Can Economics Grasp What Ecology Says?

Duncan Austin
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by

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A suggestion that the prestigious London School of Economics ought to reconstitute as a London School of Economics and Ecology is a useful prompt to recognize that economics still struggles to grasp what ecology says.

The real significance is less about improving university courses and more because this failure of comprehension is exactly why mainstream efforts to create a sustainable culture continue to fall short. Our foremost sustainability strategies – an ESG (environmental, social and governance) movement, and related ambitions for 'green growth' and 'more sustainable capitalism' – remain rooted in economic thinking that resists the insights of ecology.

The intrinsic tension between economics and ecology is that they attend to the world differently, in favouring 'parts' and 'relations', respectively. The good news is that we are all, even if only latently, 'economist' and 'ecologist', because these contrasting perceptions of the world emanate from our left and right brain hemispheres.

This implies that our sustainability challenge is not 'out there', but 'in us'.

Promisingly, right-brain thinking is asserting itself in the spread of systems and complexity science. A 'Systemic Spring' may be the remedy for the 'Silent Spring' of which Rachel Carson warned, but we must urgently accelerate this development with systems education at all levels.

We must also re-legitimize the idea that 'public' actions can best renew social and ecological relations frayed by a pursuit of 'private' self-interest that has proved more damaging than economists promised.

Our challenge is not to build a sustainable economy, but to develop a sustainable culture that has an economy.
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Duncan Austin has had a 25-year career as a sustainability researcher and investor. He writes as an independent. (dja@bothbrainsrequired.com)

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1. INTRODUCTION

A delightful story this month: Satish Kumar, the Editor Emeritus of Resurgence & Ecologist magazine, used his invitation to speak at the renowned London School of Economics to ask his hosts whether it might not be better if they were a London School of Economics and Ecology.

In Kumar’s telling, he enquired, over tea and cake, about LSE’s ecological offerings, to which he was informed there were several courses which integrated environmental issues into economic frameworks. ‘But environment and ecology are not the same,’ he replied. ‘Ecology means understanding of the entire ecosystem and how the diverse forms of life relate to each other.’ To which the response was: ‘That is too broad a concept. Our courses are much more specialized.’

I like the story for two reasons. First, I enjoy the thought of a distinguished guest speaker politely asking his hosts over refreshments whether they have considered being the opposite of what they are! It strikes me that more guest speakers at more events might usefully ask the question.

The more serious reason is that Kumar’s provocative idea, and the defensive response, catches the very essence of our ecological sustainability challenge: that economic thinking still fails to grasp the sort of thinking ecology is, particularly ecology’s focus on relation.

I believe this remains poorly understood because I, too, missed it for a long time. Twenty-five years ago, I attained one of the first ‘environmental economics’ degrees (at another London university then unique in offering such a course). With best of intentions, we all – professors and students alike – believed that environmental economics was a proper union of economic and ecological thinking, but it is now clear to me that it was no such thing. Instead, it was the appropriation of some ecological concerns into a way of thinking that remained steadfastly economic. It was not a fusion of disciplines on equal terms, so much as the capture of ecology by economics.

The real significance of this is less about improving university programs and more because it is exactly this misunderstanding that underlies our continued failure to solve major ecological problems despite considerable attention now paid to them.

Today, we live in a market-centric society, profoundly informed by – and so daily reinforcing – an economic mindset. Economic thinking is what powers the business and investment worlds. We have become ‘consumers’ and ‘human capital’. Consistently, we are trying to solve our sustainability problems in market-friendly or market-tolerable ways, spearheaded by an ESG (environmental, social and governance) movement within the private sector and by related ambitions for ‘green growth’ and ‘more sustainable capitalism’. Alas, these ideas are simply real-world manifestations of ‘environmental economics’ thinking. They represent a comprehension of the problems to which ecology points, but a failure to grasp the form of remedy to which an ecological perspective leads.
2. OF ECONOMICS AND ECOLOGY

To begin to explain, I have a proposal for an inscription over the door of any new School of Economics and Ecology. A bit cumbersome, but it would read something like:

'\textit{Ceteris paribus}'
\textit{(Economic method)}

\ldots

'When we try to pick out anything by itself, we find it hitched to everything else in the Universe.'
\textit{(John Muir, Ecologist)}

\ldots

\textit{And so, we begin...}

This captures that economics and ecology separate from the very outset, by the way in which they attend the world. Any attempt to reconcile their concerns that does not return to these first principles is doomed to fail.

Central to economics, and drummed into generations of students, is the act of severance: ‘\textit{ceteris paribus}’ – ‘assume all else remains equal’ – and now we can proceed.” Such acts of reduction adorn economics textbooks. ‘Assume man is rational’ not that he is rational and emotional. ‘Assume man is self-interested’ and not also prosocial. ‘Assume that there are two goods to choose from’, not the vast array of real life. ‘Assume two inputs of capital and labour’, not land or energy or finite resources. Economics cuts and reduces to come up with tractable problems that admit of elegant solutions, but the process inevitably renders economics a deeply decontextualized body of knowledge.

In contrast, ecology heads in the opposite direction. Ecology emphasizes and privileges connection, evident not just in Kumar’s comment and Muir’s quote, but also in Garrett Hardin’s proposed first law of ecology: ‘you cannot do just one thing.’ Ecologists resist the temptation to abstract parts of what they see and instead try to develop knowledge of the whole, as it is.

In other words, ecology denies the legitimacy of ‘\textit{ceteris paribus}’, while economics views ecology’s desire to hold everything in mind as impractical.

Economics and ecology are both valuable disciplines, but we may only fully reap their respective insights by acknowledging the depth of their difference. Without doing so, the economist and ecologist will forever talk past each other. The differences are essentially axiomatic, and as Robert Brown neatly expresses:

\textit{there is nothing more dangerous or powerful in the philosophical process than selecting one’s axioms.... There is nothing more useless than engaging in philosophical, religious, or social debate another person whose axioms differ significantly from one’s own.}
2.1. Parts or Patterns?

Indeed, underscoring the depth of their divergence, the philosophically minded may have detected that the economist and ecologist lean on different ontologies. Ontology is the branch of metaphysics that ponders what are the basic ‘things’ in the world. Is it energy? Matter? Information? All have been proposed. One ontological choice is whether to see material ‘parts’ or the immaterial ‘patterns’ that connect parts together. (See Figure 1).

In looking at the world, the economist implicitly chooses to see parts, the ecologist to see patterns; the economist to see the nodes, the ecologist, the connections. The world is a weave of the two: parts that come together as patterns and patterns that come into being through parts. Choosing to see one way temporarily forecloses the ability to see the other, until one consciously ‘flips’ one’s perception – like the famous optical illusion where you can see the young lady or the old crone, but not both at the same time.

![Figure 1: Parts or patterns? Ceteris paribus or everything connected? A part-biased view (left) privileges discrete entities, while a pattern-biased view (right) privileges relationships between and within parts. Neither is categorically ‘correct’, but economics and ecology lean on – and so reinforce – a part-view or pattern-view, respectively. (Adapted from Capra, 1997)](image)

Such axiomatic or ontological choices are beyond right or wrong. Instead, they are complementary. Each choice is valid, but different. ‘Ah, I see, you went left at that very first junction and I went right.’ And that has made all the difference.

A major reason we are having difficulties reconciling the tension between economic growth and ecological preservation is that the disciplines that have naturally emerged as the ‘sciences’ of economy and ecology have found their needs best served by seeing differently. Today’s market-centric culture struggles to truly grasp ecology’s concerns because we have privileged and normalized economic thinking in our daily lives – now as ‘consumers’ – which inhibits our ability to ‘flip’ and see what ecologists are frantically trying to point out.
2.2. Two ‘Eco-’s!

In turn, the choice to prioritize parts or patterns leads to seeing the world at different scales. A part-first vision encourages a ‘downward’ perception of the world and a focus on its subdivisions. A pattern-first vision invites an ‘upward’ curiosity to trace connections up into ever larger patterns. Hence, a further distinction between economics and ecology is that their ‘eco-’s refer to different domains. A key tension between economics and ecology hides in plain sight.

‘Economics’ is the older term derived from the Greek oikos (home or dwelling) and nemein (to manage). It is the ‘management of my home’. In contrast, ‘ecology’ was coined by Ernst Haeckel in 1869. He combined oikos with logos (the study of), but conceived of oikos as our entire planetary home – so, ‘the study of Nature’s house’. Economics and ecology exist in a nested relationship. Economics is the management of just a small niche of Nature, whereas ecology is just the study of all of Nature.

Of course, today, economics extends beyond the mere household to a larger macro-economy including business, finance, and government sectors, but even in this larger form, the discipline concerns itself only with the monetizable subdomain of broader societal and ecological relations.

Notice that the two terms differ not just in scope but also in their stance or attitude – managing versus studying. A way of seeing not only changes what is seen, but also invites a way of being. Seeing the world as separable invites the economist to think that its parts might be better arranged than they are. The economist is ‘sucked in’ to tinker and fix, to recommend better ‘allocations’ of the world’s parts.

In contrast, seeing the world as connected leads the ecologist to ponder why it has come to be connected as it is. The ecologist is ‘pushed back’ to observe and describe. Indeed, in a way that seems not to happen with economists, many prominent ecologists are almost artists. Not much separates the notebooks of Audubon and Muir from the sketchbooks of O’Keefe and Turner.

These different modes of perception lead us to see different things and ultimately beget different attitudes to the world, in reinforcing fashion. But the ‘economic’ and ‘ecological’ perceptions are complementary in being able to modulate each other from spiralling towards counter-productive, even pathological, extremes.

The ‘economist’ can lapse into endless efforts to improve the world, to make it both more comfortable and more ordered to fend off worrisome uncertainty. ‘If we can rearrange the pieces of the world by production and exchange, maybe there is a yet better way to arrange them?’ This can easily become the journeying upon an endless treadmill – the ‘hedonic treadmill’ – of ever wanting more and better, whose pathological extreme is an anxiety-driven need to accumulate and to control.

In contrast, the ‘ecologist’ who privileges connection and sees, à la Muir, that this is connected to that... can easily become paralyzed by the sheer connectivity of it all. This might induce a beneficial awe or appreciation, as Nature often does, which can unstick the economic mind from its ceaseless treading. But, taken too far, the ecological mindset can become an unhelpful reluctance to engage with the world, even a defeatism – ‘must we do nothing’? This of course is untenable in the extreme. ‘I know the apple is connected to the branch is connected to the root is connected to the soil... but I’m hungry.’ Of course, we cannot be in the world without tampering with at least some of its parts.
Economics and ecology differ, then, in their domain of study – what to see – but also in ‘how to see’, which invites a different sense of ‘how to be’.

In other words, a putative LSEE would have a job on its hands. Its challenge would not be to blend the different domains of study under the same mindset – combining plants and profits in a single analysis – but to train students to see in complementary, but conflicting, ways. Adding Ecology to Economics is not just about introducing carbon emissions into the production function, but about recontextualizing economic theory and standing outside of a self-bounded economics to see what sort of thinking and attitude economics represents.

LSE’s preference for specialization – a regrettable trait of modern academia – would seem to be one of the key hurdles to overcome. Indeed, it is interesting that the latest trends in education are heading in exactly the opposite direction. The newest London university? The London Interdisciplinary School (est. 2020), which rather sounds like the opposite of specialization.

_Economics and ecology differ in ‘how to see’ and ‘what to see’, which cultivates a different sense of ‘how to be’._
3. ENVIRONMENTAL ECONOMICS?

It may now be clearer why ‘environmental economics’ and its real-world manifestations of ‘green growth’, ‘sustainable capitalism’ and other visions, continue to fall short. They are the vehicles by which we have embraced ecological concerns, but still resist the accompanying mindset to which those concerns points.

As noted earlier, I feel like I have been living through contemporary Western culture’s efforts to get to grips with all this. As an economics undergraduate in the mid-1990s, I was drawn to a new ‘environmental economics’ emerging as an independent field out of an older ‘public economics’. The new field was shaped not just by economists for whom the environment was their prime focus – such as Boulding, Daly and Georgescu-Rogen – but also by more ‘mainstream’ economists, such as Baumol, Nordhaus and Pearce, keen to repair a major gap in economics’ coverage of the world.

*Updating Pigou*

One of their more straightforward contributions was to revitalize Pigou’s 1920 idea of levying prices on negative ‘externalities’. Pigou was the first to crystallize that market exchanges often had consequences for human welfare that spilled over beyond the actual trade, i.e., consequences that were ‘external’ to the market. Hence, the market could more effectively promote human wellbeing if such externalities were priced by government intervention and ‘made visible’ to the market. Environmental economists developed Pigou’s idea to describe and advocate carbon and pollution taxes and tradable permit markets, which are now broadly understood and have been implemented in several jurisdictions.

However, while this work plugs – at least conceptually – an increasingly large and apparent gap in the market’s grasp of the world, it is inherently limited as an approach. Pollution taxes can only be levied on commodifiable parts of the world – a discrete ‘carbon emission’, for example – and many of our environmental challenges do not lend themselves to such commodification. Instead, they require a more holistic perception that resists breaking down the environment into parts. Hence, the updating of Pigouvian thinking, while better than nothing, only represents the inclusion of some ecological concerns within an otherwise unchanged economic mindset.

3.1. The ‘Environmental Valuation’ Debate

The bigger issue of ‘how to see’ rears its head in the thorny matter of ‘environmental valuation’, and the question of whether we should impute a dollar value for ‘ecosystem services’. For example, if a pristine watershed naturally provides potable water, what is the market value of that water in dollars and cents that we would have to spend if the watershed did not provide it for free?

The issue is not whether we can impute such a value – environmental economists have developed acceptable techniques to do this – but rather whether it is intelligent to do so. In this critical matter, which has divided ecologists, is the question of whether ecology should yield to a dominant economic way of thinking or make a stand for its different way of seeing – *a different way of appreciating and valuing* – that challenges economics’ monetary default.

*Is it intelligent to impute a dollar value for ecosystem services?*
The pragmatic response has been to proceed and impute monetary values for ecosystems on the grounds that in our market-centric culture we cannot afford for such ecosystems to be valued at zero, which is otherwise the case. Hence, many such estimates have been made and have probably achieved the pragmatic goal of helping to register the importance of the environment to those who might otherwise not have noticed.

I, for example, often cite an estimate by Robert Costanza and colleagues that even just some of the ‘services’ provided by the global ecosystem had an imputed value of $125 trillion in 2011, nearly twice the value of then current global GDP. My hope is that it jars people to re-perceive our monetary economy as being a small part of a much larger system upon which we are dependent. That is, for all the celebration of the attention-demanding market as a gauge and allocator of value, the market misses more value than it captures!

Money and morals

However, something important is also lost in the process of valuing ecosystems in monetary terms because it forfeits the opportunity to challenge the idea that monetary valuation can adequately reflect the connectedness of ecology. The monetary value of an item is predicated on its separability and exchangeability – ‘price discovery’ arises from the act of exchange. A choice to refrain from imputing dollar values on the ecosystem articulates the deeper idea that there are other, non-monetary, ways of appraising and ‘valuing’ the world, which should be held up against our default tendency to think in dollars and cents, premised on ‘ceteris paribus’.

Such a stance would lead to a more profound conversation about how to weigh monetary values against non-monetary values, or profits against principles. It would make the point that if the monetary grasp of the world is so partial, we must be careful at the level of human culture, not to steer by economic thinking and monetary values alone. It invites a broader conception of value – a meta-value framework – which recognizes that economic and ecological thinking lead to two different bearers of value – money and morals.

In turn, this would force a more explicit debate about where economic thinking is the ‘right’ or ‘acceptable’ mode of thought and where it is not, even though it might still be done. One can always impute the dollar value of a natural ‘service’ or calculate the opportunity cost of, say, not cutting down giant redwoods for timber or not damming the river for a new bottled water factory. However, the pre-economic cultural question is whether that is the ‘right’ thinking to do in that circumstance.

Does that sound contentious and difficult? Of course. Does it sound like there might be strong views about where economic thinking should or should not apply? Yes. But it has been the false promise of 20th Century economics that the spread of markets and the ability to monetize many things might replace the need to make difficult value judgments. In practice, arguments for market primacy, based on the supposed ‘value neutrality’ of markets, have merely smuggled into culture the meta-value that monetizable values matter more than non-monetizable values.

Of course, this has been an almost impossible conversation for ecologists to advance because, today, we find ourselves in a profoundly market-centric culture.
Market-centricity
The reasons for this will be detailed later because they owe much to reverberations of the Scientific Revolution and the way our left brain thinks, but the concise story of the 20th Century is roughly as follows. Mainstream economists downplayed markets’ omissions and burnished the idea that markets were a near infallible mechanism for coordinating human activity. This depiction of markets was eagerly seized upon by post-WW2 ‘neoliberals’, who were keen to promote individual freedoms and to limit government, as an understandable response to the horrors wrought by authoritarian regimes, but who were less keen on scrutinizing the claims made about the superiority of markets. The market-favouring ideas burst into socio-economic reality via the Reagan and Thatcher governments in the early 1980s and have since settled across most of the Western world. To adapt Reagan’s famous 1980 phrase, the effective slogan of our time: ‘markets are the solution; government is the problem’. We live in a world in which markets have primacy within our larger efforts to self-coordinate.

Some go further to describe the status quo as ‘market fundamentalism’, in that our cultural elevation of markets owes much to a faith in the superiority of the market mechanism that has never been subject to an empirical test of sufficiently large scale and long timeframe that might validate the claim. Indeed, today is the ongoing experiment. Markets have clearly enabled the accretion of much material wealth – a so-called Great Enrichment – but until the full impact of the associated Great Acceleration is also known, the final cost-benefit verdict must wait. Experiments are generally not deemed to be ‘over’, until the phenomenon under investigation has reached a new equilibrium or resting state, which hardly describes our relationship with the planet today.

The point is not that markets are inherently bad but that their primacy is what may be detrimental. With markets privileged – and non-market institutions discredited – government has been unable to correct the market’s omission of so many recognized externalities, let alone advance non-market regulations or prohibitions to protect our ecology. Hence, though environmental economists have advocated carbon taxes from the 1970s, less than 1 percent of total global emissions are currently priced at a level sufficient to meet the Paris Agreement. We are arguably making even less progress in establishing sufficient measures to safeguard global biodiversity.

There has been a ‘double capture’ of the ecological mindset by economic thinking. First, economics can only readily accommodate those ecological concerns, such as carbon emissions, which are discrete and separable. Second, the realpolitik of a market-centric culture, bolstered by the primacy of economic thinking, means that current market actors wield real political power to prevent the internalization of even those ‘externalities’ which economic thinking can stretch to!

Perversely, the widespread portrayal of our environmental challenges as ‘externalities’ has conveyed the impression that market logic can handle our ecological problems, which foreclosed deeper questioning of the sufficiency of economic thinking overall. This has left market primacy as the status quo, which has then empowered market actors who might suffer from internalizing externalities to maintain a successful decades-long resistance to any meaningful externality pricing!

Out of a mistaken confidence we might fix things in theory, we have not bothered in practice.

There is a critical asymmetry in the way markets extend. Markets eagerly reach out to embrace new profit opportunities but rebuff the internalization of new costs. As the decades go by, this ensures that markets become ever more extractive in nature.
3.2. ESG at the Epicentre!

At the very centre of this tension lies the flourishing ESG movement. In a market-centric world, efforts to protect our ecology have had to fit under the larger neoliberal narrative, and the emergence of a burgeoning ESG movement is in many respects a consequence. ESG aims to be a solution to our environmental – and social – challenges but is really a symptom of deeper cultural trends set in motion long before the scale of our ecological problems became apparent.

As a market-based movement, it has had to uphold a market-friendly narrative, evident in some of its key refrains: ‘win-win’, ‘doing well by doing good’, ‘green growth’, ‘sustainable capitalism’ and more. But the narrative that protecting the global environment must be profitable, and consistent with ‘economic’ growth increasingly seems implausible, with diminishing time left to acknowledge the fact. Market measures exclude so much ecological value that decision-making anchored upon today’s partial financial statements is the problem. ESG does not constitute ‘ecological’ thinking but rather the appropriation of some ecological concerns into thinking that remains steadfastly economic. It fails to grasp the deeper significance of ‘relation’ and ‘connection’ and keeps in place a largely decontextualized economic system as the main shaper of matter and energy in the world.

Effectively, a long-gestating neoliberalism met a nascent environmentalism, and the result is the modern ESG movement, which may simply not be enough. It is increasingly urgent that we comprehend that such a movement is limited not by the sincerity or enthusiasm of its proponents, but by the form of thinking it constitutes and so reinforces.

Measuring and reporting
One marker of its insufficiency is that it has been side-tracked into an extraordinarily time- and resource-consuming exercise in measurement, reporting and disclosure – now ‘ESG data’ – which falls short of placing monetary values on what has long ago been measured well enough. The disclosure movement began in 1997 with WRI’s GHG Protocol and the founding of the Global Reporting Initiative. It implicitly leant on Peter Drucker’s maxim: ‘what gets measured gets managed.’ Alas, that is not a law of the universe, only a catchy slogan. In the adage not being an iron-clad law, it can also be true that measurement is sometimes an excuse not to manage, which increasingly seems to be the case here. Counting is not valuing. The authors of the original GHG Protocol were quite clear that reporting was only meant to be a stopgap measure not an end. And yet, here we are, 24 years later: 1 percent of carbon emissions sufficiently priced but reports and commitments galore.

Climate change and biodiversity
Another marker of the continuing primacy of economic thinking is that our sustainability discourse continues to be dominated by the mechanical issue of climate change, which can be more easily grafted onto economic thinking than the more complex, but equally important, issue of biodiversity.

Climate change may be a ‘wicked’ problem, but it is very easy to describe: human activity releases several gases that get trapped in the atmosphere, which then heats the planet. Biodiversity is a much more complicated idea. A healthy ecosystem relies on a complex and rich biodiversity consisting of myriad connections and relationships, many of which are beyond our capacity to detect and monitor.
Hence, it is not just a question of staunching the flow of a few discrete gases, but of maintaining the integrity of large-scale, often overlapping, systems. Not surprisingly, an economic way of thinking has found it easier to grasp the problem of climate change than the problem of biodiversity.

In the recent period, when the main challenge has been to raise awareness of sustainability overall, it has been acceptable to prioritize climate change because there is considerable overlap between the potential solutions for climate change and biodiversity protection. However, it is not a complete overlap, and we increasingly need to guard against a ‘climate-dominated’ view of sustainability that may advance biodiversity-damaging climate change ‘solutions’. Unfortunately, many of the technical fixes now emerging for ‘climate change’ impose considerable new footprints in terms of demands for new raw materials, waste flows, premature obsolescence of existing infrastructure and more. Elon Musk’s recent announcement of a $100 million prize for carbon capture misses that any such fix would need to be implemented at so massive a scale it would bring with it its own enormous footprint.

Overall, as recognition of the point sinks in, one realizes that human behavioural change and ecological restoration will have to carry much more of the freight of sustainable adaptation than a ‘climate-first’ framing of sustainability suggests.

The just-published Dasgupta Review, sponsored by the UK Treasury, throws a welcome spotlight on biodiversity. Helpfully, the Review expresses the critical point that the economy is embedded in Nature and so is bounded, not limitless. Yet, at the same time, the document’s framing of Nature as an ‘asset’ and as ‘natural capital’ reveals our implicit dependence on economic thinking, even as we confront the problems to which such thinking has led.

**Human behavioural change and ecological restoration will have to carry more of the freight of sustainable adaptation than a ‘climate-first’ framing suggests.**

**Summing up**

Ultimately, ESG represents a well-intended and increasingly serious effort to try and lead culture in a more sustainable direction but as a market-based movement, it is too reliant for its existence on underlying market norms to constitute a sufficiently strong challenge to the primacy of economic thinking at the heart of our problems. Sustainability will require a more robust challenge of market primacy. Certainly, the ESG community can play a key role here, but it will require considerable reappraisal of its meta-strategy that voluntary action by the private sector can deliver sufficient change.
4. OUR ECONOMIC AND ECOLOGICAL BRAINS

Now, for some better news. We are all both ‘economist’ and ‘ecologist’!

In a very real sense, Evolution has granted us an ‘economic’ left brain and an ‘ecological’ right brain because both are beneficial, even if they must be in tension. So, the issue is whether we are in balance.

I believe this is one conclusion that can be drawn from Iain McGilchrist’s landmark work, The Master and His Emissary – a must-read for those seeking to understand the deep drivers of our contemporary world.12

McGilchrist, a formidable combination of neuroscientist and humanities scholar, makes a compelling case not only that our left and right brains perceive the world in fundamentally different ways – complementary, but in tension – but also that the long arc of human history reveals left-brain ways of thinking and being inexorably asserting themselves over right-brain ways, in slowly accelerating fashion.

‘My thesis is that for us as human beings there are two fundamentally opposed realities, two different modes of experience; that each is of ultimate importance in bringing about the recognisably human world; and that their difference is rooted in the bihemispheric structure of the brain. It follows that the hemispheres need to co-operate, but I believe they are in fact involved in a sort of power struggle, and that this explains many aspects of contemporary Western culture.’13

Though McGilchrist bases his argument primarily on developments in the humanities, with which he is most familiar – art, poetry, architecture and more – today’s primacy of economic thinking over ecological thinking – even in the face of a deteriorating global ecology – appears to be yet another manifestation of left-brain ascendancy. Our left, ‘economic’, brains are ‘crowding out’ our right ‘ecological’, brains, creating overshoot problems our left brains cannot remedy because they uphold the sort of cognition that created the problems in the first place!

In other words, the real solution to our sustainability problems may not be ‘out there’, but ‘in us’.

4.1. Left and Right Brain

McGilchrist’s thesis is so comprehensively researched it is risky to simplify, but to highlight one repeated theme:

‘One of the more durable generalisations about the [brain] hemispheres has been the finding that the left hemisphere tends to deal more with pieces of information in isolation, and the right hemisphere with the entity as a whole.’14

Ceteris paribus and John Muir? Our dual ability to hold ‘all else equal’ and to perceive that everything is connected appears to emanate from different brain hemispheres. The conflicting nature of these beneficial tasks may be one reason why human brains, and to a lesser extent the brains of higher-order mammals, exhibit clear division into separate hemispheres. (See Figure 2).
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While the corpus callosum, which physically joins the hemispheres, transmits much activity from one side to the other, it is noticeably 'quieter' than the hemispheres themselves. It acts as much as an inhibitor as a transmitter, as if the two hemispheres require their own space to think.

Hence, to use one of McGilchrist’s many examples, the chicken – also bihemispheric – solves the twin vital challenges of needing to eat and not be eaten by employing the right eye (left hemisphere) to focus on its food and the left eye (right hemisphere) to scan its surrounds.15 One hemisphere can attend to the 'local' problem of pecking feed, while the other hemisphere the 'global' problem of keeping watch.

Our brains do something similar: focused attention is governed by the left hemisphere and vigilance by the right. Focus and vigilance both seem useful but must be in tension.16 But, with less independent eyes than the chicken, we are forced into more of an explicit choice – whether to summon focus or broader attention. These are different ways of being in the world – not just in their fields of view and their demands on the eye musculature, but in the attitude that each field of view summons. After all, vigilance is about resisting the temptation to focus. Intriguingly, and probably best this way round, the right hemisphere seems to be less susceptible to fatigue than the left.

Critically, even though the left hemisphere has a more fragmented view of the world, it seeks to formulate for itself a coherent ‘whole’ story. The veracity of this story is necessarily constrained by the parts of the world of which the left brain has become aware, but, in seemingly hubristic manner, the left brain denies that its vision of the world is ever incomplete. As many split-brain experiments have shown, the left brain can easily be fooled into making nonsensical claims about reality, of which it remains wholly convinced!17

Attempting to trick the right brain to do the same does not work, because the right brain’s global vision enables an ‘anomaly detector’ that generally prevents it from spouting nonsense.18 Indeed, the right brain often sounds the alarm to anomalies it registers in left brain narrative, but the left brain

Figure 2: Human brain seen from above. The longitudinal fissure divides the brain into left and right hemispheres. (Not visible is the corpus callosum lower down, which holds the hemispheres together.)

The left brain has a more fragmented view of the world but denies that its vision is ever incomplete!
does not always pay heed. Have you ever had that feeling when you start explaining something and, at some point, realize that you are making it up by piecing together available ideas on the fly, but carry on anyway?!

As McGilchrist summarizes:

‘The right hemisphere underwrites breadth and flexibility of attention, where the left hemisphere brings to bear focussed attention. This has the related consequence that the right hemisphere sees things whole, and in their context, where the left hemisphere sees things abstracted from context, and broken into parts, from which it then reconstructs a ‘whole’: something very different.’

The left brain divides and reassembles – reduces and reconstitutes – the world, but its reconstituted world can only be as complete as the parts it has gathered. It ‘adds back up’ the parts as best it can but the whole may still fall short of the more holistic right-brain view. (In turn, the right brain gives up certain details for its grasp of the whole).

And yet, even though the left brain’s perception of the world is decontextualized or ‘disembedded’, the left brain remains, of course, within the world and is in many ways the domineering hemisphere in its control of language and in its inclination to ‘do’. This combination sets us up to act within the world – and so to transform it – with dulled and blinkered appreciation of what we do.

And to underscore, this is relatively new information about ourselves. The gift offered by McGilchrist – and by other neuroscientists writing for lay audiences – is nothing less than a heightened level of self-awareness.

This is not McGilchrist’s term, but we are effectively biperceptors.
4.2. Out of Balance

The problem today, McGilchrist argues, is that we are out of balance. In a broad sweep of cultural history, he traces the fingerprints of a steadily more assertive left brain – in the development and orientation of writing, changes in the direction in which portrait subjects sit, the growing abstraction of art and music, and much, much more – all hinting at a left brain trying to make the world more amenable for it. The shorter record of mental illness hints at a rise in mental disorders attributable to excessive left brain rather than right brain function.

The positives of this development abound: medicines and vaccines, planes and trains, warm homes with glowing screens. But something is also lost by the ascendancy of the ‘part-seeing’ left hemisphere:

‘An increasingly mechanistic, fragmented, decontextualised world, marked by unwarranted optimism mixed with paranoia and a feeling of emptiness, has come about, reflecting, I believe, the unopposed action of a dysfunctional left hemisphere.’

The whole amounts to a long-term 'leftward' drift of human cognition. Certainly, there have been counter-movements – the Renaissance, the Romantic period etc – but such periods seem only to constitute pauses not reversals. They appear as periods of psychological integration, where we make sense of the last leftward advance before the journey commences again. Eventually, the Romantic Era, for example, was dismissively rebranded as the Counter-Enlightenment and on we went.

Cultural reinforcement

While the idea of a whole civilization in the grip of a runaway cognitive dynamic may seem fanciful, it becomes easier to comprehend when one recognizes the reinforcing nature of culture. Runaway thinking can happen at the level of a whole culture because minds and culture constitute a loop in a complex system.

Peter Richerson and Robert Boyd, authorities on cultural evolution, define culture as:

‘…socially learned information stored in individuals’ brains that is capable of affecting behaviour’

While we ‘scaffold’ culture with many cultural artifacts – literature, buildings, laws and more – the main locus of a living human culture is in the plastic brains of its human members. The reflexivity between our plastic brains and the plastic culture in which those brains are fully immersed – the social ‘imaginary’ – constitutes a feedback loop in which mind shapes culture shapes mind, a so-called ‘mind-culture co-evolution’.

The reflexivity between our plastic brains and our plastic culture constitutes a feedback loop in which minds shape culture shapes minds.

Consider, for example, how you define for yourself ‘success’, ‘happiness’, ‘good’ and ‘bad’ behaviour, ‘normal’ even. How can any of us possibly define such ideas without looking around to observe how others define them? And where did they get the idea from? Were they looking at us?

This mind-culture-mind loop now exhibits runaway dynamics: our left-brain ‘way of being’ has brought forth a left-brain culture that encourages and rewards further left-brain thinking, and so it
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goes on. Bit by bit, we lose our capacity to ‘be in the world’ in a more meditative, less calculative, way that is the preserve of the right brain and plausibly a greater part of how we used to be.

Such runaway processes have long been evident in human culture – in the delusions of cults, and now, at greater scale and speed, in the echo chambers of social media. But this appears as a grander, slower-moving, runaway that has stealthily been shaping Western culture’s perception of the world.

4.3. Reductionism and Systemism

While McGilchrist takes a long view of human history, a critical ‘recent’ accelerant of left-brain advance has been the Western Scientific Revolution, which vaulted the left brain’s reductionist, mechanical perspective to ascendance, and which, with a two-century lag, would make it possible for serious academics to propagate a vision of *Homo Economicus* without everybody falling about laughing.

Broadly, left and right brains underwrite our complementary capacities for reductionism and systemism of which economics and ecology are among key respective flagships.

Reductionism is the idea that we can best understand the phenomena of the world by breaking them into parts, learning how those parts work and then ‘adding back up’ this knowledge to arrive at a superior comprehension of the whole. It is a process of ‘reduce and reconstitute’.

Reductionism earned its spurs because it proved spectacularly successful at explaining the behaviour of ‘dead’ things that were the dominant objects of enquiry at the dawn of the Scientific Revolution. Alas, those early successes profoundly shaped the way we believed all science should be conducted, so that we applied an intrinsically reductionist scientific method to a more complex ‘living’ natural world, including ultimately ourselves.

The problem, as is increasingly understood, is that complex systems exhibit *emergent* properties, which cannot be anticipated even from complete knowledge of the parts, but only discerned from observation of the whole.

But, in not recognizing this, reductionism – granted primacy within the conception of what science should be – crept up the disciplinary stack, from physics to natural sciences and ultimately to social sciences, where, fatefulhy, it led the most influential social science, economics, to model itself on classical physics through most of the 20th Century.23

Then, in the last several decades, economic ideas of the 20th Century ‘jumped’ into the real-world via the promotion of neoliberalism, which placed markets at the centre of human self-organization.

Keynes famously said of politics’ tendency to follow economics with a lag:

> ‘Practical men, who believe themselves to be quite exempt from any intellectual influence, are usually the slaves of some defunct economist. Madmen in authority, who hear voices in the air, are distilling their frenzy from some academic scribbler of a few years back.’

So, it has come to pass. When Reagan and Thatcher came to power, they implemented the ‘academic scribbles’ of mid-20th Century economics. To the extent that these ideas continue to underpin our contemporary culture, we are largely living in a world hypothesized by 20th Century economists, and

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23 Reductionism crept up the disciplinary stack, causing economics to model itself on classical physics.
that was premised on reductionist, physics-inspired theories we increasingly recognize as poor descriptions of complex human society.

**The Fallacy and Trap of Reductionism**

The overall development can be seen as a fallacy of reductionism that led us into a trap of reductionism.

The **Fallacy of Reductionism** is that reductionism is always the best way to investigate the world, and that more knowledge will always be gleaned from breaking phenomena into parts than contemplating them whole.

The **Trap of Reductionism** has been that because reductionism was so successful in explaining the dead things upon which the Scientific Revolution was founded – planets, light, falling objects etc. – we were insufficiently sceptical about its adequacy as a method to investigate more complex, living things. (Ironically, we were not sceptical enough about our sceptical method!) Yet, we proceeded anyway with the unfortunate consequence that we have delayed, and sometimes derailed, our comprehension of many living things, including ourselves.

**The Valley of Reductionism**

This trap can also be envisaged as a valley. Hence, Christopher Tape, a biologist, depicts the broad history of biological enquiry as being a ‘downward’ journey of reductionism, now transitioning into an ‘upward’ journey to discover emergent properties that cannot be gleaned from knowledge of the parts.24 (Note the appearance of ‘systems’ and ‘life’ on the right-hand side of Figure 3).

Similar trajectories could be drawn for many other natural and social sciences, all ‘pulled down’ to a reductionist vision. The point is not that this has not yielded considerable benefit, only that it promoted a method of investigation whose cost was the postponement of our comprehension of emergent properties. As that recognition has sunk in, many disciplines have recognized they have reached the point of diminishing returns to reductionism.

![Figure 3: The ‘Reductionist Valley’ (Tape, 2016)](image)

**4.4. A Systemic Spring**

Encouragingly, there is now a ‘Systemic Spring’ under way in which multiple disciplines are racing to incorporate the insights of complexity thinking into their subjects, with the natural and social sciences having the most to gain. Indeed, in general terms, the more ‘complex’ the object of a
discipline’s enquiry, the more there is to gain – or, equivalently, the more that reductionism has been inadequate.

As Brian Arthur, one of the key proponents of complexity in the field of economics, recently expressed it: ‘complexity is not a science, rather it is a movement within science.’ If so, it is the complement, with a 300-year lag, to the reductionism that preceded it and which, virtue of ‘going first’, came to be baked into our sense of what science should even be.

**Biology**

Biology provides a good example of the history. In many ways, biology has been the discipline most bruised by reductionism because, sitting just ‘on top’ of chemistry, it is the layer of the scientific stack where ‘life’ starts. However, biology was forced by notions of ‘good scientific practice’ to deny that the living things of its enquiry might have purposive behaviour or intention. Aristotle grasped this only for Descartes to ungrasp it.

Yet, the clear message of the Human Genome project and of recently identified processes of epigenetics and DNA methylation is that no such neat correspondence between genes and traits exists. Instead, a more complex – frankly, much more interesting – picture has emerged in which the larger parts of the organism themselves play some role in determining which proteins are expressed. There is not just ‘upward causation’ from DNA, but mysterious ‘downward causation’ too.

As Wendy Wheeler, the English biosemiotician, explains, we are having to adjust our metaphor: ‘DNA is not a blueprint, but a library’, not a deterministic set of instructions for cellular machinery to follow blindly, but a repository of possibilities from which an organism can select depending on contextual demands. This raises fascinating questions regarding what is doing the selecting and how, but the two-way nature of the process seems like it will yield its secrets more readily to a systemic perspective than a reductionist one. Hence, the rise of ‘systems biology’.

**Physics, too!**

While the natural and social sciences have most to gain from a Systemic Spring, the same fundamental challenge of having to see in two ways has reared its head in even the ‘hardest’ of sciences – physics. In the early 20th Century, having drilled down through the structured, ordered stack of the compound, the molecule and the atom, physicists arrived upon the baffling mystery of quantum behaviour in which light has a dual particle-wave nature. Light has both the properties of a particle and of a wave pattern, until our act of perception forces the issue and ‘locks in’ one or the other. Look for light as a particle and you will see light behaving as a particle and not as a wave. And vice-versa. We can only explain the phenomenon via a principle of complementarity. It is as if Nature
mischievously left a message at the bottom of our physical world: 'Congratulations on making it this far! Now turn around and think the other way.'

Perhaps no-one grasped the implication more fully than James Lovelock. Sufficiently conversant in the microscopic parts of the world to have invented the electron capture detector, Lovelock also looked 'up' at the interconnections of the parts and wondered: 'what if it is just one thing?' Lovelock's Gaia Theory was definitely not hailed as the greatest scientific breakthrough of the 20th Century, though it may have been one of the century's most important thoughts.

Even as physics was forced into its turn from the 1930s, other disciplines, including economics were still making their way 'down' with a lag. In many respects, economics was last into the valley, has ventured in most deeply, and is among the last to sense a need to clamber out.

*The poets always knew!*
Non-scientists have always looked in on this valley from its ramparts and hailed warning, but their cries were too easily dismissed by scientists within a culture keen to divide art from science – itself a reductionist stamp!

Poets – the masters of relation – sensed exactly what was happening, from early on. Wordsworth, in 1805, commended his friend Coleridge for not succumbing to the fashion to choose to see the world in parts and then believe it was actually divided:

‘*No officious slave*

*Art thou of that false secondary power*

*By which we multiply distinctions, then*

*Deem that our puny boundaries are things*

*That we perceive, and not that we have made.*

*To thee, unblinded by these formal arts,*

*The unity of all hath been revealed.*

Coleridge had not been blinded by the new 'formal arts' – that is, 'sciences' – into dividing the world.

Similarly, William Blake's famous lines of 1802:

‘*...May God us keep*

*From Single vision and Newton's sleep.*

Blake, perhaps more accurately, allowed that reductionism was a vision, but only a 'single' one. The point is not that reductionism has not been beneficial, but that it relies on and reinforces a 'singleness' of vision. This singular vision is what has been cemented into our science and so into our culture. Werner Heisenberg, one of the key pioneers of quantum mechanics, sensed how deeply our penchant to divide had sunk and how difficult it would be to root out:

*'The Cartesian partition has penetrated deeply into the human mind during the three centuries following Descartes and it will take a long time for it to be replaced by a really different attitude toward the problem of reality.'*
Heisenberg’s comment – mind, singular – betrays his understanding that a way of seeing the world had sunk into all our minds together because of the way culture works and that any change in attitude will have to be a collective endeavour – the transformation of our hive mind.

What is genuinely exciting about systemic science is that it introduces a rigorous way of seeing relation over part – of seeing the connection to which Blake and Wordsworth were privy. It is not exactly poetry, but it may be science building itself a ladder out of the valley and towards a broader vision in terms the scientific mind can accept. It may be nothing less than a right-brain renaissance.

Could we have avoided the ‘valley of reductionism’ altogether? Or was it inevitable? In some sense, the whole shape of the journey was triggered by ‘simpler’ things having yielded their secrets sooner than more complex things. But of course! Our deciphering of the world could hardly have been from complex to simple! The perhaps unavoidable consequence is that a way of seeing that worked for simple things became anointed as the way to investigate more complex things until its limitations became apparent. Is this just part of growing up? Have advanced alien civilizations stumbled along the way, too?

4.5. Self-Reduced by Economics

The real-world consequence of this today is that, with a lag, reductionist thinking has shaped our socio-economic form and our sense of how to self-organize. Gregory Bateson, one of the most prominent system thinkers of the 20th Century, who tried to lean against the reductionist tide in the social sciences when it was at its height, said:

‘The major problems in the world are the result of the difference between how nature works and the way people think.’

Mainstream economic thought of the 20th Century is one of the principal means by which we have accomplished this dubious feat.

We conceived of Homo Economicus and built a logical model of the world around that conception and have ever since been trying to live up – live down, really – to that self-image. We have been striving to make our behaviour fit a simple model rather than adjusting our models to a new comprehension of our complex behaviour. Effectively, a subplot of our broader mind-culture co-evolution has been a mind-market coevolution, in which human minds have made markets have shaped minds.

Central to that model – and to our current faith in markets – is the left-brain inspired idea that society can be reduced to rational individual ‘agents’ endowed with entirely independent preferences who exchange parts of the world in a market system that has the magical power to ‘add everything back up’ to arrive at the best of all possible worlds. It sounds exactly like the sort of place the reductionist left brain would like to live in.

In this world, ‘complete markets’ can reconstitute the expression of everyone’s individual choices into a safe and prosperous outcome. Government can be minimal and simply uphold the property...
rights markets require. It is a seductive vision – both magically self-coherent and entirely insulated from any external limitations.

Yet, it is a model that denies that the complex systems of human society and global ecology have emergent aspects greater than the sum of monetizable parts. The decontextualized nature of the market system – in failing to recognize physical limits and in being generally ‘incomplete’ – is its weakness, but we have led ourselves to downplay – even deny – the significance of this. However, a society that elevates an incomplete market system to primacy under the belief that markets have ‘got it all covered’ dangerously disembeds its operating system from social and ecological reality.

We missed another warning from someone who saw all this. Karl Polanyi, like Bateson a polymath in an era that venerated specialization, cautioned in 1944:

“To allow the market mechanism to be sole director of the fate of human beings and their natural environment... would result in the demolition of society.” *(emphasis added)*

It is not that the market actually disembeds from society and ecology and becomes somehow safely detached, but, worse, that it remains embedded in society and ecology and transforms those foundations but with only a dull and blinkered sense of the damage it causes. It is left-brain thinking at scale. Bull in a china shop stuff.

Again, the risk of reductionism is its ‘single vision’ – markets as sole director of our fate. In a critical ‘sliding doors’ moment for human history, Polanyi’s warning was drowned out by Hayek’s *Road to Serfdom* of the same year, which was the launching pad for the neoliberal ideas that shape our contemporary world. Hayek’s ideology would be hitched to subsequent ‘complete markets’ theories establishing a sense of infallible markets to create the policy agendas for Reagan and Thatcher.

Today’s neoliberalism, deeply founded on the view of omnipotent markets, is what results when you apply scientific techniques suitable for analysing dead things to the living fabric of society and ecology, and ride them to their logical conclusion, without looking up along the way.

Bateson, again:

‘Epistemological error is all right, it’s fine, up to the point at which you create around yourself a universe in which that error becomes immanent in monstrous changes of the universe that you have created and now try to live in.’

Unwittingly, and through no-one’s explicit design, we reduced ourselves.

Perhaps it was unavoidable, but now we know. In elevating economic thinking to primacy, we wrapped a market part-world around us. In Ursula K. LeGuin’s phrase, ‘we live in capitalism’.
4.6. Right Brain Therapy?

Also alert to latest developments in neuroscience is American psychologist, Allan Schore, who has crystallized the implications for individual mental wellbeing in his concept of 'right brain therapy'.29

Rooted in new understanding of the role a holistic, emotionally dominant, right brain plays in supporting mental health it emphasizes empathic connection and the significance of non-verbal communication in achieving interpersonal awareness and understanding. It is effectively a program of rehabilitation for a right brain withered by modern culture.

Details aside, the very idea of a 'right brain therapy', from only 2009, is an interesting marker of where humans have arrived on their long journey of self-awareness. Only very recently have we been able to locate in one half of our brain certain of the functions deemed integral to mental wellbeing. But the very need for explicit restoration of right brain health is suggestive of its debilitation as a possible consequence of today's cultural arrangements. It suggests that normal life can induce a mental imbalance – a sort of cerebral version of the javelin thrower’s complaint – in which daily routines somehow build up one side of the brain to overpower the other, which duly falls into relative atrophy.

McGilchrist – who cites Schore’s work – does not use his term but leads us towards the idea that civilization’s largest problems might benefit from collective right brain therapy. Not, to be clear, in a forced authoritarian way, which would not work anyway, but in the sense that the scale and stubbornness of major problems simply may not yield to a more-of-the-same technological fixing mentality, but instead require deeper cultural rebalancing, through a ground-up awakening. Wishful thinking on my part? Perhaps, but cultural movements do, of course, happen.

Meta-Enlightenment?

Indeed, if we are willing to contemplate long-term cultural shifts, our much-feted Western Enlightenment starts to appear lop-sided – effectively one-brained.

Intriguingly, we use the term Enlightenment for two major cognitive developments: the Western Enlightenment of the 17th Century and the Buddhist Enlightenment of 5th Century BC. They offer strikingly divergent recommendations about how to be in the world. Western Enlightenment is about using reason for human progress, crystallized in a quantitative-based scientific method. Buddhist Enlightenment intuited that human striving is the source of unhappiness and that progress has treadmill or trap-like characteristics. The Western Enlightenment, right from its Baconian outset extolled an extractive attitude towards Nature – 'let the human race recover that right over Nature which belongs to it by divine bequest'. It is a worldview that leads one eventually to describe Nature as an 'asset' and as 'natural capital'. Buddhism does not even recognize Nature as separate.

Possibly the time is ripe for some Third Enlightenment – a meta-Enlightenment?! – which might reconcile why it is that humankind already has two major Enlightenments on the books. The current crop of humanists who marshal much data to plead the case for more Enlightenment seem trapped in our quantitative paradigm. The fruitful question is not 'how Enlightened are we', but rather 'how are we Enlightened'? In what way? Fittingly, a qualitative question, not a quantitative one.

If it seems frivolous to propose the solution to our problems is some new 'Age', as if such a thing might be produced to order, consider that the momentous recognition of the Anthropocene is exactly

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The question is not 'how Enlightened are we', but rather 'how are we Enlightened'?
the sort of event that might induce an Age. The crystallizing of the Anthropocene is a stunning milestone in the history of human self-awareness – ‘Oh, I see, we’re that big!’ Big enough to change planetary processes. Big enough that Earth is not the immutable backdrop we assumed it to be. Possibly, the only feasible response to such a profound reappraisal of our context is an equiproportional change in human cognition and self-organization. Indeed, with simultaneous advances in Earth sciences and neurosciences, our sense of the world and of the brain we use to navigate it, is changing rapidly and dramatically, with us sandwiched in between. It is impossible to imagine that human beings will not be deeply changed by current events.

Where Einstein said you cannot solve problems with the same sort of thinking that created them, what McGilchrist effectively says is that you cannot solve problems with the same brain hemisphere that created them. What I suggest from a lowlier perch, and what Kumar invited his LSE hosts to consider, is that we are unlikely to solve problems that have arisen from economic primacy with thinking that upholds economic primacy.

While our sustainability crisis presents as rising sea-levels, shrinking forests and disappearing species, the front line of our struggle is the corpus callosum that divides the human left and right brain. This is where our sustainability crisis will ultimately be resolved, or not.

*The front line of our sustainability struggle is the corpus callosum that divides the human left and right brain.*
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WELL, A LONG TIME AGO, WE FELL INTO THE HABIT OF THINKING DIFFERENTLY TO HOW NATURE WORKS...
5. WHAT TO DO?

So, what should we do?

Asks the left brain!

By this point, your left brain – logical and utilitarian – is desperate for practical suggestions, preferably with bullet points. Joking aside, I will indulge the left brain because the point is not that we need left brain lobotomies, but that we need to restore balance – to use both brains, not just the one we keep using.

Here are two ideas:

• Reverse our perception of primacy; and
• Create a left brain AND right brain culture, by revitalizing our sense of ‘public’.

5.1. Reverse the Primacy

We have got the primacy – between left and right, between economic and ecological – the wrong way around.

An important detail of the history of neuroscience is that the left brain was long deemed the superior hemisphere – an assumption now forced into reappraisal by McGilchrist, Schore and others. The left brain was accorded primacy because of its control of language and other higher-order faculties, such as analytical thinking, that most conspicuously distinguish us from our primate cousins. But it is now clear that the left brain can only do its beneficial work within the broader contextual awareness the right brain provides. If anything, primacy lies with the right brain upon which foundation the left brain is entirely dependent. It is the right brain that is the Master, the left the usurping Emissary.

The left brain can only do its beneficial work within the broader contextual awareness the right brain provides.

Schore, too, argues for the primacy of the right brain, which is chronologically foundational in the human lifespan. It is firmly in the driving seat during the crucial development period of infancy, before the slower-developing left brain comes ‘online’ and language skills are acquired. Moreover, throughout life, the right brain remains the dominant hemisphere for monitoring one’s own emotions and those of others’, and so for interpersonal connection.

However, and very curious this, the left brain seems entirely unaware of its dependency upon its neighbouring hemisphere. Their different ways of being in the world induce an intriguing asymmetry: a right brain alive to the connection in the world knows that it needs the left brain, while a left brain intent on division seems not to know that it needs the right brain. This asymmetry reveals itself in the general pattern of stroke cases. A right brain whose fellow left brain has suffered a stroke is likely to sense that something has been lost, while a left brain whose fellow right brain has been injured can carry on oblivious.
A similar asymmetry seems to repeat at the level of human culture. The broader vision of the ecologist has room to understand the role the economist plays, but the economist – and the businessman and the investor – do not seem to know that they need the ecologist.

Inside-out stewardship

Our market-centric culture has granted primacy to the economist, not the ecologist, which may be the wrong way around. Of course, we do have to ‘manage our house’ (economics), but we must also be mindful of the state of Nature’s house (ecology) and of how the management of our house at the local level affects Nature’s house at the global level. Economics talks a good game about understanding ‘externalities’, but the transplanting of its ideas into the real-world has spawned a culture that does not seem to want to do much about them. In getting the primacy and nesting wrong, we are stewarding our planet from inside-out rather than from outside-in.

Keynes, who would probably feel more comfortable with today’s systemic thinking than many other 20th Century economists, captured a part of the ‘inside-out’ problem in the relationship between the stock market and the broader economy:

‘When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done.’

Yet, this pattern repeats at the next level up: when the stewardship of our ecosystem becomes a by-product of the activities of the economy, the job is likely to be ill-done.

Put the layers together and our situation today is that we are managing the planet as a by-product of an increasingly frenzied stock market – one part automated algorithms, one part chat room raiders – which is virtually oblivious to environmental context even as it transmits the signals for how to allocate the financial capital that transforms the energy and matter of the world. The bull in the china shop does not even know it is in a china shop! A high churn stock market steers the economy that drags modern culture along behind, ripping up nature in its wake.

We have got our stewardship process precisely backwards. We have self-organized to manage from inside-out not outside-in.

What was meant to make this a safe – indeed the ‘best’ – way to organize was the left-brain inspired idea that an all-knowing ‘complete’ market had the power to ‘add back up’ all human knowledge and preferences to improve human wellbeing better than any other institution might.

Indeed, market advocates have sometimes likened the market to an ‘intelligence’. But if it is intelligent, it is very much intelligent in the way the left brain is intelligent: with a limited view of the world – a ‘part world’ – that it nonetheless believes is whole. McGilchrist has remarked: ‘the left brain doesn’t know what the left brain doesn’t know.’ By the same token, the market doesn’t know what the market doesn’t know, but we have told ourselves that it is all-knowing: ‘markets are the solution, government is the problem’.

The market doesn’t know what the market doesn’t know.
Information processing
One of the key arguments that promoted the superiority of markets was that the market is a better ‘information processor’ than the central planner – a crucial debate waged in the 1920s and 1930s. But that debate was premised on an earlier ‘flat’ conception of knowledge in which all knowledge might be equally important, rather than today’s nested perception of knowledge which recognizes many layers of local-global information.

Out of a commendable instinct for mutual respect, we have perhaps become too reluctant to deem certain people’s knowledge as more valuable than others. Not only does this deny genuine expertise, but it fails to grasp that ‘global’ knowledge may be superior to ‘local’ knowledge regardless of its beholder. The apprentice sailor sent up to the crow’s nest to look out for rocks and pirates had global knowledge of context to which the knowledge of his on-deck commanding Admiral was subordinate.

Markets are exceptionally good at processing the more ‘local’ parts of the world of which they have been made aware – your preference for tea versus mine for coffee. Market advocates are entirely correct that a centrally planned supermarket would be recipe for disaster. But human beings are now privy to much new ‘global’ – genuinely global – knowledge of which markets have no comprehension at all, only to find that our current narrative has foreclosed the idea we should correct markets! We are so conditioned to genuflecting before the Invisible Hand, no-one dares point out that the Hand is missing more fingers than not. The Hand is both Invisible and Incomplete!

Sustainability requires that we nest markets within a broader conception of human self-organization. Our challenge is not to build a sustainable economy but to develop a sustainable culture that has an economy.

The specific challenge for the ESG movement is to recognize that in acting as market participants, not only are they constrained by their form to make too weak a challenge of market structures, but they also daily endorse a deeper sense of market primacy as a sustainable form of self-organization. Efforts to become more sustainable must aim at changing culture – the totality of human behaviour – not just our economy.

5.2. Rebalance Culture by Re-legitimitizing Public
If the goal is cultural change, you might now be expecting that I will prescribe meditation, advise you take up art or poetry, or get out into Nature more often. Certainly, please do such things as they all amount to beneficial ‘rebalancing’ activities with demonstrated benefits for mental health. However, our real challenge is to scale up the insights of ‘right brain’ thinking beyond the minority of our time that we can often devote to such practices. Just as our left-brain mindset owes much to its reinforcement and amplification by left-brain-favouring institutions, so the key to rebalancing may be to rebuild and re-empower institutions that have, not always knowingly, upheld right brain behaviours.

So, now you are perhaps anticipating that I will recommend mandatory Church attendance, or similar. Again, please do, but somehow forcing everyone to attend Church hardly seems viable – though it becomes ever clearer what all that was about. Of course, the central organizing myths of religion crumbled before a sceptical modern mind, but in secular society’s withdrawal from religion, we have also withdrawn from the acts of congregation, ritual, prayer, moral reflection, even singing together, all of which, in different ways, cultivate or play on right brain faculties. Wonderfully, Oliver Sacks described the act of humans singing together as being almost a ‘binding of nervous systems’.

Our challenge is not to build a sustainable economy but to develop a sustainable culture that has an economy.
In a sense, a more secular society has thrown out the bathwater with the Baby and it was the bathwater that may have been the thing. The rise of systems science might yet lead Science to find Religion – its supposed nemesis. ‘Oh, so that is what it has been for all this time.’

Revitalizing ‘public’
Unfortunately, even if a renewal of spirituality and religiosity emerged, we may not have time to wait for its effects to take hold. However, if the putative benefits of such right-brained biased activities are to re-learn and re-appreciate the deep connectivity of our social and natural worlds, the secular institutions that can act upon that insight and can take steps to honour and protect the relational nature of our society and ecology are ‘public’ and public-affirming institutions – from community through civil society to the various levels of government.

If a left-brained culture has enabled – and been reinforced by – the ascendancy of the private-enabling market over non-market institutions within human self-organization, then we might attain a more sustainable culture by revitalizing the institutions left behind by that ascent. Indeed, before the ‘neoliberalism’ that has been ascendant for the duration of the ‘Great Acceleration’, there was an ‘embedded liberalism’ in which market and non-market institutions were more finely balanced.

Critically, the potential benefit of such a rebalancing is to reinvigorate those institutions that can complement the markets by standing up to them! The real value of government is its potential not to amplify market forces but to modulate them. This used to be more widely accepted, for example, in the notion that government deficits should be ‘counter-cyclical’ – that government ought to save for society when times are good and spend for society when times are bad – an idea that dates to Joseph.

However, today’s story is that the government should unleash market forces and then stand back. This was premised on the idea that the market was ‘self-regulating’ – in the complex systems sense, i.e. self-balancing. And, in many instances it is. If the demand for bread increases, the price of bread will rise inducing more supply so bringing the price back down again. The market ‘self regulates’ or rebalances, in this way all the time.

However, the market is not only self-regulating, but also susceptible to positive reinforcement loops that can become runaway problems. This was crystallized by Brian Arthur in 1990, when he identified that economic systems did not just exhibit ‘diminishing returns’ – or balancing loops – but also, quite commonly, ‘increasing returns’ – or reinforcing loops. This may have been hard to spot in 1990 but is now much easier to grasp in a world of ‘winner take all’ businesses and technology platforms.

Moreover, the possibility of reinforcing loops in the economic system can accumulate to make a reinforcing loop of the whole system! A telling marker is that our biggest problems – global debt accumulation, wealth inequality, climate change and biodiversity loss – all exhibit runaway, vicious spiral, dynamics. Because neoliberalism has granted markets primacy, and because markets are vulnerable to large-scale runaway loops, neoliberalism is effectively a runaway feedback loop of a human operating system in which large swathes of the global population are now swept up.

Neoliberalism has become a runaway feedback loop of a human operating system.
McGilchrist notes that the left brain, unlike the right brain, can become ‘sticky’ or set in its ways with the consequence that:

*The left hemisphere tends to positive [or reinforcing] feedback, and we can become stuck. The right hemisphere...is capable of freeing us through negative [or modulating] feedback.*

This happens this way around because the detachment of the left brain’s vision means that it can create loops for itself, sealed off from interruption or re-grounding by the real world. It is precisely the ability to decontextualize – which enables focus and the conception of exchangeable commodities – that also creates the vulnerability to runaway dynamics. Similarly, this capacity to disembled is at the heart of economics’ long denial of real-world limits.

While it is too simplistic to equate the market to the left hemisphere and the government to the right – government work involves much left-brain-type activity – the broader pattern is the thing. To the market’s part-world mechanics, government is the principal vector by which we can re-ground the market with our superior awareness of the state of social and ecological fundamentals. Hence, a revitalized sense of public – as a counterbalance to private – might be the only way we can resolve global ‘public goods’ problems that have arisen, perhaps inevitably, during a period of market primacy.

**Government is in the loop!**

The problem, as should now be clear, is that we have spun a narrative web for ourselves – ‘markets are the solution; government is the problem’ – that limits government intervention in markets. We have created a culture in which the role of government has been to support the market and governments now find themselves ‘caught in the loop’. The private market Emissary has usurped the cultural Master – no matter that the markets are entirely dependent on a ‘rule of law’ which only the Master can uphold!

Governments increasingly use economic performance – even stock market performance! – as a measure of their success, which negates their ability or even interest to counteract markets. Other loops are more tangible, still. For example, corporations use profits to lobby for lax regulations that enhance profits which can be used to lobby for more lax regulations etc. This dynamic – Friedman’s Feedback Loop, call it – has inexorably neutered government’s ability to improve human welfare by modulating market forces.

As these loops have run over the past few decades, so our collective capacity to act on any principle that conflicts with profit has diminished. It has been impossible to argue that we ought to value and protect our environment for moral reasons, not just monetary ones. And this larger discourse has ultimately forced an ESG movement into its increasingly implausible ‘win-win’ stance that we only need implement profitable projects to arrive at a sustainable culture.

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*Governments are caught up in the market loop; corporate leaders even more so.*
Can Economics Grasp What Ecology Says?

Can corporate ‘leadership’ work?
Perhaps even more trapped in the loops are corporate leaders, in whom such great hope has been placed. I, too, was hopeful for a long time, but have come to believe this is misguided.

Today, corporate leaders are so effectively bound by fiduciary duties, share-based compensation, and business norms that they are now among the human beings least able to provide leadership on global public goods problems even as their prominence makes them the focus of so much courting.

This is not necessarily a reflection of who CEOs innately are, but rather what our culture turns them into. Alas, the ascent to corporate leadership is a process by which men and women with leadership ability are transformed into profit-maximizing administrators. Less CEOs, more PMAs.

Ironically, this shackling of spirit was hailed at the dawn of market society as one of the great potential benefits of capitalism. Ambition and effort that in earlier eras may have found an outlet in violence and warfare could now be peaceably yoked to the market. It was described many times, before Keynes neatly summarized: ‘it is better that a man should tyrannize over his bank balance than over his fellow citizens.’ And, the Invisible Hand of complete markets, would ensure that all this ambition and competitiveness would be transformed into the best contribution a person could make for society, with no adverse spill-overs.

As with all dynamics of a complex system, balance is key, and this dynamic has created problems in its own extreme – all the tyrannizing over financial accounts has led to the financial tyranny of culture, in which it has become progressively harder for society to act upon any principle that is not profitable.

Corporate leaders are just the apex of a larger private sector community which now contains millions of people wondering why it is that business norms require them to make routine decisions at odds with social and ecological wellbeing. ‘Whose dumb idea was all this?’ is the merged thought bubble one can sometimes see forming over the skyscrapers of the City of London.

Possibly, the transfer of US leadership from Narcissist to Public Servant might disturb corporate leaders into some recognition of the shackles in which they are bound but breaking out will be difficult. Behind corporations is an investment industry, themselves heavily incentivized, that acts in aggregate as a global profit enforcement agency, quick to force any public company with dangerous ‘stakeholder’ ideas back into profit-maximizing line.

And behind the investment industry stands millions of savers and pension fund holders who check their quarterly statements hoping for higher, not lower, financial returns. We are all chained into an unsustainable system, but we then expect those most bound by its logic to lead the way out.

The intrinsic problem is that ‘public’ is an expression of collective will and action. Its great impediment is the risk that some will free ride to their relative advantage and to the detriment of the public intention. Our private-favouring culture has fragmented some of its genuine leadership talent into siloes of business that inhibit the development of collective action that might re-legitimize public. The only way corporate leadership might work is if they plot to break out together to revitalize public interests out of some broader shared sense of real leadership that goes beyond the faux leadership of maximizing shareholder value.
These private sector challenges are a subset of the challenges of society writ large. The broader issue is that a free democratic society can only respond to any new ‘global’ threat or emergency if a majority understand - and accept - the problem. Hence, the educational work of the IPCC, Al Gore, Cristiana Figueres, David Attenborough, Greta Thunberg and many others has been so critical – even as they have had to suffer insults from those who would shoot the messenger.

We essentially need both to educate ourselves about our sustainability problems and to educate ourselves to accept the problems. For all that we extol the Scientific Revolution, we have not had the accompanying Acceptance Revolution it would seem to require. The nature of scientific advance is that we will inevitably find both good and bad – for every fortuitous discovery, an ‘inconvenient truth’, yet these receive vastly different welcomes. We race to embrace benign discoveries and adopt the technologies they enable, but we resist inconvenient truths with their demands for us to change or unlearn. Our capacity to accept the discoveries of our scientific advance has not kept pace with our ability to make such advances. Our ‘intelligence’ is surely a function of both.

Which brings us back to the key institution that is education and all the way back to Satish Kumar’s advice for LSE. For, one way to promote understanding – and acceptance – of our world, is to aggressively accelerate systemic and relational thinking at all levels of society.

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Our capacity to accept the discoveries of our scientific advance has not kept pace with our ability to make such advances.
6. CONCLUSION

I sincerely hope LSE consider Satish Kumar’s suggestion. It feels as if there is some institutional, civilization-bettering, leadership up for grabs. I do not mean to slight well-established centres of ecological economics – at universities of Vienna, Vermont, Leeds and at Kumar’s Schumacher College among others – but for one of the top 10-ranked economics universities to embrace ecology on ecology’s terms might stimulate thinking and action well beyond its walls.

I might even up the ante and suggest that such a step might soon be a reputational necessity as a systemic reappraisal of 20th Century economics is likely to be harsh. The world’s economics departments and economics-based business schools are fast confronting a legacy and credibility challenge.

A ‘Systemic Spring’ is beneficially propelling systemic thinking up the disciplinary stack via multiple disciplines’ embrace of complexity. The ease of modelling and comprehending complex systems will only increase as the ability to run agent-based computer simulations becomes ever quicker and cheaper. A developing Systemic Spring in human thought may be the remedy for the ‘Silent Spring’ of which Rachel Carson warned.

Systems thinking is already seeping into economics. Behavioural economics was an early infiltration. Narrative economics grasps that, because we cannot not respond to theories about ourselves, social science is always, in part, ‘social story’. Brian Arthur’s work on increasing returns and non-equilibrium economics have been critical contributions. Kate Raworth’s Doughnut Economics applies modern systems thinking to recontextualize economics within real social and ecological parameters. Also thinking systemically, Mariana Mazzucato has urged us to see that much of our celebrated private ‘value-creation’ is highly dependent on less heralded public value-creation. Ole Peters’ ergodicity economics threatens to knock away one of the reductionist-inspired pillars supporting considerable amounts of economic theory. Essentially, in the plumbing of micro-economic theory, there is an assumption which is a perfectly good way to model atoms but – you may not be surprised – not so good for humans.

Systemic thinking will not only enhance economics’ ability to understand issues it already cares about – an intra-economics gain – but it will also force the discipline to a new meta-economic awareness of its nested position relative to other disciplines. This will mark a welcome reversal from the hubristic ‘economic imperialism’ that led certain economists to believe they had answers not only for their field, but also for other fields too. In reality, economics is a reductionist carve-out of commodifiable pieces of the larger complex systems of society and ecology.

These are all exciting and potentially civilization-improving developments. The small price to pay is they will cast a harsh light on some of the economic terrain we have passed through and on some of the economic thinkers we have celebrated – and upon the mindsets of those who feted them.

Future students may wonder at what point economics split off to become an ‘allocative science’ that unleashed its part-world view. Well, a key milestone was Lionel Robbins’ 1932 Essay on the Nature and Significance of Economic Science. Where was he Chair, again?
Future students might wonder how it was that a theory of complete and superior markets made the jump into socio-economic reality. Well, a key architect was Friedrich von Hayek. Remind me again, where did he lecture?

But this is just mischief-making to stir urgency. One could as easily needle other leading economics departments – Milton Friedman and James Buchanan had institutional homes, too. To be more charitable, this is the work of cultural tides greater than any individual or school. It may simply have been unavoidable that a Scientific Revolution that unlocked a powerful reductionist method could have averted the mass specialization that followed. Too many rabbit holes opened that were too interesting not to explore. But the larger cost is that generalists with non-singular vision have been elbowed aside and their bigger – necessarily blurrier – systemic pictures debased within the academic firmament. Ecologists have been among the most misunderstood.

Satish Kumar’s provocative idea was of course good rhetoric for a lecture, but name changes alone cannot achieve much. They take time and risk being merely symbolic – see the corporate world for examples. More meaningful and more actionable is to commit to develop the research and pedagogical capacity to bring ecological thinking not just into LSE but into all economics departments and business schools. Assuming such institutions know something of competition, they might ponder if it is not them who takes up the opportunity of the day, will it be one of their rivals?

Indeed, I wonder for how much longer it will be tenable to offer economics as a program without a prerequisite course in ecology or meta-economics. Economics is a very powerful way of thinking that has many spill-over consequences beyond its boundaries. We may not want future practitioners of economics to be oblivious to those consequences any more than we want operators of heavy machinery not to understand the potential hazards of their own Earth-transforming equipment.

However this may happen, the first point to impress upon the students at a School of Ecology and Economics is that the two disciplines are different in nature because they represent two different ways of ‘attending the world’, both of which are valuable, but which seem to have fallen out of balance. Neither, in itself, is right or wrong, but what may be wrong is not to pay them equal attention. Until our culture is clearer on the significance of their difference, we are unlikely to be successful stewards of the global ecosystem or to have the long future we might.

‘Ceteris paribus’

... ‘When we try to pick out anything by itself, we find it hitched to everything else in the Universe.’ ...

And so, we begin...

Duncan Austin has had a 25-year career as a sustainability researcher and investor. In 1995, he obtained a MSc in Environmental and Natural Resource Economics. Oh, well. He writes as an independent. (dja@bothbrainsrequired.com)
“Change is always in the last resort a change in the habits of thought.”

Thorstein Veblen
REFERENCES


2 Garrett Hardin, like several prominent figures of his era, is now a controversial figure. On the one hand, he crystallized certain universal insights, such as the 'tragedy of the commons', but, on the other, held some repugnant racist views. As did John Muir and Woodrow Wilson. The list goes on: Konrad Lorenz, the giant of 20th Century animal behaviour was a Nazi, as was the philosopher, Martin Heidegger. I think the only viable approach is to separate ideas from whole personalities and to uphold – and reference – those ideas that still have merit and condemn those that are abhorrent.


10 From the introduction to the 2001 GHG Protocol report: 'Many governments are taking steps to reduce GHG emissions through national policies...'; 'companies... will need to comply with national or regional policies aimed at reducing corporate GHG emissions...'; and 'The GHG Protocol... will help companies better understand their own position as regulatory programs are debated and developed...'


13 McGilchrist. Page 32.

14 McGilchrist. Page 34.


16 McGilchrist. Page 68.


19 McGilchrist. Page 70.

20 The illustration is intended merely as an aide-memoire. In fact, the manner in which left and right brains perceive and attend to the world differs in many respects beyond just visual. Also, illustrating 'left' and 'right' visions presents a challenge of exposition. The left brain actually 'sees' the right-hand side of the visual field and vice-versa. That is, the left brain does not see with the right eye, but with the right half of both eyes! So, the illustration should probably be flipped left-to-right to be more accurate. However, as drawn, it is more intuitively left and right for the lay reader, and aligns with the discussion of 'economics versus ecology', 'parts versus patterns' etc.


Wheeler. Page 170


Schore. Page 170


McGilchrist. Page 162


For a recent summary, see: Arthur, 'Foundations of Complexity Economics'.


Milton Friedman’s central role in the elevation of today’s neoliberalism is well-known. James Buchanan’s influence has been less recognized but is laid bare in Nancy MacLean, *Democracy in Chains: The Deep History of the Radical Right’s Stealth Plan for America* (Penguin, 2017).