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8 Future Archaeology

Re-animating Innovation in the Mobile Telecoms Industry

Laura Watts

"iWatch to save Apple?" the banner blazed on the news website in February 2013 (Herzog 2013, n.p.). As an ethnographer of the future in high-tech industry, and an ethnographer of mobile telecoms futures in particular, I read on. A wristwatch-like device with mobile phone capabilities was being heralded as the innovative product that would return Apple to its former share-price glory. The article mentioned that this was not the first such smartwatch, "Sony's original watch" was launched in 2010, "but it failed to catch on with customers" (Herzog 2013, n.p.).

I shook my head, speechless, my spine prickling with déjà vu. For my first encounter with a wristphone had been back in 1998, at the massive consumer electronics fair, CeBIT, in Hanover. In a tall, spotlight perspex case I had admired the chunky black, red and green Swatch Talk, a voice-only watch mobile phone launched by Swatch Telecom (this was in the days before mobile data and the wireless Internet). Twelve years earlier than the 'original' Sony watchphone. Twelve years. Over a decade was missing; the wristphone appeared to have been dead and buried and born again as a 'new' technology, all very convenient for the making of a potential innovation and newness in the mobile phone industry. The headline might have been rather different had it noted that the iWatch was a mere iteration, another watchphone in a product category with a history going back over a decade, well before Apple was even in the mobile phone business.

Lest you pass on, uninterested in the market failure of the obscure wristphone or the market success of a well-known corporation, let me provide you with some further curious artifacts from this archaeology of the future. The wrist personal communicator from Philips was industry news in 1999. Samsung showed their watchphone in 2000. Motorola launched their version in 2001. Just to make the point, in 2004 Seiko announced the world's first wireless watch, at exactly the same industry conference as a Thinking Materials phone-watch and a gaming wristphone from Teleca, and, if you are still unmoved, LG was touting their Touch Watch Phone in 2009, only one year before Sony's 'original' wristphone mentioned in the news report.

It would appear there has been ongoing development in the product category of wristphones over the past fifteen years. From where comes the newness and innovation that is proclaimed to be the salvation of a high-tech company? To provide some perspective, the Wi-Fi standard, now so common that the air in many parts of the world is always-on with wireless Internet, that taken-for-granted standard is more or less the same age as the watchphone; they have both seen the same number of years of development (the 802.11 standard was first published in 1997).

In the normative version of technological innovation, the version that underlies the news report, technological development is supposed to be an increasing, linear or step-wise progression; things can only get better, so to speak; the 'new' is always more than the 'old.' And shareholders will hold you to that version, as the report makes clear; this is not an idle theoretical point. The iWatch was new; it was proclaimed to be an exciting future for the mobile telecoms industry. But that future could only be 'new' if all those former 'new' and world-first watchphones were made absent, forgotten and buried. Any connection between those old futures and the new future in 2013 had to be severed; no relation made. All the old futures had to be quietly killed off.

I felt like the protagonist in Bruno Latour's book on the Aramis transport system, another technological future that had died a death (Latour 1996). Latour's detective character was on the case of the murder, asking: who killed Aramis? I had a feeling that some of the answers to that question, which drew upon a sociotechnical and actor-network theory approach to technological research and development, would be relevant to my own murder investigation. I wanted to ask: was this a one-off murder, or was the killing of the future widespread? How did the murders take place, how did those futures die? And were their deaths really necessary to making innovation in the mobile telecoms industry?

This was why my spine prickled with *déjà vu* and the desire for action. As an ethnographer, I had evidence of those former watchphones erased from existence in the news report, and I felt compelled to do what every ethnographer must: make a fieldsite.

FIELDSITE FOR UN-DEAD FUTURES

A fieldsite is not a part of the world out there waiting to be bagged and tagged in an ethnographic notebook. As has been well argued, a fieldsite is an effect of deskwork and fieldwork; it has to be made, woven back and forth between the located analyses of an ethnographer at their desk, and their particular, partial experiences of the people and places they collaborate with in the field (Strathern 1991; Gupta and Ferguson 1997). As an ethnographer of technoscience, with a former career as a designer in the mobile telecoms industry, my knowledge and collaborations are located in ways that need a slower moment to explain.

There is a particular scent to futures. I tend to smell them, catch their scent on the wireless ether. It is a sensitivity I have as an ethnographer, which has been developed over several years. The mobile phone network standard '3G' was a future once, a prophecy made in industry predictions and then in corporation-breaking billions, and it was where I began my fieldwork inside the mobile telecoms industry in 2003 (Watts 2008). For four years I variously inhabited the design studio of a major mobile phone manufacturer and other industry sites in the UK. But those experiences are also entangled with five prior years enmeshed in mobile phone design and development during a former career, 1997–2001. Through these experiences my senses have become attuned to future-making in the industry. My fieldsite is a knot that ties these experiences together.

Given that this fieldsite (and any fieldsite) is only ever a fragment, as I write I elide 'the' mobile telecoms industry with these fragments. But, of course, a mobile phone operator makes a different future than a manufacturer, and then there are differences over geographies, the mobile phone world in North America is rather different to Europe and Asia, and so on.¹ Just to make my generalization explicit.

I have a nose for futures, I said, and by 'futures' I do not mean some unknown future over the temporal horizon, nor am I interested in reading the statistical entrails or the augury of future studies or futurology (although that is a serious business). The futures whose scent, fresh or decaying, I can but follow, are those made around me; this is why I speak of 'future-making'. Futures are made and fixed in mundane social and material practice: in timetables, in corporate roadmaps, in designers' drawings, in standards, in advertising, in conversations, in hope and despair, in imaginaries made flesh (Brown et al. 2000; Bloomfield and Vurdubakis 2002; Jensen 2005; Rosenberg and Harding 2005; Adam and Groves 2007). Following Haraway's situated knowledges, I think of these as situated futures; for futures are both material and semiotic (Haraway 1991). They are made in practices, with things such as standards and strategy documents.

So, since they are situated and made by particular people in places, with all the social and technical relationality that implies, their making can be recorded, evidence gathered and my fieldsite constituted.

Consider this fieldsite as the making of an archaeological excavation, unearthing the remains of dead (and perhaps not so dead) futures in the mobile telecoms industry. So let me dig, let me excavate my fieldsite and expand the trench that began with the wristphone.

There is already something in the ground, round and smooth . . .

PEBBLE FUTURES

In another article on the iWatch, there is a comparison with the 'Pebble watch.' This accessory can display notifications from your mobile phone on its curved screen wrapped around your wrist; one reviewer called it "the

first smartwatch for regular people" (Patel 2013). Not a world-first, then, but still a first. Yet reading this review, it's not the reanimation of the wristphone future that blooms hot and fetid in my nose, it's that other word:

Pebble.

Back in 1997 I had helped to design a pebble-shaped mobile phone concept. The shape had been so iconic that I had even written a short science fiction story for a company newspaper featuring a pebble wireless device. But when I returned to the industry as an ethnographer, seven years later, the salty stench of pebbles was still present.

During my fieldwork, I remember the company minibus driving me into the clean, chlorinated white and green buildings of the research and development campus wherein lay a mobile phone manufacturer's design studio. This was in the Thames Valley high-tech zone to the west of London, a walled mass of IT and telecoms corporations, pressed up against Heathrow airport. My hard-won visitor's pass let me pass into only one of the three buildings, then into an elevator and up four floors. It green-lit my access through a frosted glass door and into the off-limits design studio, a sanctum few employees were permitted to enter. This hidden world had a familiar aesthetic: Herman Miller chairs, birch desks, science fiction prints on the walls (a character from the film *Blade Runner* was one I immediately recognized), as well as project rooms, their corkboard walls covered, floor to ceiling, with notes, drawings, illustrations and torn-out magazine pages.

In the central 'hub' room, a team of industrial designers sat in *ad hoc* Ikea chairs, hunched over pens and pads of paper. They were discussing the design trend for a handset to be launched in two years time. A future was being made, so I took out my notebook (no other recording devices were permitted on such hallowed ground). Here's an extract of the conversation, as I noted it:

"Ecological, in a material sense, [means] is natural."

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

"Stone is more natural than white . . . White is ageless . . ."

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

There: pebble.

The meeting had ended and one of the designers invited me to his desk and handed me a polished, rose quartzite pebble. He explained that it had inspired his design for a mobile phone to be launched next year. The pebble was a tactile mnemonic for the sensations he wanted to evoke (Watts 2005).

Caught in my notebook and then in my hand: the fixation on a particular shape, a particular sensation, a particular future.

And the fixation remained during my fieldwork. Two years later, in 2006, Motorola launched the PEBL mobile phone. Its accompanying advertising campaign, "Shaped by Nature," featured the origin myth of the PEBL: a meteorite flung from space in some distant past, to fall onto a beach, to be pounded and smoothed over aeons by the sea, wind and rain, to be at last picked out of the waves by a barefoot user—a creation myth more akin to King Arthur's sword, Excalibur, than to technological innovation or invention.

And so we return to 2013 and the Pebble watch. My evidence traversed sixteen years in total, sixteen years in which the Pebble remained always future, never past. In the trench, then, buried in the dirt of my fieldsite were not just the corporeal remains of long dead wristphone futures, but also long dead pebble phone futures.

The erasure of history and the lack of corporate memory in high-tech industries is an old theme, however, and has been remarked on before. For example, Brian Schiffer's excavation of the portable music player and its many forgotten histories suggests that the reworking of high-tech history is a strategic, political act by corporations intent on ownership of both past and future (Schiffer 1991). Kim Sawchuk makes clear the white middle-class politics embroiled in the development of wireless technology and its happy-family histories (Sawchuk 2010). Whose future gets made, and whose gets erased and buried, is an important question. Futures are situated, as I said; they are always located in socio-cultural epistemology, they always have race and gender specificities.

Given that burying and forgetting technological pasts is not surprising, then, given that quietly 'bumping off' the previous technological generation is not uncommon, why remark upon it? What does digging around in this fieldsite do that is interesting? Merely naming the dead futures in mobile telecoms, such as wristphones and pebbles (and there are more), is not enough.

There is one point that needs to be made.

The same industrial designers who were reanimating the sixteen-year-old pebble phone future also claimed: "It feels as if we're always underpredicting . . . on the backend of every curve . . . It's shocking the speed at the moment." Let us be clear, this is an industry whose tropes, whose stories, are about speed and high-speed technological change. Speed is a story with extraordinary effects: the news report on the iWatch is suffused with the perceived failure of a company to reproduce this story, and the direct correlation with its dwindling share-price. "Innovate or die" is the oft-repeated business mantra.

Making this fieldsite of long-dead and reanimated futures is a clear counter to the mobile telecoms industry hyperbole of high-speed development.

Digging up and attending to reanimated, zombie-like futures claimed to be 'new' calls into question what counts as innovation, as named by the industry. It makes clear that the work being done in making pebble and wristphone futures is not limited to the invention of a 'new' product or prototype; there is much more going on. Devices such as the iWatch and PEBL enact and reproduce already existing futures. Within this industry, and perhaps other similar industries, there are not changing futures, but enduring futures. Industry innovation maintains the same future over considerable periods of time. Its practices, prototypes and products hold a future steady, whilst it simultaneously maintains a trope of 'shocking' speed (and there is perhaps much to say about that as a low-risk strategy in a high-risk game).

Social studies of science and technology have long critiqued normative versions of high-speed technology invention and innovation. Now-classic texts have discussed the *deus ex machina* problem with innovation as technological determinism, and demonstrated how technology does not appear fully-formed or derived from itself, but is an effect of extraordinary and difficult sociomaterial labor and relation-making (Latour 1987; Bijker et al. 1989; Bijker and Law 1992). More recently, much work, also in anthropology, has nuanced the difference between innovation, invention and creativity and how these are done in different places and have diverse effects, such as in the 'technological society,' which is defined by its political reliance on technical change (Barry 1999, 2001; Ingold and Hallam 2007; Nowotny 2008). Lucy Suchman, in particular, has explored how high-tech industry innovation is often, when looked at in everyday practice, much more a matter of artful integration and local improvisation, involving the reconfiguration of existing relations between people and things (Suchman 2002, 2007), and these are just some pertinent examples from a very extensive oeuvre. So innovation is much more interesting than the sudden appearance of a world-first wristphone (again). But poking a stick at all the dead futures that have been buried along the way in the mobile telecoms industry does not get my fieldwork much further than these existing critiques.

Inside the industry, the notion that a future, that the shape of things to come, might be decades old, that technological innovation might take considerable time, decades even, and be fraught with long-term failures and artful resurrections, is not tenable. It cannot be made visible in an industry whose salaries and company existences, both large corporations with shareholders and small start-ups with venture capital funders, depend on a version of innovation that is about not just newness, but newness-at-speed. I might go as far as to say there is incommensurability between this industry innovation and the version created by the critical academic work I have cited. The mobile telecoms industry enacts innovation through the efficient murder of its former darlings, so that the 'old' can be made 'new' again, which is a very efficient way to satisfy the requirement to 'innovate or die.'

In comparison, sociotechnical critiques of innovation are concerned with how the 'new' is made, by making the 'old' visible. These do not go together. They are different kinds of work. So, aside from repeating the critical move to make the 'old' visible, what else is there for an ethnographer of technoscience to do?

I need to keep digging, keep following my nose for rotting futures. But I also need to attend to the partiality of these remnants, for dead futures are not whole bodies but partial assemblages (as any technology must be). The pebble phone and wristphone are Frankenstein monsters, made of bits and pieces, bits of things and people put together; they are sociotechnical relations that have been plugged in and switched on (Law 1991). What I can do is ask more questions: what relations constitute these futures? How are these futures made, and how did they die?

Back to the trench, then, and there is already a long, thin thread I can tug from the dirt . . .

UBIQUITOUS FUTURES

The thread I began to pull from the dirt was an old, familiar line to me. An industry magazine described it as "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" (Malone 2003, front cover). It was perhaps one of the most famous versions of newness-at-speed in the high-tech industry: the line known as Moore's Law. This was a prediction made in 1965 by a founder of Intel, Gordon Moore, of the exponential doubling of components on an integrated circuit year on year (Moore 1965). Since then, Moore's Law has been taken to stand for the prediction of an exponential annual increase in almost any measure in the industry, from bandwidth to battery life. The manager of the design studio in the Thames Valley called it "the hockey stick effect" (reflecting the shape of the line on a graph), and was as frustrated by its stranglehold on company decision-making as the magazine journalist.

This speeding thread had endured in the industry for at least half a century, far longer than wristphones and pebble phones. Its age reeked in my sensitive nostrils, an ancient sinew. I bent closer, pulled on the thread, seeking ethnographic evidence for how it had endured, and found it was entangled in endless exponential graphs.

The graphs took me from the Thames Valley to Cannes in the south of France, famous for its film festival, famous in the mobile telecoms industry as the former location for the massive event known as the 3GSM World Congress. I had attended this industry conference along with thirty thousand other delegates in 1994, an event so vast that it had increased the local population by 50 percent. (By 2013, it had relocated to Barcelona and there were seventy-two thousand delegates swarming the city).

I remembered that the company bus had rolled through the palm-lined strip of La Croisette, its famous beach promenade. I had watched women in furs trailing small dogs, crisp black-and-white-uniformed waiters serving coffee to dark-suited business men (and they were all men), the Versace and Armani boutique shops, and the gleaming white hulls of corporate-sponsored yachts packed into the marina, or what the industry journalist I interviewed called "the floating gin palaces." And hanging from every luxury hotel façade, every street pole, pasted to almost every vehicle, was industry advertising. Even the sea and air were branded through evening fireworks that blazed with logos, reflected in the water. That morning the air was magnificently bright to my British eyes, as the venture capitalist said, "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."

The venture capitalist and journalist had passed on their experience as well as the conference pack as part of my fieldwork in 2004. The conference pack contained the PowerPoint slides from the presentations, and they were full of hockey-stick-shaped graphs. The conference speakers had made countless exponential, visual predictions: music revenues would increase exponentially from 2003 to 2008, subscribers for location-based applications would increase exponentially (no need for an axis measure on that one), the number of 3G mobile phone models over a year would also see exponential growth, revenue from mobile media messaging (sending photos between phones) was another hockey stick drawn from 2003 to 2008, its rise only surpassed by revenues for mobile instant messaging (not to be confused with text messaging) during the same period.

I could go on.

No matter the y-axis or the time along the x-axis, the shape was resolute, repeated until it was mantra: the speed of the industry was increasing, in every measure. The future was acceleration. This was how the runaway train roared down its path to apparent disaster. This was how newness-at-speed was done, in large part. Here, the line of Moore's Law was reanimated into near-mythic proportions; how could such an enduring future, re-enacted over and over by conference speakers from around the industry, be questioned?

Now I knew something of how this monster was assembled.² But how else was this zombie future made so potent?

There were two additional, already well-documented, practices.

First, as I have explored, technological determinism was endemic in the industry. One mobile telecoms company CEO at the conference said in a news report that: "[mobile telecoms network] operators are frightened to death of technology. It comes at us like missiles" (Ee Sze 2005). That fear

of technology was an effect of the normative separation of the social and technical. The industry erased itself, its social organisation and people, from its technology innovation, and so erased its potential censure (and responsibility). Without such separation it's hard for a mobile phone designer or CEO to argue that the speed of change is shocking, for they are the ones making the change.

Second, was that well-studied technoscience power, the power of number, and trust in numbers (Porter 1995). The exponential lines on the PowerPoint slides adopted the apparatus of fact-making, the graph, to evoke trust in their numbers, and trust in the prediction of the line. Failure to label the axes was not an issue since there was no science being done, only a simulacrum that evoked measurement and scientific practice. The graph was read as reliable and trustworthy as a future, because it was a graph. The slides did not reanimate the name of Moore's Law; it was not the label that mattered. They reanimated the graph from Gordon Moore's article, the hockey stick curve. They reanimated a mathematical shape, reproducing a prediction that had apparent mathematical certainty, and there lay a considerable part of its power.

But this monstrous line had a third potency: it was an asymptotic curve, as mathematicians might note. It was tending ever-upward toward a future, infinitely far on the horizon. This accelerating line had some impossible-to-attain end point, a future vision that the line and the industry yearned for. The advertising from the powerful industry association, who organised the conference in Cannes, stated that vision in an advert in the conference daily newspaper: "GSM grew from a vision. A revolutionary vision that mobile phones should keep customers connected anytime, anywhere, even when crossing borders" (*GSM Daily*, February 25, 2004). The word that encapsulated this vision, which was on so many PowerPoint charts at the conference, on my tongue in 1994 and still on the industry tongue ten years later, was "ubiquity."

I asked the industry journalist for a definition. He put it simply: "[It's] everywhere you go in the universe, and everywhere you go it works the same way."

Everywhere.

Anyone Anytime Anywhere, to complete the well-used triptych in the industry. This was the industry vision, the tendency of the exponential line, and the dream that was evoked, sometimes explicitly, by all those graphs. Ubiquity was made powerful through its universal, all-encompassing vision. Nothing seems outside of ubiquity. It seems weightless, hovering nowhere and everywhere.

But I said earlier that futures are always situated in epistemology, they are always located and have politics. So the knee-jerk question is always to ask: Whose dream is this? It seems to be a dream for everyone

and anyone; who would not want to be connected anytime, anywhere? But it is a classic god-trick, that is, knowledge and knowing that appears to be omnipotent, for only a deity could be everywhere in the universe (Haraway 1991). In practice, telecommunication networks are necessarily much more specific (and more interesting). They are sociotechnical infrastructures that are always partial and patchy in their implementation (Star 1999), with not-spots where there is no mobile phone signal, and with people who are not important enough, or not wealthy enough, to warrant the cost of the infrastructure; 'not-ones' who are not included in the *anyone* named by the dream, such as those living in places remote from cities. So this future is neither weightless nor universal. It is sociomaterial, with absences and presences. Ubiquity is not some special class of über-future, an unquestioned good over and for all; ubiquity is particular.³ Ubiquity is just a particular mobile telecoms future, constituted by people in places, as much as the wristphone and the pebble phone.

So ubiquity was taken-for-granted as a future in mobile telecoms, its unquestioned status derived from technological determinism, from trust in numbers, and from a god-trick.

LANDSCAPES OF UN-DEAD FUTURES

Through my fieldsite I had excavated three futures, now, that the mobile telecoms industry had reanimated and made to endure: wristphones, pebble phones and ubiquity. But I was not content to just count and name the bodies, as I said. As an ethnographer of technoscience I was looking for the parts that constituted these monsters, and that must include the soil; in archaeological terms, the stratigraphy, or the location.

The dirt in which all these futures were buried smelled the same to my future-sensitive nose, and that was very interesting.

I have a refined nose for futures, which perhaps does not parse in text. So let me explain the quality of their smell.

The dank smell of situated futures rose up from the dirt, literally from the place where they were made. This is because my professional senses have been honed via an attention to the landscapes where knowledge gets made. Tim Ingold was a key instructor in this attention: his classic work on the temporality of landscape argues that as we walk and move through the world we perform its memory, "we know as we go, not before we go" (Ingold 2000, 230). David Turnbull builds on this to argue that particular movements through particular landscapes perform particular knowledges (Turnbull 2002). Just to be clear, this is not environmental determinism, place does not determine knowledge, rather I regard place as an actor in knowledge-making; the heterogeneity of actor-networks is merely expanded beyond the social and technical (Law 1992). So, since the futures of which I

speak are also made by things and people moving through places, my senses have been tuned to the dirt under their feet. Particular dirt gives rise to particular futures; that is, where the designers, pebbles or CEOs go affects what they know and the futures they may weave.

So when I speak of the 'smell' of situated futures, I mean that it has particular qualities. There are three qualities to situated futures: the epistemological landscape (the situated knowledge), the socio-technical landscape (the embedded infrastructure) and the geographic landscape (the place). These three are entangled and inseparable in practice, of course.

And, as I said, the smell for all three zombie futures was very similar; they shared similar qualities.

The wristphone was being reanimated, allegedly, from deep within the Apple campus in Cupertino, California. Even though I had never visited, I smelled its normative innovation and middle-class wealth in the industry news reports (Wikipedia cites it as the eleventh richest city in the United States), and in other ethnographic fieldwork on Silicon Valley innovation (Stone 1996; Finn 2001; Suchman 2005). It is a place where the wireless Internet is ever-present, and the mobile phone signal is strong.

The pebble reanimation takes place in another gleaming, secretive, corporate research and development compound, in another high-tech valley, this one in Britain. As with Silicon Valley many of the world's large telecoms and IT companies were here (Microsoft, Oracle, LG, HTC, RIM, Cisco, Cable & Wireless, the list was extensive). This was the landscape where fourth-generation mobile Internet (4G LTE, for the technically inclined) was trialed, well before the network was rolled out to other parts of the UK a year or so later. The air and the ground hum with high-speed broadband. The Thames Valley is topographically flat, and the population is dense with disposable income, ideal for cost-effective and technically-effective mobile infrastructure. Here, you can live as though 'always on.'

Cannes, on the French Riviera, backed by the mountains of the Alpes-Maritimes, may seem to be somewhat different, its situated futures an entirely different scent. But you need to be sure to smell the dirt during the conference, when ubiquity was reenacted once more. The local knowledge was not that of the long-term residents, but rather the knowledge of the thirty thousand industry delegates who flew in for the three days and doubled the population, the majority senior management and board level decision-makers. This was not a place for a marketing junket, but where deals between companies were cut. As a venture capitalist I interviewed said, "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." This is normative innovation doing business. The infrastructure was also entirely different. Thirty thousand additional people puts something of a strain on a mobile phone network, so that year (and every year) a team of engineers worked for five months to install an entirely new 3G network in Cannes, involving new antenna on and in buildings, hotel rooms turned into equipment

rooms, and so on; a massive social and technical undertaking, and it was temporary, operational only for the conference. All done so that when the mobile telecoms industry turned up, they could just switch on their phones and have mobile Internet as though it were always on, anytime, anywhere, and it seems pertinent to note that I was forbidden access to the conference unless I paid the entrance fee of 3,000 euros (about US\$3,800); the cost of its visitors pass restricted access as surely as at the other locations.

All three landscapes had the same smell, epistemologically, infrastructurally and geographically. Three zombie futures (the wristphone, pebble phone and ubiquity) were all remade in places that were remarkably similar in their situated-ness. The industry might be global, but it was not universal and anywhere; it was much more parochial in where it made its home and where it made its futures. The landscapes where the industry lived and dwelled were similar locales. If a place had an unfamiliar landscape then it was remodeled, as the massive re-landscaping of Cannes during the conference demonstrated. It was almost as if the industry lived and thrived in only one particular place, a single archipelago whose islands were connected by airports and air corridors.

It may seem like a rhetorical point: the landscapes of the high-tech industry are islands sprung up like reefs around wartime wireless and computing histories, and around major international airports (there are obvious benefits to this when you are moving large numbers of employees around the world for meetings). But given that landscapes are actors in how futures are made, given that place is not a backdrop, not mere context to the main event in the design studio, it is perhaps important to note that the same landscapes enact the same futures.

And these landscapes are privileged in the future of the mobile telecoms industry; something you know all too well if you happen to be a farmer on a Scottish island, or in other wireless-Internet-disadvantaged sites in the world.

So, landscapes were another part to the zombie futures of the mobile telecoms industry. Futures were made of bits and pieces of place, as much as they were of dead wristphones, design studios, quartzite pebbles and dreams.

No wonder they smelled of dirt and decay.

But were there any other unexpected parts in my dissection of these un-dead futures? Yes, there was one thing more, one additional scent that my nose as an ethnographer could detect. That line, the hockey stick curve of ubiquity, smelled ancient, it smelled old, really old, older even than the industry itself . . .

IMAGINARIES IN THE AGE OF UBIQUITY

How old was ubiquity, then, how far back did the line and its asymptotic ideal go? This might seem the obvious question, but it made the mistake of assuming that ubiquity (or any future of the mobile telecoms industry)

was reanimated over and over precisely the same as before. Looking for the original ubiquity was rather like looking for the original watchphone (à la Sony in the news report). You could always point to some earlier object that was similar. This was because the futures that were being resurrected by the industry were not wholes, they were heterogeneous mixtures, monstrous hybrids. Like Bruno Latour's Aramis and Mary Shelley's Frankenstein, they were mash-ups, they were made from bits and pieces: dead bits of ubiquity that had gone before, but also pieces of other things like designers and landscapes. The iWatch enacted the same future as the Swatch Talk, but they were not identical. It was a repeated performance, a rehearsal, always containing the possibility for difference. This was not surprising given that the future was remade in local people and places; if you know as you go, then you know futures as you go, and particularity is everything.

It was a hopeful thought. Things might be otherwise, in time, much more time than the industry presupposed. But time did remain in my nostrils, that decaying smell of age, of the *longue durée*.

I could only dissect some of the parts that comprised the body of this un-dead ubiquity, but even the parts I could name were enough to provoke marvel at the age and endurance of this monster.

There were twenty-first century parts, of course. One made by the industry association who organised the conference: "Imagine a world without wires; a seamless, limitless world of verbal and visual communications," it said. Its newspaper advert spoke of the wireless world, the global mobile Internet, a very contemporary ubiquitous future it seemed.

Still contemporary was the twentieth-century book I was handed during my fieldwork, a book that my industry informant called their "bible on the future." It spoke of a very similar ubiquitous moment in a global communications network, "a wondrous day when electricity would endow the planet itself with cosmic intelligence" (Kaku 1998, 43–44), and this industry bible made the connection between the two explicit: "In the twenty-first century the telecommunications revolution, ignited by the microprocessor and the laser, will finally make Hawthorne's vision come to pass" (ibid.), and now for the putrefaction: this cosmic intelligence was a future envisioned by novelist Nathaniel Hawthorne in 1851. His ubiquity was a nineteenth-century future inspired by the wonders of electricity and the telegraph.

My sense of smell was supported by many others who have dug down into the histories of the wireless world: legendary physicist, Nikola Tesla, envisaged a "World Wireless System" in 1915 (Gabrys 2010); and universal communication is an ideal that has been linked back to Judeo-Christian myths of the Tower of Babel (Mattelart 1999). Ubiquity was a future older than the mobile telecoms industry itself.

Ubiquity was also fiction, and that was interesting to me as an ethnographer. Ubiquity was part science fiction, part biblical myth. The exponential curve on the graph might resemble mathematics, the wireless talk might resemble technoscience, but this zombie future was lumbering around with

imaginary parts. That is not to say they were superfluous or ephemeral, quite the opposite. These imaginaries, these fictions were material-semiotic all the way down; see the very material evidence: the book, the words, and the industry association advert.

I should not have been surprised. The mobile telecoms industry was immersed in science fiction; thus the *Blade Runner* character on the wall of the design studio. Another book from my fieldsite, written by a well-known industry futurist, agreed: "If I ever had a dream of mobile communication it was fuelled by my Tuesday night experiences as a student in the 1960s . . . 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" (Cochrane 1997, 77–78). When I was working inside the UK industry during the 1990s, the next generation of Star Trek had the effect of turning the company laboratory into a silent wasteland on a late Wednesday afternoon. This entanglement of science fiction and technology innovation has been well-documented, particularly through feminist scholars on cyberpunk and the Internet (Featherstone and Burrows 1995; Balsamo 1996; Bloomfield 2003; Kirby 2010). Innovation has always been made, in part, through imaginaries.

As I followed this scent of science fiction in the futures of the mobile telecoms industry, my trench appeared to be coming full circle. For the news reports on the Swatch Talk, on the LG wristphone and on several others all cited the exact same origin for the wristphone. They all cited Dick Tracy, the science fiction detective comic book character created by Chester Gould in the 1930s, who was famous for speaking into his wrist communicator. Judith Nicolson has examined the racial and political effects of Dick Tracy and his science fictions; there is nothing neutral about this technological imaginary (Nicolson 2008). Science fictions are always located, they are just as situated, just as material-semiotic, as any other future.

There were two things here that I cared about as an ethnographer of technoscience, two things that mattered to me in the imaginaries of the mobile Internet.

First, technology futures in the mobile telecoms industry are made, in part, by science fiction. The zombie futures reanimated by the industry in the name of innovation have social and technical parts, but they also have imaginary parts that are no less influential. There is a tendency to ignore the imaginary in ethnographic studies of technoscience, hiving it off to literary or media theorists and retain focus on the oily, mechanical bits and on flesh-warm bodies (although there are always good exceptions, Marcus 1986). But as my case study trench had un-earthed, zombie futures are made of such fictional stuff, with juicy evidence to show. In actor-network-theory ways of making the world, the imaginary was just another actor category, more heterogeneity. It is usual to speak of assemblies of people and things, and the inseparability of the social and technical. It is less usual to speak of

the inseparability of people, things, the environment and the imaginary. But in the mobile telecoms industry, futures were made of such stuff.

But the thing that mattered most to me was that science fictions also fix the future into a static shape; they establish conditions of possibility (to draw on Foucault). They were not neutral or innocent but imbued the futures that reanimated them, knowingly or not, with those politics and those conditions. The transport system, Aramis, whose death was studied by Bruno Latour, was fixed and held in stasis for seventeen years by the impossible dreams of those who conceived it (Latour 1996). The conditions for science fiction and dreams are radically different to the hard negotiation, blood, sweat and tears of technology innovation. Fiction has the luxury of impossibility, for science fiction is partial in all the ways that matter to innovation: science fiction does not consider how a technology is manufactured, how is it maintained, how much energy it uses, what is the warranty, what is the intellectual property, who is envisaged as a user, how much it costs, which standards it supports, how is it packaged, installed, recycled, reused; all these things are absent, and all these things need to be agreed upon for a technology to move through a product development cycle. There is no iWatch without the small print and a large infrastructure (or two), all of which Dick Tracy and his author never had to concern themselves with.

So no wristphone can ever be the Dick Tracy dream, no wireless world can ever be as ubiquitous as a global electronic brain or the Tower of Babel, and no mobile phone can ever be as natural as a pebble or as mythic as a meteorite that has fallen to earth. Science fictions are not only unobtainable; their conditions of possibility, if established by the needs of fiction and a good story, may not be relevant futures at all, and yet they remain, binding the future.

Science fiction futures endure in the mobile telecoms industry. As a marketing manager said in the Thames Valley design studio, speaking of a proposed new videophone: "It is the science fiction dream, I cannot believe you never want to do that."

All of which led to an interesting proposition. As an ethnographer of technoscience, who acknowledged that she generated her fieldsite from fragments of evidence, might I write a scientifiction (as Bruno Latour called Aramis as a genre), some empirical science fiction, that might do work in the mobile telecoms industry to un-fix its futures? Perhaps write an intervention into innovation as reanimation?

FINAL THOUGHTS ON A FUTURE ARCHAEOLOGY

Some might argue it is not the role of an ethnographer to write science fiction, or even scientifiction, as an intervention into her fieldsite. Science fiction writers are already writing interventions into the future, and some

are attentive to those futures they make present. Writers such as Ursula Le Guin, for example, who has explored different futures for sex and gender, and argued extensively for both fantasy and science fiction as an important part of our engagement with the present; what matters is “our thoughts and our dreams, the good ones and the bad ones, and it seems to me that when science fiction is really doing its job that’s exactly what it’s dealing with. Not ‘the future’” (Le Guin 1989, 143). It is a sentiment mirrored by Warren Ellis, who argues that “good science fiction, challenging science fiction, is never about the future we expect. SF has never been about predicting the future. It’s been about laying out a roadmap of possibilities, one dark street at a time” (Ellis 2006). It is this attention to the conditions of possibility, to our dreams in the present, that I agree with; for it is in the present that the futures of the mobile telecoms industry are reanimated. As an ethnographer of technoscience I am also attending to these dreams in the present; this entire excavation and fieldsite has been just that. So I share the same care as these science fiction writers, but my method for writing, my toolkit for storytelling, as an ethnographer, is rather different.

So making an intervention is a methodological question, for me. This excavation has done work to provide tools for a method that might intervene in mobile telecoms innovation.

My method must include my commitment to the empirical, to my fieldsite data (however partial). But technoscience knowledge-making has always been generative, knowing the world is always both an empirical and creative process; you always have to fill in the gaps between the evidence, so to speak. The zombie futures I have constituted are made from parts, decaying fragments, which I have written together. Hence why the metaphor and approach of archaeology has been insightful in this chapter. For archaeology is an approach that also acknowledges “the productive and generative potential of breakage and decay,” as archaeologist and prehistorian Joshua Pollard argues (Pollard 2004, 60). Both ethnography and archaeology are concerned with generating stories from partial fragments of evidence. But whereas archaeology is concerned with stories of the past, I am concerned with generating stories of the future. Writing stories of the future from fragments of empirical evidence is a method I call Future Archaeology (Watts 2012).

But this chapter has added one further tool to a method for intervention into the industry. The zombie futures of the mobile telecoms industry are constituted by heterogeneous parts, including people, things, places and fictions. In my excavation of three examples of enduring futures in the industry I found that, although people, things and even fictions are various, the places seem to remain remarkably similar across all three. If enduring places lead to enduring futures, then perhaps it is the geography of the mobile telecoms industry, the places wherein it dwells, that are a site for generative interference. If the places where the mobile phone industry lived and moved, remembered and dreamed, were different, then perhaps the futures they designed might be different in

some way, too. It is something I have begun to explore elsewhere, but there is much more to be done (Watts 2005, 2008, 2012).

I began this excavation and fieldsite by asking if un-dead futures were really necessary to making innovation in the mobile telecoms industry. Perhaps through a method of Future Archaeology and its attention to place and the role of landscape in high-tech futures, there might be other kinds of innovation that are possible, in other kinds of places. Unfixing the landscape might unfix the future.

I also said I had hope, and so it remains. For innovation as newness-at-speed is already only one version of innovation in the world, as I have explored. Future-making that cares and takes responsibility for the futures it makes is already practiced by many science fiction writers, whose parts constitute high-tech innovation. So within the zombie futures of the mobile phone industry there are already hopeful interventions. Zombie futures are perhaps not the walking dead that I feared, for they are always reanimated with differences, their parts can always change, and others are already tinkering with their innards, and I intended to do a little ethnographic tinkering as well.

NOTES

1. For an example of the mobile telecoms industry in another world region, in this case the Caribbean, see Horst and Miller (2006).
2. For a parallel example see Genevieve Bell and Paul Dourish’s work on the future in ubiquitous computing (Dourish and Bell 2007; Bell and Dourish 2011).
3. For a discussion of ‘monsters’ as an actor-network assemblage see (Law 1991).

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Theories of the Mobile Internet

Materialities and Imaginaries

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