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Walking to the Restoration

A few months ago, the word *restoration* took up residence in my mind and began setting roots there. In the manner of an oak in a field, it rose above the other words around it, kin to wider things, like the horizon and the Earth's turning. It was sure of itself, this word, spreading in a constellation of directions, commanding my thoughts, bearing the energy and authority of something whose time has come.

Perhaps what drew me is what it's not – new or technological. Restoration is no one's innovation. It's also not 'environment', a word I find problematic. If the aim of a word is to speak for its subject, to lend an appropriate feeling for it, environment fails. Try as it might, it can't reach beyond its political confines into the depths of the actual living world. Instead, it functions like an ideological marker, partitioning people onto one side or another of an increasingly dangerous divide. Perhaps it's the vacuum left in the wake of this unfortunate word that allows *restoration* to emerge so succinctly, to be the oak in the clearing.

The more I circled it, the more it revealed its universality. There is no end to what you can restore. In addition to land, you can restore health, trust, balance, justice, democracy, civility, vision: all of which seem broken today. You can restore a river and you can restore a Model T. A farmer distrustful of 'environmentalism' might welcome a conversation about restoring fertility to his or her soil. A building contractor may not think he has much in common with an 'environmentalist', but both might equally appreciate the craft in an old Victorian home and agree the building should be restored. With restoration, political identity becomes a little less predictive, its borders more porous.

It also has a bridge-like quality. You can imagine divergent peoples meeting at the middle of such an intention, approaching it from different directions but agreeing on its suitability, its rightness. It could sit as easily in a conservative conversation as a liberal one and, in today's fractured world, that is no small thing.

One day, while walking down a country road I made it a noun and

capitalised it. I called it ‘the Restoration’, a coronation it accepted rather nobly, I thought. Now I felt myself apprehending not just a resonant phrase, but a potential human era, an organising principle capable of competing with capitalism itself, as though its natural successor. Is that too grandiose? A few feet overhead, a sharp-shinned hawk floated over, the scalloped dark and light design on the undersides of its wings clearly discernible. The soundlessness of the passage stopped me. Whether coincidence or not, I felt an affirmation. Nature approved, I decided, and kept walking.

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That journey soon took a more practical turn when I came across a notice about the Global Earth Repair Conference taking place near where I live in the north-west corner of the US Pacific Northwest. The conference promised a four-day exploration into every imaginable aspect of restoration, and I signed up immediately.

Looking for a broad overview, The first sessions I attended were ‘Earth Repair in India’, delivered by Rajendra Singh – known as ‘the water man of India’ – and ‘Earth Repair in Africa’, by Precious Phiri.

Singh is credited with bringing water back to over a thousand villages and resurrecting numerous dried-up rivers throughout some of India’s most desiccated landscapes. Though he started out doing medical work, he was challenged one day by an indigenous farmer who told him that if he really wanted to help the villagers he would bring them water. Then this farmer explained to him the old ways of harvesting the rains; ways largely undone by subsequent British colonial rule. The principle was simple: hold the rainfall on the land, not with industrial-scale dams, but small, traditional catchments called check dams, or *johads*. Once held, the water would drain down, recharging aquifers, feeding vegetation and calling back long lost weather patterns.

It worked, almost magically, as it had worked for centuries before the British imposed centralised engineering. Not only did the old methods restore land previously barren, they also prevented flooding, moderated droughts and cooled the local climate by a rather auspicious 2°C. In time, forgotten rivers began flowing again, and young people, who had fled the region, began returning. Villages revived, farming resumed, wildlife reappeared.

Phiri’s presentation, ‘Earth Repair in Africa’, began like Singh’s, with

photos of cracked and barren landscapes. Then pictures of the miracle: chest-high pasture grass, wildlife browsing, children playing in a river. Like Singh, Phiri didn't bring new knowledge, imposed from outside, but instead restored something pre-existent which had been lost. In this case, it was the once-teeming herds of wildlife, ungulates such as zebra and wildebeest, which had fertilised and hoof-tilled the landscape for millennia. Phiri and her team, using grazing techniques pioneered by Zimbabwean ecologist Allan Savory, began moving cattle in patterns similar to the ancient herds, to which the land responded exuberantly, as though remembering itself. Forgotten shrubs and grasses appeared again, and, as in India, a local river once thought extinct started to flow.

Along with wildlife, human culture returned too. Cow herding had lost status against the advance of technology, coming to be considered work for high school dropouts. But as the land returned to health, more and more young people showed up, wanting to learn the trade.

I could have also attended 'Reforestation Scotland', 'Mycorrhizal Fungi and Jamaica', 'Wetland Restoration with Ranchers in Harney Basin, East Oregon', 'Agroforestry in the Pacific Northwest', 'Earth Repair after Hurricanes', 'Earth Repair in War-Torn Areas', and would probably have heard the same basic story: not only is the land renewed but so too are the people, and the relationship between them. But it was 'Ecosystem Restoration for Climate' that caught my attention. I'd brought a question with me, and I was hoping this panel might answer it. The question, or questions, went something like this: *If climate projections are modelled on a current baseline of ruined landscapes, biocidal farming and collapsing ecosystems, what would they predict on a planet that was healthy, or being restored to health? Doesn't the Earth have a say in this?*

Apparently, I wasn't the only one with questions. The room was packed and I found a place against the wall with about twenty others. A panel of eight presenters from various parts of the world had been pulled together; most Skyped in remotely.

Professor Millán M. Millán, who began his career as an aeronautical engineer (and who also happened to design the metal detectors we pass through at airports) got things started by referencing a 1971 MIT publication called *Inadvertent Climate Modification*. This early scientific treatise on climate change reflected what the modern climate narrative seems to have forgotten: that there is more to climate than the build-up of carbon gases. There is also a local and regional basis moderated by hydrologic cycles. In fact, the most significant driver of climate, both in

terms of heating and cooling, by volume and weight, isn't CO₂ but H₂O, water. It affects climate in all its various phases: as a potent greenhouse gas, as heat-reflecting ice and cloud, through cooling by evaporation, amongst others. 'Back then,' he said, 'the idea was that there were two legs to the climate, one being carbon gases and the greenhouse effect, the other land use and hydrology, because whenever you alter land surface you immediately change critical hydrologic cycles, from very small-scale to very large.' And that profoundly affects climate.

This was news to me. In years of climate activism, I had never heard much about land use – urbanisation, industrial agriculture, deforestation and the like – or the hydrologic cycle. It was always about atmospheric carbon. Millán wasn't dismissing atmospheric carbon, it was just that for him the carbon that mattered most was the carbon in the soil and vegetation, for through them ran the prize – water.

'Water begets water, soil is the womb, and vegetation is the midwife', continued Millán. Apparently, when scientists go down the restoration road, they start talking like poets. Unlike the common perception that rain originates over large water bodies like lakes and oceans – which to some degree it does, depending on the location – it mostly develops *and regenerates itself* over living landscapes, via hydrologic cycles which are profoundly local, cycling through watersheds large and small. 'Clouds begin in the ground', he said, calling to mind what Singh and his indigenous guide accomplished in India. Through various, local means of holding water on land, they 'planted' future clouds in the ground and eventually 're-grew' lost rain patterns, cooling their local climate as they did so. Not surprisingly, in India they say, 'Water is climate, climate is water.'

Vegetation is the midwife because it delivers moisture from the soil to the atmosphere via transpiration, thus feeding the formation of clouds. Like this, plants help water propagate itself through soil, landscape and atmosphere, cooling all three on its journey. We've seen in India and Zimbabwe that rain can be convinced to return to an area it seems to have abandoned. Millán is now working to re-establish lost summer storms over arid regions of the Mediterranean, which in Roman times were wetlands. He hopes to accomplish this with the strategic planting of woodlands. Since rain there is now scarce, he must hold what little falls on the land as long as possible. The means for this is soil, but not just any kind will do. It has to be living soil, capable of creating what he called the 'soil sponge'.

Didi Pershouse, a soil sponge strategist, author and educator, described the soil sponge as ‘the basic infrastructure that makes life on land possible.’ She demonstrated with a plate heaped with dry flour. The flour represented the degraded soils of modern agriculture, heavily tilled and chemically sterilised. She poked holes in the bottom of a cup to simulate rain and ‘rained’ over the flour. The water slid off as if repelled, or carved deep gouges and ravines, before flooding the plate. What remained resembled a classically eroded landscape.

Then she did the same onto three slices of bread. The bread represented living soil, or soil ‘leavened’ with carbon-based microorganisms into a living, sponge-like matrix. This ‘soil’ absorbed nine times as much water as the flour, and the water that did drain through sank downward, seeping out of the bottom into what – in a natural system – would be an aquifer, getting filtered both physically and biologically along the way.

Then she gestured to the two plates, asking, ‘In a dry climate, with infrequent rain and strong wind, which would you rather have? In a wet climate with heavy and frequent rain, which would you rather have? If you were a seed trying to grow, where would you rather make your home? If there were hazardous chemicals in the soil that you wanted to keep out of local rivers and streams, which would you want?’ Another question one could ask: ‘If you were trying to draw carbon out of the atmosphere, which would you need?’

The difference between these two soils is life, or, chemically speaking, carbon. One has it, the other doesn’t. Or you could say, one has vegetation, the other doesn’t. When plants pull carbon out of the air they essentially make themselves out of it, mixing it with mineral nutrients drawn up from the soil, making carbohydrates, or carbon sugars, which they then feed to the soil microbial community, down through their roots but also when they decompose into the ground. Like this, you could say, plants ‘sweeten’ the soil with carbon.

The equation is simple: SSC (sand, silt, clay) plus C (carbon) = soil sponge. The carbon in this equation comes as life: mycelia, fungi, bacteria, nematodes, earthworms, other soil microorganisms and the slimes and glues they exude. Only this mixture, fed by plants sipping carbon out of the air, can produce the soil sponge, of which she showed us a highly magnified photograph. You could see the individual mineral particles and clumped aggregates and, between them, translucent slimes and threads holding the particles both together *and* apart. This created spaces that Pershouse, who also tends toward the poetic, called ‘cathedrals’. It is

where the water is held, much like the air pockets in bread. This stored water feeds more vegetation, which draws down more carbon, while feeding the clouds more moisture to spread more life, and around and around it goes.

‘It’s a very, very elegant, natural system,’ added Walter Jehne, a renowned Australian soil scientist and UN climate advisor. He referred to the soil sponge as the soil-carbon sponge, emphasising its carbon-sequestration capabilities. Like Millán and Pershouse, he took a broader view of carbon, presenting it as a necessary element in the cycle of life. Also like them, he didn’t speak much in numbers, but the few he offered were illuminating. At present, 130 billion tonnes of atmospheric carbon are produced on the planet each year through various oxidative processes, such as forest fires, modern agricultural practices and the burning of fossil fuels. However, 120 billion of those tonnes are then re-absorbed by the various processes of life and sequestered in soil, plants and animals. It’s this second number that turns the lens, bringing the nature of our present crisis into clearer view. This is a crisis of balance – not just of chemicals in the atmosphere, but in the overall functioning of life on Earth. The planet, if allowed, and even helped, to flourish, can cool itself naturally, absorbing carbon along the way. If we weren’t busy paving, tilling and poisoning its living membrane of soil, it would be turning the excess carbon in the atmospheric into more life.

Here Jehne reminded us that while sequestering carbon is important and necessary, we need to go beyond that and begin to cool the planet. This has become increasingly important as the oceans, which have been steadily absorbing our excess heat, are now full, and will begin throwing heat back out, with future land-based warming baked into the proverbial cake. Cooling the planet may sound like a mammoth undertaking, but according to Jehne, it is quite doable. He estimates that restoring one per cent of the planet’s natural cooling capacity through restored hydrologic cycles would offset the heating effects of current anthropogenic carbon gases. At two per cent we are cooling down.

Pershouse provided a visual explanation, showing a fence-line photo of barren, rocky soil next to a section of land restored to rangeland grasses and shrubs, both under the same blazing sun. She then asked us to imagine standing on one side, and then the other, in bare feet. Not only would our feet feel cooler on the grassy side, but so would our heads. The air temperature above vegetated landscapes is cooler than that over bare soil or pavement by as much 11.6°C.

We started burning life off this planet long ago, Jehne explained. Through deforestation, the draining of marshes and exhaustive agricultural practices, we've not only been heating the Earth, we've been desiccating it, with a trail of over 20 self-made deserts left in our wake. They reach around the globe on virtually every continent, not to mention the once heavily forested Middle East. The obvious opportunity – and this spoke directly to my question – is in bringing all those places back to life, with all the extra carbon in the atmosphere helping to feed the growth, and all that growth helping to cool the atmosphere. Restore soil and nature does the rest. As though speaking in the voice of the planet, he said, 'I can run a monsoon, I can re-green continents.'

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The Q&A session at the end was dominated by questions like 'why isn't anybody talking about this?' It was as though we found ourselves standing in a new conceptual geography. Zach Weiss, who runs an ecological restoration firm, laid out this new terrain. Carbon, he pointed out, is invisible, and its cycling is so slow we can never see the results of our work with it. With water, though, the results are almost immediate, occurring within a single rainy season. And when people witness the rebirth of their landscapes, they no longer need convincing, he said. 'They come running.'

Charles Eisenstein, the philosopher on the panel and author of *Climate: A New Story*, flipped the narrative completely, pointing out that when he googled the term 'effect of biodiversity on climate', the results always came back for the opposite request: the effect of climate on biodiversity. He encountered the same with soil erosion. He was researching what he called his 'living Earth hypothesis', that the climate is a product of a living biosphere, and discovered how skewed we are towards seeing it the other way around. He brought up the classic image of the 'cracked field'. We've all seen versions of it alongside articles about climate change. The image implies that global warming, or anthropogenic carbon gases, caused the field to dry and crack, when actually abusive land use practices likely did that by ruining regional hydrologic cycles. The same is true of most flooding, where the soil sponge has been destroyed and the land can't hold and store the rain when it falls. And as Millán pointed out, our forests are drying out mostly because of damaged hydrologic flows. 'I think,' said Eisenstein, 'we are just beginning to understand how

this planet actually works, and the role of life in maintaining climate.’

The role of life in maintaining climate. I hadn’t before considered the notion, but felt its validity immediately, and it came as a relief. For years I’ve watched the climate narrative gradually push the non-human sphere to the side and place us, our technological innovations and economic interests, at the centre. We’ve been peering skyward for invisible carbon, fixating on abstract numbers, predicting far futures based on ice cores from deep pasts, all the while somewhat blind to the saws, roads, bulldozers and industrial farms busily dismembering the living remnants of what ultimately creates and maintains the climate. Now we turn to face a scale of ecological collapse we scarcely possess the vocabulary to describe.

How ironic, and even mysterious, that it’s the places we’ve most injured that now look back with such profound capacity to help us. There is forgiveness in that, a generosity that is nearly unaccountable, and yet it’s here, all around us, vibrant with potential. Somewhere during the discussion, the host joked about the need for a new bumper-sticker phrase: ‘Make Carbon Life Again’.

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I had more than enough for my brain to process at this point, but as I was to find out at the closing ceremony, the restoration story isn’t to be fully comprehended with the mind alone.

We had gathered in a large circle, and an elder of the Rogue River People, Grandmother Agnes Baker-Pilgrim, invited us to drop from the intellectual mind to the heart-mind, that place from which we truly meet the world and each other. A Lakota man – who ‘comes from a place also surrounded by seas; seas of grass’ – spoke of flying over the Arctic and seeing vast cracks in the ice below him, and the deep grief the sight produced in him. He then sang a song, an old song, and you could hear the sadness in it. It stretched all the way back to the days of invasion and massacre, an ancient grief singing through a present one.

Another elder, a white elder, slowly tapping a drum, invoked the place itself: the giant madronas branching overhead, the grass and soil beneath our feet, the surrounding hills and ocean-fed breeze. The sun was warm on our faces. Birds sang into the silence. I rarely tear up, especially in public, but all the grief I’d been holding for this Earth suddenly started to move. I felt my chest beginning to shake, and, though surprised, I

welcomed it, and let my eyes brim. Water again, salt water, like the water in the ocean so near I could smell it.

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A few weeks have passed since I returned home, and I realise I no longer see the climate the same. Or perhaps more accurately, I've actually begun to *see* the climate, in the soils, the waters, in the flows and cycles of life. Before, it was always a featureless abstraction. I imagined a kind of vast atmospheric bubble, which one could presumably stick a thermometer into for a temperature reading. But I've since learned global temperatures are actually averages of thousands of individual local readings, each from specific landscapes. One is out my window, another yours.

Look around. Imagine seeing, say, 20 miles in all directions. How much of the land is covered in concrete, gathering heat? How much is laid out as monocrop, vast tracks of chemically sterilised soil, bare much of the year, sequestering and transpiring nothing? If there is grassland, how much is wrongly grazed? If there are mountains, how desiccated are they from not receiving moisture from the lowlands, which have been crippled of their hydrologic function, dammed at their own headwaters?

Looking out my window I see a clouded fragment of the Salish Sea, the inland waters between the US and Canada. Seen from overhead it resembles a bodily organ, spreading lung-like, north and south into inland bays fed by a densely veinous tapestry of streams and rivers. There its apex predators, the Southern Resident orcas, are starving. They're not starving because of carbon in the air, but because we've dammed the rivers that once fed them massive runs of salmon. We can decarbonise the entire global economy and they will still likely slip into extinction. So it is with so many creatures and remnant ecosystems. In many ways, the last thing they need is for us to embark on a new industrial revolution, however green it proposes to be. What they need from us is far more obvious and immediate – to repair the damage we've already done. And then join in the renewal.

Here is the nexus, the spark point. It's where the human hand and the living Earth, our intention and the regenerative genius of life, meet. Magic happens here, and points to the first thing we need to restore – our relationship with the rest of life. We are human, after all, as in *humus* – of the Earth – and so also 'humility'; which I would offer as the operative demeanour of the Restoration: to humbly restore our place as humans

among, not over, the greater life community. If we could accomplish that simple grace, we would find ourselves hitched to the will of the planet itself, on the side of the very forces that can save us. Our human ship, tossing about in self-made gales, might find a compass point, a common destination by which to reach calmer waters. The Restoration could be just that at first, a directional bearing.

Where is it pointing? It's pointing here, where we've always been, toward vast landscapes hungry for life again, lost rivers ready to flow again. Here soils are building, not washing away, and restored farmlands are calling displaced peoples back home. Here, no miracle technologies come to save us, and the tech billionaires are surprised to find they're no longer at the centre of the story. The Earth has taken their place, and each day it grows back a little more skin, breathes a little more cooling water, lends a little more credence to the idea of hope.

Does this mean we can go on indiscriminately burning carbon? Of course not. Carbon gases do trap heat, frustrating the planet's already degraded ability to cool itself. They're also turning the oceans to vinegar. And they remain in the atmosphere for as long as centuries, subjecting all life to planetary changes of geologic scale, an epically irresponsible thing to do.

But there are two legs to the climate – CO₂ and H₂O. We can think of the carbon-gases leg as the pushing-off leg, the one that says *no*: to our reliance on fossil fuels, to the pipelines, the drilling, the concentrated greed, the asthmatic kids. Stepping forward is the land use and hydrology leg, saying *yes*: to rebuilding soils, repairing rivers, rehydrating forests, reviving land-based economies, restoring human respect for the Earth and each other. Together they provide a stride we can maintain for the long haul, twin determinations with a common confidence, on the Earth and toward life.