DAVID SAUNDERS

Dear Peter(s), Dear All…

*I meant to write a quick note of thanks after* ***Radical Technology Revisited****.  Instead it has turned into a bit of an essay – a personal reflection on what was, after all, a conference about the last forty years of my life and that of everyone else present.  I found it useful to write this review as a journaling exercise, and to think through the parts that I found most significant.  It seems to me that some of the comments I hard to the effect ‘not a lot has changed’ and ‘we were saying this 40 years ago’ may be masking changes that are happening exponentially, and already reaching or passing critical mass.  So thanks, and here’s my reflection…*

Thanks for a really great, interesting and thought-provoking [Radical Technology Revisited](http://www.radicaltechnology.org) conference at the weekend.  I had lots of ‘aha’ moments at the conference, and learned a lot – and I’ve a couple of things to share that mix prescience (not mine) with hindsight – as Yogi Berra said “*It’s hard to make predictions – especially about the future.*”  And as Peter Russell says “*When making predictions about the future we often unconsciously assume a linear growth pattern. If actual growth is exponential, then a given goal will be reached much sooner*.” ([in The Awakening Earth](https://www.dropbox.com/s/90vbyw8s027uets/Global%20Brain%20%E2%80%93%20Exponential%20Growth.jpg?dl=0) / The Global Brain 1982).  See below…

**Solar Hydrogen Economy**

Peter Harper mentioned that RT did not make much mention of solar PV, and that the hydrogen economy still hasn’t take off.  But when RT was published, solar PV was impossibly expensive – even in 1977 [solar panels cost $70,000 per Kilowatt](https://cleantechnica.com/2014/09/04/solar-panel-cost-trends-10-charts/).  Yet in 1975, in ‘Energy, The Solar Hydrogen Alternative’, [John O’Mara Bockris](https://en.wikipedia.org/wiki/Hydrogen_economy) predicted we’d eventually have plentiful cheap solar energy – because the cost was dropping exponentially.  He was the world’s leading electrochemist, and explained that hydrogen from electrolysing water with cheap solar energy would provide energy storage at night, and for winter – our gas grids can store a winter’s worth of energy demand, so he proposed replace methane in our gas grids with hydrogen.  Few people understood the science so clearly – in 2000 at the World Expo in Hannover (in the ZERI – Zero Emission – Pavilion) I was saying solar PV was unsustainably costly – but by 2011 I was helping start a rooftop PV co-op in Bristol to explore community renewables – because the cost of solar PV was falling through the ‘grid parity’ barrier.

**Why Solar Hydrogen Trumps Fossil Energy.**

So, as of this weekend’s 40th anniversary conference we may be well over halfway to the solar hydrogen economy…  Just this last week, a power auction in [Chile announced bids to supply solar power at a record low of 2.2 pence (UK equivalent) per unit](http://economictimes.indiatimes.com/industry/energy/power/chile-breaks-dubais-record-of-solar-power-output-at-low-cost/articleshow/53932595.cms) – India Times (2.9 rupees = 2.2p).   That’s a lower wholesale price than electricity from any other source – at this price we can convert it to hydrogen and back again into electricity that will still cost less than the 4p/unit price of ’natural gas’ – methane – or our current wholesale price of electricity.  So both solar energy and the hydrogen economy are not just desirably renewable but financially viable.  And at these prices for mass generation and storage, there is no strong argument for building nuclear power stations – especially as the cost of solar will continue to fall exponentially from this record low – as the installations grow exponentially.  However, it’s all very well to say ‘Physics trumps politics’ – it’s another thing entirely to get politicians to understand physics – except in Germany, where the chancellor is a physicist.

**Exponential Growth – the kick in the tail**

Even in 1995, solar PV was producing less than a thousandth of one percent of world electricity – and that was easy to ignore.  But as the Wikipedia article on Growth of photovoltaics says “Worldwide growth of photovoltaics has been fitting an exponential curve for more than two decades.” – and by 2014, only 19 years later, it had grown by three whole orders of magnitude and was supplying 1% of world electricity.  Two more orders of magnitude – in twelve years, maximum? – so by 2026 and we have 100% of world electricity demand from the sun.  The article struggles to balance this against official forecasts of 5000Gw of solar PV by 2050 – approximately 20% of our electricity – representing a factor of 20 growth in 24 years – or less than a third of the current growth rate.  Given that solar is cheaper now than everything except hydro power, it’s hard to explain the difference between exponential extrapolation and official estimates without invoking the utterly implausible argument that governments are being unduly influenced by the incumbent fossil fuel lobbies.

**Scenario Planning**

Of the scenarios considered at the weekend, these solar ideas fit best with ‘muddling through’, as little or no political action is needed.  I’d like to do a detailed comparison with other scenarios, but I suspect that the least cost, easiest to adopt solution that requires least political intervention is likely to ‘win’ (i.e. happen).  Whoever said that we are in a technocracy, not a democracy, hit the nail on the head – technologies like smartphones and services like Uber or Deliveroo, or Twitter or whatever – compete for our attention – growing exponentially, without political help – and all drifting in the direction of Jeremy Rifkin’s [Zero Marginal Cost Society](http://www.thezeromarginalcostsociety.com).  So far, a generation of Internet companies (Amazon, Apple, Google, Uber, Deliveroo) are taking over from dinosaur industries.  Apple passes on 70¢ from a 99¢ music or software sale, which compares well with former 10% music industry royalties. As Jeremy Rifkin explains, the most likely scenario is the emergence of a global internet-based collaborative commons with nearly free goods and services that eclipses capitalism. Boo hoo.

**Inner Technology / The Global Brain**

I was looking forward to the lunchtime session on Inner Technology, and itching to share an idea from Peter Russell’s The Global Brain.  What I hadn’t realised or remembered was that Peter had written the introduction, to this section – which I’ve been thrilled to [read on microfiche](http://www.fastonline.org/CD3WD_40/JF/409/01-13.pdf) (pp 234-7), however grainy.  Framing the section up, Paul Allen said that Pete’s article on Inner Technology was in some ways the most radical is it proposed ‘a metaparadigm shift’ … it is only if we really feel one with the world that we cannot imagine damaging it.  This mindset shift involved – to an “I and thou” relationship with nature rather than “I versus it” – would change everything – not just the technologies we’d want, but our need for technology.  And Pete notes that people are increasingly using techniques like meditation to experience unity, transcendence, directly.  By 1982 Pete had written the Awakening Earth (in USA The Global Brain), documenting [human activity shifting](https://www.dropbox.com/s/rbgklroi8z48d3y/Global%20Brain%20%E2%80%93%20Human%20Activity.jpg?dl=0) from predominantly agricultural, to more than 50% involved in industry, and then moving on to information technology…

**The Metaparadigm Shift**

Peter predicted the wave beyond this in Radical Technology – a ‘metaparadigm shift’ to a time when the majority are involved directly in ‘psychotechnologies’ – technologies of thought and consciousness. When Radical Technology was written, the information age was in sight, but had not overtaken the industrial revolution.  It was 2011 before [Apple overtook Exxon](http://www.bloomberg.com/news/articles/2011-08-09/apple-rises-from-near-bankruptcy-to-become-most-valuable-company) as the world’s most profitable company – ‘Think Different’ beat ‘Think Fossil’.  This is a total paradigm shift – information technology has given us the silicon for a solar revolution, and the software for smart grids that will power the planet sooner than most expect.  But Peter saw past the information age in 1976 to the next horizon – the Consciousness Era that’s emerging today.  For an update, here’s Pete framing up the October 2016 conference on Science and Nonduality, speaking in 2014 on [The Reality of Consciousness](https://www.scienceandnonduality.com/the-reality-of-consciousness-peter-russell/). Incidentally, in a publishing quirk, this [waves of change](https://www.dropbox.com/s/bmq318wwazyx05f/Global%20Brain%20%E2%80%93%20Waves%20of%20Change.jpg?dl=0) diagram in The Awakening Earth (p73), was omitted from the US version, The Global Brain – [here’s my updated version from 2000](https://www.dropbox.com/s/rvn4zq1htvuej75/Waves%20of%20Change.png?dl=0).

*“The changes that this will bring will be so great that their full impact may well be beyond our imagination.  No longer will we perceive ourselves as isolated individuals; we will perceive ourselves to be part of a rapidly integrating global network, the nerve cells of an awakening global brain.”* – Peter Russell, The Awakening Earth, 1982.

**From Limits to Growth, to Awareness Based System Change**

The whole environmental movement was hugely informed by warnings like Rachel Carson’s 1962 book Silent Spring – it influenced me to switch from chemistry to computers, in order to avoid causing effects like DDT had.  And a decade later, Information Technology had evolved to the point where Jay Forrester’s group at MIT could model the world ecosystem, and produce the Limits to Growth report in 1972 for the Club of Rome – which strongly influenced Undercurrents and Radical Technology.  And if we fast forward the work at MIT – as we fast forwarded Radical Technologies this last weekend – their work has itself shifted from being on the cutting edge of Information Technology, to the cutting edge of the consciousness revolution – Jay Forrester’s work morphed into that of Ed Schein on organisational cultures; then Peter Senge on learning communities; Joe Jaworski on Presencing – and now Otto Scharmer with Theory U – which puts consciousness (as Pete predicted) at the foundation of the universe, and humanity, and ‘awareness based system change’.

**Leading from the Emerging Future –**

Everything I have written above is directed towards noting a remarkable synchronicity, and to advocating that we take this last weekend’s conference as both milestone and springboard.  Otto Scharmer’s deep research on Theory U over the last 20 years at MIT has flowered into a MOOC (massive online course) called U.Lab that was tried out on 75,000 people in 2 sessions last year, with the biggest groups in the USA, China, and the new government of Scotland!  This year **u.lab** is launching fully with a 1½ hour introduction (**u.lab ox**) already online, and the main course (**u.lab 1x**) starting EXACTLY a week after Radical Technology Revisited. This is a remarkable coincidence. Pete Russell wrote in RT that we need a metaparadigm shift in order to be able to truly implement the visionary ideas presented in Undercurrents and RT as the solutions to an environmental crisis, and for humanity to live in harmony with nature.  At the weekend we saw that all the tools we need are now available and in place – but this shift to a one planet world still hasn’t quite managed to happen…

**– from Ego System to Ecosystem**

But the tipping point may just be a few days away.  With Otto Scharmer’s U.Lab course, communities around the world are being given the tools (the course is free) to make this shift.  More often than not, u.lab is being run out of community hubs, which are already involved in social change and the shift to a near ‘zero marginal cost society’ – and hence a near zero waste society too.  ‘Impact Hubs’ around the world are increasingly the focus of community-led innovation,and social enterprise start-ups, which are accelerating past our legacy corporations – the insurgency is beating the incumbency.  My feeling is that all this is a remarkable conjunction or juxtaposition – and far more synchrony than coincidence.  I wanted to draw it to your attention, as well as to circulate the thoughts above – about exponential solar, and the fulfilment of the ideas in Undercurrents and RT – and how the metaparadigm shift is accelerating with u.labs, and can speed the spread of ideas from pioneering hubs like CAT in Wales, Findhorn in Scotland, and Coexist in Bristol.   Enjoy…