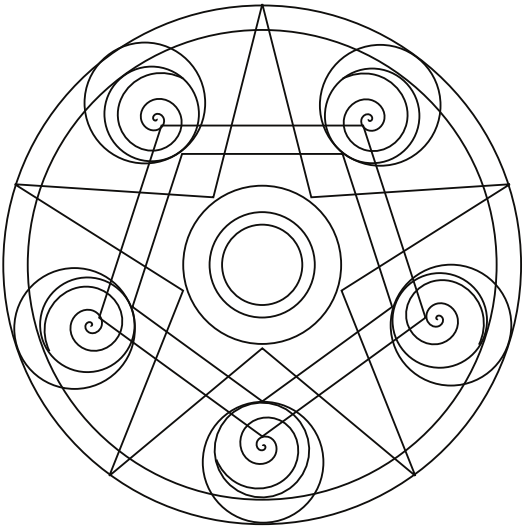
TRACTATUS AYYEW

An Earthen Ethics

BOOK ONE

Angway & Maier



TRACTATUS AYYEW

AN EARTHEN ETHICS

Angway & Maier

BOOK ONE

TRACTATUS AYYEW
An Earthen Ethics

Russell Maier & Banayan Angway

First presented at the Bandung Spirit Conference
Rise of Asia in Global History & Perspective |
La Montée de L'Asie, Histoire &
Perspective Globales
12.02.2021

Université Le Havre, Normandie, France Book One First Edition
Publishing on Earthen.io 22.02.2022

This is the first print edition of Book One.
Published, April 2024, Yogyarkarta, Indonesia.

The *Tractatus Ayyew* is also published as an Earthbook: a human and planet friendly format that enables highlighting, annotations, citations, content sharing and ecological impact tracking.

Scan to access the Earthbook or visit
book.earthen.io

Throughout the enterprise of writing and publishing the *Tractatus Ayyew*, all carbon and plastic impacts were tracked and accounted for. Our regenerative reporting can be accessed at book.earthen.io/en/accounting

Seperately, a life-list of the biodiversity hosted in the enterprise's physical space in Gianyar, Bali, Indonesia is available at earthen.io/impact

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

CONTENTS

INTRODUCTION

All of the chapters of the Tracatus Ayyew are available online at book.earthen.io by adding their language and chapter key.

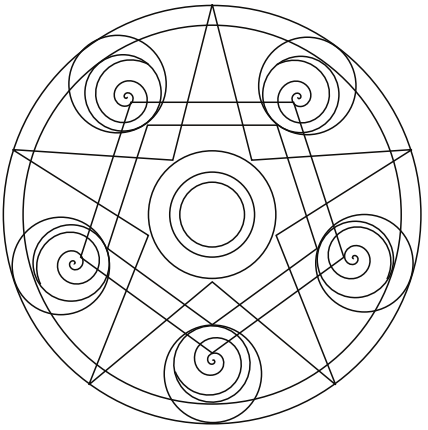
BOOK ONE

BOOK TWO

A sample chapter of Book Two of the Tractatus Ayyew is included as a preview

APPENDIX

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 centre 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, we provide a short sentence, a long sentence and a paragraph that each sum up the theory of Earthen ethics which has unfolded out of our journey.

Of course, *how* a story is told (or a theory for that matter) is just as important as the story itself. In the dap'ay, both tale and telling were inseparably intertwined. Stories were told after a dance and feast; the listeners intently gathered around a fire.

While our telling will never be quite so magnificent and meaningful, the dap'ay has inspired us to put great care in our book's presentation and publication. Consequently, the *Tractatus Ayyew* is published as an *Earthbook*— an Earth and reader friendly format that embodies the Earthen principles that we'll be laying out in the pages that follow.

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 stand-alone component so that its facet of the theory may be readily referenced and shared. For example, this section of the book can 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 full mandala at the top of the previous page.

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.

"Ayka ta man gagayam ta..."
(Come, let's tell some stories…)

– Igorot expression

PREFACE

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.

However, the Igorots had not been sitting idly by.

In 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 mines, used dynamite cable was being woven into traditional backpacks. In homes, straws and wrappers were being woven into 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 upcycled designs to make saleable 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 as the ecobrick movement has spread. And with trepidation.

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 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 convictions have crystallized: 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 world views[1] that our two ancestral backgrounds embody.

In Latin, the word *tractatus* refers to the philosophical tradition of a treatise— a step-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 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.

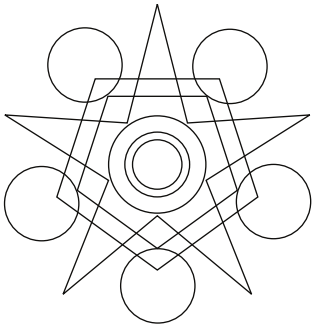
In Book Three we conclude with a five-fold Earthen solution for plastic.

In this way, through the *Tractatus Ayyew*'s systematic presentation of the functional facets of green enterprise, we aim to provide a tool kit rather than a manifesto.

It is our hope that with Earthen principles clear and plastic's resolve exemplified, other grey challenges may transition with unprecedented confidence and clarity, to an Earthen shade of green.

TRACTATUS AYYEW

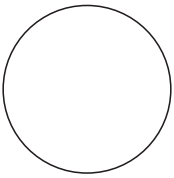
BOOK ONE



"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

From: *Le siècle vert. Un changement de civilisation*
(The Green Age A Change of Civilizations)



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 for all our fellow creatures. 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 emit— so too do they capture and concentrate more than they let loose. No longer do we merely strive to conserve and protect the planet's ever diversifying tapestry of organisms— so too do we play a part in its weaving. Thriving all together, 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 walked. 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 our modern view of the world has been unable to grasp or even conceive. Only to the extent that we can recognize these enlightened moments, can we ever imagine our own. And insofar as we can imagine it, the realization of a green age for all is not nearly as distant as many of us are tempted despair.

Inspired by the verdant legacy of Banayan's people, the Igorots of Northern Luzon,[1] 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 share space. 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

1 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), earthen.id/sources/iped.pdf.

approach, the very nutrients, fertilizers and medicines that bring a struggling garden to thrive.[2]

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*.

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 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.

---

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

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 do our best to articulate each of the principles that compose our planet's five-fold pattern of ecological enrichment.

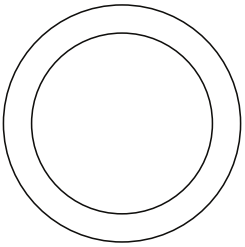
The resulting *Earthen ethics* will help us to make sense of our modern processes, technologies and enterprises by providing a means by which we can discern that which is enriching from that which is degrading; that which is an ecological contribution from that which is a depletion; and that which is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

In this way, with Earth's example as our guide to green, we can move forward with unprecedented clarity and confidence to embody the geometry of contribution in all our processes, cycles and systems.[3]

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

---

3 "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.



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.[1] Investigative journalism and scientific study has made the fate of all our plastics clear.[2] No matter

1 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).

2 In a comprehensive survey of all plastics ever made, it is estimated that 8300 million

how well we landfill it— microscopic plastic particles are ending up loose in the biosphere.[3] No matter how thoroughly we incinerate it— plastic's chemicals are leaching out into ecosystems and us. No matter how much we recycle it— plastic's usage, production and associated emissions[4] rise unabated.[5]

Our realization of the relentless ensuing pollution has evoked a generational despair.[6] 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.[7]

However, such judgments are entirely misplaced.[8]

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

---

metric tons of virgin plastics have been produceda 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.

3 "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.

4 "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).

5 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).

6 "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).

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

8 "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.

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 from 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 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, we shall see in the chapters that follow, how plastic holds an ecological value that our modern society has completely overlooked.

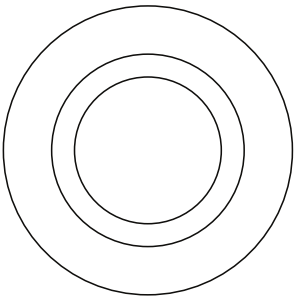
For as plastic passes through our hands each day, through it we can quite literally touch the pattern that powers our age of depletion. Through this touch, we have a unique opportunity to shift plastic's fate— and so too shift the paradigm that looms unseen behind both it and our modern world.

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.

As we shall see, only with a view from the stars can we gain the requisite perspective to the glimpse the green way forward here on planet Earth.



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 spiralling debris, further mass 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 matter: 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.[1]

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.[2] For aeons, its surface was distinguished solely by the ebb and flow of tectonic plates, of ocean currents and atmospheric flows. However, as these

1 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).

2 "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.

primordial cycles spun under the relentless shine of the sun, the Earth we know now began to unfurl.

For as the sun shone down, entropy demanded dissipation.[3] 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.

Driven and determined by its unique planetary configuration, Earth's cosmological character began to unfold. Steadily, processes, cycles and systems began to blossom 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.[4] Steadily, these systems unfurled into cells, organisms and eventually, into ecosystems.[5]

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.

As they did so, they interacted and adapted— and as they adapted, they diversified and intertwined. A vibrant matrix of inter dependence 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, thrived. As these

---

3 "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).

4 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).

5 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).

creatures lived and died their carbon matter spiralled from one organism into another while their nutrient energy spiralled outwards through the web of ecosystems that came to comprise Earth's biosphere.[6]

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.

Although Earth's organisms breathed out carbon dioxide, the subtractive spin of their cycles tended to sequester more carbon into the ground than they added back into the air. With more and more organisms living and dying, living and dying, soon great quantities of carbon were removed out of the atmosphere. With more carbon being sequestered all the time, Earth's climate stabilized[7] and the biosphere flourished.

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.

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 until 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.

---

6 "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).

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

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.[8] With nowhere to go, these chemicals began to pile up.[9]

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 marvellous 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.[10] No longer were expensive silver plates required to take a photograph.[11] No longer was the shelf life of fresh food limited to a few days.[12] Plastics enabled a slew of new products and technologies— and new ways for enterprises to reduce expenses, increase revenues and accrue capital.

Powered by the ever increasing flow of petroleum and profit, industries grew and grew. As they expanded, so did the extraction of carbon, its 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.

---

8 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).

9 "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.

10 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.

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

12 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).

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. With growing alarm and anxiety we watched as our plastic clogged rivers, littered beaches and piled into great smoking mountains.[13] The particles of plastic were everywhere— inside the bodies of fish and animals— and us.[14]

Shocked, shamed and determined, industry strove to amend their mistakes and improve their ways. Industry, did their best to convince themselves, and everyone else, that there was a solution just around the corner. Enterprises strove valiantly to make their processes, products and packaging less harmful, less polluting and less damaging.

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

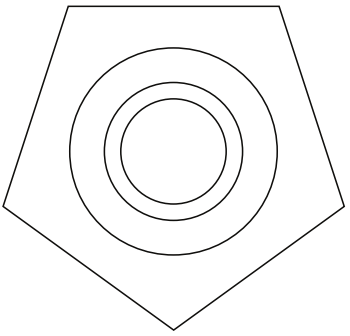
Unabated, the grey flows of plastic and pollution continued to grow.

And with it, our despair.

---

13 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).

14 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, even more remarkable, our telling of the tale is now part of the story itself.

The 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 sentience in a myriad of forms. Powered by ancient compacted carbon, our last centuries of civilization and 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.[1] And finally, through the resulting emergence of consciousness, we have been propelled to pondering the process itself.

So, where do we go from here?

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. Due to the doings of modern humanity, it has been aeons since Earth's processes, cycles and systems so abruptly added more carbon into the atmosphere than they removed.[2]

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 away 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 one grasp the process of the play.
There is no other way.

Likewise, our disruption of ecological cycles is not a consequence of

---

1 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".

2 "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).

our nature any more than it is the nature of carbon or oxygen.[3]

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, degraded diversity and stifled awareness. In sharp contrast, Earth's processes have 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.[4]

Like a despairing determined child on a second-go at block 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 harmful, less polluting, less degrading, less grey. However, no matter how hard we have striven, our polluting has increased unabated: over time, any improvements in the efficiency of our grey processes have been inevitably eclipsed by their proliferation. For with the underlying grey pattern of our processes unchanged, even if they are less depleting— *depleting they remain*.[5]

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

---

3 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 subset systems within it, our Earthen character becomes clear. See: Rutger Bregman, *Humankind: A Hopeful History,* (Little, Brown and Company, 2019).

4 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.

5 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.

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 Earth's can be observed with unprecedented clarity. In the stark contrast of patterns, we can begin to discern the planetary cosmological character that has propelled the inexorable transformation of a barren rock 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.

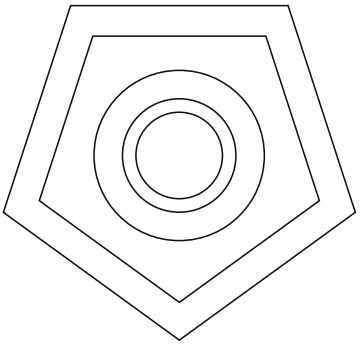
And in a similar way, through our modern society's ecological dissonance, so too can our modern gaze now recognize those societies— ancient and ongoing— that have long attained resonance with Earth's pattern and character.[6]

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 one and for all.

---

6 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 ecological cycles of which they were a part— leaving them more diverse, verdant and vibrant with each spin. Today, as we strive to find our green way forward, it is crucial to recognize that such contributive cultures have already walked the path and laid 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 notably, as teachers.

While countless great greening societies have thrived around the planet (and many continue to do so), the example set by than those that first settled the continents of the Americas, is particularly enlightening.

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.[1] Contemporary estimates of the

1 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

continents' populations at the time range from ten million to over one hundred million inhabitants,[2] with some city populations estimated to have exceeded one hundred thousand inhabitants.[3]

Many of these nations were (and are) centuries old, with ancestries going back to the last ice age. Over the millennia, many mastered the use of fire to to clear the undergrowth of huge swaths of land. Others developed systems of aquaculture and agriculture that encompassed entire forests, lakes and mountainsides.

Given the large populations and the potent technologies of the time, these nations were more than capable of over-hunting, overfishing, over-gathering[4] 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.

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.

2 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.

3 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).

4 "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.

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 bio-diverse 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[5]

We know now that such colonial conclusions were 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 past an edifice of scientific misconception all built upon the false assumption that rich ecosystems are somehow isolated from human integration. 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.[6] Where they fished, today the rivers

---

5 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.

6 "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,*

are more abundant than others.[7] Where they sourced their shellfish and clams, today the shoals host more species than adjacent un-cultivated ecosystems.[8]

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 verdant, vital and diverse Amazon ecosystems of today.[9]

Significantly, while these first nations shared this ecological tendency, their various societal structures were immensely varied. While some were patriarchal, others were matriarchal; while some were kingdoms, others were confederacies; while some sought peace, others sought war.[10] 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.[11]

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

---

(National Geographic: 2021).

7 "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.

8 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.

9 "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.

10 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).

11 Jack D. Forbes, *Indigenous Americans: Spirituality axqnd Ecos,* (Dædalus, 2021).

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 colonists, 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, ecosystems and cycles*.[12]

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

This kincentric view of the world, determined how these cultures learned.[13] 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.

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 subset-systems of the ecosystems of which they are part. It then follows that, as younger 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 perspective, plants and animals— having had millions of years to integrate into a particular ecosystem— embody invaluable lessons and example for humans to follow.

---

12 "[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.

13 We are applying Enrique Salmon's term 'kincentric' to describes cultures that relate to the plants and animals with which they share an ecosystem as kin: "Indigenous cultural models of nature include humans as one aspect of the complexity of life." Enrique Salmón, *'Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship', Ecological Applications,* (Ecological Society of America, Oct., 2000) Vol. 10, No. 5, pp. 1327-1332.

In fact, a salmon and an eagle, an oyster and a pine tree, all embody the culmination of millions of years of behavioural 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 a 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*— a means of formally declaring family with a particular animal.[14] Through stories and myths, they were inspired by the animal's ecological example to lay out their clan's principal values and ethics.

Grounded in these values and virtues, these societies were able to weave ecological mastery into the fabric of their language, grammar and values.[15] 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, such cultures steadily

---

14 "A North American 500 years ago could travel from the shores of the Great Lakes to the Louisiana 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.

15 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).

enhanced the harmony of the ecosystems of which they were part[16]. 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.

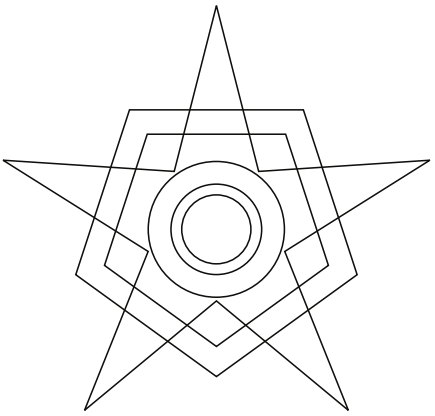
Today, in realizing the great green feats of these *cyclocentric* nations, in turn we can learn from them and follow their example.

To do so, the ontological recognition our kinship with all Earth's creatures is key.

Only then can we realize the absence of this axiom in our modern view of the world.

And only then can we understand that this oversight is the result of an even deeper metaphysical mistake: an ancient error that has for too long destined all our endeavours and enterprises to deplete and degrade.

16 From the Greek Κύκλος for 'Cycle', we introduce the term 'cyclocentric' to describe kincentric cultures and their propensity to self organize around the sync and celebration of Earthen cycles. We use this term in distinction to the terms 'ecocentric' or 'biocentric' which fail to capture the importance of human/ecological synchrony which characterized these particular cultures. This term and concept are inspired by Igorot Ayyew culture. See an account of the way in which the Igorot culture and calendar are centered around the ecological cycles of their biome, the earth, moon: William Henry Scott, (1959) *Some Calendars of Northern Luzon*, Anthropologist 60(3):563 - 570.



NATURE'S FALLACY

IN SHARP CONTRAST TO KINCENTRIC CULTURES 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 and right from wrong— and, incidentally, centred 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 cultures and cyclocentric civilizations were based on an altogether different way of knowing. Rather than learn 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 their pattern of ecological enrichment, 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.

However, today, we know better.

After centuries of science, biologists have long dismissed that humans are at the top of life's tree. Likewise, astronomers have long disproved that the Earth is the centre of the cosmos. Here, 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 persisted, buried in the depths of our modern ideologies. Just as a building is often built upon the forgotten foundations of one that came long before, these ancient errors tilt and incline our modern intellectual edifices that continue to stand upon them.

Although our modern ideologies may claim vast differences and boast of scientific savvy, all too often they share this common foundation. From capitalism to communism, our modern views of the world remain anchored in the same archaic axiom of human exceptionalism.

Nowhere is this more clear than in the way our modern ideologies speak of the biosphere. From neoliberalism to socialism, from libertarianism to communism, the very way that they refer to 'the natural world' most reveals their deep moorings in antiquated human-centric assumption.

In fact, 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 and conservationists to protect and preserve '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 endeavours. 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.[1]

Over the last decades, feminists[2], theologians[3] and philosophers[4] 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 environmental endeavours that follow, thus strive to reduce their harm, to protect and to conserve the 'natural' world from human touch— which is understood *a priori* as contaminating, depleting and destructive.

Alas, from this reasoning, human ecological integration is an impossibility. And as such, the very notion of human ecological contribution 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.[5]

---

1 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.

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

3 "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.

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

5 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

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, always fails. As the neighbouring parts degrade, so too will the whole, and with it, inevitably, so too 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.

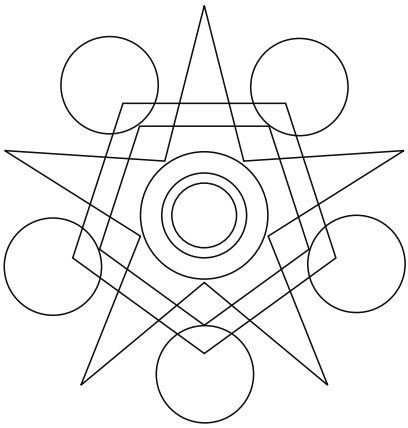
Only then, can we shatter the mind forged manacles of antiquated, anthropocentric cosmology and open the door to the ecological regeneration to which our moment so urgently calls.

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.

---

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.



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[1], 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 Earth's

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

ways.[2] In the resonance of our scientific and kincentric knowing, we can discern five principles that compose Earth's underlying pattern of process:

1. *Earth's processes tend towards cycles that spiral.*
2. *Earth's cycles tend towards the outwards spiral of energy.*
3. *Earth's cycles tend towards the inwards spiral 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 diverse, resilient, vibrant, interwoven and hospitable home for us all.[3]

While there are hints of these tendencies upon other planets, upon ours, they definitively incline the cycles of matter and energy[4], setting

---

2 As outlined in chapter 6, we take the view of planet Earth as a self-contained 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.

3 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.

4 Here we are not oblivious to the great extinctions, cataclysms and ice ages that have occurred over Earth's history. Rather, we are surveying the full history of Earth

Earth apart in their expression and consequence.

Yet, Earth, in this way is not an exception to other spheres of matter spinning through space. 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 colour of Mars, each planet's character tends towards its own expressions of surface, ocean and atmosphere.

That said, each planet's tendencies are not hard and fast rules. Not all Jovian storms turn to giant red spots, not all Venusian mountains erupt and not all Martian rocks are red. Likewise, not all Earthen systems express Earthen tendencies with equal clarity and consequence.[5]

In this way, over the apons, certain of Earth's organisms and ecosystems have come to express Earthen tendencies more than others.[6]

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 each of the five facets of 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*.

---

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.

5 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.

6 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, Earth's ways are not unique to Earth, but rather 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.

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-faceted 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.

EXEMPLI GRATIA

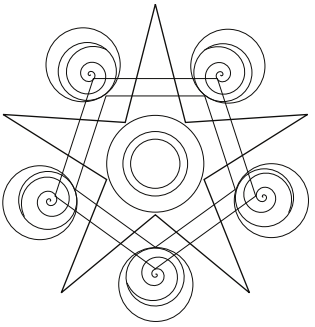
That's the end of Book One of the *Tractatus Ayyew*.

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

TRACTATUS AYYEW

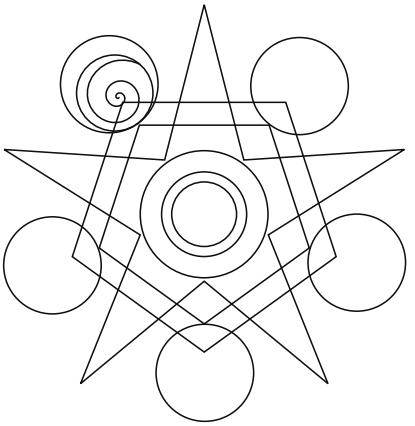
BOOK TWO



"You see that hill over there? Blackfellow law like that hill. It never changes. Whitefellow law go this way, that way, all the time changing. Blackfellow law different. It never changes. Like a stone, like that hill. The law is in the ground."

— Doug Cambell

A spokesperson of the
Yarlin people



CYCLES THAT SPIRAL

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

– Earthen Ethic No. 1

THE THICKLY FORESTED MOUNTAINS OF NORTHERN *Luzon have long been the home of the Igorot people. Over untold generations, Igorot society has spun with the cycles of the creatures with whom they share space. For the Igorots, the time for planting the first rice seedlings is heralded by the return of the migratory kilin bird. Then, once the crop has turned gold and the kilin has flown back to the forest— the harvest. And then… always a little more. For after the rice has been carried 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 paddy becomes not just a better home for rice, but a better common home for countless others: crabs, frogs, snails, mud fish and more. Over the generations, fertility and harvest increased. Igorot society thrived. The river and the forest ecosystems florished. And the kilin would always return. Then, the next cycle would spin— always a little greener than before.*[1]

1 For an account of the Igorots remarkable ecological synchrony see: William Henry Scott, (1959) *Some Calendars of Northern Luzon*, American Anthropologist

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

As we saw in Earth's Stellar 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 neighbourhood 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 soil, liquids, and gasses were 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.[2]

Over the aeons, 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. Like rice terraces capturing, 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.[3]

60(3):563 - 570

2 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 Earth's unfolding kinetic character.

3 "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*.

And, Earth greened.

While, today's contemporary physicists and philosophers struggle to articulate life's emergence within a thermodynamic frame,[4] the Igorots have a single, precise term– and with it, an ecological ethos that governs their cyclocentric culture.

All aspects of Igorot life and culture are guided by the virtue of *ayyew*[5]. Men, women, households and communities are admired and respected to the degree in which they embody the principle. Ayyew means to not just to be in sync with a cycle, 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 neighbourhood 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 labour 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

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

5 Banayan, 2014.

planetary kind: stability, resiliency, diversity, vitality and abundance — the very same characteristics that have unfurled on our once barren planet.

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, Earth 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: 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, plastic's molecules are incompatible with such cycles. 'Single-use' and 'disposable' plastics, are engineered without a plan for their cyclical reintegration and fail to fit back into ecological systems, causing problems of all kinds. Such products and processes lead to such linear goals as dumping and incineration. 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 colour 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?

Today, many 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'[6]. In this way,

6 The term 'technical nutrient' was first proposed by William McDonough. See:

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 aeons our neighbouring 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, systemic enrichment failed to take hold.

As we have seen in the ways of Earth and the Igorots, ecological enrichment requires a tended shift— *always something more*. Another stone added to a 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 in the unfolding cyclical systems of the biosphere, there are no perfect circles — only cycles that spiral outwards or inwards, contributing or 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.

William McDonough, Michael Braungart (2002), *Cradle to Cradle, Remaking the Way We Make Things*, North Point Press.

SUMMARIES

1. A short sentence

The Earthen ethics concept of 'green' can be summed up in a simple sentence:

A process is green when it follows Earth's example of ecological contribution.

2. A longer sentence

By adding 'must' we have the core Earthen ethic. Note that green is interchangeable here with 'ecological contribution'.

To be green a process must embody Earth's pattern of concentrating matter and dispersing energy to cyclically enrich the diversity and awareness of the system of which it is a part.

3. A paragraph

Now, let's place it within 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 both Earth's multi-billion year pattern of ecological enrichment and our modern pattern of ecological depletion. By retracing plastic's primordial and modern stories, we can observe the sharp contrast in each's patterns of process. In particular, the ways in which Earth's spiraled its matter inwards and energy outwards to unfurl ever greater vitality, diversity and consciousness whereas our

modern civilization has spiraled matter outwards, energy inwards to unfurl just the opposite. Learning from cultures and creatures that have long embodied Earth's pattern to master their own ecological integration, we can amend our metaphysics to recognize ecological contribution as a basis for an ethic of green. Then, and only then, can we step forward with bold green enterprises that operate in cycles of enrichment, that declare their for-Earth intention and that raise the awareness of all those they touch. 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.

ACKNOWLEDGMENTS

WHAT FIRST BEGAN AS CONVERSATION, BECAME A SCHOOL project, then a program, then a curriculum, then a movement. Eventually, an essay emerged. Then another and another. And finally, the Earthbook before you. Along this decade long journey, our thoughts have been touched and propelled by countless contributions from the folks who have assisted and accompanied us along our way.

First and foremost we are grateful for our plastic. Without the trials and tribulations of trying to figure out what to do with it— the physical and philosophical journeys its pollutions and solutions have sparked for us— this book would never have begun.

That said, we are grateful to our invisible beginnings: our ancestors, both of our own lineages and those of other kincentric cultures around the world that have touched and inspired our struggle with the meaning of green. Their accumulated wisdom serves as the bedrock upon which we have built.

Along our journey, countless friends, family and colleagues who have been of invaluable assistance in our undertaking.

Thank you to Pi Villaraza who was instrumental in energizing our early connection and collaboration. He pointed us towards the use of Igorot and Filipino wisdom traditions to both undergird our work with plastic and to guide the social spread that followed.

Un grand merci to Fabrice Garrigues for his dedication and efforts in the French translation of the *Tractatus Ayyew* and for rich evenings of family, wine and philosophy that accompanied it. Thanks to George Beurnier for his dinners that supplemented our efforts, and for his

friendship and encouragement in the quest towards plastic's resolve—and billiard excellency.

Un grand merci a les deux Frère Jacques de l'Abbey de Scourmont. First, thank you to Frère Jacques senior for his gift of the *Laudato si'* encyclical (of which the concept of a "common home" helped to inspire and guide our work) and to his heartwarming persistence acquiring an early version of our French translation without our knowing! Thank you to Frère Jacques junior for his early review and sourcing Catholic feedback and critic so that we could ensure our work resonates with the Laudato si' movement.

Thank you to Trisha for her support, encouragement, listening and friendship. Thank you to Shiloh Vermaack and Richard Goldsmith for the relentless reviews of every chapter, not once but twice and sometimes thrice. Thank you to Nicole and Vaughn for the in-depth reading and encouragement. Thank you to Mel for the reminder that our ancestry, in particular its contrasts, was not just a side note, but a principal theme. Thank you to James and Ruth for their support and insights from the Bulkley Valley. Thank you to Rolf and Chris for their scathing early reviews. Their invaluable critiques had a profound effect on our direction. Thank you to Ani for her fathomless patience with the piles of pages and infinite coffee cups that accompanied this process.

Thank you to our Igorot and Wet'su'weten brothers and sisters whose examples have inspired us: James, Jed, Sir Ernesto, Jake and the Sabangan guides.

Chapter banners, Eagle & Salmon No.1 and No.2, Frog and Sun by Wet'su'weten artist James Madam.

Photos of Igorot culture on Earthen.io by Gladys Maxim. Chapter 9 photos by Robert Brodey.

Thank you to Thumas Hutton and Thomas Nail, both of whom wrote a book entitled *"A Theory of the Earth"*. Although each book were published quite independently (the first in 1788 and the second in 2021!) both greatly inspired and encouraged our own work and theory.

Thank you to Mark Donnovan and Donnie Maclurcan, with whom a conversation inspired the insights of Chapter 9.

Thank you to Stephen DeMeulenaere for the steamy conversations on the parallels of capital and carbs, fats and fiat that was invaluable in

shaping our ideas of Earthen energetics in Chapter 9.

Thank you to Balaji Srinivasan. Though a good deal of our ideas are in direct opposition, the "web app" version of his book The Network State nonetheless inspired us to aline our publishing platform and our principles and inspired our development of the Earthbook concept.

Thank you to Enrique Salmon for his pioneering work developing the concept of "kincentric ecology" as a means of distinguishing Rarámuri metaphysics (and that of other fist nations) from the modern concept of 'nature'. His work and his term underlie our use of the phrase 'kincentric culture' and have been invaluable to advancing our theory.

Russell acknowledges the land of Banjar Sumampan, Gianyar, Indonesia, the ancestral home of the Balinese, as base for the writing and publishing of this book.

Banayan acknowledges the land of the Igorot people and their wisdom tradition which inspired, nurtured and enabled this book, her oversight and contribution.

THE PUBLISHING

THE TRACTATUS AYYEW WAS WRITTEN AND PUBLISHED USING 100% open source hardware and software developed by not-for-profit enterprises. Written using Libre Office, using a Purism Librem 13 laptop running Ubuntu and a Framework laptop running Linux Mint. The Earthbook's cloud files for writing and all final published files are hosted on an Ubuntu server running NextCloud.

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 Ecological accounting in annual Regenerative Reports.

THE 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 Cordillera Administrative Region DepEd Indigenous Knowledge curriculum and their experience founding the Filipino ecobrick movement.

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

With her academic background in education, Banayan has worked for over two decades in indigenous peoples education highlighting indigenous values. A long time researcher and practioner of her people's values she has striven tirelessly to integrate Igorot concepts into the education curriculum of the Northern Philippines. As the Indigenous Peoples Education (IPED) coordinator for Mountain Province from 2011-2015 she oversaw the integration of Igorot concepts into more than two hundred schools. In 2012, guided by Igorot values, she and Russell were instrumental in the start of a local movement of ecobricking that would later spread across the entire Philippines and beyond. She has been the Department of Education's Schools Division Superintendent for the province of Abra (2017-18) and Tabuk City (2019-2023). She is currently the DEPED superintendent for the province of Apayao.

Russell Maier

Russell is an inventor and regenerative philosopher, currently based in Gianyar, Indonesia. Russell is a co-founder of the Global Ecobrick

Alliance with Banayan. When not gardening, programming or designing, he writes on Earthen.io. He is currently the lead of the Global Ecobrick Alliance's Ocean to Earthen project that recovers ocean plastic to build regenerative earth and ecobrick structures.

AUTHOR DECLARATIONS

BANAYAN AND RUSSELL ARE CO-FOUNDERS OF THE GLOBAL Ecobrick Alliance. Banayan is a paid employee of the Cordillera Administrative Region of the Philippines Department of Education (Kalinga Province). Russell receives commissions on GEA trainings and is an active principal in the organization.

A private donation by Trisha Joe of 2500$ USD was received in 2020 to purchase the Librem laptop and upon which this work was written. A second donation of 3000$ USD by the same supporter was received to publish the *Tractatus Ayyew* Earthbook edition in 2022.

Other than the above, no grants, sponsorships or funding from any organizations, companies, governments or corporations were received by Russell or Banayan to support the writing of the *Tractatus Ayyew* or at any time for any other of their work.

BLIBLIOGRAPHY

Principal sources listed in order of appearance in the book.

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

Bill Mollison, *Principles from Permaculture a Designers' Manual,* (Tagari Publishers: 1988).

Daniel Pinchbeck *How Soon is Now: From Personal Initiation to Global Transformation,* (Publisher: Watkins Publishing, 2017)

Sustainable Packaging: Consumer View, (Global Web Index: 2020)

R. Geyer, et al., *Production, use and fate of all plastics ever made* (Science Advances, 2017) Vol. 3, no. 7.

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

Plastic & Climate: The Hidden Costs of a Plastic Planet (Center for International Environmental Law, 2019).

Russell Maier, *Recycling: The Evil Illusion*, (Medium.com, 2016).

Mike Pearl, *Climate Despair Is Making People Give Up on Life* (Vice Magazine, 2019).

D. Gilford et al, *The Emotional Toll of Climate Change on Science Professionals,* (2019)

Steven W. Running, *The 5 Stages of Climate Grief* (University of Montana, Missoula: Numerical Terradynamic Simulation Group Publications: 2017).

Guido Tonelli, Genesis: *The Story of How Everything Began*, trans. Erica Segre, Simon Carnell (Farrar, Straus and Giroux, 2021).

Rye, R., Kuo, P.HO., and Holland, H.D., *Atmospheric carbon dioxide concentrations before 2.2 billion years ago* (Nature, 1995), 379, 6013-75.

Thomas Nail, *Theory of the Earth* (Stanford University Press, 2021).

Jeremy L. England et al. (2015), *In the beginning: The full story of life on Earth can finally be told*. (NewScientist, 2019).

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

David M. Raup and J. John Sepkoski, Jr., *Mass Extinctions in the Marine Fossil Record,* (American Association for the Advancement of Science, 1982) Vol 215, Issue 4539.

UK Oil consumption, (British Plastics Federation, 2008), Ref PD/LFH/19/8/08.

Russell Maier, Ani Himawati, *The Rise of the Regenerative Ecobrick Movement*, (Le Havre University: Bandung Spirit Conference, 2019).

Susan Freinkel, *Plastic: A Toxic Love Story,* (Houghton Mifflin Publishing Company, 2011), p7.

Carmen Nobel, *How Cellophane Changed the Way We Shop for Food,* (Harvard Business School, 2017).

Beyond Storms & Droughts: The Psychological Impacts of Climate (American Psychologists Association, 2014).

Mental Health and Our Changing Climate: Impacts, Implications, and Guidance (American Psychologists Association, 2017).

David Beerling, (2007) *The Emerald Planet, Oxford University Press*

Rutger Bergman, *Humankind: A Hopeful History,* (Little, Brown and Company, 2019).

Dobyns, Henry F., *An Appraisal of Techniques with a New Hemispheric Estimate,* (Current Anthropology, 1966) Issue 7, no. 4: p395–416.

Charles C. Man, *1491*, (Vintage Publishing, 2006).

C. Ballard, *The Salmon Weir on Green River in Western Washington*, (Davidson Journal of Anthropology, 1957) Vol. 3 No. 1, Summer, pp. 37-54.

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

Gabriel Popkin, F*orest Gardens Show how native land stewardship can outdo nature,* (National Geographic: 2021)

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

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.

David Graeber, David Wengrow, *The Dawn of Everything: A New History of Humanity,* (Signal Publishing, 2021).

Jack D. Forbes, *Indigenous Americans: Spirituality and Ecos,* (Dædalus, 2021).

Enrique Salmón, *Kincentric Ecology: Indigenous Perceptions of the Human-Nature Relationship,* Ecological Applications, (Ecological Society of America, Oct., 2000) Vol. 10, No. 5, pp. 1327-1332.

Berkes, F., *Sacred Ecology*. Third edition. (New York: Routledge 2012) Chapter 5, p.105.

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

Theodore Hieber, *Retranslating Genesis 1–2: Reconnecting Biblical Thought and Contemporary Experience* (Sage Journals, 2019) Vol 70, Issue 3.

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

Seline Meijer, *People and nature blur in the world's indigenous languages*, (IUCN: Planet at the Crossroads, 2017).

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

William Henry Scott, (1959) Some Calendars of Northern Luzon, American Anthropologist 60(3):563-570

GLOSSARY

Key terms & their definitions as used throughout the *Tractatus Ayyew* and on Earthen.io publications.

Ayyew

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

See chapter 6: *Nature's Fallacy*

Biome

An ecosystem of ecosystems: the principal ecosystem of a biosphere.

Introduced in chapter 1: *Imagine*

Biosphere

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

Introduced in chapter 1: *Imagine*

Cosmological Character

The unique history, configuration, and composition of each planet that gives it its characteristic pattern of processes.

Introduced in chapter 7: *Earthen Ways*

Cyclocentric

From the Greek Κύκλος for 'Cycle', we introduce the term 'cyclocentric' to describe kincentric cultures and their propensity to self organize around the sync and celebration of Earthen cycles.

See chapter 5: *Kindred Relations*

Dap'ay

The central stone plaza of every Igorot village that is used for ceremonies, feasts, and storytelling.

Introduced in chapter: *Preamble*

earth

Soil, ground [lowercase 'e']. Used with an article (i.e. "the")
Related terms: earth,

Earth

The third planet orbiting the sun [uppercase 'E']. Used without an article.

Introduced in chapter 1: *Imagine*

Earth Enterprise

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

See chapter 9: *The Cycle of the Salmon*

earthen

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

Earthen

Of the character of the Earth. [Capital 'E']

Introduced in chapter 7: *Earthen Ways*

Earthen Ethics

An ethical framework for discerning the ecological color of an act, process, or enterprise based on the example of Earth.

Introduced in chapter 7: *Earthen Ways*

Ecological Consciousness

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

Introduced in chapter 12: *Awareness*

Ecological Contribution

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

Introduced in chapter 1: *Imagine*

Ecology

A biological system; a part of a biome.

for-Earth

The intention of an enterprise to strive first and foremost to enrich the biosphere by following Earth's example.

See chapter 9: *The Cycle of the Salmon*

Fossil Fuels

A modern term to describe the Earth's ancient compacted carbon stores.

See chapter 3: *An Interstellar Story*

Green

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

Introduced in chapter: *Preface*

Grey

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

Introduced in chapter 1: *Imagine*

Humancentric

A view of the world in which humans are central and separate from the natural environment around them. Also, 'anthropocentric'.

Introduced in chapter 6: *Nature's Fallacy*

Igorot

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

Introduced in: *Cycles that Spiral*

Kincentric

In opposition to humancentric; a view of the world in which plants, humans, animals and all Earthen organisms share ancestry and origins, cycles and ecosystems.

See chapter 5: *Kindred Relations*

Petro-Capital Economy

An economy whose flow and generation of capital is powered by petroleum energy.

See chapter 3: *An Interstellar Story*

Plastic 1.0

The paradigm of plastic as human made and managed.

Introduced in chapter 2: *Plastic 1.0*

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.

Introduced in chapter 13: *Plastic 2.0*

Plastic Sequestration

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.

Introduced in chapter 14: *Plastic Sequestration*

Plastic's Stellar Story

The four billion year view of plastic as carbon sequestered by the Earth, and de-compacted by humans.

See chapter 3: *An Interstellar Story*

Regenerative

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

Spiral Design

The Earthen principle of crafting indefinite cycles that are enriching, both socially and ecologically.

See chapter 9: *The Cycle of the Salmon*

Wet'suwet'en

Wet'suwet'en are a First Nations people who reside in the interior North West coast of North America along the Bulkley River. The Wet'suwet'en Nation is composed of five clans, each of which has its own traditional territory and hereditary leaders.

See chapter 9: *The Cycle of the Salmon*