Spurensicherung* artists who work critically with archaeological methods already create radically alternative archaeological stories, explore its socio-material practices, and contest the singular and scientific accounts of its evidence (Holtorf 2005: chapter 4); perhaps the most well-known example being Mark Dion's Tate Thames Dig and its subsequent aesthetic categorisation and display of 'finds', from drawers of Nineties phone cards to bags of Victorian porcelain (Coles and Dion 1999). This is the politics of my archaeological vision, my archaeological practice. I am interested in the absent, untold stories that may be assembled from fragments. My practice is about assembling partial fragments (that are never part of any whole) generatively, creatively, into new accounts of the future – to design a future. The past, for me, is always also contemporary, always part of the future; following Michel Serres, an assemblage of fragments always enfolds past, present and future¹⁴⁰. Similarly, my fragments of evidence may be as old as a geologically-weathered stone, as contemporary as an ethnographic notebook, and as futuristic as a science-fiction novel. What matters is how they are assembled, and what future they materialise.

My fieldwork began with an initial experimental foray at an industry exhibition 'Mobile Commerce World 2003'. But my principal fieldsite, the archaeological landscape where I principally dwelled and gathered my fragments of evidence, was a design studio in the mobile telecoms industry. This was a period of landscape fieldwork conducted over four months during 2004. This was an important site in the industry, a site where (particular) accounts of the future are materialised in design practices and artefacts, and therefore a site with residues of those socio-material fragments involved. These are sites of interference into the future of the mobile telecoms industry:

¹⁴⁰ See discussion in Figuration 1.

With my archaeological perceptions I gathered my heterogeneous fragments: fieldnotes, artefacts, photographs, photocopies, maps, electronic files, and drawings. In the manner of a field survey, I created a detailed 'finds database' (see below) of 184 items in which I noted how and where fragments were found and their relationship to one another.

Overleaf:

Find ID 031 database entry.

Find ID 031: re-used finds bag containing *chalk stone* and *Intel PXA800F Cellular Processor business card*, found on Intel stand at Mobile Commerce World 2003.

finds record

ID: 31

date: 24/09/2003

site: MCW 2003

location: exhibition hall - Intel stand - C09

description of context: edge of Intel stand included a border of white stone

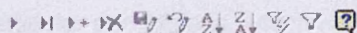
type: artefacts

description of find: Intel branded business card CDROM + white chalk stone

notes: why the use of stone and what does this signify?

confidential ☐

storage location: box 1



My focus during this fieldwork was very explicit. I was interested in the fragments of socio-material interaction that were related to future-making in the industry. However, this focus was also defined by my particularly archaeological sensibilities. Cornelius Holtorf, whose reflexive work situates the popular contemporary appeal of archaeology, defines the realms of archaeology as including: the sphere of the underground, perils of fieldwork, discovery of treasure, traces as clues (Holtorf 2005). All of these inform archaeological perceptions as much as other, perhaps more familiar archaeological realms, such as monuments and artefacts, notions of authenticity, and the past. The Traumwerk group at Stanford University, who explore a wide range of *avant garde* archaeological practices and theories, categorise their archaeology into: abjection, absence, collection, connoisseurship, entropy, fields of production, memory, symmetry, and topology (Webmoor, Witmore et al. 2005). These lists helped me to create a shorthand for my own particular perceptions, which needed to reflect not simply on archaeological practice, but on designer practice, and future-making practice.

Durability

(including abjection, absence, entropy): Sensitivity to how places and things might endure or not into the future; what remains present and what is made absent; the transformation rather than loss through decay and disposal (Hetherington 2004).

Heritage

(including connoisseurship, collection, memory): Sensitivity to the politics of accounts of the past and future. Whose past and future is being rehearsed and how is this account stabilised. Informed by Barbara Bender's discussion of the politics of Stonehenge and the accounts of its past and possible futures (Bender 1998).

Aesthetics

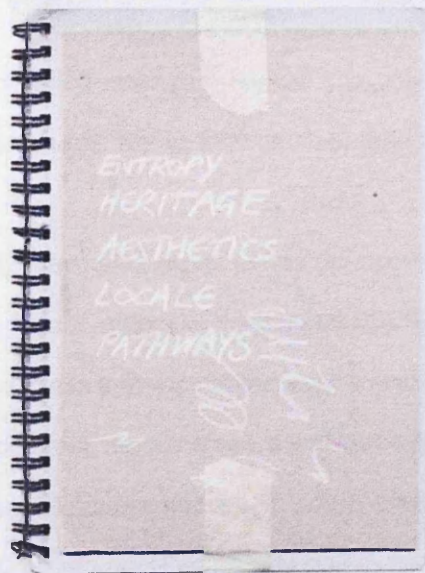
(including treasure): Sensitivity to the multi-sensory experience of places and artefacts. What aesthetics are being mobilised, for whom, and how are they embedded in designs and strategies (Gosden 2001).

Locale

(including underground): Sensitivity to the location of a place and artefact. What is considered local and closely related, what is considered remote and disconnected; for example, Andy Jones discusses the relationship between the location of village huts at the centre of Barnhouse prehistoric settlement, and their particular pottery, which is very different to the pottery of the village huts at the edge of the settlement (Jones 1999). And, remembering circular landscapes, how is a location performed.

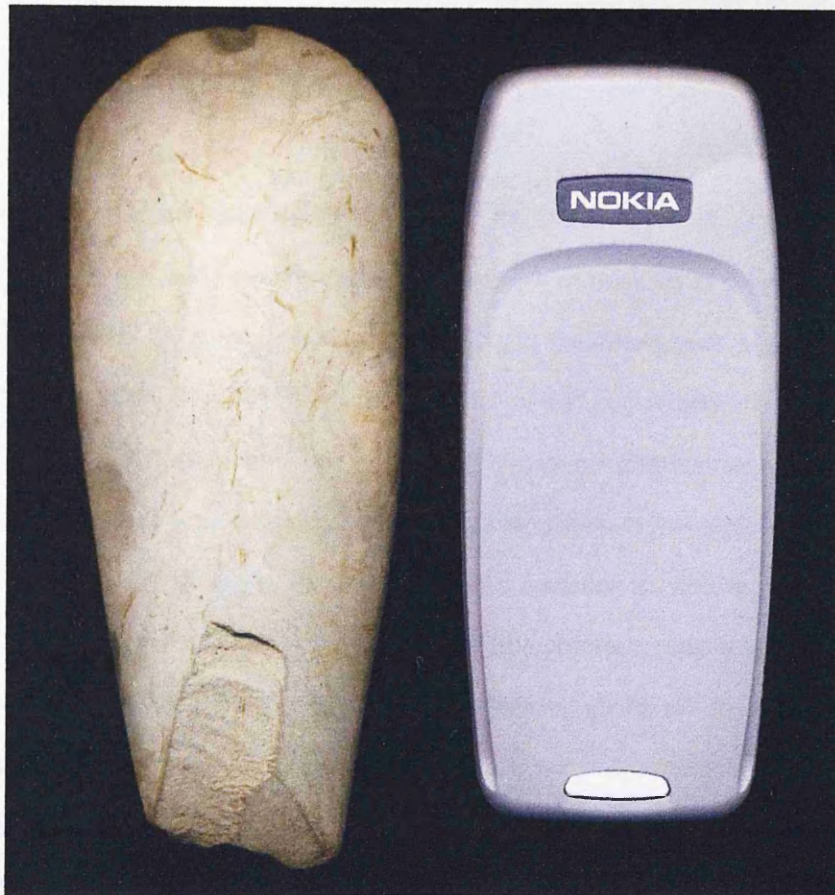
Pathways

(including traces, topology): Sensitivity to movements and performances that are possible, those that are resisted. What traces can be followed and where do they lead, and what paths are blocked or difficult to follow. Inspired by David Turnbull's work on the performance of knowledge at Maltese megaliths (Turnbull 2002; and see discussion in prologue).



On the back of my field notebook I always taped this list as a shorthand reminder of my archaeological perceptions.

These formed the focus of my archaeological perception in the field. As an example, all of these sensitivities are invoked when I place a mobile phone and a Neolithic hand axe side by side. Two portable, hand artefacts with a very different heritage.



Group VI polished stone axe (source: Langdale Pikes, Lake District), and Nokia 3310e mobile phone (source: Nokia, international); artefacts are side-by-side on a flatbed scanner.

Interestingly the mobile phone is less durable than the axe. The phone contains metals that will tarnish, electro-magnetic memory whose directional field will fade, chemical batteries that will dissolve, glass that will shatter; even the plastic cover will decompose and begin to flake in time. In contrast, the hand axe is polished tuff, a volcanic rock. It will weather geologically if exposed but will not decompose or fade or dissolve. The axe is more a permanent technology, will remain effective and operational far longer than the phone.

This insight interferes with the usual accounts of their heritage. One is spoken of as five thousand years old, part of the prehistoric technologies of Western Europe, the other is described as five years old, part of a category of Information and Communication Technologies, and a symbol of the rhetoric of technological progress from Stone Age to Silicon Age. But the rhetoric of this progressive evolution and technological determinism do

not hold with respect to their durability, for the older technology will, and has, endured for far longer.

Their shapes bear a striking similarity: a flattened, curved wedge, with a clear asymmetry at either end. There is a top and bottom. Even the colours are shades of grey, rather than bright metallic or pigments. Both are smoothed, although the axe is reflective, highly polished. Their aesthetics are enchanting (Gell 1999), although for perhaps quite different aspects of their design and production. The stone axe is enchanting in its alien temporality, its seeming otherness evoking some unimaginable past, the juxtaposition of that past with the beautiful polished surface; several weeks, I read, it might take a person to achieve that brilliant surface (Bradley and Edmonds 1993). It invites the fingers, the polished surface invites us to touch (Cummings 2002); it enchants through its texture, it enchants the senses. Conversely, the mobile phone enchants with its magic of invisible wireless communications, and the magic of miniaturisation; it draws one into communion with all the other worlds it may make present. Indeed, the world of the mobile telecommunications network is as un-imaginable (for most) as the world of the Neolithic.

And both objects do not exist in isolation, they are located, are bound up with places. The polished stone axe is categorised, one could say branded, as Group VI, its stone sourced from Neolithic axe quarries on the Langdale Pikes in the Lake District mountains (Bradley and Edmonds 1993). More interestingly, those axe quarries are in the most vertiginous, the most dramatic locations on those outcrops. There is no sense of efficiency or least effort imbued into the stone axe, but an unfolding drama of treacherous experience (*ibid*). There is drama, too, in the locales of the mobile phone, for many of its sources are also mines and quarries. Coltan, a mineral essential for certain capacitors found in mobile phones, is predominantly mined in the Democratic Republic of Congo, currently in a state of civil war. Much of the Coltan circulating in the high-tech industry may have been mined illegally in support of that war, and there are estimates that 30% of the children in DRC are involved in its extraction (Gordon 2003; Wajcman 2004: 122).

Finally, the brand of Nokia evokes an imaginary Finland, and the imaginary experiences of Scandinavian design, landscape, and futurity which Nokia as a company circulates through its advertising.

Overall, this comparison is not an argument for any essential parity between these artefacts, for parity is to be expected as an effect of my archaeological senses that can only construct certain relations and not others. However this is a comparison, it makes a connection between these two artefacts (Strathern 1991: 51), and in so doing translates them. Something interesting happens to both the stone axe and mobile phone as they are translated, both are altered as they are connected: the mobile phone is no longer part of some steady evolution of technology through the ages of Stone to Silicon, or is even the predominant artefact in a discourse of biodegradability, relative to the stone axe its durability is considerably less - aeons will shimmer above the surface of the stone whilst the phone hardens, becomes brittle, and then dust. The stone axe, in turn, becomes a branded technology, amenable to the critiques of consumption, not just in terms of heritage, but as a way of thinking through the Neolithic; the polished stone axe manifests an imaginary Langdale Pikes, transporting that imaginary as the axe moves around the country.

Comparisons are always partial connections (Strathern 1991). Comparative archaeology, or ethnoarchaeology, involves the comparison between past and contemporary artefacts, and their methods of production. Ethnoarchaeologists frequently engage with artefact generation and disposal at a fieldsite, comparing those living practices and residues with archaeological evidence (Hodder 1982; David and Kramer 2001). The production of some material culture is scrutinised, and compared with the fragments of residue from an excavation. Analogies between prehistoric Europe and contemporary non-Western cultures abound. Mike Parker Pearson, an archaeologist of Stonehenge, and Ramiisonina, an archaeologist of contemporary Malagasy stone monuments, argue that these cross-cultural comparisons are 'probable' and powerful analogies (Parker Pearson and Ramiisonina 1998). Through their comparison of Neolithic and Malagasy monuments, they conclude that Stonehenge can be

interpreted as a monument built for the ancestors, in contrast to timber monuments, which are constructed for the living.

The politics of such archaeological comparisons are highly problematic, however. The connection reproduces both technological determinism and colonialism (Bhabha 1984) by placing a non-Western contemporary culture in resonance with a European past, as though the non-Western culture were technologically 'behind' the West. It also assumes a universal commensurability, that parts of societies separated by several millennia and even continents, are parts of some whole and, moreover, that these parts translate meaningfully and relatively un-problematically between these locations.

Such moments of connection might be better worked through as juxtaposition rather than archaeological comparison. Michael Shanks, drawing on James Clifford's arguments for ethnographic surrealism (Clifford 1988), argues for an *archaeological poetics* that juxtaposes fragments and creates experimental narratives (Shanks 1992). A mobile phone connected with a Neolithic stone axe is, then, not a comparison between past and present, but a contemporary poetic juxtaposition. My connection is between contemporary archaeological accounts of one and contemporary ethnographic accounts of the other. Both accounts are situated in a present Euro-America. This is not about the past, but the present and the future.

Comparison, although partial, is rarely symmetrical. Stonehenge and Malagasy stone monuments are compared, but the conclusions are all one-sided. Stonehenge is transformed but the monuments of Madagascar remain unaltered. The practice of comparison is one of diffraction – my slow version of Donna Haraway's diffraction from the prologue. One account remains fixed, grandly woven, the stabilised anthropological or archaeological knowledge around which others are diffracted. Comparison does not generate symmetrical differences, it retains the duality of knowledges; one is altered, the other remains unaffected. What I am interested in doing is interference, in the superposition of knowledges and locations where nothing remains inviolate, in making a new place. Yet, in my account of a stone axe and mobile phone, nothing new is made; axe and phone do not combine into a different artefact as

they would in an interference. Although the account attempts to be more symmetrical, it seems to be little more than a series of diffractions, one artefact stays still whilst the other is diffracted, and vice versa. This is never enough. I need to be generative.

How to generate a new place, here, in this thesis. How to tell you of a place comprised of fragments, bits and pieces of many knowledges superposed. How to make this interference and persuade you of its presence. One way is to construct a place from those fragments of evidence.

Archaeological visual reconstructions of monuments, of assembled pots, of prehistoric daily life are persuasive, if not insidious, frequently reproducing stereotypes such as 'man the hunter' (Wylie 2002). As with Donna Haraway's caution concerning the erasure of partial perspective in the technoscientific images of galaxies (Haraway 1991b), archaeological reconstructions also erase the partiality of the fragments from which they are constructed. Reconstruction, re-making what was, is a largely technoscientific truth-making practice, the piecing together of a past-as-it-was, completing the incomplete, flattening out the multiplicity of evidences and labours. Archaeological illustrators can therefore become squeamish when the assemblage is too evidently partial: "very fragmentary evidence does not provide enough information for a complex scene (you can build many different things on a few postholes or foundations running across an excavation trench). I have declined to produce drawings from such limited data, because the result would be utterly speculative, wholly misleading, and in effect, dishonest" (James 1997: 26). Yet, it is in these very gaps and postholes, in the partiality of the fragments, that the empirical promise of a partial perspective lies, for situated knowledge is more honest than a drawing of a view from nowhere. This reiterates the importance of fragmentation in archaeology as generative rather than problematic. Situated fragments of evidence can be superposed, contain the possibility for interference, generative difference. As Joshua Pollard explains in his discussion of the transformative possibilities of assemblages of art and artefacts: "As ably demonstrated by the artworks of Andy Goldsworthy, Cornelia Parker and others, the breaking down of objects and substances frees them from the binding conventions of categorization, and allows their recombination in new

and hybrid forms. Far from being imbued with negative qualities, the productive and generative potential of breakage and decay must be acknowledged" (Pollard 2004: 60).

Reconstructing, repeatedly and variously constructing, places and artefacts from fragments is an honest project of interference that can generate compelling new places, hybrid objects, artistic impressions, future possibilities. A creative reconstruction of my location, creating my site of interference from fragments of evidence, is what I must do. I must reconstruct a hybrid, creative, possible account of the mobile telecoms industry and its future-making practices.

The archaeologist, Mark Edmonds, has already written such generative reconstructions. Throughout his archaeological account of Neolithic everyday life he interposes scenes and roughly sketched stories, bringing imaginative life to his evidence and ideas. "The old man leant forward and spat into the fire" is how he begins his second chapter. And the chapter continues:

"...[The old man's daughter] held the hammer between forefinger and thumb as lightly as she might have held an egg too precious to drop. Her grip was soft yet confident. Without thinking, she let the hammer fall on the flint, just in from the edge, just above the ridge. There was a satisfying ring as a second thin blade came away from the core..." (Edmonds 1999: 11).

Edmonds explains that these narratives are not attempts to reconstruct the past, to bridge some gap between past and present, but attempt to catch at something more elusive. In a reflexive postscript, he does not claim the stories as empirical work but as experimental: "I think that experimenting with different forms of writing is essential if we want to capture the mess, complexity and intimacy of the processes and the people that we're interested in... I wanted to give a sense of immediacy to the conditions that might have created a specific form of evidence..." (*ibid*: 161). These narratives are an archaeological poetics (experimental), and the practice of an interference into archaeological knowledge-making (empirical). They are stories woven from fragments of evidence, archaeological knowledges, and most importantly they involve a little imaginative flair to involve the reader, and immerse them in their world.

They are perhaps not the most creative tales that might be told, but they are an example of how to construct interference, how to superpose fragments persuasively.

Donna Haraway suggests that in my position as a figure, I am “the one who can construct and join rational conversations and fantastic imaginings that change history” (Haraway 1991b: 193). *Fantastic imaginings* are crucial, for they are the part of making an interference that translates a comparison, a simple juxtaposition of fragments, into a compelling superposition, a rich pattern. Imagination is not anti-empirical, for any account, even an objective scientific one, is inherently a story.¹⁴¹ The imaginative has generative effects. It weaves a coherent readable story, constructs something new from partial and incoherent evidence. I see Edmonds’ approach to interference as a possible response to Donna Haraway’s question of what a more honest technoscientific knowledge-making practice might look like: “What if the study and crafting of fiction and fact happened *explicitly*, instead of covertly, in the same room, and in all the rooms?” (Haraway 1997: 110). To honestly reconstruct my site of interference, I must explicitly craft fiction and fact from fragments of archaeological evidence of the future in the mobile telecoms industry. I am in that room. For I am committed to the project of scientific rigour, to the empirical, and this commitment requires partial perspective, situated knowledge, and explicit fictionalisation. Imaginative reconstruction from fragments of evidence is the empirical move necessary to change the future, or at least, to make a difference.

I remember the monumental radio telescopes in the prologue, standing in a white dotted line in the fields of Cambridgeshire, and I remember the so-seductive stories of galaxies and planets made from their fragments, wholes made from (partial) parts. *Interferometry* is the mechanism I have been discussing here. The mechanism of generating seductive, persuasive wholes from fragments of evidence; the creation of a different world. This is the method of reconstruction that I must perform.

¹⁴¹ See discussion in the prologue on ‘imagination’. Also see Steven Shapin’s work on the development of the literary technology of scientific writing, which discusses how notions of literary objectivity and veracity were created during the Seventeenth-Century (Shapin 1984).

For the team who excavated Leskernick on Bodmin Moor, making an interference into the landscape, and so creating a different world, was their most important work. They argued for the importance of altering place, that performing art in the landscape (as they did during their fieldwork, installing flags, doorframes, wrapping stones, and creating extensive photomontages of their site) was not only a performance of their evidence, but also enriched and multiplied its possibilities (Tilley, Hamilton et al. 2000). As an archaeologist of sorts, the performance of landscape, of earth, water and stone (remembering the Ring of Brodgar) is something I am particularly attentive to. But this interference, and even Edmonds' narrative, seems to leave the landscape inviolate. It is the same landscape, covered or collaged, as though the landscape is a backdrop or theatrical set. But, as discussed in the prologue, "the landscape tells - or rather *is* - a story" woven from fragments of experience (see Ingold 2000b: 189). Landscapes are themselves made from fragments, they are made from rememberings, from knowledges, from interactions, as much as artefacts. Those fragments permeate my finds and fieldnotes as maps, photographs, stories, accounts of interactions and experiences. In an interference those fragments of landscape, too, must be altered, made different, mixed.

My archaeological evidence of the mobile telecoms industry includes landscape, as well as artefacts, people, practices and futures; the landscapes of the design studio where I conducted my fieldwork – my archaeological site. In making my interference, in reconstructing that site, here, in this thesis-as-experiment, I must also make an interference into that landscape rather than attempt to reconstruct it, as though it were whole. Interference is a practice of making difference from mixtures of knowledges. So, my archaeological site must also be made different through mixture, the superposition of knowledge. Since I am committed to crafting of fiction and fact, to remain empirical, I must acknowledge that fiction and fact are always mixed. Writing a convincing reconstruction demands that they become intermingled, inseparable. The landscapes of the design studio are no more immune to reconstruction, to interference with imaginaries, than any other aspect of my work.

Explicitly, an archaeologist is always moving, relocating their fragments of evidence to an imaginary elsewhere. Archaeology is, traditionally, regarded as a movement back and forth between (practical) sites of fragmentation and (theoretical) sites of interpretation (Jones 2002). Archaeological method is defined by its effect of *distancing*, the creation of a journey from the site of evidence to the site of the reconstruction of evidence, typically the distance between contemporary fieldwork practice and a version of the past (Buchli and Lucas 2001). Crucially, this may be either through alienation, reifying a colonial version of the past and present as other, or this distancing can (as suggested earlier) presence absent politics, attend to untold stories (*ibid*); distance as a journey to hopeful possibility, the creation of a new story to somewhere else, rather than the rehearsal of well-trodden routes to the exotic (past or present). An archaeological journey is always made from fragments and the imaginary; whilst conducting fieldwork in a landscape the archaeologist is also reconstructing that landscape, and reconstructing the past from its fragments of evidence. As an archaeologist walks, the past is made present through a moving interference of evidence and *fantastic imaginings*. As Richard Bradley demonstrates, practices of archaeological reconstruction and illustration are inseparable from 'ways of seeing' a fieldsite (Bradley 1997). What I am trying to emphasise, here, is that my practice as an archaeologist, as I walk through the design studio of my fieldsite, always involves the ongoing reconstruction of that evidence. Gathering evidence and reconstructing evidence are simultaneous acts; fieldsite and reconstruction are inseparable, but they are not in the same temporal-spatial location.

The location of my reconstruction was chosen with care. As a Future Archaeologist I might have chosen the future, an interference in time. But it is an interference into location and landscape that matters to me, as I have argued; the effect of landscape on the future of the mobile telecoms industry. I chose the location of my reconstruction as the landscapes of the 'Heart of Neolithic Orkney' World Heritage Site on Mainland, Orkney; an archipelago off the far north shore of Scotland. This is the site of the Ring of Brodgar stone circle. This landscape on Orkney is one of the world's largest prehistoric monument complexes, and comprises extensive archaeological accounts of landscapes and archaeological evidence to inform my reconstruction. As I performed my fieldwork at one design studio in the mobile telecoms

industry, I was reconstructing the evidence into another design studio in the World Heritage Site on Orkney.

Landscape has agency, it has effects, it performs knowledge (Turnbull 2002). It is not a backdrop or canvas upon which to paint a reconstruction, but an intrinsic part of generating a difference, of imagining the future differently. By making a reconstruction within an archaeologically rich landscape on Orkney, I hoped to generate an interference into the landscapes of future-making in the industry. Through a different landscape, with all its different effects on practice, lies the possibility for different futures.

What I will do, what I must do in this interference, is to reconstruct a design studio from fragments of evidence. And then enact an interferometry and weave that interference of evidence and imaginings and landscape into a coherent story, a coherent place, a coherent reconstruction. Not to persuade you of the truth of it, but to persuade of its possibility.

That place is called Sand14.

Figuration 3

The final figuration. The formation of the principal protagonists in this thesis. Not the Ethnographer and Future Archaeologist, they are the *methods* by which these protagonists are made. No, the principal protagonists are the landscapes, the *places* that are made by these two methods. Two places made at, and as an effect of, two very different interferences into the futures of the mobile telecoms industry. Two places woven into life, here, through the methods of the Ethnographer and the Future Archaeologist.

BLUE DESIGN GROUP

by Ethnographer

A brisk walk from my university-campus accommodation to a bus stop, a bus ride to a train station (surrounded by people in dark suits with novels and PDAs), ticket, barriers, train, forty minutes on a slow service that wove in and out of the thread of the M25, flashes of sunlight through lime trees and branches of rooftop television aerials, and I arrived in mock-tudor suburbia. Then it was another brisk walk to another bus stop. A pause. Queued with the khaki-and-rucksacks, one common outward form of a high-tech worker. And then I rode the company-branded minibus to the site, thankful that my temporary security pass had not been noticed by the sunglass-encased driver. We were comfortably packed into cubes, elbow to elbow. My oversized, corporate black laptop bag stood on my knees, pushing my arms up and over the front; I felt as if I were wearing body armour. The minibus wove sickeningly between seventies suburbia, the town cemetery, and a faded industrial estate. We half-circled a number of grass and empty flower-bed roundabouts, each one sponsored by a different high-tech firm, rolled along the edge of a vast red-walled housing estate, an asylum for middle management, and finally pulled up to the entrance of the R&D compound.

This was one of my daily journeys to Blue, the mobile telecoms manufacturer whose design studio, the Blue Design Group, formed the heart of my ethnographic work.

Within the minibus I was just another employee on their way to work, part of the corporate flow. I was just another body being inserted into the company campus through the thin needle of corporate traffic: the capillary action of the M25, of the London commuter train line. The company was an M25 and Network Rail junkie, it main-lined its employees in daily doses. Those needles were the only way into the site, the only way to legitimately insert my body into the company for the day.

I watched the needle penetrated the corporate-skin...

The heavy steel gate rolled laboriously back and the security team in their high-visibility jackets peered at us onboard, then waved us on into the car park, the gate rolling shut behind us. I always felt like an interloper, felt self-conscious of my un-named temporary badge that marked me as an outsider. More so, because I knew I was one of the family; I could easily wander on and off the site unchallenged, and was often mistaken for a full employee. My designer-black camouflage clothing and laptop bag was an anonymous shape in the compound. I knew I still bore the mark of the mobile telecoms industry, in my speech, in my walk, in my easy familiarity. I had been branded by the industry as family, a mark on my body, an ultraviolet tattoo that showed up when lit by the industry's high-frequency, wireless telephony knowledges.

Looking up at the chlorine-bleached and opaque windows, the sandstone walls, the CCTV cameras impacting on every corner, I knew what lay inside. Even before I had arrived for a tentative meeting with the senior design manager who would later become my liaison, even then I knew what was within those walls. The inventory of an industry R&D site formed against my closed eyelids: the café, the cafeteria, the Herman Miller Aeron chairs, the paint spatter walls, the glass coffee tables, the brown leather sofas, the birch desks, the Meridian caller-id telephones, the desk pods. And in the design studio: the project rooms wall to wall with notes, drawings, illustrations, presentation slides, posters. It was all so familiar. Blue haunted me. The company would always be, partly, a ghost of my memories. That was its power. The power to rattle my perceptions; they were constantly uneasy, jangled... hear, see, smell, taste, feel: my senses were sharp, my attention hard and fast. Or, rather, as kith and kin to the industry, I felt as any tough-loving companion species must: "run fast; bite hard!" (Haraway 2004a: 297).

Off the bus, I dodged through the trees, grit bins, and visitor's cars that formed a central tableaux for the site, to reach the building on the far side. This was Building 3, as it was

colloquially known. Much the same as the other two, a small variation on the architectural theme of turquoise chlorine and white ceramic, this was where I had spent most of my time, in the 'ivory tower' (as one designer named it) of the design studio on one of the upper floors. Perhaps it was not ceramic, I thought, perhaps it was bone, the buildings not some super-conductivity experiment, as I had at first imagined, but a cross-section, layers of water and bone in cryogenic freeze. The corporate body cleansed and preserved for generations to come.

As usual, there were a few smokers gathered on the stairs. One face that greeted me was Brian, the senior design manager and my liaison, whose good grace, patience and unwavering enthusiasm had helped me to negotiate access. He was demarcated in seniority and trade by his cheroot and the pre-production model handset he held to his ear. We exchanged smiles as I rotated through the door, and I fervently hoped that I would never have to reveal my own, now rather aging, phone in this handset-hawk environment. There was the usual exchange of pleasantries with the uniformed receptionist, and my usual wince at some artist-in-residence 'intervention' on a press-release filled table (a wireframe leaping figure I was later told had been abandoned by the artist, and simply never collected). Men in dark suits stood waiting, huddled together with cases ready to wheel into taxis. The foyer was a marble cinematic box, glass screen wall at one end in which images of employees in the building atrium played, a replay (for me) of that scene with the café, the brown leather sofas, the glass coffee tables, the informal meeting. T-shirt-ed and jean-ed employees passed back and forth through the glass wall, paper cups of coffee in hand.

I turned away from the action replay and took a small side-corridor to the stairs. The stairwell door regarded me suspiciously for a moment, until it heard the wireless tag inside my badge. The tag was a key, a universal translator, able to negotiate with the building infrastructure. The door checked a database, agreed to admit me into the stairwell, and turned its light from red to green. I heard the click of the lock, pushed, and was in.

I dashed up a few flights of stairs to the floor of the design studio, grateful for the exercise, and then faced another door, my hand out, ready to push; but its sullen red light steadfastly refused to transform. I waited, re-counted the flights of stairs, for I only had access to that floor, and only the design studio partition. Still nothing. I began my little door-dance, waving my badge in the air, stepping back and forth, hoping the movements would re-open negotiations. The too-prophetic voice of satirical science fiction author Douglas Adams began to resound in my ears: 'All the doors in this [company] have a cheerful and sunny disposition. It is their pleasure to open for you, and their satisfaction to close again with the knowledge of a job well done.' (Adams 1979), an excerpt from a sales brochure for intelligent doors by the makers of the infamous Marvin the paranoid android. Adams' version of intelligent devices included all the eccentricities, emotional foibles, and unpredictability that 'intelligent' denoted in people.

As I waited, a long-limbed colleague tripped down the stairs from the floor above and halted beside me. He gave a wry snort as nothing happened in response to the arrival of his own badge,

"It's just a pain... it's symptomatic of the company... you have to fight to go through the door."¹⁴²

We had worked together in my previous life, and I knew his was the sharp irony of a sabre-toothed user interface designer. These brief moments of the inexplicable in an automated system were the meat of his corporate existence. His daily concerns were a corporate desire for security in tension with a concern for people. If this door was the future that the company desired, then it seemed a future in which the corporate body, and the maintenance of its boundaries, its flows, was the principal site of accountability; the life of the corporate body over the life of the individual.

¹⁴² Extract from field notebook no. 2.

After only moments the door awoke, or the database rebooted, or the wireless tag said 'open sesame' (all seemed equally possible) and the light turned green, and we passed inside.

There was still another glass door, another negotiation, and then, at last, I was inside the Blue Design Group; hallowed ground, where few employees were allowed to tread. A prophetic site of fore-knowledge. As the design studio manager had explained to me:

"Access [for others in the company] only allowed when working with them. Reason, [we] often have advanced knowledge of project cancellations, as they are either ramped up or pulled several months before the rest of the project knows."¹⁴³

It was an open plan office in grey, burgundy, and black. The geometry was digital, pulse-code modulated, ninety degree turns. White walls held patterns of desk pods and wooden work surfaces in a grid. On each edge of this square grid were additional sites of importance: side one, a large brainstorming project room; side two, the model shop, where three-dimensional models could be quickly mocked-up; side three, the senior management desk pods facing the windows; side four, a locked door that led to the management meeting room, and an open door that led to the games room.

The studio was quiet with mouse-clicks, murmurs of telephone calls, and the incessant background roar of motherboard cooling fans and air-conditioning; the breath of the corporate body. I stole around one of the desk pods to a temporary workspace, a hotdesk for transients like myself. Today it was empty, today I had a chair and I sat, grateful, already tired from watching and writing. Around me ambient, monitor-friendly lighting cast no shadow upon the walls. I flexed my wrist and wrote:

¹⁴³ Extract from field notebook no. 0.

Constant sound in the background: the whirr... the fan on the Minolta CF910 colour photocopier...

Howl of air conditioning... The projector on the ceiling, its fan rustling above my head... And more loudly still the fan for the computer driving the projector - roaring...

The breath of Mac towers, punctuated by Mac mouse clicks...

I feel sucked dry by the noise. Like the marrow of my life has been leached away in every mechanical breath upon me.¹⁴⁴

Later, I translated my experience into a far better form for communicating the emotion, the unspeakable embodied reaction I had to the design studio (always haunted by another design studio from my past):

¹⁴⁴ Extract from field notebook no. 0.

Ethnography of a Design Studio in the Mobile Telecoms Industry 2

Burgundy chairs. Black desks. White walls. Grey air.

Incessant constant: whirr howl rustle roar:

air-conditioning, Minolta photocopier, projector, printer, Mac.

Emptied window, in-corporate sky: the brand penumbra:

no shadow, no light. No line, no shape, no limb: dismembered.

Defleshed. Dejuiced.

Leached.

Bland!

expanding, pressing, reaching, swallowing.

(I am) partially digested. Burgundy stained. Raging.

Ethnography is never objective.

A head appeared above the blank, burgundy desk divider, smiling broadly with his trademark charismatic sense of mirth. It was Brian, returned from his taste of cheroot. He apologised, but a brainstorming session I had been invited to, planned for this morning, had been shifted to later. A plane had been delayed for a couple of hours at Heathrow, reminding me that the effect of that airport was inescapable, air-travel fumes always filled the studio, were suffocating; flows from the opening of another vein for corporate traffic in employee bodies. I thanked him for not writing off my invitation, despite the increased intensity and sensitivity that this delay would have on the discussion.

I was enormously grateful to Brian (and many others at Blue), for always finding the time to talk to me, to invite me in to meetings, despite considerable pressures: a stream of crises, re-organisations, infeasible deadlines, and so on. Although the design studio leached away my senses, the circulation of people who worked within its walls (never fixed, always an ongoing migration between corporate locations) had developed thicker skin; their bodies remained solid, buoyant, resisting. It was a practice of resistance I needed to understand.

And then it was time to meet her, the Future Archaeologist. We had decided to visit one another at our respective fieldsites, to understand and compare our practices of interference and the reconstructions we each wove.

I returned to the stairs, and headed downwards. In the expanse of the four storey atrium, filled with odd murmurs of quiet conversation, the Future Archaeologist waited for me, as we had agreed. For this, of course, was not some true ethnographic account, but a collage of moments and experiences from my ethnography, juxtaposed to create a fieldsite. I was walking through those moments, folding time and space into a narrative, which I could empirically account for in fragments (for how is any accounting done except by tracing fragments). As my footsteps traced my path through the atrium, as they had done so many times in my research, I was also presencing multiple paths, multiple times and multiple memories. This story of Blue was a poetic evocation of a design studio in the mobile telecoms

industry, a necessary interference; not even a thick-description, for any attempt at an objective description pretends an absence of difference.

The Future Archaeologist sat at the other end of the building, by the far windows, staring out onto a patio. She sensed my approach and looked round. She was, of course, similar to myself, but wearing mud-encased walking boots, as though she had somehow arrived cross-country.

She stared at my clean black pumps as I sat. "Don't get too comfortable. I'm not sure how long I can sit still in this place." She turned back to the wall of window, the small stone patio, the few metres of grass and trees, and the metal stakes of the fence driven in to the embankment beyond. "Do you go outside, much?" She asked suddenly.

I thought for a moment. "Once I am here, no. Only a walk to Building 1, for the library and cafeteria. I can't get in to the other building. I did walk the perimeter of the campus once, to draw a little map, but my back crawled the entire time. I expected an alarm to go off, or a security person to appear and question me. Outside feels like a demilitarised zone with all the CCTV cameras and electric fencing."

"No loitering on the grass?" She was amused.

"Loitering on the patio, with a coffee and sunglasses, yes. Loitering on the patches of grass, or in front of the privet hedges by the fence, definitely no. We're not encouraged to explore the boundaries of the campus. Once you're inside, there is no outside."

I saw the Future Archaeologist shudder, but felt little more than an inner shrug.

"What's outside anyway?" I said, palm against the glass wall. "A commuter housing-estate, birch wood scrublands, a graffiti-encrusted subway beneath a train line. School. Supermarket. Roundabouts." The shrug manifest. "I have sat in the supermarket cafe, walked the

scrublands, photographed the graffiti. This story is the effect of that landscape. It is the inspiration for Blue.”

The Future Archaeologist looked at me, too-perceptive. “You cannot breathe here,” she murmured.

I took as deep a breath as was possible, then suggested, “let’s start our work outside.”

We had decided to take each other on a tour of our interferences, perform something of our different approaches to juxtaposing fragments of evidence. Our footprints were topological traces, imaginary technologies of movement that stamped together times and spaces.

The Future Archaeologist rose, took a quick sip of water from a bottle, and shouldered her rucksack. Jigsaw pieces of mud fell from her boots as she disentangled herself from aluminium chair legs. I realised I had never seen mud inside the buildings before.

We walked side by side, hands to our toolkits: I, clutching pencil and silver notebook held together with masking tape (the only recording equipment I was allowed on site); she, holding one arm of her silver climbing rucksack (containing I knew not what). This was to be my tour of Blue, and the Blue Design Group, for the Future Archaeologist.

We wandered out to the marbled foyer, and I mentioned my metaphor of the glass wall as a cinematic screen, a certified film playing of the company as it appeared in the atrium beyond.

Then I saw the Future Archaeologist had stopped, was thoughtful. “You know, if we had a mallet, I could bring the whole of that glass wall down and replace it with something far more interesting. A low entrance way in coloured glass, so that you have to stoop to enter into an illuminated world, your body and vision transformed...” she saw the look on my face. “What’s the problem.”

"It's not relevant. The company would never allow you to do that."

"Why?" She seemed genuinely surprised. She clearly did not live in the same world as me.

I sighed. "This is a corporate research and development site! Look at the three men waiting over there with their dark suits, purple shirts and yellow ties. Are they going to bend double to duck through a fluorescent doorway to a meeting on the future? It's ridiculous."

"Why?"

I sighed again. With her cool hand on her hip, her stance reminded me of a Clint Eastwood pose, a female gunslinger, a loose canon. "It's about the brand of the company, it's simply not that elastic."

"But what would the company be like if its brand were that elastic. How would its futures be different."

"It wouldn't be part of the mobile telecoms industry," I said, flatly. "At least, not a major manufacturer, not a multi-billion pound industry player. Too risky. Too much like nineties beanbag chairs and eccentric skunkworks projects."

"Are you sure?" She was pressing me, awkward, irritating.

I flipped through my notebook, and read out a couple of quotes I had noted:

"We need to think logically, calmly, where the future lies... We exist to... make revenue... we should always be heading for the mass market."¹⁴⁵

I looked up at her. "Tunnel entrances and abstract glass foyers are not mass market. It's a question of transformation that you can explore, perhaps. But my interference is this." I waved my hand around the (fragments of) foyer. "Blue is constructed from my attention to socio-material practices inside the industry, it's made from evidence of situated actions. You don't pay enough attention to the socio-material. The quotation I read out may have been noted slightly awry, but it's the sense of what I heard. What matters to me is juxtaposing practices so that they make something new, but something that heightens and accentuates particular politics and passions of a mobile telecoms industry I experienced. Even my own boredom is important to retain and focus. Look, I'll show you..."

We stepped outside the building, and I guided the Future Archaeologist down the stairs and to the right, following a sandstone pavement that shouldered the yellow-white blasted sandstone blocks, a circuitous walkway around to the next building. I was immediately nervous; glanced at the guards in their checkpoint by the nearby site gate, but they did not turn. Not yet. My eyes were finally drawn away by the chlorinated windows at my shoulder, cleaned of any interior view by their tinted surface. Only my imagination could see the desk pods inside; the curious faces looking up, looking back at me through raw, chlorinated eyes.

I stopped, deliberately abrupt, feeling perturbed. The Future Archaeologist, distracted by the many moons of white cratered CCTV cameras in orbit above us, almost stood on my foot. I pointed downwards at the half-meter gap between the sandstone path and the building wall. It was filled with large, glistening grey-white quartzite pebbles, each smoothed as though tumbled by the sea. The perimeter of all three of the buildings were surrounded by these

¹⁴⁵ Extract from field notebook no. 2.

pebbles. The Future Archaeologist reached down and picked up a particularly rounded stone, almost the size of her hand.



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"This is the same stone that forms part of the evidence for my site," she noted, and passed me the glittering weight. I felt the rough quartz grains in the lines of my palm. The stone was heavy, gritty surface pushing against my fingertips.

"Beach pebbles much like that one enter the archaeological record as hammerstones, stones used for pounding," she explained. "In Cumbria there are large numbers of Neolithic hammerstones recorded, and almost all of them are simply pebbles collected from the local beach¹⁴⁷. But what's your interest in beach pebbles? What's it doing here, at Blue?"

"Do you remember the desktop image of granite beach pebbles on the Apple Mac?" I asked.

The Future Archaeologist nodded. "They still come preloaded in OS X."

¹⁴⁶ Photograph of Find ID 038. This stone was removed from my ethnographic site.

¹⁴⁷ For a discussion of Neolithic hammerstones in Cumbria see (Bradley and Edmonds 1993).

"Well, I used that background image when I was working as a user interface designer in the industry. At the time, the industrial designers I worked with described the ideal shape of future mobile devices as pebble shaped. It was so *de rigueur* in the future imaginary of those I worked with, I even wrote a short science fiction story for the design studio newspaper in 1997 involving a squeezable, pebble-like mobile device."

A rush of insistent memory flowed down my spinal column in a cold wave, and I closed my eyes, allowing the memory to speak:

She fished into the voluminous depths of jacket material and deftly deposited a smooth, rounded chrome object in front of him; wiggled it playfully.

"A PX-3898." He said uninterested, eyes drifting to the distant glass. "Cute but utterly unusable."

"Hate to show you up, but..." and she squeezed the flattened egg between thumb and forefinger. The top and bottom halves sprang apart to reveal a curved screen glittering as a stream of shapes ran across its surface.¹⁴⁸

The memory sunk into my heels, a fading weight, and I returned to myself. The Future Archaeologist raised her eyebrows ever so slightly, but I continued, the world quickly becoming firmer beneath my feet.

"Much of the imagery of future mobile devices in the late 1990s was very smooth and rounded, often egg-shaped, or even more amorphous.¹⁴⁹ The shape of this pebble," I thrust the stone at her, "weaves through the future of mobile device design."

¹⁴⁸ Extract from 'The Last User Interface Designer' published November 1997.

¹⁴⁹ Examples of pebble-shaped mobile phones, imagined in the future by the industry. From a copy of a magazine found in the design studio (Ricca-Smith 2003) -

The Future Archaeologist was smiling slightly. "Then I was right. The juxtaposition of mobile phone and stone axe is a potent one for the industry." She stretched her neck to stare directly at one of the CCTV cameras overhead, smiled. She was highlighting my reactions to the security-signed landscape, the signature of the brand inscribing itself into my flesh. Yet she resisted its authoritarian mark; the company inscribed no mark in her flesh.

I wondered at her remark concerning the stone axe. It reminded me of another connection the pebble held with the industry.

"And then there is the story of the mobile phone that fell to earth as an asteroid," I said. "How it was worn down through the ages into a pebble, and was finally picked up on a beach."

"Is this an industry myth of a pebble phone?" She asked, attention swinging back to me.

"A version of that myth. This version is perhaps borrowed from the Norse and the tales of the Edda. It's a version of Thor's hammer, or one of the other many stories around the world of meteoric iron, stories of a mythical weapon or divine technology that falls to the earth as metal and flame. In this industry myth an asteroid falls from the heavens, a divine technology; is pounded by the sea and the wind and the rain, endures through the aeons, and forms as a pebble upon a beach, a mobile phone pebble. A divine technology rather than



a designed technology. Providence rather than provenance. The mobile phone pebble lies there, ready-formed, a gift from some divine (in)corporate being, and is finally taken up by human hand."

I flipped open my notebook, and held it out to the Future Archaeologist. On it was a still image from a mobile phone television advert, which I had taped into place:



"Eight years after my science fiction story, and the pebble has finally arrived."

I gave the heavy yellow stone back to the Future Archaeologist. "This is future myth made manifest."

She turned the rough pebble in her hands, "And it's archaeology," she added, then looked up.

"So, where next?"

¹⁵⁰ Source: Motorola PEBL television advertisement 'Shaped by Nature' 2006. Image printed from <http://www.visit4info.com/details.cfm?adid=30309> Accessed 10/12/2006. Full advert can be viewed at <http://video.google.com/videoplay?docid=4208527555956100619>

"Well, it's almost ten. There's a brainstorming meeting about to happen in The Hub, back in the design studio. We need to go back there to listen."

We took the lift to the design studio, a sightless metal box rising through the marrow of sandstone.

The main entrance to the design studio was a glass wall. One designer had told me of a plan to cover it in frosted strips, to prevent those outside from peering in; although their stare could only encompass the bare outside wall of the brainstorming room and three or four digital slashes in its surface. Through those rectangular, pixelated slits I could see glimpses of the white walls inside the room, covered in collages of torn-out pictures.

My tag spoke and we edged around the wall, back into the studio. I hurried the Future Archaeologist around the sharp one-hundred and eighty degree turn, through the concertina door (before she could gather scent of the design studio), and into the large open space of the brainstorming room. It was a cork-panelled white room, filled with orange and brown lounging chairs, sheepskin rugs, a few low tables, a CD player and the detritus of a design workshop: piles of books, magazines, coloured pens, and unopened sketch books. On three of the walls were pinned groups of torn out magazine pages and photocopied sheets, with scribbled words and phrases on pink and yellow post-it notes as titles.

The two of us perched on wicker-rocking chairs, pushing them back against the wall to gain vantage of the room. A team of designers gathered, five or six (depending on the competing demands of their mobile and the virtual meetings they were simultaneously attending), one from the USA, another from China, others from continental Europe and the UK. They pulled up plastic orange bucket chairs, covered them in sheepskins, picked up some of the picture-books, and began to leaf through the glossy images. One of the senior designers put a CD into the player, a forest sounds ambient track, to create a different acoustic environment.

I leaned in to the Future Archaeologist. "This is a meeting in 2004 to discuss the trends for handset design in 2006," I explained. She nodded, although her attention was absorbed in the collage of pictures pinned to the walls. She pointed out one collection, largely torn from New Scientist and National Geographic. It was a collage of gold ingots, green-copper bracelets in dark earth, and other gleaming archaeological finds from South America. The pink post-it note below read: 'archaeology discovered'¹⁵¹:

I nodded, wondered what she would make of the connection. "The collages are an articulation of various future design aesthetics. They're the resource that the designers will be using to create the future. Remember the beach pebble and listen..."

And the meeting began. The conceptual design specialist, a contract designer with a background in fashion, took the others through her collages, her proposals for the future aesthetics in the industry. All I could capture was something of the circulating discussion:

"[Design is] highly functional... biomechanical..."

"Lightness in materials, in playfulness, in tension: skin and bones, not demanding as a concept... Ecological, in a material sense, [means] is natural."

"Fierce function between mechanical and natural in a bike. Instead... need to make contrast. Softer, tactile smooth, but visually contrasted... [like] really beautiful scissors or knife... [the metal] clearly invites the handle..."

¹⁵¹ From photocopy of magazine pages and post-it note (Find ID 110).

"Choice of natural has integrity, do it where need flexibility has a rationale."

"[It's] the human element, witness the handmade... Royal Dalton used a gold leaf fingerprint."

"Stone is more natural than white (of Apple Inc.)... White is ageless..."

"Products [need to] look like they are in motion... Pebble shape has motion."

"Need to find the correct pace for these products, but not stopped..."

"Beach glass is already worn, the more you touch it the better it gets."¹⁵²

I looked pointedly at the Future Archaeologist (who was still more possessed by the collages than the designers' conversation), and motioned towards the door.

We joined the circulation of bodies leaving the room. Once beyond the concertina doorway I let out a pent-up growl. "Now do you see why I am so frustrated here? Why I am bored and frustrated?"

It was a rhetorical question and I didn't wait for a reply. "I have been listening to designers talk about the future of mobile phones as pebbles for eight years! I am bored to tears with pebbles!" I was over-reacting slightly, but the release felt good. "This group of designers had absolutely nothing to do with the PEBL phone. The pebble shape has been circulating in the

¹⁵² Quotes are all extracts from one meeting recorded in field notebook no. 1.

industry as a future for almost a decade. It has been continually 'rediscovered' and reinvented every few years, as you have just heard."

I paused, lowered my voice.

"The future of mobile device design is talked of by the designers in terms of the surface material. It's outer skin versus inner technology. They reify the bicycle, the scissors and the knife into natural versus mechanical parts. Their talk of function has no functional components. So, the mess of wireless antenna, SIM card, processors, memory, and technical features of a mobile phone, and their effects on the surface, the screen, the keyboard, are erased. There is no interface (as a once and future user interface designer, that's what I am sensitive to). Natural surface is separated from technological skeleton. The desire is for 'clean design' a purification of natural aesthetic from technological operation. The handset is as featureless in the conversation as a pebble, which is why stone can become a meaningful future.

"Ultimately, the ideal is for the surface of the mobile phone to be as natural and as pure as possible. So, stone is more natural and more desirable than simply a white surface. The pebble is the idealised future, rather than an un-natural white Apple iPod." I shook my head, feeling depressed, bored.

"It's the familiar natureculture critique," agreed the Future Archaeologist.

I nodded, pausing in my soliloquy, attempting to find something new to say rather than repeat the well-worn moves of that critique.

Thinking aloud, I began. "Although the moves are similar, this future is not born of Donna Haraway's militarised cyborg.¹⁵³ The designers are not imagining the surface as biological skin over a technological skeleton, they are imagining the mobile phone surface as geological. The mobile phone as part of a landscape, as a pebble, as a piece of soft glass tumbled by the sea. Although what kind of landscape they imagine I am not sure."

I gave the Future Archaeologist a sudden fearful look. "They are constituting a landscape, a world, where what they call technology is always invisible, and only what they call natural is visible. It's a romantic idyll, run by a pervasive machine whose programmers have long since been forgotten."

She touched my arm with a wry smile. "You need to experience what a romantic idyll really tastes like. Trust me. Rural landscapes are very different when you live in them, are rained on by them, and are blown sideways almost over a cliff by them."

I chewed my lip, still concerned, thoughtful, threading my way through the design studio to the small library. I felt the call of the far windows. Standing by the darkened photocopier in the corner of the room, protected by a half-filled stack behind, I stared out into the colour-casted sky. It was empty blue. It was always empty blue.

"What do you see?" I asked the Future Archaeologist at my shoulder.

"An earthen bank, a monumental building, a summer solstice sky," she replied.

¹⁵³ Donna Haraway's famous interference into the Cold War militarisation of the cybernetic-organism, the cyborg. Haraway translates the figure of the hybrid cyborg as part of a feminist technoscience (Haraway 1991a), a figure that she has since articulated as only one particular (and situated) member of many companion species (Haraway 2003).

"I see the landscape-surgery of a railway embankment, the cube of a logical car park, and a corporate-coloured sky. And it has a romance, for me; a bitter tasting romance."

"But it's not the romantic idyll of the designers," she said.

"No... although their beach pebbles do lap at the sides of the building..." I stopped, unsure where that notion might lead, the thought had risen with a sense of foreboding.

We stared out at our different skies in silence.

A bright Scottish accent filled the lengthening moment: "Hey, how's it going?"

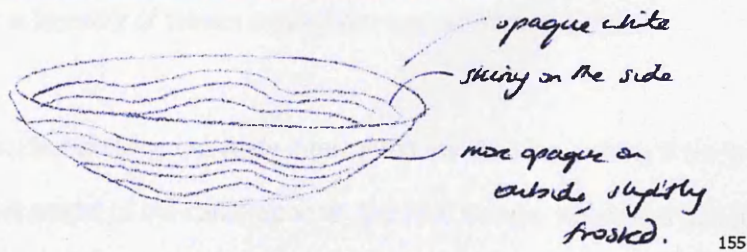
Andy, one of the industrial designers, had been loitering on a sofa in the library, looking through the magazines. He was friendly (as always) yet faintly suspicious (as always).

We exchanged pleasantries, and I left my silent foreboding at the window to retrace my footsteps with the Future Archaeologist back into the studio, crossing the dashed white vector line of desk partitions.

I scanned his desk for inspirational flotsam: an embossed Japanese drinks can rested on a pile of papers by his monitor, and a small legion of Manga toy figures remained on permanent guard. I was particularly taken with a delicate white-frosted glass bowl and some polished quartzite pebbles resting inside, and nodded obsequiously to the Future Archaeologist.



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I took one of the pebbles (see above) into my palm and quizzed Andy on its significance. He said he was interested in the texture of the bowl and stones for a recent camera phone design project, his fingers running around the open circle of the white frosted bowl; the Future Archaeologist became very intent. I asked for more about the design project, and he wove me this little tale, stroking his black goatee beard as spoke:

"Senior management creates a set of priorities, the strategic requirements for the project: make it big and make it small. So it goes down to middle management, the heads of design and mechanical, who tell us to make it big and make it small. And we scratch our heads and try, and come back to middle management and say: well, we can make it big and make it big, or we can make it small and make it small. Middle management tells senior management, who go: no, we

¹⁵⁴ Photograph of Find ID 044. Stone was removed from my ethnographic site.

¹⁵⁵ Outline sketch of the frosted glass bowl made in my ethnographic notebook.

really need it big and small. So middle management say: okay, we'll tell them to try harder. So, we go off and the cycle repeats until senior management shout at us. And then they tell us: oh, but now we want it thin, that's the new priority."¹⁵⁶

It was a great tale, told with ironic fervour, and I thanked him. It reminded me of the negotiations and power asymmetries that were inseparable from the designer's imagined landscapes of the future. Theirs was not the only future that mattered. Their ideals participated in a tapestry of woven and woven-over imagined futures.

There was more in his story, but Andy interrupted my thinking, asking if the two of us wanted to see the latest model of the cameraphone, the final design, which had just arrived from the model-makers. And, of course, we did.

He pulled open a desk drawer and extracted a small hard, black case, placing it carefully on the desk top. He released two latches and lifted the lid. It revealed two glistening white cameraphone models, held tightly, end to end, in grey foam.

"These were about five thousand each," he noted. "I think they're the most expensive models we've ever had made."

He picked one up between finger and thumb, brushed a light palm over the frosted white front. I knew it was made of wood, sprayed to look like metal and plastic; knew from my own design experiences how it would feel slightly warm rather than metal-cool. Yet its exact mimicry was seductive. I looked back at the white bowl and translucent stones, sensed something of their luminescence in the rounded, soft white form of the models. As the smooth quartz pebble in my hand led my fingers to rub, almost absently, at a nagging

¹⁵⁶ Expanded from ethnographic notes and memory.

imperfection, the bevelled edges and detailing of the models also demanded to be touched. But Andy cautioned us not to handle, or even breath on, their surfaces. The question of touch was a serious managerial decision, a privilege that was frequently denied. Focus group testing of new designs with consumers often only involved a plain block model and some illustrations or photographs (providing results that were both upheld and quietly derided, depending on the moment). These enormously expensive, fully detailed models were reserved for impressing senior management and important customers who, I was constantly reminded, were the network operators, not the consumer. In time, after the first pre-production handsets were rolling out from the tooling-up process in China, after the first scratches had appeared, then they would be consigned to the bottom of (a canny) someone's drawer or the innards of a display case.

I quickly sketched the white frosted bowl on Andy's desk (see above), thanked him profusely, and we reluctantly moved away; slunk back into my temporary desk space and its baleful hum, the soft quartzite pebble still held absently in my palm.

I turned to the Future Archaeologist and gave her the pebble, which she immediately began to caress.

"What did you think? Due for release in late 2005, I believe."

"Not only did its surface properties mirror the bowl and that quartz stone," I continued. "So the landscape of the company seems to have had an effect on the design. But, also, the shape of the model was smooth, rounded, and white. It was so similar to the future ideals of the designers we listened to earlier. It seems something of their purified, natural future is being manifest in mobile telecoms devices." I actually felt a slight sense of excitement.

My counterpart hummed a vague acknowledgement, and other thoughts rushed into her silence.

"Interesting how touch is so regulated. Touch is often said to make something more real, so to speak. Touch makes the world."¹⁵⁷ Regulating touch also regulates who gets to make what worlds. If I could have touched that model, I could have touched that future."

"And *to allow an object to be touched, especially continually over a long period of time, is to invite the prospect of ruin,*," quoted the Future Archaeologist, holding the stone out to me, deliberately running the flesh of her thumb pad over a veined imperfection.¹⁵⁸

"Touch makes time," she said. "As Kevin Hetherington points out, it leaves a trace, a patina."

I nodded.

"I'm interested in the haptic effects of these artefacts. They seduce the designers with their polished texture, with their translucent warmth and colour. Prehistoric archaeologists are also seduced by polished stone, by the starry depths of a flint-blue scraper, by the soap-softness of a jadeite stone axe."¹⁵⁹

"And you?"

"And me!" She laughed, tossed the quartz pebble high.

"Remember this stone, Ethnographer," she commanded. "You will see it again."

¹⁵⁷ See Tim Ingold's discussion of the role of haptics in perception (Ingold 1995, 2004).

¹⁵⁸ Quoted from Kevin Hetherington's discussion of the haptic perception of the visually-impaired, and the display of museum artefacts (Hetherington 2002).

¹⁵⁹ See Vicki Cumming's discussion of the role of aesthetics in the archaeology of prehistoric polished stone artefacts (Cumming 2002).

Then she narrowed her eyes playfully, "Are you ready to go on a journey? Three days of mud and mountains?"

"To your fieldsite?"

She nodded, already striding to the stairwell. I caught up, let us through the door with my pass.

"Where are we going?" I asked. "We could journey to the other side of the world and back again in three days."

"North, to the islands of Orkney."

We were flying down the stairs, were out of the stairwell; mud pieces from the Future Archaeologists boots littering the fragments of Blue I had created for us.

"Now?" It felt too sudden, too fast. I was unprepared.

But she was ahead of me again, striding towards the iron gates of the campus, towards another world beyond those borders that I had so carefully stitched together from my notes and memories.

The security guards were already rolling the gate back, not for her, but for one of the black taxis that maintained the dosage of international employees injected regularly into the campus. We skipped out, passed forward-facing guards who cared little for the excretions of company business, and turned right onto the squelching-wet grass verge out front.

Impressed on the verge, nose to nose with the grey post of a bus stop, was a dilapidated long-wheel base Land Rover Defender, whose long pedigree of farmyard usage was inscribed

in its paint-patched dents. The Future Archaeologist was already in (I was fairly certain the thing had been left unlocked), and was waiting for me to join her. I shook my head. I knew I was in no way dressed for this journey. I didn't even have a coat with me.

Reluctantly, I opened the door, pushed a pile of cassette-cases over on to the central seat, and climbed in to the cab. It smelled of mud and rust.

"Do I need a pair of wellies?" I murmured.

"We'll find a pair to fit you, don't worry. Let's go! Will Self claims to have done it in a twenty-four hour shift¹⁶⁰ but it's sensibly three days. We'll be stopping overnight in the Lake District, and then the Cairngorms. And then there's the Pentland Firth ferry. It's categorised as one of the most dangerous sea crossings in the world..."

I sighed, and felt horribly under-prepared. Blue was already disappearing besides us in a haze of inattention. But then the diesel engine stormed into life, we bounced down the kerb, and were off in a growl of gears.

¹⁶⁰ See his story of the journey from Orkney to London in (Self 1998).

SAND14

by Future Archaeologist

Orkney.

It begins with the journey.

There is an airport at Kirkwall on the main island of Orkney, but the flights are often (somewhat mythically) delayed by the rampant sea-fogs that enshroud the flat boglands of the runway. Stories are told of world-weary camera crews being confounded by the unreliability of Orcadian air-travel (pilots may take the plane up to 'have a look' but return to the Scottish mainland to await improved weather), or unfortunate pilots who have miscalculated their landing in the wet mists, and required a boat to tow them out of the bog.

But the real journey, the journey that defines Orkney for me, is the one by ferry across the broiling seas and whirlpools of the Pentland Firth. Then you do not stumble into Orkney, as you might stumble, blinking and deranged, from the doors of a 737. You are translated and transformed through the sea, from the Flow Country of the Caithness peats and moors, to a land of few trees; to a land where even the hardy hawthorn bushes are drawn tightly into the lea of the ever-present wind; to a land of oil tankers, prehistoric villages, and fleets of scuttled ships. Orkney is not a place of romantic idylls, it endlessly resists idyllic ease, but a harsh place of historic tales. If there is romance here, then it is in the voluptuous midnight storms, the burning red eye of the Flotta oil terminal flare. This is the place where Sand14 is located, the company and extraordinary design house for mobile devices where I made my future archaeology of the mobile telecoms industry.

Orkney.

It began with thick mists on the northern horizon as we set out from the north-east tip of Scotland aboard the Hamnavoe. The mists never parted (as they might in pre-Raphaelite tales of the mist-hidden island of Avalon), never thinned, only steadily darkened. And then,

after many minutes standing hood-up on deck, gloved-hands fitted to the white railings... there... the dark mists gathered form, and the towering cliffs of Hoy were before us. Vast. Jurassic. Their cliff-tops lost in the mist, the red and green wall of rock passed silently, rotoscoping before our eyes. Tumbling long streams, falling hundreds of metres, hung like heavily-dewed primeval spider webs. The stack of the Old Man of Hoy, mouth open in breath, greeted us with his unspoken voice from far above; and in amongst the swirling flat seas, puffins dove in and out of the water, black wings flapping madly in their comic, flustered agitation.

Then the cliffs faded, and on the port side, low grey buildings and low green hills materialised and drew in all around us, as we slid in to dock at Stromness with a fanfare of ferry horns.

I had lent the Ethnographer a windproof jacket and fleece, which she had zipped herself into since the rains of our stop-over in the Lake District, and had barely removed since. Now she sat hunched into the high collar, eyes bright, quietly waiting in the passenger side of the Land Rover for the ferry doors to open. I smiled with anticipation. Orkney's rocks and waters had been impressed over the long ages with a peculiar magnetic field, one that aligned the bones of visitors into those who were drawn closer and those who were repelled. The Ethnographer, I was certain, would be drawn in.

The Land Rover joined the flood into the harbour front, but I slew to a crawl as we passed the non-descript annex and apex of Julia's Café, which was one of Sand14's regular haunts and local supplier of good cake and lunch. No one I recognised was sitting at the usual harbour-side table so I pushed the Landie back up to speed over the hump of Stromness, and headed out of the town; passed the geodesic dome greenhouses and the pebble-dash bungalows that seemed the basic building blocks of island life.

How to describe the next moment? The first moment as you come over the rise of the hill and the gleaming magnificence of the loch of Stromness and loch of Harray stretch before you,

with the sliver-tail of the isthmus between, an isthmus upon which the teeth of the Ring of Brodgar stone circle set their jaw against the sky.

The moment caught us both, I knew, and in that moment something of the two of us was left hanging in the damp air; a memory, a connection. But the Land Rover was homing in on Sand14, drawn ever more rapidly towards its usual resting place in the land below. So we swept on down in a wide curve around the edge of the loch, passing the small grass dome of a prehistoric passage grave by the loch-side, entering the bounds of the World Heritage Site and one of the densest proliferations of Neolithic monuments known.

The curve drew us on past the cream walls of the hotel I had stayed in during my first few weeks here; waking up to a view that looked out across the loch at the silhouette of jagged stone teeth on the horizon.

The isthmus was racing in towards us and I pointed to the little shingle beach in the crook of the spit of land that reached out towards the curving tail. I could just see the black crescent moon of a seal asleep on the dark rocks, head and tail curved to the sky. Set before the seal was a vast semi-circular window glinting off the brackish water, its frame deeply embedded into a large grass covered mound. The broad circular mound spread out towards the edges of a walled field, but the building's height was hard to read beneath its camouflage, perhaps a couple of storeys, perhaps more. Surrounding the edge of the circular shadow of mound was a pale yellow ring that, from here, always reminded me of the white chalk figures of the Wiltshire Downs, part of a long forgotten symbol dug forever into the earth; a future archaeology, indeed.

"That's Sand14," I explained to the Ethnographer, pointing to the grass dome.

She only nodded, eyes on the mound as it appeared to spin clockwise, the semi-circular glass window turning away from us as we passed.

We turned left into what was unofficially known as Brodgar Road, the lane that led down the tail of the isthmus towards the stone circles of Stenness and the Ring of Brodgar itself. I pointed out the grass dome of the Neolithic passage grave of Maeshowe, pushing up over the rise on our right.

"Maeshowe was one of the architectural inspirations for Sand14," I said. "The other was the prehistoric settlement of Barnhouse on the loch side, which we might walk to later. You need to get a sense of the surroundings to really understand what's happening here."

I drove in through the old gate (a vestige of the field's previous use as arable farmland) into the plastic lattice strewn car parking area, pulling up in the waiting space before the low grass circular bank that surrounded the mound, now looming into the grey-soaked sky. We could now see the windows that burst out all over its surface, long and tall narrow slits, blue-green tinted panels that seemed a sea-enriched soil beneath the grass, a faint submarine light coming from within their depths.

The Land Rover was actually the company car, or rather 'bus' as it was affectionately called, and I had only borrowed it for my sojourn to the South. I tossed the keys into the first aid kit beneath my seat and threw open the door, leaped out into the cool, damp wind. A friendly gust blew a wisp of smoke from the chimney vent and I breathed in the faint scent of peat.

"Welcome to Sand14," I said, theatrically.

I led the Ethnographer around the edge of the bank, barely a foot high, to the front entrance set back into the mound beneath a square slab of stone. The mound was a few footsteps along a stone slab causeway, surrounded on either side by a ditch filled with yellow-grey quartzite beach pebbles.

The Ethnographer stopped and reached down, picked up one of the heavy beach pebbles.




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"Looks familiar," she murmured.

"That's the point, " I reminded her. "Sand14 is based on evidence. We both thread our reconstructions together from fragments of evidence. This," I waved my hands around me, "is no less empirical than your imaginings of a mobile telecoms company."

I dropped my rucksack to the flagstone for a moment, and rummaged inside for the sheaf of print-outs from my finds database, stuffed into an arts portfolio:

¹⁶¹ Photograph of Find ID 038. This stone was removed from my fieldsite.

ID	38	authorised rer
date	22/04/2004	
site		storage locati box 1
location	Border building 3	
description of	Left hand stone pebble border of building 3, pebble picked off the top	
type	artefact	
description of	quartzite pebble, glitters with mica, yellow-white disk	
notes	cf with motorola pebble and mica shard from micra meeting room	
confidential	<input type="checkbox"/>	

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“That’s the entry I made when I collected that pebble,” I said, re-reading my notes. “I’ll show you the mica shards when we get in. Hmm, I should have noted the relationship with the chalk stone I found as part of another boundary ditch - around the edge of an Intel exhibition stand.”¹⁶³

“What’s the connection?” The ethnographer was intrigued.

“Both these beach pebbles and the chalk stone encircle and define the boundaries of a corporate space,” I explained. “But the important difference is in their landscape setting. These pebbles, here on Orkney, are part of the landscape, they might even be from a local beach. There’s a whole category of artefacts found a few miles away at the prehistoric village of Skara Brae called Skaill knives, which are sandstone mica cobbles, just like this, sliced in half.”¹⁶⁴

“At the exhibition stand in the London Docklands, however, the fragments of chalk have no local significance. The landscape is one of red-brick mills, metal pylons and power cables, and tidal mud. The exhibition stand boundary is deliberately evoking another landscape, an imaginary, perhaps even romantic chalk down-land.”

¹⁶² Print-out of finds record for Find ID 028.

¹⁶³ See Figuration 2.

¹⁶⁴ See (Saville 1994).

“And chalk is white,” noted the Ethnographer. “The designers favourite colour. Perhaps its about purifying the technology, again.”

“Maybe,” I was less interested in that argument. “But my point is the effect of the different landscapes on the boundary stones, how their meaning is transformed. The beach pebbles at your Blue are not to evoke the harsh Atlantic western edge of Orkney, even though that’s where they may be found. They are placed to evoke some imaginary cobbled beach, warm pebbles under foot, blue skies overhead, ne’er a soul to be seen, a single-sailed fishing boat on the horizon. It’s a fantasy world. The same with the exhibition stand. The chalk was not natural, in any meaningful way. It had been compressed and processed into smooth stones – never found in any chalk cliff or down-land. The chalk was part of an imaginary landscape, a fictional landscape. Here, the beach cobbles evoke a local experience, are integral to the island, the other, evokes your suburban employee’s fantasy desires.

“This,” I pointed back to the fields behind us and the isthmus. “This landscape is where that pebble belongs, far more than at Blue.”

I shouldered my rucksack again and we stepped up to the heavy glass door, tinted one way so that it appeared deepest sea-green to us; a dark watery passage through which we must enter. I pushed my key against the lock. Inside was the porch that lay between the outer and inner doors. It was filled as usual with discarded walking boots and wellies, a much underused broom hanging from a hook, and a detritus of stones and mud that we kicked back into the corners. I always thought of the long glass box as an airlock, where the mud of the outside world was transformed into the pencil sharpenings and dusty threads of the indoor world.

Suitably de-soiled, I pushed on the next glass door, and we passed into the brightly lit foyer. It was filled with birch café chairs, tables, and a large dishevelled black sofa, with a bright rug thrown over one corner. The far wall of the foyer was white with tall slot windows that gave

glimpses into the design studio beyond between a mass of abstract paintings, the other was a series of illuminated green panels, curving around the inside of the dome.

The foyer was a meeting space for the company, and a large LCD screen currently showed (no doubt with someone's sense of irony) an image of the grass growing on the sides of the mound outside. Spot lights and candles were everywhere, reminding me that we were closer to the Arctic Circle than to London, closer to Norway than to France, and for large parts of the year the sun set after lunch, and darkness prevailed for most of the day.

Through a tall door on our right, a tall, haphazard professor crashed in. He was dressed in a lopsided, overly large green fleece. It was Richard, my initial liaison and the founder and co-director of the design studio. He did not look like a designer, or manager, or engineer (his first degree was alleged to be in cybernetics) or any other kind of high-tech or telecoms person I had seen at work in a senior position. But my reports from others in the industry were that his mass of gold-grey unruly hair and vast eyebrows disguised, perhaps accentuated, a shrewd business man.

"Ah, Good morning," He said, typically distracted. "Have you seen Pearce on your travels?"

Pearce's Peedie Parcels was the local delivery company Sand14 used. The Ethnographer and I both shook our heads.

"Ah... well, we're about to get together in the kitchen. Do come and join us." He said, and flung himself back through the door, dancing deftly to the left as another body unexpectedly appeared before him.

"Oh, hullo there." Anne's bright body in broad smile and thick-red cardigan, waltzed into the foyer. "I thought I saw the bus on its way. Did you want a hot chocolate?" It had become something of a traditional drink in the company, and we both eagerly accepted, I was certainly still feeling slightly stiff and damp from the crossing.

Anne pulled open the tinted glass door and we headed down the curving passageway, circumnavigating the edge of the design studio. Despite being an award-winning contemporary building, it was not a minimalist space, the roar of lights and abstract canvases on the walls (the other co-director was a professional painter), and plain sandstone walls made it feel somehow rough and worn, and strangely warm. As we walked passed the gallery of midnight-coloured canvases to our left, there were a series of studio rooms down ramps to our right, rooms that were partly buried in the earth, their wide windows high in the walls.

I peered into one room, one I had been intrigued by for several weeks. On a slab of wood above a couple of trestles, was a strange woven ball of metal, almost a meter high, a mass of tangled silver strands wrapped around a what was at some point in its past, a sawn off front end of a Mercedes radiator complete with its metal logo. The wire strands had been extruded from its surface, and then wrapped endlessly around its form, forming the strange ball in which the radiator grill hung, suspended, frozen in its own stratigraphy of metal layers. There was a single post-it stuck to the wall nearby that read:

*Mercedes, More natural. More human, than industrial.*¹⁶⁵

“Very J.G. Ballard,” commented the Ethnographer, presumably referring to that author’s infamous fascination with car-crashes and the blurring of cars and bodies.

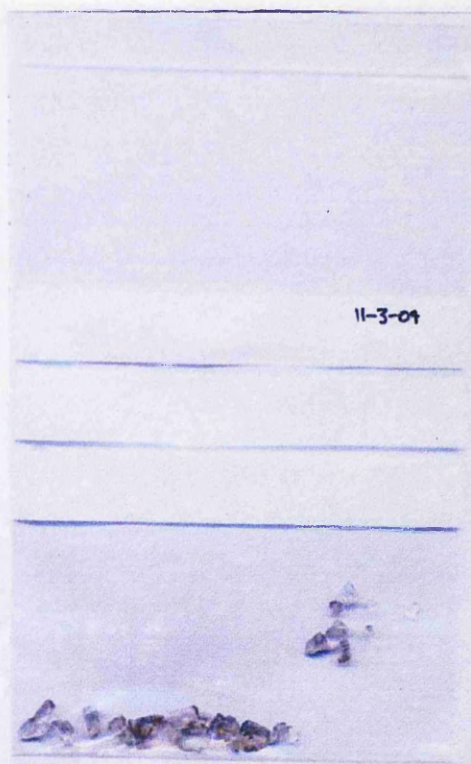
That was not my reading of the piece, one of the many attempts by those at Sand14 to create inspirational future aesthetics, but I said nothing, continued following Anne around the quarter-circle of the passageway to the door to the design studio.

I couldn’t quite resist pausing at the door and giving the Ethnographer a slight, mysterious smile at what was beyond.

¹⁶⁵ Copied from a post-it note used for inspiration for the aesthetic of future devices, found on wall of design studio at fieldsite. From notebook No.2 p.68.

We stood in the doorway for a moment, as I let the Ethnographer's senses resonate and overwhelm her. It was a huge domed space, with that vast semicircular window staring out down the loch, encircled at the last by the great undulating dark tail of the isthmus on the horizon. The low, rich silver skies, endlessly shifting clouds of metal vapour, filled your eyes from rod to cone to rod across your retina. The weight of silver danced with your gaze, as your eyes rove in wild rhythm with its flowing movement. However, that weight was counterbalanced, poised, by what lay at the heart of the mound; standing as though timeless, the hard core around which the soft mound had grown over aeons: a two storey square, sandstone building that reached to the roof, the pillar and nexus for life at Sand14. It was around this axis that everyone sat, in an organised chaos of mis-matched furniture, drawing desks and computer equipment.

I pointed down at a large potted fern besides one table. The soil in the large ceramic pot had been covered with small shards of what looked like mica.

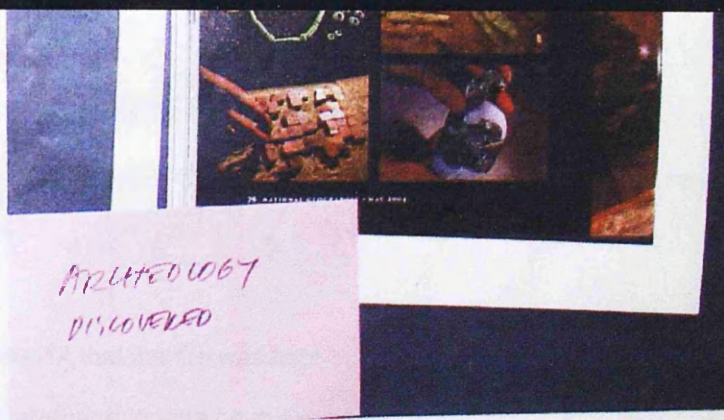


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Anne motioned us in to the central 'house' as it was known, weaving us through piles of pictures, books and magazines, and endless collages of imagery stuck to propped cork-boards. The Ethnographer gave one of the mish-mashes of magazines and post-it notes a second glance; beneath torn New Scientist and National Geographic pages of South American archaeological finds it read: 'archaeology, discovered'.

But mixed with this were other pages, including a huge blown-up image of an artefact found at Skara Brae, known only as the Skara Brae object.

¹⁶⁶ Find 052 collected from fieldsite.



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"We tend to work more in the house later in the year," Anne was explaining. "If we come in at all. Some days the wind is fierce. You'll get blown away into the loch before you've taken two steps out your front door." Anne smiled infectiously.

We dodged around clearly demarcated areas of work and personality (I nodded to Soo-Yin, the industrial designer, who looked up from her monitors as we passed), and finally stepped into the stone building.

It always felt like entering a small house, a one-up one-down. What always struck me was the smell, the distinctive smoke of peat. This was the kitchen, a warm parlour, the heart of the company. The unmistakeable peat fire, black bricks gleaming red, burnished the air and

¹⁶⁷ Photocopy of magazine pages and post-it note (Find ID 110), and photocopy of Skara Brae object in (Clarke, Cowie et al. 1985).

immediately my chill dampness, the clamour of wet weather, was gone. Much of the kitchen was filled with a dining table and assortment of chairs, more and less rickety and upholstered. At the far end of the small room the fire burned perpetually alight in its stove, suspended from the ceiling. Surrounding that warmth were the mirror-hard surfaces of an industrial stainless steel kitchen, appliances, pans, drawers and cupboards, all suffused with a corrosive orange glow. A spiral staircase besides us led to the library on the floor above. On a warm plastic chair, back to a corner, facing the hearth, an older woman in designer-black with an orange scarf sat, tapping furiously on a laptop. She glanced up, but Anne said,

“Och, don’t worry, George. I’ll get them something to drink.”

“Would you? I’m just really up against it, right now.” George(ina), the co-director, gave us both a brief smile, “Sorry, I’ll be with you in a moment,” and returned to her rapid movements over a mouse pad.

It was a tradition at Sand14 that the fire was kept burning, partly out of necessity, so I conscientiously threw another briquette on the hearth.

Anne handed us two large cups, or rather bowls, of hot chocolate, and other members of the company began to drift in.

Richard launched in to the room, hopping with nervous energy from one foot to the other, and gabbling at high speed to Simon, the flamboyant prototyping engineer, who was calmly making notes and sketches, dyed-white spiked hair sawing through the air.

George(ina) then leaped to her feet, and with business-like efficiency, formed our disarray into a discussion appropriately watered with hot drinks.

Richard quickly held court at the table as usual, leaning in, furtively, over his black tea; eyebrows bouncing up and down as he spoke.

I leaned in to the Ethnographer. "They're discussing the cameraphone models, which Richard saw in London a few days ago," I explained.

The Ethnographer gave me a sharp, surprised glance, but I motioned her to be still.

"I have to say, I was a bit surprised," Richard began. "I rather thought the models looked like props from a nineteen fifties science fiction movie."

"It's the whole retro thing," commented George with a sigh. "All white and bulbous curves. It's just so totally uninspired. It doesn't engage with the world at all. It's a fantasy of styles from the past. Oh, I know it's terribly popular, but I just hate it."

Richard rolled on, fingers weaving the air as though incanting a spell. "Well, I then wandered into the British Library. And I didn't realise, but some of Tim Ingold's recent work on multi-sensory communication talks about the importance of the *lived experience* as opposed to the reification of the senses.¹⁶⁸ I think this is crucial for us. What we are doing is transforming, or rather translating, an experience of the world, not of the individual senses. It's the transformation, rather than the transmission, which is central. Our work is really about how to transform an experience, through silicon and radio, into something else."

"And into something no less magical..." murmured Anne.

"But we have been really focused on haptics and force feedback, recently." Simon looked worried.

"Ah, don't worry, this is definitely not a redirection. I think we just need to keep it absolutely clear in our minds that we are not, we are not," he emphasised, "designing a multi-sensory

¹⁶⁸ See Tim Ingold's discussion of sensory experience in (Ingold 1995).

communications device, as a kind of evolution of voice and camera phones. That would be quite wrong. What we are doing is generative. We are trying to translate a bit of the world into something else, which will hopefully be something a little extraordinary.” He gave a sudden, quick, grin. “I guess it’s like painting.”

“I don’t think it’s anything of the sort, Richard,” said George, piqued. “I accept it might be like photography, which is a translation of the world into a flat, timeless rectangle with a single point of perspective. But it’s not painting.”

The conversation bounced back and forth for a while, with the three socio-cultural researchers, Anne, the Ethnographer and I, sharing a quiet space between it all.

Finally George, who as both artist and businesswoman always insisted on the salient details, asked Richard how he might pitch their radically different design concept to the mobile telecoms industry.

There was a pause, and Richard leaned back, “Ah, now that is an interesting issue.”

It was an issue I knew would not be easily solved, one upon which their viability as a business rested: how might their version of the future be made as part of the mobile telecoms industry future. But it would not be answered today.

The discussion disbanded, and everyone drifted off, thinking hard.

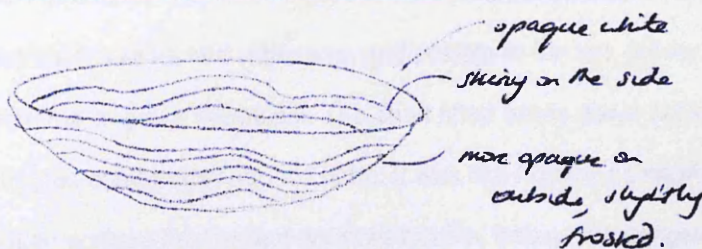
The Ethnographer and I caught up with Simon. I was eager to show the Ethnographer what the engineer had meant by haptics and force feedback, show her the effect of this landscape on the future of the mobile telecoms industry.

We walked around the assortment of working areas, to Simon’s own world. He had set up a couple of thin metal work benches and a floor of paperwork in front of the wall of window, with

the waters and beach almost at arms length beyond the storm-enforced glass panels. I scanned his desk: lots of paper, pens, a pot of some fragrant herb (rosemary, I thought), a planisphere, an old CD player and chewed up headphones. And there was one of the white-frosted glass bowls on his chair, still full of hot chocolate:



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There was also a large old-fashioned rubberised laptop, closed and leaning against the window, with a polished quartzite pebble resting on its clasp. I picked up the pebble (see above), and the Ethnographer asked him if it was important.

"Feel it." he replied, looking at me.

I pressed the stone between my thumb and forefinger, and rubbed its surface; felt the coldness, the smoothness, but also a slight crease in the surface, a fracture, which drew my thumb.

¹⁶⁹ Photograph of Find ID 044. Stone was collected at my fieldsite.

¹⁷⁰ Outline sketch of the frosted glass bowl made in my field notebook.

"You feel the fracture?"

I nodded.

"Well that's what I'm really interested in. The imperfection draws your fingers, doesn't it? But it's the colour, the translucency of the polished stone, that draws your attention."

"How does that lead to a mobile device?" asked the Ethnographer, alert.

He rummaged on his desk, pulled aside a few maps, and revealed a strange, glistening black object, shaped like a rounded and elegantly sculpted letter 'T' – the Ethnographer immediately glanced over to the distant collage of the Skara Brae object, eyes widening with recognition. The object was not entirely black, in its depths were pale arteries of white. Nor was it completely smooth, it was etched with some grid pattern at the top. Simon held the maps back, and invited me to grasp the object. The shaft fitted easily down between my fingers and the handle snuggled comfortably into my palm. It was like holding some kind of designer bottle opener. The silken surface felt like sun-warmed marble, heavy, but gorgeous to touch. Instinctively I squeezed it, and felt the give of two pressure pads beneath my knuckles. A light appeared at one end, projecting down onto the floor. Then, extraordinary waves of what felt like cool water began to lap up and down my fingers. It was delicious. I realised there was a smudge of blue in the light on the carpet, put my other palm into the beam to bring it into focus. It was a picture of someone's hand dangling in lapping water, and I heard a slightly distorted voice from the object whisper: "Can you feel that?"

I could.

I had not seen the device working before, had no idea of its effect. I didn't know what to say, almost dropped the device, and gave it back to Simon.

The Ethnographer looked slightly stunned. "That's..." she began, gave up.

Simon grinned. "Isn't it just!"

We walked away in silence, leaving Simon to immerse his thick bare arms in code and the ongoing debugging process. It was time for us to have our *tête á tête*.

I led the Ethnographer out of the studio, into the suddenly enclosing passageway, around and out to the foyer.

"Let's go for a walk, " I suggested. She peered out at the skulking rain clouds through the glass airlock, gathered herself and nodded.

We walked down the lane, out along the isthmus. Sand14 was inside one of the greatest prehistoric monument complexes in the world; part of a five thousand year-old architectural project. In a few minutes we were opposite the three, seven metre high monoliths of the Stones of Stenness, once part of a stone circle. Beyond, marking the connection between spit and isthmus was the single standing Watchstone. And further, almost in a circle on the far hills all around us, beyond the rain soaked mist, were more standing stones, ever present at the edge of this world.

At this time of year, midsummer, there was a steady stream of tourists pulling in to the lay-by, but we hit a lull in the photographic traffic and were alone before the towering vertical slices of stone.



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I pointed to the circular dome on which we now stood, "When the ditch around the circle was excavated a few years ago fragments of prehistoric pottery were found with undulating decoration. Grooved ware, as it's called."

The Ethnographer began to walk away, pointedly uninterested. I called after her,

"The grooved undulations are reflected in Simon's frosted opaque white bowl, the one sketched in the field notebook."

She turned, listening now.

"Like the beach pebble, the bowl resonates with this local landscape. Its decoration is more Neolithic than it is London suburban. Perhaps, in five thousand years, fragments of the bowl will be found and will be known as grooved ware, too."

"As far as I am concerned, that's spurious. It was found a long way from here," she said, pedantic.

"But we are still there. Here is there, at my fieldsite. There is here. This place both is, and is made from, my fieldsite."

"Now you've lost me," she said, shaking her head. "Blue is geographically located where I did my fieldwork, that makes sense. But what you're doing is unnecessarily complicated."

¹⁷¹ Stones of Stenness and the Loch of Stenness beyond, June 2006.

I gritted my teeth, ready for the long explanatory haul, and began striding across the grass, politely giving the sheep a wide berth. "Just follow me, this will explain everything..." I called out behind me, and vaulted a stile onto a footpath that headed away from the road towards the loch of Harray. I heard the Ethnographer slipping along the wet grass behind me.

We walked for a few hundred yards and then stopped abruptly and turned left to face the loch, between us and the water were the glistening stone foundations of the archaeological remains of the prehistoric village of Barnhouse. It began to rain very lightly, a faint downward movement of mist, mizzle, and I pulled on my fleece hat.

"This is one of the architectural inspirations for Sand14," I explained, and motioned her to join me standing at the entrance to a 'house' framed with upright stones. The sides of the building and its internal structures were built up a foot or so with slate tiles overflowing with tufts of grass.

"Look it's a circular building, with a square structure in the centre. We turn right here, at the entrance, around the edge of the building and walk in a quarter-circle, to reach the inner entrance. It's the same with Sand14."¹⁷²

She looked at me, thinking, unconvinced. I took her hand, held it in front of us both, the rain sealing our knuckles. We were standing in front of the inner entrance, on the threshold of the square building at the heart of the mound.

¹⁷² For a full outline of the architectural properties of Barnhouse, and prehistoric houses on Orkney more generally, see (Richards 1990). As well as the architectural style, Sand14 also retains the orientation of prehistoric houses and, more importantly, the central hearth.



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"Now, see the kitchen at Sand14. There! Just through the doorway. And smell the peat fire from the hearth, smell it in your nostrils! Hear the voices of the designers! Hear them!"

I pulled her roughly forward into the room, knuckles white. "Ah, it's warmer in here. Touch the wooden table. See the brushed steel surfaces. Do you see the two unwashed mugs of hot chocolate by the sink, our unwashed mugs..."

Then I murmured Ursula K. Le Guin's words. "*Could you hear voices, Schliemann, in the streets of Troy? ...[We]... slip weightless among molecules, dwelling where a century passes in a day, among the fair folk, under the great, bell-curved Hill of Possibility...*"¹⁷⁴

I squeezed the Ethnographer's hand, then released it, felt the mizzle again greasing my fingers. The rich metal scent of earth and stone in my nose, the lap of freshwater and summer wind in my ears.

¹⁷³ Photograph of the entrance to the inner 'house' at Barnhouse, June 2006.

¹⁷⁴ See quotation in the Prologue.

"You and I, we are both storytellers of landscape, " I explained. "And, as Tim Ingold says, *telling a story is not like weaving a tapestry to cover up the world, it is rather a way of guiding the attention of listeners or readers into it.*"¹⁷⁵ Sand14 does not obfuscate or complicate the mobile telecoms industry, it heightens and focuses attention. It is a perceptual technology for seeing the future of the industry. Is not Blue the same?"

The Ethnographer nodded, "Yes, Blue is a story of a landscape, of a fieldsite. It can never be the fieldsite experience, that is always transitory, momentary; an ethnographic account always involves translation and relocation of experience. Blue is my focus on the future of the mobile telecoms industry." She glanced at me. "I apologise. It seems we are both relocating our fieldsites; shifting locations, as Gupta and Ferguson would say."¹⁷⁶

"Exactly. We are both travellers through a landscape that *is* a story. Ingold points out that the field practices of archaeology and anthropology are both the gathering stories from the landscape. Now, he goes on to argue that meaning is there for us to discover in the landscape, that archaeology is an act of remembrance, which I have to disagree with. The notion of discovering knowledge in the ground is something that I am rather sensitive to as an archaeologist. Meaning is not in the landscape, meaning is an effect of activities in, and therefore with, the landscape."

"Okay, I follow," agreed the Ethnographer. "Meaning is made through located socio-material practice. Landscape has agency in practice. It pushes back in intra-action, as Karen Barad might say."¹⁷⁷ I did not discover Blue whilst I conducted my ethnography, I made it in the specific activities of my fieldwork. Had I done different things, been attentive to other things around me, the story of Blue would have been quite different."

She hesitated, then gave me a hard stare. "So what's the difference between us, then?"

¹⁷⁵ (Ingold 1993).

¹⁷⁶ See discussion in Figuration 2.

¹⁷⁷ See discussion in Figuration 2 and (Barad 1999, 2003).

I thought carefully for a moment, flicked gathering drops of rain from my finger-ends, leant back on my heels, boot soles carving twin moons into the muddy top-soil. My bones were beginning to chill, the mizzle seemed to seep beneath my waterproof, beneath my skin, was rapidly seeping into my bone marrow. I suggested we start walking again.

We returned to the road and took a new footpath along the shoreline of the isthmus, began to snake our way along the tail towards the Ring of Brodgar.

"I think the difference is in our professional vision, as Charles Goodwin puts it," I finally continued.¹⁷⁸ "We both tell stories from fragments of evidence we gather from our practices in a landscape. We both weave those partial fragments together into a whole, with the usual moves that it's a whole made from juxtaposed parts. But our vision, our perception, and therefore what fragments we perceive and gather, is quite different.

I was striding along, thoughts gliding with my footsteps, in that zone where movement-thought-breath beat with the rhythm of the world.

"My fragments are residues of activities. I see static moments, things, people and artefacts, at rest. I look for the absence, the entropy, the deep time. Not because I look for the past, but because I believe in the *generative potential of breakage and decay*."¹⁷⁹

I looked over to the Ethnographer, who was pounding along the shale with me. "What of you? What do you see?"

The ethnographer frowned, thinking, feet sliding through grass and gravel for while. Finally she said, "I see fragments of activities. I see living moments, practices, in motion. I look for the

¹⁷⁸ See discussions in Figuration 2 and (Goodwin 1994).

¹⁷⁹ See discussions in Figuration 2 and (Pollard 2004).

presence, the multiplicity, the contemporary. Not because I look only at the present, but because I believe in political, contestable, *situated intervention*.”¹⁸⁰

I nodded, a mutual understanding finally beginning to form. We walked on again in silence.

“Of course,” I noted. “As storytellers of our respective fragments of evidence, as writers of a world comprised of fragments of memories and materials, I would say we are both archaeologists. You have your archive, I have mine. I don’t see the difference between an ethnographic archive and an archaeological one, we both must suture our stories from a landscape record, even if it contains quite different finds.”

The Ethnographer seemed as if she might object, but then tilted her head. “I can see that, even a video recording is archaeological. But we are still not the same in what we do. What matters to us. What we care about.

“All this,” She looked around her, at the daubs of clear sky that had begun to pool above us, transmuting the weight of silver into a lighter alloy. “All this... you still haven’t explained why Orkney. Why this relocation? You said it was a perceptual technology, that it heightened attention. But attention to what?”

“Time and landscape,” I replied, being succinct if obtuse. Then I relented and explained, “Ingold claims that archaeology is the study of the temporality of landscape.”¹⁸¹ But I understand that in a rather different way to his notion of remembrance, as we said.

“Firstly, attend to the landscape. Here, on Orkney, landscape has extraordinary effects in everyday life. If landscape has any effect on the future of the mobile telecoms industry, then that effect will be pronounced, heightened, here. The topography relentlessly exerts itself. Radio transmission, television and mobile signals, are resisted by the scattered mountains

¹⁸⁰ See discussion in Figuration 2 and (Gupta and Ferguson 1997).

¹⁸¹ (Ingold 1993).

and sea; one moment you may have full signal, the next nothing. You notice the days this far north, the light and the dark. It's evening now, but the sun is far from setting, even at midnight it will still seem as dusk. The sea-fogs, the eternal silver skies, frequently sever your connection with air-corridors that have a permanence elsewhere; make them visible. But this raw, wind-swept archipelago is not a romantic place to live, it resists utopia..."

The Ethnographer interrupted me. "It definitely resists the dreamlands of the mobile telecoms industry. Their suburban fantasies seem for warmer, easier climes. Although others might argue that this was romantic..."

"Perhaps, but maybe that's a discussion for another time." I refused to be drawn. "But then there is this..."

The footpath took a sharp turn inland, up an unexpected steep rise. We climbed, drawn upwards. And there it was. The Ring of Brodgar circle of stones, curving down the hill to the loch of Harray, cutting seawater from freshwater, holding the world in place.

"Attend to 'time'! Sand14 is drenched in prehistoric archaeology, in a temporality that is deep, that endures, that is of the *long durée*. Tell me that this would not inspire, would not infect, would not alter your imaginings..."



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¹⁸² Photograph of the Ring of Brodgar, June 2006 (source: Aaron Watson).

Stones and passion spoke: "Your company, Blue, is in a landscape that has been cut from time, most of its archaeology buried in the rubble beneath the tarmac of road and runway. Its archaeology, its time, now starts thirty or forty years ago. It's a parochial temporality; buildings all the same age, airport terminals all the same contemporary style. It's a landscape that evokes impermanence, brevity; the disposable. Nothing is there that has endured or will endure for aeons. That is the temporality of the futures that Blue creates. Sand14 has the possibility of creating different futures, enduring futures, less parochial futures, for its temporality is different.

"Sand14 is here because *this* is here."



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¹⁸³ Photograph of Ring of Brodgar stone circle, June 2006 (source: Aaron Watson).

Reconstructions

Reconstruction 1

by Ethnographer

I left Orkney and returned to my home amongst the concrete motorway interchanges and cubic crystal-balls of industry architecture. I wanted to infiltrate the landscapes of the mobile telecoms industry, find a way to infect the corporate bodies of steel and glass, to understand how those landscapes were entangled in the future. Driving on the M25, the M3, the M4 would only mainline me direct into the beating vein of a company. I wanted to experience the skin, the pain, the resistances of corporate landscapes, to see and feel the boundaries. To do this I had to translate differently through its locations, I had to move differently compared to an employee, find other ways in. Then I would push up against the barriers, barbed wire and borders of mobile telecoms in the UK.

I began, in my usual way, by taking a bus to a business park on the M4. An industry association of companies had agreed to allow me to 'sit-in' on one of their quarterly meetings, an event normally closed to non-members.¹⁸⁴ This association was one of the many industry alliances of companies with a shared strategic interest, who worked together to create social and political effects in the industry. The quarterly meetings/social events were usually a day-long series of themed presentations from notable industry forecasters, analysts, and company strategists. Today, the event was being hosted by a smaller site of one of the large multinationals; a scout on the M4 whose mothership campus might be half an hour's drive west, or half an hour's flight along the air-corridors of Heathrow, both were possible.

¹⁸⁴ I had been involved in this industry organisation previously, and was able to gain access through this past association. My liaison to this industry association was extremely helpful and appeared to have very few concerns with my presence at the three briefing sessions I attended.

It was a very dim December morning, and the bus pushed through the gloom along a dual-carriageway and around a number of branded roundabouts before halting at a lonely bus-stop sign on a grass verge. I was abandoned in a cul-de-sac of heavy-roofed corporate boxes, squatting besides the carriageway that flew over their shoulder. The official directions to this place assumed I would be arriving by car or taxi, walking was an act of insurrection, a rising up onto my own feet. People do not walk or hike, do not imagine the ground, the grass, the gentle slope, in the mobile telecoms industry; in Tim Ingold's words 'for inhabitants of the metropolis, the world of their thoughts, their dreams and their relations with others floats like a mirage above the road they tread in their actual material life' (Ingold 2004). With a homemade map in my pocket, I set off along the disused tarmac pavement, a black streak around the edges of the corporate buildings that began and ended abruptly at the edges of the 'park' - a dark road to nowhere.

My destination required little more than navigating a roundabout or two. The brown-field landscape was utterly service-industrial, anonymous two-storey buildings in dowdy brick and glass, easy access for sales and marketing, slip in and out through the dual-carriageway spur. The 'park' cultivated plastic-looking bushes and mown-grass, to blend with the toy racing-cars lined up in their parking spaces. It felt incongruous and temporary, as though the 'park' had been towed into place, or had been designed for somewhere else and was merely loitering on the edge of the M4.



My destination was a red version of the 'park' architecture. At first glance I mistook it for one of the chains of motels that were perhaps the first architectures to squat in the shadows of dual carriageways and the M4. Travel lodges and hotel inns were the architectural mode for these loitering landscapes, it seemed.

If corporate landscapes locate a company socio-culturally as well as geographically (Berg and Kreiner 1990), then this building and its park-lands were a socio-cultural mirage hanging by a thread; floating, dislocated from the earth and muck beneath, connected by the most tenuous of visions, that of a dual-carriage way surface sliding before a car windscreen. There were other connections: fizzing power cables and pylons marched directly overhead, the perceptible signs of infrastructure whose metal lines formed threads through which bits-of-people, binary-encoded life, could move far more easily than I. Angels, as Michel Serres named them, the connections and communications that travel through the air and materialise as parts of places and times (Serres 1995a). Arriving by email would have been easy, I had the address. Arriving by foot was much more problematic. My feet were sites of resistance. This corporate landscape looked skyward, into the wireless air, to communication satellites in geostationary orbit. Its location was first a TCP/IP address, the geographic directions were

only co-ordinates measured in units of distance to Heathrow and miles along the M4. It floated in the landscape because it was only barely tethered.

The building I was walking towards did not dominate its surroundings, rather hovered below the road, obsequious, hidden. This was not an HQ calling out its status to all, but one of the many small looks-outs, the work-horses of the industry. You would not know that the mobile telecoms industry was here, unless you went looking. Walking in the business park, I was separated from everything aside from the dual carriage-way; there was seemingly no where to go, no way out. 'Park' was an apt name for the experience, I decided. It denoted separation through landscaping, cutting off the corporate buildings from everything aside from their life-support of car-dwelling employees and infrastructure; the 'park' was severed from the great wilds of the world. It was safe. In the industry's own terms it was a *walled garden*, a term used to denote private networks of specialist content, networks closed to the outside world; a garden to keep people in, keep them happy as though drinking at some fount of paradise.

My walk finally ended at a reception desk, and the usual exchange of signature and pass card. I waited in the foyer before a series of public meeting rooms, staring at a paper shredder, watercooler, photocopier machine, and a table full of glossy corporate magazines. On the wall was photograph of a Formula 1 car with a comic bubble rising from the driver saying 'I'm on the phone'. The advertising image slipped into a different focus, here, on an almost severed spur from a high-speed motorway.

Along with the thirty or so other attendees we were called in to a meeting room, a long room with a vast boardroom table around which we sat, as though for dinner. The day's theme was '3G: Market Trends'. I stared at the dark carpet with its cross-hatch weave in navy blue, a hotel carpet, a motel carpet. Half of the men present were wearing the same shade of purple shirt and black suit; two men even had exactly the same shirt on; an industry uniform.

Head down to my notebook, I listened and wrote. The director of the industry association set the tone:

Once bandwidth increases... the sky's the limit... Only limit is our imagination.¹⁸⁵

The future is full of infinite possibility once the bandwidth increases; and 3G bandwidth will make it all possible. This was the evocation of Moore's Law, the ever-increasing line of technological quantification - more is always necessary¹⁸⁶. But the question remained as to what they imagined, what conditions of possibility their skies possessed.

The director handed over to an analyst from one of the large multinational consultancies.

I'm from a dedicated Thought Leadership Group...

What's most important is the emergent technologies...

We had RFID 20 years back... falling cost, falling size, makes it feasible now...

Walmart is mandating [RFID] bar codes. The US Department of Defense has mandated all suppliers [to have RFID]... to find its weapons (laughs). You could argue Iraq should have had RFID (laughs)...

[This means there will be] 2.6 petabytes, or 1000 terabytes, of information per day from Walmart as of next year... The US Library [of Congress] has less...¹⁸⁷

¹⁸⁵ Source: Ethnographic notes from closed industry association meeting on 3rd December 2003.

¹⁸⁶ See discussions of the future as a line in Figuration 1.

¹⁸⁷ Source: Ethnographic notes from closed industry association meeting on 2nd June 2004. I have taken the liberty of re-locating this piece of evidence in this particular instance.

The future was measured, quantified in ever-increasing units, terabytes to petabytes; a closed future where the mobile telecoms industry benefited and participated (in cost per byte) in the surveillance of property.

The analyst moved on to another 'emerging technology' of future benefit to the industry.

Fuel cells [as an] alternative power technology... replacement for lithium-ion battery... Lasts between 4-10 times [as long].

Key drivers are Moore's Law... process and power goes up at an exponential rate...

[Latest 3G handset] it's got IrDA, Bluetooth, 80 MB, 2 colour screens... it's got everything... but what's the power consumption?... [3G] phones come with 2 batteries...

[When the battery runs out] it doesn't die with a beep, it shrieks at 3am in the morning and it's quite scary.¹⁸⁸

Moore's Law was explicitly evoked. Infinite possibility requires infinite battery life (or an infinite number of batteries). An asymptotic movement of the future was being practiced and rehearsed before me. 3G mobile networks and handsets had materialised, yet they were not enough, longer-life batteries were still needed, and so the limitless possibilities of 3G receded into the future. In mathematics an exponential curve tends to infinity - is asymptotic. Moore's Law as an exponential curve tended to infinity, to an always unobtainable dream of limitless possibility; Moore's Law had the effect of creating a future that was always in the distance, at the end of the curve. What seemed crucial to me, listening, was that the future had to be *quantified*, had to remain numerically located on the line of Moore's Law for this asymptotic movement to occur. The future could only recede if the line of the horizon was clearly demarcated, and could be seen to march ever forward – this was the strange topology of the industry's future. Technological development had to be measured and accounted for so that

¹⁸⁸ Source: Continuing ethnographic notes from closed industry association meeting on 2nd June 2004.

the future could remain both possible (measurable) and infinitely far away (the measurements show that more is always needed). The future created by Moore's Law remained perpetually at the end of the rainbow curve. The sky is the limit, as the director said, but the sky ended in a horizon that moved ever further away as the industry progressed and moved forward.

What was the genre of these futures, both infinitely far away and yet eternally possible, both fact and fiction? Martin Parker suggests that these organisational futures are part of a long tradition of high-tech utopian tales following Bill Gates, Alvin Toffler, Charles Handy and other futurists (Parker 2002: 4). However these mobile telecoms futures were not stories of some utopian *nowhere* but were very carefully located through quantification; both in the practices of constructing those numbers and on the graphs themselves. It was the location of the numbers that provided the future with its import, with its prescription, taken intravenously by the industry. As I stared at one of the forecaster's exponential graphs predicting revenue growth for mobile applications, my senses abruptly refocused. It wasn't just the numbers (how ever many millions) it was also their socio-material location that mattered. Those numbers had to be located, injected into the industry, here, at this place, in this industry business park, and by this person who spoke for a multinational futures consultancy.

I was awoken from my reverie with the director's request for us to "collect our happy sheets at the door".¹⁸⁹ The meeting was over. But I needed more in order to understand how the closed topology of the industry's future was bound up with its closed topographic landscapes. Thankfully, there was another industry association meeting a few months later that was to prove insightful.

¹⁸⁹ Source: Ethnographic notes from closed industry association meeting on 2nd June 2004. 'Happy sheets' referred to a satisfaction questionnaire which was handed out at the end of each meeting.

My alternative 'guerrilla-style' journey to this industry meeting required a public transport mimicking of Junction 15 to Junction 16 on the M25, another way to travel between sites in the industry without resorting to the motorway. As Iain Sinclair had warned me the M25 is 'negative space, an energy drain... designed to test the threshold of boredom; it is mainline boredom...' (Sinclair and Petit 2004). If that was what the industry mainlined through its employees then I was having no part of it, I wanted to evade the monotonous boredom, evade the slick tarmac trail to the exclusive golf course that was the next 'X' on my map of industry landscapes. But it was tricky, there was a towpath along the Grand Union Canal leading to the golf course, but my OS map was vague as to the boundaries. I risked a cab from the train station but found the footpath to walk back.

It was an overcast, mid-summer's day as the taxi leaped over the sleeping-policemen towards the club house. The manicured fairways were unblemished carpets as though Elysium fields, gardens of paradise. As the cab pulled up to the door, the taxi driver announced that this was an old Victorian sanatorium, and I was flung back into Sinclair and Foucault's world of the landscapes of asylum.¹⁹⁰ The building before me was a long-used site of social ordering, where the Victorians had separated the mentally ill from the mentally sane (Hetherington 1997); London sifted into the sociable centre and the madness of the periphery. This doctored landscape, now maintained as a private golf course, continued to do social ordering work (ibid; Law 1998) but it remained to be seen of what kind.

¹⁹⁰ See discussions began in Figuration 2.



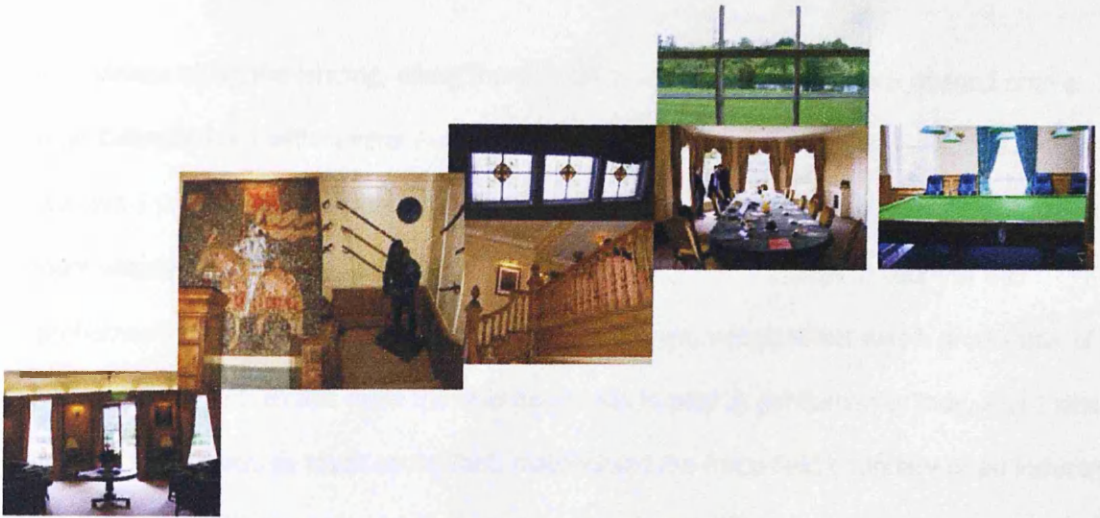
Collage of entrance from the road, two or three minutes from Junction 1 on the M40.



Collage of entrance from the footpath, around forty minutes along the Grand Union Canal.

I stepped through the main doorway and into the downstairs lounge, a reception room steeped in leather armchairs and oak-panelling. Following the signs to the conference suite, I walked up the stairs past a large faux-tapestry of a knight-in-shining-armour; a romance of medieval chivalry that was periodically re-invented, from Elizabethan sonnets on courtly love to contemporary Hollywood extravaganzas. The theme of a particular masculine nobility and chivalry was reinforced on the stairs with a set of decorated plate armour, a number of swords, and a salver of some indeterminate metal. All of the decorations were mock-versions of grandiose heirlooms and antiques. I was walking through a themed-hotel where the theme appeared to be the National Trust country-estates of Britain. The club-house evoked a nostalgia for an agrarian heritage and landed gentry, from its stained glass windows, to oak-panelled walls, to animal portraits. This was not a country estate, but it was a romantic

theme-ride that allowed *playing* at being a gentleman. This was the social ordering work here, the doing of a particular form of masculinity, a gentlemanly masculinity.



Collage of my walk through the building from the reception to the conference room.

In her discussion of gendered architecture, Daphne Spain argues that the heritage of the *gentleman's country house* as a space, lies in the representation of gentlemanly wealth, a desire to 'present the image of an upper class whose wealth came from landholdings rather than business investments...' (Spain 1992: 112). Such allusions are particularly apt for the business executives and analysts of the mobile telecoms industry. Spain goes on to explore the social segregation effected through the spaces of the country-house. Men and women were spatially ordered into specific rooms at opposite ends of the house, with men socialising in the smoking room, the billiards room and library (typically), and women largely restricted to the drawing room. These spaces were explicitly designed to be gender exclusive, the drawing room was designed to be *as ladylike as possible*, as one Victorian designer expressed it (*ibid.* 113); therefore no gentlemanly transactions, such as politics or science, would be appropriate in such a space. In short, the spatial ordering of the gentleman's country-house

produced particular forms of gender, and as a consequence, particularly gendered knowledges.¹⁹¹

As I walked along the landing, along the stained-wood balustrades, a door opened onto a large billiards room with several executive-style black leather chairs by the windows. For a moment I paused, was compelled to take a photograph (see the collage above). This was a room whose lineage was clear, an illegitimate descendent of the billiards room of the gentleman's country-house; the scion of a romantic tryst, whose effect was a production of gender that jarred. In this room the only game was to play at gentleman or lady, and I was neither. My gender, as much as my feet, materialised the force-field boundary of an industry landscape; the billiards room gave me a shock, repelled me¹⁹²

This was a golf *club*-house, and I was about to attend a *club*-meeting inside the mobile telecoms industry. The lineage of this executive billiards room (replete with sash windows and full-length drapes) descended from a gentleman's country house through the spaces of the gentleman's *club* in town. The gentleman's club of the eighteenth and nineteenth century was a site for country gentlemen to conduct their public lives and business whilst in town. Membership was accorded on the basis of personal association, although your social position was a major factor in your 'clubbability' – only some bodies were deemed clubbable (Sinha 2001). The spaces of the gentleman's club reproduced the spaces of the country-house, with smoking room, billiards room, library, dining room, and so on (Peacock and Selvarajah 2000). Thus the gentleman's club reproduced the orderings of gentlemanly masculinity and ladylike

¹⁹¹ Steven Shapin's work on the gentlemanly pursuit of science and knowledge-making in the seventeenth century notes that science was conducted in the, necessarily public and therefore gentlemanly, laboratory 'round the back of the house' and in the 'public rooms of the residences occupied by public persons' (Shapin 1994). As Donna Haraway has persuasively argued, it was the particularity of these sites that constituted the gentlemanly *modest witness* of science (Haraway 1997).

¹⁹² This is not an argument concerning sexuality, but the formation of gender and gender-roles. No doubt other women and other men would have experienced a similar repulsion to the billiards room.

femininity. In the twenty-first century gentleman's clubs remain a powerful, contemporary site for the rehearsal for these gendered knowledges (and much else). Nirmal Puwar explores in rich detail the effects of the racial and gender inscribed spaces of the contemporary Houses of Parliament and its exclusive member rooms. She regards the smoking rooms, breeches and tailcoats, buckles and uniforms, pomp and ceremony, as contributing 'to the flows of cathexis established in other places, such as specific public schools, Oxbridge, certain professions, men's clubs' (Puwar 2004: 306); the landscape of the gentleman's club/country house continues to order power and gender through a long tradition of elite spaces. Despite the 1975 Sex Discrimination Act (inapplicable to private clubs) of the many London clubs only the Reform Club currently admits women as full members; the Carlton Club, whose membership is based on the Conservative Party, permitted Margaret Thatcher only limited associate membership (Peacock and Selvarajah 2000). An ethnography of a twenty-first century gentleman's club reads as though of an eighteenth century country-house:

'Restricted rights [for women] appear to mean confinement to areas decorated in pastel shades of green and pink, with an emphasis on cushions and flowery motifs. The male-only rooms tend to be heavily steeped in deep red leather armchairs, faded oak panelling and dark blue carpeting' (*ibid*).

And here I was, standing in a pastiche of such leather armchairs, faded oak panelling, and dark blue carpeting. And I had also been standing on dark blue carpeting and sitting in a leather executive chair around a gentlemanly dining table at the last industry association meeting. The landscapes that the mobile telecoms industry chose for its work were part of the lineage of a gentleman's country house, and gentlemanly science and politics; I was being haunted by the ghost of the modest witness (Haraway 1997). The future of the mobile telecoms industry was being made in locations designed to reproduce a nostalgia for the social orderings of a pre-industrial past. Not that this was entirely unexpected, for the gendering of high-tech industry spaces has been well discussed (see for example Wajcman 1991; Cockburn and Ormrod 1993; Berg 1999). What was important was the effects this

nostalgia for an agrarian elite past might have on the knowledges and imaginaries for the future.

I pushed open the door to the conference suite, entered the ante-chamber. A wall of men in black suits stood talking in low voices around a fireplace that was ornamented by a large gilded mirror, a tableaux transposed from a Jane Austen novel. I strode past into the conference room. A vast oval table was laid as though for dinner (see collage above). Individual places were set with their own pads of paper sheathed in a gold-embossed folder, a glass for water, and a printed card to fold into a name-plate. Down the centre of the table sickly green and orange cordials stood in a line of chemical bottles, a scientific charade.

Today we were to explicitly rehearse the future; today was the annual forecasting event for the membership. Forty men and four women (according to my tally) sat on gold-painted chairs at one end of the room before a felt-covered table with a whining projector pointing towards a small portable screen. It was hot and humid.

The host began by evoking a chuckle, suggesting we “admire the BMWs on the forecourt” of the golf-club.¹⁹³ This seemed to set the tone for the first forecaster from one of the large consultancies:

Euro2004 [football event] is a good place to push applications...
I would be willing to pay 5 Euros a month to see Schumacher cross the line...
I’m Italian. I love football. I love Formula One...
It’s not boring. Ignore the press...

Gaming, after Ringtones, is the next biggest thing...

¹⁹³ Source: Ethnographic notes from industry association meeting on 2nd June 2004.

What will drive the gaming market? Sponsorship e.g. Ferrari handset...
 [Problem of] conflicting interests. Beckham was at Manchester United
 now Real Madrid. [He has transferred sponsors from] Vodafone to
 Siemens...

How detrimental to Vodafone [is it] with all those women on the go?¹⁹⁴

Sports cars, computer games, and football: this future seemed to fit well with its BMWs and playing-gentleman themed surroundings. These were activities that might be desired by particular men (and particular women) on a mobile device. But not by me. Ballard's dystopian future of utter boredom, where nothing new or interesting happened again, was gestating in its vat, a future cloned from a nostalgic past. The BMWs driven here via the outside lane of the M25 mainlined boredom, as Sinclair put it. And they brought it with them. The club-house was boring (to me). The future was boring. This future was old, it was familiar, its orderings were worn out, poor replicas of another time.

The second forecaster took over, and I attempted to brighten my mood.

All the metrics suggest this is the year for mobile data...

By 2008 27%-28% of revenue for information services... high value
 stuff...

Lots of hype on video... [But] need better quality handsets, screen
 quality, batteries...

Video messaging [is the] hopes of operators...¹⁹⁵

My pen scribbled restlessly, recognition setting in. These were the same asymptotic moves of future-making I had heard at the last association meeting. An elastic future, stretching into the distance. The metrics and revenue predictions of high value, followed by the 'but' and

¹⁹⁴ Source: Ethnographic notes from an industry association meeting on 2nd June 2004.

¹⁹⁵ Source: Ethnographic notes from an industry association meeting on 2nd June 2004.

reasoning why the future would not arrive just yet, despite all the hopes. A future numerically located on a line of time against money (the axes of Moore's Law), followed by its move to the horizon; a future there, located on a graph and in a trusted source, but always out of reach.

Trivia, horoscopes, gossips, pin-ups [are] up there with games for content revenue...

Adult content... If [you] ask operators [they say] Oh, we're not doing anything with that... but they are... Publicly steering clear of it... [Issue of] how to protect under 18s... Operators concerned with their brand content... What about impact on porn industry [by] playing with Vodafone? [It's] like buying [porn] from your granny...¹⁹⁶

So, this was the future the industry imagined: games, trivia, horoscopes, gossips, pin-ups, and pornography. This act of divination was a reading from the inside of a telephone box in Soho, London; expensive-rate mobile phone numbers for services only certain men and women would desire. It was a future lacking in imagination, lashed down, cowering on its line. A future that was more romantic pulp fiction than science fiction. This was a closed future formed from a closed landscape whose only egress were tunnel visions of tarmacadam, the Heathrow air corridor, and duplex transmission (my feet had crossed the boundaries, witnessed them). Landscape and future were choked into *lines*, lines on the landscape, the line of the horizon; linear thinking, linear time, born of linear movement.

The future was 28% of revenue, 2.6 petabytes of information. The future had been quantised, measured, drawn on a graph. Prediction, the dark divinatorial art of forecasting, had made the conditions of possibility for the future, made them into a line. What was off the

¹⁹⁶ Source: Ethnographic notes from industry association meeting 2nd June 2004. Note that these notes combine presentations given by two different forecasting companies.

graph was impossible. The future had been suffocated by rationality. Michel Serres had known, he had stood within the unrelenting fields of precision agriculture, seen the exactness of economics, landscapes with no roads out, and had cried out to the sky, "we are close to history's end" (Serres 1989). He had cried out for the possibility of nonsense, for without nonsense there could be no tomorrow. Difference, a new day, was generative, off the graph; here there be dragons. Serres, Ballard, and Sinclair, the triumvirate poet-philosophers of future boredom. But only Serres offered a way out: fly with the dragons in the valuable, rolling and metamorphosing, clouds; 'one does not fly twice in the midst of the same sky' (*ibid.*: 18). The sky was indeed the limit, but it was limit-less. Nonsense, surrealism, interference, these possibilities could relocate this future, as I told it, of the mobile telecoms industry, take it elsewhere on the wing. I refused boredom, refused the line, took to the skies.

The meeting had ended in social cells collecting around the edges of the room, seeking cooler pockets of air. I walked over to the semicircular bay window, watched the demonstration of an infrared keyboard on the mantelpiece beside me, one eye to the bright blue sky through the window panes. A red laser drew a keyboard on the white paintwork, and I typed on the projected keys, watched the letters appear on a mobile phone as my fingers broke the beam. The little monolithic projection device fell over, too light to maintain its balance for long. We laughed. It was a prototype, it would be better. It would always be better soon.

I looked down... noticed that my feet were red. I was wearing red moon-boots. The sound and heat of the crowd around me dulled, voices thinned into noise from a tweeter in my ear. I looked back up... and through a visor into the mirror above the mantelpiece, and saw myself wearing an orange-red spacesuit. I stared hard into the mirror. The room, the rather ornate dining table, the gold chairs, the oil paintings, and embossed gold stationery were all suddenly brought into focus as the standard fixtures and fittings from an executive, rather luxurious hotel suite; certainly an improvement on the red motel of the previous industry meeting. But the floor, the floor was like a winter's sky, white and glowing, carved into neat

squares by dark lines. Through my spacesuit visor, through the mirror, I recognised the hotel room and understood where I was.

I was standing in the hotel room at the end of the journey through the monolith taken by Dave Bowman in 2001: A Space Odyssey. I was no longer in a romantic fiction of a hotel, I was standing in a science fiction hotel.



Still from 2001: A Space Odyssey (1968), directed by Stanley Kubrick

Bowman's hotel suite was a fake, a replica to reassure, a replica made from old data, from past transmissions (Clarke 1968: 210-217). Perhaps that was why I was here, for that was exactly the effect of the conference suite in the golf-club. Both spaces were, ultimately, nostalgic interpretations of the past, of a gentleman's country house; a suite of rooms based on the same socio-spatial theme. They were both designed to reassure, to rehearse a particular gendered knowledge-making. I drew a long shaky breath, and reached up to release the seals on my helmet...

...and touched my hair. My eyes wavered slightly, and I felt hot, too hot. The humidity of the room must have affected me. The small black monolith of the prototype laser keyboard still stood on the mantelpiece, but the conversation had moved on to investment, cost of

production, market value. I smiled politely, and turned from the fireplace to face the window, stared out at the rigidly striped mown lawn, the line of canal.



View from the window at the golf-club.

I wondered how many people were needed to keep the grounds so well manicured, where those people were. The golf-club was a theme 'park' whose theme was National Trust properties rather than Disney worlds. The invisible labours of maintenance were as magical, and as hard working, as those of theme park grounds-staff who overnight replanted trees, bushes, watered flowers, fed the grass, removed the litter; as invisible and magical as the labours that constituted the hotel room and monolith in '2001'.

It was time to leave the theme park. I was tired of playing, of riding on the gentlemanly gondola around the fireplace. I had to hear, see and taste the futures of that other industry world – see if Blue bore some relation to these theme 'parks' of the mobile telecoms industry association.

The next morning I took my usual train, foot and bus ride to Blue. The building blocks of corporate life, the architectural islands of a business 'park', marked out the few moments before we arrived at the gates of the campus; the island paradise of Blue.

Brian accosted me as I wandered the design studio waiting for something to catch my thoughts that morning. His head poked out of the usually locked management meeting room in the corner, and he gave me a merry grin.

"The design management team has flown in today – rather special occasion, we usually meet in the States."

He motioned me in, and I greeted the mostly unfamiliar faces around the large boardroom table, that vestige of conducting gentlemanly business after dinner. Through the window strip running along the walls I could see the car park injection mechanisms beneath a cloud-bright sky, all homogenized into grey by the diffusing glass surface. The atmosphere was relaxed, one of the managers had his feet on the table, another was scouring a greeting-cards website on her laptop. Yellow and grey Ethernet cables formed a putrid mass on the floor, seeping out of a column of network ports. Their tendrils reached up over the table lip to a monumental array of black IBM Thinkpad laptops, one standing open before each manager.

Excerpt from a design board meeting in the mobile telecoms industry

Ten IBM Thinkpads,
upright,
occluding
the air;
a circular monument of monolithic plastic,
(a petrified moulding from some Woodhenge).

Ten executive bodies,
hearts
beating
at five hundred emails a day,
(suckling on vitamin ASCII from the corporate mammon).

Ten hundred PowerPoint slides
churn,
digesting;
bits
sliding in a python's gullet towards the serial port,
(Apollo's poison and prophecy delivered with forked tongue).

Michael, the UK design studio manager, was standing characteristically hands on hips, chewing gum. His eyes were faraway, elsewhere, as he called to me from across the room:

"This is top, top stuff... [You are] very privileged to be a part of it... We don't even let these guys in." He nodded to the design studio beyond the now shut door. "This is about how the company operates. It's about as classified as you can get."¹⁹⁷

I sat down at the table, back to the large screen where PowerPoint slides slid into focus, mutating rapidly from one page into another.

Brian began by raising his concerns with the location of the studio.

"[Usual employees] are nine to fivers, and have a completely different life outside... Is this right for the brand?"¹⁹⁸

"[We have a] high turnover of contractors due to [the] commute from central London... [We're] isolated from the consumer and everyday life... versus being located in central London... [There's also the] issue of separation... from the rest of the site."¹⁹⁹

In response there was a discussion of an upcoming design team gathering in New York. The US manager took the role of writing on the whiteboard a list of issues to be addressed by them, as the management board, at that event:

us versus them

¹⁹⁷ Source: Ethnographic notes taken at Blue on 11th March 2004.

¹⁹⁸ Source: Ethnographic notes from discussion with Brian 4th March 2004.

¹⁹⁹ Source: Ethnographic notes from discussion with Brian 4th March 2004.

trust

communication

value/respect

recognition/appreciation

boost creativity²⁰⁰

The senior manager with his feet still up on the table commented that there should be, "[a] sufficient amount of alcohol present all the time."

The US manager added 'Guinness consumption' to the list on the whiteboard.

As he did so Michael, still skulking at the back, looked sharply at me and reminded everyone that, "alcohol is not an inclusive activity... some people are teetotal".

But the conference in New York returned them to the problem of their contract staff, as Barbara commented. "[We are reliant] on contract externals... But legally [we] cannot include them, cannot send them to the conference".

As I watched and listened, words filling my notebook at speed, I both heard the segregation of 'us and them' and experienced the segregation in the hard wall and (usually locked) door behind me. There were 'us' privileged to be inside a management board meeting, and 'them' outside the walls of the palisade; an immediate effect of which was an intensive network of 'spies' as one industrial designer named them, who trafficked information, translating the 'really dark and dirty' management proceedings across the border into the wild-world of the design studio. But there were many other places constituted as 'them' by the design studio management: life outside the company versus life inside the company (nine to five); central

²⁰⁰ Source: Ethnographic notes taken at management meeting at Blue on 11th March 2004 (as is the case for other quotes in this conversation except those marked).

London versus the campus location; consumers and everyday life versus design studio life; the rest of the site versus the design studio on site; contract staff versus permanent staff.

Lucy Suchman discusses how research centres conduct ongoing boundary work of inside and outside to constitute themselves in landscapes of knowledge-production (Suchman 2004). From her own experiences as an intern at Xerox PARC she shows how processes of affiliation and differentiation create a boundary that constitutes a centre of innovation. However, the management team at Blue constituted an incoherent set of shifting boundaries. 'Us' and 'them' did not create a single bounded location as a 'design group' centre but established affiliations with many actors in many places that shifted. Parts of boundaries were established (and perhaps later forgotten or dissolved), that allowed the management team to mobilise the affiliations of actors as 'us' and then as 'them' (the rest of the designers, the rest of the company). This created multiple insides and outsides, and ultimately multiple centres, multiple locations (designers, Blue employees, permanent staff and so on). During a slight hiatus I asked Michael whom he meant by 'us versus them'.

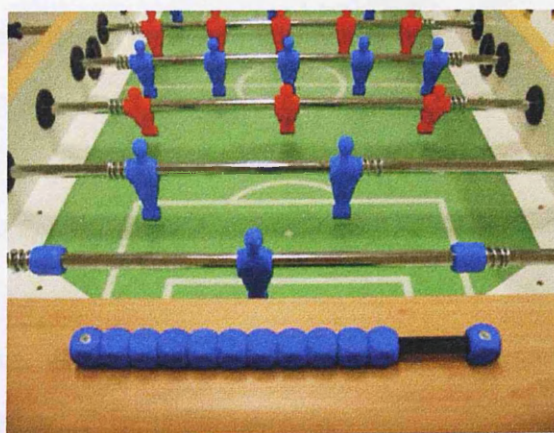
"[It could be] design versus the business. Industrial design versus mechanical design. Designers versus managers. Designers working for the business versus designers working for the design group."²⁰¹

The meeting dissolved and one of the managers who I had met before came over to say hello. He showed me a new game on his handset. On his screen was a live image of the view of the design studio through the mobile phone camera. On the screen a digital mosquito was flying irritably around the room, and using one of the keys you could zap it – if you aimed right. As the 'mosquito' apparently flew past someone's head there much guffawing as he 'shot' the person in the head to zap the insect.

²⁰¹ Source: Ethnographic notes taken at management meeting at Blue on 11th March 2004

I heard more uproar coming from the photographic dark room down the hall, and made my excuses to investigate the unexpected racket – the studio was normally quiet and industrious.

The photographic dark room had been commandeered as a table football room. A number of the industrial designers (IDs) were stood hands to the spinning rods, keeping score. I was invited to join in, but could not bring my feet to step over the threshold of the doorway, my legs were suddenly lead-like. I declined politely, leant on the doorframe, hands to my notebook and pen.



The football table at Blue

Taking advantage of the gathering, and thinking of the multiple boundaries at work in the management board meeting, I asked about the design studio as a place to work compared to elsewhere.

One of the IDs laughed.

"It's like the Lord of the Rings. We're the Fellowship of the Ring and they're the goblins and things... Over there [the building opposite] it's the place of jeans that are too short, white socks and

sandals, and shirts tucked in... It has the highest density of belt clips and belt cases... They're engineers."²⁰²

"Used to be linked walkways [between the buildings]... in the original plans..." added another one of the football players. "[Instead there is a] feeling of isolation... IP [Intellectual Property] is more important than people..."²⁰³

Us and them, designers versus engineers, people versus intellectual property. Blue was a moving marshland of locations that came together and pushed apart, transient relations shifting and re-arranging. Blue's landscape was moving, difficult to map; guerrilla islands of engineers and designers that came together, worked together, yet knew little of the other. A landscape to stop intellectual property and people from flowing too far.

As the game progressed amidst much taunting and laughter, I asked how the football table had arrived in the studio.

"It was a joint decision amongst the group to purchase the table as a replacement for [a] Playstation console, which was too invasive... the football table could instead fit into a quiet corner"²⁰⁴.

I noted the harsh looks directed at the shouts from the dark room by the Graphic Designers (GDs), who occupied the desk pods nearby, but held back a comment on their 'quiet' game.

"So, what else have you bought for yourselves?" I asked.

²⁰² Source: Ethnographic notes taken at Blue on 4th March 2004.

²⁰³ Source: Ethnographic notes taken at Blue on 4th March 2004.

²⁰⁴ Source: Ethnographic notes taken at Blue on 10th June 2004.

Andy, who had now handed over to his team-mate, nodded over to his desk, a few rows of desk-pods back. I followed his gaze and saw two plastic heads staring back at me besides his monitor, the faces of a devilish Darth Maul and beaming Buzz Lightyear.

Gavin (who had just shot a goal) added, "Check out my Mardi Gras Power Ranger..." And I saw that opposite was another action figure, resplendent in its gold and yellow battle armour.



Gavin's Mardi Gras Power Ranger figure.

"Technically speaking [they] belong to Blue," Andy explained. "They're product samples... [We] can buy anything within limit... not a BMW..."²⁰⁵

Although, I did notice a couple of model cars cruising along a desk pod wall.

"[We] regularly used to go to a local toy shop and buy figures [at lunchtime]... these are all looking a bit old now..."²⁰⁶

Cars, computer games, and football. I knew these games and the knowledges they made.

The designer's world repeated the world of the industry association, it was the same games,

²⁰⁵ Source: Ethnographic notes taken at Blue on 5th March 2004.

²⁰⁶ Source: Ethnographic notes taken at Blue on 5th March 2004.

the same sense of play. The green painted surface of the football table began to glow, expand, burn a familiar rectangle into my retina; the white football stopped, grew hard and glittered... became a billiard ball on a green felt table. The dark room merged with the billiards room at the golf-club. The force that had held my feet at bay, had shocked them into stillness in the doorway to the dark room, was dancing before my eyes; the force-field of a particular masculinity (and femininity). I had resisted that game, as I had resisted it before.

One of the female designers walked past the room and glanced in, distracted by the laughter spilling out into the studio, and I shook away my thoughts and smiled a greeting, gesturing to the football table game.

"Have you played this?" I asked.

"No, and I have no interest in it," she said emphatically, and moved on.²⁰⁷

Toy figures, model cars, games consoles... Playing games in the high-tech industry has many connotations. It has a long and darkened history through the military scenario games and the computer war games of the Cold War (Cohn 1987). Lonny Brooks and Geoffrey Bowker's ethnography of the Institute for the Future, a future think-tank based in California, troubles the notion of play as an egalitarian practice in organisations, tracing its ongoing association with crises of corporate innovation – *playing at work* as corporate panacea for loss of innovation, loss of Intellectual Property (Brooks and Bowker 2002). They trace the heritage of *playing at work* to a sheering from Victorian ideals of play versus work. But rather than a sheer separation between Victorian and contemporary ideals, the heritage seemed to me to be more continuous; there was a thread of nostalgia for Victorian gentlemanly and gentlewomanly life that shot through the landscapes of the mobile telecoms industry. 'Play' ordered the spaces and social relations of the design studio (as I had already felt), it

²⁰⁷ Source: Ethnographic note taken at Blue on 10th June 2004.

produced particular genders, particular relations of power. The design management board did not play, for example, they promoted and permitted play. Playing with cars, computer games, and football tables, produced the design studio, and therefore participated in the production of possibilities for the futures that were imagined and made there.

I left the industrial designers to finish their game and immediately turned to face the dark gaze of one of the lead graphic designers (GDs), standing in the desk pod besides the dark room.

The GDs were something of a crack team of contractors, brought in on a fixed-term to refresh the company's global brand. They had formed a silver Mac-ghetto in one of the desk pods, bodies and monitors squeezed shoulder to shoulder, pushing up against the black and grey boxes of the ID's corporate wintel PCs. Although freelancers, they had worked together before, were from the same London art college, and identified themselves as part of the same graphic design movement.

Ewan's eyes slid back to me and nodded a peremptory greeting. He was standing over a colleague, tense, eyes quickly returning to the screen with a frown. Then said,

"We're just off to lunch. You wan'a come?"

Of course, yes. It was a small professional victory for me that I had managed, and continued to manage, my location with the IDs and GDs so that I could be part of both worlds.

His design problem solved for the moment, Ewan stretched up, and almost on-cue the GD team downed keyboards, and began scrabbling for their wireless passes. I dutifully wore mine on site, but the GDs tended not to, sometimes borrowing each others to get through the door, grab a coffee from the machine outside.

We trooped downstairs to the cafeteria. As we waited for someone to load up their wireless pass with cash – payment in the cafeteria was supposed to be cashless - I saw an architectural model of the campus on a plinth, the buildings in white card with white model people, white model cars, all enclosed in a Perspex box. I smiled, but had no time to dwell on its import.

Over lunch I chatted with the graphic designers, reflecting on the space and boundaries of the campus, asking them about the design studio as a place to work compared to elsewhere.

They had much to say:

"They [the industrial designers] all get to go home at six, they all have lives. We should all be phone designers"

"All very relaxed before we came... just cycle in to work and cycle home again... I mean, please..."

"[We] are working until 11pm or 2am every night... It can't go on like this... 11pm is our usual day."

"[We] pulled an all-nighter last Friday."

"To have a credible design organisation you have to be in London... Designers need refreshing."

"[We] commute 2-4 hours a day... You just don't recover over the weekend... After seven months you just feel more and more tired."

"I absolutely hate it [the design studio]... It does not inspire my creativity at all... It's so white... hard... reminds me of being in a sanatorium..."²⁰⁸

They, too, felt the white sleeves of the asylum strait jacket pulling at them; the needles of deadening boredom at their temples. The landscapes of madness here at the edge of London infected their sanity, drove them back to the familiar city. They were unmarked by the mobile telecoms industry, unlike I, and drew no tattoo of affiliation on their bodies. Theirs was the life of diaspora, differentiation from all, defined by tattoos of ownership by another world. There were no fleeting multiple boundaries for the GDs. Only a Blue hard line that pushed, and that they pushed against; a hard boundary that pushed them into a ghetto, into a corner of the design studio.

The rich lunch was over quickly, and the GDs headed back to their Macs. I slowed, sauntered back to the model in its box, wondering what bound the design studio together, the design management to the industrial designers, to the graphic designers, and all the games that they played.

Everyone ate the same food, slept (occasionally) on the same sofa in the library, drank the same coffee; were immersed in the same studio air, the same studio acoustics, the same deathly pale light from the windows; were injected through the same capillary actions into the building, never walked on the same grass, never stepped outside on the same curves of soil between the buildings. Homogenization of the senses, of the landscape – the homogenous experience of the design studio at Blue - made the design studio at Blue (Hofbauer 2000). Every day was made much the same as another, the temperature and the light carefully

²⁰⁸ Source: All these quotes are from ethnographic notes on a single discussion on 10th March 2004.

controlled. As Brian had remarked to me once: "It looks like a nice day and you never realised that it was hot!"²⁰⁹

I looked long at the model, at the homogenous white people standing on its grey-painted tarmac. The surface of the model was flat, there was no topography; the model floated on the surface as Ingold had said it would, as the buildings of the industry association meeting had done. They were not responding to the muck and mire of the hills and plains of the M3/M4 triangle. In the triangle everything hung, suspended, flattening out any difference in topography, no incline to cause resistance, difference, or the nonsense of meandering brooks, un-tended meadows. The borders of the model campus were marked by a miniature fence, glued to its $y = 0$ surface, but beyond there was nothing.

The bushes of foam had been stuck in place on the model with exactness, the model trees placed in the centre of the campus, where I passed them each morning. The campus was a garden, protected and planted and tended by invisible gardeners; like a Disney theme park and the golf-club it was a manufactured landscape, separated by labours and technologies hidden from view, by surveillance at the corner of the eye (Burrell and Dale 2002). The landscapes of the mobile telecoms industry were all *walled gardens*: theme parks, business parks. They segregated their landscapes by severing connections, making safe places to play for persons and property. Its business park buildings were walled away from a prying public, lost at the foot of a highway, one way in/out, on pavements that were paths to and from nowhere; the campus walls of Blue were electrified, its windows tinted, flows of employees and intellectual property squeezed into ordered lines, no leaks, no arborescence. The mobile telecoms industry existed in isolated dreaming gardens in the M3/M4 triangle, dreaming gardens in which the future, infinitely far away, was always possible.

²⁰⁹ Source: Ethnographic notes taken at Blue on 4th March 2004.

With a sigh, I looked up at the grid of sky through the panes of the atrium windows. I saw monsters in the cloud shapes, a dragon with wings furled back, darting downwards, long snake neck twisted towards me. Below the clouds there were... I realised that I could see nothing beyond the electrified wire stakes of the campus fence. There were the fir trees, a dense thicket up on the grassy rise of the border. I could see the metal fence posts locked into the ground of the tree roots, metal weaving between leathery-brown lower branches. But what was beyond? Was there anything beyond? What could I normally see from here? What was beyond the wall of the campus, this miniature city where people slept and ate? What mattered beyond suckling on daily dose of willing bodies, delivered by tarmac and steel needle, jolted by binary code and ring-main voltage nerve impulses? The disc of sun glowed for a moment, but was darkened by the windows, diffused. In here, behind the oppressive glass, the dome of the heavens was forever softened, eyes forever protected against glare, against too-golden a light.

I looked back at the model and knew, then, that it *was* the campus; a domed city, floating alone, protected forever from the atmosphere by its transparent surface, a mirage hovering above the ground. I was sealed in a box, a protected *walled garden* for the industry to play in and make its futures.

Reconstruction 2

by Ethnographer

The only way, now, for me to leave the glass dome, escape the closed world of the campus was to take to the skies; to grasp the tail of the dragon-cloud. I wanted to travel elsewhere, nowhere, to the land of mobile telecoms industry dreams, to the city of its imagined desires, to the magical world where industry futures lived and breathed, fought one another, and were renewed each year. I wanted to find a way to reach the GSM World Congress at Cannes, the annual event in the mobile telecoms industry's cyclical calendar. I stared out through the dull window-panes of Blue, caught the dragon-cloud by the tail...

... and sat in the darkened tube of an airbus on the descent to Nice. I was looking through a frosted lozenge window, sucking in the stupendous clear, sunlit azure waters of the Mediterranean. Behind, the tips of the rugged Alps Maritime could be felt in the harsh, edgy drop in height. The runway stretched off into the water, and we sunk down through pockets of air towards its grey flatness. The airbus tossed lightly from wave to wave peak, before landing with a bump. And then I was walking out into warm air above a glittering concrete runway. The air was magnificently bright, the light from the sea reflecting endlessly within a turquoise-white sky. I longed to change out of my winter suit into a t-shirt; it was as if I had travelled hemispheres and had switched seasons for this was no British February gloom but a warm summer.

I checked my watch. It was 10 o'clock on 16th February 1998.

From the date, I was re-living the days when I had first attended the GSM World Congress. These were my memories as a designer at a vendor of mobile networks and handsets. It was the day before I was due to start presenting on the company exhibition stand. I hurried my pace, eager to explore; shifted the weight of my satchel slung behind me. It was an

unexpected heavy addition to my body, so I swung it round. It was a conference satchel, saturated RGB blue neoprene, with the GSM World Congress logo stitched into the corner. I lifted a corner to peek inside. It was full of evidence: magazines, torn out pages of newspapers, brochures, CDROMs of presentations, flyers, video tapes, transcripts of interviews with attendees, cameraphone pictures... all the evidence concerning the congress I had collected between 1997 (my first visit) and 2005. I was weighed down by its histories, its stories, yet was beholden to its possibilities. Indeed, I walked through them.

I stretched my limbs as I stepped on to the transfer bus to the terminal, muscle strings feeling supple beneath the sun's heat. In a mobile telephony dawn chorus, a myriad of handsets chirruped and beeped, welcoming their bright new mobile network. Hands around me fumbled for voice mail and text messages. Despite this reminder and the weight of my satchel, I felt on holiday from Blue, a luxurious sense of freedom and escape from the walls surrounding the campus. And I would send the Future Archaeologist a postcard or two, fragments of this reconstruction, fragments of this collage of memories and evidence; postcards from the ethnographic edge, so to speak.

Outside the concrete terminal building, I waited for the company coach that circulated the stream of employees between Nice airport and Cannes. It pulled in next to its corporate rivals under the concrete porch, white and gleaming with the current advertising slogan *anyone anywhere anytime*. Although Cannes could hardly be said to be just *anywhere*, there were some specificities to the location of the GSM World Congress that brooked no ignoring; its infamy as location for the Cannes Film Festival, for example. It was the intersection between this particular location and the mobile telecoms industry (and its futures), that was why I had dreamed of returning here.

Onboard the coach were only a handful of passengers. This was the day before the conference and exhibition, when the backstage support staff and exhibition crew, such as myself, were arriving. Engineers had been here for months already (one wondered if they

ever left), and a host of labourers had been setting up building-sized banners, posters, party tents, sound checks for well-known music acts, exhibition stands, internet cafés, re-branded hotel façades, fax rooms, sea-faring hospitality suites, fireworks, the infrastructure for the circus and spectacle that formed this extraordinary industry event – ‘... the incomparable mobile telecoms industry jamboree in Cannes now known as 3GSM Congress’ as one journalist named it.²¹⁰ Tomorrow the senior management, who formed the actual delegates, would arrive and the circus or jamboree would begin.

The coach doused me in an unwanted blast of conditioned air and cool blue glass. Through the glass I could see the azure coastline as we skirted above the ports of Monaco and Antibes, sunlight occasionally flashing from a few white yachts out in the bay.

I began to rummage in my satchel, looking for some facts and figures on the scale of the event, some hand-made measurements:

The Business of 1 billion + connected people worldwide



Organised by the GSM Association and Informa Telecoms & Media, the 3GSM World Congress is the world's leading mobile communications conference and exhibition. Held annually since 1994, the event attracted 28,000 visitors from 173 countries with over 4,600 conference delegates, more than 600 exhibitors and 1,000 media in 2004.

The 3GSM World Congress promises to continue its dominance of the industry calendar as a crucial week of networking and learning. Whether you are exhibiting or visiting we hope that it proves to be a valuable and productive experience for your organisation.

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²¹⁰ From silicon.com news article 'Re:Viewing 2003 - Mobile and Wireless' at

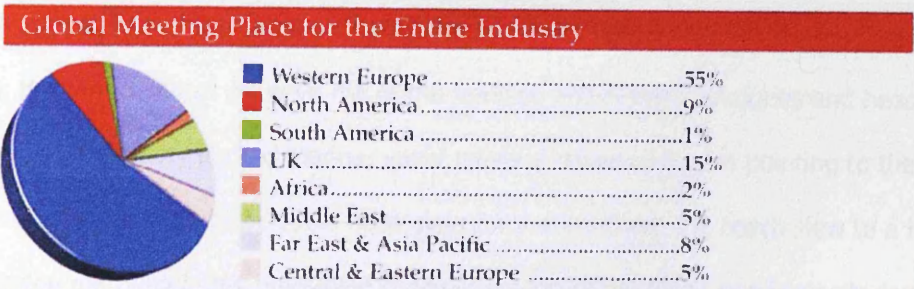
<http://www.silicon.com/networks/mobile/0,39024665,39117487,00.htm> (accessed 22 March 2004).

Important note: The congress was initially titled the GSM World Congress, then changed its name in 2001 to the 3GSM World Congress to reflect a change in emphasis from 1st Generation GSM mobile technology to 3rd Generation (3G) technology.

²¹¹ Cut from 3GSM World Congress official web page on its history

<http://www.3gsmworldcongress.com/exhibition/default.asp> (accessed on 9 July 2005).

I wondered at the low numbers of delegates compared with visitors, it seemed to suggest that most were not coming for the official conference at all but to participate in the jamboree, the spectacle.



And of those who would be arriving tomorrow - the backstage labourers such as myself were uncounted and invisible bodies - the UK and Western Europe allegedly formed 70% of the attendees. But I had torn this pie chart from the conference brochure more for its fascinating constitution of borders and territories. The UK and Western Europe had been separated into two distinct categories, as though the UK were independent of Europe. The UK was being positioned at a continental scale, as though it were not an island but a vast geologically distinct region separated by tectonics, its division from other industry regions incised into the globe. And my studying the UK mobile telecoms industry participated in this fault line.

The coach was now hauling through the streets of Cannes, along the promenade Boulevard de la Croisette, and the four luxurious beachfront hotels that defined the sea wall of the town – the Majestic, Noga Hilton, Carlton and Martinez. These prestigious hotels were where the executive board members would be staying from tomorrow onwards, a couple of evening’s rest between helicopter flights to and from Nice airport. The four hotels were normally ‘owned’ basement conference floor to penthouse ceiling by one or two select companies, every room booked years ahead, and the rest of us had to search further a-field for our beds. For example, an enterprising colleague rented a villa in the hills every year and sublet rooms to less organised visitors.²¹³

²¹² Cut from 3GSM 2004 conference brochure.

²¹³ Limited accommodation was something of a feature of telecoms industry conferences. CeBIT in Hannover was renowned for its unusual approach to accommodation, whereby this very hospitable city

The coach pulled through the strip of palm trees of la Croisette, women in furs and sunglasses strutting beneath their flashing sunlight and shadows, trailing tiny dogs. Crisp black and white waiters in open air restaurants served coffee to a few dark-suited business men. But in a moment we were out of the Versace and Armani boutiques and heading towards the densely packed marina; yacht masts a crowd of fingers pointing to the sun. As their unblemished perfectly white fibre-glass hulls drew close, the coach slew to a halt and deposited me outside the unyielding concrete wedge of the Palais des Festivals conference centre, its shape cutting out a vast rectangle of sun, sky and sea before me

The concrete maw of the Palais des Festivals swallowed up marina and beach on either side. It was staggering modern brutalism against the stone walls of the old town; furled in endless red drapes advertising the conference. On its private promenade were endless white exhibition tents, and temporary buildings (in aluminium and glass) projecting out like long, gouging teeth into the Boulevard de la Croisette, and down into to the beach itself.

seemed to turn every spare room in every private house over to the show. Stories of delegates spending several nights in a child's room, whilst the child slept on the living room sofa, were not uncommon. Those attending the massive ITU Telecom show in Geneva frequently commuted many hours across national borders.



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I was due to meet four colleagues who had attended the conference (several every year almost since its inception). But to begin I had to reconstitute myself as passable, redefine my body so that it was digestible in the mouth of the conference, prevent myself from being spat out by the ever-present and ever-polite security. I needed a conference pass.

This year, 1998, I was able to walk up to the reception desks erected on the forecourt of the conference centre, and collect a badge organised through the company. It was specially colour-coded to indicate that I was an exhibition stand worker. I had no privileges to attend any of the conference sessions, functions, or access to other delegate-only areas. In 2004, when I had attempted to obtain a full conference badge worth £2600 as an ethnographer, my requests had been gently but firmly deflected. A telephone conversation with one of the senior managers inside the conference organisers (itself engineered through a favour from an industry colleague) told me that only members of the press were permitted a free conference pass. My body would lead to a net loss for their organisation; the need for an extra chair was cited as an example of the cost they would have to bear – somewhat unbelievably. In short, I

²¹⁴ Publicity photograph of the Palais des Festivals main entrance from 3GSM World Congress 2005 website. See

<http://3gsm.telecoms.com/c/show/img.jsp;jsessionid=7BB87C799EE6B920BA058D66C579C460?id=5>
(accessed 04/07/2005).

experienced the sudden shock of a barrier materialising before me. By pushing up against the conference pass, an industry pushed back, resisted. For a moment, in that conversation, the conference pass mediated the boundary of a mobile telecoms industry; a version of the industry imagined by the conference organisers. For a brief moment on the telephone, I knew what it was to be outside the industry, to have laser-incised the wireless tattoo from my body, to be unmarked by wireless knowledges.

I turned back to the building and saw Paul, the venture capitalist whom I was due to interview, hands on hips, merry round head skywards, finishing a business call. He signed off, saw my badge and laughed in shared humour.

"...I have borrowed badges. I have been to Cannes eight years on the trot and have never paid for a conference ticket. I have no intention of doing so."²¹⁵

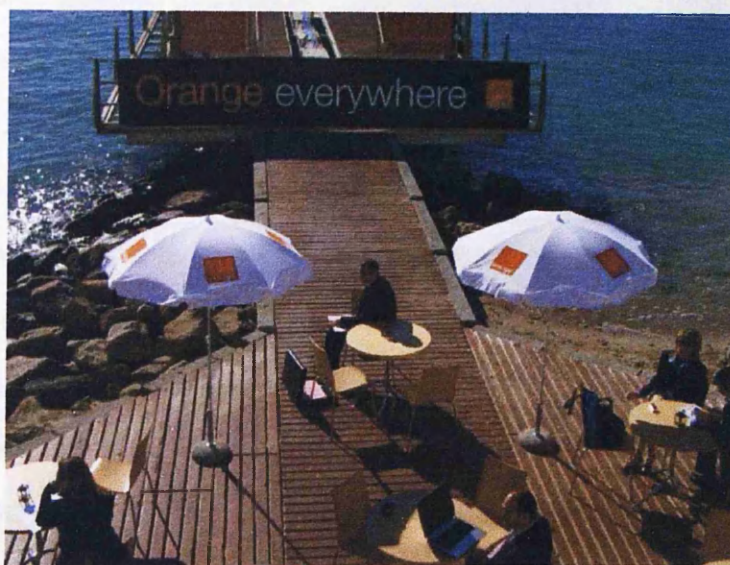
He had another call to make but would meet me shortly .

I felt the flimsy paper conference pass in my fingers, its coloured ribbons hanging by a golden safety-pin. It was a papier-mâché technology, a mask of sticky relations that had hardened into a boundary surface, to be worn over the body as part of the spectacle, to enable to me pass the uniformed guards; a mask that could be taken off and borrowed by another. Wearing my papier-mâché mask I was no longer Laura Watts, I was a brightly decorated representative of one of the world's largest telecoms companies. Masked I slid through the dark peristaltic tracts of the conference building, towards my rendezvous. The few people whom I passed, suits or security, looked always first to my badge, to my mask, that slide of the eyes downwards, and then back up with a smile of recognition...of the mask and its imagined possibilities (for them). My mask allowed me to belong to the industry crowd, a

²¹⁵ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

faceless character marked by colours, ribbons and brand; one of the whirling masses that would be dancing on the morn.

Finally, I found my way out to the pontoon at the far end of the promenade surrounding the concrete walls. The Orange-branded internet café was where we had agreed to meet:




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Taking a seat beneath a parasol I took in the view. It was persistently dominated by black banners, *Orange everywhere*. Its tone reminiscent of the *anyone anywhere anytime* slogan of the company I had worked for. Everywhere, anywhere... But this was somewhere. I flipped open my satchel and rummaged for some inspiration.

February 23, 2004
Orange UMTS launch reinforces 3G confidence at World Congress
 By Steve Pusey

"In the convention hall, in the private Nortel Networks demo centre across the Boulevard de la Croisette in the Majestic Hotel, and around the streets of this picturesque city, users are recognizing that "3G is For Real" in 2004."

- Steve Pusey



Steve Pusey, president, EMEA, Nortel Networks

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²¹⁶ Extract from 3GSM Daily Mobile News online bulletin:

<http://3gsm.telecoms.com/c/show/img.jsp;jsessionid=7BB87C799EE6B920BA058D66C579C460?id=35>
 (accessed 04/07/2005).

February 23, 2004

Nortel Networks, Orange Deploy UMTS in Cannes

Rapid Deployment Delivers Live 3G Network in Time for 3GSM World Congress

CANNES, France – Nortel Networks* [NYSE/TSX: NT] and Orange have completed a five-month UMTS (Universal Mobile Telecommunications System) network deployment to provide live third generation (3G) coverage for Cannes and portions of Nice – including the airport – for 3GSM World Congress 2004.

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These were the press releases for the infrastructure that made *Orange everywhere*, a trial 3G network installed by Nortel (the manufacturer) for the conference delegates. The scale of the temporary installation was staggering. The whole town and portions of Nice, including the airport (and, I guessed, the main thoroughfares between Nice airport and Cannes) had been modified. This was an entirely new mobile network infrastructure, requiring a physical re-working of the landscape. Buildings throughout Cannes and Nice would have been co-opted, new cellsites and antennas erected on roofs and walls, and the Palais des Festivals itself was almost certainly packed out with picocells to handle the 28,000 visitors all potentially talking on their 3G phones. All this had taken five months to deploy. Five months of delicate engineering for three days of conference, and I had no sense for how long it might take to strike. And this was no well-rehearsed, packaged technology, but an unstable trial network. Ultimately, when the mobile telecoms industry arrived and switched on their phones at Nice airport, the GSM or 3G mobile networks – magically – simply worked.

I watched a man in a tie opposite as he talked on his mobile, laid back, shirt sleeves rolled up beneath the Orange-branded parasol. Wireless communications in the sun, satellite-stars tumbling overhead in a deep night sky, sub-marine optical-fibre cables swimming in ocean currents, voice mail from beyond the mantle and core of the planet, these were magic

²¹⁷ Extract from Nortel Networks archive on 3GSM World Congress 2004:

<http://www.nortel.com/corporate/events/2004a/3gsm/archive.html> (accessed on 18/12/2005). Note the reference to the Nortel branded Majestic hotel.

²¹⁸ Extract from Nortel Networks press release:

http://www.nortel.com/corporate/news/newsreleases/2004a/02_23_04_orange_umts.html (accessed on 18/12/2005). Note that UMTS is the technical standard of the 3G (3rd Generation) mobile network.

because the labours involved in making them happen were made invisible. I was an invisible labourer on the counter of visitors to the conference, and the teams of engineers were equally invisible bodies. Bodies had become subsumed into fleshless brand - simply 'Nortel'. We were just some of the hundreds, perhaps thousands, of people who organised, cooked, cleaned, manned the phones, fixed, installed, smiled, took credit card bookings, built, drove, programmed, soldered; we who were dematerialised by the magic wand of corporate branding. We were makers of the backdrop upon which the three-day performance was played. This was theatre; backstage, box office, theatre management, all hidden, bodies in stagehand black, so that all that was left was the magic. Branded magic: *Orange everywhere, Nortel Networks UMTS*.²¹⁹

I was day-dreaming in Alfred Gell's taxonomy. He draws on Malinowski's account of Trobriand gardens and Simmel's valorised philosophy of work, to argue that magic is the ideal zero-work means of technical production; the measure by which technical efficacy is made.

'The defining feature of 'magic' as an ideal technology is that it is 'costless' in terms of the kind of drudgery, hazards and investments which actual technical activity inevitably requires. Production 'by magic' is production minus the disadvantageous side-effects such as struggle, effort etc.' (Gell 1988).

The words from Gell's grave that haunted me were: drudgery, hazard, investment, struggle, effort. The 'magical attitude' re-tells relations of practice so that the sheer effort of technical

²¹⁹ This desire to make labour invisible through technical means, has been discussed with respect to the initial 'hype' surrounding e-commerce. Knights et al. argue that e-commerce 'hype' was an allegory of the Emperor's New Clothes; a study of an initial incarnation of Tesco Direct showed that behind the scenes was not a new electronic delivery system but the use of a fax machine to existing shop assistants on the floor of a local branch. They argue that attention to stories of 'hype' are crucial in understanding technical development, for they establish social expectations (Knights, Noble et al. 2002). I would reframe 'hype' as one of the tools by which technological development is magically glossed.

activity is glossed (in Gell's terms the technology casts a spell through its virtuosity of technical labours): art is divinely inspired, infrastructures magically work (Gell 1999).

Glossing a trial 3G network as *3G is for Real* was another, different labour; gloss was the addition of lustre, the sprinkling of fairy dust. 'The propagandists, image-makers and ideologues of technical culture are its magicians...' (Gell 1988). The brand-makers, those people and things that participated in producing and painting brand, were magicians. And mobile telecoms industry magic was big business.

GSM World Congress was the careful orchestration of magical technology, the removal of spit, sweat and struggle from the delegates' experience of making a phone call. Cannes had become, momentarily and for particular people in the mobile telecoms industry, a town in which *3G is for Real*. Next month the 3G network would no longer be a reality; the fairy dust would wear off, everywhere would become nowhere. Cannes, as a landscape of technologies and experiences, would be a different place. As I sat in the sun waiting for my colleagues, I realised that I was not in Cannes on the Côte d'Azur but somewhere else, an augmented Cannes, a re-landscaped town. This was an apparently magical place where a 3G future had become real, a future had become flesh, and 3G signals criss-crossed and covered the air. But it was fakery, theatrical sleight of hand, a pretend town. I was sitting in a 3G theme park, a mobile telecoms version of Disney's EPCOT (Experimental Prototype Community of Tomorrow). And much as Disney creates 'magic lands' and fantasy worlds, hiding its labours of landscaping and maintenance from visitors, plants and fauna altered to falsely suggest the seasons (Burrell and Dale 2002), here the wireless fauna had been altered to falsely suggest the reality of a future still in trial.

"Some guy next to me brought some chick back to his room... " a voice from the next table interrupted my thoughts. "Oh, Boy! She was screaming... I just kept thinking, man, just put her out of her misery."²²⁰

Abruptly, I felt I had been transported from a Disney futures theme park into some salacious novel, for the voice was Ballardian: sex-work and high-tech industry. I had strayed into the pages of the J. G. Ballard novel, *Super-Cannes*, a psychopathic tale of a fictional high-tech business park and enclave outside Cannes (Ballard 2001). Through this gated high-tech community and its decadent location, Ballard explores the relationship between the psychopathic and the autocratic control of high-tech work and leisure. *Super-Cannes* was a tale of high-tech work cut-out from a world of invisible labours of security, prostitution, and gardening. Although the invisible labours were different, *Super-Cannes* seemed an apt name for an augmented high-tech Cannes, where the mobile telecoms industry established an enclave for three days of the year to indulge its dreams of the future.

My reverie was broken as Alain, an industry journalist and one of my interviewees, appeared at my shoulder. He immediately slid into a seat opposite, coffee already to hand, regulation Ray-Bans to nose. Almost before I had a chance to greet him, he began an excited tirade of comments.

"...certainly for the last two to three years, certainly, it was nice to go out and see people. It was much more: No I'm not doing anything, let's go and have a coffee, have a drink, sit in the sunshine, let's have a gossip about life..."²²¹

I smiled, nodded, listening.

²²⁰ From memory of a conversation heard at GSM World Congress 1998.

²²¹ Audio extract from interview with journalist attendee at 3GSM 2004.

Then Paul joined us, efficiency and friendliness rolled neatly into one. He shook my hand with a smile, interrupting Alain, and passed over his cameraphone showing a picture he had taken that morning.



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"Sunrise over the Palais des Festivals... Because it was a nice morning... But the feeling I always get in Cannes when the sun's coming up and it's in February and it's the first time any of us have seen sun for six months in Britain is: sunshine, optimism. Ah, we're here again. Great, energy, let's go! ... They could only move it to somewhere sunny. So if they said there is an exhibition centre that is ten times as good in Prague. No chance... It just aids the mood of optimism generally. This year was a bad year for the weather... Just to get a little bit of sun on your back, even if you don't see much of it during the week. To be somewhere completely out of your normal context for doing stuff. The other alternative for it that people are suggesting is Barcelona."²²³

²²² Taken by Paul at GSM World Congress 2004 on Thursday 26th February 2004.

²²³ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

The move to Barcelona was something I had read about elsewhere:

Why Barcelona?

Prime location - Barcelona is located along the Mediterranean coast, with superb transport links to the rest of the world. The city is renowned for its rich cosmopolitan culture, heritage and lifestyle. The average temperature in February is 13°C (compared with 9°C in Cannes). ²²⁴

The weather, and particularly the Sun, were an integral part of the conference experience, of the future theme park. The Sun was a technology that participated in translating the conference to another world that was 'completely out of your normal context for doing stuff'. For those from the northern latitudes, a substantial proportion of the 70% of Western European visitors, the Sun transported them from the cold, damp drizzle of winter to the warm sunshine of summer. The location of the GSM World Congress was a matter of the season as well as the weather, holding it in July would not have the same transformative effect. But the Sun was (and always is) situated in an interaction, in this case with the conference organisers. In this interaction the Sun was being mobilised politically to create a performance, a spectacular transformation in season, for a particular group of visitors. This magical version of Super-Cannes, this future 3G paradise, was being carefully constructed for delegates from the northern latitudes. Scandinavian and UK visitors would experience the most extraordinary effect, the marked increase in number of hours of sunlight as well as temperature; and perhaps it was no co-incidence that these were also regarded as the largest and most advanced (GSM) mobile telecoms markets in the world. The garden of 3G paradise was prepared only for some and not for others.

As I thought, Paul sent me a copy of the cameraphone image to my mobile. Sunrise over the Palais des Festivals. Instinctively, I sent it as a picture message to the Future Archaeologist. My first postcard to her from this holiday from Blue.

²²⁴ Web page on the move of the 3GSM World Congress to Barcelona in 2006. See

<http://www.3gsmworldcongress.com/2005/faqs/default.asp> (accessed 04/07/2005). Note: 3GSM World Congress moved in Barcelona in 2006.

"Is the Sun why you are here?" I asked.

"I go to meet people," **replied Paul**. "For me it is a very cost effective way of being in the centre of something where people come in from all over the world, where I would have to go all over the world to meet them. So I had forty meetings in five days, which was well worth it... .. so eight until midnight, eight until midnight... We rent an apartment... sell the beds that our company won't use... I hire a virtual assistant for a week, booking meetings in advance, so when I get there... from the beginning of the day to the end of the day I have a schedule... We did five deals on the first day. You go and do deals. It's good... [...] ...[But] there are a lot of people who go for a jolly..."²²⁵

Alain pitched in with his methodology. "Now my usual approach to conferences and exhibitions is to spend three or four days talking myself into the ground, before going back home to lie quietly in a darkened room and try and separate the real information and the significant patterns from the background white noise and hype"²²⁶

"So what's the point of the conference itself? The two-thousand pound badge?" I asked them, glancing at my paper mask.

"The stuff that people put up on the board, or on the screen behind them, is stuff I already know," **Paul began, then stopped himself.** "That's terribly arrogant.. It's public domain. It's educating the non-educated... it's not doing anything for the educated... The conference

²²⁵ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

²²⁶ Extract from article 'The Raw and the Cooked' in Stream Magazine, June 2005, p36.

proceedings, they are for those who are giving the talks to project themselves, right, and it's an ego thing... Only the keynotes, when they work... where people who are reasonably high up and knowledgeable, come along to listen to those people who even they acknowledge to be even higher up... So when you get the head of Vodafone talking or the head of Sony talking... there are a bunch of people... even heads of lesser operators... who will go along in case there is a revelation being announced... The exhibition is where real things happen, where you get to see things working, where you get to meet real people..."²²⁷

Paul trailed off, attention caught elsewhere, over my shoulder towards the marina. He shook his head with a chuckle. I turned. Beyond the edge of the moored pleasure craft, out in the bay, was a large bright yellow ship at anchor. I had caught a brief image of this on some publicity in my conference satchel.



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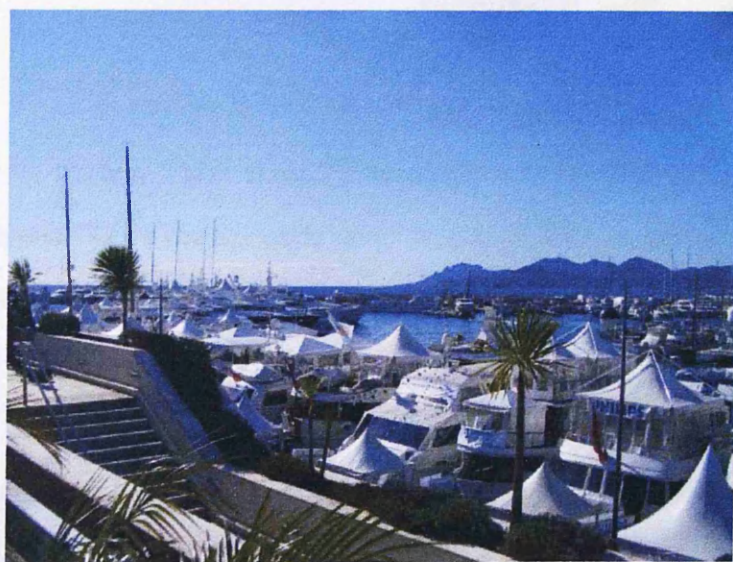
"Siemens have got this converted ocean liner..." explained Paul. "Big yellow thing with Siemens written on the side of it. Which I think is a

²²⁷ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

²²⁸ Scan of Siemens publicity booklet, accompanied the 3GSM 2004 conference pack.

perfect analogy for Siemens because it is big, doesn't turn round very fast..."²²⁹ He was chuckling to himself again.

I noticed that they were not the only ones to splash their brand over the floating scenery. Many of the private yachts had logos emblazoned on their awnings and hulls. Blue font on white background. The textual uniform of the mobile telecoms industry, blue company name on white, slid into familiarity, camouflaged amongst the blue sky and white fibre glass of Super-Cannes. The industry seemed designed for sailing, for sunlight and water.



"More hospitality... you know, all the floating gin palaces, the yachts and everything..."²³¹ said Alain.

²²⁹ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

²³⁰ Image from 3GSM World Congress 2005, GSM Daily newspaper website. Note the Philips logo on the lower right.

<http://3gsm.telecoms.com/c/show/img.jsp;jsessionid=7BB87C799EE6B920BA058D66C579C460?id=49> (accessed 04/07/2005).

²³¹ Audio extract from interview with Journalist attendee at 3GSM 2004.

Ocean liners, floating gin palaces, Victorian vices, aristocratic decadence, had the nostalgia for gentlemanly knowledge-making and agrarian social order followed me, flown with me on the breeze? I shivered. Flying in by aeroplane had left me bereft of a sense of location, I felt isolated, severed from any continuity with the world of Blue and the M3/M4 corridor. Super-Cannes was an island experience: separated, distinct, different, 'completely out of your normal context for doing stuff'. The sea was the edge of the world. The sea marked the unassailable horizon, always beyond.

Alain pulled out a pocket guidebook from a folded anorak bulging with notebooks and pens.

"[This is the] survival guide with details of local high class escorts and things like that..."²³² he babbled with considerable humour. "We can walk around, and I'll give you the inside story," he offered, then nodded at my conference bag. "Ah, excellent, looks like you've got good inside sources."

We left Paul, who immediately sprang up for another appointment, and headed back into the crisp shadow of the Palais des Festivals. As we regurgitated ourselves back out to la Croisette, Alain filled in our footsteps with tales of the conference.

"...I liked [this chairman's] handling of the 'fireside chats' (I'll keep adding the single quotes until the day an actual fire turns up on stage here)..."²³³

Fireside chats seemed to have little to do with the modern brutalism whose stair-rod-edges bit into us, and everything to do with architectures of the country house. It transformed a

²³² Audio extract from interview with journalist attendee at 3GSM 2004.

²³³ Extract from news report on 3GSM 2005 from silicon.com

<http://networks.silicon.com/mobile/0,39024665,39127936,00.htm> (accessed 4 July 2005).

concrete lecture theatre into a place where talking around a fireplace was commonplace, where gilt mirrors hung above the mantelpiece; I had stood quietly talking to men in suits concerning the investment potential of a laser-projected keyboard around such a fireplace. The fire was an imaginary technology that gentrified the architecture, powerfully relocating its orderings. Nirmal Puwar, space invader of the Houses of Parliament, draws on Luce Irigaray's thoughts on the role of gentrification in the production of the 'Western masculine universal leader'. Irigaray imagines that he is 'in his room or in his study, sometimes enjoying a fire fancied to be burning in baroque curls of smoke or else gazing out through the/his window' (quoted in Puwar 2004: 39). The fancied fire, the imaginary fireside chats of a chairman, leader of a company, were deeply embedded in elite social orderings. I shivered with a sudden chill wind, sensed the ghost of the modest witness at my heels, hurried forward.

Outside the conference venue we turned east along the promenade, passing the first of the four luxurious hotels, the Majestic. It had been branded by one large corporation so that glittering company flags flew in the deep foliage of its gardens, posters hung from balconies.

As we walked beneath the palms of la Croisette I watched an elegant woman on a bench, fascinated by her long vivid-pink nails, painted the absolute exact shade of her leggings. I tried to imagine her morning toilette as she selected her clothes for the day and matched them with her morning coat of nail varnish. Her exquisite detailing matched the nuanced colour-coding of the advertising banners that hung lazily amongst the palm trees and lampposts. Each sparkling corporate brand, Nokia, Philips, Nortel, O₂, demanded the most precise CMYK shade of deep blue on its white cloth surface, so as not to be confused with another company's blue on white brand. Differentiation was in the minutiae.

We walked on passed the Noga Hilton 'the one with the pink marble bathrooms... casino beneath it... that the film stars stay in'.²³⁴ Outside was a fleet of silver Minis with mobile phone keypads painted on their bonnets.

Alain was describing his many years treading this paving, empty sands hidden behind elegant beach cafés; scent of fruit de mare a continuous olfactory note.

"In 2000 Lucent had Tom Jones and serious big name acts. I mean, la Croisette at one o'clock in the morning was a bit like what I'd imagine Ibiza might be like. I remember thinking then, this industry is definitely going down market, its getting yahoo sales executive types. It was like Southend, or something like that..."²³⁵

Alain stopped us opposite the front door of the Carlton. The eight-storey white colossus with its twin domes rose up before us, one of the oldest and grandest hotels in Cannes; opened in 1912, according to my Survival Guide.

²³⁴ Audio extract from interview with Venture Capitalist attendee at 3GSM 2004.

²³⁵ Audio extract from interview with Journalist attendee at 3GSM 2004.



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Cannes had a history of elite spatiality. The conference Survival Guide told the story of Lord Brougham, Lord Chancellor of England, who began the flow of English aristocracy and royalty to the village in 1834. The gentlemanly social and spatial orderings had been built into the brickwork of the town, into the foundations of the hotels where the industry slept, dined, conducted business.

We sat on a bench, showered in the noonday sunlight, and marvelled in merriment at the opulence before us.

I flipped back the deep blue (more blue) neoprene of my conference bag, and took the time to find some images of the industry at play within the hotel.

²³⁶ From Intercontinental Carlton, Cannes website

<http://www.ichotelsgroup.com/h/d/ic/1/en/hotel/ceqha?requestid=668966> (accessed 17/2/2007).



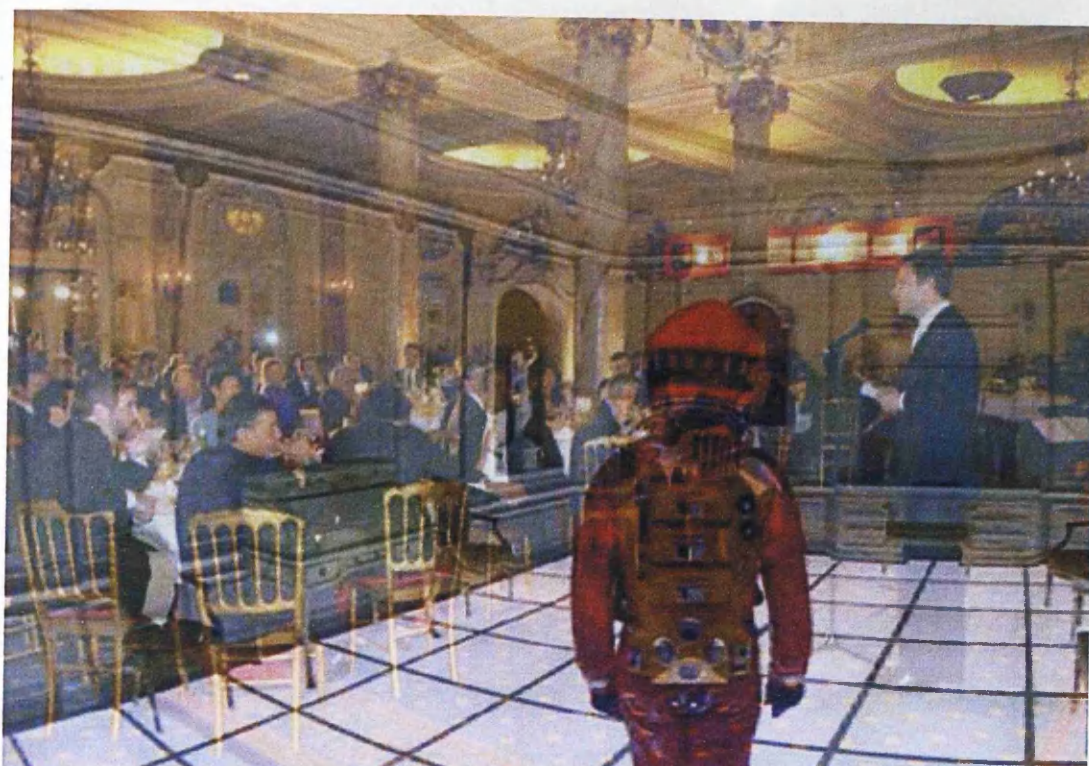
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Gilt, gold and chandeliers, pillars and mirrors, red velvet and marble veneer. This was a fabulously opulent version of the golf-club near London. From casino basement to Corinthian column head, the grand aristocratic space was the real thing, its history was of the gentlemanly elite; according to one source the first supreme council of the League of Nations had met here in 1922.²³⁸ This was gaudy and gauche, but ultimately this hotel was 'somewhere completely out of your normal context for doing stuff'. It transported the industry to another world, to where their future 'was Real'.

My head ached as I stared at the image, the Sun exerting its weight upon my neck. I stretched my spine, sighed and tilted my head back to the sky for a moment, then returned to study the image.

²³⁷ Publicity photograph from GSM World Congress website. Obtained 27 April 2004.

²³⁸ Source: Ville de Cannes (2006) 'The History of Cannes: The Great Hotels' <http://www.cannes-online.com/Analais/histhotelsuk.html> Accessed December 2006.



I knew this experience, I knew this place. It was the hotel at the end of the stargate in 2001: A Space Odyssey. But it was also the end of an industry luncheon at the hotel Carlton. They blurred, blended, evoked the same spatial orders of gilded furniture, ornate walls and ceiling, baroque seating. The statue in the distance of Bowman's hotel room stood without juxtaposition in the Carlton room, a gilt chair seemed to stand meaningfully before a desk bureau, the chandeliers might have hung above Bowman's spacesuit. The red spacesuit haunted the industry's event, half-formed. Feverishly I tore through the evidence in my bag until I found what I knew must be in there, a torn out page from Arthur C. Clarke's novel based on the screen play:

'The space-pod was resting on the polished floor of an elegant, anonymous hotel suite that might have been in any large city on Earth. He was staring into a living room with a coffee table, a divan, a dozen chairs, a writing desk, various lamps, a half-filled bookcase with some magazines lying on it, and even a bowl of flowers. Van Gogh's Bridge at Arles was hanging on one wall – Wyeth's Christina's World on another... [...] ...it was all a fake, though a

fantastically careful one. And it was clearly not intended to deceive but rather... to reassure.' (Clarke 1968: 211-213).

In this hotel, as with the rest of the conference locations, the labours of maintenance and installation would be carefully glossed over. Waiters and chefs, hotel and conference staff, engineers and technical support crew, would all be behind the scenes. For Bowman food magically seemed to appear, the room magically cleaned, there were no visible hotel staff; it followed Arthur C. Clarke's third law of technoscientific prophecy: 'any sufficiently advanced technology is indistinguishable from magic' (Clarke 1982, First Edition 1962). But this had a missing corollary: *any sufficiently magical technology is also indistinguishable from advanced technology*. Sufficient magic can gloss a trial 3G network with all its messy contingencies as a universal reality; magic by the brand can turn a demo network into a fully-functional advanced system.

Bowman's hotel was a fake, it was a simulacrum of a luxurious hotel. And Super-Cannes was a fake, it was a pretend future, a trial technology magically glossed as Real advanced technology.

These fabulous hotels of the future, Bowman in 2001 (made in 1968), and Carlton in Super-Cannes, were spaces that were both orderings of a nostalgic gentlemanly society, as I discussed in the previous chapter; spaces that were alternatives to the everyday context of the mobile telecoms industry. In addition these spaces created a magic place where labours were glossed over, a future theme park. These were all the qualities, not of some nowhere utopia, but located 'spaces of alternate ordering' within the mobile telecoms industry where the utopian ideals of the future, *Orange everywhere, 3G is for Real*, had socio-material and spatial effects. These future spaces seemed to be what Kevin Hetherington, following Michel Foucault and Louis Marin, calls *heterotopia*, a space in which different social orderings are

played with and performed (Hetherington 1997).²³⁹ One of Hetherington's examples is the Palais Royal in Paris during the 1780s and its role in social orderings that participated in the French Revolution; its gardens, promenades, and theatres were spaces and spectacles that ordered different and idealistic social relations of a bourgeois. Similarly, the gardens, promenades and lecture theatres of the GSM World Congress in Super-Cannes ordered futuristic social and technical relations so that, in this case, technical labour apparently vanished. A quirk of Hetherington's arguments is that, although they draw on science and technology studies, they do not include a discussion of the re-orderings of *techno*-social relations. But in the mobile telecoms industry 'things' were integral to the future; it was not a matter of new social relations. It was the role of technology in mediating relations that was the dream, wireless telecommunications *everywhere*. Ultimately, the GSM World Congress and its hotel landscapes were not utopian, were not that ideal future; the labours were there, but they were magically glossed, made invisible to the industry. This was a spatial performance of, and playing at, an ideal future, which is the basis for Hetherington's heterotopia.

Hetherington later remarks that the futuristic executive Bonaventure Hotel in Los Angeles, which the philosopher Frederick Jameson regards as the epitome of postmodernist spatiality, is a heterotopic space perhaps different only to the Palais Royal in its specific utopian ideals (*ibid.*: 141). Executive-style business hotels, from Bowman to Bonaventure, Palais Royal to Carlton, were spaces in which futures seemed to be continually performed. I remembered back to Lonny Brooks and Geoffrey Bowker's ethnography of a futures think-tank

²³⁹ Heterotopia are spaces within an existing society that perform different social orderings. In this case, the society in question is not the mobile telecoms industry (see discussions in Figuration 1 on the partiality of the industry) but the 28,000 or so visitors who attend the GSM World Congress in Cannes; a particular community of people who participate in mobile telecoms, many regular attendees as most of my interviewees were, but by no means an entire industry.

organization, and there, too, were the same hotel architectures participating in playing at the future:

'The location was at a hotel... where a ballroom was redesigned into separate sections with curtained fabric to create a series of mini-café's... a metaphoric playground, creating an productive atmosphere of serenity, a sense of belonging to a social elite, where a naturalized sense of sobriety and restraint prevailed... The hotel ballroom had that ritualistic air, which reminds one of family or other societal ceremonies from weddings to debutante balls.' (Brooks and Bowker 2002).

It might have been the Carlton, it might have been Bonaventure.

A familiar aspect of heterotopia is that the future is continually deferred, on the horizon. Heterotopia are spaces between; in Hetherington's words these spaces are 'of the limit, but a limit that is never reached... to reach the horizon would be to achieve a social order' (*ibid.* Chapter 7). The future of the mobile telecoms industry was also a deferred future, on the asymptotic horizon of *Moore's Law*.²⁴⁰ The topology of the future of the industry was one of heterotopia.

As I stared at the image of Bowman's stargate hotel blurred with the mobile telecoms industry luncheon, I realised that there was another ghost in the photograph – the modest witness was there, too, behind the mask of every gentlemanly-suited knowledge worker. The futuristic social and technical relations that these heterotopic places performed were not innocent in their desire to make labours vanish through technical means. The desire to make labours invisible had a long and sordid history including slavery, servitude, and subjugation.

²⁴⁰ See discussion in Reconstruction 1.

The rise of subjugated machines was a story as old as science fiction.²⁴¹ The figure of the modest witness haunted me in Super-Cannes because her genealogy of gentlemanly orders of power over others (both people and things) was being called into this future; the implications of which were not clear.

I suddenly felt cold. The image of Bowman's red spacesuit disappeared from the photograph. The sun had gone in behind a small cloud and Alain complained loudly. We stood and continued our meander along the prom, towards the fourth and final grand hotel, the Martinez.

"This is the where they have the Awards Dinner, " said Alain. "The Oscars of the Mobile Telecoms Industry."²⁴²

He suggested I go through my bag, so between us we picked out some of the better photographs of the Awards Dinner, making a collage of photographs in our hands. I held my breath waiting for them to metamorphose, but they remained steady.

²⁴¹ For example, Fritz Lang's 1927 epic science fiction silent movie 'Metropolis' turns on the Maria robot and her representation of the subjugated mechanical workers of the city.

²⁴² From Wall Street Journal Europe, quoted in the 3GSM 2004 Survival Guide.



Trumpeters in formal regalia as though heralding royalty? Bow ties, dinner jackets and dinner dresses? But this was an event that billed itself as 'expanding the boundaries' a place to 'stay in touch with the future'.²⁴⁴ It seemed anachronistic to me: both a Universal Mobile Telecommunications System (UMTS) and a nostalgia for Victorian social elitism.

The awards dinner required a £300 pass to attend, according to my Survival Guide. It was a masked ball, a masquerade of those whom the 'governing' GSM Association, an extremely select group of CEOs, had deemed worthy of an award. This was what Victor Turner calls the carnivalesque. Turner argues that the carnival, as modelled on his work in Rio de Janeiro, was a public performance of liminality. He points to the preparations for the performance: the sewing of costumes, flags, banners, masks - materiality that seemed to be so present in Super-Cannes. The carnival is a cyclic performance in which social orderings are renewed through a performance of the liminal. GSM World Congress and its awards dinner were also a cyclic performance, the social orderings of the mobile telecoms industry (or rather parts of the

²⁴³ Images from GSM World Congress 2004 and 2005 publicity web pages, provided by IBC / Informa.

²⁴⁴ From advertising slogan on 3GSM World Congress 2005 conference brochure.

industry that attend) were annually stabilised, with the GSM Association's position being re-asserted through its patronage of the conference and the awards ceremony. Hetherington argues that the liminal, a place in between, always at the threshold (Turner 1986) was another version of the space of heterotopia (Hetherington 1997). Although I had heard Paul say that he felt Super-Cannes was a place 'completely out of your normal context for doing stuff' almost a classic description of the liminal, I had yet to attend to the alternate orderings of power, which Hetherington focuses upon, as part of the carnival.

For that, I had to wait for the morrow, when the conference would begin at last. And I, I had to get some sleep for I had to be ready on the company stand to begin demonstrating by eight o'clock.

I bid Alain goodbye, and headed back along le Croisette to my own hotel, at the far end of the marina.

The next morning I was at the maw of the Palais des Festival early, keen to check that my equipment packed and shipped for the exhibition was ready to go. The exhibition hall was in the centre of the building, sunken into the ground, darkened; in the pit of the stomach. The company stand was one of the larger metal scaffold structures, one of the larger companies. It was strange to see it built. I had been part of the team of people who had started six months ago to envisage the space, the demos, the kit, the possibilities for sales and marketing sleight of hand. It was cube of branded space, floor to gantry ceiling; you stepped up onto the carpet and were flying on the company brand, breathing in its air.

This year I had been working with a Macromedia Director demonstration of a new touch-sensitive handset. I had not built this particular software interface but had spent many days developing a walkthrough of its features, developing a patter, the 'take home messages' - verbal darts to prick the ears of any unwary listener. A touch-sensitive monitor had been built into a wall of the stand and a computer concealed inside the wall chipboard panels, with a

removable panel for access. I booted the machine, it seemed to be fine. On the touch-sensitive screen was a rendered image of the handset (it did not actually exist), which I could alter between various states by 'pressing' buttons on the keypad; through patten and presses I created the impression of interacting with a fully-functional handset. It was all technically feasible, that was the line (and I believed it). In the software, I went from beat to beat, from one state to the next, orchestrating those beats into an apparently fully formed device. My presentation was not limited to those items that were present in the software, much (if not most) was not. So, on the touch sensitive screen I pressed what looked like a key on a flat air-brushed graphic of a mobile device, and went to another graphic with the mobile screen filled with a weather map of the UK. But from that transition between two pictures I would talk about the device interaction with the server, with the network, with the billing system; I would talk about the whole interactive world weather service that this single image represented; I would talk about the ease-of-use of the entire user interface design. In short, from two graphics I would knit together a coherent fully-formed object almost-available-for-purchase. My role as a presenter was to turn the discontinuous, often flaky, barely interactive software prototype into a seamless, stable and fluid demonstration of an object.

There was little else to do but stand and wait. Booth workers such as myself became wandering vagrants in the empty hall, sizing each other's stand, filling jars with this year's freebie. I welcomed the long breath before the storm of words; I would be standing, talking, demo-ing for eight hours.

By lunch time we were in full swing, the hall streaming with bodies. I had managed to gather a deep crowd around the monitor, at some cost to my vocal chords. But there was no-one to take my place. The only way the software became a demo, became a coherent and meaningful object, was with me; software and presenter were irreducible parts of a techno-social demonstration device (Suchman 2007a). Only together could we create meaningful interaction with the crowd. Another person would not do. Another piece of software would not do.

My role as an integral part of the demonstration object was, in effect, to meld the disparity into a whole with some magic. My magic made the whole object dazzling. It's the dazzle-effect of technical artistry that Gell emphasises in his example of Trobriand canoes and contemporary arts and their relation with the spectator (Gell 1999). My patter and presses dazzled by evoking the technical interactions with servers, networks, and billing systems, a vast technical system to beguile the spectators of the demonstration – a technical system that was ideal for it did not exist. What Gell does not account for is that technical artistry has no inherent universal value, it is always located. Therefore what matters is the invocation of technical artistry for a particular group, for a particularly located audience; in my case, I evoked an advanced technology that did not exist but was well-understood and imaginable by my audience. I stood, talking, demo-ing, with the touch-screen monitor and software as an embodiment of my corollary of Clarke's Third Law: *any sufficiently magical technology is also indistinguishable from advanced technology*.²⁴⁵

The next five hours of demo-ing (doing the demonstration device) left me exhausted, but that night was the GSM World Congress conference party and I had been promised an invite, another papier-mâché mask.²⁴⁶ This particular masked ball was to be a surrealist experience, a masquerade, a carnival of sensations, games, and altered social orderings²⁴⁷...

I see... a man with a marketing paunch standing next to me wine glass in hand. He is masked by his invitation, has become faceless, part of the crowd, as am I. I do not know him. Besides us stand two tall, sinuous women in caricatured Caribbean dress, overflowing baskets of fruit

²⁴⁵ The demonstration of machines as a spectacle has a long history. For example, 17th century automata were shown for the entertainment of the royal court. See discussion in (Suchman 2007b).

²⁴⁶ During my visits in the late 1990s the scale of the conference was a magnitude smaller, and a party for delegates was feasible.

²⁴⁷ The sequence of images of the conference party are taken from memory.

balanced on their heads. A photographer's bulb flashes on their darker skin, the velvet on my arms.

I see... a Harley Davidson chopper, mirror-bright before red drapes, I am sitting there on the bike. Golden candelabras light the palatial ballroom. A mainstream rock group I can almost recognise is on the stage, thrashing through a rock classic. An executive from my company is watching, we laugh, take a photograph. Then he turns, eyes following a woman in roller-boots and a sugar-pink miniskirt holding aloft a silver salver of champagne.

I see.. puce, a room the colour of blood. Pink spotlights highlight red curtains, red carpet, and three black industrial pulpits surrounding me. Inside their padded rings, masked figures in Virtual Reality headsets stumble as a faceless crowd watch the game on monitors. I am standing inside a fourth pulpit. The headset comes down heavy, pulls into my neck, the controller sinks into my outstretched hand as I grip ready to play.

I see... a world of grids, white grids on a black earth. I look around, it's like my ears are blocked, the world spins too slow, always catching up. There is a green shape, a green dragon, flat depthless mass of pixels. It is coming towards me, white dashes of light pulse in my direction. There is a sound of white noise from too far away. I duck, fire my own dashes of light, the green shape vanishes.

I see... a room, no a tent, with cushions and trestles weighed with steaming platters of food. Swaying women bring more dishes, silver trays balanced on their orange head-dresses and coiffures, their expert steps ride the rhythm of lilting music that comes from nowhere. A rich cacophony of smells confuses my nostrils. I cannot see past all the masked bodies in suits, catch glimpses of stuffed exotic meats, gloriously decorated fish, piles of unknown fruit. Some colonial dream of a French-Caribbean feast, perhaps.

I see... the railings of a terrace before a black night's sky. Huge red and white chrysanthemums explode, fireworks, an exploding chrysalis. Golden rain falls from the dim stars, and up from the mirror-back sea. The shock of the un-ending detonations shakes the building. Gunpowder smoke curls in the air, and then in the space above the water, the smoke becomes a circus for maddened acrobatic brands to leap and tumble in laser defined lines.

Then... surrealist night dissolved into a bright morning. It was dawn, sun rising over the Palais des Festivals once more. On my mobile phone was another cameraphone picture taken by Paul the night before. A picture of the firework display.



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I sent it on to the Future Archaeologist, to see what she might make of it all: sunrise and fireworks. Myself, I was looking forward to leaving this heterotopic 3G future; leaving its ideal orderings of invisible labour. For I was one of the invisible in these orderings, a demo presenter, my work on the stand magically glossed over in the conference brochures. My absence would have effects, but it would not be counted.

²⁴⁸ Cameraphone picture taken by Paul at 3GSM World Congress 2004.

Reconstruction 3

by Future Archaeologist

I had left the Ethnographer after a warming dinner at Julia's café. She had a berth on the Hamnavoe for the early morning crossing back to the other world of mainland UK, to where first class post arrived in a day. The ferry's white towers materialised as we ate, and provided a miniature city-skyline for the brick and blue passenger terminal and cargo containers on the quay opposite. The clouds had shifted and shifted, silver to grey, steel to granite, as salmon gave way to oatcakes and cheese.

Now, a new morning, the clouds were shifting once more, deep and sweet with an east-wind rain. Overnight the land had seemingly lifted, moved upwards into and inside the sky, green islands and sheep adrift in a diffuse world of water. In my new hire car I drove with cloud-blindness, the sea-lochs and sky indistinguishable, following the long white lines of the main road between the twin towns of Kirkwall and Stromness. As I rolled over the hills the islands began slowly to sink, sky rising from the grasslands and wind-whipped waters.

I had seen neither sun nor moon since arriving, for it was close to mid-summer and silver-light turned only to twilight and back. Dawn started before dusk left. And Sand14, Anne had warned me, began work early during these brief months of near-perpetual light.

Passing the grass green dome of Maeshowe, I turned right towards three of the world's most important prehistoric sites, labelled neatly on a large brown Historic Scotland sign (Ring of Brodgar, Stones of Stenness, and Skara Brae), and that other grass dome, Sand14, spun into view. The Land Rover greeted me in its usual position, and I stepped out into the cool air, took a long breath, and plunged over the slab of granite causeway into the porch. Anne was already ensconced in the foyer with a pot of tea, a notepad and her scratchy 2H pencil, taking faint thin notes from a video being played on the wall. Hailing a morning hello, I sat down on

the other side of the sofa to watch with her, picked a bit of hard mud from my socks – mopped up moments ago from the airlock.

The large LCD screen on the glowing curved wall before us threw up pixels from the low grade home-movie footage that Anne was cycling through.



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"Well, you wouldn't believe what people have in their attics and out-houses," commented Anne. "Do you know how many back copies of the Orcadian we have on the islands? You would think that no-one ever threw them away. I was asking about for old pictures, photograph albums, keepsakes, you know, memory-keepers²⁵⁰. I thought I would have a nice old trip down memory lane, and ended up with five generations of ferry timetables and fund-raisers. I think I could chart the entire life of the St. Ola in newspaper clippings. That was the ferry before the Hamnavoe."

²⁴⁹ LCD screen along curved green wall in foyer of London-based industry analyst.

²⁵⁰ Category of consumer as defined at Sand14 during team meeting 27/5/2004.

"Is this video of your research," I gestured towards the freeze-frame image of a lopsided brick out-building, a cow munching with interest, head over the barbed-wire fence besides the leaning wall.

"Yes, this is from a farm up the road. I wanted to know how [people] access something you hand on from generation to generation... digging slides up, boxes of prints from the attic. That's an experience we should understand. That nostalgic experience," she replied.²⁵¹

She pressed the play button on the remote, and we watched the camera move into the out-building, saw a huge old dusty chest of drawers. A woman in wellies and a long navy jumper came into view and opened the top drawer, took out a plastic bag. She showed the contents to the camera, "This was my great Aunt's postcard collection," she said by way of introduction to the fan of yellowing black and white cards. "I have a lovely series of photographs of her. I showed you, the ones in the frame by the sideboard. One of these days I'll put them all together, put the postcards with the photographs into a nice album." She sighed, and I sensed that the day would never come.

Anne paused the video again. "That's one of the things we need to do. Help create living memories... Memories need simplicity, clarity. Just the right memory... [Whatever we do] should be trusted, reliable and clearly beneficial... Help people re-experience their memory, other people's memories."

"Is that what the... prototype... is for?" I hesitated over the word, it seemed such a paucity of label for the experience of that T-shaped device in my hands yesterday.

²⁵¹ From ethnographic notes taken at Sand14 during team meeting on cameraphone concept 27/5/2004.

Other quotes are also from this meeting, unless otherwise stated.

Anne poured tea for us both, having a collection of mugs on the table. "Ah, no. That was another project. This is something specifically for a brief we've had to do a cameraphone concept. We weren't really taken with the idea to begin with, a bit too media driven. You know, who says a tiny mobile camera is any good for anything. But we're slowly turning it around. You should go and see Simon, he needs some distracting. Drag him away from Richard's jitters for a while. We're going to have a meeting once the consultant gets here. But he's a little late. Well, he's a day late because the airport's been closed. But he should be on the ferry this morning."

I took the mug of tea (it was covered in a red and black abstract design, reminiscent of Terry Frost), pulled open the heavy door to the curved inner corridor, and walked around to the design studio. Simon was sitting in his mastermind chair, feet-up on the edge of his desk/bench, staring through the studio window with a pair of binoculars, camera and tripod nearby.

The studio space was strangely silent except for some manic clicking from above. I looked up to the wire-strung mezzanine that encircled the upper storey of the stone house, and saw the sandy-white bur of Richard's head nodding up and down with each keystroke. Standing on a step ladder on the other side of a higgledy-piggledy assortment of slabs of desks, computers, armchairs, even an old floor lamp, was Dan, the quiet but persistent systems administrator. He was checking something in the overhead cabling system that hung from the far domed ceiling.



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From the suspended polygons of metal struts hung tendrils of black sinuous tubes of cables that connected to the floor close to people's work areas. I found them quite eerie, glistening black plastic tightened around fingers of cables, weaving downwards, perhaps considering the possibilities of connecting into me. But they avoided much of the mundane, everyday problems of providing power and networking facilities to the circulation of equipment and people. As Simon had said to me, "we like to move, and our kit likes to move too... we don't believe in captivity here!"

Dan finished with his work, clicked the ladder closed and then disappeared into a square hole in the floor – into some kind of cellar or basement. He re-appeared, glanced at me but said nothing and slid behind his wall of flatscreens.

Feeling a little out of place, I sat down on a thread-bare velvet *chaise longue*, its low curves backed against Simon and his chaos of equipment. On a side-table was a small metal and glass Turkish tea set, and I wondered who enjoyed their mint tea from this vantage looking out over the loch towards the mountains of Hoy.

²⁵² Photograph of cabling system at sand14.



As I soaked in the view across the loch Simon spoke from behind, aware of me.

"Not intending to ignore you there, just seal watching," he said.

I turned and smiled a greeting. "How are you?"

He shook his head and gave a theatrical sigh, "This camera project is a problem, I'll admit.

Gillian – that's her morning room you're currently in by the way – she's run off for the day to knit. And Soo-Yin's back home freelancing."

"She's not full-time?"

He laughed. "She's full-time many times over. But you do what you can, when you can. I do occasional stints as a wildlife photographer for the Orcadian. Dan, there, runs an ISP from his desk and teaches computing classes at the college, as well as keeping us ticking over."

²⁵³ Collage of view from location of Sand14 towards mountains of Hoy and window frame from mobile telecoms industry closed industry meeting 2/6/2004.

He sighed, pulled a mug of something very probably cold from beneath a pile of opened books on his desk, leaned his head of matted white spikes back against his chair.

"Can I help?" I offered.

He swung his leather chair round, kicking off from the corner of his desk, looked at me, and then nodded. "Yes, please do."

I returned to stand in front of his desk, and he dumped his mug (contents still cold and undrunk), and began to tear through layers of photocopied papers, bits of circuit board, and tiers of boxed components. I read some of the post-it notes that went flying: *absorbed endless timeless*²⁵⁴; *author's muse suite*²⁵⁵.

He swore, paused, then reached over to an industrial-looking cupboard on hospital-wheels, yanked it open and pulled out what looked suspiciously like a plastic school tray filled with the most peculiar assortment of oddly shaped stones, over-sized tennis balls with nodules and lumps, scratches, blunt prongs; teratomas in stone. One of them was identical to the photograph of the Skara Brae object pinned up as part of a collage on the wall.

Simon began to pick up each one in turn, hefting it in his hand. "I borrowed these models from the Skara Brae education centre. They're just for kids to throw around, really."

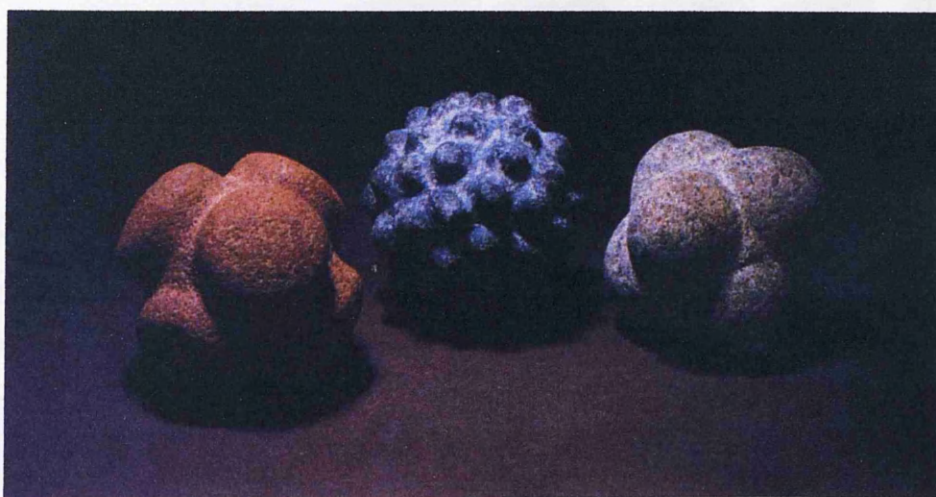
Skara Brae, I remembered, was the prehistoric village a few miles up the road, beyond the Ring of Brodgar.

"What are they?" I asked.

²⁵⁴ Post-it note in Sand14 design studio, discussed during meeting 12/3/2004.

²⁵⁵ Hand written note recorded at meeting in Sand14 concerning cameraphone project 7/5/2004.

"They're models of what are called carved stone objects. These are all Neolithic, found during excavations at the village and all over Scotland. In the inimitable words of one archaeologist 'their use is wholly unknown',²⁵⁶ He tossed a rounded ball high into the air, its thin spirals of scratches etched over its surface tumbling as it rose and fell. "They're rather open to interpretation. They've been called maps, glyphic books, where you smell and hear the patterns, platonic solids, gaming dice. And I quite like the idea that these geometric designs," he paused and traced his finger over the thinly scratched patterns of swirls, "are based on entoptics. You know, the fizz of chevrons and spirals that you get when you screw up your eyes."²⁵⁷



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I picked up an object seemingly of sandstone with six circular ends, it felt contemporary, cubic. What to do with such a shape, I wondered, rolling it from hand to hand, feeling the shape beneath the six nodules, almost a cube. Unbidden Simon and I tossed the stones back and forth for a while, then played with rolling them over the floor. As the sandstone model bumped uneasily back and forth all I could do was pattern match, find topological connections. The object's unfamiliarity snagged at my imagination, and I sought to find something familiar

²⁵⁶ See (Edmonds 1992). For a review of carved stone objects see (Marshall 1983; MacGregor 1999).

²⁵⁷ See (Bradley 1989).

²⁵⁸ Carved Stone Balls from Isle of Lewis and Aberdeenshire. From Clarke, D. V., Cowie, T. G., et al. (1985). *Symbols of Power at the Time of Stonehenge*. Edinburgh, HMSO, p. 59.

that it might be part of. The objects resisted, seemed relentlessly alien. Then I glanced at Simon's binoculars and abruptly picked up the model and held it to my eye, as though it were an eyepiece, a telescope into another universe within the stone, a microscope into silica.

"There's a whole universe in here," I joked to Simon, pretending to peer into the shape.

Simon's spikes swivelled round. "Neat." He stared at the six-sided model, and I passed it over. His next words, murmured, made little sense to me. "In terms of recapturing the youth market... it could be very cool."

Anne wandered in at that point. "I've just heard from our stranded friend. He's on the morning sailing, and will be with us by lunchtime," she announced to the room.

"I told him not to fly," said Simon, shaking his head. He gave a long look at the sky whose billowing gaseous surface seemed to be evaporating. Another world beckoned through the glass, the rippling curved edge of Sand14's shadow appeared momentarily on the loch, and Simon called out to the room. "Anyone for Brodgar?"

Anne and I immediately responded; the notion of being able to down tools for an hour and go for a walk to the Ring of Brodgar was just too enticing. So we left Dan to tend his machines (he gave us a wry, knowing smile as we left).

It felt like a school trip in the foyer, Simon leaning against the inner glass door to keep it open as he hopped into his walking boots, Anne and I trying not to stumble over each other as we pulled on our toughened footwear. Suitably booted (and in my case, gloved) we eagerly stomped out of the Sand14 car park, and headed down the lane towards the Stones of Stenness and the single Watchstone, the mortar joint sealing spit to isthmus. This new world of sunlight and shadow wove the wild grass and water into a rippling tapestry.

Rather than taking the loch-side path as I had done with the Ethnographer we took the direct route down the road, walking on the soft verge, in the sand and soil at the edge of the tarmac. The wind was a buffeting chill, the crowns of cow parsley at our knees tossing to and fro with the white crowns of the waves.

Simon and Anne walked ahead, chatting, and I listened as their words were blown back along the road.

"Storytelling, sharing, re-experiencing," Anne was saying. "Those are the three things that really seem to shine out from talking to people. Everyone's got boxes and bags of photographs, we don't need any more of those. But we need to help people tell all the little wee stories that go along with those photographs. It's nothing to do with the quality of the image. Not really. You can keep your megapixels. It's sharing the stories with your friends, with your niece, with your grandmother."

"[So] how to create an experience for your senses?" asked Simon, to himself it seemed. "It's the qualitative part of what sharing is all about..."

"It's the magic of sharing," explained Anne, then turned back to me with a grin, the collar of her red fleece flapping against her cheek. "It's negotiating social relationships."

Simon had his head down muttering, worried. "What's the magic that will make sharing really work?"

We rose up on the wave of the isthmus towards the barrows on the hill that drew us in towards the Ring of Brodgar, off the road at last, and along a furrow of flattened grass towards the outlying Comet Stone. We were silent now, nothing needed to be said. Then the stone teeth of the circle were on the horizon, bringing our heads up, a suture between hilltop and heavy cloud.

At the line of the stone circle the earth metamorphosed from grass to heather, green to brown separated by a mud ring of footpath. We crossed the line and walked clockwise around the inside of the circle, up the slope, pausing at each jagged tooth. We stopped before the fragments of one fallen stone, its laminated fractures severed on the ground. A small green sign before it read: 'This stone was struck by lightning on 5th June 1980'.

Simon crouched down, touched its mottled lichen, drew his fingers across the deep lines in its bedding planes.

"The stone has remembered the lightening," he said, looking up at Anne and I. "It has remembered falling. That moment is here, for us to read in the shattered fragments, and will be here to read for aeons to come."

Anne seemed to understand, stood chin to chest, gold-rimmed glasses cast downwards at the stone. "And the sign tells the story. And you pass the story on to us."

Simon frowned. "Storytelling, sharing, re-experiencing...?"

Anne smiled widely, green eyes alight and large behind their glass. "That's what we need. A stone that remembers the movement, a movement that tells a story. A memory in stone that can be passed on from generation to generation. Stories and landscapes, like this stone, are not 'out there'. They are 'in' people."²⁵⁹

I glanced back and forth between her and Simon, seeing a tussle of questions and possibilities pass between them unspoken for a moment. Long hours working together condensed into seconds.

²⁵⁹ From (Leach 2006).

Simon then looked at me. "I think I might have an idea," he said, mock mysterious, white spikes tilting back to brush his jacket hood.

"Oh, good," was Anne's heartfelt reply.

Back in the design studio we all huddled into the kitchen to sip hot chocolate and (for me at least) to warm hands by the glowing fire, hanging in its steel stove. The consultant, a wild-haired engineer in a quite extraordinarily hypnotic-patterned jumper, was now ensconced in a wicker chair before a large slice of fruit cake and a mug of tea. George had appeared wearing a worn painter's smock and took charge of the meeting, as Richard made furtive comments leaning back in his customary brass-buttoned upholstered chair by the fire. He introduced me to the engineer, Keith, and we settled in to discuss the problem of the future cameraphone project.

"How do you stitch together an entire experience? That's the thing," said Simon. He was drawing or doodling in a notebook with a black ink pen, speaking without looking up.

"It's the art of enchantment, making something magical," explained Anne, looking around the room, smiling and intent.

Simon smiled to himself behind his sketchpad, but said nothing.

Keith ruffled his already-ruffled hair. "There's an acute memory problem," he said.

Richard was not convinced. "Ah, this is the future, we can't worry about that."

"What can we do to make the memory experience more believable...?" Simon asked.

"Memories don't have to be the truth of anything, they don't have to be believable," Anne reminded him.

The conversation stuttered back and forth across the table, interposed between slices of fruit cake. Anne took to the spiral staircase to find some books from the library upstairs, and spread them out on the table, creating a collage of opened pages:



²⁶⁰ Find ID 096 and Find ID 022: Scans of books used in discussions of future handset at Sand14

The air began to feel a little thick with the endlessly radiating heat from the fire, and my head began to ache. The conversation stuttered back and forth slowing until George called a halt.

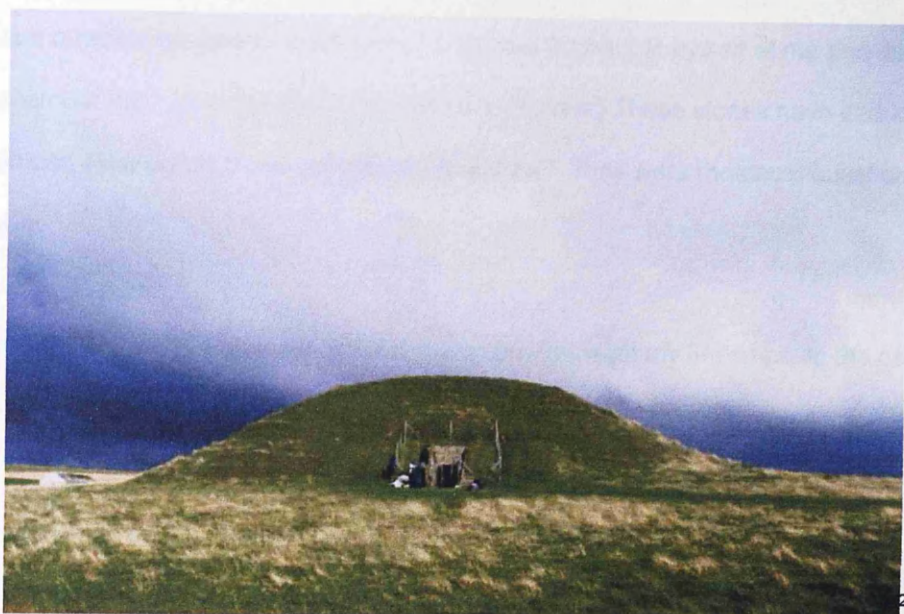
"I think we need to get out, don't you," she said, pointedly, then turned to Keith with formal politeness. "Have you been to Maeshowe? It's a rather spectacular passage grave monument over there." She waved behind her towards the direction of the mound. "It's not far."

Keith shifted forward on his chair, bringing the hypnotic jumper closer (I stared at it). "That sounds good," he said, with evident eagerness.

Although it was only a twenty minute walk it did require dancing precariously along the edge of the main road, and the only trans-Mainland thoroughfare. So we took the Land Rover, Simon and I volunteering to perch on the benches in the back. My view out the front was largely blocked by Richard's tall beanie hat, which rested precariously above his ears. George swung the Land Rover in front of the mill which housed the tickets and tourist guides for the monument in the field across the road, and we all dropped out of the battered green vehicle, design commandoes awaiting our signal to move out. Our unexpected arrival seemed to faze no-one and the staff waved us on over the road (although George lingered to catch up on some news).

Following the lead of the pointed hat and ears we walked in single file along the thin paved right-angled footpath between the fields, on the rise over the loch, disinterested sheep on either side. Our eyes were filled with the writing of islands and stone; Stenness and the Ring of Brodgar below us in the basin, uneven ragged angles clear calligraphic brushstrokes within torn pages of land almost surrounded by water. Richard provided an archaeological commentary as we walked.

And then we were there, at the four thousand-year old mound, a miniature Sand14, and its brick and fence entrance way, a dark tunnel into the earth.



With a theatrical flourish, made rakish by the new angle of his hat, Richard wielded the great iron key of the monument and unlocked the gate.

The tunnel was a dark rectangle, only a few feet high, its stone sides damp. We bent double and shuffled along, feeling wet stone against our hands, against our heads, shuffling, hearing our footsteps and breathing, called on by a lamp at the far end. And then we were out into the cold stone room at the heart of the mound. In the darkness we could see the light of the world outside, reaching down the long narrow shaft in a white-gold beam, reaching inwards but fading in a line that ended far down the passage. At the mid-winter sunset, low sunlight from above the mountains of Hoy would flood this tunnel with light, the only moment of the year when direct light from the outside world could reach the inside of the mound. Now, I felt cut-off from that world, elsewhere.

Richard switched on the lights, and we looked up into the corbelled roof, at the four orthostats marking the corners, and the precise architecture of its layers of stone, without gap or crack. Simon quickly had his notebook out of his satchel, made a few notes, and then showed them to Keith who seemed surprised for a moment, caught up in the experience, but then nodded.

²⁶¹ Photograph of Maeshowe (source: Aaron Watson).

I gave a questioning glance at the two of them, but Simon just looked at me and asked "How to remember this? How to capture this memory in stone? These stones have endured, they remember. How do we make our memories endure?" They were rhetorical questions, he had an idea.

The tightly layered stones were smooth, damp-cool beneath my fingertips. In the centre of the three other walls were large square holes, doorways to small spaces, alcoves within which were hidden electrical outlets and a telephone. Richard pointed out the famous Viking graffiti and scratch art on the walls, the mark of others here before us.

Simon then began to take video footage, camera on his shoulder for a while, peering at us, invading us. Then he moved the camera and placed it on the edge of each alcove, left it running for a time as we looked around us, felt the enlivened acoustics, the echo of our voices and movements, but also the demanding-ness of the monument, it demanded dwelling, time, listening. As Simon worked his cameras the rest of us turned and turned again beneath the stone roof, over the gravel floor. Richard switched off the fluorescent strip-lights, left only three spotlights at the base of each wall to cast gold triangular light upwards around the room, silencing us. We listened, watched a sparrow glide in through the passage way and alight on a corbelled edge, red chin to orange stone. Stared into the square holes of the alcoves, down the glistening stone passage. There seemed little to say, the monument silenced us.

When we returned to the kitchen at Sand14 and a large communal pot of tea to wash away the chill, we were subdued, not drained but inward-looking, thoughtful. Simon had promised us a demo of a concept and, finally, several tea pots of tea later he re-appeared with four video cameras piled into his arms and a much-holed plastic bag full of cables. Keith and he set to work, as Anne and I exchanged amused glances. But our amusement transformed into near breathless waiting when Simon produced the carved stone ball I had been playing with that morning; the pink sandstone shape with six circular nodules, microscope or telescope eyepieces into which I had peered mockingly, as though into a silicon universe.

Keith and Simon, with Anne's help, organised the power cables, four cameras and carved stone ball. They built up the height of the ball with a few books and sheaves of paper so that it was at the same height as the camera lenses, and Anne deftly worked some blu-tack to make sure the stone rested firmly on one of its rounded ends. The cameras were placed orthogonally around the carved stone ball, round lenses to each rounded end, eyepieces along the line of sight as though they were an extension of the ball's own rounded ends. The cameras formed a cross, with the stone ball as the nexus through which they appeared to be directed, pointing into its centre. The carved stone ball had been transformed into a mobile video concept.

Richard and George appeared in the doorway and we hushed as Simon and Keith, hand on each camera, pressed four 'play' buttons in synch. Then they bent to each viewfinder in turn, watching the queued-up video play. They backed away and invited us in to see. Anne came up first, looked carefully, rested her hand lightly on the stone ball as she looked into each of the cameras in turn. She turned to Simon and laughed, pushing her glasses back up her nose.

"There now, that wasn't so hard," she said in merriment.

I was the last to try. Through each of the four cameras I saw a view of the inside of Maeshowe, from the four directions - each of the three alcoves and from the passage; all looking in at the centre of the room and the group of us standing, watching, in awe. It was as if the room had been shrunk into the carved stone ball, and I was looking through each of its four circular nodules into its memory of light and shadow; its nodules had become eyepieces into, not another universe, but a memory, a memory of a place. The ball had become a world caught for a brief moment in the permanence of stone. Placing my hand on the stone model I could imagine the magical object left with the bags of postcards and newspapers in some attic, beneath forgotten floorboards, or treasured on a mantelpiece, and then some movement, a tilt, a shake, a tumble like the stone at Brodgar, I knew not what, that activated this memory a generation, two generations, later. And we would be there, the landscape

would be there, in the stone, a memory, a story to be told; so that stone and story might be passed on.

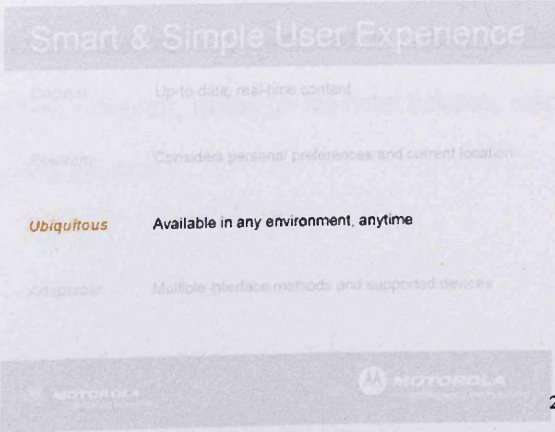
Reconstruction 4

by Ethnographer

I was still in Super-Cannes. Tired, ears and feet aching, I had been listening, not simply with pricked-ears at the conversations of delegates close to my branded patch of carpet, but also around the rest of the conference. What I had been listening for, listening in body, in memory, in recordings of interviews, in written voices, was the futures that the industry foretold. What was at the end of Moore’s Law? What were the plants, peoples, devices, relations, that constituted the utopian future? What were the specificities of the technological *telos* of the industry, or at least the industry as it was here at the GSM World Congress? *Quo vadis?* Where were you going mobile telecoms industry?

I had listened and looked and imagined, and now sat in my hotel room packing, and waiting for the transfer bus to return me to Nice airport and finally through the clouds, back to Blue.

Watching the delegates shuffling around the innards of the Palais des Festivals, I had seen a photocopied PowerPoint chart from one of the conference presentations proclaiming the future of location-based services by *Motorola, intelligence everywhere* (as the logo read):



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²⁶² Extract from PowerPoint presentation given by a Motorola representative at 3GSM 2004.

Standing at the edge of a pavilion tent I was not permitted inside, I heard the announcer of a future technology fashion show, caught a glimpse of a catwalk beneath a gantry of lights, soundsystem, television cameras, and LCD screens. The lilting female voice over an electronic drum-beat promised:

"The value is a global phenomenon... the power of constant online connectivity... A coming world where 6 billion people are on-line... all of the time. Mobile is the key ingredient in a new formula for combining Fashion, Function and Fun...

"Technology has produced a truly mobile workforce that allows wireless connectivity and access to data anywhere... anytime... and anyplace...

"Witness the synthesis of art and science... The next evolution of technology... Infrastructures are now capable of connecting anything... to anyone... the common ground upon which to build for tomorrow... when technology will align with the human desire for connectivity... with functionality... with intimacy... with style."²⁶³

Now in my hotel room the next morning I watched an effusive presenter at CNBC Europe News interview the show's director, sitting on his hotel balcony, marina behind, reactor-light shades darkened against the Sun.

²⁶³ Extracts from 'Cool and Connected' Wearable Technology Fashion Show at 3GSM 2004 transcript.

“The time is right to exploit the networks in place that can connect anyone to anything.”²⁶⁴

As I watched the television and tore at my morning's croissant, the conference newspaper was spread before me. A full-page advert by the GSM Association caught my eye, and I highlighted a few of the words below the graphics:

GSM grew from a vision. A revolutionary vision that mobile phones should keep customers connected anytime, anywhere, even when crossing borders.

Today, millions worldwide expect to call, or be called – anytime, anywhere.

They also send and receive text messages, in billions – anytime, anywhere.

From basic voice to visual communications, the GSM family continues to grow and evolve. GSM customers can now exchange images, audio or video clips; access email or the internet; and download files or data - with ever increasing speed.

And GSM customers expect to do so anytime, anywhere. ²⁶⁵

Anytime, anywhere, anyplace, anyone, anything: these were the qualities of the future that the mobile telecoms industry foresaw. A future on the horizon, possible: infrastructures are now capable of connecting anything... to anyone. Yet not quite enacted: the network has yet to be exploited (as the show director puts it), the revolutionary vision is still evolving (as the GSM Association says). It was as if the gleaming white transfer bus that had brought me from Nice to Cannes in 1998, with its brand-blue slogan proclaiming *anyone anywhere anytime*, had circulated through the town and left its vision imprinted in the gilded mirrors and furled red drapes of the conference. In 2004, six years later, the same rhetoric, the same words, were reflected from surfaces, from newspapers, from speakers, from slide projectors. Perhaps given a background electronic drum-beat, but a future un-altered, reproduced, hardened.

²⁶⁴ Quote from fashion show director in 3GSM 2004. Post-report of 'Cool and Connected' Wearable Technology Fashion Show'.

<http://www.3gsmworldcongress.com/congress/default.asp?url=/congress/pages/postevent.htm&static=> on Accessed 27/04/2004.

²⁶⁵ Extract from page advert by GSM Association in GSM Daily newspaper 25/2/04, my emphasis.

Anyone anywhere anytime had gained traction within the industry (to put it in its own jargon), had become a self-evident and unquestioned future; it had become an industry trope. But as a trope it immediately raised three questions of specificity. Who is *anyone*? Where is *anywhere*? When is *anytime*?

Anyone presumes its corollary, everyone. But there are difficulties with counting people, for empirically whole bodies and singular forms of personhood are particular Euro-American measurements, and by no means held everywhere (see Strathern 1992: 90-116; Gell 1998). The pertinent question is: who gets to be counted by the mobile telecoms industry? Accounting of mobile telecoms 'users' is generally performed through ARPU, Average Revenue Per User (see Figuration 1), only fleeting bodies with a mobile device connected through network infrastructure are visible to the billing system that performs the counting. But my journalist colleague reminded me of another metric. He had attended the balloons and party streamers of an announcement by the GSM Association 'celebrating one billion connected people... worldwide'



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"They just celebrated the billionth mobile phone user," the journalist had reported to me, back in the Wi-Fi café beneath the *Orange everywhere* parasols.

"How do they calculate that?" I asked, pushing.

He seemed taken aback with the obtuseness of my question. "The GSM Association gets figures in, the CDMA Association gets figures in and they tot it all up... So the people I was talking to were starting to engage in the next billion campaign."

"Why is that important?" His words had put me on high ethnographic-alert.

"Everybody in the world will have a mobile phone," he answered simply. "I would say that's an exaggeration, but you look at the penetration, the way it's growing in Eastern Europe, China... China's going berserk."

²⁶⁶ Photograph from IBC 3GSM 2004 publicity material.

Philippines has the highest SMS usage in the world. The penetration rates, you're talking seventy, eighty percent in developed countries.”²⁶⁷

Then this morning TelecomTV, the industry television channel, had conducted a sober interview with the CEO of the GSM Association:

“The GSM industry also passed an important milestone... breaching the one billion subscribers mark...” announced the anchor, then turned to the CEO for comment who said:

“The focus now is how do we get to the next billion. We've had the 2G wave, the 2.5G wave, now we're moving into the 3G wave...”²⁶⁸

The horizon of the future was in motion in these moments. From one billion to the next billion to the next so that, ultimately, the utopian future becomes possible and ‘everybody in the world will have a mobile phone’. But if the billions measured by the industry equalled the billions estimated by population statistics, would that mark utopia at last. I had my doubts.

The billion and next billion were not people but ‘subscribers’ to mobile telephony networks, a metric whose definition seemed elusive but was, I believed, a measure of the number of Subscriber Identity Modules (SIM cards) registered and billed by a network operator; a metric whose correlation with bodies was by no means direct. One person might have several phones with their own SIM cards, or several people might share a handset and SIM card. Anyone, everyone, and *one billion*, contained considerable slippage between artefacts and

²⁶⁷ From interview with industry journalist attendee at 3GSM 2004 (interview conducted in central London).

²⁶⁸ From television interview viewed at TelecomTV.com (2004) 3GSM World Congress 2004, Day 5.

people. The industry's perception, its accounting, its future, was focused not on people but on the mobile device components connected to the infrastructure. Within the *anyone* of its utopia was a politics of connectivity and wealth – those who could afford several handsets would be counted twice, those who shared a handset would only count as part of a person.

There was something else within the utopian dream of *anyone* and everybody in the world acquiring mobile telephony, something more insidious: a scent of righteousness, the rust-blood scent of a moral crusade. My kinaesthesia had been awoken by the TelecomTV report, which had continued with a segment on the GSM Association Awards Dinner the night before. Standing on a red carpeted stage in full dinner jacket, hands gripping the podium-pulpit, the CEO of the GSM Association had made the promise of the future to the industry:



"GSM and 3GSM has the potential to fulfil the basic human need for communication to some four billion people in the world today without any telecommunications. We have the opportunity to become a key driver of economic development in every country in the world."²⁷⁰

²⁶⁹ Photograph of Rob Conway, CEO of GSM Association at 3GSM 2004 Awards Dinner, from IBC 3GSM 2004 publicity material.

²⁷⁰ Extract from keynote speech given by Rob Conway at 3GSM 2004 Awards Dinner, transcribed from TelecomTV programme broadcast online.

The industry was primarily satisfying a *human need* for telecommunications, and the economic result, the profit, was framed as merely a potential effect of this provision.

Human needs. The ethics of mobile telecoms industry utopia seemed to be sliding from profit into charity. The line from 2G to 3G had become a social effect, an insatiable human need for telecommunications; technological determinism had transformed into social determinism. But satisfying *human needs* was a language the audience of marketers and MBA alumni well-understood. That word '*need*' was one of the foundation stones of marketing, the pyramidal block of Maslow's *Hierarchy of Needs*.

'There are at least five sets of goals, which we may call basic needs. These are briefly physiological, safety, love, esteem, and self-actualization. In addition, we are motivated by the desire to achieve or maintain the various conditions upon which these basic satisfactions rest and by certain more intellectual desires... These basic goals are related to each other, being arranged in a hierarchy of prepotency.' (Maslow 1943).

Human goals arranged in a nebulous pyramid whose apex was 'self-actualization' were not framed as transitory or located social effects, but as a universal for human existence. Yet Maslow derived his hierarchy on the basis of limited empirical research, principally an assessment of the relationship between self-esteem and sexual behaviour in college women during 1930s (Cullen and Gotell 2002). One of the many criticisms of the Hierarchy of Needs is its basis in a gendered discourse of naturalised (Maslow framed it as biological) male dominance and female submission; for example 'self actualization' for women required the primacy of the family (*ibid*).

Maslow explains the effect of *need* thus: 'Another peculiar characteristic of the human organism when it is dominated by a certain need is that the whole philosophy of the future tends also to change. For [a] hungry man, Utopia can be defined very simply as a place where there is plenty of food.' (Or as the mobile telecoms industry read it, for a socially

isolated person, Utopia can be defined as a place where there is *anyone anywhere anytime* telecommunications).

When I heard the CEO call from his pulpit for the industry to satisfy naturalised *human needs* I shuddered. Maslow's needs produced (literally) lower levels of human existence where all that could be imagined in the future were food, shelter, warmth. Above these levels were higher, more developed human life, where the future was imagined in terms of lifestyle choices, mobile phone choices. The satisfaction of *human needs* called forth the long and bloody crusade of civilising the uncivilised, the project of technological and economic development. In his speech, as he stood there marked by his location and his bow-tie as a civilised gentlemen, he called for the civilising of four billion people who were without any telecommunications. It was not the provision of mobile telephony that made me chill, but the politics of this provision, the politics of 'development', although its particular effects were outside my experience. When 'everybody in the world will have a mobile phone' then everyone and anyone will be civilised, a level of technological sophistication achieved, another level of technology beyond and upwards. *Anyone* had civilising politics.

The second question of specificity in the utopian future of *anyone anywhere anytime*, was the question of 'where is *anywhere*'. Where is the mobile telecoms industry present? The answer to this seemed to require a map, and the GSM Association had helpfully provided one as part of the conference pack in my blue neoprene bag. I dragged the weighty sack from the floor up to my hotel bed that doubled as a table-top, found the map, and spread it out before me.

people and equipment. Although the map alluded to coverage - it spoke of empirical measurements of area and subscribers - it was merely an illusion of coverage, an illusion of empiricism, a sleight-of-hand to mobilise the optics of scientific truth (Haraway 1991b). Absences permeated the map. And there was a particularly telling absence: the entire continent of Antarctica. The map portrayed itself as a Mercator projection of the world, an empirical two-dimensional 'picture' of the planet. Yet it made absent a continent clearly considered unimportant to the GSM Association. Antarctica was a landmass without a single politics, a region that could not be coloured red, orange or green; a politics that did not fit. This was not a geographic map, in a sense that its aim was not to provide empirical topographic information. Rather it was a political map whose politics was one of propaganda, a play on and with the optics of truth-making so that I would be persuaded of the global coverage of GSM, even if the small print said otherwise.²⁷²

Whenever I stare at maps I always imagine walking within them, and now was no different. Sipping lemon tea, elbows burrowed into the eiderdown, I wondered what it might feel like moving from country to country if the GSM Association's promise of coverage were possible. And then I realised that this imaginary *was* the world that this map was intended to convey. It was an imaginary map of the world, a map of the future, a map of *anyone anywhere anytime*. I was looking at the industry's utopia - that was the propaganda. But this was propaganda on behalf of the GSM standard, and all the other forms of mobile telephony were absent on this map. There was no CDMA, no PCS, no other infrastructures. The globe was utterly enclosed within GSM, as though it alone could bring about the imagined utopia.

Mapping communication utopias has a long history. Armand Mattelart tracks the mapping of a utopian French optical telegraph network in the eighteenth century, as part of a desire to

²⁷² All maps are located and political, in the sense that there is no objective and universal map possible. Propaganda maps are therefore not a category of cartographic distortion versus representation rather an overtly political practice (see Turnbull 1989; Pickles 1992).

revive the Greek *agora*; a classical dream of the telecommunications network as a space for equal exchange between all. He then follows this 'techno-utopia [that] gives birth to unmediated planetarism' through the universalising dreams of the railways, to Norbert Wiener's future 'information society' and Bill Gates' road ahead to a 'frictionless capitalism' (Mattelart 1999). Utopian and perfectly complete telecommunication networks, and their universal mapping, endlessly reproduces what Mattelart regards as Christian communism, the desire to return to a lost communal paradise where communication between all is possible; the desire to return to Babel. The mapping of a utopian telecommunications network, the mapping of *anywhere*, was a mapping of the city of Babel whose tower reached infinitely upwards into the heavens and incurred the wrath of God, who then scattered the people over the earth and gave them different languages (Genesis 11: 1-9).

Martin Hall also follows a long history of communication networks as he sets sail with Martin Frobisher in 1576 on the first colonial project from Euro-America to Africa, and then sets sail with Howard Rheingold in 1993 between exactly the same regions on a second 'virtual colonization' project as he calls it (Hall 1999). So, the *anywhere* of mobile telecoms was deeply embedded in ongoing historical and socio-cultural practices of universalism and colonization.

I rolled over, sighed. Closed my eyes...

... and remembered infrastructure maps. Endless black lines and blue clouds on white PowerPoint charts. PSTN, SMSC, HLR, SGSN the acronyms from a career reading mobile telecoms infrastructure maps were glowing tattoos against my eyelid. The visual language of the industry, a language of clouds...

... I re-opened my eyes, the acronyms shone fluorescent yellow against the bamboo-print wallpaper, floating as they always had done. But were those network clouds still shifting in

miles of underground cables; the VLSI drawings of each silicon component; the millions of lines of code in each switch; the patent negotiations; the legal constraints; the loss of signal. All this was necessarily transformed into a fluffy 2D container, a black box (Latour 1987). As Latour said of the cybernetic black box, no matter the scale of the network within, all that mattered was the input and the output (*ibid.* 3). But for the network cloud, floating in its infrastructure, there was no transmission of data between receiver and destination, no message, no terminal, these were all inside its fluffy-drawn edges. There were only transmissions of signalling between parts of the network, perhaps as far as a basestation but no further. There were only lines of the network signalling protocol radiating outwards like sunbeams on a child's drawing of the sky.

The network cloud unmade moments, places and actors. It removed, almost completely, all the work and labours in which a network was entangled, all the places in which it might be, all the times when it might operate, and all the data and meaning it might distribute. In the network cloud they did not exist, heterogeneity did not exist, all that was left was a technologically pure object in an engineering schemata with no input, only output, mediating nothing. The network had been purified (Latour 1993). This mobile telecoms network-as-cloud was not embedded in any form of socio-materials or politics, was innocent, could not have been designed (except perhaps by divine intervention), and was not limited to any geography but was possibly everywhere and anywhere. The network cloud floated in past, present and utopian future. It therefore represented the past, present and future possibility of online connectivity for anyone. The network cloud, as an effect of its very impenetrability, contained and performed *anywhere* in an engineering schematic, and made it possible.

The network cloud made the enticing words of the Fashion Show catwalk announcer meaningful: Technology... allows wireless connectivity and access to data anywhere... anytime... and anyplace...

Anywhere... anytime. This raised the final question of specificity, when was this *anytime* of the industry's utopia? What temporality was contained within this conflation of past, present and future?

The phone rang, interrupting my internal monologue. The concierge informed me that the transfer bus (an object entirely dedicated to *anyone anywhere anytime*) was on its way. I stuffed my evidence back into the satchel, conducted a final visual interrogation of the room, and departed via the black and pink marblesque hallway.

Downstairs in the vast foyer I met the director of the 'Cool and Connected' Wearable Technology Fashion Show, an industry colleague of mine, and we ensconced ourselves in a sofa to talk, he about the show, me about the temporality it performed.

He began by explaining that he had borrowed the concept from elsewhere.

"So, who organised the first show?" I asked.

"...CTIA [the telecoms exhibition in USA] did. Something that came out of MIT Multimedia Labs... It's defunct now... They started promoting the company with fashion shows all over Europe... but much smaller things... And it was cute and all that sort of thing. Last year they did it on a catwalk, it was part of the exhibition floor [at CTIA]... three or four times a day... So that's how it got started."

There was an origin story in here. The start of time for wearable mobile technology was being measured from a project at the MIT Media Lab, a reference to the well-cited wearable computing or 'WearComp' project conducted at the labs during the 1980s by Steve Mann:

'... a later effort of the mid 1980s when I was to make an attempt at making wearable computing fashionable, and be represented through two modelling agencies. By 1985, I had established a following in certain parts of the fashion industry. However, after various fashion shows and the like, I decided that function was more important than form, and changed my focus from design back to art and science.' (Mann 1997).

Both the director and I were familiar with Mann's WearComp fashion shows, since the design group I had worked for was inspired by MIT Media Labs to create a fashion show of wearable devices under development during the late 1990s, and the director had seen the show and been much enthused. Over a period of twenty years, from MIT Media Labs to 3GSM 2004, wearable mobile devices had been performed as part of a fashion show, and yet this conception of wearable devices remained not past but future. So what was the difference twenty years on from WearComp? I asked the director:

"They [the ICT industries] are either doing computers or mobile phones or PDAs. The thing where we're doing - this is basically coming from the phone end not the computer end. If you go in to the web and Google wearable technology, wearable computers, you will find tonnes and tonnes of stuff. So I went through all of that. What did I find? Was a flurry of the stuff around ninety-seven, ninety-eight, and ninety-nine. And then it just died. It absolutely died... It was all about, the mantra was, wearable computers, wearable computers, wearable computers. It was all these guys with boxes on their belts. Why? You know, why? But most of them weren't connected... What I found was that the real driver is connectivity. So connectivity is the driver, number one."²⁷⁷

²⁷⁷ Extract from interview with Innovation Advisor and director of 3GSM 2004 Wearable Technology Fashion Show (interview conducted in M3/M4 corridor).

He flipped the brass catches on his leather suitcase and pulled out a glossy script of the whole fashion show event, passed it over, then called to a waiter and ordered coffee. I idly turned the pages of the booklet, thoughtful.

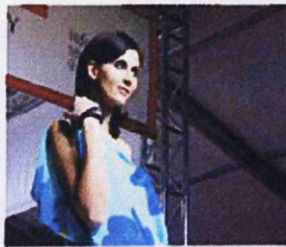
Wearable computers plus connectivity, that seemed to be the difference. Wearable computers, wearable computers, wearable computers had been a recursive cycle, a feedback loop in which the output had fed into the input, until wearable computing had worn out through its own recursive re-telling. But recursion, as with Deleuze's rehearsal, always contained the possibility for difference, for any system is located in socio-material relations and therefore permeable over time; the perfectly closed system, like the perpetual motion machine, was only a mathematical ideal. So over time wearable computing had become wearable computing plus mobile infrastructure. But the origin story remained. The fashion show was measured in years post-WearComp. So the Ur-artefact for wearable devices was an imagined original WearComp pack (a guy wearing boxes on his belt) created by Steve Mann, and from this original device the 3GSM 2004 fashion show artefacts cited their descent. This origin story, this out-of-MIT story, established a particular pedigree for the fashion show devices. They were the descendents, adaptations from the original WearComp device: improved, faster, smaller, more efficient, with added connectivity. More importantly, they were separated as a species from any other wearable technologies²⁷⁸ – separated from more familiar portable technologies, the common wristwatch and the common hand axe, whose lineage spanned almost half a million years of hominid technological development and practice (Cunliffe 1998: Table 2). Mesolithic stone blades from twelve-thousand years ago are 'a technology suited to a mobile way of life' (Thomas 1991: 21) – words that the siren-voiced fashion show announcer might have sung to the entranced crowds before the catwalk. The out-of-MIT story severed the fashion show future from this vast history and prehistory of

²⁷⁸ In referring to technologies as species I am drawing on Donna Haraway's work on companion species where she explores cross-species sociality, which includes the technical and organic (Haraway 2003)

wearable and portable technologies. The fashion show artefacts were nothing so mongrel and prosaic as a wristwatch with a mobile phone built in, they were a different species to the common wristwatch, they were wearable computers with mobile connectivity. They were 'wristphones' and 'phone watches' and 'wireless watches' as I read in the glossy brochure:

Run 4

awareable by **Seiko: the world's first wireless watch...** see who's calling... read incoming messages...and customize ringtones. Shown with the LiteOn PMG which stays in the background always ready to energize all of your companion devices. To charge the batteries... just drop them onto the Splash Pad charger... the batteries all your accessories are topped up wirelessly.



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Run 28

Thinking Materials Phone Watch: this wearable communicator keeps you in touch and on time. A full function phone with Bluetooth connectivity to a headset and other accessories.



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²⁷⁹ From 3GSM 2004 Wearable Technology Fashion Show transcript, my emphasis.

²⁸⁰ From 3GSM 2004 Wearable Technology Fashion Show transcript, my emphasis.

Run 29

What do you expect your phone to be? Mobile game players have given this wrist phone the 'thumbs up'. The Manta from Teleca also sports special software for browsing and messaging.



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As I flicked through the pages of the brochure I experienced a dizzying sense of déjà vu re-living endlessly receeding wristphones... at CeBIT 1998 I remembered the world's first wristphone resting in its glass case surrounded by press and photographers:

BEST GADGET: Swatch Talk



With a nod to Dick Tracy, Swatch Telecom has put a cordless phone in a wristwatch. Gotta have it.

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And then, again... I remembered Philips had announced a wrist personal communicator in 1999, and again... NTT's wristwatch telephone appeared in 2000, and again... Samsung's wrist device in 2000, and again... Motorola had their world's first GSM wristphone in 2001:

²⁸¹ From 3GSM 2004 Wearable Technology Fashion Show transcript, my emphasis.

²⁸² From Time magazine Digital Daily article "The best of CeBIT" report on CeBIT 1998 by Janice Castro (http://www.time.com/time/reports/cebit/best_of_show.html), my emphasis.



Figure 4.7 Wristwatch Telephone

Source: NTT

283 **Wearable Communicators**

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Motorola GSM (late 2001)



Samsung CDMA (late 2000)

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Déjà vu. Time repeated, looping back on itself. Each product announcement seemed to override the former. Always the future, never the past. The wristphone seemed to be caught in a temporal loop, some twist in the story of time so that as with a Mobius strip, it always returned to the same place, the same prototype. The concept was almost annually re-invented so that, by 2004, Seiko were still able to announce the world's first wristphone six years after Swatch, and the fashion show was able to present these wrist-based artefacts as part of the future not the past. How was this possible? How was an innovation repeated and repeated and repeated, without ever becoming history?

²⁸³ From Electronics Design Technology News Network article "Designers get a handle on wrist Communicator" by Peter Clarke 10/27/99. Note: Philips were a manufacturer of mobile handsets.

²⁸⁴ From Harte, L. et al, (2000) The Comprehensive Guide to Wireless Technologies. APDG Publishing, Fuquay-Varina NC, p. 24.

²⁸⁵ From presentation on 'Ubiquitous Wireless Examples' by Ramesh Harjani, Analog Design Group, University of Minnesota.

If wearable technology was out-of-MIT then those artefacts that followed this genealogy were establishing a story of technical hereditary, and therefore a story of time. The director had been telling me a story of technological innovation from an MIT past into the future; he had been telling me how time is measured and experienced. Telling time through technology necessarily requires technology to change, to adapt, to innovate for time to move forward. If technology does not alter, does not innovate as perceived by those who measure time, then the future will be the same as the present and time will not move forward. This was Michel Serres' prophetic terror 'tomorrow does not exist... we are close to history's end' for tomorrow requires a path of difference to follow (Serres 1989: 12). The director had been telling me that technological innovation was the beat that marked out the path of time in mobile telecoms: technology innovates, time passes. This time was what was measured on the axes of *Moore's Law*: exponential increase in technological innovation - as quantified in bandwidth, in battery life, in applications, in number of colours, in pixel density - equals an increase in time. Without change, without innovation, industry time could not pass it could only recur, there could be no history and the future would be endlessly the same. The wristphone was a concept that seemed to move in this recursive time, never innovating, only looping, feeding back on itself to produce a GSM-variant, a CDMA-variant, a text-messaging-variant, but never becoming a product, never reaching the end of its product life cycle, and never becoming history. *Anytime* was a very particular time, it was time as measured by technical innovation. Without innovation time became recursive.

In the six years between CeBIT 1998 and 3GSM 2004 there had been almost no translation of the wristphone prototypes into a mass-produced product but despite this stasis there had been no change to the concept. There had been no negotiation between socio-material actors of mass production and those of prototyping and small-scale production, so that the wristphone remained always partly imaginary. All I could hear in my ears as I stared at the wristphone models were the cries of Professor Norbert, Bruno Latour's detective character, over the death of an advanced passenger transport system that also had been redone and

redone as a prototype without ever hardening into a product: 'Aramis has been exactly the same for seventeen years. The basic concept hasn't undergone any transformation, any negotiation... Nothing changed it,' Norbert had cried (Latour 1996: 281-282). But although Aramis as a project had died, Aramis as a concept for personal rapid-transit lived on with new names and new prototypes, the biography of the concept went far beyond the project.²⁸⁶ Similarly, although Swatch Talk had died the same concept lived on. It was the lack of transformation of the concept that was what held time still. The concept was never transformed, never innovated, never developed, never existed on the line of innovation versus time. The 'wristphone' was therefore always outside of time, or rather, it was beyond the exponential curve, in the asymptotic, possible yet never quite present. Always future never past.

The 'wristphone' seemed to be a series of artefacts that evoked the utopian *anytime*. They were part of the heterotopia of Super-Cannes, small spaces, material artefacts, that played with utopian social and technical orderings (as I considered previously). They were prototypes that created space for playing at different, and utopian, social and technical relations.

I felt I now understood the specificities of this *anyone anywhere anytime* utopian future of the industry, its civilizing politics, its universal mapping of a Babel communal city, its measurement of time through *Moore's Law* innovation. But there seemed far more to say concerning the fashion show itself, as a site in which this *anyone anywhere anytime* future was manifest.

Coffee arrived on a silver tray, dark and burnt. So, as we sat, I prompted the director with more questions.

²⁸⁶ For example see discussions of the ULTra PRT system for Heathrow Airport (<http://advancedtransit.org>).

"What I put together was totally scenario based," he explained. "A run was a scenario. You can't take it too far, because models aren't actors. But a person who is dressed as if they were doing a certain thing... The voice-over had to very concisely describe the situation. It was difficult... twenty or forty seconds that they are going to be out there, you don't have time for that... What I wanted to have was something that said this is what the person's doing right now, this is what they are able to do and, surprise, surprise, they are also able to do this, and this is the reason... This is a journalist... she can interview people with a videophone, she can type out her thing on a virtual keyboard, and then that came out of a pocket, and we had another thing to store the thing on..."

"What was the main intent for the fashion show technology? Was it for future concepts or was it contemporary products?" I asked, pushing to get a sense of the temporality.

"No, it was available, or near available, with some conceptual stuff. That was what it said... In the end I was short of conceptual stuff. But we fixed it [with the jewellery]"

"You invented three products on the Sunday before, from shop-bought jewellery, right?"

He nodded, laughing.

Then continued. "... [Mobile connectivity] is becoming relatively ubiquitous, it's becoming quite easy with a phone to add a bookmark... and all of a sudden... it does something you didn't expect it to."

"When you say relatively ubiquitous, what's ubiquitous?" I asked, alert.

“Everywhere you go in the universe. And everywhere you go it works the same way.”²⁸⁷

But I had to cut the conversation then as the transfer coach pulled in below the awnings of the hotel front, and I had to leave.

As I departed the transient, annually renewed Super-Cannes, I closed my eyes against the glass-darkened sky of the coach, and considered the director’s words.

The catwalk models were miming a scenario. It was a mimed performance of a ‘journalist’, ‘busy Mum’, ‘football coach’, ‘mobile game player’. There were no mobile phone calls, no exchanges of information, not even the pretence of interaction with any of the devices, no pretending to push a sequence of keys. What was being shown on the catwalk was not simply a device or artefact in the hand of a model, but a scenario, a mime of how life could be in the future. The devices were incorporated, during their twenty or forty seconds on stage, into a social and technical ordering of the future. The wearable technologies of the fashion show were making futures, momentarily, through a heterogeneous performance similar to my own performance of the touch-screen demo. This was magic.

²⁸⁷ Extract from interview with Innovation Advisor and director of 3GSM 2004 Wearable Technology Fashion Show (interview conducted in M3/M4 corridor).



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The catwalk was dazzling, with its raised stage, LCD screen backdrop, spotlights, FashionTV cameras, electronic drum-beat music, voice-over, sexually-provocative clothes, made-up models. The dazzle of the catwalk made the scenarios convincing, magical, indistinguishable from advanced technology, even if some of the future devices were jewellery purchased the day before. The catwalk was separated, isolated from the rest of the conference and within that separated space there were at least four crucial actors constituting the future scenario: the performer, the patter, the artefact, and the stage.

The performer, in this case the fashion model, provided the promise of a socio-technical relation, an embodied promise of the future. The patter, the voice-over, provided the story, weaving what were incoherent and transient relations into an apparently whole and stable object. The artefact, no matter its technical functionality, provided the imaginative surface, the nexus through which future possibility was made materially present. And the stage was the magical domain whose effect was to cast a spell, to dazzle and enchant all those who watched.

²⁸⁸ IBC publicity photograph of 3GSM 2004 Wearable Technology Fashion Show.

The jewellery, which marked the finale for the fashion show, fascinated me. They were the most conceptual devices, according to the director. The most imaginary and the most magical, I would say. Gell suggests that technology is enchanting as an effect of its technical artistry: 'the enchantment of technology is the power that technical processes have of casting a spell over us so that we see the real world in enchanted form' (Gell 1999: 163). But Gell proposes that this is not simply some rational assessment by the audience of technical skill, but rather the impossibility of knowing, an effect of uncertainty. The more uncertain we are concerning a technical activity, the more magical it becomes. Gell almost gestures towards situated knowledge (Haraway 1991b) in his work, suggesting that this uncertainty is not opposed to knowledge, but intrinsic to knowledge-making in particular practices. Magical technologies, those whose technical artistry is most uncertain, most open to possibility, are therefore the most generative. Magic is not a lack of technical meaning, it is generative of meaning. The jewellery and their associated voice-overs, modelling, and staging generated enormous possibilities as concepts because of their sheer lack of technical implementation; everything was left to the imagination... except the possibility of their presence in the future. But the politics of this generative practice is not innocent, as Brian Bloomfield and Theo Vurdubakis suggest in their analysis of a demo centre. They note that the audience was invited both to imagine the future and to view their present state as one of ignorance and impotence, and a carefully staged demo configured the solution to this ignorance as the future offered by the host organisation (Bloomfield and Vurdubakis 2002).

The utopian future of the industry was being made through the generation of technical uncertainty on the catwalk, uncertainty that was made to dazzle and magically cohere as stable and possible futures. The industry audience was enchanted by the possible 'near-available' utopia of *anyone anywhere anytime* telecommunications. In the words of the voice-over that descended over the crowd as the show began:

"The time is right...3GSM World Congress is the place...Developments in device and networking space combined with imagination and ingenuity

have taken us to a new realm of portability... The value is a global phenomenon...the power of constant online connectivity....A coming world where 6 billion people are on-line...all of the time.”²⁸⁹

Light and shadows danced over my retina as the coach slew from bend to bend along the maritime coast, then were gone as the window became enveloped by the concrete of the airport terminal. It was the same concrete shapes as almost every other airport I had travelled between. I could be in almost any international transport hub.

As I sat in the terminal building waiting for my flight I sorted through my satchel. It seemed much of it was advertising for other industry conferences, flyers and brochures that had been stuffed inside conference packs, newspapers and magazines for GSM World Congress. But the list of locations in which industry conferences were held was astonishingly short, it seemed to read like a list of international transport hubs:

London, UK; London, UK; Cape Town, South Africa; London, UK; London, UK; London, UK; Amsterdam, The Netherlands; London, UK; Rio de Janeiro, Brazil; Dubai, UAE; Amsterdam, The Netherlands; Prague, Czech Republic; Amsterdam, The Netherlands; London, UK; Vienna, Austria; Prague, Czech Republic; Paris, France; London, UK; London, UK; Prague, Czech Republic; Madrid, Spain; Barcelona, Spain; Budapest, Hungary; London, UK.²⁹⁰

Just under half of the conferences were held in London, but the rest of the UK never appeared. The global village of the mobile telecoms industry was a parochial place, a small network of parts of cities in which communication networks were deeply entrenched; Super-Cannes was a town made, specially, to be part of this telecommunications experience. Within this parochial networked city the universalising, communal experience of *anywhere* could be

²⁸⁹ From 3GSM 2004 'Cool and Connected' Wearable Technology Fashion Show transcript.

²⁹⁰ Collated from brochures for 24 separate mobile telecoms conferences held between 2004-2006.

an everyday experience. Within the very particular places of the mobile telecoms industry, the M3/M4 triangle, London, Super-Cannes, Barcelona, Prague, Amsterdam, the industry existed inside carefully connected heterotopia of *anyone anywhere anytime*. These connected places formed an experience of the city of Babel, the city of communal paradise, the city of ever-present 'always-on' telecommunications; a colonial, universal, communal and continual city of the future. Outside of this small city, in Cannes, in Cornwall, in Orkney, the partiality and specificities of the mobile telecoms network manifest; 3G and GSM were not everywhere in these places. But for the mobile telecoms industry these were sites to colonise, to connect into the city, to turn from orange to red on the map. As they had done, temporarily, with Super-Cannes.

As the fashion show director had said to me, mobile telecoms was ubiquitous "everywhere you go in the universe. And everywhere you go it works the same way."

But this universe of ubiquitous mobile telecoms was particularly located. This city of Babel was a heterotopia, a place in which the future was experienced (with considerable backstage labour), and at its centre was a tower, a line reaching upwards towards infinity. The exponential tower of Moore's Law.

I had seen this tower being built on PowerPoint slides in the conference proceedings, built ever-upwards with more services, more revenue, more bandwidth:



The topology of the mobile telecoms industry's utopia, the shape of the city did not follow other utopian shapes in sciences studies. Helga Nowotny draws on Ernst Bloch's distinction between 'authentic' and 'inauthentic' futures to draw a distinction between futures that transcend the existing order, and futures that are daydreams of the present order; she argues that science points to both forms of utopia (Nowotny 1984). Following Luhmann, Bloomfield and Vurdubakis suggest that the shapes of these utopias are an either/or: either an open horizon of uncertain and novel futures, or a closed horizon of controlled and predictable futures (Bloomfield and Vurdubakis 2002). However, following Kevin Hetherington's heterotopia (Hetherington 1997), the mobile telecoms industry's utopia was an ever-receding horizon, an ever-growing tower reaching to infinity; an asymptotic shape that was both possible *and* uncertain.

I had an answer to my question: *quo vadis*, where are you going mobile telecoms industry. The answer was upwards and outwards, increasing the line of Moore's Law and connecting *anyone anywhere anytime* to the city of mobile telecommunications (not always successfully, the wristphone was an example of the recursive looping of technologies that resisted this heterotopia). The mobile telecoms industry's future was a ubiquity of telecommunications. But this ubiquity, for all its implacable universalism and colonialism, was still a future in motion. It was constantly being done, in fashion shows, in temporary 3G networks, in booth demos. And so there was always the possibility that it could be done otherwise. Within the magic of future technology, within the possibilities that technical uncertainty generated, there was always a moment for imaginative difference.

²⁹¹ From slide presentation given by O₂ representative at 3GSM 2004.

²⁹² From slide presentation given by Motorola representative at 3GSM 2004.

The sky thickened as the aircraft took off, nose upwards towards the mountains. I watched the clouds through the fuselage portal, watched the condensation gather, beads of moisture that turned the patterns of cloud into depthless grey.

It was raining. The beads of moisture began to run down the panes of glass. And I was again standing in the atrium at Blue, my back to the perspex box of the white campus model, face to the window. Now I knew that I stood within the heterotopia of the industry, within the city of Babel itself. Beyond the fence was outside the city, outside the protective dome of tinted glass; only the sky and clouds, suffused with their travelling bodies and data, were safe and connected. But perhaps today, in the design studio at Blue, this city of the future would be done differently, ubiquity imagined differently.

I could but hope.

Reconstruction 5

by Future Archaeologist

The moments of stark blue skies during last week had congealed into thickly hanging baskets of rain. The underside of these rain, mist and mizzle carryalls brushed our shoulders as Gillian and I walked up the sheeptrails of Wideford Hill. Gillian's fierce pale face, and her endless supplies of thickly woven mittens, had become a familiar friend. And we had taken to wandering and talking every other day, even if it was just across the road to Stenness. It was through Gillian that I heard a history of Sand14, how Richard had been convinced that the landscapes of Orkney could achieve what he felt he had failed at running a business near London. How George's industrial paintings and sculptures had become involved, although less so now.

We walked up a wide road in the heather to the summit of the hill, dominated by a vast mobile phone antenna, dull steel scaffold at one with the clouds hanging low, brushing at its crenulations. This was one of the highest points on Mainland and looked out over a wide vista of fields, moors and waters; we looked back, and the mobile phone handsets on the island looked back, I knew, with their stuttering regularity.



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"We designed a co-operatively owned one of these," said Gillian, looking up with faint disapproval at the corporate steel behemoth above our heads.

²⁹³ Photographs of Wideford Hill basestation and vista.

"Really?"

"Yes, a couple of years ago for one of those big European-funded projects in renewable energy." She clapped her move-mittened hands together, seal-like, stretching her arms. "Och, it was great. We even got some award."

The collection of basestation huts and barbed wire, some mimicking barrows beneath earthen mounds, drifted from our attention and Gillian began to lead me down the hill in a different direction. Rain settled in my hair briefly, and then lifted, too languid to fall.

"It was a combined mobile phone antenna and wind turbine, one powered by the other. Well, we did the 'social design' as Richard pitched it. Anne did, gosh, months of ethnography on Birsay. They have a co-operatively owned wind turbine there and sell their excess power back to the national grid. Well, naturally, we worked with them to construct a co-operatively owned and maintained wind powered antenna, as part of a franchise system from the mobile operator.²⁹⁴ Sorted out all the bureaucracy with Ofcom, created this fabulous little pack of all the relationships that needed to be taken care of, both with maintenance companies and inside the co-op. That was my part. I did all the pack design, gave it a little box, fold outs, tried to cut out the worst of the printer inks. It was great."

"Wow!" I was genuinely impressed, it seemed like such a great idea, in principal at least.

"The proposal offered the advantage of combining the provision of two utilities, electrical and telephony. And it provided a community with the ownership of something like that tower up there, which has a pretty substantial impact on their local environment and landscape. You

²⁹⁴ Note: wind-powered mobile phone antennae have been developed by Motorola, trialled in Swindon and deployed in Namibia. See BBC News 'Mobile Networks Powered by Wind' <http://news.bbc.co.uk/2/hi/technology/6353741.stm> (Accessed 1/3/2007)

know, the mobile industry has had terrible trouble in some places installing antennas. We hoped that this would help everyone.”

She glanced at me, rain drops a net over her fist of orange hair “Although none of the operators have taken it up yet.”

She turned back pointed down the hill. “Don’t think you’ve been here,” she said.

I followed the line of her mitten to an area of grass, but could not make out any structure, no banks, ditches, wondered if it was some subtle mark in the heather, barely discernable.

I almost walked on top of it. Gillian pulled back a large iron green lid buried into the surface of the hill. Inside the black opening was a small notice politely offering us a torch on a hook, and a suggestion that we take care on the damp metal ladder within. We climbed downwards out of the rain. Inside the hill was a passage grave, stone rooms with tall corbelled roofs, and floors of sandstone mud - pools of copper water connected by tiny openings in the wall that we could only squeeze through. Gillian loved rock, aside from her embroidery and knitting business (which she ran in addition to working at Sand14), she was a magpie for interesting little pieces of stone and rock. On long evenings at her home we had sat on cushions amongst her tiers of rocks, and she had relayed stories of all of them. Now she was idly feeling along the joins in the rock walls, eyes half closed, touching rather than seeing.

“I’ve tried to get Simon to use his force-feedback stuff on the cameraphone project,” she said unexpectedly, in the way of someone connecting and reconnecting thoughts.

“It seems a shame that it’s such a struggle, that project,” I said.

“Oh, I know. I think what Simon did needs a name. Anne was so adamant that this was about storytelling. And in all good stories naming things gives them life, gives them power and a shape.” She opened her eyes, smiled slightly apologetic. “When you’re sewing or knitting you

have to know what you're making right out the outset. It's just impossible, you can't make it up as you go."

"You need a pattern," I volunteered.

"Yes, that's right," she agreed. "Even if you embellish or change it out of all recognition."

We returned to Sand14 later that morning feeling expanded, that re-orientation of the shoulder blades lower, wider; the concentrated squint of forehead and eyepits gone for a while.

Everyone was in and the studio buzzed with conversation and quiet music. Gillian decided to work on her *chaise longue* for a while, and Dan helped her quickly rig up the power and network connections she needed from the overhead gantry. George had been the source of this office design. The idea was that anyone could set up their desk anywhere they liked, with whatever furniture they liked, although some negotiation with one's colleagues was always necessary. George had been adamant that this was not hot-desking, which she waved away as some 'awful nineteen eighties down-sizing utopia... just dreadful. It never works. People need to choose and own their own space, not be foisted with one. I certainly do...' Although I had noticed that the egalitarianism was occasionally out-weighted by George's own aesthetic judgement, since she had purchased much of the original furniture from Ikea and her opinion of Simon's old filing cupboard by the window was legend (she was the one who had provided it with hospital wheels).

Lunch was early, a home-made soup and crusty bread from George as something of a celebratory experience; she was one of those people who was unfazed by feeding double-figures at short notice. It was only a few times a month that everyone was in and could squeeze in around the kitchen table together. Gillian playfully erected a little decorative tableaux in the centre from one of the plastic models of the carved stone ball that Simon had been working with, surrounding it with a gravel of stones and a couple of candles.



As Simon loaded china and cutlery into the dishwasher with his usual hyperactive verve, the conversation returned to the question of the cameraphone project.

"I think we should go back to the attic," suggested George, her face wrinkled in thought. She tugged at the red scarf around her neck. "We've talked about nostalgia, about things lasting for generations. Creating something that both your grandchildren and grandparents can enjoy. So, what happens in the attic? You just chuck stuff up there. I know I do. Attics are where you store your memories, all those old family photograph albums."

Gillian laughed. "I think my attic has spread downwards into my house!" She paused, hand on sharp chin for a moment, then added, "You know, I don't just chuck stuff up there, I do make some effort to pack it. Put it into a box."

"I label all my boxes," said Dan, eyes wide over sips of tea.

"You're just too well organised," Gillian jibed.

²⁹⁵ Find ID 043: Collection of small stones, gravel, on display on a shelf at the entrance of Sand14.

"I keep my postcards on the fridge," noted Anne. "After a few weeks I throw them out. Well, I think I have a couple hiding somewhere in a drawer. But, from everyone I talked to, almost no one keeps all their postcards. Whereas they do keep all their photos, except that now, with digital photos people are starting to delete them again." She leaned over for the teapot, offered more tea and then filled her own mug.

"I keep them as souvenirs," said Gillian. "I suppose it's like paperweights."

"So you're saying we need to create a pointless make-weight, that maybe has a pretty picture in it, and can happily collect dust on the mantelpiece," said Simon, pulling up his chair again to the table, sketch pad, notes and pens resurging from their former place on the floor.

"Ah..." Anne put down her mug. "Snowglobes!" Her merry face broke into a twinkling smile. I was not sure if she was serious or not.

Simon was with her, energetic. "Now you're talking, Anne. It's 3D postcard," he glanced conspiratorially at Dan, perhaps concerning the three-dimensionality. "You pick it up and shake it every now and again, or whatever, to view it. Perhaps it's kinetically powered."

From her high-backed chair, George looked at everyone over the dark rim of her glasses, mock-stern. "You know, I can honestly say I have never, and will never, own a snowglobe. They are absolutely ghastly tat. I can't imagine us ever creating anything so naff!" She peered at Anne from the steely business end of the kitchen. "Are you serious?"

"Och, not really. But it does translate well. All objects carry a story, of course, which you don't need to have written down, may have nothing to do with its history. You don't re-experience anything, you re-tell the story of it to someone, and quite what that has to do with what happened.. Well, you tell the story the way you want, don't you?" She gathered her cardigan around her large figure, and sat back in her chair.

"Kitsch or art, they all have their adherents," Soo-Yin reminded the room in her quiet voice, looking around intently. "What about Venetian glass paperweights?"

"Absolutely," agreed George. "Thank you. I think I can handle Venetian glass."

"People are magpies. They want shiny-ness,²⁹⁶" added Gillian, raising her eyebrows at me.

"[It's got to] look more like a Mont Blanc fountain pen... where as [other camera devices] look more hi-tech."²⁹⁷ Anne was always pushing away from the industry's technology, pushing to other artefacts.

"We need to make something that everyone can have in their hands. We need something that the industry can play with, as much as the rest of us," said Simon, being pragmatic.

"A mobile-enabled snowglobe," murmured Dan, smirking.

"At least we're not starting with the technology," said Simon, doodling schematics on his sheet of paper. "And even Babbage managed to prototype the computer without starting with the idea for the transistor." He glanced at Dan, the programmer, who carried on blandly sipping his tea.

Gillian picked up the sandstone model, holding up one of its six sides to eye. "So how do you get the image in there, then? How do you take the picture?" she asked.

²⁹⁶ Extract from fieldnotes taken at meeting at Sand14, 18/3/2004.

²⁹⁷ Extract from fieldnotes taken at meeting at Sand14, 18/3/2004.

"Cameras are as small as dice," explained Simon, sketching broadly as he spoke. "You just put one in to the end, press a button, and hey presto, the picture appears in your snowglobe."

"We need something other than a snowglobe. Anything has got be better than a snowglobe, for God's sake." George was adamant.

"We need a name." Gillian looked around her .

Anne agreed, and offered to make a space on the studio wall for everyone's ideas. "Does anyone have any ideas now?" she asked.

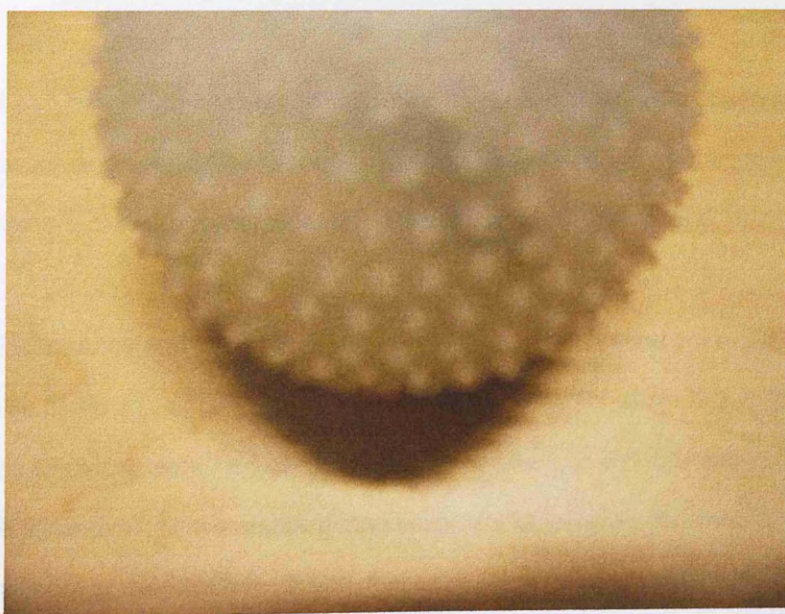
There was a long period of silence, everyone looking around, seeing if someone else had an answer.

Simon pushed away from the table, leaned back. "We have some time before delivery," he said, and as if this provided an escape from the topic the conversation moved on to other things.

Later, on one of the walls of the studio, on a vast white-painted pin board, a page with a photograph of Simon's make-shift camera and stone demo appeared. And below slowly gathered a list of possible names for the artefact, with people adding a vote and their comments, as well as other suggestions. The list ran to obvious variations on 'globe', 'core', 'ball', 'world', and less obvious local references such as the 'comet-stone' (an outlying standing stone at the Ring of Brodgar). By the end of a week of pencil scribbling the top-two scoring favourites were the 'i-Ball'; which seemed to provide much hilarity, although sober reflection in George's inimitable style and calligraphy read, 'too Apple'. And the second favourite was the 'camerastone', for its obvious resonance with 'cameraphone' and as, possibly Simon, had written 'it does what it says'.

The next time the group got together, the name seemed to have had effect. There was a pattern of activity. Soo-Yin, as a resident industrial designer, had begun a series of sketches, based on one particular carved stone ball, pictured in various locations, from various positions in the hands, to collecting dust in the attic, sitting on a mantelpiece, and even being held up by a walker on the top of a mountain at sunset; "that's the product glory shot," she explained.

On pride of place on her thin glass desk were two balls. One was the almost spherical globe covered in spirals of scratches, which Simon had first picked up. The other was a ball of plastic with nodules, reminiscent of the model of a prickly blue granite carved stone ball I had seen in the box from the education centre:

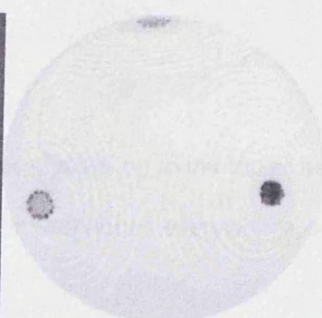


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"It was quite difficult, " Soo-Yin was saying, talking of her preliminary 3D CAD model. "The model I was originally using was a ball with four sides. And it felt very strange. It was quite trans-dimensional. I expected it to have six sides, like a cube, like the original model that you played with."

²⁹⁸ Photograph of plastic ball found on desk at Sand14.

She showed me the original photographs and the first CAD model with the dark holes for cameras and eyepieces.



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I noticed that on her glass desk surface she had a large piece of pumice... propping up a memory stick.³⁰⁰ It's from an old volcano in Malaysia, she explained.

Gillian had also been busy working on various pouches for the device in padded felt, neoprene, wool, and even some kind of Goretex equivalent. They varied from what looked like spherical camera cases to elaborate evening purses with a metal clasp.

Between Gillian, Anne and Simon they had also begun to explore the point-of-sale and everyday use of the object, taking pictures of the sales racks for computing, mobile phone, and hi-fi and electrical items, and overlaying images of the ball. Anne, in particular, was worried that it just didn't fit in a mobile phone shop. "It's decorative, it's ornamental. It should be in a glass case in the jewellery section, more like a watch than a mobile. Even swatch watches are displayed in a glass case," she commented.

George was unconvinced by the whole concept, however. "You can't see what's inside, though," she worried. "It's going to have to be pretty gorgeous by itself..."

²⁹⁹ Carved stone ball from Hillhead, St Ola, Orkney. Image from Devine, Jim. Carved Stone Ball, Online Exhibition. The Hunterian Museum, Glasgow.

http://www.hunterian.gla.ac.uk/museum/online_exhibitions/stones/stills/stills.html Accessed 15/01/2005

³⁰⁰ From fieldnotes taken at Sand14 during June 2004.

"Ahh, but it's a private space. It's an intimate space, which only you, or those close to you, through one of the windows has access." Simon was clearly enamoured with the whole concept.

George was immediately critical, pushing up her glasses on to the top of her head. "I'm not sure I like that. It's bad enough with all these cameraphones everywhere, secretly filming..."

Anne quickly interjected. "But this is designed to be conspicuous, it's not masquerading as anything else. In that respect, it's much more like a camera, a distinctive object, rather than a camera in the shape of a mobile."

George was clearly still needing some persuasion. "How does it broadcast? I hate being all industrial, I just hate it. But that's what we've got to convince. We have to come up with a mass-market broadcast device. Anne, I think that's your area..." She turned to stare hard at Anne.

"N'bother," Anne was unconcerned, waving away George's stare. "We've got a wee demo started" Then continued. "The industry want something that's seamless and straightforward, so we're keeping well away from the radio..."

Simon swept in, "Yeah, we're radio-agnostic", George gave him a levelling look, she rarely let marketing-jargon pass, and he amended, being more specific, "Well, we're assuming that anyone who wants one of these already has either a computer with USB, or a mobile with Bluetooth. The first enables only internet broadcast, admittedly, but the latter is all about mobile broadcast, even on GSM. It's a card-carrying Fixed-Mobile Convergence device." He ended with a cocky grin.

George considered for a moment, then nodded. "Okay, I think that almost makes it mass-market, but there's two questions. One, my aging mother. What about her? She is the biggest

collector of family souvenirs and postcards on her mantelpiece, I can tell you." George held up one of Soo-Yin's intricate bold sketches, thoughtful, her eyes darting, absorbing the image critically as an artist.

"Fabulous," she commented with admiration to Soo-Yin. "I love that quartz-texture you're using. It looks sensational."

"Stone is more natural than white," explained Soo-Yin. "It's ageless. Is an illusion. Like Roman architecture, it is the shadows you see."³⁰¹

"And stone has a memory," interjected Anne.

George nodded, but drew a long breath, scratched her chin absently, and continued with her concerns. "And the second question," she said, "is why anyone would use expensive mobile, instead of cheap internet to broadcast? It will be the first criticism anyone from the industry will make. I do like where this is going, I do like it. But you have to be pragmatic. It's tedious, I know." She sigh, and stood, headed over to the espresso machine by the sink, and took orders for coffee.

There was quiet for a moment, only the putt-putt of the boiler in the espresso machine. Anne, Simon and Soo-Yin exchanged glances. Then Anne said, with laughter in her voice,

"Och, we've gone and created a mobile view-master!"

"Then it will make the front cover of T3 or Stuff," said Simon, sounding frustrated. "It's a toy and a gadget, everything those early-adopters and gadget-freaks crave." He slapped down a

³⁰¹ Extract from notes on discussion at meeting at Sand14, 12/3/2004.

copy of the magazine he had been thumbing through with some disgust. It [was] full of yellow post it notes and green sticky label.³⁰²



Soo-Yin gave him a quizzical look. "I think that is what we are trying to avoid."

Over the next week, Anne was out of the office, having cake with George's mother apparently. But I caught up with her the following Monday and asked about the project.

She explained that their approach was always the design of a socio-technical system, the technical design of the product was always integrated into a social design for its use.

"Oh, I am not saying that you can determine what people will do. People always surprise me. A lady the other day, Pam on South Ronaldsay, she thought it should be a bottled garden. She imagined the ball like some miniature geodesic greenhouse for growing exotic plants," she laughed warmly. "Imagine the telecoms industry selling its wares at garden centres!" I smiled, the idea of an Orange store next to the ornamental roses was sadly unlikely. "But you can work with lots of people," she continued, "to understand what they might want to do with something, and design in all the systems, the social infrastructure as much as the network infrastructure."

³⁰² From description of Find ID 184.

³⁰³ Find ID 184: Stuff magazine May 2004, found in design studio 6/5/2004.

"I don't just mean user interface," she added, hurriedly, "I mean all the broader social relationships which sustain the object in the everyday world. As far as we are concerned you just can't have a product on a shelf that gets picked up and used, it's always integrated into a community and network of relationships. When we design something, we try to imagine all those everyday relationships as well. And I don't mean all that skin-deep dreadful scenario stuff, either."

She sank into her own modest office chair and described their process for me, hands still, facing carrying all her meaning. "Soo-Yin and Simon work through something solid, Soo-Yin does the sketches and creates the CAD data, and Simon uses them to get a model made. With Dan, whose a software engineer, the three of them often build a software prototype, just something to fake a series of interactions. Then I just talk to people, in supermarkets, at the post office, I just talk and talk. Sometimes we give presentations to local societies. We run school competitions."

"Focus groups," I assumed.

"Lord, no!" She shook her head. "You just end up with a room full of politics. No, it's just everyday talk. Sometimes we do integrate the idea with a particular company or project somewhere, like we did with the wind-powered antenna on Birsay. I'm actually thinking of working with the Orkney Craft Trail on this one, talk to a few tourists since it's the season. It's the ornamental aspect I'm trying to get at. Anyway, everyone gets a hard time from me!"

Despite Anne's humour, she seemed to act as something of a lynch-pin. Her story of having cake with George's mother expanded, when talking with her, into one of a detailed ethnography of not just people's postcards and souvenirs, but also their impressions and experiences of the Camerastone. She had been off spending hours talking, in depth, with a whole host of different people about their old photograph albums, holiday knick-knacks, valuable souvenirs, about their mantelpieces, television tops, picture frames, fridges and attics. And she had left Camerastone models with people all over the islands. She had also spent time conducting

participant-observation at Skara Brae, seeing how the coach loads of tourists collected their memories, and had attended a friend's wedding with a notebook. She had even been in cahoots with Amber to gather a report on how the nightclub and dance scene on the islands captured their memories of a good night out.

I asked her how she reported her findings, and she explained that she kept her own extensive ethnographic archive of data, but otherwise, "I just talk. I talk a lot you know!"

I pressed the issue of recording, or at least publishing, "Aye, in a quiet moment, I do publish in the odd academic journal, just to keep my hand in. But what would be the point of spending hours writing a report for Simon, and him spending hours reading it, when I can wander over to him and we can talk about it? I guess you could say I tend to rely on an oral tradition."

There was a process to their development, but it seemed to remain largely undocumented. There was a strong resistance to paper auditing, perhaps an effect of a strong sense of time in the company.

"When you only have four hours of daylight, you tend to become a peedie pragmatic in your use of time," explained Anne one day.

"We don't have time for PowerPoint," commented Simon at another juncture.

What remained, what was made durable, was the empirical rather than the managerial. Anne kept a huge archive and database of all her notes and ethnographic materials. Similarly, Simon and Gillian each had their own archive of sketches, models and drawings from previous projects, and little pet activities that each seemed to work on in odd moments. These archives, I found out, were kept in the small basement room, accessed through the little trap-door in the floor of the studio. They often referred to previous projects in conversation, using the object almost as a black-box through which connections to the many ideas worked-through as part of the project might be accessed; the heritage of the project remained largely

condensed into artefacts, whose biography was re-told and re-made at different moments, in the service of new work.

I asked Richard one day about the lack of paperwork, how the design studio functioned without financial projections, without regular accounts of the success or failure of the company in some numerical terms. He waved my questions away, "Oh, it's nothing secret. Everyone has access to the budgets. We have a weekly budget meeting on Monday mornings, and haggle a little bit between ourselves, but that's about it. Kath handles front of house, makes sure it's all legally and financially holding water. Have you met her? We often do things because we want to..."

One of the effects of the locale on Orkney seemed to be pronounced reliance on personal social relations, on a reciprocity both with the company and with others in the company, it was almost as if Sand14 was itself a distinct island within the archipelago community. As such there was nothing romantic or idealised about the working-practices, it placed extensive social demands on each person who needed to remain sensitive to their social obligations; it was a small community, and little went un-noticed. As time progressed, it became clear that projects also became people. The role of the prototypes which they built were almost to act as the socio-technical body to which everyone bonded, formed a reciprocal relation. Literally, as I watched the four weeks of intensive activity around the brief, I was watching a group of people fall in love... with a socially and technologically designed object. Love suffused these islands, I thought, staring out through the semi-circular window at the black head of seal bobbing in the water.

The next meeting in the kitchen was considerably more heated. They had yet to establish how to communicate their work back to industry, other than the usual PowerPoint slides and sleight-of-hand demo in a boardroom. Richard and Kath, a retired solicitor who acted as Front, as everyone called it, began the conversation by saying that they had been oiling the possibility of a visitation by the client for the 'Camerastone' project by offering special access to various monuments.

Richard was leaning back, precariously, on two legs of his old chair, head back, thinking. "Well, I know that they want to come. It's really rather a matter of if they get a re-org..." He flashed a quick conspiratorial grin.

If Sand14 was predominantly an oral-storytelling community, then I could well imagine why they wished their customers to visit and talk through the material with them, rather than package it up into a document and presentation which they would be expected to deliver in formal meeting. Locations, rooms and social structures (such as formal meetings) had enormous effects on the possibilities for what might be made present, and those things that might be made absent.

Simon then demoed the first prototype, and between him and Anne talked through how it would work in practice.

There was one prototype and what looked like a basic model. The prototype was a polished-bronze globe with five gleaming rings of a protruding eyepiece, each surrounded by a delicate engraved spiral; the sixth side, uppermost, was a spirally decorated dial with engraved markings around the edge. It was reminiscent of some Victorian machinery, more a child of a Babbage engine than of the transistor, and I was not surprised to find that the pouch on which it rested, made by Gillian, was surfaced in a black silk weave, a shroud of contemporary lace (it was relevant that Gillian had her own needlework studio, on the well-worn Orkney Craft Trail). Out of one of the apertures on which the object rested, were a bundle of cables leading into a laptop, under the programmatic gaze and fingers of Dan. I asked what was inside, and Simon shrugged,

"Just some small LCD screens, culled from a VR project we did way, way back."

There was also a second model, designed to be handled, which resembled a rather dazzling opaque white marble, a ball of quartz, or more prosaically a dirty snowball of a well-thumbed,

patinated iPod. On five opposing sides were drawn a soft-cornered square, through which extruded a creamy rubberised square of eyepiece. The upper sixth side was the soft nodule of a dial. It, too, had its own bag, a white, ribbon-edged pouch of neoprene. With its textures of protected rubber and toughed stone-like surface it seemed built for mountains, for harsh weather; it seemed designed to endure. Soo-Yin opened up a huge portfolio file and showed page after page of binocular and telescope brochures and images, from ornate brass desk-magnifiers to the flat metal bar of digital binoculars. She reminded everyone of various discussions and comments that had been made over the last weeks, her understated presence contrasting with the boldness of her work, so that the room became silent, listening intently. She had a whole collection of sketches of other variations of the Camerastone, which Gillian then matched up with fabric samples and sketches of purses and carry-cases.

Then it was Dan and Simon, who did a double act demonstrating the prototype, a wizard and glass affair of faked technical relations. There were two ways of using the Camerastone to 'capture the world' as Simon called it. Firstly, the stone could be placed or held somewhere, the dial set for All, and all five cameras would take a concurrent snapshot or short movies – Simon suggested that lots of interesting effects might be possible if you moved the ball at the same time to create a sort of animation effect. Secondly, you could use the dial to select a single camera to take a shot (or movie), and build up a set of images (or movies). This was all hand-waving as far as I could see, Simon holding up the bronzed stone to show that, when on single-shot mode, you used the opposing side as a view-finder. Finally, they showed the different ways of manipulating the images. Firstly, and most obviously, the stone acted as an ornament that could store its set of images in flash memory, only needing a vigorous shake or some other 'personalised movement' (as Simon put it) every week or so to keep them displayed; Anne said she would have quite a bit to say about that shortly. Then it was a Bluetooth device, so that by setting the dial all the data was downloaded to a Bluetooth enabled mobile phone (here it was just an image on Dan's laptop). You could then exchange any of the images or movies using whatever facilities the phone and network were capable of – it made multimedia content, in the language of the industry. What was particularly interesting was Simon's suggestion that the Camerastones could 'exchange worlds' between

themselves, one Bluetooth device to another – your experience of the mid-summer sunrise Stonehenge could become an underwater experience of the passing of a shoal of silverfish. Finally, the device had a mini USB port, so that all the data could be downloaded to a piece of software on a computer (faked by Dan again), software which would help knit together the images into panoramas, or collections for emailing out, or storing on an internet-based archive service. The archive could also then send the images via the network to your mobile, ready to upload back on to your device.

It was at this point that Anne, who had been smiling but clearly holding back, leaped in to the conversation, “The point is that different people can share their experiences in different ways. At its most basic the stone is itself a beautiful object that reminds you of somewhere or someone; we’re anticipating a huge number of variants in cosmetic coverings, by the way. It’s a memento of itself, that can be carried with you, or placed on a shelf, or even the bottom of a drawer.” She rolled up her sleeves, settling in.

“Although not a selling point to mobile telecoms, Mary, who’s eighty-three, really liked the idea that it kept the same images for her for potentially years. And she liked the idea that when her grandchildren visited they could all send new images to the stone for her. She called it a wishing stone, which was grand. If the industry could get its act together and actually design a phone for her, with large enough buttons, she would love to receive pictures and use the stone to keep them in a safe place. It could be a whole new market, you never know.” She coughed, asked for some water, and Gillian hastily got up and sorted out a large jug and glasses for everyone.

“The wonderful part is the kinetic memory, which means that the images fade over time, they decay. And I have suggested to Simon that the images do literally fade to black over time. But at least the thing needs no stupid bulky, power block. It’s more like a wind-up device, really. You pick it up, and move it in your own special way, and the images come to life.”

“Just like a snowglobe,” interjected George, rolling her eyes.

"After the memento, then you have communities of people, families and friends wanting to exchange memories and pictures. Amber said she would quite like to have two balls, one for her friends and one for her family, which she could keep updated and then take with her when she went away – for her these were portable photoframes. An American tourist in Kirkwall was telling me that she was desperate to buy something to remind her of being inside the cathedral, but the postcards were not enough. I'm suggesting that we set up a dummy business, with a little kiosk in our foyer, for tourists to buy a professionally created experience that's sent directly to their own stone, or even to buy a special stone for the cathedral experience, in some red sandstone-equivalent. Actually, make that the Ring of Brodgar, our industry friends might actually get there during the workshop, and see it for themselves."

Anne was in full flow now, moving her hands back and forth in small excited motions.

"For people like Amber, who send texts and pictures already, it's easy to imagine sending experiences, too. There's probably a specialist corporate market, for visual services like an ambitious real estate agent who creates a tour-like family home sales ad³⁰⁴, but they're really a side issue. Oh, and I hate to state the obvious, but the real gossips and memory-keepers³⁰⁵ generally are at home, not sitting in their office. So jewellery and ornamentation are definitely the way forward. It's got to look good on the bedroom table, not on top of the DVD player. Right..." she paused in her flow to take a sip of water, smiled at everyone,

"Okay?" Nods all round. Simon was busily scribbling, although I was fairly certain none of this new to him.

³⁰⁴ From fieldnotes taken during meeting at Sand14, 27/5/04.

³⁰⁵ Category of users discussed frequently at Sand14 during meeting 27/5/04.

"Okay, so you don't buy a Camerastone from a camera shop, then. Or at least, that's not the only place. You see them in the glass cabinets of the department store, by the watches and chiffon scarfs, with an assistant who takes them out gently for you to touch and admire. You buy them from a display case in Boots. If they're in a phone shop, then they're by the window, tantalizing, with a brochure like a glossy house and home magazine for you to take away. But in all those places you can pre-load them with images, with an experience, wedding photos, party photos. They're the ideal gift, an ornament, a memory." She looked around again, but everyone (including myself) was enrapt.

"So, aside from close family and friends sending these images and movies over the mobile network, there's also the possibility for third-parties to help connect up other people, the Bebo and MySpace phenomena. Either from your mobile or via the internet, these organisations offer an archive facility for worlds, and a way to view and send worlds to other people you either invite in, or with similar interests."

"That's a rather hard-sell approach from you, Anne." Commented George, surprised.

"Oh, I know, that's just the industry icing. The part I really love is the possibility of bringing moments to those that cannot be there. So, like our own Maeshowe webcam that shows the mid-winter sunset³⁰⁶, using these stones you could capture those moments of light suffusing the monument, and bottle them, encase them in stone, literally. Or, a ring around the moon, or a rare bird taking wing, or a sunrise experienced by someone separated from their partner, even imaginary places inscribed in abstract paintings, emotional yet unreal..." she trailed off.

Everyone sat still, dreaming.

"So, we all love it. Will they love it?" Asked George.

³⁰⁶ See <http://www.maeshowe.co.uk>

"It's got no radio." Remarked Simon. He was looking unexpectedly glum, white shards of spiked hair almost drooping with his uncharacteristically downtrodden mood. "I know what the industry's like. They're going to see it as an accessory, which will be its death-knell," he said.

"Only if they saw themselves as just mobile telecoms," rejected Gillian, voice edged with pragmatism. "But some of the people we want to invite this winter regard themselves as part of the video and media industry. If they're making camera-based devices then they are looking for a camera-based device that's something aspirational to head towards... without being weird and wonderful."³⁰⁷

"It's a Bluetooth-enabled digital camera and photoframe in one," said Soo-Yin, calm, hands hidden beneath the table. "I like the idea of PC monitor as a picture frame on the wall... it's that immediacy."³⁰⁸

"Yes, well, I like the photoframe idea," added Richard.

"It's a renewable-keepsake, at best," said Simon.

George, lounging in cushions in a large chair by the fire, shook her head, leaning forward towards the others around the table. "Oh, come on. I think you're being a little harsh. I think it has much more beauty and aesthetic quality than the usual gadgetry and digital doo-das these companies usually churn out."

"I suggest we let them see it in action," suggested Anne. "I'll ask Mary and Amber to come in, as potential users, one older, one younger. They're both opinionated and articulate, and have been helping me no end for the last couple of weeks. They can sit down with our visitors and

³⁰⁷ From fieldnotes taken at meeting at Sand14, 27/5/2004.

³⁰⁸ From fieldnotes taken at meeting at Sand14, 27/5/2004.

just say what they think about the idea, how they imagine it being part of their lives. It's not perfect, after all now. It's only a wee concept."

"We could ask Mary and Amber to subscribe as the first users of the online archive. I could mock it all up using a few cameras and some of their own photos. We could get some of the images sent to their own mobile phones, and hey presto, a whole service..." Simon was cheering up.

"I'll do the images of the sales environments," added Soo-Yin. "We can take the models and photograph them in various shops around Kirkwall, a tourist place, jewellers, department store, phone shop, electrical store... I can also take some photographs of the models in people's houses."

"Well, it sounds like an excellent performance to me!" said Richard.

"I think we should put the dumb model in the café out front, then leave them waiting in there for a while. Hopefully they'll pick it up." Gillian was being devious.

"Lab rats!" smiled Anne, winking at me.

Gillian picked up the quartz-like Camerastone and squinted through each eyepiece, frowned.

"I can't see anything," she complained.

Simon held out his hand, took the stone for a moment, then hesitated, cocked his white spikes to one side and nodded to me, "Take it," he instructed.

I took hold of the heavily veined stone, rested it in the centre of my palm, felt the warmth of the polishing, its unexpected lightness, as though it were some smooth pumice, and the brief pressure of the glazed lump of an eyepiece upon which it rested.

"Now, gently, roll it in your hands, like you might roll a piece of clay."

I did as he suggested, palm to palm, rolling the stone over and over, as if I were warming it, a magical act, making it into a new shape. As the glassy-eyed Camerastone turned and turned again within my palms, it seemed to be an opaque crystal ball, a scrying glass through which not the future but the past, memories, moments and landscapes, might dissolve into view. Inside this stone visions of experience, of friends won and lost, could be held and revealed through my moving hands. If I understood Simon, different movements could conjure different images, different memories.

After a brief moment, Simon nodded, "That should do it." Presumably referring to the kinetic powering that the device required.

I stopped and held the stone up, looked through one of its eyepieces. Inside was a series of portraits of a rather sparkling elderly lady, knitting needles at the ready, sitting in a low-beamed room, with a wide window looking straight out across a harbour. Each image was focused on the woman from all of the five directions (left, right, front, back and above), so that it seemed as if she were condensed, solidified into the very stone itself. I had rubbed the stone and it had come to life like a magic lamp. Inside this magical world was a genie, this woman knitting. I passed the Camerastone to Gillian sitting next to me who peered in and suddenly laughed.

"It's George's mother," whispered Gillian.

"Oh, God..." George had overheard. And Gillian passed the stone over to her. George bent her head to look, then gave a shriek of laughter.

"Wow! That's just fabulous!" She continued to laugh, tears beginning to gather.

"If they don't love it now, they never will," murmured Gillian.

All that remained was for Sand14 to persuade the industry to visit, by no means a straightforward proposition. How would they react to this archaeologically-inspired version of their desires? Or would everyone at Sand14 have to condense all their passion and love for this ball of stone, that was not stone, into a package of sketches, images and presentation slides?

I would have to wait and see.

Reconstruction 6

by Ethnographer

I was back inside Blue, and I was worried.

I felt I understood the ubiquitous city of the industry, as it was made at the GSM World Congress in Super-Cannes; knew how so much labour, including my own, was necessarily invisible so that this *anyone anywhere anytime* future manifest as a seamless, magical experience – a heterotopia. Yet, inside Blue was inside a site that designed this future, gave it form in products and strategies. Blue was where this ubiquitous city was being made, flowing out of its organisational structures, processes, and landscapes into the rest of the industry. What worried me was that, as I sat at my little anaemic grey desk-pod in the design studio, this ubiquity-making should be going on all around me.

I needed to listen more, listen and watch the designers as they went about their work of negotiating marketing specifications, engineering requirements, material limitations, injection moulds, corporate strategies, management coercion, formal design processes, and much else into a shape, a contingent shape, but a shape that contained a future device. I needed to understand if and how ubiquity got done, and re-done, how it was stabilised as a future; and I also needed to understand if and how the landscapes of this city, the civilised parklands of the industry, effected this work.

Thankfully, this week was a good time for such worries, for there had been a recent convulsion in the future strategy of the company (an effect of falling share prices, I was told) and a new product concept was needed to meet the revised strategy. I had been invited to sit-in on a two day workshop by the 'camera' team, the group of designers who specialised in devices with a video camera built-in. The first workshop, tomorrow, was to be a team 'away day' at a small rural hotel in Oxfordshire for them to talk through their strategy. The day after

would be back at Blue, and involved many different groups from across the campus and beyond who were needed to define a new concept so that by the end of that session a new 'cameraphone' device would be outlined.

The next morning was an early start amongst the commuter trains and buses of Oxfordshire, but I managed to arrive at the red-brick hotel to join the team for breakfast. It was an old Tudor inn restored with a strong contemporary flourish. Attention to period detail, good espresso, and pale oak beams lacing floor to ceiling. The team regaled me with ghost stories from the night before told around the brick fireplace at one end of the room, the wood in its iron grating still glowing red hot.

The team's senior manager, Brian, who was hosting the event was absent. He had driven a mile down the road in his car to have an early morning audio conference, since the mobile phone coverage at the hotel was poor. One the senior designers, Tony, had also absconded to do some work on campus at Blue for a few hours before the meeting; he would later tell me that he had driven two hundred miles and done more than two hours work before the meeting began at nine o'clock (the sudden revision in business strategy had impacted him severely).

The team was 'away' from Blue, they had chosen to leave the ubiquitous city for their discussions today, but they were still attached, still on life support, suckling on vitamin ASCII through the wireless and highway connections to/from the corporate mammon. They did not choose to venture too far from home, not too far from the Heathrow air corridors whose cloud-filled spaces formed the vacuous connections to offices for team members based elsewhere in Europe who had flown in for the day. All the team members were on EVA, on extravehicular activity from Blue, in corporate life-supporting spacesuits connected by electronic and tarmac tethers. And just as the spacesuited Dave Bowman in '2001: A Space Odyssey' had been reassured by the familiarity of his executive hotel so too were the team, here, in this executive hotel.

But being outside of Blue, watching the team drink hot chocolate and spoon muesli and fruit and ghost stories, made me reflect on the city whose diffusive one-way glass box I now sat outside. I could see its glass surface in the dull reflection of the mobile phone screens that sat on the table. I could smell it in the plastic of the designer's laptops.

The citadels of technoscience were a tall and commanding presence in science studies (Downey and Dumit 1998). Sharon Traweek had established their culturally contingent borders, stepped inside their high towers of knowledge-making (Traweek 1988). But the walls and landscapes of these citadels have been excavated, measured, and mapped in many different ways, as Emily Martin notes (Martin 1997). She suggests that Latour's approach to laboratory studies makes the walls of the citadel permeable, as technoscience spills out gathering its allies as though in a competitive spree. In contrast, she argues, Rayna Rapp and Deborah Heath see the walls as always porous, its surroundings bustling with other politics and powers, and its activities deeply implicated in a commerce of knowledge-making with many others. The version of the separated, domed and enclosed heterotopian city of the future that I imagined was different again. Firstly its population was not stable, for organisations and individuals and even technological actors came and went, as they participated in the *carnaval* of the future and then moved on to other activities, other roles, other games. I was not claiming that this was the city of the mobile telecoms industry, for such a bounded place was not part of my experience. What made the glass walls of this city was communal living within a magical, utopian experience of *anyone anywhere anytime* or *ubiquitous* telecommunications. The walls of this city allowed wireless signals and air corridors to permeate, motorway tarmac needles permitted embodied movement, the ground was threaded with electrical coax, but that was all. The heterotopia was a separate experience. The magical labours that made it possible were camouflaged, hidden spaces inside the city, but were inseparable from it. And the focus, the centre of the city, its *raison d'être* was the work of building the tower, the shape of the line, to reach utopia. Knowledges and negotiations moved back and forth between inside and outside, there was commerce as

Martin suggests, but only through its particular connections, its tethers, and only as part of the building of the city, the building of the tower. Indeed, the city hungered to expand, to be everywhere, to enclose all within its walls. The Oxfordshire hotel, in which I waited, was outside that city, and so the team were outside the city. Yet they remained tethered to its dream, to its exponential spire.

By nine o'clock we were all sat around a large table in a conservatory of the hotel, supping standard issue conference mineral water and biscuits, and watching a charismatic French member of the team construct a power adapter for his laptop from a lollypop stick jammed into an earth socket. Brian was disappointed with the out-of-the-tin biscuits, he expected freshly-baked biscuits from the chef. I understood. The biscuits (along with the requisite whiteboard and projector) were hard crumbs upon which the whole meeting room was translated, rolled on biscuit-ballbearings towards Blue; the 'away' day ambience fading as the team sat around yet another boardroom table.

Brian opened with a long monologue on their problem negotiating with marketing and program management who, in essence, contracted the design team. The program manager of a device was its spokesperson, they managed all the diverse resources within the company that were necessary to constitute that device as a coherent product.

"We put a product on the table and they go: 'Wow! That's a nice product. What does it do?' And we go: 'We don't know'. This has got to stop."

Brian was smiling as usual, still upbeat, but his smile was biting. The rest of the team took photographs, doodled, listened, pulled shawls closer around chilled shoulders.

"People fall in love with gadgets in this business. They don't fall in love with the path to gadgets..."

"They [marketing and program management] hang on to a vision of the device. [It's a] double-edged sword... rather than a proposition. They do not fall in love with the proposition of what it is... We create a design that looks very sexy and then they don't put much in it and it's an empty promise...

"The problem is they are... falling in love with every piece of it."³⁰⁹

It was a problem of love, inappropriate love, falling in love and coveting what Brian saw as an inappropriate, even dangerous, relation – the gadget. The gadget was a vision of the future, a gleaming surface that seduced the technophilic, with its exquisite buttons, metallic air-brush surface, beautifully painted glass screen. The gadget was a siren, designed in every detail to enchant, *en chant*, to sing dreams of utopian wireless pleasure. I knew the songs of the gadget well, for I too had been a designer, had woven their spell into my own designs. Designers specialised in seduction, in the creation of drawings, CAD models, illustrations, block models, and demos that would enchant the industry. The potent love spell they wove around their designs was the double-edged sword that Brian spoke of, for it made some forget that they were in love with a dream; the designers were becoming 'hoist by their own petard' so to speak.

The love spells that the designers wove were part of the magical art of technology. The illustrations and block models they passed to marketing were filled with technical uncertainty, and it was this uncertainty that contained and generated the dreams of the marketers. The gadgets were an 'empty promise' as Brian put it, but it was exactly this emptiness, the superficiality of the surfaces they made, that enchanted the marketers and made them say 'Wow!' with pleasure. These gadgets, visions of the future, contained the promise of ubiquity

³⁰⁹ Extract from notes taken at 'away day' workshop with a Blue design team, 25/3/2004.

for they were both possible and uncertain. They modelled the future, as my booth demo and the fashion show had done. But Brian seemed to be filled with fear and dread at the promise, for he knew it was empty; the models and drawings were not products, and their transformation into products often led to an unfulfilled promise. Fear and dread and hope, *elpis*, was the name of this emotion in the industry, the hope for the future contained within Pandora's Box.³¹⁰ The designers were makers of this Pandora's Box, the gadget, a three-dimensional image of possible relations and future dreams, not because they were the architects of those dreams, but because they expertly wove shapes, surfaces, that might contain them for the industry. Their technical artistry was in the arrangement of possibility and uncertainty, holding them in tension for as long as the design process endured. They held some technical requirements still, negotiating with materials and mechanical requirements so that the screen was the right size, there was enough internal space to hold the parts, the radio, the battery, the cover could be injection-moulded; whilst also leaving much during the initial design process that was undefined, uncertain. When the box was opened, when that moment came, then theirs was also the art of negotiating the tumult of possibility from hundreds of participants into the precision cutting of plastics and copper in a factory.

What Brian seemed to fear was the moment of opening, he seemed to fear that the marketers and program management would not let go of their visions and dreams, that they would remain in love with the magical box – with the gadget and not the product it had to become. Latour understood this fear, he called it the fear of technological research, the fear of negotiating and translating possibility into product, the fear that had killed Aramis (Latour 1996). He, too, thought that love was the problem: 'No, no, not enough love! Love and research - it's the same movement. They abandoned Aramis so as not to compromise it...' (*ibid.* 288). I read this as a maturing of love, a shift over time from adoration to agape, from holding a dream to working with a dream. Adoration holds the dream still, a perfect vision; agape negotiates with the dream as sister-brother-kin, accepts failure and success as part of

³¹⁰ See discussion in Figuration 1.

the ongoing project, the making of an 'elsewhere born out of the hard (and sometimes joyful) work of getting on together in a kin group' as Donna Haraway calls this love (Haraway 2004b: 3). Brian's question was a matter of how to make the marketers love their designs more, love them enough that they would love the hard and joyful work of research, the hard and joyful work of filling that seductive shape with a 'proposition' so that it might become a whole rather than empty product.

Brian had caught his audience, began to explain how they might incite this love:

"Design is about 'product-Wow!' in physical formation... But it needs to have 'service-Wow!'... No integration between service and design."³¹¹

"[They] don't see it as where the glory lies. In a product company that is where the glory lies... Glory is everything around the product."³¹²

"Dichotomy is... 'styling a box' versus design as 'defining the box'... But the boxes are changing... This is the reformation."³¹³

He was calling for the (Pandora's) box to be made with something of the infrastructure included, for their own imagery and design illustrations to include an entanglement with future practices and patterns of use; the inclusion of services that the device would make possible. He was calling for them to engrave services – what people would do with the device - into the very shape of the concept so that it defined the box, was intrinsic to the concept, and could not be removed from the box when it was opened. It was a dangerous reformation, for if the services became too elaborate then the box would be defined too early, and its

³¹¹ Extract from notes taken at 'away day' workshop with a Blue design team, 25/3/2004.

³¹² Extract from notes of a discussion with Brian concerning the problem, later at Blue, 10/6/2004.

³¹³ Extract from a discussion with Brian concerning the problem, later at Blue, 10/6/2004.

glory, its enchantment born of uncertainty, would be lost. This reformation was a renegotiation of the relations between design and the process by which a future was stabilised as a product. He was hoping, I believed, that by engraving the spells of service provision onto the box, the marketers and program managers would fall in love not just with the box, but with a strong sense of what that box might be in the future; it would draw their love into the future.

Brian also had a sense of how this love-as-adoration may have been made as an effect of earlier politics. "Once user interface experience and design were together... But possibly those that were a science were separated out... and design stood alone... was taken up as a black art."

His message was clear. As a design team they needed to return to a heterogeneous design process. They needed to establish much closer ongoing relations with other participants in the conceptual process. They needed to integrate the futures of user interface designers, for example, into the conceptual shape of the box, into their 'black art' of enchantment, before it was offered to marketing and program management who funded the device, before they fell in love with only a dream.

Liana, one of the lead conceptual designers, agreed with Brian's concerns. "[They] don't get a sense of experience, or reason for being." She pulled her black shawl more closely to her shoulders, withdrawn, chilled.

During the break, a moment for cheroots and cigarettes, renewing mobile phone calls and voice mail connections to Blue, I sat back into a sofa by the glowing fireplace and talked to the team.

The French designer was out-spoken, tapping out cigarette ash with an understated, languid hand. "They are all in diapers," he said, of the social researchers at Blue. "[Their]

stuff is a bit strange." He shook his head, long black locks brushing his eyebrows, clearly wondering how it would be possible to integrate their art of enchantment with the exotic strangers from social research.

But one of the lead conceptual designers was more thoughtful.

"[We should] create a story for marketing, so they can do their thing before the product gets designed," she said.

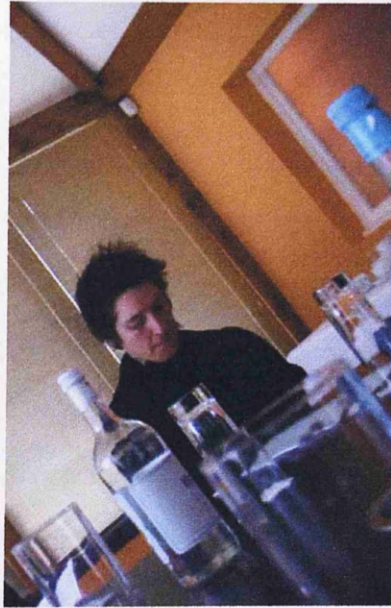
And storytelling, the art of oral communication, was Brian's next concern when the meeting resumed.

"Need to measure the results of design... but often design gets to be the fall guy... This strategy document you cannot distribute widely until Tuesday next week [when it will be presented]... This comes back to death-by-PowerPoint..."

The designers communicated their concepts to other parts of the company through a PowerPoint performance. Their box, the shape of a future device, was therefore frequently a two-dimensional projected illustration, or more specifically, a performance before a boardroom table of painted image and patter. And this was a quartet I was already familiar with: performance, patter, artefact and stage. This was the practice of technical enchantment. But enchantment was also problematic as part of a structured process necessary to make a product. It could lead to the suggestion of compulsion, a vampiric loss of responsibility by those who fell beneath its spell. All too easy to point to design as the honeyed voice of irrationality, the 'fall guy' as Brian put it... 'I was seduced' the wide-eyed marketer could cry. Enchantment was not a quantifiable practice, how to audit its success or failure as a compelling story of the future? This was the worry. The performance of a design,

the telling of its future story, could make a program manager fall in love with a concept, but love did not appear on any process chart.

I was scribbling furiously in my notebook, trying to capture words and thoughts weaving around me, frowning hard with the effort, and much to the amusement of the designers, who photographed me:



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There was another break, and Brian explained how the process of product design operated at Blue. As decisions moved up and across the company to different sites (from program management, to design, to mechanical, to user interface, to radio, to marketing and so on), PowerPoint slides accumulated, and their associated stories became embedded in a growing account of the concept. The future product, the image and imaginary of the box, accreted slides and stories so that by the time he had to perform to the executive board Brian often had a pack of several hundred pages.

"So, strategy flow is done by word of mouth?" I asked.

³¹⁴ Photograph of 'the ethnographer at work' taken by a designer from Blue during the team 'away day'.

He nodded, pleased. "Yes, that's right. Despite our use of PowerPoint we're not a document company."³¹⁵

"[It's] partly a cascade process... We have trend and strategy dissemination sessions... We would like to be a horizontal company, but we're not... I will go through the presentation plus the three hundred slides for the day's audit... over one hundred people [in the audience]."³¹⁶

The company had an oral tradition of storytelling and future-making. Not that writing and reading emails were unimportant practices in the company, but email exchanges were not 'obligatory passage point' (Latour 1987: 150) they were not moments of public witnessing of decisions concerning the future. Although I did not follow the organisational process of product design during my ethnography, I had seen the formal documented process laid out on very long folded print-out; a leaking mass of multi-coloured snail trails. The criss-crossing lines marked a specification cascade, a series of 'gates'- meetings in which particular decisions had to be specified and (in theory) fixed. These 'gates' were a weaving of a product from mere hand-waves into mass-production. From the first 'pre-concept' gate to 'product launch' was a period of five years. Yet I experienced almost nothing of this process during my visits. Indeed, after the workshop Tony looked at me, appearing considerably grey and harried, and said that he had just produced a new global product in three weeks (rather different to the five year formal process). Although only regarded as a cosmetics change it still normally should have taken six months to design and implement the manufacturing tool alone.

The oral and performance based culture of future-making at Blue, and indeed the industry as a whole, seemed an important distinction with written report cultures. The oral practice and

³¹⁵ Extract from notes made at a later discussion with Brian, at Blue 1/4/2004.

³¹⁶ Extract from notes at meeting with Brian later, at Blue 22/4/2004.

performance of future-making resonated with Diane Vaughan's account of the predictions and risk-assessments for Space Shuttle flight-readiness at NASA, which involved a highly developed oral system of communication and performance (Vaughan 1997, 1999). Both oral traditions of presenting and performing stories of 'data' from engineers and designers combined to produce a (hopefully) stable technical outcome, one a product launch, the other a Space Shuttle launch. Vaughan's work reminded me that failures in communication between design and marketing, or other groups, might not be Machiavellian or through inappropriate action, but an effect of the location of the storyteller and stories. The illustrations on the PowerPoint slides did not hold the concept or the future in place, they were enchanting possibilities that could be woven into many different stories depending on the moment and the audience, and it would be the same with all the other PowerPoint pages. As the pages added, the audience and storyteller changed, and the story of the future would be woven with different emphasis.

After the final afternoon break, after the final cheroot and voice mail exchange (when everyone seemed to dissolve into darkened oak corners and through fire exits, merely ghosts from Blue), we returned to the rapidly cooling conservatory. The team spread out sketches of their current range of conceptual designs hoping to identify a single shape, a design marker that would hold their suddenly revised portfolio of future products together. The A3 print-outs and pen sketches filled the table, and everyone gathered shoulder to shoulder, started to leaf through the images; Liana leaned over, elbows to table, attending to each page carefully.

"Looking for synergy and differentiation... [Like the] dynamic curve on coke can," explained Brian. "Something in your hand that looks purposeful."

There was tension. They already had a shape, a marker of their team, but Tony explained that, "[Marketing] have a problem with the [shape]... We need to ease them in to it."³¹⁷

I watched and listened, frowning as they debated the sketches, deeply perturbed. I simply could not make any connection between Brian's monologue concerning inappropriate love and the need to create a shape that invoked 'service-Wow!' with the discussion of sketches and shapes before me. The ubiquitous future of mobile telecommunications had vanished like a genie back into its box. There was no talk of the inside of the sketched shapes, only of the outside shape of the box, the shape of enchantment, the shape of Pandora's box. The ubiquitous future of the industry seemed to have palpable agency, it yearned to remain unopened, undefined, uncertain, full of infinite possibility. Too much attention, too much whisperings of its definition, and it would recede, recoil, upwards into the stratosphere of the industry's future dream, always in the distance. It was as if the tower of Moore's Law, that measure of the distance between possibility and ubiquity, exerted some authority by determining what could be defined and what could not.

Brian shook his head, wryly noting an explanation for marketing's resistance. "They want this hockey stick effect. The pressure means that the only way they can get the money back is by making smartphones... So worried about losing revenue."

The 'hockey stick effect' – this was Moore's Law being invoked... It was here. Even though we were 'away' from the city the effect of the tower at its centre was still present, was sensed through the tethers and life support with Blue. The tower was a weight, a pressure felt at the wide base of the exponential curve, looking up at the asymptotic future profit that had to be.

³¹⁷ Extract from discussion with Tony at a later date at Blue, 25/3/2004.

I wondered if and how this tower of Babel might appear again tomorrow, when the team would reconvene back at Blue, back in its domain.

The next morning I had switched one birch dining table for another, one bottle of mineral water for another, one bus and train journey around the M25 for another. But my easy chair in the (usually-locked) management board room was considerably less comfortable, and I shuffled my legs in restless rhythm.

Brian was elsewhere, performing his story of the future with three hundred PowerPoint slides. Tony was hosting the meeting, chewing his lower lip as he chose his words with his usual diplomatic astuteness. Today's meeting was a more direct response to the sudden change of corporate strategy, and they had to create a new concept for a cameraphone device. There was tension in some of the faces around the room, most of whom I had not encountered before. As the blinds were lowered, and the projector hummed to fill the grey air with yellow-cast pixels, Tony expressed his disappointment to me that most of those he was expecting from other sites had not flown in, there were only six people here.

He stood to one side of the screen, felt pen in hand, capped, ready to strike the pad of paper hanging on the wall behind.

"We need to think logically, calmly, where the future lies, " he began. "It feels as if we're always under predicting... on the back end of every curve... It's shocking the speed at the moment... To be competitive, when we think we have a future technology... that has got to be a starting point."

"The future is not more smartphones, I do believe that.

"I create memories [is the intent of the concept].

"The consumer typology [for the concept includes] the Event Snapper, the Innovator, the Memory Keeper, the Expert... Expert [is]... the love of owning top of the line equipment... These are our early adopters, who buy it as a piece of technology. They're the people who are really helping to get us into the market."³¹⁸

Curves, his words were filled with the shape of predictive curves. They were 'on the back of every curve' and they were also on the curve of 'early adopters'. These curves were the same shape, the same curve of technological development, not *Moore's Law* but its precursor: the diffusion of innovation. Almost a fundamental precept of marketing, this was an s-curve model of the consumer adoption of a new technology derived from statistical divisions of the bell-curve (Rogers 1962). 'Early adopters' were the alleged 13.5% of the population, the second standard deviation of a bell-curve, who would lead the adoption of a particular new technology. Rogers' suggested that they formed the opinion leaders, the successful, the role models for society. At the other end of the curve were the 'laggards' the technologically illiterate, the slow to adapt to technological change (*ibid*). Although I had no time to ponder the implications fully, there was a strong scent of gendered ordering to this model: the early adopters and 'experts', favoured by Blue, were masculinised, rehearsing gendered accounts of the male love of technology and the patriarchal leader, whilst the laggards were feminised as subordinate with a naturalised dislike of technology (Wajcman 1991, 2004). The implications were that the future, envisaged in this room, would be one that followed this gendered diffusion of innovation. The 'early adopters' would help get them into the market, because the future was being imagined and designed to fulfil their technophilic love first. This curve of future consumers shaped the box they were imagining.

³¹⁸ Extract from notes taken at concept workshop for cameraphone device at Blue 27/5/2004. All following quotations are from the same workshop, unless otherwise indicated.

The second person to perform their story of the future was a representative from mechanical design (from the building opposite). Darren jumped up with enthusiasm, spoke at high speed with lots of hand waves, arms talking. His slides began by quoting John Lennon against a faded industrial patina: 'Imagine all the people. Sharing all the world. You may say I'm a dreamer, but I'm not the only one.' His future was a monologue delivered in modulated bits:

"We brainstormed around the evolution of technologies.

"3D displays on phones, expect in a couple of years...

"[In 2006] you don't see the pixels... it's beyond the human capability...

"It's happening because it can happen... everything can happen.

"I like the idea of PC monitor as a picture frame on the wall... it's that immediacy... Digging slides up, box of prints from the attic... That's an experience we should understand... nostalgic experience."

"We feel visual chatting is likely to shoot off... My wife's got into video editing... video editing behaviour... it's not simple to learn.

"Projecting films at home... so smart, recommend it to anyone."

Who were the early adopters, the experts? It seemed as if the referent for these technophiles were the designers and engineers themselves. They were early adopters, projecting films at home, editing video, using monitors as picture frames (which I saw in the studio). The industry was almost replicating itself, re-creating its orders of gadget loving early adopters, making more of themselves and their technosocial orderings. I would have to watch and listen for more of these cloning acts, see who the *anyone* was at Blue who was their

preferred, ideal consumer – themselves, with their belief in ubiquitous telecommunications, or others, with other beliefs for the future.

And then Darren finally moved on to personal video communication, with a flurry of slides on future scenarios for applications that combined movement and video.

As the bits and bytes of Darren's story condensed, the door to the studio pushed open and a large man in a suit strode through. Tony brightened as he rolled in, and I knew from the swagger of the black suit trousers and purple shirt and Tony's deferential chaperoning that he was from marketing; he had the power and the paunch.

The paunch stood to one side as Darren finished, then took a proprietary wide stance besides him, hands to leather belt, nodding at the slide on a videophone scenario. "It's the science fiction dream..." he said to the room. "All the advertising that Hutchinson did... still can't get people to do this... and there must be something... I am an optimist... It doesn't seem possible that you never want to do that."

My pencil, almost the only part of my body that had moved since my legs had numbed earlier, stopped in abrupt shock. In the fiction of my imagination I took to my feet and gave a lengthy and impassioned speech on the long and desperate history of video communications, and its endless failures. I was caught in a déjà vu once more, and staggered within its endless reflections, the constriction of its temporal loop. Blue was caught, too, within this recursion, as had the design studio where I had worked in the 1990s. I was silenced, made

breathless by its potent noose at my neck. I did not speak then, but this is what I would have said.³¹⁹

The Hutchinson-owned Orange videophone was a 'monstrosity' in 2001 according to one reviewer, more bandwidth was still needed before the 'utopia' of watching television on a mobile handset would be possible:



Remember AT&T's Picturephone (www.att.com) from the 1960s? Weighing 26 pounds, it debuted at the 1964 World's Fair but bombed commercially. European carrier Orange (www.orange.com) recently introduced a wireless equivalent. Weighing 500 grams (hefty by today's portable standards), the Videophone can be ordered for about \$1,900. One early reviewer called it "a monstrosity."

If reaction to the Orange Videophone is taken as an example, wireless video has a long way to go before mass adoption. With the low bandwidth of today's 2G networks, emerging wireless video applications are herky-jerky imitations of what consumers have come to expect from the word "video."

Yet to hear some streaming-media companies tell the story, commuters soon will be watching the local TV news on their cellular phones while riding the train to work. The true state of wireless video lies somewhere between this utopia and "the monstrosity."

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Yet a designer of the AT&T Picturephone, cited as the original Ur-artefact, was adamant that bandwidth was irrelevant to its failure (Noll 1992). According to A. Michael Noll the first AT&T Picturephone was demonstrated at the Chicago World Fair in 1933. After the war its development resumed and a second demo was constructed for the world fair in 1964, and a version trialled in 1969. Noll suggests that the analog networks of the 1960s were more appropriate for transmitting video signals than current digitally switched networks, for their electromagnetic switching could handle the 1MHz uncompressed video signal as easily as a voice call, whereas current digital networks compress the signal and divide it into smaller

³¹⁹ Although I had expertise in some of what was happening in the design studio at Blue I chose to remain silent. This was not to remain 'objective' but to resist rehearsing knowledges and roles that I was already familiar with. I wanted to participate differently in the industry.

³²⁰ Image from Infoworld article on Orange videophone.

³²¹ Extract from article Goldman, C. (2001) 'Moving pictures' in *Wireless Review* (May): 21-23.

parts for transmission (and therefore reduce the quality). *Moore's Law* prevailed, picturephone would be a billion dollar business by 1980s the analysts predicted, but in 1973 there were only one hundred subscribers listed in the phonebook; and market research as well as trial users remained ambivalent. Picturephone failed but picturephone lived on, with increasingly reduced bandwidth (the quality was getting worse not better over time): Mitsubishi launched their service in 1987, IBM tried with PCs in 1991, British Telecom launched their device using ISDN in the 1990s, and AT&T tried again in 1992, and now Hutchinson-owned Orange was attempting the same service using wireless telephony. 'Meanwhile there is nothing new in these recent attempts at reinventing picturephone for face-to-face video communication; they will only replicate the past with the same results: namely, market failure' (*ibid.* 315). Time had become a loop. Technology had become recursive, feeding back on itself, was even degrading; there was no tomorrow for personal video communications. But I now had some sense of how this twist in the story of technology led to a Mobius loop. The picturephone was a gadget, it was an Aramis, it was a box of future dreams, and there was not enough love to translate those dreams into a mass-produced device. Or rather there was perhaps too much adoration of the videophone and not enough tough-loving kinship. The designer admitted his own culpability: 'I too was swept along with enthusiasm for the picturephone system. I even went so far as to design the picturephone booth and sequence used in the movie 2001: A Space Odyssey.' (*ibid.* 316).



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³²² Still from Stanley Kubrick's 1968 film '2001: A Space Odyssey' where Haywood Floyd uses the picturephone to call home.

There: science fiction. It was a 'science fiction dream' that the marketing manager invoked. It was this moment, this dream, this Cinerama widescreen depiction of Stanley Kubrick and Arthur C. Clarke's vision of the future, that the manager believed. A vision of life in the future that had become naturalised through its repetition in other science fictions, the videophone appeared as *de facto* in Ridley Scott's 'Blade Runner' (1982), in James Cameron's 'Aliens' (1986), in Paul Verhoeven's 'Starship Troopers' (1997). This future device was so seductive, so enchanting.³²³ Science fiction films were perhaps the ultimate demo of the future, performing the most magical of technologies, for in film it was both all fake (sets made of wood, pre-recorded video) and all possible (the story and sets were designed to weave an enchantment of believability). With this endlessly rehearsed enchantment of video telephony continually calling through television and cinema, as the marketing manager said 'it doesn't seem possible that you never want to do that.' Yet, as a storyteller would say, it was only a dream, a long time ago... Whether it was the dream of a science fiction author, or the dream of a market analyst; whether it was a magical technology masquerading as advanced technology, or one hundred local subscribers magically transforming into worldwide billions, a story from author or analyst, the love of the dream had meant that the picturephone was an unloved product - was a 'monstrosity' – and had failed, and failed, and failed.

My moment of frisson, caught in the recursive temporality of the videophone, began to fade as my heart beat slowed. My hammering frustration quietened as my imaginative, but impassioned speech to the team talked itself out. Around me the conversation concerning

³²³ Brian Bloomfield has also discussed the role of '2001: A Space Odyssey' and its effect in technoscientific development. Through a discussion of the HAL 9000 computer's birthday celebrations in 1997 and drawing on Luhmann's notion of a 'defuturized' future he argues that the relationship between science fiction and science fact forms a crucial part of organizational expectations for the future (Bloomfield 2003).

new concepts for video and camera based communications continued, and I lifted my pencil from its deep gouge on the page, began to listen and write again, translating as I wrote.

A woman who had been sitting quietly next me, swapped the LCD cable over to her monolithic plastic monolithic laptop and began to present her account of the future as a representative of the elusive Social Research team. She did not stand, but leaned back in her chair to glance at the slides occasionally. She was small like myself, very calm, her presence moved lightly through the room, and discussions moved through her presentation.

Tony made a request before she began. "What are the next big trends in behaviour... looking for the best technological jump that you can," he said.

The woman barely nodded, moved into the story from her slides. "The Consumer Landscape... There will always be Cutting-Edgers, Mainstream, Laggards.

(Early adopters, majority, and laggards according to Everett Rogers' diffusion of innovation).

"Basic psychological needs for achieving quality of life...
Storytelling, Sharing, Re-experiencing.

(Maslow's Hierarchy of Needs with three additional needs).

"Because of new technology [you have] new needs and new social contexts... Technology... is felt to be threatening at times... because of their insecurities they sometimes reject novelties...

The social researcher continued to the next slide almost without pause. "It becomes social art... [It's] the art of seduction... making it simply irresistible."

(And seduction was a black art the designers excelled at).

Tony agreed, tugged at his lip. "What can we do to make the memory experience more believable... higher quality?" he asked the table.

"Memories don't have to be the truth of anything, they don't have to be believable." The social researcher reminded everyone.

After a few beats, Tony continued. "How does a device help you to recover experience? ...How to create an experience for your senses?"

"What's the magic that will making sharing work?... Magic of sharing is crucial."

The marketing manager swung to his feet, thanked the social researcher. "Good to be user driven... we've had good results from being user driven."

Of the three needs presented by the social researcher only one 'sharing' seemed to have been digested by the rest of the room, 'storytelling' and 're-experiencing' seemed to have been lost in the milieu of comments.

There was a 'bio-stop' as Tony called it, and I turned to the social researcher next to me, asked her how they gathered their information on trends and needs. She was a little hesitant, but said that they largely conducted interviews with experts, such as university professors. It seemed that much was being done as an effect of these interviews. In essence, predictions

were shaping the possibilities for the future. Her answer reminded me of a comment by one of the industrial designers when I had asked about their trends a few days earlier:

"Worth Global Style Network (WGSN) is a self fulfilling prophecy.. as a trend agency... Car industry, fashion industry, everyone uses them. We use them. [They use] observation at trendy places such as London, New York, Milan... [It's] why you get a big recycling of trends."³²⁴

Blue was prescient not through foreknowledge as divination but through foreknowledge as a located practice bought and paid for. It was in the business of trading foreknowledge. The future of technology was known, or at least something was known, because the same predictions circulated and were stabilised through the industry; prediction was a knowledge-making business. What was believed in this room rehearsed a particular future, circulated that future, and translated that future to other parts of the organisation. The foreknowledge that had been bought and paid for effectively held that part of the future in stasis. I had been struggling all through the meeting to hear a future being made but all I had heard was the auditing of futures made elsewhere, and then rehearsed here.

Now the moment came, as the team returned to turn all their gathered prescience into a future concept. Now would be the moment to listen and see how they turned foreknowledge into future.

Tony was pointing to his scribbled red-pen notes on the pad of paper. "Have two or three categories of scenarios [to make]... We're not trying to design device, trying to design a concept that does a number of things... Can we cluster the important ones [scenarios]?"

³²⁴ From discussion with one of the industrial designers at Blue, 18/3/2004.

All of the notes and words that had been collected through the day by were transferred to pieces of paper, and transferred to the floor (the table was a mass of cables and laptops). The group huddled at the window, moved the pieces of paper around, studied the associations, relationships. They managed to collate them into three areas.

"Three super-categories [of scenarios] are Capture, Consume and Manipulate," announced Tony. "This is not coming out of thin air. This comes out of two years [research]." There was quiet laughter, embarrassed laughter; two years of research into three words; too much had been lost for the claim to hold meaning.

Someone from another group, perhaps part of marketing or program management, spoke for the marketing manager's benefit. "Is there a killer scenario in there?... Is there a hot scenario in there that will make us, the company, a lot of money and make the directors very rich? ...We're always looking for the killer scenario, like text messaging was."

But from the flooring of felt-tip black words on twenty or so white A4 pages a 'killer scenario' did not seem to coalesce.

As they shuffled the scenarios still further, Tony (with my help) quickly put up a wall of illustrations from the design team, endless shapes of devices, endless ways of opening and closing a small device, endless screen and keyboard and camera combinations. Everyone else drifted over as the mass of colour sketches filled the projection screen and walls. The next task was to select a shape, a box, a container from this multitude, in which the final scenarios might live, and from which a new concept would be given form.

And then there they were, on the paint-flecked grey floor beneath the grey windows. Three shapes, three boxes with names, and a pile of word pages (representing two years research) beneath. Tony read out the names of the three shapes:

"Memories... Moments... Sharing Magic."

The paunch clapped Tony on the back. "You're a hero... Gives us something aspirational as a business unit to head towards."

I backed away, sat down hurriedly into a chair. Where was the research? Where had all the tension, the concerns, the questions of the day gone? The day had begun with 'I create memories' and ended with a shape called 'memories' as if the day had never been. What had happened here? The words of the day had been only whispers, it seemed, swallowed almost whole by the three boxes. Those boxes lay before me, three more enchanting shapes into which the dreams of the industry had been poured, its dreams of video communication, video commands, video control. I felt a sense of vertigo, a rushing sense of inversion. I had thought that this day, this final moment of action when I would really see the mobile telecoms industry create a future, would be empirical in some way, methodological, that stories would cohere, slides accrete, and a future would solidify. The cumulative process to create the final concepts had seemed to suggest things adhering. But it seemed that the work of today had not been to create the future (although that had been rehearsed here) but to create a shape to hold the future.

The future had been rehearsed, the curves, the needs, the science fictions, the trends, not to hold them into some pattern of selection or sets of relations, but to explore the boundaries of the box, to push at the possibilities. Whatever might be in the future had to be shown to fit inside the box. And once the box was made, was given form and named, then it could contain all those futures and more besides, indeed what it contained was no longer material; it had been through a process within the company that had said – 'this is the right shape' as the

marketing manager had confirmed, 'this is aspirational'. I had been party to a process of making and then emptying a box. This was the creation of a shape that could enchant the industry, the creation of a magical box of delights that could hold within the dream of ubiquity. Another brick in the tower of *Moore's Law*. For this was what design at Blue did: it held possibility and uncertainty in tension so as long as the design process endured.

But the empty box, these three enchanting images before me, were dangerous. Brian knew, had tried to call for something else, another process that might lead to other kinds of love. These three boxes had been given form and been named, and in stories naming was an act that called forth the powers within a thing.

My head ached, and I felt grey, as though the studio air had finally leached my body of colour. It seemed to be getting darker. I needed light, and stepped out of the room, round the desk pods of the senior management and into the library, scuttled into the far corner before the window. My head yammered and I was not prone to headaches. Through the window I focused on clouds gathering in a wind-whipped line overhead, at the zenith of the campus. Below there were the young trees at the centre of the gravelled car park, the bones of the multi-storey to my right, to my left the steel gate on its wheels, and beyond... beyond this city was a thread of tarmac but its darkness slid into emptiness. No it was not empty it was in shadow, the shadow cast by the city.

Brian had called for a reformation but it had not yet come. Instead, three more bricks for the tower at the heart of this city of Babel had been made.

The wind picked up, the storm sunk down. Rain drops began to streak the window panes, gusts of air crushing the glass with distant booms. I stared at the sky behind the buildings opposite, trying to see the weight of the clouds, their shade, but the sky looked perpetually storm-green through this chlorine tint. Then the line of darkness rushed at me, rushed across the sky, an umbra filling the heavens, filling the world with grey. Cloud shapes dissolved,

smeared, and the sky became a heavy dome, a single colour, hexadecimally coded monochrome (even through these windows). And then the sky seemed to divide, and a vertical sliver of ink split the sky in the distance, behind the campus building opposite.

The vertical line began to thicken, taper. It was moving towards me.

And then I saw it. The thin black line was not a cut in the dome of grey sky, but a tower, infinitely high, tapered, lost in the dome, a space elevator to infinity; and it was rushing in to Blue. This was the tower of *Moore's Law*, the tower of Babel, there could be nothing else in this city that held such power. It was coming, coming for me, no, coming for its three new bricks that we had made at Blue, that we had named and whose power of possibility we had unleashed.

There was a rumbling series of cracks from the ground. The gravel of the car park was rent as though a wedge had pulled the earth apart. Into that crack, down the side of the building before me the thin tower came, hungry, voracious. It slammed into the apex of the wedge, and I saw that its scales of brick snaked into the ground away from me. Its weight was born upon some great tap-root that reached back along the darkness of rent earth as far as I could see. Its tapering spire leaned over me, an exponential curve stretching ever upwards.

Outside of the campus, beyond the electrified fence there was still nothing but shadow. Nothing. Too late. No way out. There seemed no escaping the tower of *Moore's Law* in the mobile telecoms industry. No escaping the dream of ubiquitous wireless telecommunications. The tower was made of so many bricks, so many dreams, that it had its own agency. And we at Blue had added another three bricks, another three boxes of future possibility to its long life.

As I stood in awe rather than terror beneath the tower, absorbing the intricate detailing of each brick, the multitude of products and concepts worn into its surface, I had only one

question left. This was a well-loved future in the industry, a future with its own agency, but was it a good future for everyone, everywhere, and everytime?

It was a question I could only answer for myself. Everyone and anyone had to decide for themselves.

Reconstruction 7

by Future Archaeologist

The stones growled, a flake of quartz hit my cheek, and still I heard Gillian grinding the raw slabs of quartz together in the utter blackness. I stared hard into the nothingness before me, retina dancing with purple and yellow lines, luminal memory of life before we had closed the door. A glow of orange in the crack between the stones... gone. There was a pause, Gillian shifted her movements, the growl of rock increased in intensity. Then there were flickering lights in the dark, gold and blue phosphorescence, a universe of stars within orange nebulae, galaxies came and went, the fires of supernovae. The lights whirled faster and the growl became a harsh ringing of quartz on quartz. There was no shadow in this world, nothing illuminated, only the effervescent glow of piezoelectrics, and finally, reaching my nostrils, the stench of burnt rock.

The sound and light faded, and I heard footsteps echoing above us in the design studio. Gillian threw back the trap door, and spotlights blazed down on us.

"That was fantastic," I said.

"I know." Gillian was shaking out her arms after the exertion. The two flat quartz blocks lay on the floor surrounded by chips and crystalline-dust. "I take them along when I'm out visiting chambered tombs. It's really atmospheric when you're in pitch darkness, standing in two inches of water, underneath the earth. Movement of the body is just so important to remembering – you're not going to forget rubbing those quartz blocks together, now, are you! It's what we're trying to get at with the Camerastone."

We clambered out of the storeroom, and I saw that the weather was thick with unshed rain, dark and heavy clouds so close as to be almost touchable. The black boulders in the gravel and sands of the shoreland were damp with wind-whipped crests of waves that crashed

against their sides. The spray rose in clumps of water, and then fell onto smooth stone surfaces to face the sky.

Gillian had gone to the kitchen and leaned out of the door way to make motions asking if I wanted a cup of cocoa.

Behind the studio door thudded open and I heard the quietly intense voices of Richard and Georgina, the grandfather and grandmother figures in this small family of designers, artists and anthropologists. In this company there were many passions: for family, for the sun that almost never set in summer and cast a perpetual twilight in winter, for the archaeological monuments whose standing stones rose from the surface of the fields, and a passion, today, for the futures of the mobile telecoms industry and, in particular, for the camerastone.

Gillian passed me a hot chocolate and dodged around a pool of blankets at the end of her *chaise longue* to listen to their discussion. Richard was glancing furtively around the studio as he spoke, peering at the collages of magazine pages stuck, irreverently, to one side of the stone tower that lay at the fulcrum of the studio.

They broke off as we came closer, and George smiled. "Good morning. We're just trying to work out how to get the industry to visit."

Richard was blinking rapidly with thought. "The airport's been closed for two days this week. They're quite likely to get stranded down south, unable to fly," he noted. "So I do think it would be prudent if we go to them. Do a presentation at a hotel in Edinburgh. Yes, that would work out well."

George was not taken with his acquiescence. "They just have to get here, Richard." She pursed her lips, ran a tense finger along the inside of her newspaper-print scarf. "The islands are in love with the Camerastone. Even my mother has one on pride of place on her mantelpiece, for goodness-sake. I don't think they will get it, unless they are here." She

levelled an uncompromising stare at him. "Anne says it's become socially as well as technically embedded here on Orkney. You cannot just move it. They can only experience the Camerastone here. It's that simple."

Richard flustered slightly at her directness. "Well... yes." Then he gave a conspiratorial smile. "Actually, I don't think it will be a problem if we have them fly up from Edinburgh. It's an enticing place for them to wait until the clouds part, if there's a problem."

"Fine." George flicked her hand dismissively in agreement. She pushed her black-rimmed glasses up onto the top of her head, frowned as she noticed an oddly sculptured bronzed ball balancing on the edge of a worktop in front of the window. From its base a tangle of ribbon cables thrashed their way uncomfortably towards the back of a PC tower. It was a Camerastone – one of the prototypes.

Carefully, I moved the ball and tried pushing the dial at the top, seeing if it would come to life. On the five other opposing sides smooth round bulges undulated my fingers as my hand flowed over its cool surface. Inside each bulge was a tiny LCD screen.

"I think you'll need to rock it," suggested a quiet voice. It was Soo-Yin, hidden in a corner behind a bank of battered widescreen monitors. She leaned over and held out her hand, twisting it back and forth to show me.

I let my fingers slide into the cool gaps between the nodules where the screens were, then rocked the stone back and forth a few times. Then I bent to peer into the stone. There was a vision of a smooth mountain top seen from afar, scree slopes falling out of frame, moving. It was a video seen from... a footpath, I wasn't sure. Then I looked in to the other screens, and saw the mountain from the other four directions, one side had a long arête, upon which people walked towards me. And then I looked above, and it was of a person I didn't know standing on the rocky summit of the mountain, walker's cairn and a white trig point nearby. It was

beautiful, a landscape and a mountain caught within the scrying glass of the Camerastone. I felt like I was looking back in time, or perhaps I was looking into the future.

"Whatever is Simon up to, now?" murmured George, breaking my reverie.

"He's just gone to the jewellers. They are engraving one of the models," said Soo-Yin.

I went around the curve of her glass desk, and she carefully set aside her graphics tablet to face me.

"Engraving a model?" I asked.

"We gave them a 3D model from the first batch we produced." She nodded towards the drinks-machine hulk of the 3D printer³²⁵, used to 'print-out' in layers models of the camerastone from her CAD data. "They decided to electro-plate the plastic, to create a show piece. They were getting their families to send in pictures and videos from their mobiles. They thought the Camerastone was like a family photoframe. Something that would hold images of friends and family together, in one place..."

"A space, an artefact, to hold social relations together," I murmured.

She nodded, "Yes, I think so. They want to engrave their model with spiral motifs, like the prehistoric carved stone balls, which we used as inspiration. But made very modern, very elegant."

There was a dull thud. The door to the studio banged open again, coinciding with a boom of wind reverberating through the wall of window. The clouds had broken at last, and the rain drops unleashed upon us.

³²⁵ The 3D printer at Sand14 arrived in August 2004.

"There you are!" It was Anne, our merry aunt. "Just off to see Mary, George's mother. She's been knitting with one of our Camerastones. Did you want to join me?"

I quickly downed as much of the rest of the hot chocolate as I could, and leaped for the studio door, trying to remember quite where I had left my boots (in the airlock or at home by the radiator...).

Inside the enormity of the leaky land rover, high up over the stream of tarmac, Anne and I had a chance to catch up. She had been out of the office for much of the time in the past few weeks.

"So, how does Mary fit into this?" I asked, eyes on the grimy pool of rainwater collecting around my feet. "Has she really invited all the executives from the industry to hers for tea?" I was somewhat sceptical.

"That she has." Anne was all mischievous. She had been in cahoots with Mary and various others for weeks. Initially, as an anthropologist conducting her ethnography of photographic keepsakes and postcards. But now she had a whole network of people across the islands who had helped develop ideas for the prototype, and then simply taken off with the concept, from jewellers to architects, from grandmothers to teenagers, each transforming the camerastone into something slightly different.

"She's quite determined to give them a piece of her mind," Anne said.

We sailed on through the town of Kirkwall and south, road now almost Roman-straight, a wet rope undulating over grassy fields that stretched away into the clouds all around us. Patches of rain filled the air, refused to fall, seemed simply to blow out of the clouds in gusts. But Anne confidently pushed through, wellie-pedal to the floor, elbows out.

"Since we made that model with her family in it, she feels quite attached, " she explained.

"And I agree with her. You can't just take an empty model and a few PowerPoint slides and plant them in front someone, and expect them to feel anything. To really get it. Well, I suppose some people would love the idea of the thing as a gadget, but I'm not very interested in them." A car passed on the other side, and Anne waved to the driver with a wide smile.

"You want someone to fall in love with the whole thing," she continued. "And the whole thing includes where it is, what it does, who does what with it. You can't really hand wave that stuff, and say, oh, teenagers will love it. Och," she shook her head. "Which teenagers where, doing what. And then you find that half of them hate the thing. It has happened to us, you know, when we've got a little carried away. Anyway, the camerastone is a future, which we've made into a plastic model. And we love it, as you know. But it turns out that other people love it, not for what it is, but for what they think it is. It's metamorphosed into lots of different futures, which is grand."

I nodded, listening. Remembered that this had been George's concern. That you could not take those different futures, and the families and people and experiences who had made them, and crush their relationships into a PowerPoint slide. The industry had to visit the families, and experience the camerastones as they existed in the lives of those people who loved them. It seemed the camerastone had metamorphosed wildly, you could not simply have a boardroom demo of the technological prototype, and say that was the whole thing. If anything, through Anne's work, the future that the camerastone embodied had become locally adaptive, mutable. The plastic camerastone model was part technical, part social, part imaginary, a future object that did not hold still as it moved and multiplied. Rather, it shifted unpredictably in response to changing local circumstances. It was a fluid technology³²⁶.

³²⁶ This draws on Marianne de Laet and Annemarie Mol's notion of the mutable mobile. They argue that their example, the Zimbabwe Bush Pump, is a fluid technology, whereby its mechanical and social parts may alter and metamorphose as it is adapted and evolved locally. They note that the bush pump is an assembly that acts differently in different places as an effect of its differing local relations, relations that also change over time (de Laet and Mol 2000).

I put the idea to Anne, and she agreed, "Aye, we're not interested in creating one thing. If we can create something that's amenable to being loved and adopted..."

"And adapted..."

"Yes, and adapted, then that's far better. It's about durability. "

That caught me, and I looked across at her sharply.

"If you want something to endure, and if you want it to settle in all sorts of varied places, then you have to make it amenable to decay and fragmentation," she shrugged, eyes to the rear-view mirror, turning the wheel to miss a pothole. "I've always thought you can't design a universal technology. You can only really design something to be part of somewhere, that can be made to fit in... with a little effort," and she leaned over to me with a duplicitous dimple in her cheeks. "Nothing works out of the box. It's all social and technical practice. That's why I push for social as well as technical design. Not to fix either in stone," she gave a cackle at her inadvertent reference. "But to try and make some space for them in a terribly practical, possible, no nonsense way. It's the internet in Trinidad argument – the internet is not global but always part of local practices. It's always local stuff."³²⁷

And that was why we were driving to Mary's, George's mother, to see what the Camerastone had become in her particular life.

We finally rose the crest of a long low hill, and tumbled down a rutted lane towards a grey cottage nestled above a brushstroke of white beach. The clouds had upturned and risen, broken even in places, so that glimpses of blue vaults pooled overhead. In the distance, below the mist enshrouded twin mountains of Hoy, a red dash of oil tankers divided a tousled sea.

³²⁷ This draws on an ethnography of internet use in Trinidad by Daniel Miller and Don Miller (Miller and Slater 2000).

"I recommend you hang on to your door," advised Anne, as she took firm hold of her own, ready to pull against the gusting late-summer gale.

Mary's front room was a dark traditional affair of Queen Anne armchairs, lace, and side tables filled with sponge cake and china teacups. An open fire glowed with intense warmth behind the mesh of a fireguard, forming a yellow grid that danced over the fiercely condensed black eyes of our elderly host.

As we tucked into the obligatory tea and cake, Mary leaned over to her small collection of ornamental figures on her mantelpiece, and took up what looked like a pale lavender ball covered with knitted flowers in thickly woven crochet. Green vines enveloped the ball, between the flowers, almost growing out from neat holes on six bulging sides. It was the camerastone. Mary fondled it briefly and then gave it series of shakes, knuckles white with the stiff, firm movements.

"Isn't that what you said, Anne?" she said, stopping suddenly mid-motion. "Shake it every day, or before you want to look inside, to keep the lights on?"

"Oh, yes," agreed Anne, watching carefully over the thin rim of her tea cup. I knew that it was this kinetic powering that Simon had calculated would keep the backlights for the Camerastone's five tiny screens alight, and in theory could provide enough charge to enable the imaging chips to take pictures and video footage, and even run the wireless Bluetooth port.

"It helps me with my arthritis," added Mary, flexing her paper-white skin stretched thinly over engorged knuckles. "The nurse says I'm supposed to fiddle with some funny little ball, but doing this at least has some purpose." She turned her black eyes to Anne, intent. "I am in training, for the real thing, you know. And Kathy's doing the same for her joints. So you had better get those people over here soon, and get them to make a real one."

Anne glanced at me. "I think that adds therapeutic device to the list of unexpected possibilities."

Mary peered into one of the knitted holes, then slowly rotated the ball, staring at the other five sides. "I do like this picture of Georgina, front, black, left, right, and that strange view of the top of her head. Although I cannot imagine how you persuaded her to step in front of the cameras. I would love to experience it properly one day, rather than these peedie postage stamps here. I'll tell that to those executives, too."

She pulled a piece of fluff from an intricately knotted crocheted leaf, and passed it to Anne.

"I've been busy with my needles, you know," she explained. "I made Amber an olive green cover. Grunge, I think she called it. And Kathy wanted one in cerise. Once you make this little stone properly, I think I might set up a knitting business."

She took back the beautiful ball of yarn.

"I couldn't possibly have it on my mantelpiece without that cover..." She flashed a hard stare at Anne. "You be careful. Those technology people. They'll end up making something all steel and black with hundreds of buttons." She reached over to a side table with an embroidered lace table cloth, a large plain, cream telephone, and picked up a silver mobile phone. "Like this."

We returned to the grass-covered dome of Sand14, an obsequious mound by the loch. I turned, and looked back across the road to Sand14's architectural counterpart, the grassy curve of a five-thousand year-old prehistoric passage grave in the field beyond. In a thousand years would they both be the past dreams of archaeologists? I wondered.

We headed back to the studio. Through the stone-slits of the square house at the core of the dome, we could hear Richard and George still in conversation, and followed their voices into the house.

The peat-fire burnished the air and immediately the chill dampness, the clamour of wet weather, left me

Surprisingly, Amber was there, her long tall limbs folded cross-legged on a chair. She and her boyfriend, who were clean-up and facilities, usually only dropped by between college classes. During this particular project, however, Amber's alter-ego as a local DJ had been extensively co-opted.

She was cradling a white plastic camerastone model covered with words, graffiti, and signatures.

"It was my last day, and it was just in my bag, so everyone ended up signing it," she explained, turning it in her hands, protective. "I had a load of pics on my phone, and Simon suggested printing them out, and pasting them onto the windows of the stone. He said you'd be able to do that - send pics from my phone and back again." She squinted into one of the five extrusions that were both viewfinder and digital display. Inside the rounded-square was a small picture of two bright faces.

Anne was nodding intently, then asked, "Will you keep it?"

Amber looked shocked. "Yeah, of course! I'll probably delete the pics on my phone, but I want to keep this as a memento." She paused, reticent for a moment. "Can I have another one to take to college? Don't you just push a button on that printer-thing?"

It was only then I realised that the spheroid models were not simply concepts but were seeds for future concepts, seeds over which Sand14 demanded no ownership or possession.

Amber left for college, and Gillian, Simon and Soo-Yin joined us for lunch.

As we made a sterling effort to polish off wedges of home-baked flapjack, George continued with her concerns for their communication of the Camerastone to industry. "I just don't know how we are going to explain our approach," she worried, spooning out the residual crema of her espresso.

Richard leaned back. "We need to communicate our approach to the future. There's a crucial difference between predictions and forecasts that foreclose the future, and possibilities that make the future volatile and unpredictable. Hmm... our approach is about creating local and multiple futures. I think we can contrast that with the utopian ideal of the mobile telecoms industry. They call it *anytime anywhere*, a global mobile network. I think that makes it very clear. Yes, let's frame it as the difference between well-rehearsed, comfortable, ubiquitous futures, and uncomfortable, unpredictable, local futures."³²⁸

George was speaking again. "We still have to persuade them to come here..."

"Yes, well, I had an idea about that." Richard's fingers were waving again. "I think that a side-trip to our prehistoric counterpart over the road, might be useful."

George raised her eyebrows sharply. "Why?"

It was Anne who leaped in to reply. "The passage grave is aligned on the mid-winter sunset," she said excitedly, head rolling back, eyes skyward, imagination soaring. "It's the only time of the year when sunlight travels down the passageway and into the inner chamber."

³²⁸ Quotes from PowerPoint presentation given by Motorola representative at 3GSM 2004.

Maeshowe. Anne had enlisted the enthusiastic aid of people and businesses all over the islands, who had definite thoughts on the uses for the Camerastone in their lives.

I worried for a while at how those in the industry might react to the social and technical approach to the design of the concept, and to the extraordinary concept itself, until I heard Richard give a whoop of delight one day. He bounded down the spiral staircase from the mezzanine floor and crashed into the kitchen table.

"I've just spoken to a marketing manager at one of the big mobile manufacturers," he said, hopping with sheer energy from foot to foot. "And he said in passing to me: we should do something like that³³¹."

So the effects began.

And the Winter Solstice Workshop was yet to come.

³³¹ Comment by a marketing manager of a major mobile handset manufacturer to a performance of a Sand14 concept, 11/11/2005.



Ring of Brodgar stone circle

Invitation to Sand14 Winter Solstice Workshop

Workshop theme
'Multisensory Mobile Communications'
Touch, taste, and test the future.

Live a one day island-wide demonstration and experience of a multisensory mobile future. Participate in a workshop to explore and discuss the possibilities of multisensory mobile communications in everyday life. Experience the effect of five-thousand years of enduring technology.

This invitation also includes an opportunity to experience the extraordinary winter solstice sunset inside the prehistoric monument of Maeshowe.

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RSVP to Richard Halcro
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Epilogue

What did they do these reconstructions, stories, fabrications, ethnographic accounts, empirical analyses, archaeological writings? I claimed to be conducting a literary-optical experiment in split vision to produce two interference patterns: between the future of the mobile telecoms industry, STS, and ethnography; and between the future of the mobile telecoms industry, STS, and archaeology.³³² These were my two methods, the two figures who did the work of weaving their respective locations into an account: the Ethnographer and the Future Archaeologist. As I discussed in the Prologue, my inspiration for this experiment draws on Donna Haraway's call for generative interference into technoscientific knowledge-making (Haraway 1991b). But others are also concerned with methods that are not contained by the reflective mirrors of critique, that do not necessarily reproduce and re-stabilise knowledges: Bruno Latour calls for matters concerned with the gathering of things (Latour 2004), John Law calls for method assemblage that attends to its crafting of alterity (Law 2004), and there are no doubt many other rallying cries. These reconstructions were an attempt neither to call for nor critique a method but to actually practice method, to generate an interference. For both methods, for both the Ethnographer and the Future Archaeologist, writing, the writing of this thesis, was an integral part. This is a practice-based thesis. It is the enactment of method. How then to answer the question 'what did they do?' and perhaps most importantly for a thesis 'did they do it well?' To answer these questions requires some evaluation criteria by which to assess what matters in practicing a method, and my methods in particular.

³³² See discussions in Figuration 2.

Criterion 1

Locatedness

As I write this, I am holding on to my notebook against the wind, feet planted wide and firm into the muddy grass, fingerless gloves buffering my knuckles against the damp chill. The callous on my middle finger aches with the pressure of holding this pencil in a numbed grasp; my elbow rests too hard on a concrete gatepost at the end of the footpath to the prehistoric village. The turf labyrinth of Barnhouse calls me to the centre of its mound; to the dome of possibility upon which I have meditated for these past few hundred pages.

It makes a difference, the patch of turf, calloused finger. It makes a difference to my attention as a writer, and what I write. It makes a difference to what worlds you, the reader, make. It makes a difference to the knowledges that are made.

This is old news. Steven Shapin and Simon Schaffer's now classic disquisitions on the production of scientific literary writing and the scientifically objective voice in the seventeenth century, are themselves twenty years old (Shapin 1984; Shapin and Schaffer 1985). Yet, the choice of authorial voice in academic writing remains largely unconsidered, or if considered is selected on the basis of publication media, such as peer-reviewed journal or book. The Point of View (POV) of the author in the majority of publications remains the classic 'objective narrator' or 'detached author' (Le Guin 1998), the voice I am writing in now. The author is topographically un-situated, there are no other people, only quoted sources, there are no places, only figures with captions. Landscape and location do not push-back, as Karen Barad might say, when the author floats in this nowhere (Barad 2003). However, across fiction and nonfiction writing there are a wealth of literary tools and different POVs through which location does push-back. As the ethnographer discussed in Figure 2, location is a matter of epistemology and socio-cultural history. Yet in attending to this important aspect of location, the specificity of place remains important, and how both are

translated in a text. Attending to the effect of location requires an attention to the translation of location, and this requires attention to the method of writing. Different styles of writing evoke a different sense of location, and create different knowledges.

The criteria for academic writing should not be simply veracity or rather, as I shall discuss shortly, resonance with evidence. Malcolm Ashmore's well-known reflexive thesis repeatedly makes the point that 'arguments are stories' (Ashmore 1989: 197), that the reader is always a participant in the effect of the writing; there is no consumption of fact or truth only the making of accounts, telling stories. There: telling stories. Yet the choice of authorial voice and location as an integral part of telling a good story raises disciplinary concerns: John van Maanen suggests that writers of impressionist styles of ethnography seek tenure in an English department rather than sociology or anthropology (van Maanen 1988: 140). The 'objective narrator' remains a powerful literary technology for scientific, and therefore assumed trustworthy, practice. Michael Taussig walks back and forth over this disciplinary division in his 'pilgrimage as method' as he moves between official and unofficial voices, attending to translation as he slips between a myriad of locations and authorial voices in his story of spirit possession (Taussig 1997); his pilgrimage makes the disciplinarians all the more potent in his separation of their official office from the distant fieldsite. But innovative technoscientific writing practices can produce innovative technoscientific knowledges. Authorial location and its effect is a methodological not disciplinary question. The questions for evaluation of 'locatedness' then become:

What *effect* does the writing method have? What locations does the writing evoke? What knowledges do those locations make possible?

The Ethnographer and the Future Archaeologist both write predominantly in the narrative 'first person' as part of a shared commitment to the effect of landscape; they are *in* the landscape. If they had written solely as 'detached narrators' and *talked about* the locations

rather than getting cold, wet, and bored in the rock, sand and glass of Blue and Sand14, the thesis would have been written differently, attended to different concerns; the effect of the thesis would have been different. Sand14 and Blue would not have existed, they would not have been enacted, they would only have been an idea talked about second-hand. Enacting an interference into the future of the mobile telecoms industry required ‘first person’ storytelling.

Criterion 2

Difference

...Smell... warm moist heather and grass, a tang of salt from the loch, metallic scent of damp wool. The incessant, ear piercing clear cry of oystercatchers in the air, on the telephone cable, on the barbed-wire fence. The surface of the earth ripples in the wind, long grasses spreading outwards, inwards, breaking against the stone foundations of the house...

Is this a persuasive story of the world? This is not a question of its accuracy as a representation of reality, but a question of whether it persuades the senses, whether it moves you as a reader; whether it makes a difference.

John Law includes ‘aesthetics’ as a measure of a good method assemblage (Law 2004: 149), noting that beauty and elegance appear to have more methodological currency in the mathematical writing of equations than in the social sciences. But aesthetics is not, for me, a desired effect of storytelling, rather it contributes to the effect of the story. Aesthetics is not an end in itself but rather part of weaving a pattern to involve and move the reader. Returning to Haraway’s optical metaphor of generative differences it is important to note that interference patterns are seductive, they effect the viewer, draw them in, make them believe or at least suspect something different. As my reading of Haraway says, interference is always “the non-innocent, *complexly erotic* practice of making a difference in the world, rather than displacing the same elsewhere” (Haraway 1994; my emphasis). A method is the making of knowledges

in the world, the formation of patterns, and those patterns can be formed differently or the same as before. But the resulting patterns of a truly successful method persuades the reader/viewer, moves them emotionally and epistemologically through their patterning of knowledge; the illusion of the God-trick is founded on the production of patterns of objects such as galaxies and planets that are so beguiling, so aesthetically entrancing, as to be simply there, as though we were out there, too (Haraway 1991b). But situated knowledge is no less beguiling, no less aesthetic, no less elegant than this 'objectivity'. Partial perspective is passionate, erotic (in the sense of arousing emotion), and non-innocent, for that is part of how, as a method of heterogeneous parts and not wholes, it makes a difference. The questions for a criterion of 'difference' are therefore a matter of:

Does the method, as an interference, generate differences? Are the results both effective and affective, do they move the reader emotionally and epistemologically? Do they beguile the reader with their patterns? And most crucially, is this difference an effect of the illusion of objectivity or through a practice of partial perspective?

I deliberately wrote *Sand*¹⁴ and *Blue* to be both beguiling and partial places, compelling locations for practioners of science studies to visit. I wove the arguments and ideas concerning the future of the mobile telecoms through those locations, which were constructed, very visibly in the text, from parts of evidence. Indeed, the visibility of the evidence was intended to be part of the stories' seductiveness. However, after telling some of these stories to colleagues at conferences it became clear that my entrancing patterns had other effects. Listeners and readers within the socio-cultural sciences were occasionally left with a feeling of seamlessness, with no obvious intersections or sites for traditional critique; the beguiling writing also silenced. But perhaps this silence pointed to the possibility of other critiques, rather than simply the absence of critique. More importantly such silence was also due to the strong emotional effect of the method of combining affective writing and partial evidence; it made a difference to people.

Criterion 3

Craft

...It's nearly eight o'clock in the evening. I have been here, walking, wandering, listening, writing for many hours, working in and at the landscapes of Sand14. A beam of evening sunlight strikes the planes of granite, the raw old surfaces glow burnt orange, dusty pink. The sky is gathering depth, blue heavens reaching up towards stars and planets, grey clouds heavy on the loch. Hurried, sliding steps of boots are behind me. It's Anne.

"I thought you might want this," she says with her wide smile above red flapping fleece. I look down at her hand holding a dark woollen pouch. The hand undoes the knotted strings, reaches in, re-appears holding a Camerastone model, sprayed inky blue, detailed with screens, controls...beautifully real.

"We've moved on, " she explains. "But we all wanted you to have this. To remember."

"Thank you." The words seem an impoverished reply.

It's hard for me to repress a fumbling delight as I hurriedly remove my gloves and carefully take the blue Camerastone into my palm...

How to measure the quality of this scene? How to assess its execution as part of a method of generative interference? If my method is enacted as writing, then the crafting of words and language must be part of the criteria. Craft is an integral part of any methodological practice; making knowledge is a matter of execution and the skilled manipulation of apparatus and tools. Skilled, trained, crafted: these are qualities of an experimental practice, a measure of its quality. In writing-as-method, the social science stock in trade, there is curious lack of

attention to the craft of writing; although there is considerable attention to other things, such as argument and evidence. As John Law points out:

‘If we reflect on the sheer pleasure of reading a well-crafted novel, one in which the words are carefully chosen, put together just right, then we may ask the question: what is the pleasure in reading an academic book? And how many academic books are really well written at the word-level? At the level of crafting?’ (Law 2004: 11) .

The divide of fiction from factual writing is a resilient boundary, despite considerable excavation of its foundations in Science Studies finding little but shifting sands; as Malcolm Ashmore says succinctly ‘the distinction between fiction and nonfiction is illusory; all writing is fiction’ (Ashmore 1989: 197). But a brick in this illusory wall that thickens the boundary with every word on the page, is the difference in craft.

Law claims it’s a matter of different means and ends, novels are ends in themselves, academic texts are means to other ends. However, rather than debate the difference in politics between categories of text, what interests me is the quality and auditing of the ends, of the work. Creative writing workshops emphasise attention to alliteration, rhythm, phrasing; shifts in authorial voice, tense, character; punctuation as breath (Le Guin 1998). Writers trained as fictional authors develop attention to style through mimicking others (writing in the style of Virginia Woolf, for example) but which science studies course suggests a study written in the style of Donna Haraway or Michel Serres, two authors with extremely distinctive voices? The rigour of a well-crafted work of fiction does not seem to apply to nonfiction, and in part perhaps produces these distinct categories. Yet, literary craft alters the effects and persuasiveness of all forms of writing. The criteria of craft is germane – to my methods particularly.

In traditional social and natural science rigour is ‘the best and technically robust account of reality’ (Law 2004: 9), which as Law notes tends to assume a singular, discoverable, objective reality. But it’s ‘technically’ that seems the most crucial term. *Technē* is craft, the Greek etymological root of technology (Ihde 1979: 108). To be rigorous in method is to be technically competent, to craft a method well. The broader criteria for assessment might include:

Does the method demonstrate technical competency with its experimental apparatus: electron tunnelling microscope, computer programme, literature? And if it is writing-as-method, is the writing well-crafted?

Throughout the writing of the *Ethnographer* and the *Future Archaeologist* I was highly attentive to the crafting of the text. In particular, to the delicate balance of character and story, and to the use of language as part of the invocation of a sense of place. Literary devices, including the integration of evidence within the flow of the text, and within conversations, were used to draw the reader in whilst highlighting the partiality of the text as an empirical method. I used surrealist techniques of juxtaposition, the appearance of the hotel in 2001: A Space Odyssey and the tower, for example, to craft moments of important disjuncture and an experience of disquiet in the reader. And more generally, the writing was crafted with an attentiveness to phrasing, rhythm, and discipline of language more usually apparent in a fictional piece.

Criterion 4

Resonance

...I watch Anne hurry back down the footpath, notice the white top of the Sand14 Land Rover in the lay-by. The spherical growth of the Camerastone model protruding from my jacket pocket unsettles me. The dome of Sand14, its marine portholes, its white granite pebbles, its

glassy entrance into the grass-covered mound, all so familiar now slides into translucency. It's harder for me to see it suddenly; the turf foundations of Barnhouse interfere. Juggling notebook, pen, and compass I take some bearings: the entrance to Sand14 is at 80 degrees to the North, the Hoy mountains on the horizon are at 240 degrees, the great semicircular window faces almost directly towards the Ring of Brodgar stone circle. But its fading, becoming harder to recall, to write of. Soon, I know, there will only be the possibility, a possibility of a future of the mobile telecoms industry written down and hardened into text. All that will remain is the evidence and the story...

'Is it true?... remains a critical question, not one that will go away' says John Law, speaking of this particularly important 'good' in method, one of several (Law 2004: 148). He goes on to make the moves of a situated knowledge (Haraway 1991b), locating truth in material practice. Method, or rather the kind of method he is arguing for and I believe I am enacting, resonates in and through heterogeneous patterns of relations; method is a 'radio receiver... for resonating with and amplifying chosen patterns' (Law 2004: 117). Method works with patterns of evidence, incoherent parts, but parts none the less, and a method re-assembles those relations, forms a different pattern, different knowledges. The question of truth is therefore a question of parts and of partial relations. What parts are made to resonate through the method? As a criterion of 'resonance' for assessing a method the questions might be:

Is there sufficient evidence to create the pattern (is it convincing)? Are there evidences that might cancel the signal (the evidence does not hold) or even double its strength (important evidence has not been included)?

The radio receiver is also the metaphor I suggested in the prologue for my interference work – the beguiling patterns of galaxies and star clusters woven through interferometry. Resonance is radio reception and perception, tuning-in to particular signals and not others. My methods of the Future Archaeologist and Ethnographer tuned-in to particular evidences and wove them

into patterns designed to persuade. Demonstration of the evidence and an explanation of its resonance with a particular method is what distinguishes their writing from artistic practice, I would argue. Is it true?... can only be answered with... there is evidence at times and in places.

Criterion 5

Commitment

Donna Haraway is adamant that love and rage are part of the discipline of critical practice (Haraway 2004b: 3), they constitute an emotional commitment to knowledge-making. Passion indicates an ongoing commitment to the effects of a method. However, passion and emotional commitment are only part of it, for the cyborg stands as a reminder of the effects of animated technoscience passions during the Cold War. When Haraway refigured the cyborg she made her 'completely without innocence' (Haraway 1991a: 151), she made the cyborg accountable for her passions. Located accountability, as Lucy Suchman nuances it, is more than emotional commitment. It is acknowledged participation in a collective and multiply located endeavour (Suchman 2002). Method is always locally practiced and non-innocent and, crucially, participates in wider knowledge and object-making. Annemarie Mol suggests that what is needed is ongoing participation, not a single experiment or moment of knowledge-making, as though accountability were transitory. Rather she suggests methods and practices *care* about the people, things and worlds they make. Care involves 'tinkering' as an approach to method; an open-ended, non-prescriptive commitment that does not measure success or failure but considers the ongoing political and emotional effects (Mol 2006). The questions this then raises include:

What political and emotional commitments does the method have, and how are those commitments ongoing? What collective knowledges does the method participate in, and

within that collective what does it stabilise and what does it make absent? Is the author committed in the long-term to what they do and its effects?

The Ethnographer raged against the mobile telecoms industry, was bored, trapped, frustrated, but ultimately caught by her fascination, by both her love and rage. Her partly surrealist account of the isolated domed-campus of Blue is a warning story, a fairytale to sharpen the senses, to stimulate attention; attend to the future of the mobile telecoms industry. Sand14 was written with love, with love for the industry, for its technologies, and the landscapes of Orkney, and how those intersected. This love was agape, sisterly, the love that understands the necessity of tinkering, of when to hold on, and when to let go; the ‘art of letting go’ as Mol calls it (*ibid*). Ultimately both the Future Archaeologist and the Ethnographer were deeply committed to the industry, to its people, technologies and futures, for that is why they wrote their stories of rage and love, and through these stories offered their hopes and dreams for its future. Neither wrote an unsituated utopian account of future-making. Both wrote of a contingent, located future-making, accountable to its communities of evidence, both within the industry and in the academe.

These five criteria are the practices of assessment by which the methods of the Ethnographer and the Future Archaeologist should be judged. These criteria do not limit method to an enterprise of truth-making but emphasise method as a practice of interference; method as an always located effect now... and into the future.

...It's gone now. The dome of possibility that I have inhabited for these many years has dissolved into the sea-mist of the loch, leaving only an expanse of yellow-green grass and reeds within a five thousand year-old circle in stone. On the far side of the isthmus, its sliver of shore held only by the tall pin of the Watch Stone, the lights of a house have come on. The dimness of the air makes writing in this little notebook harder, pencil marks fading with the light. Yet the sky still refuses night, sings with twilight brilliance; no star, no planet interrupts its glory.

I step through the upright granite slabs of the entranceway, over a curb stone, and into the expanse of gravel that was the detritus-filled floor of the design studio. In the centre is the hearth, a square box of red stones that once had marked the eternally glowing peat fire of the kitchen; I am drawn to its remembered heat. I lean down to pour the stones through my fingers, feel the roughed burnt grains; and the blue Camerastone model falls from my pocket into the hearth.

With a hiss I pick it up. It's scratched, a flake of paint scraped from one edge, a fragment of wood chipped from a corner. For a moment I feel foolish, negligent... then... kneeling on the edge of the hearth, I burrow down through the gravel with my hands, pull out a few handfuls of clean earth (this whole area has been excavated, recorded and backfilled), and push the spherical model down into the ground. Then, carefully, I cover the Camerastone with sods of earth and gravel again.

It's there now, another archaeology, another fragment, for another time and another story. This one is done with.

I stand, pull soggy trousers away from my knees. And I know. I will be back for another story one day. But I will be back. For the dome of Sand14 is always and for always a possibility.

On (leaving) Orkney

Flare bright, burning islands;
industrial dreams
of plastic and sand.

Cut loose from time,
sea-schisms inserted into temporal demand,
Here I Stand.

Laura Watts

Stromness, Summer 2006

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