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Triple helix selection in the regional innovation systems field. In memoriam: Loet Leydesdorff

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Abstract
My first academic collaboration with Loet was in 2002 when we had been invited to provide the guest editorial for a Special Issue of *The Journal of Technology Transfer* (JTT). The occasion for this was a conference held in San Sebastian-Donostia and was entitled 'Technology Transfer in European Regions'—Leydesdorff et al. (J Technol Transf 27(1):5–13, 2002). The issue contained a number of case studies of 'regional innovation systems' within the European Union. Other papers elaborated on the pros and cons of the systemic approach to 'technology transfer' processes involved, or made comparisons across regions. In this introduction, we editors discussed the relations between regional policies, technology and innovation policies, and the integration of these different aspects into (potentially) regional systems of innovation. 'Technology Transfer' was less dated a concept than now, not least because technology 'learning' in those days was much more about getting hold of usable technology. Later it became, first, 'knowledge transfer' then by 2010 'knowledge management' and after that, a whole new industry of 'knowledge intensive business services' (KIBS) had grown, subject by now to its own widespread critiques (Bogdanich and Forsythe in When McKinsey comes to town: the hidden influence of the world's most powerful consulting firm, Bodley Head, London, 2022).

Keywords Regional innovation systems · Triple helix · Evolutionary systems · KIBS · Assemblage theory

Introduction

It is a sad pleasure to write this contribution in memory of Loet Leydesdorff's demise for his valuable work on evolutionary theory, sociology of science, the knowledge economy, and scientific communication. I first became familiar with an important strand of Loet Leydesdorff's multifold intellectual interests and thinking in 1996, when a preview presentation of his book on the knowledge economy by Etzokwitz and Leydesdorff (1997) was first presented. It was possibly in the first Danish Research Unit for Industrial Dynamics

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(DRUID) conference at Copenhagen Business School, on innovation and the dynamics of structural, institutional and geographic change. I had a long-established friendship with DRUID's key animator Peter Maskell, dating from more than 10 years earlier, when our group of radical regional scientists used to meet in various locations, mainly in Denmark or one of the Greek islands. The Danish seminars were funded through numerous largely public funding streams for social scientific research. The Greek government, in those days, could also be persuaded to fund such ventures through its Foreign Office, provided the chosen venue was in sight of the Turkish frontier, demonstrating the strategic value of those islands to international academic deliberations. So, government and academia were seen to be co-operating in nascent knowledge economy research from the mid-1980 s if not earlier. But 'industry'—at least in Europe—remained leery of supporting projects which were likely to be critical of its interests. Though perhaps less in the USA where Henry Etzkowitz and Loet may have found more welcoming benefactors, at least in the form of the Foundations, like the Ford Foundation with its Bellagio retreat in Lake Como.

However, Loet and Henry had possibly spotted early that the times they were a 'changin'. This was interesting because our European research on the comparable phenomenon of regional innovation systems (RIS; Cooke, 1992) was more geared to exploring the growing influence of government funding of 'innovation' which was until then mostly eventually conducted by industry, although beginning increasingly, at the pre-competitive stage by some universities. Accordingly, our RIS studies—even in dynamic growth regions like Baden-Württemberg—were open to mild criticism for tending to emphasise the public nature of policies in support of regional or even national innovation systems at that time. Clearly this was mis-placed criticism since that was an accurate description of the still-prevailing intervention policy arena. Only in Cambridge was private risk investment significant in the UK long after Milstein and Köhler's 1975 discovery of monoclonal antibodies had been patented at the Wistar Institute in Philadelphia by Hilary Koprowski from reading a *Nature* article about it. 'Layering'(Thelen & Mahoney, 2010) was actually understandable in situations where the standard reasoning by industry was that businesses had paid their taxes and it was the government's (national or regional) responsibility to fashion support policies to further industry's capabilities. Hence new policies were perceived by governance agencies as necessary to fulfil the new innovation 'mantra' for 'regional competitiveness'.

This meant calling forth new policy 'layers' (Thelen & Mahoney, 2010) on top of older ones in support of traditional interventions like training subsidies for worker skills development, reconversion of declining industry or attraction to regions of foreign direct investment (FDI). Thus in the early studies of pre-figurative or actual RISs (Braczyk et al., 1998; Cooke, 1993), I had found a relative absence of University-Industry relations, other than on skills enhancement. In the early regional test-cases such as Nord-Pas de Calais in France, Basque Country in Spain and the aforementioned Baden-Württemberg; technology agencies dominated the limited innovation support 'handlers' in the RIS rather than universities, which were either considered wholly irrelevant for other than teaching, or not producing acceptable quality of research. Thus the likes of the *Steinbeis Foundation*, in Baden-Württemberg, was often centred on single expert teachers in *Fachhochschulen* rather than university research teams. Otherwise industry association networks like *Fraunhofer* for applied research or *Max* Planck Institutes for basic research were preferred. In France, small branches of Paris-headquartered research institutes such as INSERM (medical) and INRA (agronomy) were active, mainly with SMEs in the Lille *Cité Scientifique*. In the Basque Country LABEIN and the other five Technology Centres intermediated industry innovation, funded by 'generic' and 'specific' innovation funds from the Basque Ministry

of Science and Technology, again to support SMEs. And in Baden-Württemberg, *Steinbeis* interacted with SMEs and *Fraunhofer* mainly with the *Mittelstand* and larger entities. So, effectively Henry and Loet were extolling an American model based on MIT and Stanford, which later became somewhat more widespread, but is still by no means ubiquitous. I underlined this and generously, Loet agreed, in our joint guest editorial to Cooke and Leydesdorff (2006)

Collaborating with Loet Leydesdorff

This collaboration had not been my first with Loet; in 2002 we had been invited to provide the guest editorial for a Special Issue of *The Journal of Technology Transfer* (JTT). The occasion for this was a conference, led organizationally by Mikel Olazaran of the University of the Basque Country where he was a sociologist of science, one of Loet's research specialities. It was held in San Sebastian-Donostia and was entitled 'Technology Transfer in European Regions'—Leydesdorff et al. (2002). The issue contained a number of case studies of 'regional innovation systems' within the European Union. Other papers elaborated on the pros and cons of the systemic approach to 'technology transfer' processes involved, or made comparisons across regions. In this introduction, we editors discussed the relations between regional policies, technology and innovation policies, and the integration of these different aspects into (potentially) regional systems of innovation. 'Technology Transfer' was less dated a concept than now, not least because technology 'learning' in those days was much more about getting hold of usable technology for almost instant implementation in pre-existing, still mainly manufacturing industry, than it has since become. It is hard to date, but by around 2007 it had become, first, 'knowledge transfer' then by 2010 'knowledge management' and after that, a whole new industry of 'knowledge intensive business services' (KIBS) had grown.

Whereas 'technology transfer' could normally have been arranged by going to the appropriate technology centre, like LABEIN in Bilbao, and simply having the IT software explained and demonstrated to you as the SME representative of, say, a machine-tool firm, later it had risen in scale. Thus by the time the process had become the province of KIBS, the 'customer' might have had to engage the likes of McKinsey & Co to arrange the half a million Euro contract to acquire the proprietorial knowledge directly from the management consultancy in the form of 'advice'—often with recurring contracts to follow. Nowadays the transaction costs have become so massive in the academically long-predicted 'knowledge economy' (Cooke & Leydesdorff, 2006) that fears of declining market share are increasingly being experienced. But even more damning of the Big 3 (McKinsey & Co., Bain & Co. and Boston Consulting Co.) KIBS firms' reputations are the widespread penalties in the form of fines for corruption, money laundering and offshore tax evasion in tax havens they routinely preside over in global court systems (Bogdanich & Forsythe, 2022; Mazzucato & Rawlinson, 2022). So, already by 2006 our Symposium Special Issue of JTT (2006) which originated from a conference hosted by Memorial University, St. John's, Newfoundland, Canada entitled 'Knowledge-Based Economy and Regional Economic Development: An International Perspective' was sponsored by *inter alia*: the government of Newfoundland and Labrador, the Atlantic Canada Opportunities Agency, and the Atlantic Provinces Economic Council at provincial level; and at federal level by Industry Canada and Human Resources Canada. We pointed out that hitherto 'knowledge' had hardly been studied by economists, except that some of the big name theorists like Marx (commodification of knowledge), Schumpeter (new combinations of knowledge),

Marshall (knowledge is our most powerful engine of production) and Hayek (the division of knowledge is the really central problem of economics)sometimes placed but seldom studied it at the uppermost levels of economic analysis But it finally earned a place in the spotlight with Paul Krugman's Nobel Prize in 2008 for clearly 'defining the returns to knowledge from localised knowledge spillovers' (Krugman, 1995).

Thinking of some of the things with which Loet had been involved in regarding pedagogy, joint writing and presenting, as long as his health allowed, I noted, first, that he had been instrumental in establishing the *Triple Helix* journal in which he had published an article with a long-time contributor (Leydesdorff and Lawton Smith 2021) to the journal—*European Planning Studies*—I had been a founder of in 1992. Almost uncannily, I found that I had recently also written things that echoed what Loet's recent contributions had been implying. For instance where he and colleagues, in a joint article on 'Contributions to an Evolutionary Theory of Citation' (Leydesdorff et al., 2022), they had written: 'Selection is deterministic, whereas the variation in historical phenomena can be stochastic.' Later on, the work of evolutionary economics Nelson and Winter (1982) is cited as: 'The heart of the conceptualization problem……. was to characterize the generation of innovation as purposive, but inherently stochastic'. In response to a reviewer of a recent contribution of mine, asking how I 'selected' a particular, apparently 'left-field' process to study for the paper in question, I wrote: 'It begins with a non-random walk such as one that might resemble an Instagram search. In the approach adopted (1) the data mines are excavated by a spark of interest (or hypothesis) that a lead may be found…..' (Cooke, 2023). Clearly, though the language is different, I was actually thinking of Monte Carlo simulation as a metaphor for my selection process, the processes are of a compatible nature (Frenkel et al. 2017). Their apparent difference lies in their use of 'stochastic' and my use of ostensibly the opposite-'non-random walk' (or non-stochastic)—process.

However, further thought reveals the 'selection' of 'a lead' cannot be a purely 'stochastic' process, but rather as Nelson and Winter (1982) go on to refer in the Leydesdorff et al. (2022) contribution, as the 'basin of attraction' of a likelihood function and, as they indicate Nelson and Winter's(1977) '….. earlier focus on deterministic selection environments was thus abandoned'. This had to happen as, practically, to remain 'purposive' implies some degree of selection constraint, albeit non-determinate. My underlying conception of innovation is that it is better described as semi-random but can often be unexpected. This chimes with literature Loet and his co-authors refer to by their—and my—colleagues in the Evolutionary Economic Geography Group at Utrecht University (Boschma et al., 2014). These pioneered the Dutch School of Proximity Studies, which conducted extensive international research into the theoretical concept that both innovation and entrepreneurship were intimately realised through 'related variety'; in other words an empirical vindication of Krugman's theory of 'increasing returns from localised knowledge spillovers'. They also admitted to a thesis I agreed with that 'related variety' could occur as 'revealed related variety' or mutations from non-proximate but cognitively-related applications. Famous examples are 'fly by wire' steering of aeroplanes pioneered in Formula 1 motor racing, missile guidance micro-camera technology repurposed as Pill Cam, an alternative imaging–by-swallowing endoscopy diagnostic and cereal milk drinks (e.g. 'Oatly') derived from diabetes insulin diagnostics.

Mention of the Utrecht PEEG group reminds me of my extended honorary interlude in the same department in 1988 when I was invited to accept the Belle Van Zuyl visiting chair in economic geography. My commute to De Uithof, the campus complex on the edge of the city where I worked, took me daily from Lidth de Judestraat in the inner city where I lived, past the famous modernist house of Gerrit Rietveld, built in 1924. This

white cube, which I visited on numerous occasions, also looked like a painting by Piet Mondrian, the Dutch artist whose work was similarly marked and furnished with chairs and decoration in bold, primary-coloured lines. So striking was this leading example of modernist architecture that I persuaded the publisher of the book I wrote while carrying out my chair duties, to place a photograph of the Rietveld House on the cover of the book as an example of the 'Modernity' that was in 1988 transitioning to 'Postmodernity' but emphasising the sense of 'Locality' that characterised postmodernism's critique of the ultimately meaningless 'International Style' that had hitherto prevailed. In researching this contribution, I found that in 1969 Loet Leydesdorff began his academic career after graduating with a B.Sc. in Chemistry, working as part-time professor in chemical technology at the *Gerrit Rietveld Academie* in Amsterdam. In 1966, the Rietveld Academy Building designed by Gerrit Rietveld was completed. That year, the school was renamed the Gerrit Rietveld Academie, as a tribute to Rietveld, who had died in 1964. Students seeking to be admitted to that Academy are expected to be receptive and self-reflective for the underlying purpose of discussing ideas and concepts. The Rietveld Academy, as it is also known is an art academy. It was founded in 1924 and offers programs in fine arts and design. I won't make the obvious comment, but it is clear why Loet and I saw eye-to-eye very well.

Future possibilities for the health of the field

One of the great successes of Loet's scholastic career must have been the founding of the Triple Helix Association and, later, its 'Triple Helix' journal in 2013 (Amaral et al., 2023). As the authors of his Triple Helix Association obituary note, it was successful because simple for non-academics to understand, believe in and act upon. It was thus popular with innovation intermediaries, consultants and government agencies because it was rooted in a perspective, particularly familiar with future-oriented policies embedded in the functionalist sociology of Merton, Parsons and later the German sociologist Niklas Luhmann. This meant it was based in sociological consensus theory, where the Triple Helix somewhat unproblematically brought together the master institutions of University-Industry-Government to craft innovations. Moreover, there were many research articles in the Triple Helix journal and others extolling the approach for innovation policy-making if less on the outcomes of such policy. To be fair, the same could be said to an extent of the RIS concept, more especially for its 'institutional bias' which latterly led to a rise in advocacy for 'agentic' study of *individual* innovation actors or 'leadership groups' (particularly after the rise of such techno-entrepreneurs as Larry Page, Sergei Brin, Mark Zuckerberg at Google and Meta; until 'darker' agentic leadership in the form of Vladimir Putin's, and lesser, populist leaders' deviations and devastations became evident. The functionalist variant of Triple Helix thinking was perhaps more Henry Etzkowitz's position than that of Loet Leydesdorff's according to Amaral et al. (2023) description of why there was a hiatus in their joint work from 2003 to 2015, differentiating:

> '….Etzkowitz's neo-institutional perspective focusing on the relations between university, industry, and government, and Leydesdorff's neo-evolutionary perspective regarding the helices as selection mechanisms…… Etzkowitz proposed the concepts of knowledge, consensus, and innovation spaces to better account for the mechanisms of university-industry-government interactions. On the other hand, Leydesdorff

provoked the triple helix functions of knowledge production, wealth creation, and normative control as mutual selections that shape a trajectory as in a coevolution (Amaral et al., 2023).

However, despite this, such institutional structural versus technically functional divergence are presented as complementary, or more measurable by Leydesdorff's later work as:

'Loet made academic efforts to measure the interaction between the actors, which would be the way to understand and apply Triple Helix…(and)….. provides a better operationalization of the mechanism of 'taking on the role of the other' proposed by Etzkowitz' (Amaral et al., 2023).

However, subsequent efforts to include a multitude of societal interests in their multiple helices could be argued to constitute 'infinite regress' (Occam's razor problem) from clarity of purpose.

What's happening? An uncertain future?

A final part of my task is to say what other strands of theory and research offer promise for the future health of the innovation and regional development domain. I have mentioned the 'agentic turn' which is popular although clearly socially and politically controversial, following its provenance in the 'leadership' paradigm which was early in adoption in many business schools programmes. But specifically, it critiques the now evolved meta-institutional 'path dependence' school of regional change by pointing out how little of it attends to the 'agentic' processes of regional economic change 'in direction'. This also connects to the earlier mentioned 'related variety' perspective on the same and other distinctive *firm-level* processes under investigation. Thus 'Agentic' research (Jolly et al., 2020:

'…….foregrounds how actors construct and exploit opportunity spaces for regional development by identifying change strategies and demolishing, renewing, and building new structures. In this, we focus on three types of change agency: Schumpeterian innovative entrepreneurship, institutional entrepreneurship, and place-based leadership (Grillitsch & Sotarauta, 2020; Van Grunsven & Hutchinson, 2016).

Such an approach, given the influence over innovation and regional path dependence by the aforementioned owners of Big Tech like Alphabet, Amazon, Meta and Tesla is irresistible for economic geographers whose primary object of interest is 'agglomeration change in economic space over time' such as the transformation of a 'car cluster' (see below). It is also instructive to establish whether such oligarchs can be reined in and controlled. Alternatively it is important to know if oligarchic practices can be shown to be inferior to more 'associational' models (Cooke & Morgan, 1998; as in the case of Elon Musk's 'DOGE' role in the second Trump administration). The absence of regulation by which such social media and related firms that are habitually outside the normal controls of illegitimate social practice gave rise to 2023's Artificial Intelligence (AI) Summit at Bletchley Park in the UK. There—truly 'blaming the victim'—Mark Benioff, head of cloud computer giant Salesforce blamed governments for their 'mistake' in not regulating

social media and placing restrictions on the development and use of AI. Like an infant toddler, he called for 'guardrails' which would have prevented firms like his from going 'awry' regarding unregulated social media in healthcare, elections and public policy (Prescott, 2023). Such insouciance from a Big Tech 'agent' is breathtaking but pathological cynicism was also close to the surface. For example data miner Palantir's chief executive Alex Karp said the UK was the ideal location for the regulator due to its 'common law framework, pragmatism and entrepreneurial culture' but Palantir is in line to win a £500 million data management project for the UK's National Health Service. Yann Linn, chief AI scientist at Meta accused leaders of AI companies of blatant'corporate lobbying' and aiming to capture the AI market (Prescott, 2023). Against the anxieties of AI academic pioneers like Turing prize-winners Geoffrey Hinton (Toronto University), Yoshua Bengio (Montreal University) and Yann LeCun (New York University) such are the conflicts in Triple Helix realities.

Finally, I will simply outline my present interest in theory underlying some of the largest global development projects—most of them echoing the four main strands of intellectual interest expressed in Loet Leydesdorff's work, namely; evolutionary theory, sociology of science, the knowledge economy, and scientific communication. The last-named interest affects all academics' 'performance indicators' as well as 'influencer' identities, and social media products and services through its use of 'surveillance', 'attention' and 'celebrification' to sort and rank us all. However, the theoretical approach, which is slowly but steadily gaining traction in spatial science, is 'assemblage' theory. This has origins in social philosophy, elaborated first in the work of Deleuze and Guattari (1987) where they call the assemblage 'a body without organs' (BwO) as in the sense of a 'corporate body' as an entity, self-organized, imagined by collective or singular agency (once conjured into existence), to represent and in reality a form a complex system with a specific purpose. Thus it is unlike a human body in that it has no organs but it has a motivating energy in what it *desires*. These 'agentic' desires motivate all action, being shared by non-human as well as human entities (agents) through what Kant called 'affective potential'. 'Information wants to be free' said Stewart Brand, famously, to Steve Wozniak at a Hackers Conference in 1984 (Brand, 1987). That is, the body in question is held together by a common integrative attraction. It is paralleled analytically by the 'abstract machine' of institutional-organizational, empirical, 'territorial' structures, infrastructures, buildings and technologies. These can be analysed empirically and historically with a view to understanding the evolutionary processes by which territorialization, re-territorialization and de-territorialization (e.g. of a 'car cluster', like Detroit) occur. Does it occur friction-free (as in 'digital twins', see below) or suffer development blockages. To illustrate, an 'abstract machine' might be a power generation and distribution system, once envisaged by an Edison-type 'agent' and his various 'handlers' that implement his innovation(s). Contemporaneously, it might be an Elon Musk-type agent animating the re-territorialization of a historic 'carbonscape' into an 'electroscape' of electric vehicle (EV) production. But he also founded and integrated the 'affective potential' of OpenAI, which became one of the leading AI research labs alongside the likes of Google's DeepMind for prominent AI research advances. Its mission is still to be the first to create artificial general intelligence (AGI)—an algorithm with the deep learning and reasoning powers of a human mind. This needed Musk's *desire* to avoid the dangers of the feared 'evil dictator' trauma of AGI's potential to be catastrophic without the benevolent guidance that Musk believes to be vital. He left Open AI on moral grounds after a dispute about 'open source' access to competitors as part of his adherence to the philosophy of *effective altruism* (MacAskill, 2016)—'get rich to give it away'

after Microsoft invested a (prescient) $1 billion research credit in OpenAI to spite Google (Cooke, 2021).

Returning to 'assemblage': if we consider Tesla's Gigafactory (1) at Reno, Nevada the Union Pacific Railroad (UPR) transcontinental railway runs through its axis of production and assembly which includes suppliers in Michigan and Ontario, the Nevada lithium ion battery (LIB) plant and a variety of Tesla Electric Vehicle (EV) manufacturing points along the UPR. These occur at brownfield assembly and supplier facilities and distribution centres at Livermore, Lathrop and Fremont in California. Fremont is the main assemblage location as the 'electroscape' transitions from the redundant 'carbonscape'. All the main sites are recycled oil-era automotive assembly factories, Fremont being the former GM-Toyota joint venture intended to enhance American automotive assembly by learning Japanese production techniques and transfer of small car design competence to the US. The New United Motor Manufacturing Inc. (NUMMI) plant opened on an old 370-acre GM site in 1984, some 22 years after GM built it. In 2010 Tesla took possession of the site that GM had auctioned to Toyota on dissolution of the NUMMI partnership in 2010. The other plants at Lathrop and Livermore had also been bought with state reconstruction funds from GM. The urban planning implementation followed production, as elsewhere. Thus, in Warm Springs, a suburb of Fremont, an old UPR railyard was transformed into an 'innovation district' including a 'Tesla campus' with an advanced manufacturing plant and an 'innovation cultivator' for technology start-ups in cleantech, life sciences and advanced manufacturing. Fremont and its new Warm Springs Bay Area Rapid Transit (BART) interchange was the centrepiece of a sustainable 'assemblage' for the future, facilitated with urban developer Lennar and the Fremont Economic Development Agency. So 'effective altruism' is a two-way street for Elon Musk; the Shanghai and Berlin Gigafactories (3 and 4) emulated the goods and employee infrastructural, brownfield, urban labour density, economic development assistance and loan facilities with heavy AI robotics investment in the other such 'assemblage' developments.

Conclusions

I last saw Loet Leydesdorff at San Francisco International Airport in July 2015, waiting for the same KLM flight to Amsterdam, connecting *me* home to Cardiff. We exchanged a few words but I could see Loet was working on his completed presentation at the *Society for Open Innovation, Technology, Market and Complexity* (SOITMC) conference held in San José, with his co-presenter, which was later published as Leydesdorff and Ivanova (2016). It was on 'Open Innovation' and the 'Triple Helix' as potentially 'synergetic' and more to the point, interactively 'measurable'. It would be difficult because new entrants, particularly small, independent research laboratories had proliferated to conduct innovation research for customer firms as Henry Chesbrough had reported from his recent IBM study (Chesbrough, 2003). This asset might not be patented or even registered as research—and what kind of research?—in the new, exploded 'ecosystems' that had mushroomed in this knowledge market, especially in and around the Silicon Valley. But it seemed that, in theory, it would transform the neo-institutional edifice of the Triple Helix but lead back to the 'Occam's razor' problems discussed earlier. Accordingly, the 'knowledge economy' transitions into an Industry 4.0 form of algorithmic control (e. g. 'digital twins') and even a renewal of interest in the West in 'de-globalisation' of manufacturing by 're-shoring' it. This is because of perceived dangers of military and industrial espionage, data hacking

and undermining of democratic institutions, like elections, free speech, disinformation and the Turing prize-winner anxieties about 'rogue' AI from home and abroad. Accordingly, there may be more societal concern about the wave of 'Peak Innovation' having broken compared with the rising optimistic tide of the Triple Helix era. When it comes to industry advice, even the aforementioned management consultants, who really grew to KIBS global scale as 'knowledge intermediaries' have had their reputations tarnished while helping, expensively, usher in the 'dark factories', 'darkened offices' and 'dark kitchens' of robotised production, data processing and Deliveroo or Just Eat food delivery. Had I engaged in a longer conversation with Loet it would have been to tell him what I thought was the most interesting thing I saw on our field visits to Apple's' Infinite Loop' HQ and that of the Googleplex, to see if he agreed. It was the quality of the horticulture in the style of Dutch plantsman and landscape architect Piet Oudolf, designer of the Highline Park in New York City and the Lurie Garden Millennial Park in Chicago and who revolutionised garden-design worldwide, that surrounded both campuses, echoed in our San José hotel. In passing, I would have shown him the couple of ears of corn-like purple fountain grass in my pocket that successfully seeded for transplanting to Cardiff where I would finish that journey.

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