Making Futures

The Return of Craft in a Post-Global Sustainably Aware Society[1]

> *Yes, I believe that there is a multiple people, a people of mutants, a people of potentialities that appears and disappears.... ...I think that we're in a period of productivity, proliferation, creation, utterly fabulous revolutions from the viewpoint of this emergence of a people. That's molecular revolution: it isn't a slogan or a program, it's something that I feel, that I live...*[2]

The quote from Felix Guattari, so typical of his animated thought, is a wonderfully open and exuberant cri-de-coeur that we could adopt to express the transformative 'return' to small-scale making that we envisage for a post-global future[3]. Perhaps more *'molecular evolution'* than revolution, this is a future that has been under construction for some while now, and which *Making Futures,* across its three editions to date (2009, 2011 and 2013), has sought to give prominence to. It therefore gives me great pleasure to introduce this third volume of the proceedings of the international *Making Futures* conference, which took place in September 2013 at the magnificently sited Mount Edgcumbe estate. This third edition was probably the most ambitious in the series to date, consisting of a full programme of three research workshops and four thematic sessions, interspersed with six international keynote interventions. Always more than just a conference, *Making Futures* 2013 also featured three concurrent exhibitions: a major show by the furniture maker Gareth Neal, titled *People, Process, Place* at Plymouth College of Art Gallery; *Lifecycles of Material Worlds,* featuring four artists at Plymouth City Museum & Art Gallery; and an exhibition of digitally-fabricated work by the Falmouth research group *Autonomatic,* at the Mount Edgcumbe venue[4]. In terms of delegate participation, the response to the three calls for papers and practice-led presentations far exceeded what had been anticipated, meaning that for the first time, delegate numbers had to be restricted. Moreover, the response was truly global, with abstracts received from over eighteen countries from all regions of the world. The result was a double-blind, peer-reviewed selection of seventy-two delegate-presentations of which, I am pleased to note, by far the overwhelming majority, sixty-two, appear in this volume, along with submissions from our keynotes and research workshop leaders.

Thinking Making/Making Thinking

The hallmark of *Making Futures* has been its effort to explore an expanded notion of craft – and to imbricate it in wider ecological, social and cultural patterns, to develop encounters with philosophical thought, sociology and anthropology, politics, technology, economic and innovation theory, with students of consumer trends and behaviours, and with thinking around educational experience. Convinced of craft's transformative potential at both personal and communal levels, *Making Futures* conceives of craft as a 'project' open to the future, and capable of taking up and refiguring the fragmented temporal and spatial experiences of contemporary life into coherent moments of progressive living - generating possibilities, creating futures...[5] *Making Futures* might therefore be considered, in part, a utopian project. Utopian in this instance is not used pejoratively, but rather to reference the constructive use of our imaginations in figuring better outcomes - a type of *making through thinking* in which the skill is to ensure that the future explored bears sufficient causative relation to actual existing material possibilities so as to render it plausible, and therefore (at least potentially) attainable.

This is not, however, to reduce craft to an abstract (albeit all-important) figure of thought, for when all is said and done, *Making Futures* always seeks to return to that point where the complexity of the individual creative process escapes formalist explanation, bringing artists, craftspeople and designer-makers into dialogue with one another around the nature and sustainability of practice, in and of itself. But it is to dispose oneself to explore the many ways in which the crafted object can embody our relations to the world and to each other – to reveal the affectivities and connections that can shift us, and the object itself, outside of commodification. There is, of course, a significant history here that

we inescapably rub against, one that can be traced back to Ruskin and Morris in their idealisation of a medieval craft past, but which in terms of the stark inequalities of the period, applies especially to Morris and his forward-looking ideal of a more equitable social contract - and, moreover, to his struggle to reconcile this socialist aspiration with the everyday business of fabrication for Victorian high society. Subsequent to Morris, this fissure between ideal and actuality becomes woven into Western craft history like a minor haunting, a time-worn dilemma that serves as a barometer of the wider societal quest for meaning and relation beyond the mass commodity form.[6] Perhaps this disconnect has also contributed in its own way to the impasse in thinking that seems to have marked our reaction to the more recent phenomenon of economic globalisation. Indeed, it has often felt as if, collectively, we had forgotten, or simply given up on, how to *imagine* possible futures beyond the dominant neo-liberal paradigm. Yet if the global financial crisis (or Great Recession) has demonstrated anything, it is that unfettered capitalism with its quintessential beliefs in the self-correcting 'hidden hand' of the free market, and of perpetual economic growth (at virtually all social and environmental cost) is itself a utopian project; one, moreover, that is precipitating an all too real dystopia.

A collective alarm call

In this regard the global financial crisis should perhaps have been interpreted as a collective wake-up call. Yet it seems, rather, as if we simply switched the alarm to mute in order to continue our dreaming. In the UK, for example, we are currently engaged in a somewhat less than convincing attempt to lose ourselves in 'back-to-business' normality: the Great Recession is now officially over and the economy lauded as one of the fastest growing amongst Western nations.[7] We have returned to the growth lane and the economy is once more gathering momentum... Yet to where and to what purpose? Not, it would seem, towards more equitable or environmentally sound arrangements. Indeed, the collective sense of misgiving over the associated crises of the economy and ecology is palpable, and it is against this background that there has recently been a revived interest in thinking about post-growth economies.[8]

This disquiet also explains the phenomenon of why a sober work of economic history (yes, *that* work) has recently erupted into public consciousness. Piketty's *Capital in the Twenty-First Century* acts like a lightning rod for all our anxieties. It not only validates what we have long known, that society is becoming more unequal, but it shows that the trajectory we have been on since the late 1970s points towards concentrations of wealth and corresponding levels of inequality that Morris and his peers would be conversant with.[9] In Piketty's long form interpretation the post '89 global capital expansion (*Globalisation*), let alone the current UK recovery, read as relative 'blips' that do not correct the overall trend. As Donncha Kavanagh from the University College Dublin School of Business puts it in an ironic nod to those calling for a post-growth economic strategy, *"most of us have already lived most of our lives in a 'post-growth' economy".*[10]

Piketty's analysis might seem to relegate the transformative molecular evolution that we are interested in exploring to just another vainglorious dream in that long history of craft utopianism mentioned above. We should, however, pause to reflect that Piketty himself is unequivocal in his view that although the data points in a certain direction, there is no law, economic or otherwise, that says this outcome is inevitable. In short, the problem exists on social, cultural and political planes. *We* have the possibility to act to address it. This idea resonates with our Guattarian inspired task of giving voice to *"...a people of potentialities..."* for to enter into a project called *Making Futures* is surely to dispose oneself towards some potentially bold thinking about the possibilities for making and its contexts. In short, that the 'futurology' of material culture that it calls for obliges us to *'make through thinking'*, and *'think through making'*, more hopeful outcomes.

Making Futures III – Interfaces Between Craft Knowledge and Design

The component elements of this future for small-scale making were implicit in the programming of the September 2013 *Making Futures* conference. Under the rubric *'Interfaces Between Craft Knowledge and Design: New Opportunities for Social Innovation and Sustainable Practice'* the conference brought together research workshops on '*Craftwork as Problem Solving', 'Transformative Practices through Textiles'* and '*Crafting with Digital Technologies'*.

These were augmented by parallel conference sessions on '*sustainability and social activism*', on '*post-Fordist perspectives on consumerism*', on '*craft in local-global contexts*', and on *'craft education'*. All were underpinned by Keynote addresses that further sought to delineate the contours of the new emerging circumstances - from **Adélia Borges on** cultural identity and the conjunction of design and craftsmanship in the Latin American context; **the furniture designer-maker, Gareth Neal, on experiments in sustainable making and living; the Director of the Crafts Council, Rosy Greenlees, on the latest research into the UK crafts landscape; Professor Jaideep Prabhu of the University of Cambridge on the frugal style of innovation known as '*Jugaad*'; and** from **Tomas Díez Ladera from the Institute for Advanced Architecture of Catalonia and Director of Fab Lab Barcelona on digital fabrication.** While no single session or individual keynote presumed to endorse a single global vision of the future of making, taken cumulatively (and augmented by other sources) I think we can extrapolate the contours of a new emerging future for makers.[11] Let us now try to outline this in broad and bold strokes.

The Craft Return

This new future for making will be characterised by a significant shift to localised micro-manufacturing - a shift that will embrace existing craft practices, but which in some cases is also likely to alter existing ideas of craft as practitioners adopt adaptive combinations that mix traditional methods of production with digital technologies that facilitate aspects of the design and make process. These localised practices will be enhanced by exchanges with wider global communities of production and consumption. This future will also further blur the distinction between amateur and professional and between consumer and producer that's already under way, and possibly, further into the future, between private and public as households become the locus of some forms of production. Perhaps we will even see the emergence of new cottage industries, or domestic 'putting out' systems.

Making Futures III showed how aspects of this shift are already being explored in the world of small-scale making, in ways that are helping to widen opportunities for makers, as well as to indicate more sustainable and socially-transformative paths to the future. In fact, in describing this emerging landscape we should refer to *"worlds"* of small-scale making, because in effect, we are referencing an ecosystem, or relational field, consisting of a multitude of creative making instances, or vectors, simultaneously independent and interconnected that populate an extended space which takes in the unique (predominantly hand-made) productions typically associated with the studio art and crafts tradition, designer-maker batch producers, and the types of neo-artisanal manufacturing initiatives emerging around the *maker movement*. As they arc through this space, these vectors pass through both professional and amateur manifestations of makers, and embrace both individual and communitarian initiatives.

All the points within this continuum have experienced development as constituents of the craft resurgence of the last fifteen years or so. However, as noted in previous journal introductions, this resurgence in craft can be said to have begun as a non-specialist revival that initially sidestepped the professionalised studio crafts - a story of grass roots DIY, feminist 'craftivists', voluntary material simplicity advocates, and allied campaigners for local recycling and make and mend; all buoyed by broader alternative initiatives like the transition movement, urban farming, local markets and craft fairs, and reaching out to new audiences through internet websites, blogs, Facebook interest groups, and YouTube. Conversely, these promoters of contemporary craft activism have their counterparts in the more technologically-inclined *maker movement* with its characteristic emphasis on hacking and making physical constructions that often (but not always) include electronic adaptations. These local maker groups are typically connected to wider 'open source' communities that exchange knowledge around hacking procedures and design and construction processes, including digital subtractive (such as CNC cutters) and additive 3-D printing techniques. It might be assumed that the handcraft producers and the more technologically inclined makers have little in common. Clearly, there can be significant differences in the materials and techniques employed, and above all perhaps, in the value afforded to direct hand manipulation. Yet both share in what Roberto Unger calls *'the idea of the transformative vocation'*, a spirit of independent making and creative problem-solving outside of mainstream commodity culture.[12] Moreover, both chiefly operate at (small) scales that enable the creator to retain an intimate relationship with media and materials - even when this material is being formed by a 3-D printing machine, rather than shaped through hand-wielded tools.

A Western *Juugad*

This connection between both the handcraft and technology-centred sets of making suggests an exciting and potentially important opening for experimentation and new development, especially perhaps, along the boundaries where the amateur blends into professional practitioner levels, taking on a more design-led *modus-operandi* linked to neo-artisanal forms of low volume manufacturing. The projects emerging from these borderline areas will often exemplify the inventive tacit and imaginative obstacle resolving strategies that our *Craftwork as Problem Solving* workshop sought to explore. When embedded within local communities and cultures, this form of problem-solving is also sometimes characteristic of the flexible, frugal innovation that our keynote speaker, Jaideep Prabhu, (and his co-authors) labelled '*Jugaad*' - Hindi for cost-effective "make-do" solutions associated with so-called developing nations. As Jaideep showed, these solutions can often be extremely elegant functionally as well as formally. Moreover, because they typically emerge in response to practical problems and issues encountered at local levels, they occasionally have the ability to translate across global-cultural divides to address similar requirements elsewhere. As he notes, these can constitute potentially colossal 'base of the pyramid' transnational markets which existing corporate product innovation and enterprise models are all but ignoring, partly because their product Research and Development (R&D) is simply not geared towards the low-tech, low-cost costs needs of these users. In contrast, small-scale makers are already proactively exploring these possibilities.

Confirmation of how a Western *Juugad* might materialise a form of future small-scale making comes particularly (but not exclusively) from digital fabrication, including additive manufacturing, as explored in our '*Crafting with Digital Technologies*' workshop. There is, of course, enormous hype surrounding these technologies and a clear danger that they become mythologised as some instant techno-fix for all of society's ills. Latouche, for example, in his environmental critique of capitalism, *Farewell to Growth*, asserts that technology does not in itself challenge the logic of development.[13] Overall, he may well be correct, but perhaps he doesn't give enough credence to the disruptive potential of technologies to at least propose (or enable) alternative ways to think about (and therefore to materialise) the future. For example, when linked to the Internet, digital production systems - particularly 3-D printing - do nevertheless propose a fundamental challenge to existing arrangements.

Additive 3-D print systems largely dispense with complicated tooling, require relatively low capital outlay, and allow both professionals and amateurs to fabricate in individual or very low volumes on a 'print-on-demand' basis at little extra cost. In this way they can dramatically reduce the minimum efficient scale at which manufacturing can become viable and, in turn, empower individuals and groups to become independent producers, to retain control of production, and to rapidly address local cultural needs and idiosyncratic values through their work. Internet repositories of design files become an important element in this 3-D printing universe, allowing for a distributed print system. Open-source design files can further reduce costs while permitting the customisation of pre-designed specialist parts.[14]

Certainly, the technologies themselves are becoming cheaper and improving in technical competence. Originally limited to making prototypes, by 2011 around 20% of 3-D printer output was estimated to be final product, with the figure predicted to rise to 50% by 2020.[15] More recently, the research firm Gartner reported that global shipments of 3-D printers rose by 49% in 2013, and predicts a further rise to 75% this year.[16] Current approaches tend to employ natural or synthetic polymers and ceramic slips, including, sometimes, custom-made recipes. In high-end professional applications, metals such as stainless steel, titanium, gold and silver are often used. Professional users often report that the additive process significantly reduces materials use, and can lead to less waste. In principle *maker movement* enthusiasts enjoy similar efficiencies. In practice, of course, much of the 'stuff' available on popular *maker* knowledge sharing and selling web platforms might be deemed by some as little more than gimmicks destined to (rapidly) become landfill. However, we might also pause to remember that people often learn by producing seemingly nondescript work.[17] All of which is perhaps especially OK if it's recyclable nondescript work, an issue that points towards the need for effective waste capture and recycling infrastructures; a crucial topic, but too substantial a subject to address in this introduction.

Globalisation Inverted - the Return to the Locale

As these micro-manufacturing systems filter down to local design, make and mend, the space where DIY handcraft producers and technology hackers overlap will be especially active in ways that will, hopefully, extend the possibilities for individuals and communities to become more locally productive

and resilient - perhaps using 3-D desktop printers for some forms of relatively small-scale creations, and Fab Lab style workshops or local business park fabrication shops for larger and more complex constructions.[18] Marked by their flexibility and adaptability, these localised micro-projects and micro-enterprises will be at the forefront of a broader trend that corporate capital is now struggling to come to terms with - the shift from global value chains towards more localised, smaller-scale distributed manufacturing.

This notion of a return to the locale is supported by a particularly interesting Royal Society of Arts report, *'Making at Home, Owning Abroad: a strategic outlook for the UK's mid-sized manufacturers'*.[19] Essentially a trend guide for mid-scale manufacturing, it predicts that over the next ten to fifteen years fewer products will be made at high volume in truly global production networks, but rather that the production and sourcing of consumption goods in many sectors will become regionalised, and potentially localised, even for some larger companies. In effect, we will experience a *'re-shoring'* trend, particularly of mid-sized manufacturers, from Asia and elsewhere. The report excludes high-value density products (those with significant value per tonnage of weight) from this trend, but quotes a recent Boston Consulting Group analysis that identifies seven industries (transportation goods, computers and electronics, fabricated metals, machinery, plastics and rubber, appliances and electrical equipment, and furniture) as already close to the tipping point where it makes economic sense to manufacture regionally, or even locally, rather than in far offshore centres of production.[20] The reasons for this expected *'re-shoring'* are several-fold and well rehearsed, but *'Making at Home, Owning Abroad'* usefully recaps and updates them:

i. Increasing labour costs to capital: the report predicts that the total labour-cost savings of manufacturing many goods in China will only be about 10% to 15% so that many companies will find that making products in the East that are destined for consumption in the West will bring only marginal cost savings.

ii. Rising commodity prices: similarly, it notes the rising costs of commodities as the demand from emerging economies impacts on global markets; also other pressures, such as climate change constraints on production and transport will translate into commodity price rises.

iii. Environmental emissions legislation: the report notes that while the international community has largely failed on climate change, it still foresees the introduction of tighter national and international emissions regulations related to the production and transportation of goods - particularly as business and transportation are key sources of climate change emissions. In the UK, for example, the business sector accounts for 15% of all emissions, while transport accounts for 26%.

iv. Peak oil: the report includes a brief but interesting discussion of peak oil, a much-disputed topic. While noting the uncertainty locked into oil pricing and its subsequent impact on transportation, in terms oil stocks it cites *"... strong evidence..."* that oil production will peak before 2030 under practically all scenarios. Moreover, it refers to what is taken to be a robust model of the world oil market by the International Monetary Fund (IMF) that states:

> *"...our prediction of small further increases in world oil production comes at the expense of a near doubling, permanently, of real oil prices over the coming decade. This is uncharted territory for the world economy, which has never experienced such prices for more than a few months."*

v. Changing consumer expectations: finally, a subject that *'Making at Home, Owning Abroad'* doesn't really develop, but we add to this list because of its importance, is the issue of changing consumer expectations - particularly in relation to climate change, localism and social equity. This is a topic that *Making Futures* has regularly featured, not least through its *'post-Fordist perspectives on consumerism'* strand:[21] that citizens are no longer content to see themselves as passive entities within unidirectional consumption systems, but are increasingly looking for options that might allow them to exercise their agency within production and consumption *relationships*, particularly where these are restorative or regenerative in terms of both social and environmental capitals in ways that citizens can directly identify with, for example, in relation to improving their locales.

All the above factors imply that production will indeed move closer to the customer and will be carried out in low volumes with a strong focus on

the reduction of unnecessary stock and waste. They also connect back to the spread of craft and maker movement values mentioned earlier; craftspeople and artisanal micro-manufacturers who can show that they are responding to these issues, for example, by engaging with circular 'cradle to cradle' principles as much as possible (i.e., reusing durable components, eliminating waste wherever they can, and (where feasible) drawing on renewable energy sources) are particularly likely to have futures as makers. Of course, it will not be easy. The 'high street' competitive struggle will, as ever, be intense, especially as mid-sized companies start to re-shore. Competition fronts are most likely to be fought around copyrights and, perhaps even, the supply of equipment and certain base materials.[22] But adjusting to the necessary changes will not be easy for corporate players either. For many it will mean dismantling sophisticated operations built around high-volume exports to build complex new production systems within, or close to, each of their markets. Moreover, as discussed in relation to '*Jugaad',* above, their R&D is simply not built to deal with the ad-hoc, flexible and frugal innovation that new low-cost design-to-make systems permit. Indeed, it is particularly telling in this regard, that one of the big four global corporate consulting firms, Deloitte, has recently produced a twenty-one page executive briefing on the *maker movement* advising that companies begin to track it as an early signal of the future business landscape. They recommend that senior managers develop feedback loops into maker communities in order to gather intelligence that will help them entirely rethink the corporate business enterprise - its products, assets and markets, but above all, its *modus operandi* and mind-set.[23]

Zero-Marginal Cost Society

Finally, there is the critical issue of whether it will simply be worth some companies trying to compete with small micro-producers based on possible rates of return. Here we reference Jeremy Rifkin's notion of the trend towards near zero marginal cost operations.[24] We have already noted how digital fabrication technologies are becoming available to smaller-scale (ultimately domestic) makers; moreover, how they can reduce start-up, production and materials costs. Rifkin predicts that these 3-D production systems will obey the same economic logic as 2-D digital media systems that have reduced the costs of producing text, voice, image and sound communications to the point where they are almost free. He claims the end result of this process will effectively be the removal of many forms of product exchange from capitalist market equations. In this he points to a huge expansion of the Collaborative Commons[25] allied to the so called emerging *Internet of Things*, i.e., the migration of a raft of fundamental modern socio-economic structures (consumer goods production, energy production, finance systems, knowledge and data platforms, distribution and communications systems) into low-cost digitally enhanced network infrastructures. Indeed, Rifkin anticipates these infrastructures will consolidate into a type of parallel but alternative political economy - indeed, will perhaps become *the* dominant non-capitalist political economy as the effects of these developments swell beyond the economic realm to fundamentally alter our social and political institutions.

Whatever one feels about eventual destination depicted in Rifkin's vision, it is not necessary to completely accept all that he claims to nonetheless appreciate the legitimacy of some aspects of what he says. Taken with the trend towards local production, opportunities are indeed likely to arise (in fact are already developing) for craft producers and micro-manufacturers as digital production costs continue to fall. Of course, not all craft producers will want to adopt digital fabrication techniques,[26] and still less do we envisage market-based exchange relations ceasing to exist. However, many large trans-national and national markets will perhaps fragment into a spectrum of smaller-scale local markets embedded in local cultures and weaving economic value chains with social value chains; and which despite their local orientation, will constantly interact with wider globalised communities and enterprises. In effect, we are likely to construct our lives in and out of mixed instantiations of small-scale market and commons associations, as these simultaneously orbit around the periphery of a reduced number of global production and consumption chains.

The Ideological Figure of Making

We accept that aspects of this imagined 'molecular evolution' in the making might sound too hopeful, perhaps even naïve. In defence we would repeat that we are, of course, only too aware of the fate that Piketty's scenario implies: that the future return of craft is unlikely simply to be a matter of freely choosing agents engaged in the small-scale making and voluntary material simplicity agendas typically associated with middle-class life-style choice. On the contrary, we are likely to see a great deal of what might more appropriately be termed *enforced material simplicity*, brought about by deprivation and marginalisation and in which self-directed making

and mending is not experienced as affirming and liberating, but rather as a form of marginalisation and emasculation. Yet we *must* also reiterate what was noted earlier, that this future is not inevitable. There is no law that says this must happen; we have agency and can act to change these circumstances.

This last thought returns us to the heart of the craft enterprise and what we might call its ideological dimension. Craft *can* lend definition and identity to the life-cycles and rhythms of human work and being, *can* make comprehensible our experiences of materials and objects and show how these mediate our relations with self and others. Given this, and the endurance of the so-called 'social turn' in creative practice more broadly, it is not surprising that craft today has become an instrument of social engagement, quoted by the fine arts and design alike. For one of the principal reasons for the current revival in craft and maker movement activity is that the craft 'project', if it may be called this, so successfully appears to straddle the various contradictions underpinning modern life: craft recognises itself as enmeshed in market relations, yet is still capable of exploring notions of autonomy, embodiment, technology, work and their relation to everyday life - in effect part of the commodity system, yet simultaneously claiming a space for living according to values that reach beyond commodity relations. For these reasons craft is, and will remain, powerful as an idea and set of practices that serve as rallying points for a critical and engaged public. Not as a *'slogan'* or a *'program'* (to return to Guattari's quotation), but as something that is *'felt and lived...'* This critical potentiality is important because what it comes down to, finally, is to what we want... to what we *desire*. And this, as *Making Futures* has consistently sought to suggest, is at least a question of how we learn to *desire* (a better) desire.

Needless to say, preparations are well under way for the fourth edition of *Making Futures* which will take place in September, 2015. We look forward to continuing the good work of exploring with colleagues and community our common future in, and through, making.

Malcolm Ferris

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References

[1] Elements of this essay were first published as the introduction to the print booklet of abstracts to the *Making Futures* conference at Mount Edgecumbe, September 2013; and as a presentation entitled '*The Return of Craft in a Sustainably Aware Post-Growth Society'* in the *ephemera* conference at Copenhagen Business School, 2014.

[2] Felix Guattari, *Molecular Revolution in Brazil,* Semiotext(e) / Foreign Agents, distributed by MIT Press, 2007. The quote is also used on the MIT page promoting the book.

[3] I use the first person plural as a rhetorical device; the positions outlined in this paper represent my opinions only, and any errors or omissions are mine alone.

[4] For a full description of the component elements of the conference programme, consult the *Making Futures 2013* website at: http://makingfutures.plymouthart.ac.uk/

[5] We link this progressive idea of craft to what we have referred to as its *Theatre of Becoming*, i.e., the slow drama of the encounter between body and material in making. This serves, however, not simply as a potential description of making as experience, but also as a trope, or symbol, for the idea of craft more generally. See, for example, the introductory essay to the second volume of the Making Futures conference, *Making Futures – the crafts as change-maker in sustainably aware cultures*, available at: http://makingfutures.plymouthart.ac.uk/journalvol2/index.php. Richard Sennett analyses this 'body-material' encounter through the component elements of gesture, resistance and rhythm. See Chapter 7, *'The Workshop: Making and Repairing'* (pp. 199-220), in Richard Sennett, *Together: The Rituals, Pleasures and Politics of Cooperation,* Penguin Books edition, 2013.

[6] Caroline Arscott discusses this apparent contradiction between the socialist politics of Morris and his practice as a producer of handcrafted luxury goods for a bourgeois market. She quotes Walter Crane's explanation of how Morris saw this dilemma:

"...according to the quality of the production must be its cost; and that the cheapness of the cheapest things of modern manufacture is generally at the cost of the cheapening of modern labour and life, which is a costly kind of cheapness after all." See Caroline Arscott, *'William Morris: Decoration and Materialism'*, (p. 9) in Andrew Hemingway (Editor), *Marxism and the History of Art: From William Morris to the New Left,* Pluto Press, 2006.

[7] The UK's return to growth is presently the subject of intense debate as to whether it is a solid recovery built, for example, on manufacturing production and sales, or whether it is fundamentally another house prices driven credit-based boom. Time, as ever, will tell ...

[8] Since the late 1960s there has been a steady stream of critics who have questioned the feasibility, moral legitimacy and sustainability of the idea of perpetual economic growth that they see as the underlying assumption of the contemporary capitalist organisation of society. See, for example, E. F. Schumacher, *Small is Beautiful: a study of economics as if people mattered*. Vintage, (1973); S. Latouche, *Farewell to Growth*, Polity Press, (2009); A. Gorz, *Capitalism, Socialism, Ecology,* Verso, (2012), to name but a few. There now seems to be a renewed interest in returning to these and other recent texts to critique the paradigm of growth orientated capitalism. See, for example, the *ephemera* conference, *'Organising for the Post-growth Economy',* Copenhagen Business School, 2014, and the forthcoming special issue of *ephemera* on this theme to be published in late Autumn of 2014, The *ephemera* site is at: http://www.ephemerajournal.org/

[9] Piketty shows that the historical norm was for the rate of return on capital to be higher than the growth rate of output and that this fits with the evolution of pre-industrial agrarian societies and their socially-rigid, oligarchical structures. This broadly remains the case even as Western nations transition into industrial societies, but changes in about 1913, when it becomes profitable to invest in industrial production. For Western nations the next eighty years or so, mark a period of increased social mobility, a narrowing of inequality levels, and the advance of democratic institutions, with the data suggesting that this changes were induced by the two World Wars and population growth. However, world population began to decline from the late 1970s, and since circa 2012 the return on investment is moving in the direction of being greater than economic growth with the trend clearly showing that we are heading towards a society in which accumulated and inherited wealth again become primary sources of power. Thomas Piketty, *Capital in the Twenty-First Century,* Harvard University Press, 2014.

[10] Professor Donncha Kavanagh, Director of the Centre for Innovation, Technology and Organisation, University College Dublin, Ireland, in his presentation at the *ephemera* conference, *'Organising for the Post-growth Economy',* Copenhagen Business School, 2014, and reiterated in follow-up correspondence.

[11] Needless to say, this exercise is undertaken without in any sense implying that individual *Making Futures* keynotes or delegate speakers endorse or subscribe to the scenario sketched here.

[12] For an exposition on work as honorable calling, see Chapter 3, *'The Idea of the Transformative Vocation: A First Point of Departure',* (pp. 26-35), in Roberto Mangabeira Unger, *Social Theory, its situation and its task, Volume 2 of A Critical Introduction to Politics,* Verso, 2004.

[13] S. Latouche, *Farewell to Growth*, p. 9, Polity Press, (2009). See also the CNBC report *'Surge in 3-D-printing stocks largely hype, analysts say'* 2014. The article warns that some of the larger 3-D printing companies, like '3-D Systems', represent a potential stock bubble, and quotes an analyst who suggests that 3-D print companies have ridden an innovation wave that is now losing force, *"...it's a roll-up of third- and fourth-generation technology. The reason they are doomed is because they can't roll anything up anymore."* Full article at: http://www.cnbc.com/id/101443055

[14] There are of course myriad examples of customisation one could discuss, but a simple yet effective case appeared in a CNN blog that reported on the customisation of orthotic insoles for shoes using a small domestic printer. Whereas a custom insole could cost $500 to $800 from a retailer, an insole could be made on a 3-D printer for about $2, although the customisation element did require input from a 3-D scanner. See: *At-home 3-D printing could save consumers 'thousands',* CNN, July 2013, at:

http://whatsnext.blogs.cnn.com/2013/07/31/study-at-home-3-d-printing-could-save-consumers-thousands/

[15] The Economist, *The printed world,* February 10th 2011, at: http://www.economist.com/node/18114221

[16] Reported by Benedict Dellot in '*These new one-man makers',* RSA Enterprise blog, March 2014. Also stated on the CNBC report listed in footnote 12 above.

[17] The RSA views these micro-business as potentially very important. They recently announced a new research project, *The Power of Small,* in partnership with the web platform, *Etsy,* (which in 2013 hit a billion dollars in annual revenues) exploring the nature and dynamics of small-scale makers. See: http://www.thersa.org/action-research-centre/enterprise-and-design/enterprise/enterprise/the-power-of-small

[18] Here at Plymouth College of Art we will be opening a Fab Lab in September 2014 as part of the Phase II opening of a £7 million plus new workshops and studios facility. On Fab Labs more generally, including a map of Fab Labs around the world, see the Fab Foundation website at: http://www.fabfoundation.org/

[19] The Royal Society for the encouragement of Arts, Manufacturers and Commerce, *'Making at Home, Owning Abroad: a strategic outlook for the UK's mid-sized manufacturers',* 2013. Available at: http://www.thersa.org/action-research-centre/enterprise-and-design/enterprise/industry/making-at-home,-owning-abroad

[20] A selection of, largely mid-scale, UK re-shoring case studies can be found on the Manufacturing Advisory Service (MAS) *Reshore UK* site, at: http://www.mymas.org/manufacturing-support/reshore-uk A more extensive selection of largely American re-shoring reports and case studies can be found on the *Re-shoring Initiative* website at: http://www.reshorenow.org/

[21] The session strand *'post-Fordist perspectives on consumerism'* has appeared within each of the three *Making Futures* editions to date. The 2012 *Making Futures* conference also featured a keynote introduction by Professor Kate Soper based around her research into *'Alternative hedonism and the theory and politics of consumption'.*

[22] The issue of copyright protection in digital environments is of course already hotly contested, and the dispute is rapidly spreading to the 3-D maker world. For example, the start-up company *Authentise* has created a streaming service for 3-D printing files that protects design rights by making it impossible for users to store and share the files. The solution is similar to Spotify's for music files, or Netflix's for video files. See the *Authentise* website at: http://www.authentise.com

[23] See *A Movement in the Making,* a report by the Deloitte Center for the Edge, Deloitte University Press, 2014.

[24] Rifkin devotes a chapter to digital manufacturing, see *'3-D Printing: From Mass Production to Production by the Masses*, (pp. 89-108), in Jeremy Rifkin, *The Zero Marginal Cost Society*, Palgrave Macmillan, 2014.

[25] The Collaborative Commons is a term for the ecosystem of sharing that is developing around the Internet and digital tools more generally. It is not to be confused with the Creative Commons, which, as a non-profit organisation that enables the sharing and use of creativity and knowledge through free legal tools, can be considered a key institution within the wider collaborative commons, see: http://creativecommons.org/

[26] Although we should perhaps note here the Craft Council's study, *'Making Value: craft & the economic and social contribution of makers'* (2010) which reported that over half (57%) of makers were using digital technology in their practice or production, with the majority of these doing so often or all the time.