TRACTATUS AYYEW

An Earthen Ethics

BOOK ONE

Angway & Maier

Tractatus Ayyew

An Earthen Ethics

Book One

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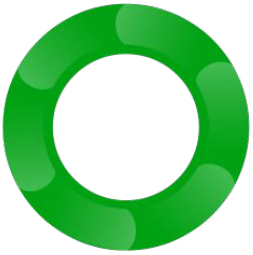
Ecological Accounting

Throughout the enterprise of writing and publishing the *Tractatus Ayyew*, all carbon, plastic and biodiversity impacts were tracked. The annual disclosure of the enterprise's ecological accounting can be accessed at book.earthen.io/accounting A full biodiversity disclosure of the enterprise's physical space in Gianyar, Bali, Indonesia is available at russs.net/forest



For-Earth Enterprise

In the disclosure of the *Tractatus Ayyew's* ecological accounting and biodiversity impacts, the authors and publisher express their commitment to net-green, *for-Earth* enterprise.

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Dedication

To our mothers and fathers,
who let us play in the forests and fields,
tasting berries and climbing trees,
loving the wild and learning its leaves.

Preamble

IN THE CULTURE of the Igorot people of Northern Luzon in the West Philippine Sea, story telling is central. In their *dap'ay*— stone plazas at the center of every village— stories are told to introduce people, lessons and ideas. It is an example that we will follow in the chapters ahead.

To start, Banayan and I will share the story of the pollution, short-falls and questions that sparked this book's unlikely beginning. For the reader eager for an overview, in our summaries section (see the appendix), we provide a short sentence, a long sentence and a paragraph that each sum up the theory of Earthen ethics which we develop in the *Tractatus Ayyew*.

Of course, *how* a story is told (or a theory for that matter) is just as important as the sum of its sentences. In the dap'ay, both tale and telling were inseparably intertwined. Stories were told after a dance or a feast with the listeners gathered around a fire; rice wine in hand.

Alas, while our telling will never achieve such a magnificence of medium, we've nonetheless put great care into our book's presentation and publication. Consequently, the *Tractatus Ayyew* is published as an *Earthbook*— an Earth and reader friendly format that embodies the principles of Earthen ethics that we'll be developing in the chapters ahead.

Like most theories, the *Tractatus Ayyew* progresses sequentially. However, unlike most books, the Earthbook format enables a modular arrangement of chapters each with its own URL. Consequently, each chapter of the book is written as a standalone essay so that its facet of the theory may be readily referenced and shared. For example, if you are reading the PDF, eBook or print edition, this section of the book can also be found at book.earthen.io/en/preamble

To represent the modular geometry of the *Tractatus Ayyew*, each chapter begins with a mandalic representation of its place within the whole. The full theory (and each chapter's integration within it) is represented by the mandala at the top of this section.

As an Earthbook, both the content and code of the book are made freely available. Meanwhile, the print and eReader editions of the *Tractatus Ayyew* are for sale here on the Earthbook site. Sales are independent of middle-men, with 97% of book sales going direct to the authors.

As a self-contained platform, the Earthbook format enables the authors to track the net-ecological impact of the book's reading and publishing. The book's for-Earth intention and its ecological accounting are publicly disclosed in the Eartbook's regenerative reporting.

Preface

ALAS, not all books have beautiful beginnings.

In 2011, the amount of discarded sandals, sodden diapers, used bags and tossed wrappers entering the Chico River had reached a breaking point. Overwhelmed by the ever arriving slew of plastic, the downriver Filipino province of Kalinga took action to sue the upriver town of Bontoc. The mayor and governor took the charges seriously. They set about shutting down the numerous dumpsites along the river's winding course through the remote region.

But where was all our plastic to go?

For those of us living along the river, the challenge was palpable.

For centuries, the tribes of the region, collectively known as the Igorots, had thrived in fierce independence from the rest of the Philippine archipelago. With their towns and villages nestled within a rugged chain of verdant mountains, the Igorots had remained largely insulated from three hundred years of Spanish colonization further South. However, over the last decades, modern goods had reached even the most remote villages. Whereas the leaves, wood and vines that had long served them as functional materials were entirely biodegradable, now strange modern materials stubbornly refused to degrade when discarded.

However, the Igorots had not been sitting idly by.

In the Igorot society, the art of ecological integration is highly esteemed— in much the same way that painting or sculpture is in other cultures. Consequently, the region had become a hot-bed of up-cycling innovations. In town, old tires were being cut up to make remarkably functional chairs and tables. In the mines, used dynamite cable was being woven to make traditional backpacks. In homes, straws and wrappers were being used to weave mats, purses, wallets and household items of all kinds.

Banayan and I were so fascinated by this upcycling movement, that we became part of it ourselves. While Banayan had been integrating upcycled arts and crafts into school curriculums, I was involved in improving designs to make saleable upcycled products. However, in the face of the ever-growing flow of plastics being discarded, our successes

were all but insignificant. As the legal stand-off in Bontoc intensified, we realized that securing plastic out of the environment was far more vital than making or teaching handicrafts.

It just so happened that my colleagues and I had been experimenting with a new technique from South America in which plastic bottles were packed full of sand to make building blocks. Providentially, the river sand pit and the local dump-site were side by side. After making several sand bottle-bricks, we decided to try packing them with plastic instead.

The experiment was a success!

Not only were we able to make bottle-bricks that were just as effective as those packed with sand, we'd been able to secure a great deal of plastic that would have otherwise scattered into the river.

At my home, I began to experiment with packing my own used plastic into a bottle. I made a small garden bench with the result. My neighbours and I were delighted. The nearby school, which was struggling to dispose of the plastic of hundreds of students, asked to be shown how it was done. After a day of packing plastic, making bricks and building a composter, everyone was excited by this simple alternative to burning and dumping.

As the technique began to spread to other schools, Banayan stepped in. She realized the potential for raising the awareness of plastic's dangers. We worked together to create a reporting system and a guidebook. Through her coordination, what was soon to be called 'ecobricking' spread out to hundreds of schools in the province.

And then to thousands.

Within a year, as the entire Northern Philippines department of education, the Catholic and Protestant Churches, and various municipal and provincial governments came on board. Even the offices of the Bontoc mayor and the provincial governor! Over the next years, ecobricking fast became an alternative for millions of Filipinos to manage their plastic.

Banayan and I have watched with both joy and trepidation as the ecobrick movement has spread.

While at first it seemed a great victory that so much plastic was contained and secured from contaminating the river, the matter was far from settled. We were to learn that the persistence of plastic is a multifaceted social and physical phenomenon: much as we may wish, it does not disappear after we dispose of it— nor when we put it in a bottle.

As the ecobrick movement spread, we observed that sometimes, in providing a solution for plastic, the continued consumption of plastic was legitimized. We also observed troubling applications of the technique.

In some schools we saw a jump in the purchase of soft-drinks in order to procure bottles for ecobricking. In other locations junk food consumption increased so that there would be wrappers to pack. Elsewhere, we observed the use of carbon-intensive cement as a mortar in ecobrick construction.

Banayan and I, reflecting on these phenomena, were troubled. Were ecobricks truly being of ecological service?

Over the last decade these questions have compelled us to re-examine not only ecobricks as a 'solution to plastic', but so too what constitutes an 'ecological solution' in the first place.

As a short-hand for ecological solutions, the term 'green' has come to figure prominently in our reflections.

Specifically, we've come to ask ourselves: *What in fact should green really mean?* And, more precisely, what are its requisite parameters and principles?

While Banayan and I continue to ecobrick our own used plastic, our suspicion has grown that solving plastic (and being 'green') is not just about new techniques and technologies. Just as significant as *what* we do is *how and why* we do it. In this aspect, our conviction have crystalized: the wisdom traditions of ancient indigenous cultures are critical to giving meaning and substance to our contemporary concept of green.

Our title reflects this merging of the modern and indigenous perspectives[1] that our two ancestral backgrounds embody..

In Latin, the word *tractatus* refers to the philosophical tradition of a treatise— a ste-by-step exposition of a particular concept. In Kan'kan'ue, the language of the Igorots, the word *ayyew* refers to the virtue of cyclic ecological integration that guides their culture.

It is this *ayyew ethos* which inspires and guides the theory of green and grey presented in the three books of the *Tractatus Ayyew* ahead.

In Book One we clear the ground and establish the five-facet foundation of our Earth anchored ethics.

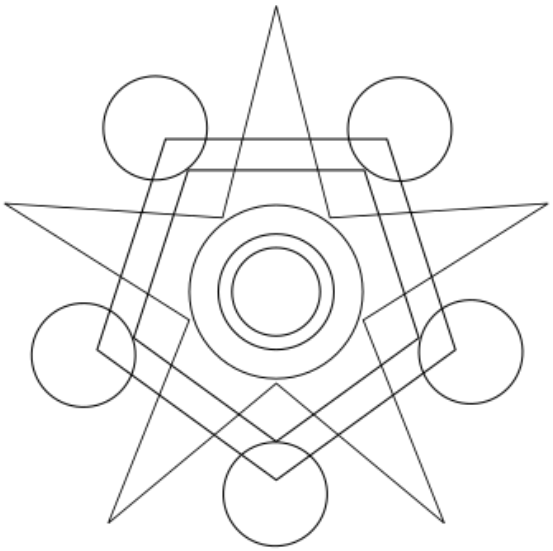
In Book Two we dedicate a chapter to each of the five Earthen ethics.

In Book Three we conclude with a five-fold Earthen solution for plastic.

In this way, through eighteen chapters that each present a functional facet of green enterprise, the *Tractatus Ayyew* aims to be a tool kit rather than a manifesto.

It is our hope that with the application of Earthen principles in plastic's resolve, other grey challenges may transition, with confidence and clarity, to the Earthen way of green.

1 Going forward, instead of the term 'indigenous' we will use the term 'kincentric' to specifically reference the indigenous world view which we are exploring: a particular cosmology that, although it is characterstic of most indigenous cultures, is not necessarily so. This will be expanded upon in chapter 5

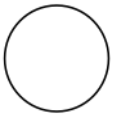


BOOK ONE

"*Another world is being born right in front of our eyes: a whole new spirit in the way we think, hope and fear. The ecological anguish that gives its color to this new age announces nothing less for our civilization than all-encompassing change. First History passed; now Nature is next. This is the moment to take green seriously.*"

— Régis Debray, The Green Age: A Change of Civilizations[2]

2 Régis Debray, Le siècle vert. Un changement de civilisation (Editions Gallimard, 2020)



Imagine

Imagine a world where the way we live is steadily enriching the ecosystems of which we are part. It is a world where our households and communities, just by thriving, make the biosphere a more abundant, vibrant and hospitable home for us and all our kin. Rather than strive to reduce our environmental harm, in this world we have come together to maximize our ecological contribution. To do so, the way we manage our matter and energy has shifted. No longer do our enterprises operate merely in circles— so too do they spiral; each spin overpaying its debts and dispersing its surpluses. No longer do our enterprises merely reduce the amount of carbon and other elements they let loose— so too do they capture more than they release. No longer do we merely admire the tapestry of organisms and ecosystems around us— so too do we play a part in its vitality and diversification. As we all thrive together in this common home, the awareness of our interconnection ever augments, and with it, the sync of our cycles of enterprise and ecosystem, economy and biome, humanity and biosphere— a harmony rising up with us towards the stars.

TODAY, AS WE BECOME more and more aware of the ecological degradation inherent to our modern world, we yearn to amend our mistakes and to improve our ways. However, as our homes and enterprises unite in a common planet passion, never before has it been more important to recognize that the way forward has already been cleared and its path tread. Dismissed and all but forgotten by our modern civilization, nations ancient and ongoing have long mastered their ecological integration to achieve heights of harmony that far exceed our modern imagination. Only to the extent that we can recognize these enlightened moments, can we imagine our own. For insofar as we can imagine, the realization of a green age for all is not nearly as distant as many of us despair.

Inspired by the verdant legacy of Banayan's people, the Igorots of Northern Luzon[3], she and I have to come to see that the longing and the potential for ecological contribution unites us all on planet Earth.

Across cultures and continents, we long to contribute to that which we are part: to add to the communities in which we belong, to harmonize with our neighbours, to sync with those with whom we sing. Consequently, as the parts we play in our local ecosystems and global biomes becomes clearer, so too does our yearning to participate positively in them and contribute to their harmony, vitality and abundance.

Indeed, Banayan and I have come to see that the transition to households, communities and enterprises that are in-and-of-themselves ecological contributions is the next stage of an epic planetary story whose direction is, quite literally, in our hands.

So how do we arrive at this thriving common home that we all long to see?

One word:

Plastic.

Therein this problematic modern material lies our way forward.

As it must be.

Gardeners have long observed that *the problem is always the solution*— weeds, pests and pollutants are always, with a shift of perspective and approach, the very nutrients, fertilizers and medicines that bring a struggling garden to thrive.[4]

Like nothing else, plastic embodies the definitive facets of our modern moment. Derived from ancient fossilized carbon, plastic allows us to touch the primordial story that has enabled our own. Bought and sold, plastic is a physical manifestation of the petro-capital economy that powers our global age. Crafted by humans, entirely for humans, plastic is a vivid reflection of our modern, human-centered civilization.

In this way, our plastic is in fact a mirror.

And an opportunity.

By confronting plastic's full billion year story, we can face our own within the same frame.

Then, in seeing our reflection with unprecedented clarity, we can know our plastic— and ourselves— anew.

Above all, we can renew our understanding of positive human ecological participation: *what green should really mean*.

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3 In particular the Igorot Ayyew ecological ethos. See: Banayan Angway, Cordillera Administrative Region Indigenous Peoples Education Curriculum K-12 (Bontoc, Mountain Prov., CAR; Philippines Department of Education, 2014).

4 The first principle of permaculture. Bill Mollison, Principles from Permaculture a Designers' Manual, (Tagari Publishers: 1988).

Banayan and I, in struggling to manage our own plastic positively, have come to see that the contemporary concept of green is lacking and incomplete.

Seen through the lens of the ecological ayyew ethos of her people, we observe that the modern ethic of green is merely about reducing *harm*— while the concept of *contribution* has remained all but un-imagined.

It is a view of human ecological potential that sharply contradicts the lived experience of Banayan and her ancestors.

As we shall see in the chapters ahead, ecological contribution has in fact been the overwhelming tendency on Earth— a unique planetary pattern of matter and energy that, from the very beginning, has permeated all of Earth's processes, cycles and systems.

And our own.

To the extent that this Earthen pattern has been reflected within the values and virtues of a culture, the societies that have ensued have systematically enriched the ecosystems of which they are a part.

Conversely, to the extent that a culture's pattern has differed from Earth's, systematic depletion and degradation have been the inexorable result.

The discernment of this Earthen pattern, shall be our chief task in the *Tractatus Ayyew*.

Through the combination of our two ancestral perspectives, Banayan's Igorot heritage and my European, her indigenous culture and my settler, her agrarian upbringing and my industrial, we will investigate the shortcomings of our modern ethical understanding. In particular, the misconceived human exceptionalism that we observe is at the root of all our modern ecological malaise.

With this ontological error excised, we shall then lay out a new theory of green anchored upon the cosmological character of our planet.

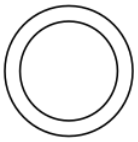
Guided by the insights of great green nations, the ways of magnificently contributive creatures and the latest insights of Earth science, we shall lay out each of the principles that composes our planet's five-fold pattern of ecological enrichment.

The resulting *Earthen ethics* will help us to make sense of our modern processes, technologies and enterprises by providing a means by which we can discern that which is enriching from that which is degrading; that which is an ecological contribution from that which is a depletion; and that which is *green* from that which is *grey*.

In this way, with Earth's example as our guide to green, can move forward with unprecedented clarity and confidence to embody the geometry of contribution in all our processes, cycles and systems.[5]

5 We can think of our current civilization-- its technical and sociopolitical infrastructure, its ideology and beliefs-- as an operating system, much like the software that runs our computers. Now we need to reboot and install a new system software". Daniel Pinchbeck, How Soon is Now: From Personal Initiation to Global Transformation, (Publisher: Watkins Publishing, 2017) Chapter 2, p.105

To begin, let us turn to that troublesome material we so love to hate.



Plastic 1.0

LIKE NO OTHER MATERIAL, plastic has been made entirely for the use and benefit of humans. For the last half-century we have loved it: steadily incorporating plastic into every aspect of our modern lives. However, of no use to other creatures, plastic has come to clog ecological cycles on land, in river and at sea. The polluting consequences of our human-centered creation is now the focus of great hate and humiliation. Though our various other ecological crises— ocean acidification, climate change, species extinction— may be far more dire; nonetheless, as we survey sullied beaches, choked rivers and beached whales, it is plastic pollution that causes us the most shame.

However, through it, an awakening has begun.

Around the globe we're realizing where our plastic, oh-so carefully segregated, is actually ending up[6]. Investigative journalism and scientific study has made the fate of all our plastics clear[7]. No matter how well we landfill it— microscopic plastic particles are ending up loose in the biosphere.[8] No matter how thoroughly we incinerate it— plastic's

6 A report by Global Web Index found that the 'Attenborough Effect', named after the narrator of the 2018 documentary *Blue Planet II*, led to a 53 percent reduction in single-use plastic usage over 2019. See: *Sustainable Packaging: Consumer View, (*Global Web Index: 2020)

7 In a comprehensive survey of all plastics ever made, it is estimated that 8300 million metric tons of virgin plastics have been produced worldwide; 9% of which have been recycled, 12% were incinerated and 79% have accumulated in landfills or the natural environment since 1950. R. Geyer, et al., *Production, use and fate of all plastics ever made* (Science Advances, 2017) Vol. 3, no. 7.

8 "Worldwide there is a growing concern about the risks and possible adverse effects of (micro)plastics." See: Ansje Lohr, Heidi Savelli, Raoul Beunen, Marco Kalz, Ad Ragas, Frank Van Belleghem, 'Solutions for global marine litter pollution', (sciencedirect.com: Current opinion in Environmental Sustainability, Vol 28, October 2017) 90-99

chemicals are leaching out into ecosystems and us. No matter how much we recycle it— plastic's usage, production and associated emissions[9] rise unabated.[10]

Our realization of the relentless ensuing pollution has evoked a generational despair.[11] It has led to a harsh judgment of both ourselves and of plastic as innately flawed and ecological damaging. Many lament that both plastic and humanity seem destined to pollute, contaminate and deplete.[12]

However, such judgments are entirely misplaced.[13]

While we're now seeing clearly where our plastic ends up, this is only half the story. Our century-long account of plastic as human-made and managed has been woefully short-sighted. Until now, we haven't truly grasped where our plastic *began*– both physically and philosophically.

Oft-unknown: plastic's matter is a by-product of the extraction and refinement of the fossil carbon that powers our modern age. And the fossil carbon itself? It is in fact the by-product of Earth's epic unfolding of a greener and greener biosphere— an ecological act of which we have much to learn.

So, while our slumber has been stirred by observing plastic's destiny, our full awakening shall come with an understanding of its origins. For therein plastic's primordial story lies the key to the reversal of plastic's polluting— and, incidentally, to the reversal of all our other ecological crises. For while plastic pollution, ocean acidification, climate change and

9 "By 2030, CO2 emissions from the production, processing and disposal of plastic could reach 1.34 gigatons per year—equivalent to the emissions released by more than 295 new 500-megawatt coal-fired power plants." *Plastic & Climate: The Hidden Costs of a Plastic Planet* (Center for International Environmental Law, 2019).

10 In 2016 Russell spent time working in a Canadian recycling facility. The experience and realizations of industrially recycling's role in the generation of plastic pollution invigorated the authors dialogue. See: Russell Maier, *Recycling: The Evil Illusion*, (Medium.com, 2016).

11 "It's super painful to be a human being right now at this point in history." Mike Pearl, *Climate Despair' Is Making People Give Up on Life* (Vice Magazine, 2019).

12 Steven W. Running, *The 5 Stages of Climate Grief* (University of Montana, Missoula: Numerical Terradynamic Simulation Group Publications: 2007).

13 "Human beings are a disease, a cancer of this planet." Agent Smith, The Matrix (1999). We observe that the common modern view of humans as a super virus, is a form of human-exceptionalism. We observe that the categorical judgment of (human-made) plastic as bad is an extension of this ontology-- the very same human-centricism that underlies our modern ideologies. The repudiation of this ontology as both empirically and rationally fallacious is one of the principal efforts of the Tractatus Ayyew in the chapters ahead.

species extinction may seem disparate and unconnected, they share a common cause in the dissonance of Earth and modern humanity's patterns of process.

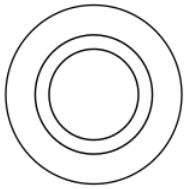
In this way, in the chapters ahead we will see that plastic holds an ecological value that our modern society has completely overlooked.

For as plastic passes through our hands each day, through it we can quite literally touch the paradigm that powers our age of depletion. Through this touch, we have a unique opportunity to shift plastic's fate— and so too shift the parameters and patterns that loom unseen behind it and our modern world.

But to grasp this momentous opportunity, we must first transcend our judgments and condemnations of plastic— and of ourselves.

To do so we must go back and look at how plastic arrived into our hands in the first place.

To do so we must go back to the interstellar origins of planet Earth and see anew the story of our plastic.



A Interstellar Story

OVER 5 BILLION YEARS AGO, IN A CLOUD OF STELLAR DUST our solar system swirled together. As cosmic matter collided and coalesced, growing ever denser, our sun ignited. Within the remaining spiraling debris, further matter and momentum began to merge— falling into orbit as dense clumps around our young star. As each gained cohesion and coherence, the planets of our solar system came to be. Steadily, each planet arrived at its own unique combination of energy and mass— of solar distance and spin, of elemental abundance and chemical composition, of axial tilt and surface temperature— a planetary configuration that just as it coalesced, so too it began to unfold.[14]

Like all its solar system siblings, Earth was at first a barren and desolate place. For our planet's first two billion years, its atmosphere was full of carbon dioxide, making its climate hot, harsh and unstable.[15] For eons, its surface was distinguished solely by the ebb and flow of tectonic plates, of ocean currents and atmospheric flows. However, as these primordial cycles spun under the relentless shine of the sun, the Earth we know now began to emerge.

For as the sun shone down, entropy demanded dissipation.[16] Like the run of rain down a mountainside cascading into the twists and turns of a stream, the sun's ever arriving blaze cascaded across Earth's surface. Just as a mountain's contoured character leads to rivers and valley's that are all its own, so too Earth's planetary character led to flows of energy all its own.

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14 For an excellent account of this process see: Guido Tonelli, *Genesis: The Story of How Everything Began*, trans. Erica Segre, Simon Carnell (Farrar, Straus and Giroux, 2021)

15 "Atmospheric CO2 levels are estimated to have been 100 times what they are today 2.2 billion years ago". Rye, R., Kuo, P.HO., and Holland, H.D., *Atmospheric carbon dioxide concentrations before 2.2 billion years ago.* (Nature, 1995), 379, 6013-75.

16 "The earth is more like an eddy in a river through which flows of matter continuously stream. It is replenished and depleted in a vortical cosmic dance." Thomas Nail, *Theory of the Earth* (Stanford University Press, 2021).

Driven and determined by its unique planetary configuration, Earth's cosmological character began to blossom. Steadily, processes, cycles and systems began to unfold with a distinctly Earthen character. Hand in hand with the dictates of thermodynamics, Earth's cycles tended their spin towards ever better dissipations of energy. Steadily, new chemical combinations unfolded to better disperse the sun's blaze. Steadily, the tiniest cycles whirled together into larger systems that began to drive themselves onward.[17] Steadily, these systems unfurled into cells, organisms and eventually, into ecosystems.[18]

As ever more effective patterns of dissipation emerged, plants rapidly dispersed across the planet's surface. By capturing carbon out of the air, they used it to build their bodies and to gather and hold energy. Plants began to compose leaves, flowers and towering trunks while other organisms discerned how to decompose them.[19]

As they did so, they interacted and adapted— and as they adapted, they diversified and intertwined. A vibrant matrix of mutual support began to weave itself across Earth's surface.

Soon forests, fields and fungi covered the planet. Animals, algae and dinosaurs, all made from intricate patterns of carbon, emerged. As these creatures lived and died their carbon matter spiralled from one organism into another while their nutrient energy spiraled outwards through the web of ecosystems that came to comprise Earth's biosphere.

One after the other, each fallen generation was covered up by the next. Whether on a forest floor or the floor of the ocean, slowly and steadily, layers of life were buried under silt and sediment. Over hundreds of millions of years, Earth compressed and compacted the biomass of these ancient organisms— indefinitely concentrating and securing their carbon deeper and deeper underground.[20]

Cradled by the verdant abundance, over the last 30 million years, a variety of bipedal apes emerged from the forests— and we sapiens shuffled onto the scene.

As we struggled to survive, we figured out fire.

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17 Dylan T. Holden, Nicolás M. Morato, and R. Graham Cooks, *Aqueous microdroplets enable abiotic synthesis and chain extension of unique peptide isomers from free amino acids* (Proceedings of the National Academy of Sciences, Vol. 119 | No. 42, October 18, 2022)

18 This view is inspired by our ayyew interpretation of the biological implications of the second law of thermodynamics. We'll go much deeper into this into Chapter 7. See: Jeremy L. England et al. (2015), *Dissipative adaptation in driven self-assembly* (Nature Nanotechnology, 2015).

19 "The events of the first 3.5 billion years of evolution are coming to light at last and they include far more drama and intrigue than we ever imagined" Michael Marshall, *In the beginning: The full story of life on Earth can finally be told.* (NewScientist, 2019).

20 Bekker, A., Holland,Wang, P. et al., *Dating the rise of atmospheric oxygen,* (Nature, 2004) 427, 117-20.

First, we started by burning wood to warm our caves. Then to heat our homes. Then to fuel our forges. It wasn't long then til we discovered Earth's long buried carbon stores.

We realized that they were far richer in energy.

Some of us (but certainly not all of us) began to unearth this ancient carbon— what we came to call coal, natural gas and petroleum. As certain societies became better and better at extracting and burning it (those others kept-on just fine), it came to turn our wheels, power our our machines, and fuel our factories. As carbon came to drive entire economies, we gave it a new name: *fossil fuels*.

However, despite the nifty name, these fossil deposits were never at first fuels. To make them so required refinement— an intensive process that always resulted in leftovers that could not be used[21] With nowhere to go, these chemicals began to pile up.[22]

We soon realized that the residuals of refinement could be used too. With a little chemistry, polymers could be produced—and with a little more; an endless array of marvelous materials.

Plastics had arrived.

Soon, we were solving all sorts of problems by making all sorts of amazing things. No longer did elephants need to be killed to make ivory billiard balls[23]. No longer were expensive silver plates required to take a photograph.[24] No longer was the shelf life of fresh food limited to a few days.[25] Plastics enabled a slew of new products and technologies— and new ways to reduce expenses, increase revenues and accrue capital.

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21 Our research indicates that 4-14% of crude oil that is processed cannot be refined into fuels. This rate various with the geological source and chemical composition of the crude. See: UK Oil consumption, (British Plastics Federation, 2008), Ref PD/LFH/19/8/08. Also: Russell Maier, Ani Himawati, The Rise of the Regenerative Ecobrick Movement, (Le Havre University: Bandung Spirit Conference, 2019).

22 "Oil refineries run 24-7 and are continuously generating by-products that must be disposed of, such as ethylene gas... propylene, acrylonitrile [and other chemicals which are ideal for making plastic]. Plastics are a small piece of the petroleum industry, representing a minor fraction of the fossil fuels we consume. But the economic imperatives of the petroleum industry have powered the rise of Plasticville." Susan Freinkel, Plastic: A Toxic Love Story, (Houghton Mifflin Publishing Company, 2011), p7.

23 With the rise in popularity of billiards during the 1850's African elephants were being slaughtered en masse for their ivory to produce balls. A competition to find an alternative material inspired the first experiments with petroleum by-products.

24 Plastics revolutionized the early photography industry that was severely limited by bulky and expensive equipment, enabling picture taking to become a household activity.

25 Transparent plastic film, originally developed by the cigarette industry, came to dramatically increase the shelf life of fresh foods. Carmen Nobel, How Cellophane Changed the Way We Shop for Food, (Harvard Business School, 2017).

Powered by the ever increasing flow of petroleum and profit, industries grew and grew. As they expanded, so did the extraction of carbon, the refinement, and the economies based upon it all. As it all spun faster and faster, there was always that little bit that couldn't be processed. This led to industry producing more and more plastic at lesser and lesser cost.

As we consumed one plastic product after another, we tried our best to reuse and recycle. However, there was already so much cheap new plastic, there was little profit in processing the old— better to burn it, dump it or send it somewhere else.

Soon there was so much plastic that it began to spill out of our homes, enterprises and industries. In growing alarm.[26] we watched as our plastic clogged rivers, littered beaches and piled into great smoking mountains. The particles of plastic were everywhere— inside the bodies of fish and animals— and us.[27]

Shocked, shamed and determined, industry strove to convince themselves, and everyone else, that there was a solution just around the corner. Enterprises worked valiantly to improve their processes, products and packaging. New technologies were launched that were less harmful, less polluting and less damaging.

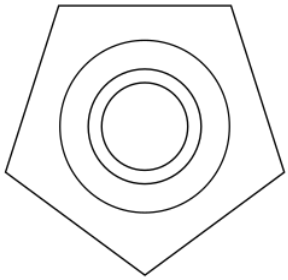
Yet after turning countless corners, despite being less polluting and harmful, harmful and polluting their processes remained.

Unabated, the grey flows of plastic and pollution continued to grow.

And with it, our despair.

26 Observing plastic pollution and extreme weather are taking a growing emotional toll. Beyond Storms & Droughts: The Psychological Impacts of Climate (American Psychologists Association, 2014). And: Mental Health and Our Changing Climate: Impacts, Implications, and Guidance (American Psychologists Association, 2017).

27 Heather A. Leslie, et al, *Discovery and quantification of plastic particle pollution in human blood (*Environment International, 2022) Volume 163, 107199, ISSN 0160-4120



Patterns of Process

OVER THE LAST FOUR BILLION YEARS, the singular combination of our planet's orbit, spin, composition and chemistry has played out. As this unique configuration of matter and energy has unfolded, a once barren rock has transformed into the thriving biosphere that is our common home today. Of all that we know of other planets in our solar system and galaxy, it is an extraordinary and epic story. However, what makes the story even more remarkable is that the tellers of the tale are thoroughly part of it.

Our telling of Earth's tale is only possible through a vast and unique confluence of matter and energy; the spiral of carbon into ever more concentrated and complex configurations, the dispersion of the sun's energy into ever more diverse organisms and ecosystems; and through it all the inexorable unfolding of consciousness in a myriad of forms. Powered by ancient compacted carbon, our last centuries of science have been able to illuminate both Earth's story and our own.

From this vast vantage we must revisit our judgments of ourselves and of plastic.

Rather than be mired in despair at our modern moment of ecological depletion we can be awed by Earth's momentous act of ecological enrichment!

The way our planet— *as a uniquely configured cosmological system*— has managed its matter and energy has led to the steady greening of its surface; the cultivation of ever greater diversity, vibrancy and abundance.[28] And finally, through the resulting emergence of consciousness, we have been propelled to the telling and pondering of the story itself.

So, where do we go from here?

28 Going forward we will refer to Earth in ways that imply agency (i.e. "Earth managed its matter"). While it is more than possible to conceive Earth as a sentient entity, a divine being, or the active creation of a divine being(s), such claims are beyond the scope of this essay. Instead we imply agency simply in as much as any singular self-contained system has its own unique patterns, character and tendencies. i.e. "Big Ben kept time", "Mont Blanc stood tall", "Uranus spins slowly around the sun".

First, let us hold fast to our vantage and the vast view it affords.

From here we can observe another pivotal planetary phenomenon. Aside from meteor strikes and massive volcanoes, it is a phenomenon unseen on the planet for millions of years. Because of the doings of modern humanity, never before have Earth's processes, cycles and systems so abruptly added more carbon into the atmosphere than they removed.[29]

The ensuing decline of the vitality and diversity of the biosphere is a direct challenge to our last century of carbon play.

Much like a child building with blocks for the first time, we have much to learn from our moment. All too often, youngsters are swept way by the thrill of assembling a grand construction. However, when the pieces inevitably tumble down, when the results aren't as intended, the upset child invariably blames themselves and the blocks.

Of course, neither are to blame!

Only through the first fall can the child grasp how the play is played.

There is no other way.

Likewise, our disruption of ecological cycles is not a consequence of our nature any more than it is the nature of carbon.[30] Rather, it is the *way of our play*: the fundamental pattern by which our processes have managed their energy and their matter.

As we saw in plastic's story, our modern processes have increasingly intended patterns of energy and matter that have dispersed carbon, concentrated energy, reduced biodiversity and stifled ecological awareness. In sharp contrast, Earth's processes have inexorably tended towards just the opposite: the concentration of carbon, the dispersal of energy, the increase of diversity and the cultivation of consciousness. Whereas our modern pattern of process has degraded ecosystems, Earth's has systematically enriched them— making them ever more diverse, vibrant and abundant.[31]

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29 "The present atmospheric content [of CO2] exceeds anything Earth has experienced in the last million years and possibly the last 20 million years" David Beerling, The Emerald Planet, (Oxford University Press, 2017).

30 Are humans inherently destructive or contributory? Competitive or collaborative? In the chapters ahead, we take a firm position in this ongoing debate: in discarding the empirically and rationally untenable view of humans as central and exceptional to the biosphere, and instead as subsets systems within it, our Earthen character becomes clear. See: Rutger Bregman, Humankind: A Hopeful History, (Little, Brown and Company, 2019).

31 Here and throughout the Tractatus, we refer to the cumulative four billion years of the Earth's history. Over the full period of the Earth's history, there have been tremendous swings in the abundance and diversity of the biosphere– extinctions, depletion and lulls where for millions of years life was severely stifled. However, despite these declines, we observe that on the whole the net-biodiversity and abundance of the biosphere has steadily increased. We will examine each facet of the planet's net-enrichment in the five chapters of book 2.

Like a despairing and determined child on a second-go at tower building, we're trying harder than ever. With a shame at our failings, we have our heads down, striving valiantly to build stronger and higher: to make our processes less polluting, less damaging, less grey. However, no matter how hard we have striven, our polluting has continued to increase unabated. Over time, any improvements in the efficiency of our grey processes have been inevitably eclipsed by their very proliferation and increase. For with the underlying pattern of our processes unchanged, even if they are less harmful— *harmful they remain*.[32]

Banayan and I have come to see that it is time to raise our heads from the toil.

And the judgment.

Again, rather than despair, we can be awed.

Our once-in-a-million-years phenomenon of additive carbon usage is in fact a tremendous opportunity.

For the first time, with our usage of carbon as a foil, the difference between our modern ways and the ways of Earth's can be observed with unprecedented clarity. In the stark contrast of patterns, we can begin to discern the cosmological character that has underlaid the Earth's transformation of a barren planet into a thriving biosphere: the pattern by which Earth has managed its matter and energy through processes, cycles and systems towards the enrichment of all.

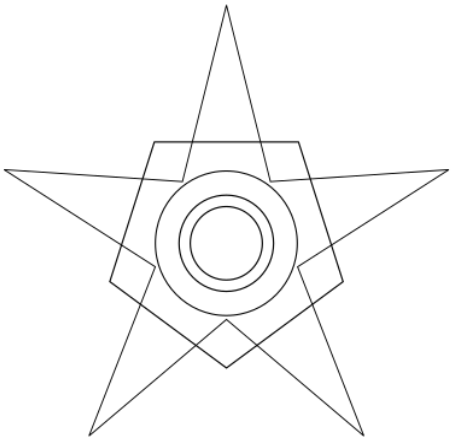
And in a similar way, through our modern society's ecological dissonance, so too can our modern gaze can now recognize those societies— ancient and ongoing— that have long attained resonance with Earth's pattern and character.[33]

Nations that just by thriving, enriched the vitality, diversity and abundance of the ecosystems of which they were part.

Nations that, just like Earth, cultivated common homes for all.

32 Hope is often placed on increases in efficiency to decrease the cumulative environmental impact of human processes (i.e. "more efficient coal powered steam engines will decrease London's pollution"). However, historically, advances in technological efficiency have in fact resulted in increased environmental impact. This is known as Jevon's Paradox: as efficiency increases, so too does the adoption and spread of the technology, inevitably leading to a net-increase in environmental impact. Our argument is complimentary: we observe that processes, cycles and systems have an inherent pattern that will unfold regardless of efficiency or scale.

33 See Banayan's work laying out the Ayyew Ethos of her people: Banayan Angway, Cordillera Administrative Region Indigenous Peoples Education Curriculum K-12 (Bontoc, Mountain Prov., CAR; Philippines Department of Education, 2014).



Kindred Relations

OVER THE COURSE OF HUMAN HISTORY, certain nations have excelled far more than others at the art of ecological integration. In contrast to the steady ecological depletion characteristic of our modern moment, these cultures steadily enriched the ecosystems of which they were a part— leaving them more diverse, verdant and vibrant than they found them. Today, as we strive to find our green way forward, it is crucial to recognize that such contributive cultures have already cleared the path and walked the way. Only through this recognition can we begin to learn from them. In particular, how they themselves learned— a way of learning that was only possible through their view of plants and animals as kin, elders and, most significantly, as teachers.

While countless great greening societies have thrived around the planet (and many quietly continue to do so), there are no better example than those that first settled the continents of the Americas.

Five hundred years ago, prior to the arrival of germs, animals and humans from Europe, the Americas were home to hundreds of thriving, independent and prosperous nations.[34] Contemporary estimates of the continents' populations at the time range from ten million

34 This biological encounter, after hundreds of thousands of years of continental ecological separation, was to have a seismic impact on the biomes and civilizations of the Americas. Diseases spread like wildfire ahead of European explorers killing 90-95% of human populations. Only several years later, explorers encountering the decimated villages and cities made gravely inaccurate assumptions about the sparse human habitation they observed. Their estimations of human population and ecological consequence were thus woefully low. Population estimates weren't rectified until centuries later by anthropologists such as Henry Dobyns.

to over one hundred million inhabitants,[35] with some city populations estimated to have exceeded one hundred thousand inhabitants.[36]

Many of these nations were (and are) centuries old, with roots going back over 12,000 years to the last ice age. Over the millenia they developed sophisticated hunting, fishing and cropping technologies. Many had mastered the use of fire to to clear the undergrowth of huge swaths of land. Others had developed systems of aquaculture and agriculture that encompassed forests, lakes and mountainsides.

Like all concentrations of humanity, a significant ecological impact was inevitable. Indeed, given the large populations and advanced technologies of the time, these nations were more than capable of over-hunting, overfishing, over-gathering[37]and depleting the carrying capacities of the ecosystems of which they depended.

However, over-consumption and exploitation did not occur. Nor the depletion of the continent's ecosystems.

In fact, just the opposite.

In 1492, the first Europeans to arrive recorded their observations of the land and people of the continents. They were shocked not only by the vastly differing societies and cultures they encountered, but so too by the vastly different fauna and flora.

And their abundance.

From South America to North, explorers recorded dazzled accounts of the ecological vitality they observed: Rivers overflowing with fish; grasslands filled with countless grazing beasts; forests full of animals, birds and trees of colossal size; coastal shoals overflowing with marine life.

Alas, the newcomers lacked the conceptual ability to truly see what they were seeing. Seeped in a culture in which food largely came from single species crops and in which most animals were domesticated, the explorers were unable to comprehend that such

35 Henry Dobyns estimated a 1492 population of the Americas ranging from 90.04-112.55 million inhabitants. Dobyns, Henry F., An Appraisal of Techniques with a New Hemispheric Estimate, (Current Anthropology, 1966) Issue 7, no. 4 : p395–416.

36 Charles C. Man provides a comprehensive survey of his field and academic research which has revealed Mesoamerican and North American population centers exceeding 100,000 prior to the arrival of Europeans Charles C. Man, 1491, (Vintage Publishing, 2006).

37 "With their technology the people could have captured every fish, but that would have made no sense. River groups agreed to remove traps periodically to allow enough fish upstream to spawn and keep the run healthy. Spaces between weir stakes were also calibrated to allow smaller fish to ascend unimpeded. The fishery was so well managed that when the settlers arrived it is estimated that returning salmon numbered in the millions." David M. Buerge, (2017), *Chief Seattle and the Town that Took his Name*, Sasquatch Books. Referencing: *The Salmon Weir on Green River in Western Washington*, Davidson Journal of Anthropology, Vol. 3 №1, Summer, 1957 pp. 37–54.

biodiverse abundance could be human facilitated. Consequently, they mistook the vibrant ecosystems they encountered to be the work of 'nature' alone:

> "*…the country before us exhibited every thing that bounteous nature could be expected to draw into one point of view. As we had no reason to imagine that this country had ever been indebted for any of its decorations to the hand of man, I could not possibly believe that any uncultivated country had ever been discovered exhibiting so rich a picture.*"
>
> — Captain Vancouver's observations of the Pacific Northwest Coast *in 1792*[38]

We know now that this conclusion was gravely mistaken. Modern research has confirmed what the descendants of these nations have known all along. The thriving ecosystems of the time were not the result of a lack of human participation, but rather, *the consequence of it*.

Today, contemporary researchers are seeing past an edifice of misconception built upon the false assumption of 'bouteous nature'. Looking closely at the areas where these nations thrived; a flood of research is uncovering an underlying pattern. Where these first nations foraged, forests are today demonstrably more abundant and biodiverse than adjacent un-managed ecosystems.[39] Where they fished, today the rivers are more abundant than others.[40] Where they sourced their shellfish and clams, today the shoals host more species than adjacent un-cultivated ecosystems.[41] Poignantly, areas of thick Amazon rain-forest, long seen as the paragon of Wilderness and of Nature, are now being shown to have been the site of pre-Columbian agriculture, gardens, towns and cities. Their places of living, ways of cultivating and cropping quite literally laid the ground for the Amazon we know today.[42]

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38 George Vancouver, *A Voyage of Discovery to the North Pacific Ocean, and Round the World*, vol. 2 (London: G. G. and J. Robinson, Paternoster-Row; and J. Edwards, Pall-Mall, 1798), 220–28, 288–89. Chapter 4, 2nd of May 1792

39 "Patches of forest cleared and tended by indigenous communities but lost to time still show more food bounty for humans and animals than surrounding forests. [These] 'forest gardens' show how Native land stewardship can outdo nature", Gabriel Popkin, Forest Gardens Show how native land stewardship can outdo nature, (National Geographic: 2021)

40 "Persistence in the fishery [of salmon over the last 7,500 years] is not due simply to a lack of perturbation, but rather indicates resilience in the ecological–human system" Campbell, S. K., and V. L. Butler, Archaeological Evidence for Resilience of Pacific Northwest Salmon Populations and the Socioecological System over the last ~7,500 years, (Ecology & Science, 2021) Vol. 15, No. 1, Art. 17

41 A. Groesbeck AS, Rowell K, Lepofsky D, Salomon AK, Ancient Clam Gardens Increased Shellfish Production: Adaptive Strategies from the Past Can Inform Food Security Today. (PLoS ONE, 2014) 9(3): e91235.

42 "They practiced agriculture here [in the Amazon] for centuries… but instead of destroying the soil, they improved it, and that is something we don't know how to do today...in tropical soils" Charles C. Man, 1491, (Vintage Publishing, 2006). Chapter 8, quoting Bruno Glaser, Institute of Soil Science and Social Geography, University of Bayreuth, Germany.

Significantly, the various societal structures of the first nations of the Americas were immensely varied. While some were patriarchal, others were matriarchal; while some were kingdoms, others were confederacies; while some sought peace, others sought war.[43] However, despite this social and political diversity, beneath lay a relatively consistent view of themselves and the world— especially as compared to the world view of the arriving Europeans.[44]

Indeed, in much the same way that the disparate nations of Europe shared a continental and cultural provenance in the ideas of ancient Rome and Greece, so too did the nations of the Americas in their ice age ancestors. Just as the ideas of ancient Greece and Rome gave nations as disparate as England and Spain a common underlying view of 'Man' and of 'Nature', so too did the first nations of the Americas have their own underlying view that they largely shared. However, rather than a dichotomy of 'the hand of man' and of 'bounteous nature' that characterized the view of the colononists (we'll examine this in greater depth in the next chapter), across the Americas, nations, clans and tribes shared an underlying ontology in which humans, animals and plants were members of a common family. For these nations, all beings were integral parts of the living land— *a community of kindred relations sharing ancestry and origins*.[45]

From this world view, animals and plants were respected as *kin*: brothers or sisters, grandmothers or grandfathers.

This *kicentric* view of the world, determined how these cultures learned. Just as they would learn from a distinguished human elder, these cultures paid special attention to those particularly distinguished organisms around them: beings that in elegance and ingenuity had magnificently mastered their ecological integration.

From a scientific perspective, we can today appreciate the depth of their world view.

Indeed, just as brothers, sisters, aunts and uncles are all parts of a family because of their shared ancestry, so too are plants, insects, animals, and humans parts of an ecological family connected by lineages that reach far back into time. Just as a son, parent and grandparent are subsets of a family system so too are humans, plants and animals all subsets systems of the ecosystems of which they are part. It then follows that, as younger

43 The prevalence of a vast disparity of social structures and political systems throughout the pre-Columbian Americas (and the rest of the world) is the main argument of archaeologist and anthropologist Graeber and Wengrow. See: David Graeber, David Wengrow, The Dawn of Everything: A New History of Humanity, (Signal Publishing, 2021).

44 Jack D. Forbes, *Indigenous Americans: Spirituality and Eco*s, (Dædalus, 2021).

45 "[it is] a view that has parallels in many other indigenous groups... a cosmology in which humans are part of a 'community of beings' within the ecological system." Berkes, F., *Sacred Ecology*. Third edition. (New York: Routledge 2012) Chapter 5, p.105.

and elder family members differ in their accumulation of wisdom, so too do members of an ecosystem vary in their mastery of ecological integration.

From this kincentric view, plants and animals, having had millions of years longer than humans to integrate into a particular ecosystem embody invaluable lessons and example for humans to follow.

In fact, a salmon and an eagle, an oyster and a pine tree, all embody the culmination of millions of years of behavioral and evolutionary trial and error— the result of innumerable interactions, adaptations and optimizations to integrate within a particular environment. In comparison, the first humans to settle in the Americas were newcomers— ecological younglings who had much to learn from their resident elders.

And so they did.

As early first nations observed the way in which the lives of plants and animals synced with the cycles of an ecosystem, tendencies were noted, characters observed and virtues discerned. From the cooperation of crows to the diligence of a deer; from the strength of a bear to the endurance of an elk, stories about particular creature and the virtue that it most illuminated, were passed down over the generations.

Often, a tribe, resonating with the character of a particular creature would adopt it as their representative and guide. Almost all North American first nations contained clans that took an animal as their totem.[46] Through stories and myths, they were inspired by the animal's ecological example to lay out their clan's principal values and ethics.

So grounded in values and virtues, kincentric societies were able to weave ecological mastery into the fabric of their language, grammar and values.[47] In so doing they were able to fast forward their ecological awareness, integration and collective well-being. In this way, their cultures came to sync with the cycles of the creatures they admired most— the migration of geese, the return of salmon, the coming and going of whales and elk— and precisely because these life-cycles continued to thrive, so could they continue to learn from them.

In a virtuous spiral of ever deeper awareness, kincentric cultures steadily enhanced the harmony of the ecosystems of which they were part. With the momentum of millennia of compounding insights, their way of knowing steadily led to an ecological understanding of unparalleled lucidity. Steadily, these societies were able to effectively co-create with plants and animals a common home for all to thrive.

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46 "A North American 500 years ago could travel from the shores of the Great Lakes to the Lousiana bayous and still find settlements – speaking languages entirely unrelated to their own- with members of their own Bear, Elk or Beaver Clans who were obliged to host and feed them." David Graeber, David Wengrow, The Dawn of Everything: A New History of Humanity, (Signal Publishing, 2021) Chapter 4. Free People, the Origin of Cultures, p. 123

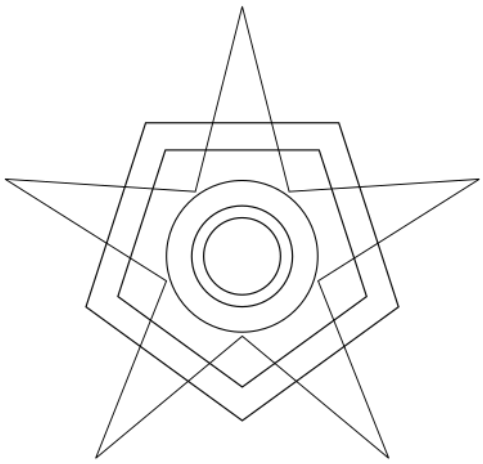
47 Ecological cosmology is deeply embedded in the Banayan's Kan'kan'nue language and so too other kincentric cultures. See: Matthew C. Bronson, Lessons in the Old Language, (Global Oneness Project, 2018).

Today, in realizing the great green feats of these nations, in turn we can learn from them and follow their example.

To do so, the recognition of the power and potential of kincentric knowing is requisite.

Only then can we realize its absence in our modern way of seeing the world.

And only then can we understand that this hole in our modern worldview is the result of a deep metaphysical mistake: an ancient error that has for too long destined all our endeavours and enterprises to deplete and degrade.



Nature's Fallacy

IN SHARP CONTRAST TO KINCENTRIC NATIONS ANCIENT AND ONGOING, our modern view of the world is based solely on the teachings of our fellow humans. From philosophers to prophets, priests to kings, scientists to seers, human teachers have entirely shaped our modern understanding and relationship to 'the natural world'. Upon this way of knowing, we have established the means by which we discern good from bad, right from wrong, green from grey— and, incidentally, centered our modern ideologies upon fulfilling human needs over those of all Earth's other inhabitants. However practical and successful this paradigm has been for the prosperity of humanity, it has wholly failed to achieve the ecological harmony we so long for today.

As we saw in our last chapter, kincentric nations were founded on an altogether different way of knowing. Rather than learning solely from humans, these societies recognized the plants and animals around them as kin, elders, and teachers. Today, as we come to recognize the connection between their kincentric ontology and the pattern of ecological enrichment inherent to their cultures, we can glimpse the pattern of depletion within our own— and isolate the ontological error that distorts our modern view of the world.

From Greek stories of human-gods ruling the world, to Roman legends of humans dominating it, western society has put humans upon a pedestal. From early astronomers declaring that the sun spun around the earth, to biblical interpretations declaring man's dominion over earth and all its creatures, humanity's centrality and exceptionalism has become lodged in the depths of western collective consciousness. Over the centuries, as modern philosophy, religion, ethics and science have evolved they have built layer upon layer on top of this ancient foundation.

Today, we know better.

After centuries of science, biologists have long dismissed that humans are at the top of life's tree and astronomers have long disproved that the Earth is the center of the cosmos. In this, contemporary science and ancient kincentricism align. Both agree that humans, plants and animals all share ancestry and origins, action and consequence, connection and dependence. Both concur that no organism is central or separate to the others: like a tapestry each and every one are inextricable parts of the whole.

However despite unequivocal dismissal, the axioms of man's centrality and separateness have remained and persisted buried in the depths of our modern ideologies. Just as cities are built upon the forgotten foundations of structures that came long before, these ancient errors tilt and incline our modern intellectual edifices that continue to stand upon them.

From capitalism to communism, fascism to feminism, our modern views of the world remain moored in human exceptionalism. Even though they claim vast differences and boast scientific savvy, their underlying cosmological foundations share the same archaic axioms.

Nowhere is this more clear than in the way our modern ideologies speak of ecosystems. From neoliberalism to socialism, from libertarianism to communism, the very words that they use to describe the organisms and ecosystems that they so long to love (in their terms: *'the natural world'*), most reveals their deep moorings in antiquated human-centric assumption.

In modern terminology, there is no word more imbued with the cumbersome weight of ancient metaphysical misconception than that of '*Nature*'. This term, used so poetically by environmentalists to compel conservation and protection of 'the natural' world, is alas seeped in irredeemable dualistic fallacy: the ancient error of delineating man and nature, culture and ecology, the natural and the human.

Upon this stark division not only is modern society built, but so too our most fervent *environmental* attempts and endeavors. Derived from the Middle-English term *environ*, meaning to circle or surround, 'the environment' has come to mean, that which is around us humans, but not that which is us.[48]

48 Russell received a personal account from Robert Muller, three time under-secretary of general of the UN, who in discussions with UN Secretary General U Thant during the 1960's, selected the word 'environment' (which had no political meaning at the time) as a term for the world's growing ecological concerns. The term was used for the 1972 United Nations Conference on the Human Environment, in Stockholm, giving 'environmentalism' its modern political meaning.

Over the last decades, feminists[49], theologians[50] and philosophers[51] have observed that the modern environmental ethics that results from this foundation (laws, sustainability guidelines, UN goals, etc.) are thus locked into a perspective of human-time, human-space and human-needs, and consequently: of human rights, interests and economy. From this view, 'nature' is inevitably objectified as something with which humanity is ever interacting: managing, dominating, stewarding. Our 'green' endeavors that follow, thus strive to reduce their harm, to protect and to conserve the 'natural' world from human touch and contamination. From this reasoning, the notion of *human ecological contribution* is an impossibility. As such, it has remained all but unimagined by environmentalists and industrialists alike.

Banayan and I observe that not only are the axioms of this logic flawed, its conclusions run contrary to the lived and ancestral experience of her people and that of countless other kincentric nations ancient and ongoing: cultures in which the concept of '*nature*' is both absent and fundamentally antithetical.[52]

We also observe that the effort of preserving and protecting 'nature' is likewise doomed to the very fate it aims to avoid. Conserving and protecting one part of a system (i.e. an organism or ecosystem) at the exclusion of others, in the end, always fails. As the neighboring parts degrade, so too will the whole, and with it, inevitably, so too all its parts.

To move forward towards authentic green contributions, we must thus first thoroughly excise human exceptionalism and its crooked conclusions from our view of the world.

To do so, the concept of 'nature' must crumble like the ancient rusted chain that it is.

Only then, can we shatter the mind forged manacles of antiquated, anthropocentric cosmology and open the door to the ecological regeneration to which our moment so urgently calls.

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49 Carolyn Merchant, *The Death of Nature: Women, Ecology and the Scientific Revolution*, (Harper & Row, 1980).

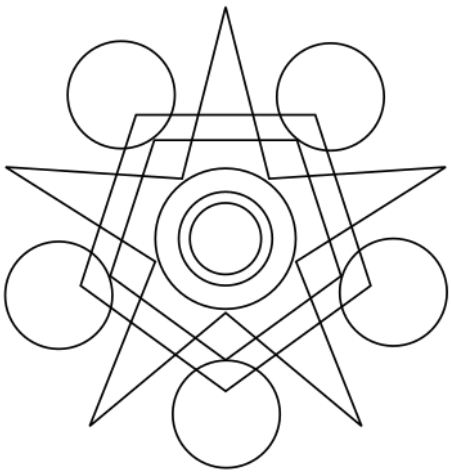
50 "A tradition of translation [of the word 'dominion' in Genesis] has inscribed the dualistic, anthropocentric, and hierarchical cast of Western philosophy and theology into the biblical text. Careful attention to the world of the text, and translations that reflect that world authentically, can open up new ("old") readings that are more ecologically sound and sensitive." See: Theodore Hieber, Retranslating Genesis 1–2: Reconnecting Biblical Thought and Contemporary Experience, (Sage Journals, 2019) Vol 70, Issue 3.

51 Timothy Morton, *Ecology without Nature: Rethinking Environmental Aesthetics*, (Harvard University Press, (2007).

52 In Banayan's Kan'kan'ue language there is no word for 'nature'. The closest term is *'batawa'* which denotes the world around without separating people from other beings. This observation is shared by speakers of other indigenous languages: Seline Meijer, *People and nature blur in the world's indigenous languages*, (IUCN: Planet at the Crossroads, 2017). See especially the work of E. Salmon, Kincentric Ecology, 2000.

Only then can we too see the plants and animals around us as kin, elders and masters of ecological integration– teachers from whom we can learn to vitalize our own contributive potential.

And only then can we see that the greatest teacher of all has been waiting for us all a long.



The Earthen Ways

FOR TOO LONG we have assumed the earth beneath us to be a static and stable constant. In fact, it is anything but. The flow of cosmic matter and momentum that first formed our planet has never ceased its spin. With no vestige of a beginning and no prospect of an end[53], the ever unfolding confluence of Earth's unique combination of matter and energy, composes a cosmological pattern of process all its own. Indeed, in our entire galaxy we know of no other entity that has so thoroughly realized the very ecological enrichment to which we now so long to manifest ourselves.

Truly, the transformation of our once barren planet into a thriving biosphere is the penultimate example of *green*.

In the same way that kincentric societies have been guided by the example of ancient masters of ecological integration, so too can we be guided by the example of Earth.

Observing the planet's shift over the eons from barren to bounteous, from grey to green, we can discern an underlying pattern in the Earth's ways.[54] In the resonance of our scientific and kincentric knowing, we can discern five principles that compose the Earth's underlying pattern of process:

53 Thomas Hutton, *A Theory of the Earth*, Royal Society of Edinburgh, (Transactions of the Royal Society of Edinburgh, 1788) Vol. 1.

54 As outlined in chapter 6, we take the view of the Earth as a self-contained, planetary system in which humans and their systems are subset. In this way, when we allude to "following Earth's example" we are mindful of the 'naturalistic fallacy' (i.e. because it is natural to do things a certain way, we ought to do things that way). While this fallacy certainly pertains to is/ought arguments between two independent systems (i.e. 'the human world' and 'the natural world'), the fallacy loses in relevance when one system is acknowledged to be a subset of the other. In such a case, a three part is/ought/if statement is possible on certain characteristics of the whole: a system is a certain way; its parts ought to embody that way if both are to operate as they should. i.e. the wall is solid and strong, and so ought be its bricks if both the bricks and wall are to stand. The plant is growing towards the sun, and so ought its leaves if it is to thrive. Consequently, we categorically avoid the dichotomy of 'natural' systems and human systems. Instead, throughout the *Tractatus Ayyew* we view human processes as an ecological subset of the Earth's biosphere.

1. Earth's processes tend towards cycles that spiral.

2. Earth's cycles tend towards the outwards dissipation of energy.

3. Earth's cycles tend towards the inwards concentration of matter.

4. Earth's spirals of energy and matter tend toward diverse systems.

5. Earth's systems tend towards ever greater awareness of their interconnection.

From organism to ecosystem, from biome to biosphere, we are surrounded with the verdant consequences of these primordial principles unfurling through space and time. Whether the process is minute or massive, ancient or ongoing, in looking closely, we can glimpse the same Earthen ways reflected and embodied— a microcosm of the macro— within every organism and ecosystem. Within the life-cycles of everything from a forest to a tree, a bird to a flea, we can observe the tendencies of Earth's character expressed— a vast symphony of a trillion processes, cycles and systems all tending towards a more resilient, livable, vibrant and abundant biosphere for all.[55]

While there are hints of these tendencies upon other planets, upon ours, they definitively incline the cycles of matter and energy[56], setting Earth apart in their clarity of expression and consequence.

Yet Earth in this way is not an exception. Given the unique coalescence of every planet, each has its own cosmological configuration and unfurling. From the endless storms of Jupiter, to the endemic volcanoes of Venus, to the very color of Mars, each planet's character tends towards its own expressions of surface, ocean and atmosphere.

55 It is important to note we do not lay any claim to why or how the Earth came to its particular cosmological character. We are simply observing the net change of the planet from its barren (grey) state to its biosphere (green) state. Whether the Earth's characteristic ways were laid by coincidence, a divine being, many beings, or a sentient planet is a separate matter.

56 Here we are not oblivious to the great extinctions, cataclysms and ice ages that have occurred over the Earth's history. Rather, we are surveying the full history of the Earth and observing its net tendencies. We observe that even when great regressions of the biosphere are taken into account, these are secondary to an overall process of greening.

That said, each planet's tendencies are not hard and fast rules. Not all storms on Jupiter turn to giant red spots, not all Venusian mountains erupt and not all rocks on Mars are red. Likewise, not all of the Earth's systems express Earthen tendencies with equal clarity and consequence[57].

In this way, over the eons, certain Earthen organisms and ecosystems have come to express the Earth's tendencies more than others.[58]

And so too certain human cultures and societies.

In the next five chapters, we shall examine five Earthen phenomena that have attained an exceptional magnificence in their geometric expression of one of the five facets of the Earth's cosmological character. With the help of various kincentric cultures and the guidance of contemporary physics, biology and astronomy we will examine the ways of the Igorots, the cycles of the salmon, the manner of mollusks, the process of a coral polyp and the means of a mycorrhizal forest. Each shall aid us in discerning the essence of a particular Earthen principle, and together reveal the full character of ecological contribution.

What we shall call an *Earthen ethics*.

Applying these Earthen ethics, we can confidently discern and define what is green (*what is an ecological contribution*) and what is grey (*what is not*).

What is green is that which embodies the five-fold geometry of Earthen principles and leads to processes, cycles and systems that are ever more vibrant, stable, resilient, abundant and conscious.

What is grey is that which conflicts with any one of the Earthen principles, leading to the opposite— lowering consciousness, reducing biome abundance, vibrancy and stability, and decreasing resiliency.

Let us move forward now to discern in detail the five parameters of ecological enrichment on planet Earth— the requisite five pillars of a new green age and a thriving common home for all.

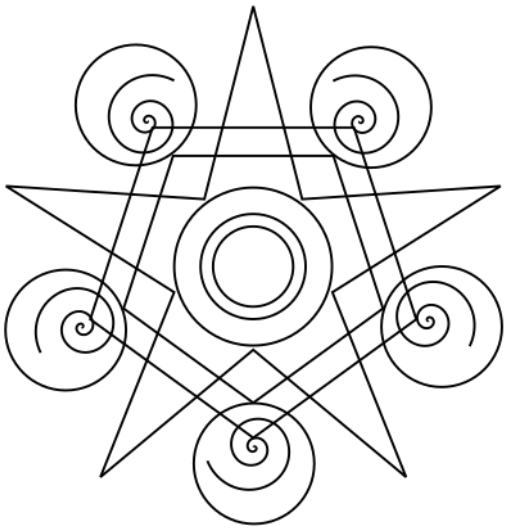
57 In fact, some processes may in fact run contrary to the overall cyclical tendency. However, these processes are always a minority— otherwise they themselves would be the tendency.

58 Although it is beyond the scope of the Tractatus, a logical extension of our argument is that Earth's patterns are in fact the requisite tendencies for the unfurling of life on any planet. In this interpretation, the Earth's ways are not unique to Earth, but rather the Earth embodies the ideal cosmological context for these tendencies to express themselves. While this requires far more proof to be established than is available, should it be true, it would not be antithetical to the Earthen ethics developed in the Tractatus. Rather it would simply place them in a broader context.

Book Two Exempli Gratia

That's the end of Book One of the *Tractatus Ayyew*.

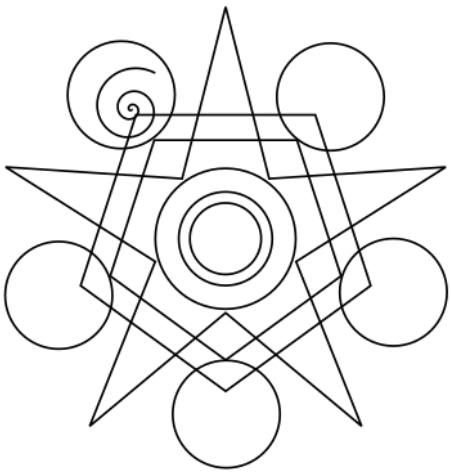
What follows is a bonus chapter of Book Two. New chapters are posted on the Earthbook edition. Subscribe and follow at https://book.earthen.io



BOOK TWO

"*If we don't do things the right way, it poisons the outcome*"

— Ruthanna Emrys, *A Half-Built Garden*



1 | Cycles that Spiral

Observe the way the Earth tends its processes towards cycles that spiral.

Rice Terraces of the Filipino Cordillearas - Photo Gladys Maximo

THE RUGGED GREEN MOUNTAINS OF NORTHERN LUZON *have been the home of the Igorot people for untold generations. Each season, with the arrival of the migratory kilin bird, the planting of rice begins. Then, once the crop has turned gold and the kilin have flown on to the forest—the harvest. And then… always a little more. For after the rice has been taken home to dry, it is time for a ritual as old as the harvest itself. One by one, rocks are gathered up from the river to shore up the sides of the field. Stone by stone, the paddy is improved to better capture and disperse the flow of rain down the hillside. Season by season, the garden is enriched—becoming not just a better home for rice, but a better common home for crabs, frogs, snails, mud fish and more. With each season the Igorots' management of soil and sun steadily augments the vibrancy of the ecosystem. Over the generations the soil's fertility increased and the harvest's grew in yield. Igorot society*

thrived. Rivers remained clean and clear. The forests were respected and the kilin would always return. And then the next cycle would spin— always a little greener than before[59].

Today as we seek to green our modern ways, we have much to learn from the way the Igorots managed their energy and matter. At the heart of their kincentric culture is an ancient ecological ethos that can help us make sense of the latest breakthroughs in thermodynamic theory and planetary science. As we shall see, the ways of Earth and of the Igorots share a geometric resonance. Both tend their processes towards cycles that spiral and enrich. This vortical pattern underlies not only how the Igorots steadily enriched their ecosystem— but also the way our once barren planet greened. This first aspect of Earth's cosmological character, can show us the geometric shortcomings of our modern linear and circular processes—and point us towards the green way forward.

To begin, we must return one more time to the origins of our solar system.

As we saw in Earth's Interstellar Story, the planets of the early solar system formed over 5 billion years ago. As each planet coalesced out of drifting stellar debris, it gained a kinetic pattern of energy and matter all its own. To this very moment, each planet's unique combination of elements, chemistry, orbit, moons, magnetosphere and more continues to unfold. Much as a culture defines and guides all aspects of the life of its people, this cosmological character permeates all a planet's processes. In particular those that repeat: its cycles — tending them in patterns that are unique to each planet.

In this way, our solar neighborhood has come to be. As Venus, Mars, Earth and all the other planets spun around the Sun, they absorbed and adapted to a never ending torrent of solar energy. Like rain pouring down a hillside into streams, rivers and rapids, the sun's energy shone down upon each planet's surface spilling into planetary cycles— atmospheric flows, ocean currents, tectonic shifts. As the planet's matter (soil, liquids, gasses) was spun, the resulting cycles were driven by the rigid dictates of thermodynamics. In ways unique to each planet, the sun's ever arriving energy was dissipated.[60]

Over the eons, the cycles on each planet unfolded and the character of each was expressed.

On Earth, one entropic adaptation after another began to accumulate. Just as the Igorots would shore up their terrace walls with new stones every season, each Earthen cycle tended infinitesimally towards an ever improved configuration of matter to capture energy — adding an atom here, a chemical bond there. Much like rice terraces capturing,

59 For an an account of the Igorots remarkable ecological synchrony see: William Henry Scott, (1959) *Some Calendars of Northern Luzon,* American Anthropologist 60(3):563 - 570

60 Entropy research by theoretical physicists posit a pattern of adaptive dissipation in the way matter organizes itself in the presence of sustained energy inputs. Meanwhile, parallel breakthroughs in cosmological epistemology help make sense of the Earth's unfolding kinetic character.

fracturing and spreading out the rain's downward flow, Earth's cycles did the same. As one cycle fractured into a thousand, and that into a million more, life began to unfold. Steadily, life-cycles adapted their spin towards ever more concentrated configurations of matter and ever better dissipations of energy.[61]

And, Earth greened.

While, today's contemporary physicists and philosophers struggle to articulate the connection of life's emergence within a thermodynamic frame[62], the Igorots have a single, precise term– and with it, an ecological ethos that governs their cycle and kin centered culture.

All aspects of Igorot life and culture are guided by the virtue of *ayyew*. Men, women, households and communities are admired and respected to the degree in which they embody the principle. Ayyew means to not just just to be in sync with a cycle (be it social or ecological), but to tend to its spin.

Children first learn the concept of ayyew at meal time. It is ayyew to finish every grain of rice on one's plate. Not because it is a waste — rather, because it is a cycle's crescendo. The last grain represents the culmination of one cycle and the beginning of the next — *and an opportunity for a little more*. As one cycle ends and another begins, there lies the chance to grow strong so that one can contribute to it: *to sow the next seedling, to help with the next harvest, to add a stone to the garden's wall.*

When there are leftovers from a process (burned rice, banana peels, grass cuttings, etc.) ayyew guides their transition to a subsequent cycle. Rather than simply compost the organic matter, it is more respectable, *more ayyew*, to feed them to the neighborhood pigs. While both methods lead to fertilizer, the resulting manure is far more concentrated in carbon and microorganisms, making it more effective at spreading over fields and gardens to disperse its nutrients out to the ecosystem at large.

Finally, ayyew guides the Igorot's relations with the land. While the destruction of the forest is despised (*how can one achieve any richer system of cycling?)* the long labor of transitioning a grassy slope to a bio-diverse and fertile ecosystem is admired above all. Rather than the rush of rain down the hillside, instead it is caught in a fractal of zigs and zags. This way the downward flow of the hydrologic cycle (rain-river-evaporation-and-rain-again) is dispersed outwards and ever more equitably throughout the hillside ecosystem. Each terrace is thus enriched— but 'riches' not just in yield. Most especially riches of the planetary kind: ecological stability, resiliency, diversity, vitality and abundance — the very same characteristics that unfurled on our once barren planet.

61 "The earth is more like an eddy in a river through which flows of matter continuously stream. It is replenished and depleted in a vortical cosmic dance. — Thomas Nail, (2021) *A Theory of the Earth*

62 Jeremy L. England et al. (2015), *Dissipative adaptation in driven self-assembly*, Nature Nanotechnology

Within the deep resonance of the Ayyew ethos and Earth's cosmological character, lies our first Earthen ethic.

As we strive to ensure that our human enterprises are green, our planet shows us the way forward. Just as Earth tended its process towards cycles that enrich, so too must we intend with our own. Only when our human processes intend and result in cycles that spiral, can they be considered ecological contributions— and green.

Today, we are realizing that our modern processes all too often result in the opposite: greying, ecological depletion. Perhaps, nowhere is this better observed than in our use of plastic.

In an Igorot community the carbon-based molecules of a grain rice can be cycled from garden, to human, to pig, and back to the garden again indefinitely. Although plastic molecules are also carbon-based, its matter all too often has a one way destination. 'Single-use' and 'disposable' plastics entirely lack a plan for their circulation. Such linear products and processes are defined by linear goals: incineration, dumping, combustion, etc. In so far as these processes fail to plan for their subsequent cycle, they fail to embody the cyclical ways of Earth.

To discern the color of our modern processes we must thus first ask about its end: *is there an intention for subsequent cycles once the first is complete?* Only when our processes have a plan for their next use, and the subsequent ones after that, can they begin to be considered ecological contributions.

So what then of our circular processes— are they sufficient to be green?

Indeed, many modern products are engineered to be circular — their next life is planned. In this way, PET bottles, carpets and casings are often designed so that when their first use comes to an end they can be recycled into something new. The materials of these products are considered indefinitely reusable 'technical nutrients'[63]. In this way, modern processes strive to transition to a 'circular economy'.

Insofar as such processes contain a plan for the next life of the product, their circularity is an important step towards following Earth's cyclical ways.

However, circularity is in and of itself is insufficient.

After all, over the eons our neighboring planets spun in perfect circles about the sun— yet they did not 'green'. No matter how much solar energy arrived, Venusian cycles did fracture and cascade. No matter how sustained Mercury's spin, its matter did not spiral into ever more concentrated and complex configurations. No matter how perfect their planetary circles, the ecological enrichment that we so long to replicate failed to take hold.

63 The term 'technical nutrient' was first proposed by William McDonough. See: William McDonough, Michael Braungart (2002), *Cradle to Cradle - Remaking the Way We Make Things*, North Point Press.

As we have seen in the ways of Earth and Igorots, ecological enrichment requires a tended shift— *always something more*. Another stone added to the terrace wall. Another atom of carbon added to a protein molecule. While it may be an infinitesimal addition in itself, over an indefinite series of cycles the result is, quite literally, a world of difference. Indeed, it is the difference between depletion and enrichment, grey and green.

As such, a plastic bottle may be indefinitely reusable, an economy circular, a company sustainable — yet like the surfaces of Venus and Mars, result in desolation.

For indeed, in the unfolding cyclical systems of the biosphere, there are no perfect circles — only cycles that spiral outwards or inwards, contributing of degrading, enriching or depleting.

As we strive to ensure our enterprises are green, not only must we plan for the subsequent cycles of our material and energetic processes, we must ensure that each iteration enriches.

The requisite spiral geometry clear, we can now delve deeper into the vortical character of enrichment itself. In particular, the *outwards spin of energy and the inwards spin of our matter*— our next two Earthen ethics.

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Summaries

1. A short sentence

The Earthen ethics concept of 'green' can be summed up in a simple two part proposition:

> *A process is green to the extent that it is an ecological contribution and it is an ecological contribution to the extent that it follows Earth's example.*

2. A long sentence

By adding 'must' we then have the core Earthen ethic:

> *To be an ecological contribution a process must embody Earth's pattern of concentrating matter and dispersing energy to cyclically enrich the vibrancy, diversity and consciousness of the system of which it is a part.*

3. A paragraph

Now, let's put our ethic within our contemporary context:

> *As we become more and more aware of the ecological degradation caused by our modern age, we long to amend our ways. Of all our ecological crises, plastic pollution is particularly representative of our challenge. As a fossil-fuel by-product, plastic embodies a direct connection to both the biosphere's multi-billion year pattern of enrichment and our modern pattern of depletion. By retracing plastic's and Earth's primordial story, we can observe the sharp contrast in these two patterns. In particular, the ways in which Earth's spiraled its matter inwards and energy outwards to unfurl ever greater vitality, diversity and consciousness. Learning from cultures that have long embodied this very pattern to master their own ecological integration, we can amend our metaphysics to recognize ecological contribution as our basis for green. Accordingly, we can ensure that our processes, cycles and systems embody Earth's pattern of energy and matter management, declare their for-Earth intention, vitalize*

biodiversity and raise awareness of their ecological impact. Starting with our plastic, we can follow Earth's example in this way to ensure that our enterprises systematically enrich the ecosystems of which they are a part.

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The book is for sale on the GoBrik store where it's sale in Brikcoins directly corresponds to the sequestration of plastic out of the biosphere.

The book is type set in Cooper LT Light and Regular by Oswald Cooper and Bitstream as well as Mulish Light & Regular by Vernon Adams, Cyreal, Jacques Le Bailly.

The enterprise of publishing the Tracatus Ayyew is for-Earth. This means we disclose our in annual Regenerative Reports.

Authors & Authorship

The writing of the *Tractatus Ayyew: Earthen Ethics* is the culmination of a decade long dialogue and friendship between Russell Maier and Banayan Angway (read the full story in the preface). The book is inspired by Banayan's research and articulation of the concept of *Ayyew* for the Cordilleria Administrative Region DepEd Indigenous Knowledge curriculum[1] and their experience founding the Filipino ecobrick movement.[2]

The words of the *Tractatus Ayyew* are written by Russell with Banayan's oversight and review. The chapter format of prefaced ecological parables is inspired by the Igorot tradition of storytelling after the Bugnas festival feast.

Banayan Angway

Banayan was the superintendent of Kalinga Mt. Province DEPED from 2015-2021. She oversaw the development of the Indigenous Culture component of the Kalinga and Mt. Province curriculum's where she integrated and developed the Ayyew concept into textbooks and lessons. As the indigenous peoples education coordinator for Mountain Province from 2011-2015 Banayan facilitated planning, implementation and evaluation of related activities that made her program known nationwide.

Russell Maier

Russell is an inventor and regenerative philosopher, currently based in Gianyar, Indonesia. Russell is one of the principals of the Global Ecobrick Alliance and writes regularly on Earthen.io. He travels around South East Asia observing the impact of human systems on biological diversity, in order to maximize human ecological contribution.

Declation of Interests & Funding

Banayan and Russell are co-founders of the Global Ecobrick Alliance. Banyan is a paid employee of the Cordillera Adminstrative Region of the Philippines Department of Education (Kalinga Province). Russell receives commissions on GEA trainer and is an active principal in the organization.

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Glossary

Ayyew: The Igorot virtue of ever increasing one's sync with ecological cycles.

Biome: An ecosystem of ecosystems. A principal ecosystem of a biosphere.

Biosphere: The all encompassing ecology of a planet (usually that of Earth).

Biodiversity: The variety and plurality of species in a biological system.

Cosmological Character: The unique history, configuration and composition of each planet that gives it its characterstic patterns of processes.

Dapay: The central stone plaza of every Igorot village that is used for ceremonies, feasts and story telling.

earth: *Soil, ground [lower case 'e']. Used with an article (i.e. "the")*

Earth: *The third planet orbiting the sun [upper case 'E']. Used without an article.*

Earthen: *Of the character of the Earth. [Capital 'E']*

earthen: Of the earth (i.e. soil, ground) [lowercase 'e']

Earthen Ethics: A ethical framework for discerning the ecological color of an act, process or enterprise based on the example of Earth.

Earth Enterprise: An enterprise that strives first and foremost to enrich the biosphere by following Earth's example.

Ecological Contribution: A process that fully embodies the principles of Earthen ethics. A green ecological impact.

Ecological Consciousness: An awareness of one's interconnection to the cycles of life near and far, old and new, local and global.

Ecology: A biological system; a part of a biome.

Fossil Fuels: *A* modern term to described the Earth's ancient compacted carbon stores.

Green: An ecological contribution: a process that follows Earth's example by embodying all the Earthen principles.

Grey: A depleting ecological impact: a process that fails to embody all the Earthen principles.

Igorot: The people of the highlands of northern Luzon, in the West Philippines Sea.

Kan'ka'nue: The language of the Igorots.

Petro-Capital Economy: An economy whose flow and generation of capital is powered by petroleum energy.

Plastic Sequestration: Plastic sequestration is the process of concentrating and compacting plastic to create short term building blocks that secure and store plastic over the long-term, in a not-for-profit process that raises consciousness, supports biodiversity and is net-subtractive.

Plastic's Stellar Story: The four billion year view of plastic as carbon sequestered by the Earth, and de-compacted by humans.

Plastic 1.0: The paradigm of plastic as human made and managed.

Plastic 2.0: The paradigm of plastic as a part of the Earth's billion year process of cultivating the biosphere and as representation of our petro-capital economy.

Regenerative*: A greening process whose subtractive impact is over twice that of its additive impact.*