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Introduction

"Nature has beauty and brains" is the theme we have chosen for our research paper. At the outset, we would like to contest the theme itself. Beauty in our opinion is subjective. What is beautiful to one may not be, need not be beautiful to another. One may view the snow clad mountains of the Himalayas as beautiful; for another, it may be the chattering parrots in their own backyard and for yet another, it may be the unmitigated, sheer joyfulness of the waves they see in the oceans. For one of our own team members, beauty is the *'hide and seek'* game played by a tiger and a deer in the forests of Asia or Africa. Beauty is limiting; it worships what is superficial, seen and visible. Beauty can also be evaluative; one can get caught with one's own idea of beauty and can easily start viewing and evaluating things by that narrow definition. This narrow definition may have its own purpose in our world of humans. Can we apply this definition of beauty to Nature, which transcends evaluation, criteria, purpose, and goals? Doesn't that speak of our own arrogance and perceived superiority?

When we think of brain, we see reasoning, thought processes, understanding and learning. Brain is defined as ***"An organ of soft nervous tissue contained in the skull of vertebrates, functioning as the coordinating center of sensation and intellect".*** Brain is also closely linked to knowledge –***"the fact or state of knowing; the perception of fact or truth; clear and certain mental apprehension."*** To equate Nature, which so far as we know, has no beginning and no end to brain, and knowledge is not only absurd but is also ineffectual. Brain and

Beauty addresses an infinitesimally small part of the physical reality; to use it to describe/evaluate the natural world shows our ineptitude and arrogance.

Nature according to us is much more expansive. Nature is *wisdom and wonder*. A sense of wonder stirs in us awe, reverence and humility. It gets us in touch with not only the known, the unknown but also the *'unknowables'*. There is unfathomable mystery in the miracle that this planet is – in the way the planet came to be, in the manner in which life evolved on it and the seemingly effortless life sustaining processes.

Nature is also wisdom in that it transcends the known and the visible. It is a continuous thread that links past, present and future, built on the collective experiences of a community of beings, both living and non-living. Wisdom is also about seeing and valuing the underlying connections, the interlinkages and the *'whole'*.

Our paper focuses on *wonder and wisdom* that is nature.

Anthropocentric vs. Holistic View of the World

Anthropocentrism or homocentrism is the way of living when nearly everything is approached from the perspective of human beings. ***"Human chauvinism, the idea that humans are the better species, the source of all value, the measure of all things, is deeply embedded in our culture and consciousness".*** Man usually looks at things around him as discrete elements which he can use to benefit from and often loses sight of the web which interconnects everything together. For example, when a tree is cut to acquire land to construct buildings or for lumber, the ecosystem the tree had been supporting is lost as well. Oxygen, which is released during photosynthesis, is no longer generated. The birds nesting on the tree have lost their homes. These, however are some of the consequences of cutting one tree. The repercussions of large scale deforestation are well known and well documented.

Holistic approach looks at man as being a part of the whole system and his place in the web of life is no more important than its other elements. Holistic view is the idea that all the properties of a given system cannot be determined or explained by its component parts alone. Instead, the system as a whole determines how the parts function, and the whole and the parts have a dynamic relationship with each other.

Several micro-organisms, other forms of life, abiotic agents like wind and water and other components of the Earth are in constant and ceaseless interaction to ensure the maintenance of Earth's balance. Even when there is a small disturbance in the functioning of these, Earth's natural system gets impacted as everything is

interlinked. As stated by James Lovelock in his book Gaia, "Human beings are a part of the community of living things that unconsciously keep the Earth a comfortable home, and we humans have no special rights only obligations."
An Anthropocentric view looks at the natural world and phenomena from a narrow, short-term human perspective. A flood is evaluated in terms of loss to human life and property. A holistic approach to the same phenomena will view it as a natural process of continual change in the earth's biosphere which may include positives such as renewal of the soil's fertility and richness. Another example could be natural forest fires. There is no denying that forest fires affect the people and wildlife in that area. Holistically speaking, the ashes of the burnt trees return fertility to the soil, making it possible for new life to begin. As we shall see later in this paper, the forest fire is also a mechanism by which the planet keeps the oxygen level in the atmosphere at the safe level of 21%.

This anthropocentric world view is also reflected in and reinforced by many of the pop culture renditions subtly and/or overtly conveying the message that ***"the good of mankind is the only thing that matters".*** This was clearly evident in a much anticipated movie-sequel released in the summer of this year. In the film, when the city is threatened with a bomb explosion, the super hero manages to locate it and disposes it off into a sea. The superhero is applauded and receives accolades for saving the lives of people. Through this, aren't we conveying that disrupting the oceanic ecosystem is a small price to pay for protecting the well-being of humans?

In contrast to conventional anthropocentric belief that non-living matter is merely a backdrop for life, the holistic view as propounded by James Lovelock in his Gaia theory argues that the rocks, the air and the oceans are part of Gaia [1].

Gaia has continuity with the past, back to the origins of life and extends into the future as long as life persists. "***Gaia, as a total planetary being, has properties that [illegible] of organisms living together***

1 – "Gaia is the idea of Earth as a self-regulating interconnected living system which regulates and administers its physical conditions to make itself a place to support and sustain life" – James Lovelock

Man's Place in Nature

"We don't own the web of life, we are merely a strand in it"-Chief Seattle

Over millions of years of evolution, we human beings have gradually emerged as complex beings able to discern and manipulate the environment. The materialistic progress made possible by science and technology during the last two centuries in particular has given us the notion that we are a superior species. But when one looks deeply at the web of life, we see that the existence of man is no more or no less significant than the existence of other species.

As stated by Gerald Durrell in his book Amateur Naturalist, ***"One of the chief ways in which living things in a community depend on each other is through the need for food.*** There is a network of feeding relationships, of eating and being eaten which is called a food web. Organisms depend on each other for things other than food like homes, places to hide in and the right conditions for their growth. Living beings are very dependent on the physical aspects of their environment – and this reality puts a limit on where various species (including human beings) live and how large a population of these can be supported there. A community together with its physical environment is called an ecosystem. Within a stable community, niches are usually arranged so that no species is in direct competition with another. ***In a community which has lots of different species, relationships amongst various species are interwoven in a complex fashion.***

From all of this we can see that the whole of nature is dynamic and fluid and is a self-regulating system; seasons revolve, niches are emptied and filled, there is

competition and cooperation among species and there is a constant recycling of nutrients."

Man for the most part of his existence accepted his part in the web and there was a relationship of mutuality and equality with other constituent parts. It is only in the recent past that he began to dominate and subjugate nature – "he over-exploited the natural forest, over fished and polluted the seas. He continues to eliminate some animal species and deplete others. He has introduced animals and plants into regions where they have no business to be." (Ref: Gerald Durrell, Amateur Naturalist)

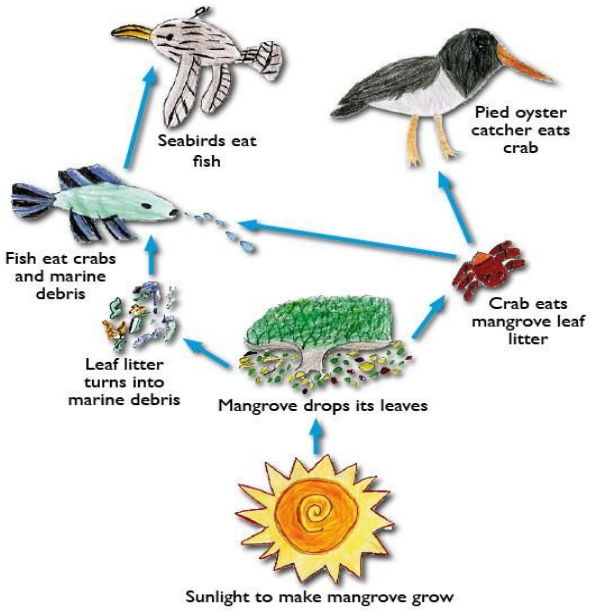
In short he has alienated himself and feels disconnected from the web of life. He has lost his ***'sense of place'***.

Nature is Wisdom

Life's cycles:

Nowhere is the wisdom of nature more evident than in the life's cycles. In the living world, every form of life is food for another. Food chains and webs show how food and energy are exchanged between species.

1. **Food Chain**



(Source: http://www.livingheritage.org.nz/schools/primary/hauraki/mangrove-forest/chain-gang.php)

A food chain is a food pathway that links different species in a community. In a food chain, energy and nutrients are passed from one organism to another. Food Chains rarely contain more than six species because the amount of energy passed

on diminishes at each stage, or trophic level. The longest chains usually involve aquatic animals.

In a food chain, an animal passes on only about 10 percent of the energy it receives. The rest is used up in maintaining its body, or in movement, or it escapes as heat. The amount of available energy decreases at every trophic level, and each level supports fewer individuals than the one before. This results in a pyramid of numbers with many organisms at the bottom and few at the top.

A community of living things may contain hundreds or even thousands of different species. Each species is usually involved in several different food chains. Therefore different food chains often interconnect to form a large network, called a food web. Even in a small ecosystem, such as a pond, food webs can be extremely complicated.

The food chain can be summed up in the following way- the primary consumers (the herbivores) eat plants to gain their energy, a secondary consumer then eats a primary consumer to get its energy. This happens till the end of the food chain when they die and decompose to get mixed with the soil. ***"Microorganisms like bacteria, fungi and other larger organisms break down all organic matter to a rich resource – compost."***

The whole process of decomposition is truly the ultimate wisdom of nature. ***"One cannot see the microbes in action and yet the result is evident. A pile of organic matter will, over time, heat up, shrink in volume and convert to dark, rich***

compost. Further study of this process reveals that this happens thanks to an amazingly well-defined hierarchy and role definition among the microbes. Through this biological process that returns organic matter to the soil, the composting cycle becomes part of the earth's biological cycle of growth and decay." (Ref: Cycles of Nature, Eternal Bhoomi Magazine, pg 24-25)

The main reason it is called a food chain is because at the end, the energy is returned, back to the producer in the food chain. The wisdom of this cycle of Nature is that energy is constantly moving in cycles, providing nourishment to all and ensuring the cycle is looped back without any wastage. In fact, if not for this aspect of Nature's wisdom, of the dead being recycled into life, Life itself will not be possible and we would not be here to think and write about Nature!

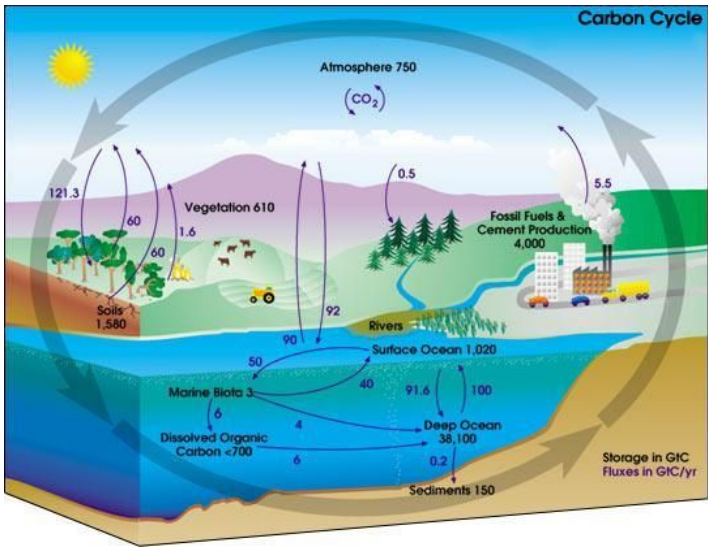
There are several other life's cycles powered by the sun in many ways. They include the carbon, oxygen, nitrogen, phosphorous and water cycles. Out of which the most interesting is the nitrogen cycle.

2. NITROGEN CYCLE

The ***"Nitrogen cycle"*** is an example of the fascinating coordination and inter-dependency between the various biotic and abiotic elements in nature. Nitrogen found in the atmosphere cannot be used as such by plants and animals. It is converted by bacteria present in soil and water to more usable forms. Animals then get their share by eating plants, and humans get theirs from eating animals and plants. The wisdom of the nitrogen cycle is that, nitrogen which is an essential building block of protein – and hence of life itself - is made available to plants and animals. (Ref: Cycles of Nature, Eternal Bhoomi Magazine, pg 24-25)

3. CARBON CYCLE

Due their ability to photosynthesize, plants are the only living things that produce their own food. They take in carbon from the air in the form of CO_2, produce



carbohydrates and release O_2, which keeps life on Earth going. Then the plants shed their leaves, which are decomposed by millions of soil microorganisms to release carbon to the soil and air, which is absorbed by a new plant. The cycle thus continues so that more food can be produced. This is the carbon cycle. Another aspect of the wisdom of the carbon, nitrogen and other cycles is that the same atom of carbon, nitrogen etc can be recycled for millions of years. (Ref: Cycles of Nature, Eternal Bhoomi Magazine, pg 24-25)

4. WATER CYCLE

The water cycle is fundamental for life on Earth. It is powered by the sun and gravity. Solar energy causes water to evaporate from water bodies. Plants extract water from the soil through their roots and transport it to their leaves from where it transpires. The vapour eventually condenses and comes down as rain, snow or sleet; the wisdom of the water cycle is that water which is again essential for life is made available freely to all living beings.

Nothing new can ever be added into the earth except for the energy of the sun which makes it critically important for us to re-use repeatedly the resources of Nature just as Nature re-uses most of her resources by cycles such as the nitrogen cycle, carbon cycle, phosphorous cycle, and the water cycle.

Nature is Wonder

a) LIFE ON EARTH

The Earth we live on is an incredible mystery which has revealed to us only some facets of itself. The fact that life exists itself is a miracle. Life on our planet is certainly miraculous - not in a “theological sense”, but in the extraordinary sequence of events and processes that seem to have been crucial in creating an Earth suitable for life. Often times we tend to lose sight of how special this planet we call home is.

Earth is estimated to be about 4.5 billion years old, and for much of that history it has been home to life in one form or another. Indeed, some scientists think life appeared the moment our planet's environment was stable enough to support it. The earliest evidence for life on Earth comes from fossilized mats of cyanobacteria called stromatolites in Australia that are about 3.4 billion years old. Ancient as their origins are, these bacteria (which are still around today) are already biologically complex—they have cell walls protecting their protein-producing DNA, so scientists think life must have begun much earlier, perhaps as early as 3.8 billion years ago.

But despite knowing approximately *when* life first appeared on Earth, scientists are still far from answering *how* it appeared. "Many theories of the origin of life have been proposed, but since it's hard to prove or disprove them, no fully accepted

-theory exists," said Diana Northup, a cave biologist at the University of New Mexico.

The basic timeline of a 4.6 billion year old Earth, with approximate dates is as follows:

- *3.6* HYPERLINK "http://en.wikipedia.org/wiki/1000000000_(number)" *billion years of simple cells (prokaryotes),*
- *3.4 billion years of stromatolites demonstrating photosynthesis,*
- *2 billion years of complex cells (eukaryotes),*
- *1 billion years of multicellular life,*
- *600 million years of simple animals,*
- *570 million years of arthropods (ancestors of insects, arachnids and crustaceans),*
- *550 million years of complex animals,*
- *500 million years of fish and proto-amphibians,*
- *475 million years of land plants,*
- *400 million years of insects and seeds,*
- *360 million years of amphibians,*
- *300 million years of reptiles,*
- *200 million years of mammals,*
- *150 million years of birds,*
- *130 million years of flowers,*
- *65 million years since the dinosaurs died out,*
- *2.5 million years since the appearance of the genus Homo,*
- *25,000 years since the disappearance of Neanderthal traits from the fossil record.*
- *200,000 years of anatomically modern humans,*

Source: Wikipedia

It is believed that a lightning bolt fertilized what were then our seas into the first living cell. It is from that single cell that the drama of life unfolded. So from the microscopic organisms to the blue whales, all of us can trace our origins back to that *single mother cell*. That all constituent parts of the earth are intimately connected is the truth that none of us can escape from.

Earth's biosphere is teeming with millions of organisms. An ecosystem is defined as the minimal grouping of diverse organisms with the non-living physical and chemical environment that interact and function together in order to sustain life. Ecosystems vary widely in size, complexity, biotic and abiotic components, and the sharpness of the boundary. The key point is that it is the ***ecosystem that sustains life***. Individual organisms or populations cannot sustain life indefinitely. No single species can produce all the food it needs, decompose all its waste, and reuse the matter to produce more food. Can we then state that interconnectedness and interdependence is the key to sustain life in this planet?

Living sustainably therefore means that we accept this truth and live in harmony with Nature. This in turn means adopting life-styles and development paths that respect and work within nature's limits. It can be done without rejecting the many benefits that modern technology has brought, provided that technology also works within those limits.

b) **BIOSPHERE AND BALANCE**[2]

The biosphere is the global sum of all ecosystems. It can also be called the zone of life on Earth made possible by the dynamic interplay of the three realms – hydrosphere, atmosphere and geosphere. It is a closed and self-regulating system. The Earth is a self-regulatory system in that it constantly tries to be at a state of equilibrium by regulating its climate and composition so as to make it comfortable for all the organisms that inhabit it.

So what defines conditions for a unique life-bearing planet?

1. **Temperature**

Our bodies maintain a certain temperature – usually around 98.4°F. When the temperature outside is very high, the body perspires and brings down the temperature. Where the temperature outside is low, the shivering that results increases molecular activity to generate more heat by burning more body fuels. "A similar process of self-regulation applies to Earth as well. After organic life began, the Earth's average temperature has been maintained between a narrow range of 10-20^{0}C, even when the sun's heat has increased by 25^{0}C over the last 3.5 billion years. 3 billion years ago, a mere 2 degree decrease in temperature would have been enough to establish an ice age and wipe out most forms of life. And what is fascinating is that this temperature regulation within a narrow range has been sustained by Earth for over three billion years."

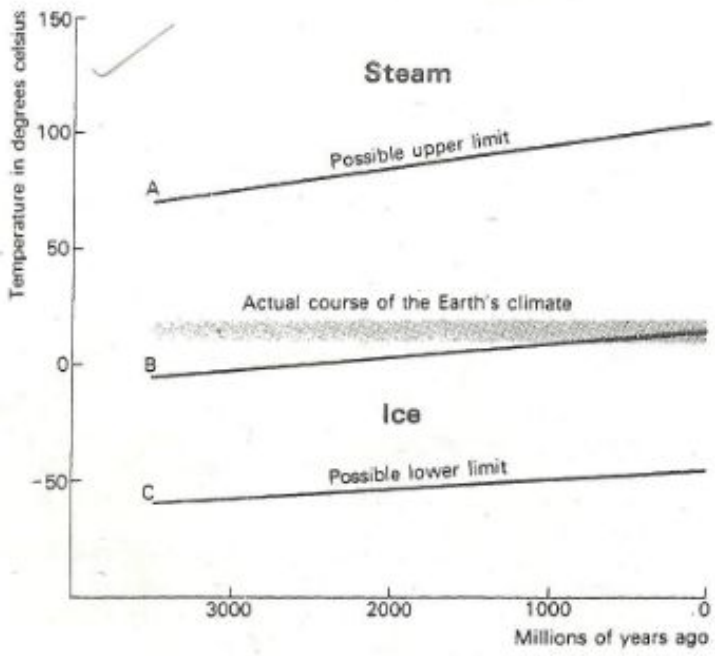


Fig. 1. The course of the Earth's average temperature since the beginning of life 3.5 aeons ago is all within the narrow bounds of the horizontal lines between 10° and 20°C. If our planetary temperature depended only on the abiological constraints set by the sun's output and the heat balance of the Earth's atmosphere and surface, then the conditions of either the upper or lower extremes, marked by the lines A and C, could have been reached. Had this happened, or even if a middle course were followed, line B, which passively goes with the sun's heat output, all life would have been eliminated.

Source: James Lovelock, Gaia- A new look at life on Earth

2. **Constancy of oxygen**

"Oxygen is taken in during respiration and there should be enough of it to keep aerobically respiring organisms alive. Oxygen is also a supporter of combustion and its actions are muted by nitrogen. Instead of around 21%, if the atmosphere had around 25% of oxygen life would not have been sustained for everything would be in flames. The constancy of oxygen concentration suggests the presence of an active control system, presumably with a means of sensing and signaling any departure from the optimum oxygen concentration in the air."

3. **Oceanic salinity**

"Oceanic salinity has been maintained at a constant level of less than 3.4% saturation for millions of years. How is this possible when natural processes of weathering are releasing salt washed off from the lands continually into oceans? The answer lies in the miracle-creator – dense patches of bacteria that thrive in the salt flats in the oceans. They trap salts and other minerals and helps in maintaining the oceanic salinity at a constant level."

4. **Acid-alkali balance**

The troposphere consisting of the dense layers of the atmosphere are "a curious mixture of reactive gases forever in flux and chemical disarray, yet never losing their balance. Various gases like hydrogen, oxygen, Ammonia and much more are constantly in movement between themselves with the biosphere. Gaia's control system keeps all the gases and acids in balance but this balance is beginning to be

disturbed in parts of the world. As fossil-fuel burning releases sulphur into the atmosphere, it is brought down as sulphuric acid or acid rains."

The earth, like every other living entity is also constantly evolving. The fact that life magically appeared on this planet in response to certain optimum life supporting conditions is a wonder; that life in turn sustains and supports the conditions for life to continue is the ultimate wonder!

2 – We are Gaia, Seetha Ananthasivan, Eternal Bhoomi Magazine, pg 10-13

Nature's wisdom and wonder is palpable if we choose to see it, feel it and connect with it. Nature's cycles are intimately interlinked with our own life processes. The self-regulating mechanisms that she has created and has sustained define who we are as humans. She is a water being; so are we. She is diverse with her seen and unseen organisms and multiple life forms; so are we. She works in cycles, interlinking, interconnecting; so do we. She creates, adapts and evolves; so do we.

The parallel ends here. If I am a part of the web of interconnected living and non-living beings, I would naturally be part of processes that deepens the interconnections and not destroy it. I would naturally and organically live within the limits imposed by Her natural order and not impose and operate from my own notions of order. Unfortunately, the very life's cycles that have evolved over billions of years through the cooperative working and collective wisdom of millions of known and unknown beings is under threat.

If we go back in time about two million years ago, we would see that man was as much a part of the rhythm of life as any other being. He then tried to fathom Her complexities, was overawed and also started worshipping her. With the sharpening of his reasoning power and ability to figure things out, he got a peek into how things work in nature. With this began his disconnect and disregard for the complexities that define the natural world. He lost touch with who he is and his obligations towards Earth and its community of beings.

"From you I receive, to you I give.
Together we share, by this we live."

- **Anon**

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