ON GROWTH AND FORM OF LIVING BEINGS

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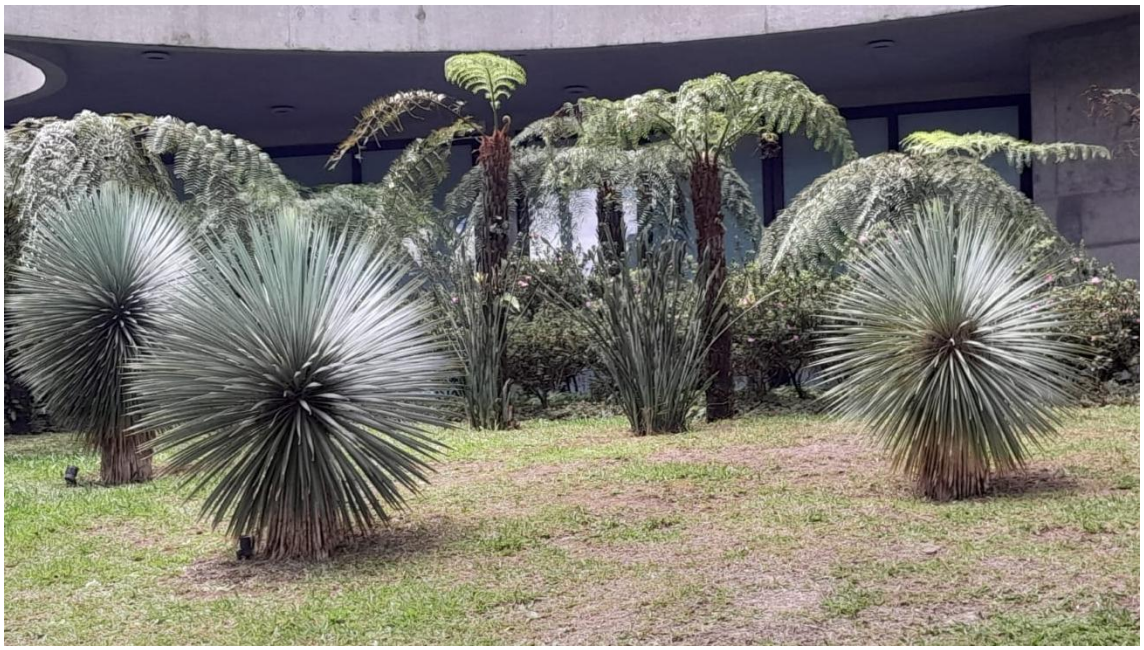
1. Introduction

On February 13, 2025, while visiting the CARDE – Museu do Automóvel [*Automobile Museum*], in Campos do Jordão, State of São Paulo, Brazil (remarkably interesting, very well organized by epochs and brands), I photographed the following plants in the garden:



I was mesmerized by the spherical shape assumed by these plants, especially the one on the front left. There are perhaps hundreds of narrow, needle-shaped leaves, their tips shaping a fairly spherical configuration. Note that if the plant is isolated, i.e., its growth is not impeded by any obstacle, this spherical shape does not depend on factors such as sunlight and, to a certain extent, wind. Initially, looking on the internet for similar plants, I thought it was the species *Nolina nelsonii* [see references]. Júlia Monte drew my attention to the species *Yukka rostrata* [see ref.], but I am in doubt.

2. The growth of living beings

Living beings grow by cell division. Two new cells are formed in the division of one of them (mitosis), eventually replacing cells that have died (apoptosis).

Note the wonder of life: this growth occurs from the inside out, unlike minerals, which grow by external deposition, generally following molecular forces, as in the case of crystals. This is one of the fundamental distinctions between minerals and living beings.

A cell can be influenced by its neighbors when subdividing, but it makes no sense to assume that the division of a cell depends on those far away. In the case of the plant in the picture, one cannot imagine that the cells in different leaves are communicating, for example one "communicating" to another on another leaf: "I've subdivided, try subdividing too, otherwise we'll break the spherical shape." Imagine the division taking place at the same time in thousands, perhaps millions of cells. So, in the plant in the picture above, the cells in one of the leaves subdivided independently of the cells in another leaf. So how did they contribute to organizing the outer spherical shape formed by their tips?

Up to now, only the growth of living beings has been dealt with, but the same applies to the regeneration of tissues, maintaining the original shape [or form].

3. Can the shape be due to genes?

It turns out that cells are physically very imprecise. If cell division were controlled solely by the cell's genes, the result would not be so geometrically perfect. Obviously, the genes are involved in the process, as it has already been shown that by modifying the genetic code, the shape of a plant can change.

4. Fundamental hypotheses

Suppose a cell is in an initial state $\mathbf{E_0}$, containing all the cell's configurations.

Hypothesis $\mathbf{H_1}$. The first hypothesis is that by physically examining a cell and its environment, it is impossible to predict when there will be a cell division or the beginning of cell death, i.e., if it is in a certain state in terms of cell division, it is not possible to predict which of the following three state transitions will be taken:

$\mathbf{T_1}$. In the following "moment," the cell will remain as it is, i.e., in terms of cell division there is a "transition" from the $\mathbf{E_0}$ state it was in into the same $\mathbf{E_0}$ state, i.e., there was an $\mathbf{E_0 \rightarrow E_0}$ "transition". There was no modification in terms of cell division. (The reader may find this name "transition" strange, since there was no change in cell division; this name was borrowed from the theory of formal automata).

$\mathbf{T_2}$. In the next "moment," the cell will begin to divide, i.e., there is a transition from $\mathbf{E_0}$ to a state **D** in which division begins to occur, in the process of mitosis. In this case, the transition is $\mathbf{E_0 \rightarrow D}$.

$\mathbf{T_3}$. In the next "moment," the cell will begin to die, i.e., there is a transition from $\mathbf{E_0}$ to a state **A** in which cell death begins to occur, in the process of apoptosis. In this case, the transition is $\mathbf{E_0 \rightarrow A}$.

According to hypothesis $\mathbf{H_1}$, there is a physical non-determinism related to the three possible transitions.

Hypothesis $\mathbf{H_2}$. The second fundamental hypothesis that I will formulate here is that there is an Individual Model underlying each plant. (These Models are noted with capital letters to distinguish them from the common use of this word). The Individual Model of each plant controls which of the three transitions will be taken by each cell at each

moment. Thus, it controls cell division, within the physical possibilities of each plant. Depending on the physical state of the living being, the interaction can be different, which explains different forms during growth.

5. The nature of the Model

In the case of the plant in the picture above, the Individual Model imposes approximately a sphere, as well as imposing the elongated and pointed shape of each leaf, as well as the distance between the leaves, the shape of the trunk and other details.

How do we recognize the sphere? With our thinking! With it, we can imagine an ideal sphere, i.e., one whose points on its periphery are equidistant from the same point, its center, and associate this mental image with what we see approximately on the plant.

Note that no one has ever seen a geometrically perfect physical sphere. Even if it is made of metal, manufactured with great precision, if you look at the surface with a microscope you will see numerous irregularities. A geometrically perfect sphere exists only in the *Platonic world of ideas*, which is not physical. As I showed in my article "Concepts, ideas, sensations, feelings and cognition" [see ref.], ideas cannot be stored in the brain; they are reached or observed with one's thinking and expressed in the form of concepts (words or symbols). When a person observes the plant in the picture, using thinking, s/he can immediately associate its external shape with a sphere, that is, this shape is recognized as being approximately a sphere.

Therefore, the Individual Model of each plant, which controls cell division by imposing the spherical shape of the tips of the leaves, is not physically inside the plant. It acts on it "from the outside," as has been said, imposing the state transitions described, so as to preserve the shapes of the leaves and the sphere formed by their tips.

Hypothesis $\mathbf{H_3}$. Each species of living being has a single Species Model, which interacts with the Individual Model of each plant in the species, imposing on it, as far as possible, the ideal form of the Species Model.

It is the Species Model that is recognized by some person in the shapes assumed by each plant.

As we have seen, the Models that impose forms on plants (and on all living beings) are in the Platonic world of ideas. It so happens that this world is not physical – just as the whole of mathematics is not physical. But if the Model of a living being is not physical, how can it act physically, interacting with the physical body of a living being, imposing the form of the being?

6. A theory of how something non-physical can act physically

The growth of living beings by cell division enables the formulation of a theory of how a non-physical Model can influence something physical.

In section 4, the hypothesis was formulated that, in terms of cell division, it cannot be said which of the transitions $\mathbf{T_1}$, $\mathbf{T_2}$ or $\mathbf{T_3}$ will be taken next. However, there have clearly

been choices as to which transitions should be taken by which cells. Here comes another fundamental hypothesis.

Hypothesis **H_4**. In terms of the division of a cell that is in a certain state, the *choice* of which of the three possible transitions to take next *does not require energy*. Perhaps a transition such as cell division (mitosis) requires energy, and the death of a cell (apoptosis) even produces energy. But *choosing* which of the three possible transitions to take does not require energy. It is precisely here that something non-physical can act on the physical body, without violating physical "laws" and conditions.

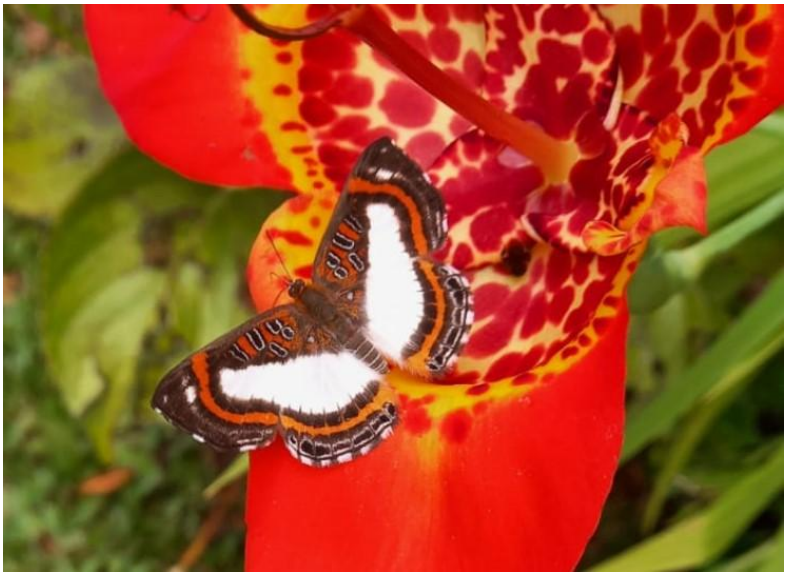
An extension of this hypothesis is that there are an infinite number of physically non-deterministic state transitions in nature, which do not deal with cell division. For example, where will a water molecule move to in a river or cloud? Or will it evaporate?

Note that there can even be a stochastic (i.e., statistical) determinism, whereby we can roughly predict what will happen to a large group of beings or matter of the same species, under the same boundary conditions (surroundings). But a stochastic process cannot be applied to a single cell or molecule. For example, one can predict that the plant in the picture will grow roughly spherically, but that does not say anything about which cells will undergo mitosis next.

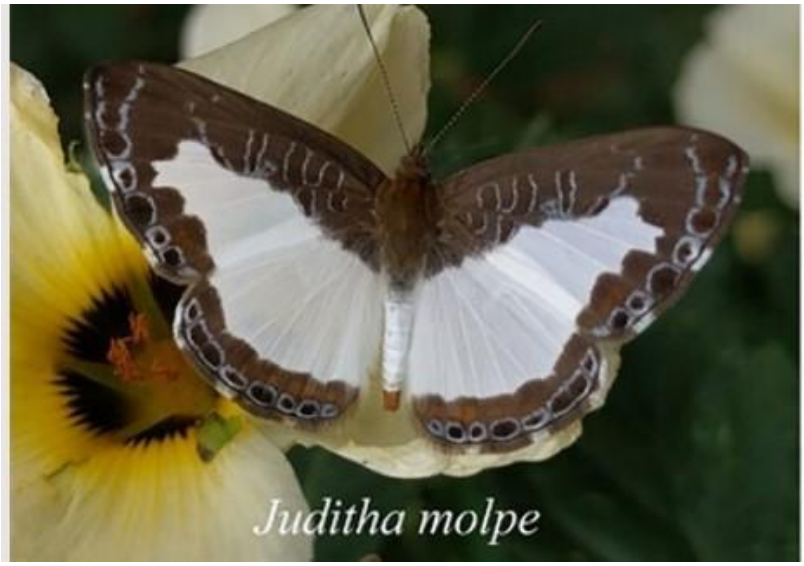
7. Other models

This theory can be applied to understand, to a certain extent, the shape of living beings. Why do the leaves and flowers of a certain plant all have roughly the same shape, to the point where you can recognize the species of the plant by the shape of its leaves and/or flowers? Why do plants of the same species in a certain region flower at almost the same time? How do great symmetries occur in certain living beings? Look at the extraordinary symmetry of the shapes of three butterflies (the first two are my photos, taken in Ubatuba and Campos do Jordão, two cities in the State of São Paulo, respectively; the second butterfly is on a lily):

Hamadryas arete



Synargis phillone



How is it possible that these butterflies created such symmetrical shapes on their wings, with matching shapes and colors? It's impossible to suppose that the cell divisions and chemical modifications (which are responsible for the colors) that took place in one wing during growth were transmitted to the other wing so that the second wing would do the same as the first, so as not to break the symmetry. It is also impossible for the genes to have controlled the growth processes in independent tissues because, as has already been said, living cells are very imprecise. Worse still, the butterflies grew in their cocoons when their wings were curled up!

The shapes are very similar in butterflies of the same species (search the internet for examples of those shown in the pictures, using their scientific names). Again, it can be assumed that there is a Model associated with each species, associated with the Individual Model that controls the growth and chemical modifications of an individual of the species. We recognize the species because our thinking is of the same nature as these Models!

8. Symmetries in human beings

The reader is invited to observe her/his hands, placing one over the other, palm to palm. Note that they are very symmetrical, unless accidents have modified their form. When the adult reader was born, her/his hands were perhaps half the size they are now. How was it possible that during their growth they continually preserved the great symmetry between them? Note that the hands grew independently of each other, and one was probably used much more than the other!

The Model theory expounded here can once again help to understand the process. There must be a Model that imposes the symmetrical shapes, controlling cell division leading to tissue growth and regeneration. This is achieved because these Models control which cells will make the $\mathbf{T_1}$, $\mathbf{T_2}$ and $\mathbf{T_3}$ transitions described in section 4 above.

In the case of the plant shown above, the Species Model imposes the Individual Model of each individual. The latter controls cell division in all the leaves. In the same way, a Species Model would be associated with the Model of each butterfly, which in turn would control the cell divisions in the butterfly's two wings. Laterality could be due to the surroundings of the cells, or even the genes with which the Model interacts.

In the case of hands, there is one more peculiarity (which, incidentally, also applies to the growth of plants and animals): the Individual Models must be dynamic, i.e., they must vary, for example as the hands grow. After all, the hands of very young children are chubby, and those of older people are generally drier. Symmetry is certainly preserved throughout a butterfly's growth.

The dynamism of the Models that impose cellular divisions shows that common thinking, which is essentially based on the physical world (plus mathematical modeling), cannot be used for the non-physical world of ideas. People are used to static models, such as the floor plan of a house, the design of an appliance, etc.

9. An evolutionary explanation

One person, reading a short text on the issue of the Model in the case of the plant described in section 1 above, came up with a typically Darwinian evolutionary observation: “Wasn't that shape due to the plant's protection against predatory animals?”.

First of all, no one has investigated the development of the plant over thousands, millions of years, until it reached its current form. Therefore, this is mere speculation. Incidentally, this applies to current cases of birds migrating from one island to another and changing due to the different environment, or the well-known case of bacteria developing resistance to antibiotics. Secondly, in these cases and in the plant, no one has followed the genetic changes and their causes and, in the case of birds, the matings leading to natural selection. Thirdly, one must ask: "Why haven't other plants developed the same supposedly protective form? If this were an evolutionary advantage, there would be thousands of plant species with similar shapes, but from different species." For example, araucaria trees (*Araucaria brasiliensis* or *angustifolia*, see ref.) have a very strange characteristic: their leaves form tufts at the end of branches that can reach

8 meters in length; these branches are usually near the top of the tree. Imagine the force (torque, from a physics point of view) that these tufts exert on the branches, especially at their beginning. If there is an evolutionary advantage in araucarias having the chandeliers shape shown in the picture below (note the verticality of the trunk, which is not very common in trees), why do other plants in the vicinity not have this shape?

10. Other properties of the Model

The hypothesis of the existence of a non-physical Model interacting with the physical manifestation of a living being could shed light on various properties of living beings. Non-physical Models of different beings could come into (non-physical) contact with each other, influencing these beings. For example, in his excellent book *Revolution of Plants*, the great scientist Stefano Mancuso [see ref.] deals with the mimicry of certain climbing plants, which have the property of imitating the shape of the plants on which they grow. In his chapter 3 “The sublime art of mimesis”, he describes in detail how this occurs with *Boquila trifoliata*, a climbing plant that can mimic various plants on which it rests (this is mentioned in the Wikipedia article [see ref.]), in the shape of the leaves, size and colors, even assuming serrations on its leaves, if the host has this type of leaf. This could happen if contact between the *Boquila* Models and their host Model produced a change in the physical performance of the former's Model. Or perhaps this plant's Model is exceptionally variable?

In chapter 1, “Memory without a brain”, Mancuso draws attention to a fundamental difference between plants and animals: the former do not have single organs, unlike the latter; they constitute a decentralized system. He asks himself: "How do plants remember the exact moment when they should flower? Their reproductive success and ability to generate offspring are based first and foremost on their ability to flower at

the right time. ... Many plants wait a certain number of days to flower after being exposed to the winter cold. They are therefore able to remember how much time has passed." It is not known where the plant stores this information. This “memory” could be a property of the Models.

Speaking of the supposed memory of plants, it's worth quoting Peter Wohlleben's bestseller *The Secret Life of Trees* [see ref.]: "[...] if trees are capable of learning (and one only needs to observe them to know they are), the question arises: where and how do they store the knowledge they acquire? After all, they don't have a brain to store information and manage their processes." [p. 48].

By the way, one cannot say that the brains of animals and humans store information, because how this happens is not known in detail. The question of this individual “memory”, which is common to plants in the same region (which, for example, flower at almost the same time, in temperate climates begin to form new shoots on the branches at the same time, etc.) is a consequence of hypothesis $\mathbf{H_3}$.

It is the Individual Model that would hold the information necessary for the Species Model to impose certain properties, such as the need to flower or create shoots. The generic form of a plant would be imposed by the Species Model. The particular shape due to the environment would be produced by the plant's Individual Model.

Wohlleben deals with various tree processes that are mysterious to science. For example, how the sap from a tree several meters high, sometimes tens of meters, rises to the top. He mentions three possible factors: capillarity (but it would only go up 1 meter at most), transpiration from the leaves (the molecules pull on each other, but the effect diminishes with distance), and osmosis (but it only acts on the leaves and roots), but none of them or all of them together are enough to explain the rise of water and sap. Perhaps the interaction between the Model and the plant could shed some light on the subject?

Due to the various reactions that trees show, he considers that they have sensations and feelings. The subtitle on the cover of the Brazilian edition reads “O que elas sentem e como se comunicam – as descobertas de um mundo oculto” (“What they feel and how they communicate – the discoveries of a hidden world”); I checked the German original, which also contains these phrases. This is a mistake. To have sensations and feelings, a nervous system is needed, and they are due to a non-physical “member” that is even more “subtle” than the Model considered here. Animals and human beings have this “member”, but plants do not. It should be noted that sensations and feelings are a great scientific mystery; this lack of knowledge allows us to hypothesize that the process is not physical, but nevertheless has physical consequences, such as nerve activity. It is precisely the Model theory presented here that could shed light on the apparent occurrence of sensations and feelings in plants, considering, as has been explained, that, not being physical, the Model could interact with Models of other plants and other living beings. In particular, it is popularly said that if plants are loved, they will thrive much more. Again, it is not a question of a plant feeling a person's love for

it, but an effect of the suprasensory contact between the person's Model and that of the plant.

Supposing that the Earth itself has a Model, this could shed light on a great mystery: how certain birds make a migration of thousands of kilometers. According to National Geographic [see ref.], Arctic terns migrate from pole to pole flying up to 30,000 km. How do new birds migrate without ever having made the journey? How do they always go to the same regions? How do birds like storks make nests, migrate, and then return to the same nests? Homing pigeons manage to return to their place of origin with impressive precision. The explanation that birds have an internal "compass" detecting the Earth's magnetic field is not convincing.

11. Other studies on the forms of living beings.

Numerous studies have been conducted on the shapes of living beings. These studies got a big boost with the monumental book by biologist and mathematician D'Arcy Thompson (1860-1948) *On Growth and Form*, which in its first edition in 1917 (see ref.) was 793 pages long, and the second, expanded edition in 1942, had 1,116 pages. In it, D'Arcy Thompson deals with forms in many elements of flora and fauna. The reduced form of the book is the best known [see ref]. The book contains variations on the shapes of living beings obtained by geometric transformations. Another book that cannot go unmentioned is Theodore Andrea Cook's (1867-1928) *The Curves of Life* [see ref.], the original version of which dates from 1914 and has no less than 415 illustrations of living beings, architecture etc. He discusses various examples of forms, such as plants that regularly curl into others, forming spirals, and also in human beings.

The arrangement of leaves on the branches of a tree or plant is called *phyllotaxis* (from the ancient Greek phýllon φὐλλον, 'leaf,' and táxis τάξις - in fact, tázis -, 'arrangement'). In literature, this name is also used for the arrangement of the branches of a tree, the florets in a composite flower (like the daisy), the seeds (like the sunflower) and the thorns on a branch.

There are countless works on phyllotaxis. It is assumed that the ancient Egyptians, who were great admirers of flowers and meticulous observers, as the texts in the tombs of the pharaohs attest, probably knew more about numbers and phyllotaxis than was later reported, for example, by the Greek Theophrastus (370-285 BC), considered the father of botany and Aristotle's successor in his school, and the Roman writer and naturalist Pliny (*Gaius Plinius Secundus*, 23-79 AD), author of the encyclopedic book *Naturalis Historia*, which became a model for encyclopedias. Pliny died trying to save a friend and his family from the eruption of Vesuvius, which had already destroyed the cities of Pompeii and Herculaneum. The article by Adler, Barabé and Jean [see ref.] is an excellent reference on phyllotaxis.

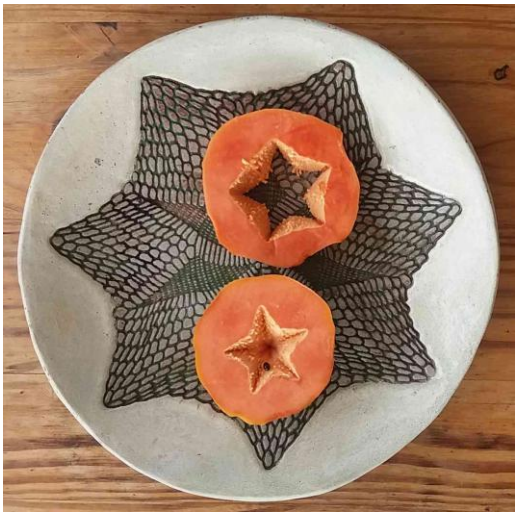
Chapter 4 of the book by Przemyslaw Prusinkiewicz and Aristid Lindenmayer [see ref.; available on the Internet] is devoted exclusively to phyllotaxis and contains numerous color photos of plants. Astrophysicist Mario Livio, in his very interesting book *The golden ratio - the story of Phi, the most astonishing number* [see ref.], discusses numerous

topics related to the golden ratio, with relatively little mathematics and a lot of historical data, and includes a chapter on phyllotaxis. Peter S. Stevens, in his book *Patterns in nature*, presents two numbers used in phyllotaxis, relating the number of turns that branches make around a trunk (or branches, or stems), and the number of leaves (or branches, or thorns) that appear on each one. He gives examples of various trees. Giorgio Wilberstaedt's graduation work, *The shapes and numbers of nature*, contains numerous examples and considerations of phyllotaxis, as well as the golden ratio, spirals and a chapter on beehives. György Doczi's (1909-1995) interesting book *The Power of Limits - Harmonies and Proportions in Nature, Art & Architecture* [see ref.] deals extensively with geometric shapes in plants and animals, with special mention of the occurrence of the golden ratio.

My book *Mathematics can be interesting... and beautiful!* [in Portuguese, see ref.] discusses at length the Fibonacci sequence, the logarithmic spiral and Fibonacci's quasi-logarithmic spiral, showing how the numbers in the Fibonacci sequence and the golden ratio occur in nature.

Numerous studies have been conducted trying to explain why certain plants have certain shapes. For example, in the case of plants and fruits that assume distributions with a geometric regularity, Mario Livio, in the aforementioned book, in the chapter "Son of good nature" cites several of these studies, which show, for instance, that the distribution of follicles in a daisy, or of seeds in a sunflower flower, or of buds on the skin of a pineapple, all of which form spirals, are due to either maximizing the space occupied, or minimizing the energy expended to assume their shapes. In the case of some trees and shrubs, the regular rotational distribution of branches and leaves would be due to the greater possibility of collecting light.

First of all, these theories presuppose the existence of objectives. For example, optimizing the space occupied to accommodate as many follicles or seeds as possible must necessarily consider the overall aspect and not that of each individual element. In addition, the observation made at the end of section 3 that cells are very imprecise must be considered. Without external control outside the physical body, conducted by what has been called here the non-physical Model, it would not be possible to achieve the enormous regularity of those elements. The Model can contain a global objective which, obviously, cannot be present in each element. Consider, for example, a papaya which, if cut crosswise, sometimes displays a fantastic pentagon (in its middle) or pentagram (close to its ends), as can be seen in the following picture (my photo; the ceramic bowl was also made by me):



Why these geometric shapes on a papaya? Wouldn't an approximate circumference or another polygon, or other more complex shapes, be suitable for the formation of seeds, as is the case with other fruits? The theories of physical minimization or maximization are not complete, i.e., they do not definitively explain why such regular shapes exist, because they do not show what physically imposes cell division for growth. To do this, it is necessary to stop thinking only physically, as happened with the introduction of the notion of the non-physical Model in this article. Note that “pentagon” and “pentagram” are pure mental concepts (see my paper on concepts and ideas in the refs.)

12. Epilogue

To understand the forms of living beings, it is necessary to use a type of thinking that is not the usual one based on physical processes. I have a strong conjecture that science, with its current materialistic reductionist paradigm, based exclusively on the physical world, will never be able to explain how the growth of living beings takes place, leading to the characteristic forms of each species.

Current schooling and the physical world mean that children and young people use thoughts based exclusively on that world, in other words, materialistic thoughts. The successes of science and technology induce an almost blind trust, a faith in both science and scientists (scientism). As current science is materialistic, this induces a materialistic mentality, which uses thoughts based exclusively on the physical world, plus abstractions, mathematical models used to predict measurements, that is, results of experiments carried out with some apparatus. These results constitute a major alteration of natural reality. I made a little verse about this:

The measure of space
Is not space.
The measure of time
Is not time.
The measure of mass
Is not mass.
The measure of movement
Is not movement.
So we go on measuring,
Measuring, measuring,
And about reality lying,
Lying, lying.

Note that it is already a big deal to observe plants like the one in the first picture above, recognizing in them the tendency towards a spherical shape, or other geometric shapes in other plants. For example, as seen in the picture above, several papayas, cut crosswise, show an almost regular pentagon, and near their tips a pentagram, which always makes me ecstatic. But an absolutely essential step towards extending materialism with a certain spirituality is to recognize that the spherical shape of the first figure, the pentagon of the papaya and the symmetries of the butterflies and hands, are due to something non-physical, which has been called the Model.

When in section 5 a non-physical Platonic world of ideas was mentioned, I'm sure many readers must have found it strange because, due to their school education, and probably their culture, as well as their profession, they are obliged to dismiss any thought that is not based on the physical world. Perhaps they are even used to reading or hearing mockery about anything that resembles spirituality, and even ridicule themselves any spiritualist manifestation, transcending the physical world, or at least not taking it seriously.

Note that I have not mentioned thoughts based on religions, because they too have become materialistic. For them, non-physical entities such as God and Christ have become mere abstractions. One of the symptoms of their materialism is that they blindly believe in biblical images as if they were physical facts, such as the seven "days" of creation. That these are not our 24-hour days is clear from the fourth "day", on which the Sun and Moon are created, i.e., before that there could not have been our "days" [Gen 1:16]. In biblical times, people in general did not have our mental capacity and could not conceptualize, as even children do today, and so they created the images of myths which, in essence, reveal great non-physical realities that they could observe. Incidentally, speaking of the creation of the physical universe, it should be noted that the origin of matter and energy in the universe makes no physical sense, as do the boundaries of the universe due to the big-bang theory: what lies beyond these boundaries, a void? And how far does this void go?

For those who would like to think spiritually, I have shown that it is possible to observe a living being and think that its form and action are due to a Model that is not physical,

but has reality in the Platonic world of ideas, to which we can ascend with our thought. This is what we do when we come across any object and recognize the idea behind it. For example, thinking "this is the screen of a computer, tablet or cell phone," that is, "this object I'm looking at has the essential characteristics of all the screens of these devices." An object is a physical manifestation of a non-physical idea underlying it. Recognizing this is perhaps a first step towards abandoning materialism, i.e., in the case of this article admitting, by working hypothesis, that living beings are not just physical matter and energy, and that not all their processes are due to purely physical phenomena.

Why is it important to abandon materialism? An inevitable consequence of materialism is to consider the human being as a physical machine, and this means eliminating compassion, empathy and solidarity, essential attitudes for treating the human being humanely. For example, it would be a psychological aberration to feel sorry for turning off a computer. The world is currently experiencing a brutal rise in inhumanity, an absence of empathy and compassion, and an increase in selfishness, leading to devastating wars.

By the way, the expression "human being" is not correct, because it incorporates all its experiences. For example, the reader who has had the courage to get this far is different from when he started reading. Thus, human beings are in permanent transformation, evolution, or involution. It would be more accurate to call it "human becoming."

I have tried to show here that it is possible to think "spiritually," without giving up rationality, objective observation of nature, without dogmas or beliefs, but based on working hypotheses that are always subject to revision and improvement. There is already a spiritualist worldview along these lines, whose foundations inspired this article: Anthroposophy [see ref.] introduced by Rudolf Steiner (1861-1925) at the beginning of the 20th century, with a conceptual spiritualist approach, without dogmas and with successful practical applications. Its best-known application is Waldorf Education which has more than 1,200 schools and 1,500 kindergartens worldwide, almost 300 in Brazil. However, I am not going to go into details here so as not to give the impression of proselytizing, which is why I have not used the anthroposophical terminology for the non-physical aspects. Steiner does not talk about a "model." I hope that someone, reading this article, will feel curiosity or an inner call to search for a spirituality that is transmitted conceptually for understanding, without beliefs or dogmas, that preserves conscience and freedom, does not contradict scientific facts (but can contradict scientific judgments), with various successful practical social applications. Some of my articles in section "Spirituality, Anthroposophy" on my website can give more details, as can the website of the General Anthroposophical Society [see ref] and countless books by its developer, Rudolf Steiner (1861-1925, see ref. for a list of his published and translated volumes)) and people who have extended it. Nowadays, with the abundant material available on the internet, anyone who has reached the point in her/his development where s/he is dissatisfied with materialism and is looking for a spirituality that is not mystical, because it is primarily directed at understanding and

not feelings, will certainly find her/his path. If the hypothesis that every human being has non-physical members holds, then the mentioned dissatisfaction may be an intuitive personal call to recognize that s/he is not just physical matter.

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