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*Theory Culture Society* published online 21 January 2014

DOI: 10.1177/0263276413510953

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# Analogic Return: The Reproductive Life of Conceptuality

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Theory, Culture & Society

0(0) 1–19

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DOI: 10.1177/0263276413510953

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## Abstract

One of the most important lessons the work of Marilyn Strathern has taught us about knowledge practices is how they stand alone or intersect according to their context. In turn, this has helped us to develop a more dynamic account of knowledge formations as they both travel and stand still. Indeed it is the vacillation between movement and stasis that explains how essentialisms can either anchor cultural systems of thought or become unmoored – a process Strathern has tracked across both cultural and epistemological contexts. In this paper I use the biological sciences as a context in which to track the process by which analogies ‘travel back’ to remake both their object and its epistemology, or ‘habits of thought’. Indeed, context itself can change, and be changed by, what I am calling analogic return – something we might also consider in relation to scale or perception, or as one of the world-making practices out of which we constantly remake ourselves, now more literally than ever in the context of new genetic technologies and stem cell science.

## Keywords

bioscience, kinship, merographic connections, stem cells, Marilyn Strathern

## Introduction

I begin this paper by retracing well-worn ground and revisiting a familiar example of what we might describe as the work, or travel, of analogies. I first describe how analogies are seen to give birth. I move on by comparing this model of analogical work to others in the context of the new genetics. In turning to Strathern’s account of travelling analogies, and their effects, I revisit her model of merographic connection as a type of analogical perspective, or agentic comparison. I then cast a quick eye over some of the new kinds of embryos being propagated in scientific

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laboratories, with a view to understanding the way context itself can change, or be changed by, the way analogies ‘travel back’ to change their objects, or what I am calling ‘analogic return’. I conclude by asking what difference our ability to change context and scale makes to the reproductive models through which we understand ourselves and our relations, using examples from the context of stem cell research. This exercise in re-reading Strathern’s work, and applying it to the biosciences, also reconsiders how Strathern’s models of what she calls ‘kinship thinking’ are now being built into new life forms, thus repeating a recursion that has been the subject of much of her work, between concepts as ideas and actions. Today what is particularly striking about fields such as stem cell science is the extent to which the object of study and the experimental equipment are identical – eroding the difference between technology and biology at the very point of discovering ‘more’ about the biological ‘ground state’ of cellular renewal. This striking fact is epitomized in the new conception of the human conceptus (embryo) as a tool (Franklin, 2013a).

### **Analogies Give Birth**

In his now famous prediction, first published in the Zone anthology *Incorporations* in 1992, Paul Rabinow introduced the term ‘biosociality’ by claiming that:

In the future, the new genetics will cease to be a biological metaphor for modern society and will become instead a circulation network of identity terms and restriction loci, around which and through which a truly new type of auto-production will emerge which I call ‘biosociality’. If socio-biology is culture constructed on the basis of a metaphor of nature, then in biosociality, nature will be modelled on culture understood as practice. Nature will be known and remade through technique and will finally become artificial, just as culture becomes natural. (1992: 241–2)

In this oft-quoted and almost mantra-like passage predicting the birth of a truly new form of autoproduction known as biosociality, Rabinow points to a flow of analogies, or metaphors, arguing that their direction will be changed by a specific set of mechanisms – together comprising a set of forces he argues are amenable to empirical investigation. Hence, the flow through which ‘culture is constructed on the metaphor of nature’ will be reversed: ‘nature will be modelled on culture’. The primal scene for this reversal, the new genetics (itself ‘a biological metaphor for modern society’), will be revealed, according to Rabinow, through a series of moves or techniques, namely the human genome project which will ‘move’ our definitions of the social into the flesh of our very

being, as our newly instrumentalized germlines become the object of the self-management, harnessed to the imperatives of the risk-avoidance strategies that have become the hallmark of postmodern subjectification. Key to this process is its offspring: the 'truly new form of autoproduction' called biosociality, exemplified by such empirical units as 'groups formed around the chromosome 17, locus 16,256, site 654,376 allele variant with a guanine substitution...[which] have medical specialists, laboratories, narratives, traditions and a heavy panoply of pastoral keepers to help them experience, share, intervene in, and "understand" their fate' (1992: 244). Thus, in Rabinow's prediction biosociality would involve 'the formation of new group and individual identities and practices arising out of... new truths', by which he means the new truths of the human genome project. But the change, as he notes, is also one of a reversal in a presiding cultural logic, by which the direction of analogical flow – from nature to culture – is reversed, so it flows backwards. The change is thus one of relationalities (biosocial identities, connections and groups) but also of context and perspective (molecularization). The consequences are worldmaking, and also unmaking of worlds.

As predictions go, this one seems quite accurate in retrospect, especially given that it was written more than 20 years ago. As it happens, we now have quite a large amount of data on exactly what Rabinow described as a predictive 'certainty' in 1992. In particular we have Rayna Rapp's (1999) exhaustive study of exactly what Rabinow describes as biosociality. Indeed, in the section of her book devoted to his arguments subtitled 'Biosociality', Rapp writes that in describing how 'parents and children... resculpt their identities using the resources of peer support groups' she is demonstrating how such individuals 'are participating in a process which Paul Rabinow (building on Foucault) has labelled "biosociality", [meaning] the forging of a collective identity under the emergent categories of biomedicine and allied sciences' (1999: 302). As Rapp goes on to emphasize: 'I have also tried to describe older and deeper traditions of doubled discourses through which children labelled abnormal or anomalous can be reconfigured into social life' – a process Rapp and her colleagues describe elsewhere (Heath et al., 2004) as genetic citizenship (which has a somewhat different inflection from biosociality). As Rapp notes, with a characteristic lean toward the limits of discursive compliance, 'Biomedicine provides discourses with hegemonic claims over this social territory, encouraging enrolment in the categories of biosociality. Yet these claims do not go uncontested, nor are these new categories of identity used untransformed' (1999: 302).

Hence, while for Rabinow what was noticeably predictable about the new genetics was the means by which the new epistemic norms of genetic science would be taken up as new norms of identity and self-management, what Rapp emphasizes is the unpredictable way in which this is done. Elsewhere (Franklin, 2003) I have referred to this difference

between the emergence of new regulatory norms of surveillance and the way the authoritative knowledge that undergirds them may be challenged by exactly this process, as ‘the genetic gap’. The role of analogies in this context is akin to a type of apparatus through which connections can be forged, resisted, or refigured. What is notable about the context of kinship that concerns both Rabinow and Rapp is that the work of analogies not only serves to ground identity or connection, but also to define the content of kin ties as both substance and sign.

## The Genetic Gap

Both Rapp’s and Rabinow’s interpretations of biosociality are equally useful and valuable, and together they articulate the ‘two sides’ of what has become a well-known paradox not only in the context of the new genetics but of new reproductive technologies as well, and we might add of developmental biology in general. The paradox can be stated simply: the more explicitly literal we have become in our ability to talk about the precise features of genes (for example how many allelic repeats a particular mutation might have, etc.), and the more accessible this knowledge has become through mechanisms such as the internet, *the more uncertain it seems we are about the meaning of this information or what to do with it.*

This is where Rapp finds her moral pioneers – women who are struggling to make sense of more precise and literal information but in a context, arguably, of too many dissonant knowledge contexts that do not align neatly to the ‘genetic truth’ that is only ever precise in the lab where it was made. As she points out repeatedly, the literalism of clinical genetics – its very precision – can be what makes it so hard to interpret, because scientifically exact knowledge of chromosomal variation does not travel either easily or automatically out of its rather narrow knowledge context – which is the lab to which such knowledge is, in proper Latourian fashion, autochthonous, ‘native’ or obvious. Many other researchers on new reproductive and genetic technologies have reached similar conclusions about what Jeanette Edwards describes simply as ‘kinship thinking’ – the quotidian conceptuality through which meaning of new scientific facts about reproduction, inheritance and genetics both can and cannot be separated from what Edwards characterizes as a ‘context in which common cultural resources are deployed’ (2000). Following Strathern, Edwards provides a cogent description at the end of *Born and Bred* of what she describes as the necessary hybridity of ideas of relatedness, which must be composed out of distinct idioms, such as love, care, genes, blood, naming, or place in order to function in a social context that requires constant adjustment.

Hence, what makes all of us experts in kinship thinking is our ability to create, to maintain, *and also to change and disconnect* the perspectives,

or vantage points, out of which we ‘do’ both the social and cultural work of kinship – as practice and connection as well as meaning and symbol. This plasticity is possible because there are many conflicting and paradoxical ‘strands’ of kinship thinking, all connected to different knowledge domains (nature, culture, and technology being some examples). Unlike Rabinow, who imagines that the new genetics might be the final nail in the coffin of the nature/culture split (although I am sure even he would agree the ‘famous last words’ club for this particular prediction is a rather large one), Edwards argues, like Rapp, that we need to recognize the essential utility of the ‘doubleness’ this hackneyed polarity provides as a cultural resource that is used to make, and unmake, social connections. This is precisely the work Charis Thompson has denominated as ‘strategic naturalization’ (2005) in the context of assisted conception. Here again, a question of analogic apparatus arises in the effort to characterize how kinships and identities are both signified through substance and substantialized through signs.

On the basis of my own research on IVF (1997) and more recently on preimplantation genetic diagnosis (Franklin and Roberts, 2006), I have argued similarly that the question of ‘the genetic gap’ that arises in so many studies of the new genetics may be evidence that the natural facts/social facts distinction will continue to be reinvented socially, and may consequently remain useful analytically (Franklin, 2003: 66). My own preference is for the even more inclusive formulation Jackie Stacey, Celia Lury and I developed for our book *Global Nature, Global Culture*, in which we used a ‘rolling’ model of process whereby naturalized ‘facts’ could be serially denaturalized and renaturalized as part of the same ‘movement’ described by Rapp, Edwards and Rabinow. Hence, for example, a specific mutation might become the basis for a new kind of genetic kinship linking disparate families and individuals via the internet, or it might simply be ignored. A new type of ‘autoproduction’ might be imbricated within a form of ‘kinship thinking’ that links new diagnoses to emergent networks of care and community, for example those documented by Rapp and her colleagues (Heath et al., 2004) in the context of specific genetic syndromes. However, the point that is shared across all of these approaches (and others, such as Haraway’s (1997) model of ‘imploded’ naturecultures) is that the relationality known as kinship is a mix of ingredients and is deployed to secure, as well as flex, connections: as in sex, mix adds flex, and flex co-exists with stasis.

This model of kinship as a plastic technology of ‘making’ or ‘crafting’ relational ties naturally leads to the more difficult problem of how we explain the mechanisms connecting the plasticity of kinship to the constraints that make things *stand still* – which is another way to describe what genetic literalism does: *it anchors the meaning of shared reproductive substance to a singular version of it as true and real*. And if you are a PGD patient, or having an amnio, or being tested for Huntington’s, that truth

is a singularly powerful force – although, paradoxically, never the only one. What is notable in contexts such as prenatal testing or PGD is the movement, or toggling, back and forth between the effort to naturalize selective aspects of the process (often in an effort to achieve alignment with normative expectations) and the selective exclusion of other components, such as the new role of would-be parents as consumers in a market-driven reproductive service industry.

## Merographic Connections

A well known paradox of both new reproductive and new genetic technologies is that they are both like and unlike the ‘natural’ contexts of kinship they are designed to imitate, or replicate. In other words, although PGD is at one level a form of reproductive assistance helping couples to achieve what would have happened naturally, it is also the reverse – and doubly so. First, it is as much designed to prevent ‘what would have happened naturally’ from occurring (by preventing a pregnancy compromised by severe genetic pathology) as to facilitate a process that would normally not require technological assistance (the birth of viable offspring). And second, the experience of PGD is nothing like a ‘normal’ pregnancy, even if it is successful in facilitating the birth of a healthy child. This double paradox of PGD is what engenders its doubled analogy as both ‘just like’ and ‘nothing like’ normal or natural pregnancy.

The paradox of the double analogy that is ‘native’ to the context of assisted conception is central to the work of numerous anthropologists of the new genetics, including Rayna Rapp (1999), Jeanette Edwards (2000), Kaja Finkler (2000), Monica Konrad (2005), Sahra Gibbon (2007), Mette Svendsen (2006), and Paul Rabinow (1996), as well as my own research (Franklin, 2003). Because it is a phenomenon that involves not only the ‘borrowing’ of analogies in one direction (‘just like nature’), but also their ability to ‘travel back’ (‘just like technology’), its analysis requires a more complex model of the work analogies perform and enable in the kinds of ‘kinship thinking’ that accompany technologically assisted reproduction. This doubled function of comparison, which I am calling ‘analogic return’, can usefully be analysed through Strathern’s concept of ‘merographic connections’. Arguably the work of stabilizing the paradoxical implications of biomedical intervention into reproduction has a wider set of implications for biology, or biological relations, in general as they are increasingly technologized in the context of what has come to be known as the ‘biosociety’ or the ‘age of biological control’.

Marilyn Strathern’s model of merographic connections is a useful heuristic not only for analysing the traffic in analogies indigenous to the contexts of new reproductive and genetic technologies. It is arguably also crucial to understanding the traffic between ‘natural facts’ as they

arise in the context of bioscience and biomedicine and the formal mechanisms of 'kinship thinking' in the Euro-American context where the biogenetic model has been especially prominent. The merographic model is introduced in *After Nature* (published in the same year as Rabinow's article) as a means of distinguishing a specific kind of cultural borrowing through which the meaning of 'facts' can be changed through connections to different contexts. Describing English kinship in terms of how it generates endless plurality through merographic connections, Strathern explains not only how each part can be a distinct perspective, or whole, but, importantly, that the logic of their totality does not reside in movement but in relations. Hence Strathern writes in *After Nature* that:

The popular supposition that kinship is only 'part' of society rests on the fact that it is also a 'part' of biological process. Such parts are not equal to one another. *The perspective that gives each of them its distinctive nature appears always as a different order of phenomena.* Each order that encompasses the parts may be thought of as a whole, as the individual parts may also be thought of as wholes. But parts in this view do not make wholes. ... Thus, the logic of the totality is not necessarily to be found in the logic of the parts, *but in the principles and forces that exist beyond the parts.* (Strathern, 1992: 76, emphasis added)

In other words, kinship is often imagined to have both a social and a biological component, but these are neither synonymous nor interchangeable. Each 'part' provides a vantage point from which it can be imagined to belong to a larger whole (e.g. the gene is 'part of' the individual). But each 'part' also has its own internal 'logic' – as in the biological mechanisms of gene expression, or the effects of mutation. Part of living with the ordinary pluralism the English use to make their everyday bundles of perspectives is knowing that the 'logic of totality' – for example in the sense of what Marcel Mauss referred to as a total social fact – *can only emerge out of a mixture of components*, and this is where the merographic model becomes helpful. 'Merographic connections', Strathern argued in *After Nature*, are those that connect domains *by mingling together parts that belong to different wholes*. 'Domaining' is how the logic of the parts becomes defined through context: hence a gene, for example, can mean one thing in a genetic counsellor's office and something completely different five minutes later in a conversation on the bus with another family member or a phone call from a concerned spouse.

Domaining, however, can be upset by the very borrowing that allows the logic of a part to define the whole. A famous example of this described by Strathern in *After Nature* is the way Darwin 'borrowed'

the ideas of affinity and genealogy to describe relations between kin as a template for his model of the evolution of life – for which he lacked an adequate descriptive language. In this way, as Gillian Beer has pointed out, the potentially disturbing, unpalatable, sacrilegious, and even shocking implications of Darwin's theory were cleverly rebranded as a means of socializing nature (as did Darwin's extensive references to domestication, and the 'selective improvement' accomplished by the breeder's hand). As Strathern notes, however, 'Darwin's loan' also recontextualizes its object: by making the 'natural connections' of living things into a kind of kinship system, kinship becomes analogous to nature. In turn, the analogy 'travels back', naturalizing kinship as something we share with the natural world around us, and indeed literalizing the radical germ(line) at the heart of Darwin's theory. This is how a merographic connection 'activates' the displacing effects of a doubled analogy.

This is why the merographic connection cannot be understood primarily in terms of *the logic of the parts it comingles*, but needs instead to be analysed in terms of *the effects engendered by such comingling*. As Strathern notes, it is the 'principles, forces and relations that exist *beyond* the parts' that remain always available to create plurality, room for manoeuvre, and space for further supposition. Thus, 'kinship connects unique individuals with the constant proviso that kin roles are only one among a constellation of roles' (1992: 78). Strathern's point goes further, however, to examine the reproductive mechanism which makes such relations both possible and legible. Interestingly, it is their legibility, she argues, that comprises a form of reproduction in itself: the merographic logic of connection, she argues, substantializes kinship as conceptuality. Since it is a logic that 'is replicated in the very symbolisation of connection', she notes (1992: 78), we might also add that this particular mechanism, so common to kinship thinking, and so vividly displayed when kinship thinking is thought out in explicit detail at the point of technological assistance, not only describes kinship but 'makes' it. Indeed, such a claim is equally implied by the idea of 'achieved' parenthood, 'crafted' kinships, or 'making' biological relatives.

## Biological Relativity

A question Strathern raised in *After Nature* was what would happen once the ground of nature, and the depth of its incontrovertibility, was 'flattened' by the new supremacy of 'choice', and we might add 'management', 'accountability', and 'risk avoidance', as well as consumption. The sense in which Strathern argued that to be after nature was *to cease to be merographically connected* presumed the reproductive model that grounded such a perspective had been 'cancelled'. Nature, the individual and society, 'each [of which] carried its own substantive or tropic effect' (1992: 193), lost their ability to be ground to one another's figure, or

figure to each other's ground. As she claimed at the end of the book: 'If nature has not disappeared, then its grounding function has. It no longer provides a model or analogy for the very idea of context' (1992: 194).

However, an alternative to this prediction, which was in some respects quite similar to Rabinow's (1992), and also to Haraway's (1992), is that if the subject's relationship to the grounding essentialisms of either naturalized nature or whole individuals has been 'flattened', this does not necessarily mean that the potential for merographic connection has entirely disappeared. It may be that as a newly biologized and technologized nature has morphed into instrumentalized biology, it has not therefore also lost its depth. For example, it could be argued that the importance of naturalizing a technique such as IVF is precisely in order to normalize it – suggesting that the grounding function of nature has not disappeared but is simply performing a traditional symbolic function – and is still a means of delivering 'depth'. Moreover, it could be argued that within the biological sciences a merographic logic is alive and well, and used for similar purposes, for example in the case of the 'logic' of the genes becoming articulated to the 'principles and forces' of the cell, in order to provide a 'thicker' description of biological development. Indeed, the work of refiguring such articulations in the context of stem cell science, somatic cell nuclear transfer (the 'Dolly technique'), or epigenetics, continues to invoke a logic of development which precisely exists 'beyond' the logic of the gene and the cell per se, referencing the 'something else' that explains an underlying, organized, biological trajectory.

Let us consider, for example, the globally celebrated embryo that was described in the pages of the prestigious journal *Cell*, on 19 November 2007, when it was announced that a truly new type of autoproduct had been confirmed in the form of so-called human iPS cells. This new embryo was produced using adult human stem cells, which were induced to revert to pluripotency (go 'back' in time) through direct reprogramming by Yamanaka and colleagues in their article 'Induction of Pluripotent Stem Cells from Adult Human Fibroblasts by Defined Factors' (Takahashi et al., 2007). Yamanaka's team, inspired by the successful cloning of Dolly the sheep, demonstrated that four transcription factors – Oct 3-4, Sox2, Klf4, and c-Myc – could be transfected using retroviruses into adult differentiated cells to produce newly primordial cells that were indistinguishable from human embryonic stem cells – and capable of forming all of the defining tissue lineages including endoderm, mesoderm and ectoderm. These cells were 'germline competent', suggesting that by using techniques of directed differentiation, colonies of donor-specific specialized cells, such as cardiomyocytes, hepatocytes and dopaminergic neurons, could be derived, or cloned 'to order'.

This is a flat world if ever we saw one: indeed passaged human cell lines are even flatter than those of the mouse. And yet it is a model

that delivers added depth to understandings of early mammalian development – indeed a whole new dimension to cellular programming (genetically re-programmable de-differentiation). In the oddly agricultural context of stem cell cultivation, propagation, and seeding we can thus observe both a familiar and a new reproductive model at work, which is arguably also a ‘traditionally’ merographic one. In this unmistakably human model of ourselves, which is also a kind of soil in which we sow our reproductive futures, the individual, society and nature continue to do their work, like digging tools. The introduction of transcription factors (technology) induces control (over biology), offering the promise of future means of ‘bespoke’ human repair (individual regenerative therapy). Here is Rabinow’s biosociality outperforming his own predictions! Here is the birth of yet another form of ‘autoproduction’, only differently configured in a Petri dish. Here is yet another version of kinship as mix and flex – indeed as sex (albeit cloning)!

The displacing effect is here too: the four transcription factors that are described as ‘stemness genes’ evoke another analogic return at work. Once displaced by the unidirectional and hegemonic agency of the gene, the cell is travelling back to reconfigure the origin of pluripotency through (as) its ability to translate genes into action. In our new era of biological translation, or what some have called ‘the age of health and wealth deliverables’, the ability of cells to translate the message and deliver biological control has taken precedence over the gene’s now seemingly rather passive embodiment of mere code. This picture too, not so much in spite of as because of its reversals, has enduring merographic depth. Standing still, despite all the talk of plasticity, is still the notion that biological development is comprised of a logic that exists ‘beyond’ the parts. It is precisely the different vantage point enabled by the ‘parts’ that will allow the ‘whole’ of biological development to be revealed. For many scientists, this ‘whole’ is imagined as an organized temporality that exists not only prior to any individual model of development but as a universal set of forces and principles that are intrinsic to development. As the commentators on the Yamanaka article, Holm Zaehres and Hans Scholer from the Max Planck Institute for Molecular Biomedicine confirm, direct reprogramming of terminally differentiated adult somatic cells into pluripotent colonies ‘reverses the developmental arrow of time’.

And there it is! The depth of the merographic connection once again – and a familiar reversal at that, for here too once again is Darwin’s loan, only perhaps not quite what it was before, since (fittingly) it has not reproduced itself exactly. But time as it belonged to Darwin – the time of development he put into his biology, to make it evolution, by borrowing the idiom of kin to make the connection, which then got borrowed back – is now doing again what reversals do, namely the work of analogic return. The reconfigured relation of the cell to the gene is doing the work of changing, in this case, what development means, by confirming it

is not one-way but reversible. A new traffic between cells and genes has here reshaped the form of biological time, rendering it two-way. Is it a coincidence that this model of conception is also brought into being by a two-way conceptuality?

## Cellular Relationality

While, then, we might rightly comment that in the context of the iPS cell developmental time is both reversed and radically remade, this new biological fact is perhaps in other respects not so different from existing understandings of how we have been born and bred. Here again, merographic connection has enabled a new dimension to be opened up (of 'reversible' time). As we have seen (and as David Schneider (1968, 1984) said more than once) biological thinking is in many ways strikingly similar to Euro-American kinship thinking. But it is also evident that kinship thinking figures prominently in the origins of stem cell science from another angle. Cellular reprogramming (stem cell science) is at present largely financed by the public sector, private philanthropy and charitable foundations. This is because new reproductive models such as the iPS cell offer radical new possibilities for human regenerative therapy, by harnessing the 'stemlines' of human repair – an aspiration that combines a sense of parental, social, and scientific duty.

Stem cell science is not a profitable sector: it is a field of bioscientific exploration powerfully driven by the desire to alleviate the burden of severe, chronic, and, as in the case of childhood diabetes, both increasingly common and increasingly terminal diseases. It is also a field of basic scientific research closely keyed to the relief of some of the suffering most painful to experience, or to witness, in old age such as Alzheimer's, Parkinson's, or macular degeneration. Stem cell technology, then, while often linked to a world of designer futures and unknown risks, is more likely to be encountered within a familiar world of care, duty, hope, disappointment, failed interventions (as well as successful ones), and above all a world that is structured by 'kinship thinking' in its ordinary, normative, moral guise. What holds still in the seemingly fast-paced world of stem cell science is the promise of control and the emphasis on progress combined with the logics of kinship and care. Indeed the social gravity of kin relations in the form of the pull toward a duty of care toward those to whom one is 'closely related' is crucial to the complex webs of relationality that make up both what Rabinow described as 'biosociality' and Rapp and her colleagues (Heath et al., 2004) describe as 'genetic kinship'. These two 'parts' of the promise of stem cell therapy are bound together by the logic of two (at least) wholes: that kinship 'is part of biological process' while also being 'part of society' (Strathern, 1992). Thus science and kinship are also linked, or even 'related', through

the ‘principles and forces that exist beyond the parts’, namely the sense of moral obligation toward others that defines them both.

The somewhat paradoxical implication of Rabinow’s model of biosociality is that rather than science ‘reinforcing’ kinship, in the form of new genetic information about inheritance, and thus emphasizing relationships established through shared reproductive substance (which is commonly used as a definition of what kinship is ‘all about’), the new genetics might also displace the importance of kin ties as a separate domain of naturalized connection altogether (another effect of ‘analogic return’ as genes come to be seen themselves as technological). Strathern acknowledges a similar implication of new genetic technologies, which might both have an individualizing effect and a displacing one – separating ‘kinship’ from ‘family’, as was the case in the pre-industrial period (1994: 72). As Strathern also notes: ‘a cultural paradox is ... produced by the fact that “more” kinship does not necessarily lead to “more” relatives [because] not all biogenetic relationships may be activated as social ones [and] the social activation of relationships is central to what we may think of as reproduction’ (1994: 73). The biosociality hypothesis is based on a similar observation – that people might produce new technologies of social connection (networks) by ‘activating’ different models of ‘biogenetic connection’ (which is an option now even more readily to hand via the internet).

Again, what is apparent in Strathern’s observation, with its emphasis on ‘activation’, is the connecting logic that supplies ‘the principles and forces that exist beyond the parts’ (the parts in this case being science and kinship). It is the idea of *action* that connects the effort to plumb the depths of cellular interiority with the attempt to harness biological potential to cure disease, in the same way that it is a logic of duty and care that unites the quotidian meanings of kinship with the high tech search for keys to unlock the developmental mechanisms of cells. Whereas the ‘genetic gap’ indexes the distance between the scientific language of a karyotype diagram and the experience of pregnancy, or one’s own child, selective ‘activation’ supplies the means to resolve this dissonance. ‘Activation’ similarly allows us to distinguish between Rapp’s account of the tendency not to ‘activate’ genetic knowledge in some cases (to decide not to terminate a pregnancy following a positive prenatal diagnosis, for example), and Rabinow’s prescient anticipation of how ‘actively’ specific genetic mutations would be taken up as means of establishing new kinds of kinship, or biosocial ties (especially in the age of the internet).

But this is also a picture of merographic action at work – revealing the means by which knowledge is selectively employed, and perspectival shifts function to orientate knowledge one way or another. We would find parallels for the work of merographic connection in the descriptions provided by Jeanette Edwards of ‘kinship thinking’ (2000), by Signe

Howell (2006) of the work of 'kinning' foreigners, or by Charis Thompson (2005) of 'strategic naturalisation' in the context of new reproductive technologies. What I hope to show, however, is how the concept of merographic connection introduced by Strathern can be used to model both the extension of relations and their loss (or their non-loss, as the case may be). In the same way that Rayna Rapp describes how choices for women undergoing amniocentesis are narrowed, made more uncomfortable, and often resented by women presented with abstract information about biogenetic probabilities, so too are existing means of both living and understanding kinship potentially strengthened by the heightened genetic realism of the postgenomic era (Finkler, 2000). Similarly, and as I found in my own research on IVF, the very existence of a choice imposes a non-negotiable condition of choosing, when even choosing not to choose becomes a choice. But careful choices are made all the same. For the women I interviewed in Birmingham in the late 1980s, just as IVF was beginning to become much more widely available, it was clear that new choices eliminated an implicit condition they had not even recognized before – namely, that infertility could simply be presumed to be 'un-actionable' – and some lamented the loss of this 'option', while still remaining very positive about IVF (Franklin, 1997). For all that its former un-assistable-ness might have been associated with personal tragedy, the very immovability of the obstacle of infertility rendered it differently knowable from the constantly changing Pandora's Box of new reproductive technologies. Heavy as the stone of infertility might have been to carry, there turned out to be different disadvantages to the prospect that you might never be able to 'put it down' in the face of ever-increasing possible pathways forward on what quickly came to be known as the 'infertility treadmill'. In retrospect, such a situation of non-choice might be evaluated more positively than it was 'going forward'. Another paradox of IVF is the extent to which it reproduces many of the same conditions it is intended to alleviate.

## Dish Life

Marilyn Strathern was among the first anthropologists to engage with the questions raised by new reproductive and genetic technologies, and her work has been instrumental in stimulating a generation of social scientists to investigate these questions, often by using ethnographic methods, and often by invoking kinship theory. There is now a substantial body of such studies comprising one of the largest sources of empirical data available with which to examine wider questions about encounter between biology and technology more generally. Now more than 20 years old, and increasingly diverse in terms of cross-cultural comparison, the literature on kinship in the context of new reproductive and genetic technologies is too vast to summarize here, and is rightly taught at

university level as a major subdiscipline within sociology and anthropology, as well as bioethics, legal studies, and science studies. This field shows no signs of either diminishing in importance or slowing down in its rapid spread to other disciplines (the study of kinship in the context of new reproductive technologies is now pursued and taught within science studies, sociology, legal studies, social psychology, social policy, the history of science and many branches of the humanities, medicine and the life sciences).

One of the paradoxical findings of this increasingly large body of literature is that the process of 'making' biological relatives has engendered a more contingent, or relative, understanding of the biological. If biology was naturalized by 'Darwin's loan', which travelled back to biologize kinship, then we might say that the very idea of a biological relative is a form of cultural inheritance delivered by 'analogic return' and substantiated as 'miracle babies'. Following the Foucauldian model of genealogy which, after Nietzsche, eschews the confident identification of points of origin in favour of a more gradual and 'messy' process of accumulation and sedimentation to produce norms that rely on the 'effect' of origin, it is also possible to suggest that nature, like gender, is a less 'original' condition than are the historically acquired norms often modelled upon it. This proposal in turn suggests it is modelling that is 'original' – perhaps fittingly suggesting that, like genes themselves, cultural models defy the very idea of a 'beginning'.

At the same time, neither nature nor gender have entirely lost their popular associations with the notion that they are based on something 'else' that is more solid and original (often something 'real'), in the sense of being prior to sociality. Regardless of the extent to which it is possible to demonstrate that ideas about the body, sex, race, disease, or genes have changed over time, or continue to vary cross-culturally, a certain commonsense determination refuses to understand these categories as entirely contingent. We see examples of this tendency to reify and essentialize all the time – in the classroom, in the newspapers, and in the scholarly literature. In the context of innovative scientific research, such as stem cell science, it is at times difficult to determine how strongly the idiom of the 'ultimate' causes of biological organization, to use but one example, operates as a literal prerogative, as opposed to a kind of aspirational 'as if'. All scientists are aware of how fundamentally their experimental equipment determines their findings, and experimental science is widely understood as a modest practice which is largely based on failure and refutation. The idea of searching for an origin (of a biological pathway, for example) is not less useful if it is known to be a largely fictive pursuit.

Today what is equally striking about fields such as stem cell science is the extent to which the object of study and the experimental equipment are identical – eroding the difference between technology and biology at

the very point of discovering ‘more’ about the biological ‘ground state’ of cellular renewal. To describe the situation most bluntly, a human embryonic stem cell line is at once research material and research tool. This conflation of the biological and the technological in the Petri dish is not only productive of a culture system in the experimental sense of using media to support controlled model systems of living entities. The Petri dish models of human cells such as those described earlier in this paper are also models of conceptuality – they are conceptual tools that are precisely designed to test new theories based on existing ones. As such, they both contain *and magnify* the social world. They are ‘looking glasses’ that both discipline biological substance and substantialize conceptuality. This too is a form of added depth.

Here is a description of a dish containing human life that we can use as an example of magnification. In this passage from an interview in 2010 with a stem cell scientist in London, Dr Dusko Ilic, he explains how the human is both contained and expanded using stem cell models.

SF: So maybe if you could just give me an idea of what the advantages of a dish model would be, say compared to an animal model?

DI: So if you are talking about different monogenic diseases, they can be modelled the best with human embryonic stem cells or induced pluripotent cells. These cells can be differentiated into different cell types such as neurons, muscle cells or whatever is the cell type that carries the most pathology. With these cells we can then model disease *in vitro*, in the laboratory. The advantage of this system when compared with animal models is that working in a human system avoids species-specific differences. Although animal models are invaluable and irreplaceable for studying disease in the whole body context, they provide a limited representation of human pathophysiology. In addition, stem cells are an ideal tool to reduce the number of animals, complexity and costs associated with animal experiments in drug development and toxicology.

SF: So if you were looking at a particular mutation, would it be an advantage that the mutation was, as it were, a natural mutation as opposed to say a knock-in mutation in a mouse?

DI: Ah, it would from one point. I mean, there is no difference whether mutation occurs naturally or it is generated in the lab. As I mentioned, animals cannot replicate everything that is going on in humans and obviously the best way that you can do lab work is with a human source of cells. It is still technically challenging to make specific mutations in human embryonic stem cells. This is easy

to do in the mouse, because mouse embryonic stem cells are more prone to homologous recombination, etcetera, so you can knock in technologies or knock out genes more easily. In human cells it is almost impossible and has a very, very, very lower efficacy, so that is why we are aiming to get natural mutations.

In this discussion of cell models, their value is both practical and ethical. Human dish models of disease reduce the dependency on animal experiments, while also providing a more accurate model of specifically human biology. At one level, there is ‘no difference’ between a mutation that is natural or artificially induced. But at another it is so technically difficult to induce a human mutation that it is easier to find an embryo that already carries this mutation, such as an embryo donated from a PGD patient. Such models are at once an ‘ideal tool’ and ‘technically challenging’. At the same time these models are ‘ideal’ in some respects (they are simpler and easier to use than animal models, as well as being more ethical), they lack other advantages, such as the ability to replicate the function of a mutation in a ‘whole body context’.

From the point of view of merographic logic, the reasoning here is self-evidently both one of understanding parts and wholes while also recognizing the extent to which the logic of the whole exists ‘beyond’ the part, to give added depth, plurality, and ‘more’ perspectives – just as Strathern argued it would. Although not strictly analogous to Strathern’s examples of the way the idea of the individual is at once a separate domain (or ‘whole’) and also legible as a part (or another whole, e.g. society), the formal qualities of the reasoning process are similar enough to confirm the ways in which merographic connection adds both depth and plurality to the thought experiment the dish model recapitulates.

At the same time, in pointing to the simultaneous importance of both ethical and experimental criteria, the model also conforms to the characteristics of merographic conceptuality by pointing to logics that exist ‘beyond’ the experimental system itself – such as the moral duty to avoid unnecessary animal suffering. Built into these models are also the ethics of embryo donation, since by definition a PGD embryo that carries a mutation could not be used for treatment. The aim of such experiments is also broadly reciprocal: in exchange for the act of donation (of shared reproductive substance) is the promise of improved treatment of the disease under scrutiny. A distant prospect, perhaps, the logic of the experiment is social as well as scientific. Indeed the description of the design of the experiment reveals that a constant or ‘static’ feature of the logic connecting the social and scientific motivations that bring the model into being is the emphasis on ethical obligation. Arising out of a context of assisted conception, then, the logics of parenthood and scientific experimentation are ‘kinned’ in the effort to intervene in rare childhood diseases caused by pathogenic mutations.

The pattern of movement and stasis at work here by which an analogy is brought to life, in the form of a living human cellular model, achieved through artifice, in order to imitate nature, and as a means to design new tools for understanding and intervening in genetic disease, replicates a merographic pattern that is similarly ‘activated’ in social life. Indeed this formal merographic pattern is also being ‘imitated’ *in the very form of the experiment* – in its ethical as well as experimental logics, and its reach for a logic that is ‘beyond’ the parts, as Dr Ilic explains. In this context we can also see how biology becomes a ‘relative’ condition, and in more than one sense. While the embryo from which the stem cell lines are derived suggests a ‘biological’ relation of shared reproductive substance to the ‘parents’ of the embryo, this relation is itself relativized by the context of experimentation, its purpose, and the history of inherited pathology that gives rise to the question of intervention to begin with.

## Conclusion

To the extent that conception models have been considered key components of kinship systems, they have been held to model not only conception but conceptuality (Franklin, 2013b). The rise of the ‘new kinship studies’, to which Strathern’s work has been so central, has in part been based on the implications of this recursion. Another analogic return bears this connection out, when we consider reversing David Schneider’s famous claim that ‘kinship is whatever the biogenetic connection is’ in the context of the iPS cell to suggest that the ‘biogenetic’ is now also a site of remodelling kinship. This is true not only at the level of ‘biosociality’ or ‘genetic citizenship’ but arguably at the level of basic scientific research, where kin ties and obligations ground the pursuit of certain avenues of research – such as modelling ‘natural’ mutations in culture systems designed to fulfil a perceived obligation of care. These dish models, built from the donated reproductive substance of patients striving to achieve parenthood, also model not only a distinctive conceptuality but the mechanisms through which this conceptuality resembles ‘kinship thinking’, ‘kinning’, or even ‘strategic naturalization’. These modes of merographic reasoning might even be described as essential to the ability to conceive of a dish model as an ethical experimental apparatus – just as the modelling of development *in vitro* serves as a promise to reciprocate the donors of reproductive substance by furthering the goal of scientific progress. It might even turn out that kinship is expanded in such an exchange to engender whole new categories of ‘biological relatives’ (Franklin, 2013b). David Schneider, to whom *After Nature* is dedicated, would no doubt endorse the effort to uncouple genealogy from the dichotomy of ‘relatives’ and ‘non-relatives’ that make up ‘the kin universe’. By so doing it might also be possible to deposit the social more explicitly in the dish model of the human,

revealing not only a different future for kinship but a different model for science.

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