**Notes on STS and Imaginaries**

Marcus, George E. *Technoscientific imaginaries: conversations, profiles, and memoirs*. University of Chicago Press, 1995. Print.

The title of the 560 page volume *Technoscientific imaginaries: conversations, profiles, and memoirs*  suggests that it could be a major landmark in mid-1990s work on science, technology and imaginaries. How did such two dozen cultural anthropologists come together around this theme? Strikingly, the term imaginaries is not indexed as such, although there are 3 pages referencing 'technoscientific imaginaries' and several referencing 'scientific imaginaries.' This is not just a problem with the index. An electronic search of the volume on books.google.com yields only a few more. How would there be such little reference to imaginaries in this book? For such a large book, the absence of reference to imaginaries is puzzling.

Probably it has something to do with the way the book came together as an 'opportunistic assemblage' (1) in the Late Editions series of annuals. The pieces of the book all concern conditions of work in science and technology at the end of the century. 'The term *imaginary* emerged effortlessly and just seemed to fit the topic' (3) writes George E. Marcus. Imaginary was envisaged as linking scientific visual and imaging practices with the imagining of technoscientific futures. Yet the sense of imaginary developed in the volume did not quite the senses of imaginary as high-flown visionary thoughts:

We instead were much more interested in the imaginaries of scientists tied more closely to their current positionings, practices, ambiguous locations in which the varied kinds of science they do are possible at all. This is a socially and culturally embedded sense of the imaginary that indeed looks to the future and future possibility through technoscientific innovation but is equally constrained by the very present conditions of scientific work. (Marcus 4)

Instead, the notion of imaginary developed in the Introduction to the volume, but also later chapters, connects scientific practices (including imaging and visualising) with the ambiguous cultural and social locations scientists find themselves in. Indeed, this is the very core of technoscientific imaginaries: they are responses to or symptoms of an instability or uncertainty that occurs when available discourses fail or block experience.

The 'socially and culturally embedded sense of the imaginary' quote above is thus a slightly misleading formulation. It could be read as connoting that part of the scientist or technologist that derives from their social or cultural context. Actually, the sense of technoscientific imaginary developed in the book is quite different. It refers to the ways in scientists themselves to lesser or greater degrees express awareness of changes in the location and position of their own practices. Rather than being a concept used by the social studies of science to situate technoscience in social locations, a technoscientific imaginary describes how scientists and technologists working in specific settings embody the tensions and predicaments of change. If future visioning has a role here, it is a 'cautiously imagined emergent future, filled with volatility, and uncertainty, but in which faith in practices of technoscience become even more complex and interestingly constructed' (4). Like many other invocations of the imaginary, a technoscientific imaginary inhabits a 'cognitive gap' (4). It derives from tensions between practices and discourses that do not quite fit. Importantly too, the notion of a technoscientific imaginary bears political and methodological implications. It generates 'a completely transformed and vast field of inquiry on which a distinctly *cultural* studies of science might establish itself' (7).

Why then so few references to imaginaries in this book? We could answer methodologically: the notion of imaginary outlined above suggests that it would be useful to ask scientists about their relation to their own activity, about changes in what they are doing, about the possibilities of doing science and about their hybrid locations and collaborations. In the process of doing that, the book presents conversations, memoirs and interviews that document technoscientific imaginaries, but in themselves, have little reason to invoke imaginaries as such.

Taussig, Karen-Sue (1997) ‘Calvinism and Chromosomes: Religion, the Geographical Imaginary and Medical Genetics in Netherlands’, *Science as Culture* 6 (4); 495-524

Karen-Sue Taussig (1997) advances the notion of the ‘geographical imaginary’ to capture the way that ‘deeply embedded understandings of geographically specific social practices .. play [out] in daily interactions that simultaneously produce people and their social worlds’ (Taussig 1997: 497). Drawing in part on work of Edward Said on Orientalism, Taussig highlights that through this imaginary, behaviours and identities are often ascribed to others in ways that serve the interest of the majority. In the case of the Netherlands, Taussig argues that in the “ popular imagination”, Dutch people position the minority Orthodox Calvinist population in opposition to their own sense of themselves as modern and secular. Her case study follows a young Dutch couple who wish to undergo PGD (preimplantation genetic diagnosis) to avoid having a child with CF and whose interactions with clinical geneticists is coloured by their being from Zeedrecht, a village in the region of the Netherlands known for its strict Calvinism and understood to practise consanguinity. Taussig documents the way that understandings of geographical, social and religious difference, deemed to have medical consequences in the case of genetic disorders such as CF inform medical decision-making and are implicated in the production of clinical knowledge about certain bodies.

In summary, Taussig uses the notion of the imaginary to draw attention to the way that social and cultural conceptions of others is often rendered in terms of geographical locality and is conveyed through various images, representations, and narratives that have widespread currency. In doing so, Taussig emphasises that the way people imagine the world and imagine others to be does not necessarily reflect who they really are and what they really do but clearly can have real consequences for them.

1. Verran, H. 1998 ‘Re-imagining land ownership in Australia’ *Postcolonial Studies* 1 (2) 237-254

To be able to get on with their negotiations, the Cape York pastoralists need to recognise that collective picturing and storytelling about the land with its possibilities for emotional ladenness and material embeddedness is an inherent way of knowing it and owning it; and that Western picturing is no more and no less rational than Aboriginal ways of picturing and thus knowing and owning the land. Picturing and stories embedding metaphors are as much a shared ontic/epistemic resource as the rules and regularities which accompany them. That is, as long as moderns *recognise* their picturing and storytelling, we moderns can become as rational as Aborigines. My claim is that by restoring imaginaries to modern theories of knowledge, we will rediscover the capacity to re-imagine ourselves, and devise ways they can work with other communities – human and non-human (Verran 1998: 249).

I have reproduced the lengthy quote above because of its detailed specification of imaginaries and their role in knowledge-making. Imaginaries involve picturing and storytelling; they may be emotionally laden and are materially embedded; they are a shared ontic / epistemic resource; and they are denied or go unrecognised by Western knowers. The key problem or issue that Verran addresses with the concept of the imaginary is the capacity to negotiate between / across knowing and knowledge-making practices. This is a somewhat abstract formulation of her project, however, because this problem is bound up with: human exceptionalism; the way that the nature / culture binary and boundary has been constituted; and the privileging of white Western ways of knowing and related systems of law and justice which encompass both philosophical theorising and particular empiricisms. Verran addresses the very material consequences of such practices in terms of land use and land ownership in Australia, where the post-colonial context renders the issues extremely starkly. She suggests that: ‘looking at some of their puzzles [those faced by participants in negotiations over native title and pastoral leases] allows us to see an element inherent in knowing which, currently, is almost entirely ignored by modern practices and accounts of knowledge. I call this element ‘the imaginary’ and point to its necessary involvement in knowing and knowledge making. I show the imaginary as something constitutive of, and constituted by, ontic and epistemic commitments’ (238).

Verran positions her paper as a contribution to both postcolonial studies and science studies. The contribution that she hopes to offer to science studies is a conceptual resource for moving beyond what she calls ‘the now quite common descriptions of heterogeneity’ of knowledge systems (239). For postcolonial studies she is offering resources for negotiating contested knowledge and property claims. She uses the concept ‘the imaginary’ in the singular when she refers to it as an overlooked element inherent in knowing, but in the plural when she argues ‘that we cannot begin to understand this politics [struggle over different knowledge-making practices] without paying attention to ontic/epistemic imaginaries’ (239). Verran suggests ‘the ontic/epistemic imaginary’ as a preferred identifier for the conceptual resources usually referred to as ‘the dreaming’ in English (242) – the sense that Aboriginal Australian peoples have of their access to a ‘vast repertoire by which the world can be re-imagined, and in being re-imagined be re-made’ (ibid). The pastoralist descendants of European ‘settlers’ cannot access such a repertoire to ground their claims to land ownership, points out Verran, but must rely on the rigid facts of quantifying and surveying the land, even if individually they draw on metaphors to represent the land, as ‘the domain of art and emotion’ has no place in their negotiations over property. Verran’s points are well made, but I think her suggestion that ‘individuals’ might draw on such metaphors undercuts their collective constitution, but this may be because she is still unfolding her argument at this point in the paper.

Verran discusses the importance of story-telling and the working-up of metaphors in the knowledge-making and negotiating practices of Aboriginal peoples in Australia. She stresses the importance of ‘owning and publicly articulating the stories through which the land is meaningful as a set of interconnected places’ as providing the stock from which the multiple complex metaphors used in negotiating in Aboriginal Australia stem (241). Further, she suggests that the working-up of metaphors provides possibilities for imagining new categories and reworking old ones in new ways (241-2). Struggles for cognitive authority within and between clans are waged through pitting metaphor against metaphor to see which one will carry the day and Verran suggests that the one which prevails will have been greatly enriched in this process. She argues, however, that when in contest with Western knowledge-making practices, Aboriginal knowledge systems are often understood as at best partial. Of course, as Verran herself points out, other knowledge-making practices are coming to be or are already understood as similarly partial in science studies, but this understanding does not necessarily travel into the spheres where laws are made and tested.

Verran points to another problem – this time with regard to agency which she unpacks in relation to a 1970 legal ruling. In that case, although the judge acknowledged that the Aboriginal claimants challenging the development of a bauxite mine on land they understood their clans to own, had established the existence of a subtle and powerful knowledge system, linking clans to each other and to particular sites, it did not provide for any proprietary interest in the land. Rather it seemed to provide for an understanding that ‘the clan belongs to the land’. Verran’s choice of quote from the ruling graphically illustrates that even though the judge was not prepared to say that the land belonged to the clan, in his reversal he did not suggest that the land owned the clan because of the investments in human agency and control of ‘nature’ intrinsic to his own knowledge system. Verran argues that Western philosophy is: ‘Blinded by an epistemology obsessed with scientific knowledge, [and that] theory is taken to be the sole expression of true knowledge’ (238). However she asserts that an interest in ‘other’ knowledge traditions has ‘recently emerged rather differently both in empirical and in speculative work in science studies, associated with a concern for the actual practices of doing science’ (ibid).

Verran draws on her analysis to make some immodest suggestions to the pastoralists for the appropriate way to negotiate over land ownership. She writes that she would point out that they need to understand that they are involved in a process of knowledge making and that they can learn from Aboriginal Australians that such a process is a highly local affair, negotiated over ‘particular issues at particular places by particular people’ . She calls this an embedded or performative understanding of knowledge making. The second insight she would offer to the pastoralists is that they need to understand that ‘both an imaginary and a logic, intimately meshed, are involved here’ (243). She acknowledges that taking these understandings on would be difficult, however, as they would understand such negotiation not as knowledge-making, but as dirty politics. ‘Moreover’, she writes ‘they have always lived in a world where true knowledge has no imaginary. Modernity circumscribes its imaginary as of aesthetic, but not ontic or epistemic interest’ (243). Here Verran returns to the issue of agency as she claims that for Westerners only one side can have agency in knowledge-making. However she proposes to attempt to disrupt this understanding by focusing on the absent imaginary in Western epistemological traditions.

She argues that ‘doing without imaginaries, denying the pictures and stories inherent in our knowing, is a luxury which can no longer be justified, if indeed it ever could be’ and ‘suggest(s) that moderns need to bring back into view our denied imaginaries so we can more easily get on with the business of working knowledge traditions together and recognising non-human agents, as we make knowledge and remake worlds’ (243). Whilst I am in complete agreement about the need to bring denied imaginaries back into view, I think Verran’s predication of such a move on ‘see(ing) through the universalist pretensions of the sciences, and recognising the violence that lies behind these pretensions’ (ibid) is problematic. As she notes herself, the denial of imaginaries is dependent on privilege and much rhetorical and political economic work goes into shoring up that privilege. The effort to bring denied imaginaries back into view will be heavily contested, cf the so-called Science Wars and the mundane and tedious boundary work that goes on between science and science fiction in various public spheres. That said, however, I do think that Verran’s suggestion that thinking ‘the imaginary’ or ‘imaginaries’ as constituted by and constitutive of ontic/epistemic commitments is very helpful in this project.

Verran works this through in relation to Western ontic / epistemic commitments by reading Kant through Michele Le Dœuff, pointing out that Kant sees the exclusion of the imaginary as the defining property of reason, but that he can only represent this exclusion through the use of imagery and extended metaphor (picturing and storytelling). Le Dœuff accounts for this paradox as embodying Kant’s attempt both to justify the inclusion of philosophy in modernity and to give a vivid picture of what modernity would look like. Verran suggests that what is to be done now is to take Kant’s metaphor of the island – the territory of pure understanding – seriously and in full. That is ‘to see the island and the seas which surround it as integral to each other. To take the metaphor seriously is to see that it is through being lived space that both the island and the seas become meaningful. Taking the metaphor seriously makes the notion of empty space untenable’ (245). In drawing out a comparison of the ontic and epistemic commitments of Western and Australian aboriginal knowers Verran suggests that analogous boundary making and meaning making practices are undertaken – both knowledge systems combine imaginaries and logics. However, the key difference that she points to is the open acknowledgement of the making and traversing of boundaries in Aboriginal communities: ‘The paradox inherent in meaningfulness, in making ontic/epistemic commitments, is acknowledged and celebrated’ (248). This isn’t a utopian account of meaning-making, however. It is strongly normative: ‘there is a correct “map” which everyone knows in greater or lesser detail, and the “map” may be expressed in more or less elegant ways’ (248).

Verran concludes her paper by emphasising explicitly that imaginaries are not located in minds, but in practices: It is in the everyday messing around with mucky, obdurate stuff, and in the conversations and other texts – official and unofficial – that imaginaries are enacted and enact. The imaginaries imminent (*sic*) in practices interpellate those objects / subjects that / who are implicated in and by the practices, helping to constitute them as objects / subjects (252).

Verran is arguing that the work that imaginaries can do is only possibly if they are explicitly recognised and shared – at least partially – by a community. But she is not only arguing that it is their existence that should be recognised, it is also their working together with what she calls a logic in a performative mode of knowledge production. Imaginaries should be included in, not excluded from knowledge-making if ‘an unacknowledged politics of coercion and insidious translation’ is to be disrupted (252).

Joan Fujimura (2003) ‘Future Imaginaries: Genome Scientists as Sociocultural Entrepreneurs’, in Goodman, Heath & Lindee (eds) *Genetic Nature/Culture: Anthropology and Science Beyond the Two-Culture Divide*, University of California Press.

Fujimura argues that imagination is a social practice in science and technology and that the crafting of future imaginaries is part of the work of scientists. To illustrate this, she takes the cases of two leading Japanese scientists in the fields of genomics and computer science who have crafted two different imaginaries that link investment in innovative science and technology with discourses of cultural and religious distinctiveness. In this way, as Fujimura points out, these imaginaries are ‘technosocial imaginaries’ since they conjure up both alternative futures for scientific research and practice and a redesign of society and culture that negotiates notions of Japanese uniqueness in a context of a transnational economy in biology, genomics and computing.

Following Appadurai, Fujimura distinguishes the future imaginaries of these scientists from ‘mere fantasy’ because around these visions communities and practices have been formed. As Fujimura concludes: ‘the work of the two scientists I discuss here has led to enterprises that have enrolled and engaged many people, funds, and government agencies, and much public and consumer interest’ (Fujimura 2003: 192). The claims that she makes about these future imaginaries is therefore rather similar to those made by scholars writing about the sociology of expectations. Indeed, she understands imaginaries in terms of being enabling visions that marshal resources and communities around them and which might be distinguished by persuasive rhetoric and hyperbole. There are connexions to be made here between her notion of ‘technosocial imaginaries’ with its emphasis on national and cultural identity and Jasanoff and Kim’s (2009) more recent articulation of the ‘sociotechnical imaginary’. Fujimura concludes by a call for a ‘sociology of the future’ that will permit social scientists to intervene in the envisioning of futures before they are materialized by other and more powerful actors. In my reading of this chapter Fujimura understands the visions articulated by these two scientists as producing imaginaries about the future that connects calls for investment in specific science and technology with powerful notions of nationhood and cultural distinctiveness in order to gain traction and legitimacy. In this way, these scientists, by invoking Japanese religious traditions of Buddhism and Shinto, are also making cultural claims in order to enlist others in their respective visions. On this point, then, perhaps I can see why the notion of imaginary is more appropriate than the notion of ‘expectation’ as it has been elaborated by scholars to date.

Kim Fortun & Mike Fortun (2005) ‘Scientific Imaginaries and Ethical Plateaus in Contemporary US Toxicology’, *American Anthropologist* 107 (1); 43-54

Kim Fortun & Mike Fortun (2005) address the current direction of toxicology, imagined by some of its practitioners as a ‘civic science’ and the role that the anthropology of science can play in shaping the future trajectory of this field. They argue that through a study of imaginaries as they are articulated by scientists, ethnographers can then – in the spirit of ‘friendship’ – help scientists negotiate change in their field and provide the means for engaging with its social, ethical and legal implications. They are supportive of this idea that toxicology can be a ‘civic science’ that serves to protect the public’s health and not simply the interests of industry or the state and that anthropologists have a role to play in ensuring that this is the case.

For Fortun & Fortun the notion of toxicology being a ‘civic science’ is ‘something that scientists think about and pursue through practical projects. In anthropological terms, it is the product of an “imaginary”, in which different modes of sense-making come together’ (Fortun & Fortun 2005: 44). Referencing George Marcus (1995) and his discussion of ‘technoscientific imaginaries’, they suggest that the study of ‘imaginaries’ provides a way of looking at large-scale changes over time and how these are understood locally. Moreover, they contend that through the focus on imaginaries, analysts can study the forces that are constitutive of subjectivity and, indeed, they state that their interest lies in understanding subject formation, extending the work of Sharon Traweek in the 1980s. Their paper therefore draws on interviews with some leading toxicologists who imagine the ways that their scientific field can become a civic science, drawing on historical experience such as environmental disasters such as the Bhopal incident in India in the 1980s and epistemic and technical changes related to the adoption of genomics and informatics. Fortun & Fortun read these imaginaries as being at work in the articulations and actions of these statements.

However, as I have said, their use of the imaginary is also bound up with their own concern with opening up new spaces of possibilities for refashioning toxicology, redefining its mission, and deciding who is involved in setting this mission. They see that there is a role for anthropologists and other scholars from the humanities and the social sciences to play in this regard and they call for an “ethnography of ethics and friendship with the sciences”. From this perspective, they claim that the ability of ethnographers to draw out ‘scientific imaginaries’ contributes not only to anthropological theory and methods but also to ability of this field to shape the future direction of sciences such as toxicology. By focusing on the level of scientific practice, Fortun & Fortun contend suggest that by being a ‘friend’ – as opposed to being a judge which is the dominant mode of science studies today – ethnographers can access the imaginaries of the sciences and allow them to help scientists negotiate change in their scientific fields and provide ways for articulating their social and ethical implications.

Hyysalo, Sampsa. 2006. Representations of Use and Practice-Bound Imaginaries in Automating the Safety of the Elderly. *Social Studies of Science* 36 (4): 599-626.

In this paper, Hyysalo argues for a particular way of conceptualising how professionals predict and prefigure the use of technology in design. The term ‘imaginary’ forms part of his conceptual apparatus, ‘Practice-bound imaginary’ (PBI), to examine user-representations in the construction of a novel healthcare technology for elderly people. The paper is structured as follows: explaining the concept of PBI; justifying its conceptual improvement on its predecessor, e.g., ‘Technological Frame’; applying the concept to a case study (i.e., ‘Wristcare’); and explicating the professional practices in which user-representations were created for Wristcare. In my commentary, I will address the following questions respectively: what is the problem that the author is addressing with the concept of imaginary? What work does the concept do in addressing this problem? What does the author understand by the concept?

Hyysalo’s description of the case study suggests that the concept of imaginaries is responding to the *complexity of participation* in technology design. Put another way, the author is trying to explain how different groups of professionals (engineers, medical experts, care-givers, etc.) produced and negotiated representations of the user in the design of ‘Wristcare’. The development of Wristcare, a wrist device for medically monitoring elderly people, is a story about ‘success and partial failure’. In the first part of the story, Wristcare is described as a ‘techno-economic invention from *heterogeneous* resources that failed to fit the practices of users’. Hyysalo develops the concept of PBI to describe a process by which complicated elements were eventually ‘interlinked’, ‘inter-animated’ and ‘aligned’ in ways that led to a successful user-representation of Wristcare.

Another clue that the concept of imaginaries is responding to a ‘complex’ problem comes from the author’s comparison between PBI and TF. The latter is respectfully described as a concept that mediates or modulates the relationship between actors and technology: ‘The frames are seen to be located not in actors or in technology, but as a ‘hinge’ between actors and technology. Different relevant social groups give different meanings for artefacts through different TFs’ (Hyysalo, 2006: 603). However, criticism of TFs is based on ‘the *sameness of meaning* in regard to the artefact as the defining criterion for ‘relevant social groups’’. This is probably opaque. Hyysalo is arguing that artefacts are not imagined uniformly by a ‘relevant social group’. The same groups could have conceivably different meanings which ‘often exist because of complementary resources, different starting points and meanings’ (2006: 603). The author repeatedly uses the metaphor of ‘sensitivity’ to justify the conceptual improvement he is proposing. By attending to the subtleties of ‘formations of joint action’ and ‘multiple participation’, Hyysalo believes that PBI might better understand the relationship between change and continuity. The following is worth quoting:

In joint action, individuals, teams and activities interpret practices differently and combine them in novel ways with other practices. What follows is that instantiations of PBIs are often unique, both in terms of the combination of practices involved as well as in the way people and activities interpret and participate in those practices. PBIs, in turn, may instantiate a unique recombination of more pervasive ‘incomplete utopian projects’ (Gregory, 2000), ideographs (von Lente, 2000) and other cultural resources. Attention should therefore be paid to inter-animation, layeredness, and conflicts between different PBIs from which a design team or an activity draws … This is hard to do with the way ‘relevant social group’ and ‘TF’ have been conceptualized to date (2006: 604).

In the next paragraph, he asserts:

In contrast to TF, PBI emphasizes that change and continuity are *intertwined*, *multifaceted* and *partial*. It thus *sensitizes* the analyst to searching for patterns and stability in change (2006: 604, my emphasis). To summarise: PBI is a concept designed to cope with the complicatedness and messiness of social organisation in technology design; it seeks to capture subtle differences and fine-grain details within complex social organisation. In the tradition of symbolic interactionism, the concept of imaginary is oriented to understanding in more or better detail how user-representations (i.e., representations of *prospective use*) lead to successful design applications.

So, what is it about the imaginary that seems to address this problem? My hunch is that Hyysalo is making a productive connection between ‘imagination’ and ‘technology design’. The lineage he invokes to explain and justify the imaginary is pretty familiar territory. Here’s an extract from the paper:

The term ‘imaginary’ has recently become more popular in, for instance, cultural studies (Marcus, 1995), feminist theory (Stoetzler & Yuval-Davis, 2002) and Science and Technology Studies (STS) (Gregory, 2000; Suchman & Bishop, 2000; Verran, 2001; Fujimura, 2003). Like imagination it evokes both vision and fantasy, while emphasizing the corporeality and specific cultural and historical resources present in imagining (Suchman & Bishop, 2000: 327; cf. Stoetzler & Yuval-Davis, 2002: 322–27). While ‘imaginary’ is easily misunderstood as variously referring to image, imagination, imagery or the colloquial meaning of imaginary as ‘existing only in the mind’, associated with ‘free floating imagination’ (Verran, 2001: 37; Gregory et al., 2003: 3), **its appeal lies in the way it connects vision and fantasy to ways of perceiving and meaning-making**. As Michael Carter phrases it: ‘\*Imaginary+ is not a “thing” of the mind but of an overarching relation . . . the imaginary is not something which the subject calls up at will, or . . . slips into when the reality principle is lifted’ (Carter, cited in Verran, 2001: 37). Verran further defines imaginary in regard to land-right disputes in Australia, by saying that ‘an imaginary \*is that] through which the land is meaningful and by which the primary categories of that meaningfulness are given’ (Verran, 1998: 252). She refers to earlier work of Castoriadis, who defines imaginary as ‘the unceasing and essentially undetermined (social-historical and psychical) creation of figures/forms/images, on the basis of which alone there can ever be a question *of* “something”. What we call “reality” and “rationality” are its works’ (Castoriadis, 1987: 3; **bold** my emphasis).

The disciplines to which the term is linked are familiar and perhaps even a little superficial. The only surprises for me are the STS references to Suchman & Bishop (2000) and Fujimura (2003). I have highlighted the only novelty wherein Hyysalo appears to be bridging a connection between psychoanalytic understandings of the imaginary (‘vision and fantasy’) and symbolic interactionism (social interaction and ‘meaning-making’). I was particularly interested in some of descriptive and explanatory techniques he uses to ‘work up’ imaginaries as a concept:

* maintaining a resemblance to imagination
* *implying* a connection to psychoanalysis, e.g., ‘fantasy’, ‘reality principle’, ‘psychical’
* associating subjectivity with socio-historical, cultural ‘resources’
* associating subjectivity with corporeality, i.e., strong feminist theme
* accounting for misunderstanding, i.e., explanations of polysemy
* dissociating imaginary from mundane meanings
* reassigning psychoanalytic meaning to symbolic interaction, e.g., ‘meaning-making’
* invoking vague and prosaic descriptions, e.g., Michael Carter and Verran citation

My impression is that the version of imaginary being used here is much closer to the meaning of ‘imagination’: not imaginary as illusion or unreal, but socially constructed objects of the imagination. Hyysalo is using imaginary to describe the prospective envisioning work of professionals, that is, imagining users expectations and conduct to improve design. The imaginary is much less a domain (an order of objects and relations) than an assemblage of practices in which future-oriented representations are cooperatively produced, negotiated and folded back into design. Asking myself ‘what does the concept of imaginary add to the author’s problem?’, I’m not entirely convinced that other concepts could not accomplish the same task. This paper confirms my suspicion that the uptake of imaginary in STS is partly a fashionable phenomenon. But I do think there is an interesting relationship between the openness and polysemy of the concept and the complex nature of the problems to which it is being used. Maybe complex problems (i.e., problems with many actors and parts) benefit from concepts characterised by their openness and polyvalence.

Barbrook, Richard. 2007. New York Prophecies: The Imaginary Future of Artificial Intelligence. *Science as Culture* 16 (2):151 - 167.

Barbrook argues that the dream of artificial intelligence is deeply embedded in the modern imagination. It can be seen in the imaginary futures of The World’s Fair of 1964 and the fervent predictions of technologists in Silicon Valley. Barbrook makes little attempt to conceal his contempt for ideologies that continue to circulate the promise of AI, a promise which is embedded in histories of liberal capitalism, in the ambitions of corporate computing, and the exploitation of the working classes. In this classic Marxist analysis of promissory science and technology, the imaginary describes a process of mystification, distraction and fantasy.

Barbrook begins with the New York World’s Fair of 1964. The IBM Pavilion was a huge hit with the public. The launch of the System / 360 series was celebrated as ‘the harbinger of the imaginary future of artificial intelligence’ (2007: 154). Needless to say, this dream never came to pass. These ‘awe-inspiring displays of future technologies’ were opportunities for corporations such IBM, General Electric and General Motors to make promises about the future, some of which were wild speculations, while others (the mass consumption of motor cars in the 1939 New York World’s Fair) were accurate forecasts of consumer prosperity.

For most of the paper, Barbrook traces the antecedents of artificial intelligence, going back to Turing’s thinking machine, the cybernetics revolution in the US, and the disturbing fantasies of ‘cybernetic soldiers’ and advanced militarisation during the Cold War years. Each historical vignette contains its own ‘imaginary futures’, revealing connections to industry and the military. The imaginary future of AI was a distraction from acknowledging ‘the horrors of the cold war’, ‘the fetishisation of technology’, and ‘the authoritarian ambitions of corporate computing’ (2007: 160-2). The problematic that Barbrook is repeatedly referring to is the dazzling representation of future technologies that conceal commitments and interests of the ruling elite (what he calls ‘cybernetic Fordism’), that deflect attention away from the social consequences of corporate, and later mass, computing:

The sci-fi fantasy of artificial intelligence had successfully distracted people from questioning the impact of computing within the workplace. After visiting IBM’s pavilion at the 1964 World’s Far, it was all too easy to believe that everyone would win when the machines acquired consciousness […] Both managers and workers are still being promised technological fixes for socio-economic problems. The dream of sentient machines makes better media copy than the reality of cybernetic Fordism. At the beginning of the 21st century, artificial intelligence remains the dominant ideological manifestation of the promise of computing (Barbrook: 2007: 164-5).

My impression is that Barbrook uses the term imaginary in the colloquial sense, i.e., that which is unreal or fantastic. It is not treated or developed as a concept. In this Marxist historical narrative of AI, the imaginary future bares a strong connection with the concept of ideology. The imaginary is the ‘effect’ of ideological processes which conceal, distract and distort. Imaginaries are promissory structures produced by the ruling elite to induce a state of false consciousness. Ideology not only operates by rewriting / erasing history, by naturalising the present, but it also works prospectively via images of techno-futures suffused with hyperbole and desire.

Jasanoff, S. & Kim, S. (2009) Containing the Atom: Sociotechnical Imaginaries

and Nuclear Power in the United States and South Korea. *Minerva* (2009) 47:119–146.

In this article Jasanoff and Kim introduce their concept of the ‘sociotechnical imaginary’ in relation to a comparative study of the regulation and reception of civil nuclear power in the USA and South Korea. Importantly for our discussion, the article also has a section devoted to discussing the concept of the imaginary both in relation to past uses of the term in social theory generally and in relation to the field science studies in particular. They also compare and contrast the concept of the imaginary with similar modes of social scientific explanation to further clarify what it is that this particular concept can reveal.

Jasanoff and Kim begin their discussion by noting that the relationship between science and technology with political institutions is under-theorised when compared to the rest of the field of science and technology studies. Most other studies, they argue tend to focus on the production of scientific knowledge in laboratories and expert communities, and so on. These observations point us towards the field of study where they feel their concept of the sociotechnical imaginary is most useful. This is the political field around the state and its role in defining the public good, the purposes, pace and direction of public scientific investment and the parties and fora suitable for the governance or closure of science and its controversies. Flowing from this is a key question: ‘How do national S&T projects encode and reinforce particular conceptions of what a nation stands for?’(120).

Here we have the central research concern for our authors, which is to explore how national political orders and technoscientific projects co-produce each other. They have developed the concept of a national sociotechnical imaginary to examine this field, providing a definition highlighted in scare quotes, telling us that these are ‘‘collectively imagined forms of social life and social order reﬂected in the design and fulﬁllment of nation-speciﬁc scientiﬁc and/or technological projects’’(120). Such imaginaries, they add ‘at once describe attainable futures and prescribe futures that states believe ought to be attained’ (120).

Jasanoff and Kim’s work is focused on the national sphere and on cross-national comparisons to uncover the roots of national variation, so that ‘sociotechnical imaginaries can be identiﬁed, illuminated, and critiqued through cross-national comparison’ (121). The science and technology policies of nation states thus provide ‘unique sites for exploring the role of political culture and practices in stabilizing particular imaginaries’ (121). Despite globalization, sociotechnical imaginaries remain intertwined with nation building and the national sphere. While there may be multiple and contending sociotechnical imaginaries at play in any society, some are selected to become dominant and are made durable through a process involving the power of nation states to control the instruments of meaning-making and goal-selection for the nation (123), allowing us to speak of specific national sociotechnical imaginaries. At the same time Jasanoff and Kim urge us not to see the national as something simply given or immutable, instead describing the co-production of technoscientific and political order, where national entities are ‘reimagined, or re-performed, in the projection, production, implementation, and uptake of sociotechnical imaginaries’ (123). A historical analysis is also needed to show how these imaginaries are sustained and ‘invoked and re-performed at key turning points in policy formation’ (122).

For Jasanoff and Kim, the main locations where these imaginaries are to be found and studied appear to be textual ones, in policy documents, speeches and public discourses. ‘Language is a crucially important medium for the construction of imaginaries’, they claim, and therefore to make their particular case studies of sociotechnical imaginaries they identify and compare ‘recurrent discursive elements in each country’s official policy narratives for nuclear power’ (122). However in an important footnote they add that ‘mass media, popular culture, and visual materials also play critically important roles in the articulation of sociotechnical imaginaries’ and that these other media and forms could also be worthy of study (n.2, 122).

Before presenting the bulk of their argument in terms of detailed empirical analysis of the twists and turns of the USA’s and South Korea’s nuclear policy, the authors give us a relatively brief but important section further elaborating the concept of sociotechnical imaginaries in relation to existing social theory on the imaginary and to similar concepts, noting a growing recognition in social theory that ‘the capacity to imagine futures is a crucial constitutive element in social and political life’. They outline and build upon a canon of work theorizing the imaginary (Castoriadis, 1987; Anderson 1991; Said, 1978; Foucault 1979; Bowker and Star 2000; Scott 1998; Appadurai 1996; Taylor 2004). In laying out this canon they append a sentence extracting key point or ‘take home message’ on the nature of imaginaries to each key thinker that they list (122).

They start with Sarewitz (1996) to make the point that “imagination is no longer seen as mere fantasy or illusion” but instead as a cultural resource that brings into being new forms of life. [N.B. *Not having read Sarewitz, not sure if he makes this point positively, or negatively, and is used as an example of this error*]. Castoriadis (1987) is referenced to make the point that the imagination does not reside as an aesthetic quality in individual minds, but rather helps produce collective interpretations of social reality through shared systems of meanings. Next in their list comes Anderson (1991) who is invoked to make the point that these shared meanings form the foundation for a shared sense of belonging to an imagined community. Said (1978) is deployed to add that as well as solidifying a sense of who is inside a shared community, they also construct who is outside and construed as “the Other”. Foucault (1979) Scott (1998) and Bowker and Star (2000) join the list for bringing the insight that imaginaries guide the standardization of human subjects to render them governable. Finally Appadurai (1996) and Taylor (2004) are brought in to sum up the place of imagination in social theory, as ‘’an organized ﬁeld of social practices,’’ forming a ‘key ingredient in making social order’ (122).

Next, our authors go on to discuss another body of work more specifically in the field of STS (Fujimura 2003; MacKenzie 1996; Borup et al. 2006; Hedgecoe and Martin 2003; Marcus 1995; Wynne 2005; Fortun and Fortun 2005). They begin this by making a distinction between STS and histories of science and technology. The latter field, they claim, merely sees imagination as residing in individual minds, whereas the opposite understanding is crucial and defining for STS, where ‘promises, visions and expectations of future possibilities are embedded in the social organization and practices of science and technology’ associating the work of Fujimura (2003) and MacKenzie (1996) with this point. Furthermore, these collective and embedded forms of imagination shape the trajectories of science and technology (Borup et al. 2006; Hedgecoe and Martin 2003).

In their discussion of Marcus’s (1995) collection, Jassanoff and Kim imply a distinction between his term ‘technoscientific imaginaries’ and their own ‘sociotechnical imaginaries’. Technoscientific imaginaries, they argue, do not perform futures solely through technoscientific practices. Rather, drawing on Wynne (2005) and Fortun and Fortun (2005), they argue that these imaginaries of technoscience also carry implicit assumptions of the public good for ‘the social world writ large’ (123), and that therefore ‘technoscientiﬁc imaginaries are simultaneously also ‘‘social imaginaries,’’ encoding collective visions of the good society’ (123).

To further clarify their use of the term imaginary they then make a series of contrasts with other concepts that have been similarly used in exploring the cultural, social or political dimensions of technoscience, such as, ‘policy agendas’, ‘master narratives’, or ‘media packages’ around ‘discursive frames’. Thus imaginaries are less explicit, issue specific and instrumental than policy agendas. Rather they ‘reside in the reservoir of norms and discourses, metaphors and cultural meanings out of which actors build their policy preferences’ (123). At the same time, however, imaginaries are more instrumental than master narratives and are also not the simple justificatory lessons of past events of these narratives but instead are future oriented and ‘project visions of what is good, desirable, and worth attaining for a political community’ by articulating feasible futures (123). While they project hopes and promises, imaginaries also project fears and risks around innovation. In contrast to the discursive frames found in media packages ‘sociotechnical imaginaries as we deﬁne them are associated with active exercises of state power’, and while multiple discursive framings may circulate in society, some become filtered and selected into the more dominant and goals of state and public action.

Jasanoff and Kim sum up this discussion of how the imaginary differs from these similar concepts by telling us that: “imaginaries operate for us in the understudied regions between imagination and action, between discourse and decision, and between inchoate public opinion and instrumental state policy” (123).

The rest of the article – its main bulk - then goes onto give us a detailed description of civil nuclear energy policy battles in the USA and South Korea. Here the term ‘imaginaries’, which gets used in the general discussion, tends to be replaced by the singular ‘imaginary’. The cross-national comparison between the USA and South Korea allows Jasanoff and Kim to discern two different national sociotechnical imaginaries at play: ‘Although nuclear power and nationhood have been imagined together in both countries since the beginning of the atomic age, the nature of those imaginations has remained strikingly unlike’ (121). They find that the dominant national sociotechnical imaginary of nuclear energy found in the USA was an ‘imaginary of containment’, summed up by the slogan ‘Atoms for Peace’. In South Korea, however, the dominant national sociotechnical imaginary was of ‘atoms for development’ or an ‘imaginary of development’ which mainly saw nuclear power as a path to self-reliance and national independence.

The USA’s imaginary of containment emerged as policy makers sought to emphasise that nuclear technology could have a peaceful and benevolent use, that civil nuclear technology would not lead to the proliferation of military uses (126), that the hazards of radiation and nuclear waste could be contained (129), and also that public fear and dissent could also be contained (128). This imaginary was shared by both state and civil society (125). Therefore, as well as serving the nuclear establishment, this dominant imaginary could also lend traction to social movements opposing nuclear power, leading to significant setbacks for the technology in the USA. In contrast, the dominant South Korean nuclear national ‘imaginary of development’ (also shared by state and society) meant that fear of loss of national autonomy and self-reliance overrode fears of nuclear risks, leading to a more successful reception of the technology in that country.

Thus Jasanoff and Kim allocate a powerful role to sociotechnical imaginaries as key factors in questions such as whether the nuclear energy ambitions of powerful states are embraced or rejected by society, alerting us to not only the ‘not only the material and organizational resources that states deploy but also the imaginative resources with which they relate such policies to the public good’ (141).

Key texts discueed by Jasanoff and Kim:

Anderson, B. 1991. Imagined communities: Reﬂections on the origin and spread of nationalism, revised

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Appadurai, A. 1996. Modernity at large: Cultural dimensions of globalization. Minneapolis: University

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MIT Press.

Castoriadis, C. 1987. The imaginary institution of society. Cambridge: MIT Press.

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institutions, and organizations, ed. C. Edquist, 157–173. London: Pinter Publishers *(\*Mentioned in passing re nuclear policy, but not discussed in theoretical section).*

Fortun, K., and M. Fortun. 2005. Scientiﬁc imaginaries and ethical plateaus in contemporary U.S.

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D. Heath, and M.S. Lindee, 176–199. Berkeley: University of California Press.

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Sarewitz, D. 1996. Frontiers of illusion: Science, technology, and the politics of progress. Philadelphia:

Temple University Press *(\*As warning or example?)*

Smith, Elta (2009) 'Imaginaries of Development: The Rockefeller Foundation and Rice Research', Science as Culture, 18: 4, 461 — 482

Smith analyses the changing representations over the past 50 years of rice research by the Rockefeller Foundation (RF). This involves a study of different framings of problems and potential solutions by the Foundation, and how these incorporate wider ideologies, epistemologies and networks. The initial question she poses is how do these powerful philanthropic institutions determine their programmatic and funding priorities, and ‘how do they inﬂuence and respond to global politics through their engagement with science and technology?’ (461). She notes that the Foundation’s rice research is not only an agricultural modernization project, but also a ‘simultaneously a sociopolitical project that extends particular modes of governance’ (461), and that ‘science and technology are imagined to powerfully generate social and economic advancement’ in a way that shapes policy (462). In this work she uncovers two key Rockefeller ‘representational strategies’ of ‘paternalism’ and ‘homogenization’.

Smith uses ‘the term imaginaries to address the Foundation’s conceptions of ‘development’ and its changing role in rice experimentation over time’ (142). She outlines her use of the term in a section on ‘Imaginaries and Representation’. This term can ‘highlight the ambiguities and normative content’ of the RF’s projects. She then briefly refers to existing literature on imaginaries to define the concept and how she will use it. Firstly, an imaginary is a ‘particular, often complex view of the world that comes to shape agendas, research trajectories, projects, and policies’ (462) pointing us here to Taylor (2004) and Anderson (1991). Next she tells us that she will use the term to denote ‘normatively loaded visions not only of what should be done ‘in the world’ but also how it should be undertaken and why’ (462) adding that ‘imaginary also refers to a larger constellation of ideologies, and social factors that enables or constrains discourse in certain ways’ (ibid), quoting Appadurai (1996) that it is an ‘organized ﬁeld of social practices’. She then mentions Jasanoff’s (2006) concept of a ‘sociotechnical imaginary’, defining this in the case of imaginaries of development as being ‘comprised of scientiﬁc and technological imperatives as well as economic, political and cultural ones … hence, *sociotechnical*’ (462).

Smith briefly relates the term imaginary to similar concepts in social science, telling us that ‘imaginaries are complementary to and overlap with the concept of ‘discourse’’, particularly as elaborated in the development studies literature, taking discourses as ‘institutionalized modes of representation’ the study of which can focus us on ‘the uptake of ideology into beliefs and actions’. Here we have mention of several concepts – discourse, ideology, representation – but it is not made clear exactly how these may differ, or how they relate to each other. One attempt is made by telling us that: ‘The imaginaries concept suggests that the world has been consequentially envisioned in certain ways, at certain moments in time, by actors who have the capacity to materialize these abstractions’ and that ‘discourses are an important component of this process’ (463). (*Here we are referred to Cullather, 2004*). Additional points are made about the imaginary, that it is ‘future-oriented, but also constrained by present and historically produced conditions, whether cultural, technical, scientiﬁc or political’ with Marcus (1995) being invoked here. Imaginaries are also described as reflecting ‘larger socio-political and technoscientiﬁc understandings and sensibilities’ that include ‘Cold War and market-based ideologies, and the belief that science and technology can solve social problems’ (ibid).

Smith explains that there are ‘always multiple imaginaries at play in a society, and within institutions’ and that her study explores how ‘particular imaginaries emerged and prevailed through the RF’ in a way that enabled these visions to become seen to be the ‘best, most appropriate, or even inevitable—and how they became hegemonic while seeming apolitical or value-neutral’ (ibid).

Smith’s terminology here tends to slide between ‘imaginary’ and ‘representation’ without making it clear whether these terms are considered interchangeable or distinct, merely telling us that ‘representation is a key concept’.

This discussion leads on to an outline of her key findings – that the RF employs two predominant representational strategies of ‘paternalism’ and ‘homogenization’. These representational strategies are directed toward ‘both the scientiﬁc research objects under study—in this case rice— and the people thought to beneﬁt from this research’. Paternalism describes the way the foundation deems it necessary to intervene on behalf of human populations and food grains (463). Paternalistic representations include the very term ‘developing world’ which suggests a child like state, while even the term ‘orphan crop’ suggests an extension of this paternalism to rice itself (475). Homogenization represents both ‘rice’ and ‘the developing world’ as singular objects and subjects of intervention, allowing the use of a universal, generic and replicable set of tools, programmes and policies (463). The third world is represented ‘quite seamlessly as a unified space with common problems’ that can be solved through the foundations work on rice as a universalised object that can be improved via a central laboratory, a representation that elides more complex questions of diverse soils, climates and cultures (476). ‘Such imaginaries invite power to be transferred in one direction’ (475).

Therefore the foundations rice research reaches beyond being simply a series of agricultural experimentation projects rather ‘it is simultaneously a social and political project to extend particular modes of governance’ (463). For Smith: ‘I use the concept of ‘imaginaries’ to call attention to the modalities of governance through non-state institutions such as the RF. In this sense, ‘imaginaries’ functions as a mechanism of governance, in the way one might think of agenda setting in conventional political analysis’(463).

Smith concludes by noting how ‘imaginaries of development have history and politics’ (479). Between the early 1900’s and the 1980’s the imaginaries ‘projected and actualized by the RF found their roots in the early twentieth century and in later Cold War imperatives’, with the foundations ‘imaginary of agricultural science and development … constituted around a bi-polar politics of security’ (478). Here eliminating hunger was part of this larger cold war ideological battle. After the 1980’s this shifts to an ‘emerging set of neoliberal values, in which the control of life became a naturalized part of the economic value-system and could be effected through market logics that predominated over the state or other institutions’ (ibid).

This analysis enables her to ‘spotlight’ the ways in which ‘non-state actors who control the agenda for devising and implementing new technosciences participate in producing global politics’ (479). The RF and ‘a small number of foundations have extraordinary power to shape the course of education, research, and institutional development’ through control of massive funding that is almost completely unaccountable and grants them ‘virtually complete autonomy’ in their agendas (ibid). Such agendas are conditioned by powerful imaginaries where global scale is given by the ‘constructed universalisms of molecular biology’ combining the practice of plant breeding, political ideologies, analytic practices, and the ‘notion that science and technology can solve fundamental social problems’ (ibid). Such foundations, by ‘simultaneously controlling the use and meaning of a staple crop as well as the purported beneﬁciaries’ are able to gain influences that are geopolitical, socio-cultural and economic in scale.

*Notes towards a discussion? Smith takes Jassanof and Kims ‘sociotechnical imaginary’ and applies it to an actor that is beyond any national or state bounded political sphere. What is lost and gained through this? The complex web between science policy, civil society, and the state that Jasanoff and Kim focus on with national sociotechnical imaginaries becomes less defined. But ‘imagined communities’ can indeed stretch beyond the national. Interesting to see how the imaginaries of technoscience can play a role in bringing into being new forms of community, in a way similar to Rabinow’s concept of the ‘biosocial’? How do imagined exchanges relate to or map onto practical, organisational and material ones?*

Haraway and technosicientific imaginaries

Although she does not explicitly use the term ‘imaginaries’ Donna Haraway has become an influential figure beckoning her readers to decipher the imaginative dimensions of technoscience. Perhaps more than any other scholar she has shifted the STS focus towards the study of technoscience in popular culture and towards what would previously have been regarded as the ephemera of modern science (advertising, in particular). In both the *Cyborg Manifesto* (1985; 1991) and *Primate Visions* (1989) Haraway explored the variety of sites in which technoscience was being made.

Haraway also effectively excavates the imaginaries of technoscience by investigating the story-telling which constitutes modern science. *Primate Visions* (1989) was a study of the strands of story-telling that became embedded in the twentieth-century science of primatology. Indeed, story-telling became a leimotif of this book, as Haraway also examined the life-stories of those who were central to the making of primatology. A further reflexive spin was added through Haraway’s use of science fiction to raise questions about her own stories of the making of this science and to encourage her readers to conjure different versions of this science.

Chapter 4 of *ModestWitness –* ‘Gene: maps and portraits of life itself’is characteristic of Haraway’s mode of analysing technoscience imaginaries. She begins the chapter by examining the computer game, SimLife, which she contends encourages its users to position themselves as ‘scientists within narratives of exploration, creation, discovery, imagination, and intervention’ (Haraway 1997: 132). Haraway sees such narratives as deeply entangled in ‘Christian salvation history’ (Haraway 1997: 132). Narrative is identified as an important pivot of technoscience – in this case, in both computing and the life sciences.

Haraway is also interested in how modern technoscience *works visually* and this is another mode of her exploration of the imaginaries of science. This chapter revolves around Haraway’s readings of a set of visual texts (advertisements and cartoons) which represented modern genetics during the period of the Human Genome Project. This is complemented by an examination of the trope of mapping (with reference to Helen Verran’s and David Turnbull’s research)—a trope of visualization which was at the heart of the Human Genome Project.

This chapter shows Haraway investigating interpellation and the making of ‘technoscientific subjects’ through the imaginary of genomics (during the completion of the HGP) (Haraway 1997: 172). She offers detailed analyses of the SimLife computer game, Neibart cartoon advertisements, Sidney Harris cartoons, New England Biolab and the Logic General Corporation adverts. She shows that interpellation works through the mobilising of a repertoire of cultural resources and references (e.g. high art, Christian iconography), involving complex psycho-social processes, including investment and attachment. Humour is highlighted as an important vehicle in such interpellation, indicating that engagement with scientific imaginaries is not merely cognitive. Haraway provides a conceptual framing for her analysis by offering a theoretical bricolage, borrowing from Marx’s and Lukács’ notions of commodity fetishism, Freud’s theories of fetishization, and Whitehead’s conception of ‘misplaced concreteness’ (Whitehead 1948: 52; Haraway 1997: 146). This assemblage provides theoretical ballast for her empirical unpacking of the ‘corporealization and gene fetishism’ she regards as characteristic of the new life sciences.

Haraway discerns the ‘technoscientific unconscious’ as at play in ‘the processes of formation of the technoscientific subject’ and she sets out to identify ‘the structures of pleasure and anxiety’ contributing to the formation and reproduction of this subject. She distinguishes her project from the practices of critique and deconstruction by reflectively insisting that she herself is implicated in the patterns and engaged by the processes she deciphers (Haraway 1997: 151). She is specifically concerned here to trace ‘the pleasures of narrative and figuration’ (Haraway 1997: 169) associated with the life sciences emerging in the wake of the Human Genome Project.

‘The gene is the alpha and omega of the secular salvation drama of life itself’ (Haraway 1997: 133) Haraway observes. Her adoption of the label ‘secular creationism’ in characterising the contemporary life sciences is both jarring and humorous. This label seems to have been strategically invoked to disturb perceptions of this technoscientific field. Haraway uses irreverent humour to dislodge the hold of the imaginaries of contemporary genomics.

Haraway’s investigation of the ‘technoscientific unconscious’ demonstrates that technoscience is not exclusively about knowledge and cognition. She highlights how technoscience is constantly being made and re-made in the dispersed, often mundane, but always complex processes of formation of technoscientific subjects, that involve pleasure and anxiety. Narrative and figuration are the modes through which the technoscientific unconscious operates and these can be traced through a multitude of media. She maintains that we are all interpellated by these processes and thereby implicated as technoscientific subjects through diverse practices and encounters. Moreover, STS analysts are themselves not exempt from such interpellation. Hence, Haraway demonstrates that play, shock, and humour may be required to allow us to see the patterns of operation of the contemporary technoscientific imaginary.

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