Durham University

Insights

Institute *of* Advanced Study

Limitations and Liberations

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About Insights

Insights captures the ideas and work-in-progress of the Fellows of the Institute of Advanced Study at Durham University. Up to twenty distinguished and 'fast-track' Fellows reside at the IAS in any academic year. They are world-class scholars who come to Durham to participate in a variety of events around a core inter-disciplinary theme, which changes from year to year. Each theme inspires a new series of *Insights*, and these are listed in the inside back cover of each issue. These short papers take the form of thought experiments, summaries of research findings, theoretical statements, original reviews, and occasionally more fully worked treatises. Every fellow who visits the IAS is asked to write for this series. The Directors of the IAS – Veronica Strang, Stuart Elden, Barbara Graziosi and Martin Ward – also invite submissions from others involved in the themes, events and activities of the IAS. *Insights* is edited for the IAS by Barbara Graziosi. Previous editors of *Insights* were Professor Susan Smith (2006–2009) and Professor Michael O'Neill (2009–2012).

About the Institute of Advanced Study

The Institute of Advanced Study, launched in October 2006 to commemorate Durham University's 175th Anniversary, is a flagship project reaffirming the value of ideas and the public role of universities. The Institute aims to cultivate new thinking on ideas that might change the world, through unconstrained dialogue between the disciplines as well as interaction between scholars, intellectuals and public figures of world standing from a variety of backgrounds and countries. The Durham IAS is one of only a handful of comparable institutions in the world that incorporates the Sciences, Social Sciences, the Arts and the Humanities.

The focal point of the IAS is a programme of work associated with, but not exclusive to, an annual research theme. At the core of this work lies a prestigious Fellowship programme. This programme gathers together scholars, intellectuals and public figures of world standing or world-promise to address topics of major academic or public interest. Their mission is to anticipate the new and re-interpret the old, communicating across and working between disciplinary boundaries.

Every year, the Institute invites as many as twenty highly creative individuals to spend up to three months in Durham. They are located in Cosin's Hall, a magnificent and spacious 18th century mansion which, together with Durham Cathedral and Durham Castle, forms part of Palace Green, dominating the World Heritage Site of Durham Peninsula. During their stay, Fellows engage with departments and colleges, deliver public lectures and seminars, and, above all, join an international community of researchers to address the theme selected for that year. Further details of the IAS and its Fellowship programme can be found at www.durham.ac.uk/ias/fellows

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LIMITATIONS AND LIBERATIONS

Limitations and Liberations grew out of discussions in the autumn of 2011 with other fellows of the Institute of Advanced Study (IAS) at Durham University, and the seminar I gave as part of my fellowship. The first part of the paper explores the concepts of limitation and liberation, bringing into play musings on aspects of the other IAS themes within Futures II, the 2011–2012 overarching theme. These include The Recovery of Beauty, Life of the Frontier, Exaptation, Translating Cultures and Eye Function. The tremendous liberation produced by literacy is indeed produced by the visual impact of limitations and boundaries, between light and dark, which allow letter forms. However, boundaries are not necessarily beneficial for all, and dividing walls embody this. Sometimes the liberation of creativity can be induced by the imposition of limits, for example of dress codes transgressed or at least flexed in the interests of individuality. The application of the concept to biofuels seems less easy, but there are resonances in the balance between science, such as genetic engineering, that is liberated into use, and public interests and ethical concerns, mediated through the limitations of regulation.

Since the start of my professional career I have been involved in innovations – even as a young vet working in Canada and the wilds of Bedfordshire I was monitoring clinical trials in pigs and chickens of new veterinary products; and then in my years with an animal health products company I was responsible for bringing several groundbreaking vaccines through the regulatory process in the UK. The pitfalls and hurdles in the whole innovation process are many, and though the eyes of researchers and entrepreneurs are mainly on the difficulties of finding funding to take things forward, I find myself concentrating more and more on market dynamics and regulatory frameworks, acceptance of new technologies and communicating the way in which innovations answer real-world needs.

In the context of the reasons for my being at Durham University, as IAS Policy and Enterprise Fellow attached to the Biofuels, Science and Society programme, the implications of using genetic engineering in the quest for algal biofuels are the closest we get to matters of product-based regulation. And a large part of market dynamics is, of course, political and public acceptance of the technology. Genetically modified (GM) foods were perfectly acceptable in the UK until pressure was put on supermarkets to reject them. It seems ironic that a large element of the campaign, at least at the level of society, was to do with public choice – i.e. that a 'secret' introduction of GM-origin food gave the public no choice in the matter. The outcome, that the public was prevented from getting access to GM technology in food, reduced choice considerably.

The concepts of contained use and controlled release that are inherent in UK and European management of GM plants brought me to consideration of the paradoxes and beauties of limitations and liberations, the theme of my IAS seminar and the broad topic I want to use for this essay. A paradox, and an irony, is that 'release' or liberation is considered to bring nothing but good for people in a sociopolitical context, but nothing but bad when innovations and technologies are concerned. This is despite the manifold evidence that liberated peoples may

become lawless, murderous, thieving and generally bad and that technologies and inventions have improved human well-being and economic survivability of nations. 'You can't make an omelette without breaking eggs,'[1] but mould-breaking innovations, and GM technology, nanotechnology, geo-engineering and biofuels are examples of these, are more likely to become demonised. We will come back to biofuels and GM technology after digressing into the broad world of the IAS's Futures II.

Dun Cow Lane, Durham.[2]

If you are a Durham resident you may recognise this place. It is where you have to make a choice, between what we might regard as the Limitation of the pavement, which disappears quite literally up the wall, and the Liberation of the cobbled path, going one knows not where. Onwards, actually. One can imagine, as memory fades and Alzheimer's takes over, coming to such a decision point and stubbornly staying on the pavement, not being able to move forward, or even conceive of sidestepping to continue onwards.

The edge here can represent almost anything. I choose it to encapsulate the divide that has to be crossed when we need to give up cherished and well-embedded beliefs and behaviours and make a leap into a new paradigm. Indeed, it could be a model for how society does, or does not, embrace innovation.

We have well-received concepts of real-life limitations – walls, fences, borders, boundaries. Some have been broken through, others remain to be liberated. Borders are rarely natural – they represent power struggles and ancient and not so ancient conflicts crystallised and perpetuated by political ideologies and economic exploitations. They separate common people or force minorities and majorities uncomfortably together.

The Berlin Wall falls in 1989. Source: Internet (unattributed).

One needs hardly to mention Kurdistan as a concept that transcends boundaries and seeks to liberate the peoples of three different countries – I leave it to others, notably Professor Emmanuel Brunet-Jailly, IAS Fellow in 2011/2012, to take this topic of boundaries further and deeper.

Social conventions, perhaps definable as beauty but sometimes themselves symbolic of internal social oppression and codification, can be thought of as limitations, to be challenged and broken in the interests of liberation. 'Women's Lib' and bra-burning[3] are often taken as emblematic of

Protesting the 1968 Miss America pageant.

the twentieth century, US-centric changes that overlook the suffragette movement in England and other much quieter progressions proposing women as citizens equal to men, for example in Finland in 1907, the British Isles in 1918 and federal Switzerland in 1971.[4]

What the emblem for the twenty-first century might be is difficult to pin down yet, in this era of social media and instant gratification of whims and desires – Recovery of Beauty in a rather more artificial sense. Within the comforting confines of the social and sartorial limitations of, for example, school uniform and tie wearing, a great deal of boundary-pushing latitude is possible.


Source: © www.swaggerandswoon.com

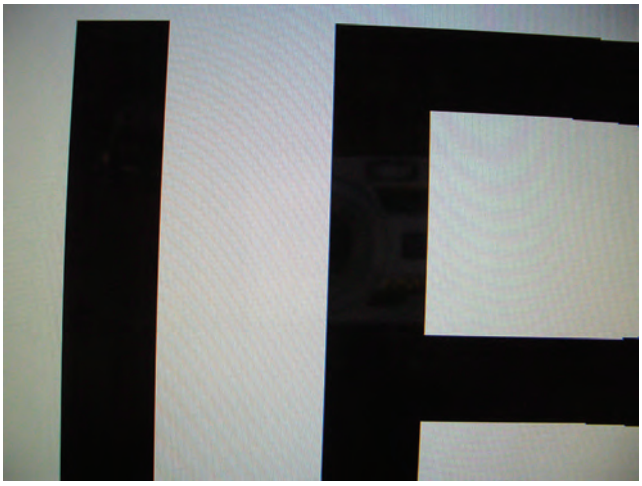
Perhaps boys wearing skirts to school might be such an emblem, but it does not seem to have caught on, except in Scotland. A lone boy near Cambridge, England, took it upon himself to challenge the sartorial rules of school that banned shorts for boys but allowed skirts, in his own reversal of 'bra-burning.' He seems brave enough to survive this liberation.


Source: © Cambridge Evening News 2011.

Source: © Internet (unattributed).

Only a few clothes, it seems, transgress the boundaries of limiting human flesh in the interests of social conformity to become themselves emblematic of society, the valuing (or overvaluing, or buying and selling) of persons and personalities, and edible themselves.[5]

These I believe pale into insignificance compared with the paradoxes inherent in literacy, where the liberative power of thought communication through writing, printing and reading is founded on perceptions of limits, edges and transitions. We know that the shapes in the image below are most likely letter forms because the image includes the limitation of an I, a J or an upside-down T, and perhaps an E, an F or a B.

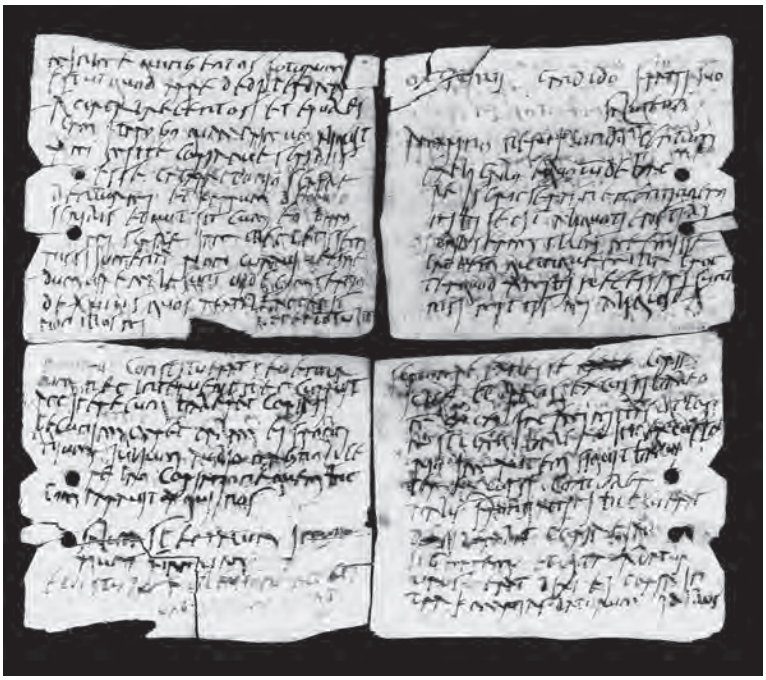


The full picture tells it all:

We are also familiar with the optician's letter list, if we need our sight correcting. Even if we cannot learn the letters on each line to cheat the system, our brains struggle to differentiate the blurred images our eyes collect, distinguishing X from A, Y from V, as they get smaller and smaller, trying to integrate the patterns and boundaries of light and dark to make sense of the shapes. This is a tremendous feat of neural activity, when it succeeds – a liberation based on limitation.

Source: © Science Photo Library and www.superstock.com

Cursive writing and calligraphy are more difficult – here, the eye can recognise the boundaries between unmarked paper and lettering but the brain definitely struggles to recognise and make sense of what is being written. It needs a higher degree of training to realise the wealth of meaning hidden in the alternations of light and dark on the page.



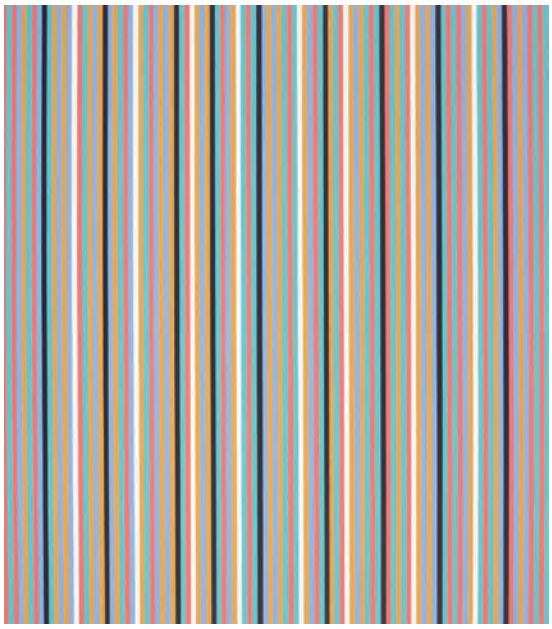
Octavius's tablet-letter from Vindolanda, Hadrian's Wall, CE100. © Trustees of the British Museum.

The image to the left is incomprehensible, clearly pixelliform, and could perhaps be a close-up of a computer-based maze, along which, if you are skilful, you can make a robotic image travel without annihilating itself in a dead end.

Computer imaging has some way to go from the pixel state to the neural integration that our brains achieve, even at a minute level.

The full view shows a beautiful and mystic modern Egyptian tent lining from an exhibition held at St Mary's College in late 2011 – a supreme example of meaningful pattern on a surface (itself a limitation).

The establishment of printed books is claimed, plausibly, to have standardised literacy and thought, breaking through local boundaries and ducal, regal and abbatial patronage. It is estimated that, from a few thousand hand-created vellum and other manuscripts in the mid fifteenth century, by 1500, more than 20 million volumes had been printed in Western Europe alone (Febvre and Martin, 1976). This tremendous and sometimes disturbing impact of the boundaries between light and dark can hardly be underestimated. In sociological terms, there is now sufficient evidence that education is the most powerful tool against totalitarian regimes and, if the education is of women, against suppression and exploitation as well.



© Tate Gallery.

The power of the line is more than two-dimensional and the brain perceives, through sight, excitations where they might not exist, as in Bridget Riley's work illustrated left, where lines create movement and depth without moving, or being deep. The tricks of limitation in the brain are indeed rather compelling – a compelling and intriguing case (returning perhaps to the mention of Alzheimer's disease) is the door as a transition boundary or event that causes our memory to drop whatever has just impressed it (Radvansky et al., 2011).

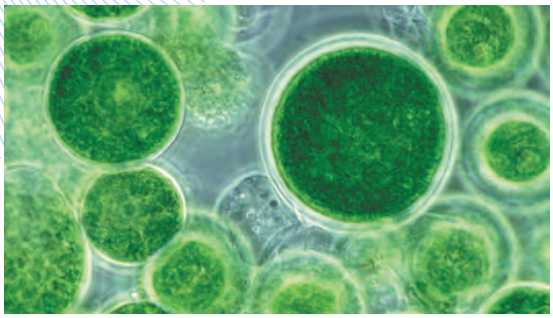
Another is the extraordinary 'visual cliff' effect that stops babies crawling on to a transparent sheet of glass over a drop, even though their hands tell them it is solid (Gibson and Walk, 1960), and gives a few grown-ups some alarm when they climb the staircase in Apple's London store in Regent Street to the first floor, as well.

On the theme of liberation, we should take account of the fact that a door is a closure and an opener, a window is a keeper-out and a letter-in, and both are protections that, once removed, provoke vulnerability and danger. Opening a catastrophe is encapsulated in the fable of Pandora's Box, which, in its canonical Hesiodic form, tells of a jar not to be opened but, when it was, all the ills in the world were released, while Hope alone remained inside. For Nietzsche, hope is the worst of evils, for it prolongs the torment of man (Nietzsche, 1878, Aphorism 71).

Pandora's Box and Frankenstein's Monster are two deeply-felt myths that have transcended their narrative unreality to embody what many believe is the truth about the scientific discoveries and applications of the past 40 years – genetic engineering, biotechnology in its broadest sense, nanotechnology. The prevalent thought is that the genie, once out of the bottle, cannot be persuaded to return.

Liberation of scientific thought and achievement has been crystallised in regulations, by their very nature limitations – in Europe there is legislation that controls research on genetically modified organisms (GMOs), their culture in closed containers and their culture in open

conditions, transportation and sale of products. Safety has to be proven far in excess for GMOs, compared with many naturally occurring and traditionally bred variants of organisms that are known to be dangerous.



In discussion of biofuels, another topic in the general theme of Futures II, genetic technologies are needed to play a part in adapting organisms to new uses, including modifying their metabolism and biochemical activities to turn more of their energy and nutrient intake into biofuel precursors. Are scientists really 'playing God' in their search for novel utility? Will the use of GM technology bring more problems than it solves?

Algae, in this context the microscopic organisms – microalgae – living in aquatic environments, are adept at building energy stores when challenged by nutritional or environmental stress. Some algae concentrate on oils, which makes them a focus for research into algal oil production for nutrition (omega-3 fatty acids) and as an alternative to petroleum-derived diesel and jet fuel.

The prospect is tantalising, because we do not yet know exactly how to make algae behave so that they produce algal oil economically, accessibly and on the very large scale that would be needed. Genetic modification offers possibilities for adapting and tailoring existing algae to work better, in this context. Synthetic biology is even under consideration, taking the most basic genetic information that will allow a microalga to survive and building into it the gene sets needed for the production of oils.

The drivers for this enterprise are climate change, the fear of petroleum dry-up and the promise that algae, unlike plants, do not compete for cultivatable land or for clean water. The International Energy Agency's New Policies Scenario (IEA, 2010) projects a world demand of 99 million barrels/day by 2035 and peak oil production at 68–69 million barrels/day. Something has to fill this gap even if there are widely enforced efficiency measures and industrial convulsion. The US commitment is to 36 billion gallons of biofuels per year by 2022, driven by a perceived need for fuel security and defence uses; in Europe, the EU commitment is 20% renewable energy, of broader scope (wind, wave, power and other technologies included), of which 10% will be used in transport (where bioenergy is more appropriate). The Institute of European Environmental Policy estimates that 0.4 billion hectares are needed for additional land-based biofuel crops – an area about the size of the Netherlands, albeit spread throughout the world, some of it in areas with a reputation for high biodiversity. If marginal land and perimeter waters can be used for algae, this immediately reduces the pressure from land-based biofuel crops production.

The organisms of interest include Botryococcus braunii, which can contain 25–80% of its dry weight of oils with a similar composition to petroleum hydrocarbons, and can grow in fresh or brackish water, but grows slowly; Nannochloropsis, Phaeodactylum and Tetraselmis, marine algae already cultivated for feeding to new-hatched fish and shellfish; Chlorella, a temperate freshwater alga suited to non-tropical culture; Dunaliella a tropical/sub-tropical marine salt-tolerant alga already grown to produce carotenoids and health food store antioxidants; Spirulina, a warm water, salt-tolerant alga eaten as a health supplement, and Cyanidium, found in hot springs and acid-tolerant. Those from extreme environments offer possibilities of naturally resisting contaminants that make large scale culture of some of the productive species more challenging. We should also not forget seaweeds, macroalgae, which can be harvested or farmed.

There is flexibility in the energy uses of algae (micro- and macro-): not just oils for biodiesel or jet fuel, but also butanol, methane by gasification, pyrolysis or anaerobic digestion and ethanol by fermentation. Challenges include controlled growth and how to remove all the water that is in algae (80% or more of harvested biomass). These are acting as spurs to the development of new and hopefully cheaper processing technologies. Without these, the various estimates and projections of algal contribution to bioenergy are unlikely to be approached, let alone achieved.

Source: © Synthetic Genomics Inc-ExxonMobil.

These projections of course remain to be proven, which they will be in hindsight only:

- by 2013, 25% of global advanced biofuels will be algal in origin;
- 420 million gallons per year (gpy) of a total of 1.7 billion gpy;
- 61 million gpy in USA by 2020;
- algal biofuels sales will reach €1.3 billion by 2020;
- a worldwide early growth rate of >70%;
- most growth expected in Asia-Pacific (China, Australia) and North America (USA), to reach 82% of world production by 2020, and, after that, in Latin America (Pike Research, 2010).

GM research aims not only at the biochemical engineering of microalgae for nutrient partitioning into oils, but also at reducing the sensitivity of algae to light fluctuations so that, on the one hand, algal productivity can be maintained at lower light intensities and, on the other, they do not shut down or die if light intensities are high. Manipulating light tolerance will require fundamental genetic engineering, as the maintenance of light exposure by most microalgae is a basic survival mechanism. Even if this approach does not prove industrially viable, it is an example of biotechnology research that is undertaken to explore some questions of microalgal physiology and environmental responsiveness. But the combination of biotechnology and the inherent spreadability of microscopic organisms like algae, raises all sorts of concerns, which may be true or may be phantom. Not saying that this is the most pressing question, nevertheless I believe that we need to tackle this issue of the fear of the door, the box, the window or the jar if we are to make our way out of the numerous adverse and increasingly adverse situations in which we find ourselves.

> The man who comes back through the Door in the Wall will never be quite the same as the man who went out. He will be wiser but less cocksure, happier but less self-satisfied, humbler in acknowledging his ignorance yet better equipped to understand the relationship of words to things, of systematic reasoning to the unfathomable Mystery which it tries, forever vainly, to comprehend (Huxley, 1954).

Door in Rajasthan. © LPM Lloyd-Evans, March 2012.

Acknowledgements

Acknowledgements are due to my fellow Fellows who stimulated a great deal of lateral thinking during my time at the IAS, to Dr Chris Greenwell, who heads the Biofuels, Science and Society programme at Durham University and was instrumental in inviting me, and to Professor Barbara Graziosi, of the IAS and the Classics faculty, for her helpful editorial contributions, some of which have been used *verbatim*.

Notes

[1] Variously attributed to Napoleon, Robespierre, T. P. Thompson, Robert Louis Stevenson, Joseph Chamberlain and Stalin.

[2] All images © LPM Lloyd-Evans, December 2011; February 2012 except where otherwise stated.

[3] Events that never took place, even if intended (J. S. Olson (1985) in *Bathsheba's Breast: Women, Cancer and History,* notes that 'Susan Brownmiller recalled, "No one in the women's movement ever burned a bra in public protest [...]"').

[4] New Zealand included women in voting, without disturbances at horse races or attempted assassinations of royal families, in 1893.

[5] Lady Gaga wears a meat dress to the 2010 MTV Video Music Awards.

Reference List

Febvre, L. and Martin, H.-J. (1976) *The Coming of the Book: The Impact of Printing 1500–1800*. London: New Left Books.

Gibson, E. J. and Walk, R. D. (1960) The visual cliff. *Scientific American* 202: 67–71.

Huxley, A. (1954) *The Doors of Perception* (various publishers and editions).

IEA. (2010) See http://www.iea.org/press/pressdetail.asp?PRESS_REL_ID=402

Nietzsche, F. (1878) *Menschliches, Allzumenschliches*. Translated by Faber, M. and Lehmann, S. (1969) as *Human, All Too Human*. Lincoln, NE: University of Nebraska Press.

Olson, J. S. (1985) *Bathsheba's Breast: Women, Cancer and History*. Baltimore: Johns Hopkins University Press.

Pike Research (Navigant Consulting Inc.) (2010) '*Algae-based biofuels*.'

Radvansky, G. A., Krawietz, S. A. and Tamplin, A. K. (2011) Walking through doorways causes forgetting: further explorations. *Quarterly Journal of Experimental Psychology* 64(8): 1632–45.

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Insights

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