



A Stress Test for the HPTD-M Transdisciplinarity through Alchemical Psychology

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Abstract: Many authors tend to think of Alchemy, especially the European Alchemical Tradition that remained until the 17th century, as a predecessor to modern chemistry, but it is much more. Alchemy arose in a context where there was no separation between the natural sciences, philosophy, psychology, and cultural traditions. In this context of the 17th-century European Alchemical Tradition, the Modern Western Culture emerges, based on the 18th-century technoscience development, as per the Enlightenment or “Age of Reason”, Newton’s classic physics, and Descartes mechanism. Nowadays human sciences tend to replicate mechanical patterns of hard sciences. The human conscience is not inherent to biological systems, and human processes can’t be well predicted like mechanisms. This is the basis of the Holopraxis Transdisciplinary Management (HPTD M) theory and praxis. So, the aim of this paper, in this connection, is to show the universality of the HPTD-M models, when stress-tested through the Alchemical Tradition, especially considering Hillman’s view in Alchemical Psychology. Tradition, philosophy, art, and technoscience are the four epistemic ways according to HPTD-M, the four main disciplines in a transdisciplinary approach. The alchemical work or opus can be divided into four parts, which relate to earth, water, air, and fire. Eninger describes these main alchemical operations, among others that we will detail below based on this author: Coagulatio, Solutio, Sublimatio, and Calcinatio. Coagulation” has to do with solids, ”solution” with liquids, ”sublimation” with gases, and ”calcination” with fire. Also in the alchemical tradition there are four stages of the opus alchemica, which is the alchemical process of transmuting cheaper metals into more precious ones. It had four stages: nigredo (black), albedo (white/silver), citrinitas (yellow), and rubedo (red/gold). Naturally, the alchemical process was more than chemical or physical. Besides that four-element framework, Alchemy has also many dualities or complementarities involved. This author has created an alchemical model of quaternary complementarities to be compared to the already existing HPTD-M Model. The Alchemical Tradition corroborates the HPTD-M framework, through the result of this stress test represented by the analytic and synthetic models for Alchemical Tradition (Table 1 and Figure 3, respectively), in the same quaternary complementarities pattern, which suggests the universality of HPTD-M as a theory and praxis.

Keywords: Alchemical Tradition. Quaternary Complementarity. HPTD-M. Transdisciplinarity.

1 Introduction

Many authors tend to think of Alchemy, especially the **European Alchemical Tradition** that remained until the 17th century, as a predecessor to modern chemistry. However, it **is much more than a protoscience and is not a magical-vitalist view of reality**. Some tend even to confuse it with a religious approach, unaware of the difference between religion and tradition (in a transdisciplinary view every religion is a tradition, but not every tradition is a religion). Alchemy arose in a context where there was no separation between the natural sciences, philosophy, psychology, and cultural traditions. In a way, it encompasses all these aspects of human knowledge, in the form of symbols, allegories, and images. Its principles can be related to Greek philosophy and integrated with the empiricism of laboratory practices. This body of knowledge was deeply studied by Jung, who discovered a series of symbolic relations with the human psyche and the unconscious, interesting for the interpretation of dreams. Thus, Alchemy reveals a universal language, to be understood by the scholar in the form of symbols and metaphors. One of the main alchemical instruments is images bringing to consciousness contents not perceived in daily life, which need to be expressed for the evolution of the being in its psychological process, which the Swiss psychiatrist Carl Gustav Jung called “individuation”. In connection, the physics of the early twentieth century broke the reductionist paradigm of Newtonian mechanics, in which there were only particles, mechanisms, and well-defined cause-and-effect relationships. In quantum mechanics, probabilities predominate instead of certainties, corroborating the principles of complementarity that existed in various philosophies and traditions of antiquity. At the same time, Jung developed his Analytical Psychology in antagonism to Freudian mechanist Psychoanalysis, considering the symbolical alchemical texts as an important source, also influenced by Greek and Oriental philosophies. Analogies with modern physics occur with the principle of complementarity. Besides, Jung was in contact and exchanged impressions with physicists of his time. [1]

The alchemical tradition is in connection with the transdisciplinary view of reality (beyond and through disciplines). Besides Jung in the 20th century, the beginning of modern technoscience promoted indirectly a transdisciplinary paradigm, throughout the second half of the 17th century, through Newton’s classic physics and Descartes’s mechanism. Newton was president of the Royal Society, besides master of the Royal Mint, a successful entrepreneur, and a politician. Most of Newton’s work is about the alchemical tradition. René Descartes, in turn, although considered the father of the mechanistic paradigm, had also a transdisciplinary view of reality when saying that knowledge is like a tree: the route is metaphysics, the trunk is physics, and the branches are the various sciences. In this context of the 17th-century European Alchemical Tradition, the Modern Western Culture emerges, based on the 18th-century technoscience development, as per the Enlightenment or “Age of Reason”, Newton’s classic physics, and Descartes mechanism. Nowadays human sciences tend to replicate mechanical patterns of hard sciences, especially Newtonian classic physics (not modern physics), which is the origin of all hard sciences. Human phenomena can’t be reduced i) to living systems at the level of organisms/ecosystems, and ii) to mechanical phenomena. The human conscience is not inherent to biological systems, and human processes can’t be well predicted like mechanisms. This is the basis of transdisciplinarity and other holistic approaches. In this sense, the Holopraxis Transdisciplinary Management (HPTD M) theory and praxis aim at establishing a dialogue between them through a perspective of an engineer, business manager, and public manager. Some authors have difficulty discerning the concepts of human phenomena, biological-ecological phenomena, and mechanical phenomena. Hence, they get confused and try to fit reality into a framework of philosophy or science. HPTD-M also has psychological aspects of reality as a framework, at personal and collective levels, which tend to be neglected in favor of a sociological approach of the more objective Western Culture. [2]

This paper corroborates how naive and simplistic sound the approaches that reduce human phenomena to biological or to mechanical phenomena. That is what HPTD-M tries to confront as troubleshooting, a new quaternary model corroborated by the Alchemical Tradition.

The latter promotes a broader perspective of reality, otherwise, Newton himself, the father of classic physics still in use nowadays, would not have spent so much time with the Alchemical tradition. [3]

So, the aim of this paper, in this connection, is to show the universality of the HPTD-M models, when stress-tested through the Alchemical Tradition, especially considering Hillman's view in *Alchemical Psychology*, as an American Jungian analyst that created his own framework. [4]

2 The Four Epistemic Ways and the Subject-Object Duality

Tradition, philosophy, art, and technoscience are the four epistemic ways according to HPTD-M, the four main disciplines in a transdisciplinary approach. Psychology was just recently separated from philosophy as a discipline, at the end of the 19th century [5]. The same happened with public administration, which separated from politics also at the end of the 19th century [6]. So, our Modern culture tends to segregate everything, at a price. The advantage is the technoscientific development, and the price is the dehumanization and reduction of the subject to the object with troubleshooting implications in many areas of study, such as education, psychotherapy, management, and public management.

Religion is a form of tradition, like Alchemy, in this connection.

Einstein, the father of relativistic physics, categorically rejected conventional religion, but defended religion as a reality perspective complementary to science: Science without religion is lame, religion without science is *blind*. [7]

As Bohr once said about religion, with his background in modern physics:

The fact that religions through the ages have spoken in images, parables, and paradoxes means simply that there are no other ways of grasping the reality to which they refer. But that does not mean that it is not a genuine reality. And splitting this reality into an objective and a subjective side won't get us very far. [8]

According to Nicolescu, physicist and transdisciplinary theorist:

In Modernity, Subject and Object were totally separated [...] by a radical epistemological cut, allowing in such a way the development of modern science. The Object was just there, in order to be known, deciphered, dominated, and transformed. In Post-Modernity the roles of the Subject and Object are changed in comparison with Modernity and are reversed in comparison with Pre-Modernity: the Object, still considered as being outside the Subject, is nevertheless a social construction. It is not really "there". It looks more like an emanation of the Subject. Transdisciplinarity leads to a new understanding of the relation between Subject and Object [...]. The Subject and the Object are, like in Modernity, separated but they are unified by their immersion [9]

According to Jungian analysts, two remarks in this connection:

- a) Hillman: Jung claims that alchemical metaphors best provide an understanding of what the psyche goes through in deep, long-term analysis. [4]
- b) Hall: The alchemists did not clearly distinguish objective work on the matter from subjective work on themselves. [10]

Those two Jungians and the alchemical tradition itself are in a paradigm close to modern physics and transdisciplinarity.

3 Alchemical Tradition in the Context of Transdisciplinarity and Four Elements

These simple symbolic images may need long texts to be described in words so that meditation on these allegories can often have as much effect as hours of study on the subject. The expression of duality is

frequent in Alchemy, through the figure of the Sun and the Moon, of the King next to the Queen, of the Star of David (a star symbol formed by two overlapping equilateral triangles, one pointing up and the other down, used by Judaism and its followers. Another name given to this symbol is the “Seal of Solomon”), of the Ouroborus (a star symbol formed by two overlapping equilateral triangles, one pointing upwards and the other downwards, used by Judaism and its followers. Another name given to this symbol is the “Seal of Solomon”) of the Ouroborus, among others, a drawing of the serpent eating its own tail. In general, the head has stars and the rest is black, which would be the secret opposition. In the ancient Greek text, this is explained: the head is different from the tail. It is an image that shows there is an opposition between the head and tail. It is a kind of European Tai Chi, like the Yin-Yang symbol. It can also appear as two birds or dragons, one without wings and one with, both biting each other’s tails. Another possible name for Ouroborus is Uroborus), Also the four elements appear frequently, earth, water, air, and fire. According to Franz:

The alchemist Zozimos (3rd century AD) already stressed that the four elements should not be understood concretely; rather, they were mysterious “centers” or principles present in matter. Later, they were interpreted as aggregations: all solid matter was considered as “earth,” all liquids as “water,” all gases as “air,” and everything that burned, corroded, or burned as “fire”. [11]

As a rule, Alchemy outlined a “chemical transformation” process, which could also be understood as “the work” (the *Opus Alchemica*), and consequently dictated the instructions for this process to be completed. However, the way it was forwarded and even described varied from adept to adept. Each alchemist had his own language, and perhaps this is why, even today, its study is considered very complex. The Squared Circle is an Alchemical Symbol illustrating the interplay of the four elements of matter symbolizing the philosopher’s stone; the result of the “Great Work”: *Magnum Opus*, an expression also used for masterpieces of art in our Western Modern culture.

But there are some common points to note. The stages of the work, for example, were definitions accepted by almost all alchemists.

According to Hillman, Alchemy was necessary to provide a basis for Jung’s depth psychology because it abandoned literal unilateralism entirely. No term means only one thing. Every alchemical phenomenon is both material and psychological at the same time. It is then all metaphorical and symbolic. Also, according to Hillman, the soul asks to be worked just as the material asks to be refined. The raw wants to be cooked, thus suggesting an archetypal basis for the ideas of perfection, progress, as well as evolution. Complementing this, the same author points out that the alchemical model suggests that what is inside is the same as what is outside; therefore, both man and the world have souls. Furthermore, Hillman explains that alchemy offers psychological insights that cannot be reached by a Cartesian-Newtonian science, which separates the worker from the work. In this respect, quantum physics offers similar insights, only discovered at the beginning of the 20th century, as we will see later in section 6, where it is concluded that the observer cannot be separated from the object of observation, that is, the subject is inseparable from the object. Hillman adds that the alchemists said “Throw away the books”, meaning “discard the literal”, in order to hear the spirit in the letter. [4]

For Crema, in the Jungian view, the alchemical opus represents a symbolic journey in the psychic universe from the rough stone of the ego towards the supreme goal of the elixir of life, the Philosopher’s Stone of the Self. Alchemy aims at both healing and liberation of the soul and the cosmos. In this sense it complements the Christic task of human salvation, proposing equally a cosmic redemption. Still according to Crema, in Jung’s vision, alchemy is the Western dream, and more particularly that of Christianity, constellating the aspects denied in it: matter, feminine and evil. This is the second principle of the Emerald Tablet. [12]

Thus, the ultimate goal of Alchemy is to reach the Philosopher’s Stone. Then comes the concept of the quintessence, the ether or the fifth element, the result of the interaction of the four - earth, water, air, and fire.

Chaui reveals a similar principle when dealing with Plato’s four levels of knowledge or divided lines, i.e., *eikasia*, *pistis*, *dianoia*, and *noesis* [1]:

We reach the fifth element, or the true knowledge of the object, only by a 'kind of friction between the first four modes, which, says Plato, produces a kind of spark, a light that makes us see the pure idea of the thing. That is, passing from one to another, going back and forth from one to another of the four modes, suddenly, as in a flash, our soul sees directly the real object, has an intellectual vision of it, and has what Plato will later call intuition, a direct and instantaneous intellectual contact with the pure essence of the pure idea of the thing sought. [13]

Similarly, considering the four Jungian functions of sensation, feeling, thought and intuition, in Crema's reading the individual develops only one or two of them, and the others end up atrophied or undifferentiated. The development of the deficient functions and their integration and harmonization with the others leads to a fifth function, which Jung calls Self, an intelligence of the psychic totality, the central objective pursued by the individuation process, an initiation path that leads us from the egoic periphery to the heights and abysses of the wisdom of Being [12].

4 The Four Alchemical Operations

The alchemical work or opus can be divided into four parts, which relate to earth, water, air, and fire. The four elements are related far beyond the states of matter - solid, liquid, gaseous, and plasma - and can be psychologically linked to the functions of the psyche - sensation, feeling, thought, and intuition. In the alchemical tradition by the view of psychiatrist and Jungian therapist Edinger, these elements relate, respectively to the operations of *Coagulatio*, *Solutio*, *Sublimatio*, and *Calcinatio*: "coagulation" has to do with solid, "solution" with liquid, "sublimation" with gas and "calcination" with fire. [14]

Coagulatio, besides the physical process of solidification, essentially means to make something concrete. Psychologically it can be: (i) the union of the transpersonal spirit with ordinary human reality, which has been symbolized by the image of a flying eagle chained to an animal on the ground; (ii) depression, melancholy and mortifying limitation, the autonomous spirit becoming bound to heavy reality and the limitations of personal particularities; and (iii) coagulation of the psyche by desire, the pursuit of power and pleasure - it would be the desire-driven incarnation of the soul, according to some Neoplatonists. For those who are already driven by desire, Coagulatio is not a necessary operation. From ancient times matter has been identified with evil, such as a necessary purifying tribulation, a purging suffering. If one wishes to contribute to the real world, one must leave a space for evil, otherwise one is short-lived and falls ill like the saints and the spiritualized. Dreams often allude to the criminal aspect of the ego. The presumption to take over one's will and conscience can be represented by theft. Although it is a process marked by guilt, the Coagulatio can have a redeeming character, for it can be seen as the tribulation in this life that purifies the taint we have accumulated. The existence of the incarnate can be described as a prison of the soul, according to Plato in *Fedro*. A less negative symbol of incarnation is the house or temple of the soul, or even the clothes signifying the incarnate condition, the garment through which the consciousness of the soul manifests itself. Another classic symbol of the Coagulatio is crucifixion, being nailed to the "cross of the physical world," incarnation for the purpose of redemption. The Eucharist is a rite of Coagulatio. Symbolically eating something, even in dreams, means to embody, literally to make the body. It means that unconscious content is ready to be assimilated by the ego.

Solutio is the change from solid to liquid. It means the return of differentiated matter to its original state, that is, to *prima materia*, an idea inherited from the pre-Socratic philosophers that water is the original material from which the world is created. It essentially results from the confrontation between the conscious and the unconscious. This experience dissolves psychological problems by transferring the issue into the realm of feeling, which causes rebirth, rejuvenation, and immersion of creative energy, symbolized by baptism. It can appear in dreams as drownings or floods, which represent an activation of the unconscious that threatens to dissolve the structure established by the ego. Thus Solutio can mean: (i) return to the womb or primal state; (ii) dissolution, dispersion; (iii) greater thing involving or absorbing a lesser thing; (iv) rebirth, rejuvenation, immersion in creative energy; (v) proof of purification; (vi) problem solving; and

(vii) melting or softening process.

Sublimatio is physically the volatilization of the solid directly into the gaseous. What was inferior becomes superior by upward motion. It has nothing to do with sublimation according to Freud's concept. Psychologically it is the way to deal with a concrete problem by seeing it in a broader and more objective way. The higher we rise, the better our perspective, but we become distant from real life and the ability to act on what we perceive. Heaven is the home of Platonic forms, universals, archetypal images. In dreams Sublimatio can appear as an escape or release of caged birds or some other kind of upward movement. It is the release of spirit hidden in matter. The ability to be above things and see oneself objectively is the ability to dissociate. This word indicates the danger of Sublimatio: that of pushing the individual further and further away from earthly, personal reality, until the enantiodromia (a term coined by the philosopher Heraclitus for the concept that a great force in one direction generates a force in the opposite direction, a concept often used by Jung, in the idea that everything ends up becoming its opposite) throws him violently to the ground. People unbalanced by Sublimatio will dream of frightening heights, unstable tall structures, balloons, etc. This can happen to some scientists and mathematicians, who live in their abstract world.

So the ascent and the descent are equally necessary, as an alchemical saying states: "It sublimates the body and coagulates the spirit." On a psychological level, then, the figure of the circulatio appears, a transit between opposites experienced alternatively, repeatedly, until it gradually leads to a balance between them. Jung described the circulation, thus:

Up and down, up and down, up and down represent an emotional realization of the opposites, which leads, or should lead, gradually, to a balance between them. This motif often occurs in dreams in the form of up and down a hill, up a ladder, up and down in an elevator, in a balloon, in an airplane, etc. It corresponds to the struggle between the winged dragon and the wingless dragon, that is, the ouroboros... This hesitating between opposites and being thrown from one side to the other means being contained in the opposites. These become a vessel in which the element that was once either one or the other floats, vibrating, so that the painful suspension between opposites gradually becomes the bilateral activity at the point situated in the center. [15]

Finally, Calcinatio refers to the chemical process of calcination, removing water and all other elements liable to volatilization, leaving a fine white dry powder after the operation. The classic example is the heating of limestone or calcium hydroxide to produce quicklime. Calcination has two meanings at the psychological level: (i) the fire of hell, symbolized by the dragon, for the manifestation of concupiscence, purification, or purgation by desire or anger, which can last a long time; or (ii) insight from the Holy Spirit or the individual himself, which lasts a short time. The end product, the "white powder," resembles purification. Finally, Calcinatio produces a certain immunity to affect and an ability to see the archetypal aspect of existence. According to Edinger, to the extent that we are related to the transpersonal aspect of our being, we experience affect as an ethereal fire (Holy Spirit) and not as an earthly fire, the pain of frustrated desire. [14]

Figure 1 shows a representation of these four alchemical operations. In it, the symbols of the four elements, earth, water, air, and fire, are, in order, indicated in the spheres.

In the same figure the operations are represented by the jars or vases at the top, each with distinct contents. Hillman suggests a parallel between the psyche and the jars or glass. The glass, like the psyche, is how we see into, we see through. It would be a physical representation of insight. Glass as a subtle body requires a subtlety of observation. [4]

Edinger, in turn, relates the ego to the image of a vase. [16]

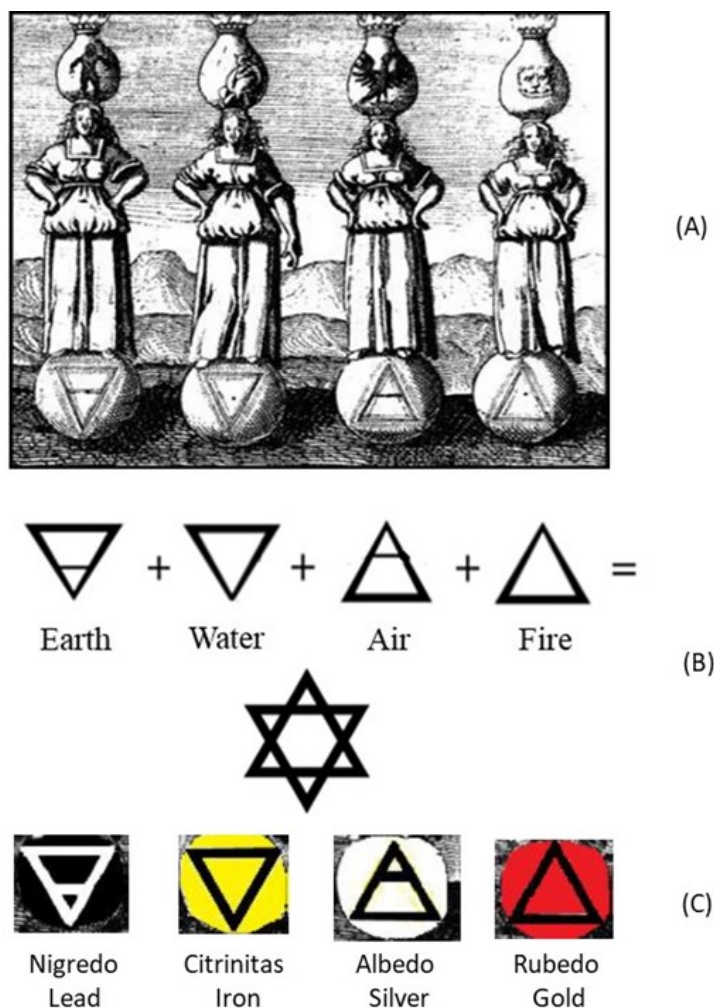


Figure 1: The Four Stages of the Alchemical Process. Sources: author’s idea based on: (A) “The Four Stages of the Alchemical Process” MYLIUS, *Philosophia reformata* (1622). (B) four elements in triangles and consolidated as the symbol of the star of David [1]. (C) Nigredo (lead) + Citrinitas (iron) + Albedo (silver) + Rubedo (gold) [4,17,18].

5 The Four Alchemical Stages

Also in the alchemical tradition there are four stages of the *opus alchemica*, which is the alchemical process of transmuting cheaper metals into more precious ones. It had four stages: *nigredo* (black), *albedo* (white/silver), *citrinitas* (yellow), and *rubedo* (red/gold). Naturally, the alchemical process was more than chemical or physical.

As seen through the two symbolical ideas of 1) states of matter and 2) colors (black, white, yellow, and red), those are psychological states, not physical. The latter can be considered simply solid, liquid, gas, and plasma.

In mythology, according to philosophy professor Galvão [17], the concept of the everyday hero emerges from the mythical hero. Myths are alive, they are not just for lulling children. There are dragons, monsters, and difficulties of all kinds in the hero’s everyday battle. So, the four stages of the alchemical process can be seen especially in a psychological way, the chemical and physical are only a symbolic part of the process

described in this sense:

- a) **Black - realization:** diving inside ourselves and the roots and shadows of our unconscious, which tyrannize us and need to be tamed, like an animal under authority, can become positive energy thus confronting the monsters within us without attacking us from behind.
- b) **White - purification:** mastery of the internal monsters.
- c) **Yellow - maturity:** realization of all monsters outside as well.
- d) **Red - elevation:** spirituality and wisdom, the path of the fullness of consciousness.

According to the *Centre of Applied Jungian Studies (CAJS)*, which is an institution that provides courses related to those four stages [18]:

- a) **Nigredo: The Blackening.** This first stage is also referred to as **putrification**, focusing on the techniques with which to explore the unconscious.
- b) **Albedo: The Whitening.** This second stage is also referred to as **purification**, focusing on tools with which to relate to the self and inner world.
- c) **Citrinitas: The Yellowing.** This third stage focuses on exploring relational dynamics and provides tools with which to explore relationships with the world, others, and intimate partners.
- d) **Rubedo: The Reddening.** The final stage focuses on providing the psychodynamic tools with which to engage with the ongoing individuation process.

As Hillman shows in his *Alchemical Psychology*, the Rubedo aiming at gold and the Albedo aiming at silver are interconnected, like the sun and the moon, respectively, in an alchemical symbolic view. **The alchemical process is both one of refining, by releasing essence from dross, and of transmutation, by improving the grade of the metal from lowest to highest, from lead and iron to silver and gold. In alchemical soul-making, gold is necessarily preceded by silver.** This means that gold comes out of silver, red comes from white, sun from moon, brighter awareness from lunacy. Alchemical soul-making proposes that the final idea of sun conjuncted with moon means nothing less and no other than a condition of being in which solar brilliance and awakensness and moon-madness are marvelously conjoined. The *mysterium conjunctionis* is illumined lunacy. Silver is required for the opus of gold-making, for evidently it is the hard lunar mind, solid in the realization of its imaginative forms, which allows gold to be hammered into specific shape and take on definition. Alchemical gold is a red elixir, we must remember. It is active and incarnated, a universal medicine, a multiplying power in the world, a philosopher-king, just as this universal ambition of the gold appears in the worldly gold-making ambitions of the alchemist. Gold is not a transcendent spiritual state of awareness, a mystical saintliness of light, truth and perfection only, but rather these virtues shaped and defined for which shaping into precise forms, silver is required. [4]

Figure 1 details the four stages of the Alchemical Process, in connection to the four archetypal elements earth, water, air, and fire.

Figure 2 connects the philosophical scheme for Soma, Psyche, and Nous, at the center, with the four Alchemical stages in circles. The spheres representing Rubedo, Citrinitas, Albedo, and Nigredo are an idea of this author to connect with the triangle, the square, and the three other circles, which are part of the New Acropolis view [19].

6 Alchemical Dualities and the Quaternary Structure

Besides that four-element framework, Alchemy has also many dualities or complementarities involved. Some duality alchemical symbols: as in the Taoist Yin Yang opposition, duality and balance are essential. The king and queen, which also symbolize the sun and the moon, represent the two opposite properties of Primordial Matter (*prima materia*): Sulfur and Philosophical Mercury. During the alchemical operations,

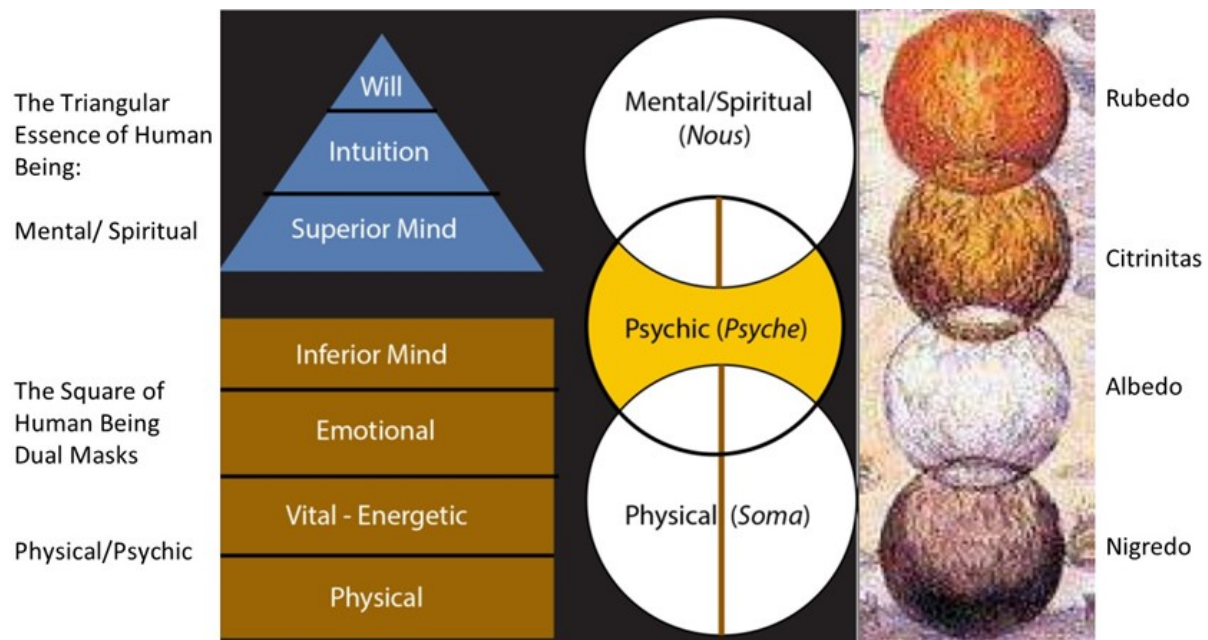


Figure 2: The New Acropolis philosophical scheme for Soma, Psyche, and Nous with the four Alchemical stages in circles: Rubedo, Citrinitas, Albedo, and Nigredo. Sources: i) New Acropolis scheme [19] and ii) The four stages of the alchemical process [4,17,18].

they are united, destroyed, separated, purified, and reunited. At the end of the work, the King and Queen merge into a single perfect being - the Androgynous - symbol of a harmonious balance between the male and female poles, which emerges from the dragon of Primordial Matter. A tree signals perfection, while the bird feeding its young suggests the capacity for multiplication of power. Whether these characters are interpreted as dual aspects of one’s own personality or as the dynamics of relationships with others, one will find that the battles, reconciliations, and passionate love between the King and Queen can be useful models for personal growth.

On duality in Alchemy, Edinger notes:

The most prominent symbolism pertinent to the creation of consciousness is found in alchemy. Although its texts are confusing and obscure, the basic idea of alchemy is quite simple. The alchemist must find the right matter to begin with, the “prima materia”. He must then subject it to the appropriate series of transformative operations in the alchemical vessel, and the result will be the production of a mysterious and powerful entity, called the Philosopher’s Stone. We now know, through Jung’s profound research, that the alchemical procedure symbolizes the process of individuation, and that the Philosopher’s Stone represents the realization of the self, that is, the consciousness of completeness. One of the crucial aspects of the Philosopher’s Stone is that it is a union of opposites. It is the product of a “coniunctio” often symbolized by the union of the red king and the white queen, where the king and queen signify any or all pairs of opposites. [20]

In this author’s view as an engineer, considering De Broglie’s wave-particle duality [21], in philosophical and alchemical terms a relationship or allegory can be made with the archetypal four elements: the “denser”, the “earthier”, the greater the “particle” character; the less “dense” or more “subtle”, the greater the “wave” characteristic. Physics also corroborates this principle in four elements, if plasma is considered the fourth state of matter. The solid state is characterized by the relative proximity between atoms and/or





molecules, and by the rigidity of the bonds established. In the liquid state the interatomic or intermolecular distances are of the same order of magnitude as in the solid state, but the bonds established are more tenuous and ephemeral. In the gaseous state, the atoms or molecules that compose it have practically no interaction with each other, except for occasional collisions, but the particles are electrically neutral, the electrons are in their atoms and molecules, which move freely between collisions. However, when the electrons are removed from the atoms, the atom is said to have become ionized and is called an ion. If a significant fraction of the material becomes ionized, it ceases to be a gas and the particles move freely and only interact via collisions, becoming a medium in which the particles can act at a distance on each other via electromagnetic forces, and continue to interact via collisions. This medium, therefore, has different behavior and properties than a gas and is called plasma. The sun is an example of a substance in a plasma state, where the temperatures are very high. Thus, the four states of matter can be related to the elements earth, water, air, and fire of alchemy, one of the bases of Jungian psychology, because the four functions of the psyche are also related to this quaternary framework.

7 The Quaternary Complementarity Framework of Alchemical Tradition Compared to HPTD-M

This author has created an alchemical model of quaternary complementarities to be compared to the already existing HPTD-M Model. The analytical model is in Tables 1 and 2, and the synthetic model is in Figures 1 and 2. The latter has a transdisciplinary green circle (TD) and a cross of the horizontal judgment axis in dialogue with the vertical perception axis. The Subject is limited by a circle, and the Object is outside.

Table 1 is an analytical presentation of Figure 3, which shows synthetically the HPTD-M model for the Alchemical Approach.

Table 1: The HPTD-M Analytic Model Translated to the Alchemical Tradition Approach

Triangle Apex	Down		Up	
Symbol				
Metal (Chemical Element)	Lead (Pb)	Iron (Fe)	Silver (Ag)	Gold (Au)
Stages of the Opus	Nigredo	Citrinitas	Albedo	Red
Psychological Functions	Sensation	Feeling	Thinking	Intuition
Physical Element	Solid	Liquid	Gas	Plasma
Archetypal Element	Earth	Water	Air	Fire

Source: author's idea

Table 2 is an analytical presentation of Figure 4, which shows synthetically the HPTD-M transdisciplinary model focused on management and troubleshooting.

8 The Nature of Conscience as Human Phenomena

In this alchemical and transdisciplinary context, the nature of the human conscience emerges as a form to demonstrate that human phenomena can't be reduced to biological/ecological or mechanical phenomena.

However, physicist and systems theorist Fritjof Capra understands that mind and consciousness emerge from matter at a certain level of complexity, when the organization becomes such that the processes and patterns involved are those that we associate with life, with living systems. Therefore, consciousness is a phenomenon associated only with biological life, not with a vital field that is outside the phenomenon and gives the "flame of life" or something like that, as some can believe. [22]

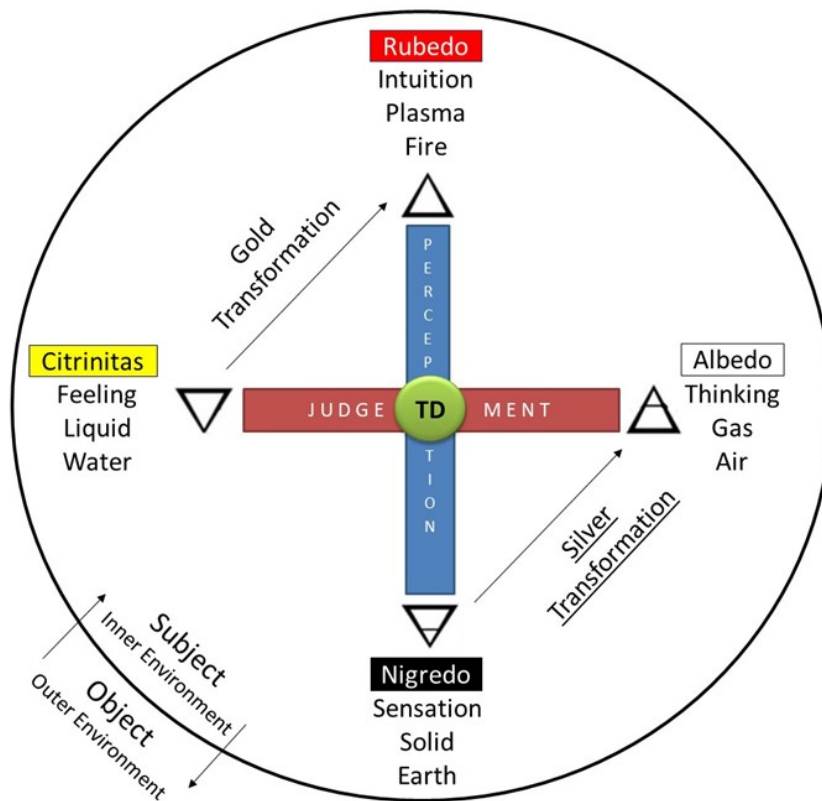


Figure 3: Alchemical View in the Synthetic HPTD-M Model (Source: author’s idea).

Table 2: HPTD-M Analytic Model [2]

Type of Skill	Soft		Hard	
Type of Intelligence	Intuitive	Emotional	Rational	Empirical
Troubleshooting Requirement	Meaningfulness	Reasonableness	Rationality	Feasibility
Methods	-	-	Deductive	Inductive
	Synthetic		Analytic	
Synchronicity vs. Causality	Synchronicity		Causality	
Level of Abstraction (MBTI)	Abstract	Subjective	Objective	Concrete
Management Attributes	Dialectics	Sustainability	Simplicity	Effectiveness

Mechanists, on the other hand, understand that consciousness is a product of chemical reactions of the brain, in a narrower view than Capra’s.

According to physicist and transdisciplinary theorist Basarab Nicolescu:

“Consciousness” was, a few years ago, a forbidden word in scientific research, as a kind of magic reminiscence. However, scientists began slowly to recognize that there is a missing link between neurons and the human being. [23]

Both biological/ecological and mechanical approaches may lead to a materialist bias if there is no understanding and recognition of the limitations of those views for human phenomena issues. This means that in some circumstances biological and mechanical approaches may be used, provided the conditions are

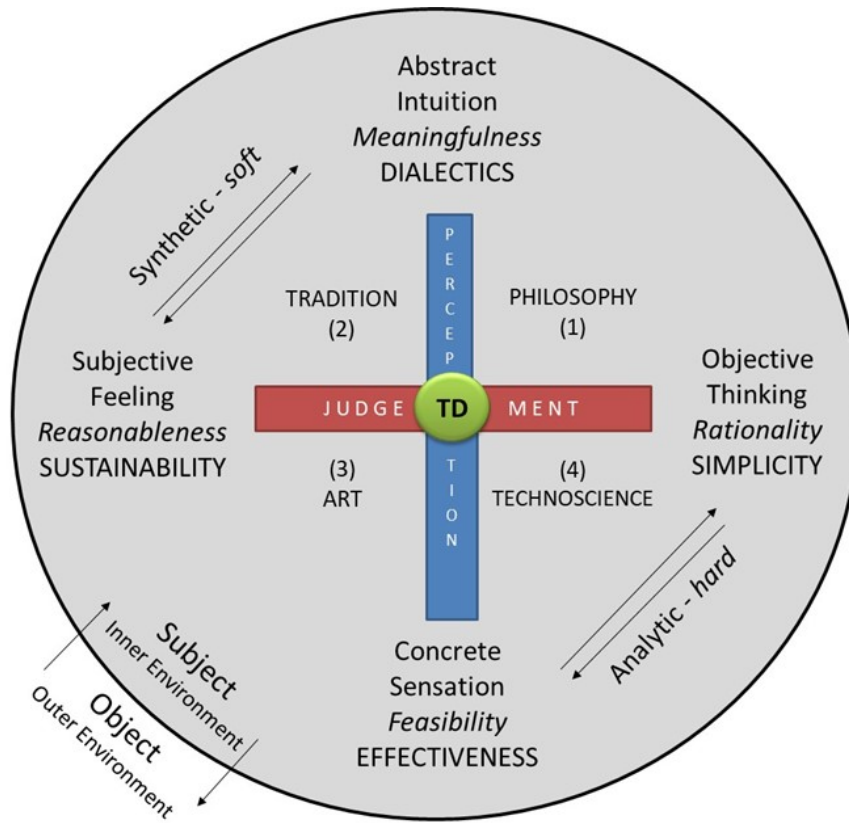


Figure 4: HPTD-M Synthetic Model [2].

very well delimited and the models configure a reasonable approximation for reality. What this author criticizes, in the end, is reductionism, because many times it is not possible to use the biological and/or the mechanical approach.

The father of quantum mechanics, Max Planck, once said: *I regard matter as derived from consciousness* [7]. In this connection are ancient philosophies and traditions. For example, Plato's through the dialogues *The Republic* [24] and *Fedro* [25] defend that the soul (*psyche*) animates de body (*soma*), as some traditions do. Those platonic ideas are compatible with Jung's Analytical Psychology vision of the psyche as a quality of matter, a different kind of matter [26]. Franz understands, as a Jungian analyst, that psyche reflects matter and vice-versa. Franz sees consciousness in terms of reflections of matter (the outside world), reflections of the unconscious in the mind, and also reflections of the unconscious in matter. Not by coincidence, the title of her book is *Projection and re-collection in Jungian psychology: reflections of the soul*. [27]

This idea of consciousness as a reflection in matter can remind the Platonic cave myth [1, 26]. In this line of interpretation, the shadows of reality are what the prisoners in the cave see from the world of the senses (material world), that is, they are purely mental reconstructions of reality without taking into account the world of ideas, that is, the intellectual intuition, the noetic world that is discovered outside the cave, in the world of ideas, which in turn can also be seen symbolically as a reflection of the spiritual world in the mind.

According to Edinger, still in the field of psychology, there is the idea of the individual as a vessel for consciousness, bringing to mind the symbolism of the Holy Grail.

The image of the ego as a vessel leads to the important idea of it being a "carrier of consciousness," that is, an embodiment of the transpersonal sense. Two main archetypal figures have represented this idea in world culture, namely Buddha and Christ. We are fortunate to possess these two figures. Having two, the possibility of comparison and objectivity arises. If there were only one figure personifying the supreme value, it could only be venerated, but not understood. With the presence of two, we discover the third separate thing that both share; understanding and greater awareness then become possible. What Christ and Buddha have in common is the idea of the bearer of consciousness. Characteristically, the image that emerges from the West represents the viewpoint of the ego, and the one derived from the East speaks of the viewpoint of the Self. Together, they reveal a pair of opposites. The crucified Christ and the meditating Buddha represent consciousness as agony and consciousness as serene bliss - on the one hand, total acceptance of subjection to matter, and on the other, total transcendence of the world. United, they portray the two sides of the bearer of consciousness. [28]

Edinger completes on this symbolism:

The individual psyche is the Holy Grail, sanctified by what it contains. Consciousness is the psychic substance produced by the experience of the opposites, experienced, not blindly, but in a state of alert glass. This experience is "coniunctio", the "mysterium coniunctionis" that generates the Philosopher's Stone symbolizing the consciousness. Each individual, to a greater or lesser degree, is a participant in the cosmic creation, one of the buckets in the great Manichaeian wheel of light, who contributes his "little bit" to the cumulative treasure of the realized archetypal psyche. Each human experience, to the extent that it is consciously lived, increases the total of consciousness in the universe. This fact provides "meaning" to all experiences and gives each individual a role in the worldwide and ongoing drama of creation. [29]

Finally, Jung said that we are conscious of only a small part of the world. Our vision reaches only a certain distance, our memory is insufficient, and our sensory perceptions, important for our orientation, also. Many things happen that we are too blind to see. Consciousness is like a lighthouse that travels across the field; only the illuminated points are conscious. The unconscious, or dark side, the part that is habitually unconscious, is the sphere of shadow. To be conscious you have to be focused; we are always conscious of something specific. The total personality could be described as the consciousness plus the unconscious. There is the usually unconscious area and the relatively unconscious area; there are times when we are conscious of this and times when we are conscious of something else. We think we know something about the nature of (physical) matter, but what is consciousness? We have no idea. We have no perspective away from consciousness, from which to judge its properties. [30]

9 Conclusion

The Alchemical Tradition corroborates the HPTD-M framework, through the result of this stress test represented by the analytic and synthetic models for Alchemical Tradition (Table 1 and Figure 3, respectively), in the same quaternary complementarities pattern, which suggests the universality of HPTD-M as a theory and praxis. The principles of four archetypal elements together with dualities are also shown in the HPTD M as a troubleshooting resource for education, psychology, management, public management, and other disciplines involving human phenomena. After all, human phenomena tend to be more sophisticated than biological-ecological or mechanical phenomena. This means that in some circumstances biological and mechanical approaches may be used for human phenomena, provided the conditions are very well delimited and the models configure a reasonable approximation for reality. What this author criticizes, in the end, is reductionism, because many times it is not possible to use the biological and/or the mechanical

approach. That is the importance of the holistic, systemic, and transdisciplinary view for understanding human problems to be solved in a way that is effective, sustainable, simple, and dialectical, as indicated by the ultimate quaternary attributes in HPTD M.

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