The Whole and the Part: A Link to the Holographic Principle

Eric Laguerre, PhD
eric.laguerre@univ-tlse2.fr

Abstract

This paper is about the search for the possible meaning of how the holographic principle is related to Aristotle's notion that "the whole is greater than the sum of its parts." This quest will follow two paths: one secular – scientific and philosophical – and the other, initiatic, more mystical. The two paths, eventually coming together in their various interpretations, intend to show that the two worlds are far from incompatible. The intellect and affect are two universes which, far from being antagonistic, are linked and should be better investigated in order, for example, to make science and spirituality compatible.

Keywords: infinite, paradox, limits, science, spirituality.

Le tout et la partie : Un lien avec le principe holographique

Résumé

Cet article porte sur la recherche du sens possible du lien entre le principe holographique et le postulat d'Aristote selon lequel "le tout est plus grand que la somme des parties". Cette recherche suivra deux voies : l'une profane - scientifique et philosophique - et l'autre, initiatique, plus mystique. Les deux voies, qui finiront par s'entrelacer dans leurs diverses interprétations, veulent démontrer que ces deux mondes sont loin d'être incompatibles. L'intellect et les émotions sont deux univers qui, loin d'être antagonistes, sont liés et devraient être mieux étudiés afin, par exemple, de rendre compatibles science et spiritualité.

Mots-clés : infini, paradoxe, limites, science, spiritualité

El Todo y la Parte: Un Vínculo al Principio Holográfico

Abstracto

Este artículo se trata de la búsqueda del posible significado de cómo el principio holográfico está relacionado con la noción de Aristóteles de que "el todo es mayor que la suma de sus partes". Esta búsqueda seguirá dos caminos: uno secular –científico y filosófico– y el otro, iniciático, más místico. Los dos caminos, que eventualmente se unen en sus diversas interpretaciones, pretenden mostrar que los dos mundos están lejos de ser incompatibles. El intelecto y el afecto son dos universos que, lejos de ser antagónicos, están vinculados y deberían ser mejor investigados para, por ejemplo, hacer la ciencia y la espiritualidad compatibles.

Palabras clave: infinito, paradoja, límites, ciencia, espiritualidad

O todo e a parte: uma ligação ao princípio holográfico

Resumo

Este trabalho trata da busca do possível significado do modo como o princípio holográfico se relaciona com a noção aristotélica de que "o todo é maior do que a soma das partes". Esta busca seguirá dois caminhos: um secular – científico e filosófico – e outro iniciático, de pendor mais místico. Ambos os caminhos, que acabam por convergir nas suas diferentes interpretações, pretendem mostrar como estes mundos estão longe de ser incompatíveis. O intelecto e o afeto são dois universos que, longe de serem antagónicos, estão interligados e devem ser objeto de investigação aprofundada para mostrar, por exemplo, como a ciência e a espiritualidade são compatíveis.

Palavras-chave: infinito, paradoxo, limites, ciência, espiritualidade.

Das Ganze und der Teil: eine Anbindung zum holografischen Prinzip

Zusammenfassung

Hier wird besprochen, wie das holografische Prinzip eventuell der Vorstellung von Aristoteles, dass „das Ganze größer ist als die Summe seiner Teile" zugeordnet werden kann.

Diese Untersuchung läuft auf zwei Ebenen: einerseits betrifft sie das Säkulare – d.h. wissenschaftlich und philosophisch- und andererseits das Initiatorische bzw. eher Mystische. Diese zwei Pfade haben unterschiedliche Auslegungen und mögen zusammentreffen, wobei sie zeigen sollen, dass diese zwei Welten alles andere als nicht kompatibel mit einander sind. Der Intellekt und die Gefühle sind zwei Universen, die gar nicht so antagonistisch sind. Eher sind sie miteinander verbunden und sollten besser untersucht werden, um z.B. Wissenschaft und Spiritualität miteinander kompatibel zu machen.

Schlüsselworte: Unendlichkeit, Paradox, Grenze, Wissenschaft, Spiritualität

Introduction

This paper is divided into two parts:

a) First, we begin our reflection with what can be described as a nonexpert's approach to mathematics and science in general. More precisely, we introduce the concept of Aristotle's "the whole is greater than the sum of its parts," or the "whole and the part," both linked to the infinite and the continuous, to fractals and their apparent contradictions with the common understanding of the infinite. We will develop this theme, adding a philosophical, biological, and physical approach.

b) In the second part of our paper, using a more figurative, symbolic, and spiritualistic interpretation, we focus on mystical approaches to our theme. Our objective is to highlight an example that illustrates the fact that it would be in vain to want to oppose the spiritual and the material, to oppose knowledge and belief, and that the opposition of the two worlds, however distinct, should be avoided, as they are counterproductive. Both are useful in humanity's quest to better understand the world.

A Nonexpert's Approach to the Holographic Principle

1. Mathematics

Adapting the topic of "the whole and the part" for the uninitiated reader and, more particularly, in order to look at this topic from the world of mathematics, we shall refer to one of Euclid's *Elements* (c. 300 BCE) which tells us that the whole is greater than the part, that the whole contains the part. This seems logical, or even obvious, except that it is from this finding that science and especially mathematics have evolved during the last 2,500 years to correctly define what is an irrational number and what constitutes the infinite and the continuous. This is seen in the work of the French mathematician René-Louis Baire (1874 – 1932) "whose study of irrational numbers and the concept of continuity of functions that approximate them greatly influenced the French school of mathematics" (Britannica 2023). It was not until the end of the nineteenth century that these concepts were rigorously established. This kind of consideration has brought scientists to face paradoxes that were not resolved until very late in the history of science. But all of this has been fruitful in terms of many related discoveries.

This leads us to the famous paradoxes of Zeno of Elea (Aristotle, *Physique*, 2002). We will look at the paradox of Achilles and the turtle to illustrate our point. First, let us visualize a race in which Achilles is going ten times faster than a turtle that is, say, given a "head-start" of a mile ahead of Achilles. When Achilles has almost covered the first kilometer, the turtle will have made a tenth of the next kilometer. When Achilles has covered this tenth of a kilometer, the turtle will have done the next hundredth and so on into infinity. Mathematically speaking, Achilles will never overtake the turtle.

This is a fallacy, of course. This story has the color, the taste of truth, but it is not the truth because this reasoning is faulty. But to realize this, we must have an insight that the Greeks did not have. It is legitimate to say that the distances that separate Achilles and the turtle are, successively: 1, 1/10, 1/100, 1/1000, etc. But it is impossible to say that there will always be a distance between the two because, otherwise, if there were to be such a distance, they would travel infinitely without ever meeting.

Thus, the sum 1 + 1/10 + 1/100 + 1/1000 + …, which can also be written more concisely $\sum_{i=0}^{+\infty}\left(\dfrac{1}{10}\right)^{i}$, should therefore be infinite, which is not true, for the following reason:

The distance between the two at movement 0 is 1.

The distance between them at movement 1 is 1/10 because Achilles advances 1 m and the turtle 1/10 m.

The distance at movement 2 is 1/100 because Achilles advances 1/10 m and the turtle 1/100 m.

The distance at movement 3 is 1/1000.

The distance separating them at movement k is: $\dfrac{1}{10^k}$. Thus, at movement k, Achilles will

have traveled $1 + \dfrac{1}{10} + \dfrac{1}{100} + - - - + \dfrac{1}{10^{k-1}} = \dfrac{1 - \left(\dfrac{1}{10}\right)^k}{1 - \dfrac{1}{10}}$.

This expression tends to $\dfrac{1}{1 - \dfrac{1}{10}}$ when k goes to $+\infty$, so we have: $\lim\limits_{k \to +\infty} \left(\dfrac{1}{10}\right)^k = 0$.

And so, we get 10/9, which is a finite distance greater than 1.

It is precisely the existence of this limit in the sum of distances that shows the absurdity of Zeno's paradox. To learn more about the paradoxes of Zeno, please see John D. Norton's various examples including the definition of actual and potential infinities (2023).

The ancient Greeks knew of only one concept of the infinite, the potential infinite that allows us to go further and further, as in the assertion that it is always possible to divide a line as many times as we wish. Whereas the concept of real infinity, actualized, as in the assertion that a line segmented to infinity gives a dot, does not allow us to cut a segment to infinity, or, in our case, to travel infinite distances if these are in a geometric progression of reason less than 1. Thus, an infinite sum can give something finite and the part can sometimes contain the whole, contrary to what Euclid and many other mathematicians thought after him: "Euclid's *Elements* (c. 300 BCE) formed a core part of European and Arabic curricula until the mid-twentieth century" (Donaldson 2023).

For another Euclidian example, let us take Figure 1 where OAB is a triangle with A' being a point on [OA], B' a point on [OB]. From the apex O we trace lines cutting the two segments [A'B'] and [AB]. Each point P taken from [AB] corresponds to a point P' on the segment [A'B']. In fact, there are as many points on each segment.
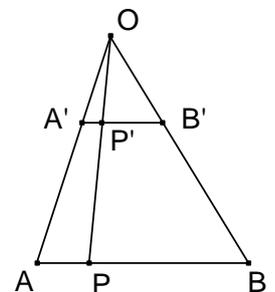

Figure 1.

Yet, the line AB is greater than the line A'B' and the segment [A'B'] projected on the bottom line (AB) gives only part of the segment [AB]. Hence another paradox of infinity is showing, here, that the part is as large as the whole.

The paradigm of this paradox lies in the bijection (one-to-one correspondence) between natural integers 1, 2, 3, 4, ..., n, ... and even numbers 2, 4, 6, 8 ..., 2n, ...

This bijection shows that there are as many even numbers as whole numbers (since every whole number has its double and every double has its half).

It is said that these two sets have the same power, even though the set of even numbers is only a subset of the set of whole numbers. This is another fundamental paradox for the concept of infinity or, should we say, infinities. For those who are not mathematicians and wish to pursue this matter of "power," please see the free site www.mathcentre.ac.uk.

Another apparent paradox lies in the fact that the set of real numbers and the open interval]0,1[are of the same power, that is, they correspond to the same infinity. See Figure 2.
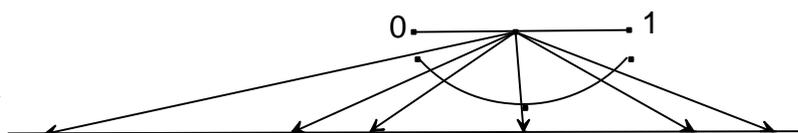

Figure 2.

We remind the reader that real numbers include all natural integers, decimals, fractional numbers to which square roots are attached, and transcendent numbers are those whose main characteristic is that they are not a solution to any whole coefficient equation. Thus, Figure 2 shows that it is possible to establish a bijection between]0,1[and all real numbers. Thus, paradoxically, the open segment]0,1[, a geometric object that has two ends and is therefore apparently finite, contains as many points as any straight line that is a mathematical object that can be extended at will and therefore is infinite.

But it must be known that it is also possible to establish a bijection between all the points of a plane and a line on that plane and that, therefore, a plane contains as many points as a line. Moreover, in infinitesimal calculus or more precisely in differential calculus, a differential element dx contains in power an entire surface since it can generate indefinitely for an integrable function according to Bernhard Riemann (1826 – 66), the area between the representative curve of the function, the x-axis and two lines parallel to the y-axis (*Britannica* 2023).

These various previous examples serve to illustrate that, in mathematics, the whole has the power to include the part and that the latter can sometimes contain the whole. This is part of the holographic principle.

This principle of the whole contained in the part is also beautifully illustrated in mathematics by fractals. Fractals are objects of splendor (Figures 3 and 4). But they are also, on the one hand, a powerful mathematical theory enhanced from previous discoveries by the mathematician Benoît Mandelbrot (Jaffard 2013) and, on the other hand, a tool for analyzing varied phenomena. Discovered in the nineteenth century, these phenomena were considered mathematical curiosities until the middle of the twentieth century. They acquired full status in the early 1970s when Mandelbrot introduced a new mathematical discipline: fractal geometry.

Figure 3.

Figure 4.

Note that even though Cézanne (1906) recommended translating nature into geometric volumes, it must be recognized that it is not smooth and cannot be enclosed in circles, spheres, or cones:

> Let me repeat to you what I was saying here: treat nature by the cylinder, the sphere, the cone, all put into perspective, that each side of an object, of a plane, is heading toward a central point. The lines parallel to the horizon give the extent, either a section of nature or, if you prefer, of the spectacle that the *Pater Omnipotens Aeterne Deus* displays before our eyes. The lines perpendicular to this horizon give the depth. Nature, for us humans, is deeper than on the surface, hence the need to introduce into our vibrations of light, represented by the red and yellow, enough bluish, for us to feel the air.

Fractals, from the Latin *fractus* (broken), as opposed to the smooth objects of Euclidean geometry that are cubes, spheres, etc., allow us to describe complex forms of nature like a cauliflower, a cloud, a rugged rocky coast, a mountain, a galactic cluster, a hydrographic network, a brain, a tree, a snowflake, etc. "In a perfect mathematical fractal – such as the famous Mandelbrot set . . . this 'self-similarity' goes infinitely deep: each pattern is made up of smaller copies of itself, and those smaller copies are made up of smaller copies again, forever" although "[m]any natural phenomena are fractal to some degree" (Michael Lucy 2021).

Fractal geometry shows that an irregular object like a cloud is not the deformed copy of an ideal model but rather that its irregularities are part of its being. Fractal objects have the particularity of having similar homothetic structures at different scales. Thus, if we "zoom" in on a fractal, we always find the same shapes, however slightly deformed.

Thus, the question arises, is nature really chaotic, that is, unpredictable and also fractal? Even in nature, perfect forms do not exist. To illustrate this point, "a crystal is traditionally defined as a solid possessing an ordered structure that is infinitely periodic in the three spatial dimensions. Even assuming that such a 'perfectly ordered' system could exist (and it cannot), such a system would still have a finite size in reality" (Alfredo Metere 2018).

The Van Koch graph, which is well known to high school students in France and elsewhere (Figure 5) is one of the first fractals built by mathematicians in 1904. It was not named "fractal" until after Mandelbrot's theory in the 1970s.
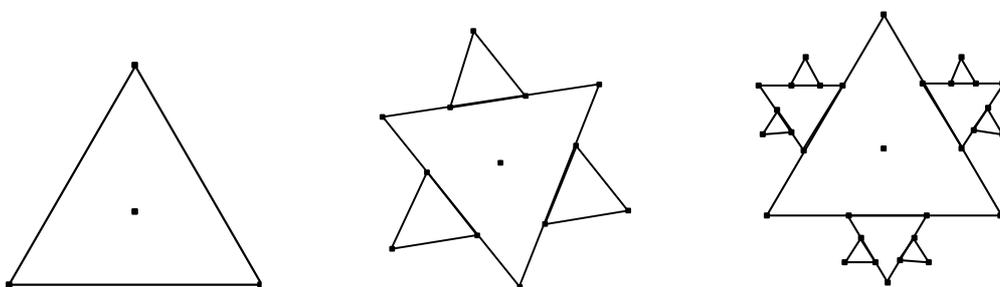

Figure 5. Van Koch graph, steps C_0 to C_2 (images by the author).

The shape starts as an equilateral triangle. Each side of the triangle is divided into three

thirds and the middle one serves as the basis for a new equilateral triangle. The new curve is thus composed of twelve segments of the same length.

If we repeat the operation endlessly, we get the figure also called a snowflake. By knowing the expression of the triangle area and with a little work, we can express the area delimited by this figure and its perimeter at step n.

For example, if we draw an equilateral triangle with one side measuring 1 cm. This step we will call C_0 since we have not manipulated the figure yet.

At step C_1, for each of the three sides of the previous figure, we now count four sides which make a total of 3 x 4 each measuring 1/3. So, the total length is 3(4/3).
At step C_2, each side of the previous figure now has four sides, which makes 3 x 4 x 4 sides, each measuring (1/3)². So, the total length is 3 x (4/3)².

Finally, in step C_n, the number of sides is 3×4^n, the length of one side being $\left(\dfrac{1}{3}\right)^n$ and the perimeter of the figure will be $p_n = 3\left(\dfrac{4}{3}\right)^n$.

If n tends to $+\infty$, $\lim 3\left(\dfrac{4}{3}\right)^n = +\infty$.

The area of the figure obtained in step n is equal to:

$$A_n = A_0 + \frac{\sqrt{3}}{12}\left[1 + \frac{4}{9} + \left(\frac{4}{9}\right)^2 + ... + \left(\frac{4}{9}\right)^{n+1}\right]$$

This expression tends toward a finite limit when n tends toward infinity since it is the sum of the first n + 2 terms of a geometric series of reason less than 1, as in the case of Achilles and the turtle. Thus, the area of the fractal is finite.

What is surprising is the fact that when we reproduce the steps to infinity, that is, when n tends toward infinity, the perimeter is infinite but the area is limited, thus finite!

We obtain the same thing with reflecting spheres which are composed of a central sphere on which are placed diametrically opposite six spheres of half radius, then on each of these six spheres, five spheres of half radius, then five spheres of half radius, etc. The area of the surface obtained tends toward infinity while its volume is limited.

Moreover, whether on the Van Koch graph or on the reflective spheres, both systems are perfectly self-similar: whatever the magnification, the observer will always see the same pattern. Each part is a reduced image of the whole and this property of self-similarity can digitally translate into a fractional dimension.

Our world is usually considered a three-dimensional space. Simply, and referring to the *Elements* of Euclid, a point is of dimension 0 since it has neither height, width, nor depth. A straight line is of dimension 1 because it has width but neither height nor depth. A sheet of

paper is of dimension 2 and a book is of dimension 3. Thus, in Euclidean geometry, the number that translates the dimension of an object is always an integer.

Fractals, on the other hand, cannot be dimensioned with integers. A pencil line is enough to draw a Van Koch curve. Its dimension should then be 1. But, after a certain number of iterations, the convolutions that shape this line are so numerous and so close to each other that we could consider them as a thickness, as a huge accordion impossible to unfold. It somehow takes up more space than a line without filling an entire surface.

Mandelbrot shows that this dimension is $\ln(4)/\ln(3)$ or about equal to 1.26, meaning that it is between 1, the dimension of the line, and 2, the dimension of a plane.

The dimension of a tree is between 2 (plane dimension) and 3 (Euclidean space dimension) and the more that tree is irregular, the closer it gets to dimension 3.

As Alfredo Metere explains, "We can now confidently state that nature seems fractal, but is that truly so? One may argue that the answer to this question has more to do with philosophy than physics, and in a way that would be correct. But what if fractals are just an emergent property of our innate inability to grasp infinity?" (*Cosmos* 2018).

We will now continue the secular approach of our subject but this time, as announced, through the philosophical and scientific aspects of the experimental sciences.

2. Philosophy, Psychology, and the Experimental Sciences

The part generating the whole is an idea that is found in fields other than mathematics, especially in the area of holograms. The word hologram comes from of the Greek *holo* which means "everything" and *gram*, meaning "letter, line."

A hologram is an image where each point contains all the information about the represented object. The holographic principle not only means that the part is contained in the whole but also that the whole is contained in a certain way in the part. For example, from a philosophical standpoint, we can consider that a single person, that is, a tiny part of humanity, can contain all of humanity, that is the whole.

As Montaigne wrote in *Essais* (1590): "Humankind carries within itself the whole form of the human condition." In the Jewish tradition, in the Talmud, we also find the well-known idea: "Who saves a person saves humanity. Who kills a person kills humanity." We can interpret these two sentences as meaning that all human characteristics, whether cultural or social, are represented in one human being and thus sum up humanity. Society, through its culture, is present in the mind of every individual. Thus, we are responsible for the good and evil that flows through the Universe. Everyone is connected to others, less by action but rather through consciousness. There is always a point of contact: Abel is the guardian of Cain.

On another angle, Nietzsche (1994) thinks that dreams repeat the thoughts of a very ancient humanity, that dreams go through the entire sequence of representations that our ancestors already had behind them. This hypothesis is likely: we carry in our body and outside also the traces of the past left by our adaptation to our environment: why should the psyche operate otherwise? Our psyche has remained the same; only the surface has changed. The fundamental contents have always been there; otherwise, we would not be able to understand foreigners in their way of thinking in terms of our common humanity.

We can also think of Carl Gustav Jung (1973) through several notions. Archetypes, for one, are in some way primal mythical images transmitted from generation to generation. These archetypes partly nourish our collective unconscious which is also composed of instincts. Jung also considers the process of individuation which helps persons to penetrate the secret of their personality in a constant confrontation with the unconscious. The riches of the collective unconscious are gradually integrated into the Self.

The Stoics believed that events periodically and eternally recur, respecting the palingenesis (recreation) of history. Later, the naturalist and author of philosophical writings Charles Bonnet (1762) claimed that each organism contained an infinite series of preformed individuals, which led to the immortality and immutability of species. He believed that the Earth periodically undergoes universal disasters that destroy almost all life and that survivors rise one degree on the evolutionary scale.

A similar idea is found in Hinduism, which refers to alternate cosmic creations and destructions. In fact, each period of emergence of the so-called "Brahma Day" universe is subdivided into four periods (called *yuga*) which decrease in their order of excellence and duration. Each yuga is followed by a partial destruction of the world; at the end of the fourth yuga comes the universal resorption by fire and water. It is then "the Night of Brahma," of equal length to that of the day that preceded it. At the end of this cycle, the process starts again; the world is reborn.

Similarly, a little later, Giordano Bruno outlined his vision, based on physics, of the infinity of the universe. He published his ideas in *Concerning Cause, Principle, and Unity* (1584) which was among the works that led to him being burned alive in 1600. These ideas are like the above: "Whatever we take in the universe, since it is whole everywhere, includes in its own way the whole soul of the world . . ., which is whole in any part of the universe."

We might think that such ideas are the ethereal musings of a sixteenth-century thinker. However, that is not so. We can rediscover these ideas in contemporary scholars and physicists who are far from being followers of transcendental research. For David Bohm (1987), a specialist in quantum mechanics, the world is a projection of an underlying order, an illusion. And this, once again, is analogous to certain concepts of Hinduism: "Any information relating to the totality of the material Universe is contained, at least potentially, if not in fact, in every moment of consciousness."

In simpler terms, again, everything is in everything; One is the Whole, which makes us think of a specific alchemical symbol, the idea of the Ouroboros. In the same vein, always through a scientific angle, a cell can contain all the genetic information which in principle allows for cloning. Biologist Pierre Sonigo (2002), director of the laboratory of virus genetics at the Cochin Institute of Molecular Genetics, confirms that a molecule is supposed to contain all the necessary instructions to build an organism.

Recently, authors Jeanette Wheeler and Kit Yu Karen Chan state in their paper on the transdisciplinary symposium for the 2023 meeting of the SICB (The Society for Integrative and Comparative Biology) that they "hope to demonstrate that cross-disciplinary research linking small-scale biophysics to larger-scale emergent phenomena can help us understand problems ranging from single-cell behaviors to tissue formation and function, evolution of form, and the dynamics of communities" (2023).

DNA, the great book of life, contains the graphic description of what will happen, the list of all the recipes to make a human being, and precisely a unique one. Better, it contains the initial instructions that start the process. Thus, the genetic program, although immaterial, contains both the description of the completed organism and the trigger of its construction. DNA appears as both the root cause and the final cause, designing a body according to its plan. So, we again meet the holographic principle: the universe as a large human organism or human as a small universe.

These ideas in the twentieth century were also expressed by James Lovelock who suggests the Gaia hypothesis (1993), according to which the Earth is a vast living superorganism, and in the writings of biologist Albert Vandel (1968), for whom: "Humanity is today the summary of the world."

The principle of the Whole and the Part is rich in teaching by itself, but there is a potential pitfall to thinking about it, which Voltaire warned about in *Zadig* (1748): "Humans are wrong to judge a whole of which they know only a small part."

Assuming the holographic principle, we might think that is legitimate. But what is true for philosophy, for fractals, for the human genome, or for a broken mirror, all of these containing the generalization that suits them respectively, is no longer true for the thought and reflection that lead to judgment.

Too many people adopt judgements that they think are legitimate when they see a small part of the whole subject. For example, since everyone went to school, we might think we have the truth about subjects that are taught but that are, in fact, of great technical and intellectual complexity. We judge by our own little experience without realizing that the field in question, the transmission of knowledge, and the development of a citizen are amongst the most complex phenomena that exist.

Another example, which is inspired from an Indian story described by Rūnî in the thirteenth century, itself inspired by Buddha, is that which characterizes a true great scientific researcher. Imagine three scientists in a wholly dark room in which, without their knowledge, there is an elephant. Their research must lead them to discover the object. The first touching the trunk thinks of holding a fire hose. The second, who holds its foot, thinks of surrounding a tree with his arms. The last one, touching the ears, imagines touching a pancake that was not cooked enough. The real scientist is the person who knows how to turn on the light and name and describe the elephant. Partial vision, in this case, distorts interpretations.

Thus, the holographic principle is not applicable to everything and anything and must be handled with caution, as with any concept bearing great hopes for the understanding of the principles of life and of the world in general.

The Initiatory and Mystical Approach

This holographic principle is present and useful in some initiatory rites. We can say that the mirror that is present in our personal Rosicrucian Sanctum and in each initiation to the different Temple degrees, on which we can look at ourselves, also belongs to this holographic idea. The mirror invites us to know ourselves and tells us that escape is impossible because,

even broken into a thousand fragments, it returns a unique and faithful image, undivided in each of its fragments.

We can also take for example an excerpt from the book written by Giordano Bruno, *On Magic* (2014): "This is what we can easily observe in a mirror, which reflects a unique image of a thing, and, even broken in a thousand bursts, continues to reflect this undivided image, in each of its fragments."

But, even if not broken, the mirror that is present in all personal Rosicrucian Sanctums indirectly invites us to cross the forest of symbols that are used by Rosicrucians or other initiatory societies, for us to emerge on the other side of that mirror.

We find this idea of the presence of the whole in a tiny part of this whole in the pentalpha, which was the rallying sign of the Pythagoreans, where on a regular convex pentagon, the drawn diagonals make it possible to develop a regular concave pentagon. Inside this five-pointed star is highlighted a new regular convex pentagon in which we trace a new star and so on.
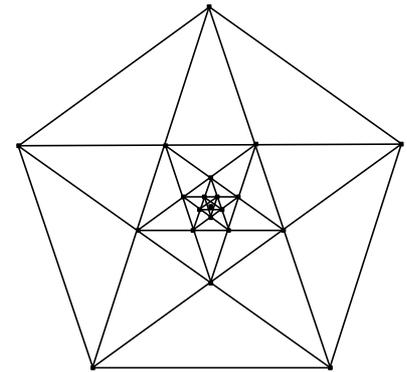
The process repeats itself infinitely. We can also see here that part of the figure encloses the whole drawing. In general, we find these ideas in one of the golden verses of Pythagoras (2001): "Nature is a whole, like itself."

Figure 6. Pythagorean *pentalpha.*

Moreover, as we know, any Rosicrucian must extend outside the Temple the action undertaken within. Indeed, we must strive to be a good spouse, a good parent, a faithful friend, a pleasant co-worker, a friendly neighbour. Rosicrucians must behave as well as possible in everyday life, both at home and at work. In other words, their behaviour must be the better adapted, the most exemplary in all the concentric circles to which they belong. Let us illustrate this with an example.

When we are born, we emerge from an egg. But immediately out of this egg, a being must adapt to the world, to its new environment, without any experience. It must show a great capacity for integration in order to adapt and be active in the world. But the primal adaptation is painful: breathing with lungs that are not yet accustomed.

Just out of the maternal egg, the first experience of air entering the lungs may provide pain. The being must thus understand very early that the egg from which it has just hatched is itself included in a larger egg, itself enclosed in an even larger egg and so on, as nesting dolls.

A Rosicrucian will understand that each of these eggs has elements of shade and light, and that the student must learn how to distinguish these dualities, and beyond white and black, in order to have the best possible attitude within different circles of belonging. But students of mysticism must not feel trapped. If they want one day to break one of the shells, or all the shells, in order to look elsewhere if a different light would allow them to better understand themselves and others, they will have to do so with care. We can say that this process has the essence of the spiritual alchemical work: to pierce the shell of the family, of a profession, of a social, cultural, religious, or political group, trying to improve oneself and improve the world in order to achieve harmony. Further, this process of spiritual alchemy aims, more generally, for the harmony between humanity and the cosmos. But the word *kosmos*, in Greek, means

"world" both in the sense of the universe and of human society (people). It then might not be coincidence that in our Greco-Latin languages, humanity and the universe are, depending on contexts, designated by the same word.

Very often we are led to consider that the images of humanity, the temple, and the universe could be substituted for each other in a holographic analogy. Each of us pushes the analogy of these three worlds according to our own standpoint of observation. We can then say that we often have a macrocosmic and microcosmic approach to the universe. The macrocosm corresponds to the universe in all its elusive infinity and the microcosm corresponds to a first substance, from which everything is created and which corresponds, in all its parts, to the macrocosm. We are once again in the field of holograms.

We are dealing with the idea that the universe is a living being, that planets and stars are also living beings like human beings. Through this approach, we hope to "see" parts of what we are in parts of the Earth and in those of the universe. We then become hosts of the principle of Unity, the fundamental theory of traditional philosophy and initiatory societies.
People have always had at least two motivations for advancement: to look for what is behind the mountain, as Edmond des Papillons would say in Marcel Pagnol's novel *Le Château de ma Mère* (1957), and unification, which is certainly not synonymous with uniformity.

The unification of the four forces of fundamental physics (electromagnetic, weak nuclear, strong nuclear, and gravitational), the reunification of Germany, the unification of Europe, the various attempts to unify the Rose Croix or other initiatory societies, etc., are clear examples of attempts to access unified knowledge and global structures. In essence, initiation leads to finding unity for some or to restore the original unity for others. In both cases, it is the eternal return to the totality, one and indivisible, to the love and fraternity that defines so well AMORC, that is timeless, to manifest our humanity.

The absolute unity that encompasses all existence, present, past, and future was once symbolized by a snake that bites its tail, the Ouroboros serpent that accompanied a Greek legend: One, the Whole.

This principle of Unity, which holds both the beginning and the end, forbids any division such as that of the inner and the outer being. This Unity resides in the proclaimed Oneness of the Universe, in which everything manifests as actions and interactions. The macrocosm is introduced into the microcosm and makes humanity part of the Whole and the Whole itself. The Whole is also called chaos: it encloses all the potentialities. In this enclosed universe, everything corresponds to essential, permanent, intrinsic relationships. Each person goes with the laws that govern the world.

Our mode of knowledge being an analog, any action on one Part influences the Whole. Initiation fosters the necessary effort, in each person as well as in a group, to reach, step by step, an approach to truth in order to reach the Ouroboros and to pass from the One to the Whole and vice versa.

The *Emerald Tablet* states: "That which is above is like to that which is below, and that which is below is like to that which is above, to accomplish the miracles of one thing" (translated by R. Steele and D. W. Singer 1928).

Another example is Zeno of Citium, who founded the Stoic school and whose thought is based on the idea of a perfectly ordered universe, the cosmos, by a universal divine force, the *logos*, to which human beings are linked by their personal logos.

Here, we can draw a parallel with the approaches of biologists, psychologists, and physicists that we discussed earlier but also with the reasoning concerning the macrocosm and the microcosm. An axiom of the theory of unity would be the typical analogy between the Great World, the *macrocosm* or the Universe, and the Little World, the *microcosm*, the human being. A person is a mirror and summary of creation.

In other words, the universe is a human being on a large scale or, conversely, a human being would be the universe on a small scale. The alchemists, especially Paracelsus (1493 – 1541), also considered the universe as a great human organism, and each person as a universe in small scale. In his biography of Paracelsus, historian Bruce Moran describes the alchemist-physician as exhorting others to "read the book of nature" (Drago 2020). We find here the ideas of Lovelock and Vandel, previously mentioned. These are obvious examples of a possible reconciliation between science and spirituality.

Plotinus in his Book One of the *Enneads* (c. 250 CE) considers that the One resembles a fountain that overflows, a fire that spreads its heat, but also an intelligible number, whole, in itself and of itself, and which nevertheless generates the infinity of an arithmetic series, or the invisible and indivisible centre of a circle whose rays carry power to the farthest ends. The Whole is united, everywhere, and nowhere, also being neither measured nor unmeasured, neither rest nor movement, neither mixed with anything nor absent from anything. He also states: "I try to bring all that is Divine in us toward the Divine that is in the Whole" (First Tractate 8).

To translate this state of mind, Plotinus, still in the *Enneads* and despite the intellectual aspect of his text, compares the love experience that unites two persons to the One to that of choir members to the conductor. Oblative love, that is, the tendency to satisfy the needs of others practically at the expense of one's own needs, is part of this process. Likewise, *agape* is synonymous with shared love. Under such an attitude, we are supposed to forget ourselves to be one with the other, without necessarily erasing differences but especially without expecting anything in return.

All of this is part of the hermetic tradition which considers that people contain everything in themselves: the quintessence of the universe. In us lies the center which shares in the qualities of all other persons. Symbolically, the Ouroboros refers to the unending movement, the eternal return and, under certain circumstances, the movement of the mind's penetration and withdrawal into matter.

The alchemical formula VITRIOL is a legacy of this hermetic tradition: "*Visita Interiora Terrae Rectificando Invenies Occultum Lapidem*" (Visit the interior of the Earth and [by] purifying [yourself] you will find the hidden stone.) This initiatory adventure leads the initiate on a path where self-knowledge and knowledge of the world condition each other to become a unique and marvellous thing. This world into which the initiate descends (*Visita Interiora Terrae*) is one's own body. As for the hidden stone (*Occultum Lapidem*), this represents our most profound nature, that part of universality which we share with the world, with all the fratres and sorores and with all men and women.

Objective parallels can be drawn between certain secular worlds and the Rose Cross, between science and mysticism. For example, the mathematical concept of the sum of the infinitely small becoming a finite object can be transposed to the Rose Cross with legitimacy. The notion of the égrégore, whether it be neutral, limiting, or fruitful, characterized by a specific moment where a particular atmosphere is created during a ritual convocation or other event may be likened to the sum of infinitesimal elements. The collective sum of the thoughts is greater than the individual sum of the thoughts held by each frater and soror. In the world of mathematics, the continuous sum, which can be translated by an integral, taking the limit to infinity, of a sum of finite elements, is superior to a discrete sum.

Conclusion

We can say that every spiritually engaged frater and soror has potentially all the characteristics of the Rose + Cross and therefore belongs to the universal R+C. Rosicrucians are in some places advised to be discreet about the fact that they are aspiring *Rose Croix* simply because prejudices exist and, too often, amalgams are quickly made between some deviations and the very essence of the Order. It is also true that in some professions, it is inappropriate to declare oneself.

Suppose that a Rosicrucian reveals oneself to others, and those persons consider that some of the Rosicrucian's shortcomings are not in line with their perception of the R+C philosophy. First, we can legitimately think that we are just people who want to improve and that, therefore, it could be quite natural if some flaws remain. Only progress is important. Also, it could be that some personal flaws are incompatible with Rosicrucian virtues. Thus, if we start from the principle that every Rosicrucian, of any degree, represents the whole R+C, and if the layperson to whom a membership is revealed thinks the same, we can quickly imagine the extrapolation which can be reached. An important deficiency that could still characterize an individual could be seen as a characteristic of all Rosicrucians.

Within AMORC, the search for the One, the Whole, is dependent on the aspirations of each one of us, and it is as much a search for a creative principle, for a transcendental morality or for superior virtues, as it can be a search for our own self in the depths of our psyche and of our humanity.

Attributed to hermetic philosophy in *The Kybalion* (1908) it is written: "The All is spirit; the Universe is mental." Thoughts spread throughout the universe in the form of vibrations. Since all material things are imbued with mind and this energy is vibratory in nature, all forms of matter vibrate. Nothing stays still, everything moves, everything vibrates. Here too, everything is the Part.

Science and Mysticism are not enemies. They complement each other and strive in their own way to overcome ignorance, superstition, and fear. Together they help humanity to understand the harmony and Unity of the universe. In this Rose Croix initiatory society, the relation to gnosis can be more specifically defined as the most extensive moral knowledge, the most generous also, the impulse that leads humanity to learn more and more. This principle is present in all we study, whether in universities, in the Rosicrucian organisation, or simply in our daily lives.

Humanity must turn away from the illusions of appearances and find the way of the sacred in ourselves and by ourselves. And that quest leads to a double path of knowledge – science

and spirituality: "Everything is of the same nature as the self, and we grasp this in a deepening of our understanding of ourselves" (Bergson 1972).

Conflict of Interest Statement

The author declares no conflict of interest.

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