

The General Law of Being

Article 1: Being of Interrelation

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Introduction

In December 1998, Dongyue Wang, a polymath with almost no engagement in the academic community, published his work, 物演通论 [*A Unified Theory of Evolution*], in which he shared his new cosmological system – a model of existence that unifies every being with a simple, universal law. It is profound and a fundamental challenge to existing thought about perceptions of reality in our universe.

Astonishingly, this ingenious, fundamental theory sprouted in China, which has almost no soil of philosophy to nourish it. While the literature of Laozi, Confucius and the Hundred Schools of Thought are recognized as Chinese metaphysics, little philosophy can be found afterwards for over 2000 years – until Wang appeared with his ideas that propose an ultimate principle of all beings, including the very basis of being and how changes of the properties of beings are possible.

It should be noted that Wang's philosophy is different from classical Chinese logic systems, primarily because of his use of the hypothetico-deductive method. The ancient Chinese systems of philosophy proposed hypotheses, but they lacked reasoning steps to verify them. Wang's philosophy, however, does not require readers to possess prior knowledge about Chinese culture, for the model is universal and lives up to the three standards of legitimacy that Wang himself proposed:

- 1) The entire model must be self-consistent, with no contradiction or anomaly.
- 2) The model must be consistent with other acknowledged models or systems. This means that his model can incorporate past models or combines well with them. If it doesn't, then defects of the past model must be explained.
- 3) The model must be consistent with facts that emerge in the future, which means that the model should be universally true to facts through all times.¹

Wang's model has had little impact in the Western world, given the inevitable language barriers and its specialist philosophical terms. Without references or literature

reviews from the West to point to the works on which his work is grounded, Wang's arguments can seem abrupt and bold.

Although my studies and Wang's work address the same fundamental theory of being, our reasoning and presentation are different. I focus on comparing Wang's thoughts to theories that are already widely known in the wider world. This includes the autopoiesis theory, Kant's transcendental idealism, Wittgenstein's philosophy of logic, systems-thinking, Schrodinger's negentropy, Prigogine's dissipative structure, Thomas Khun's paradigm, Popper's falsification, and so forth. Most of these do not appear in Wang's work. I also re-reasoned Wang's model of existence by grounding it on Humberto Maturana and Francisco Varela's equal-adaptation / equal-existence principles, then I provided falsification and upgraded their model to accord with Wang's philosophy.

By taking an evolutionary approach, Wang's model of existence rectifies Platonic notions of reality. Ancient Greek models had influenced the early development of science, and so this had led to descriptions of existence as mechanistic, reversible, and relatively static, as seen in Isaac Newton's idealised models in the 17th century. But, starting with Joseph Fourier's law of heat conduction (1822), irreversible processes were revealed, which revolutionized scientific thinking.²

Wang's model of existence provides the only path to the essence of irreversibility, by which he explains how the continuously-increasing complication of properties is possible. This conclusion cannot be had without deep reasoning and presentation of the facts on which his model is grounded. This necessity forms the core of my work. The present article is a selection from my book, *Introduction to the General Law of Beings*, which is in the process of composition.³

As you will see in Wang's framework, a 'being' does not refer just to a human individual, as is customarily spoken of in many world languages. Wang confers the name on any entity, living or not living, which can serve as a subject or an object. Since we are talking about *being* or *existence*, we should be aware that all *beings* are actually nothing but their *properties*, which allow their existence to appear to us.

Wang’s model explains how diverse beings evolve from the ‘one’ (the being with the least properties) and it describes how living organisms and mental phenomena occur. This ontological background explains epistemological questions, such as the origin of our ability to make distinctions, the essence of the world as it appears to us, and the essence of ‘properties.’

This paradigm provides us with a holistic, inclusive, and cosmological picture. By using Wang’s perspective, the emergence of everything is linked by his evolutionary outlook. A common essence is then apparent. I contend that this model is what civilization urgently needs at this point in time. As a fundamental theory, it will add fresh thought to all fields, develop new facts across disciplines, and point us to a new era.

This understanding of the need for a new direction for humanity is well understood in Russian studies of megahistory, which indicate that a crisis or at least a global, social anomie will peak in the near future. As nuclear physicist Alexander Panov has written:

If the potential for overcoming the information crisis is possible, then, in accordance with the principle of superfluous diversity, a solution to the problem should already exist in a rudimentary form. Perhaps these new sprouts in the culture of humanity are already here, and we only need to look more closely to see them.⁴

Perhaps we have some aspects of a new model here at hand within this paper. I believe that Wang’s philosophy is no longer that hard to understand if one is ready to become involved in a new way of seeing the world!

The Benefits and Limits of Dualism

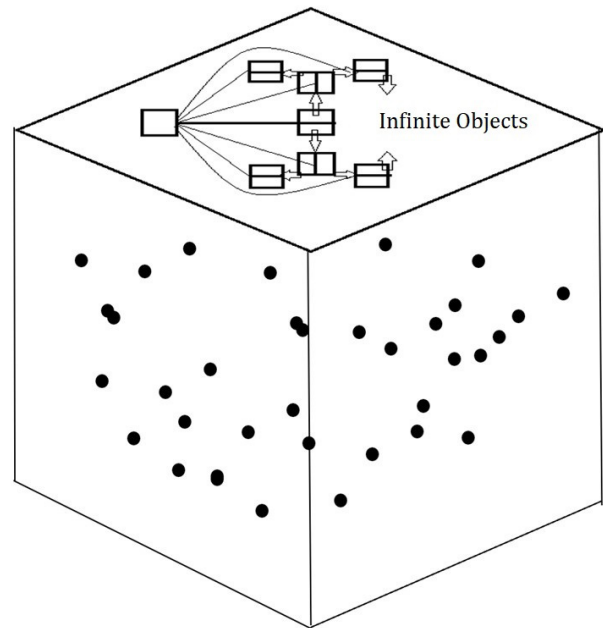
Cartesian dualism has deeply influenced how experts in all fields develop their research, thus affecting the process of knowledge-building and its contents. The harvest of data from this strategy has been rich. In order to explore items, we divide them into their constituent parts (reductionism) and then keep breaking them down to study them in greater depth. The increase of information has resulted in a wealth of scholarship, where different portions of an object are analysed by different groups of people, often in different disciplines.⁵ While it is an efficient way to produce knowledge, it also has caused a shattered distribution of learning and the loss of holistic vision, which skews our perception of existence.

By the mid-20th century, the huge amount of scientific information that had been generated could not be adequately managed by Cartesian dualism and its process of reductionism. In the physical sciences, the uncertainty principle and the observer-effect process ignited a distrust in reduction. In the life sciences, a reductionist approach could not explain the emergence of many biological phenomena.⁶ In the social sciences, the complex array of societal events could barely be reimaged by reductionist strategies. This scholarly impasse came to a head because the study of even just two factors by reductionist processes does not address the system that the factors constitute as a whole.

As a result of such limitations, *systems theory* was developed to transition from an atomistic perspective to a more holistic understanding.⁷ It was a stop-gap method. Even though systems-approach incorporated a limited form of evolution by considering the emergent properties of a process, it still existed – essentially – on a horizontal plane. Indeed, systems-approach can be considered a form of *horizontal holism*. Considering the circumscribed scale of operations being studied, the span of evolution that systems theory accommodates is relatively shallow.

Diagram 1: The top side of the cube represents how human beings – as a subject – explore objects by dividing them over and over. The dots in the cube represent information that humans study in various disciplines.

Diagram by Ye Chen.



For example, ecology uses the systems-approach at one of the largest scales among the disciplines, since it unifies non-living and living beings to examine their complex interrelationships. Nonetheless, such research is grounded just on the Earth. Because of this limitation, many ecological questions remain elusive, such as whether the Earth can be regarded as an organism capable of making its own adjustments in the support of life – the Gaia Hypothesis.⁸

The controversies surrounding the Gaia Hypothesis is a natural by-product of horizontal holism. By perceiving existence from such a flat angle, we do find complexity and contingency, but it is hard to draw out wider principles. Such axioms can only be found by placing the Earth and all its ‘beings’ in a larger, evolutionary framework. Solely by exploring the evolution of all entities and figuring out the fundamental factor in their occurrence can we understand why Earth might act as if it is a self-regulating organism.

So, apart from Cartesian dualism and horizontal holism, are any other approaches possible? Can we break the restrictions of this horizontal plane and expand our view? Such a new approach must be completely different and largely erase the disadvantages of dualism and horizontal holism.

In respect to humanity, such a new approach would no longer regard smaller, self-contained systems or entities as its focus, but instead the totality of humankind (*units to unities*). Cognition would not mean just biological variation and its by-products – sensory organs, mind or logic-forms – but rather the expanding process of all human culture. This would include the relay-system of logical models (culture in a broad sense) and its role in the continuation of species. This new outlook will require re-evaluation in all fields of study, where logical models of thinkers must be expanded and reshaped.

As for such an adjustment in the scale of thought about humanity, we also need to shift our view for the rest of existence from individual units to the totality of units (*unities*), and thus escape the instant, static scene of dualism, in order to experience the evolving quality of all exis-

tence. In this new model, the task wouldn’t be so much on observation of changing facts, but instead on contemplation of *how such change is possible*.

For example, sometimes we cannot discover a fact directly but can only infer it from other outcomes. In the 1840s, the concept of magnetic vector potential was introduced as a mathematical tool in electrodynamics, but no physical manifestation for it was detected. A century later, physicists Yakir Aharonov and David Bohm designed a solenoid and observed a phase difference of ejected electrons, which could be explained only by magnetic vector potential. This confirmed its physical existence.⁹

In contrast to systems-approach, the most characteristic trait in this new way of thinking is its evolutionary / vertical perspective – a *vertical holistic approach* – (as opposed to *horizontal holism*). As we move away from a planar perspective and explore from where a being comes, we gain extra clues about its total existence.¹⁰ This new approach eliminates anthropocentrism and expands to include earlier species, matter, and energy.

Human society carries huge amounts of information in numerous subjects, from cosmology to biology, and

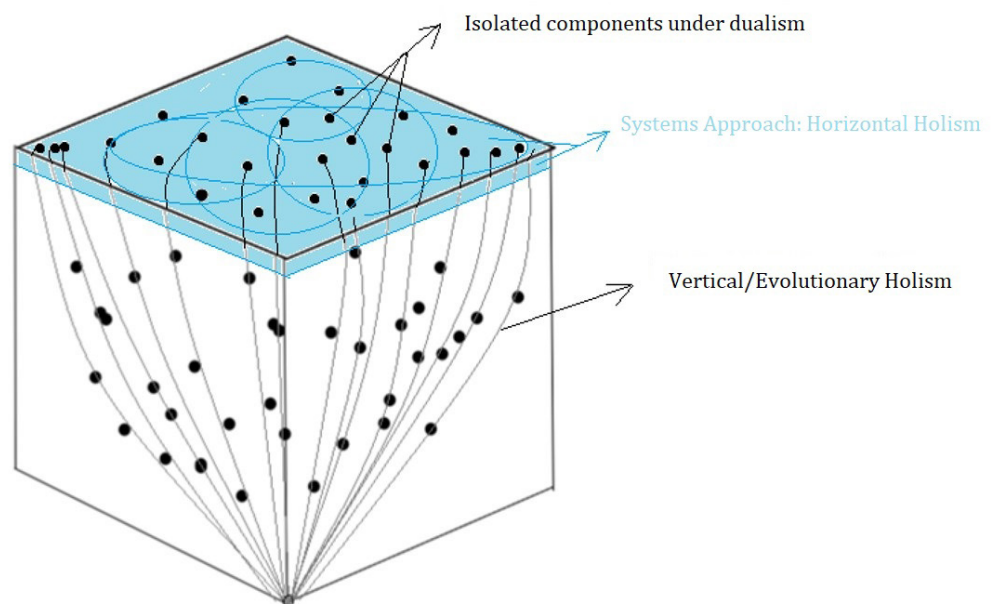


Diagram 2: A tripartite cube of knowledge that illustrates the differences between the three approaches – 1) The *dualist approach* is represented by discrete dots everywhere on / in the cube; 2) The *systems-approach* is indicated by a blue horizontal slice – its integrating effort indicated by ellipses but with a relatively shallow depth of evolution; 3) The *vertical holistic approach* unifies every dot in the diagram. Diagram by Ye Chen.

anthropology.¹¹ We now have a better chance to observe changes at a much larger scale, if we use the new methodology that unifies all subjects and explains the existence of everything. Such a vertical perspective can give us a clear picture of how we and everything else ended up here.

The Being of Horizontal Interrelation – Structural-Coupling

This section invites the reader to a different view addressed in autopoiesis theory that guides us to better understand Wang's *model of existence*.¹² It pulls the logical starting point of Kant – *cognition* – backwards to a definite mechanism, which functions at every instant of a being's existence and makes cognition possible (as for us, our feeling of *knowing something*). Thereupon, 'knowing' is no longer a static concept but a series of continuous *actions* by a being that bring forth a world of one's own.¹³

This situation is called *structural-coupling*, which takes place among all beings and results in their *identity*. It suggests that:

1) A subject cannot operate independently without corresponding conditions from the environment: '... one thing cannot exist without the other ... [it] acquires its properties from its relation to the other ... the properties of both evolve as a consequence of their interpenetration.'¹⁴ Hence, we must define a range of external conditions (environment) that has to exist for the subject to survive, without which the subject disintegrates (a goldfish dies without oxygen).

2) A subject's structure is relatively fixed. This means that there is a range of evolutionary change (organization) that can occur, and, within those boundaries, a subject maintains its identity. For example, the phylogeny of a cat determines that it cannot use language, which is beyond its range of action.

Disintegration and Maintenance of Identity

Disintegration means that a being no longer exists in its form (organization) and so it loses its *identity*. For example, a dead cat is not a functional cat, and a torn banknote is not a negotiable banknote. A failure in their structural coupling with their environment leads to a loss of adaptation and it disintegrates. In this sense, 'to exist' or 'to live' means that a being maintains its identity by adaptation to the environment from moment to moment.¹⁵ It should be noted that 'environment' does not necessarily mean natural surroundings; it can be any other object(s), single or

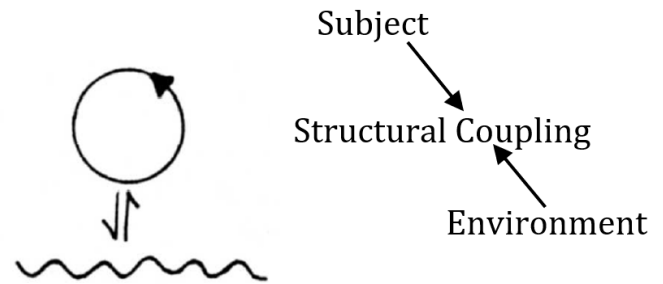


Diagram 3: A subject interacts with its environment at every instant. Interaction means that both the subject and environment continuously change their states to reach *mutual structural congruence*. All internal dynamics of a subject aim to maintain its realm of existence (presence) and its structure determines or restricts its dynamics. The presence of a subject is inseparable from the presence of the environment. Every structural change that occurs in a subject is triggered by perturbation of the environment, so the subject's dynamic balance is maintained.⁶⁵ Diagram adapted from Maturana and Varela's *The Tree of Knowledge*.

multiple, that interacts with or causes structural change in a subject.

We need to know that every act of a being – observable behaviours, such as walking and speaking, or unobservable internal dynamics – are all properties that maintain the coherence of a being. These acts are not independently invented by the being, and they are not independently selected by the environment. Instead, they are the necessary consequence of a structural congruence between the being and the environment. This *structural-coupling* generates a system by which the subject and the environment are horizontally interrelated and interdependent.

Cases of Structural Coupling – Living Beings

For an elementary prokaryote, such as a bacteria or archaea, the mechanism of structural-coupling is simple; they quickly adapt to nearly all environments on Earth.¹⁶ Many conditions from the environment, such as light, chemicals and carbon dioxide can trigger their internal dynamics – like energy intake and metabolism. An amoeba engulfing a protozoan reflects the same principle. When an environmental condition is sensed (such as a nearby protozoan), the amoeba's sensory surface coordinates with its internal protoplasm to produce movement to engulf the food.¹⁷

For the structural-coupling of plants, the condition of different temperatures triggers biochemical dynamics in ways determined by their structure. Under cold stress, plants will

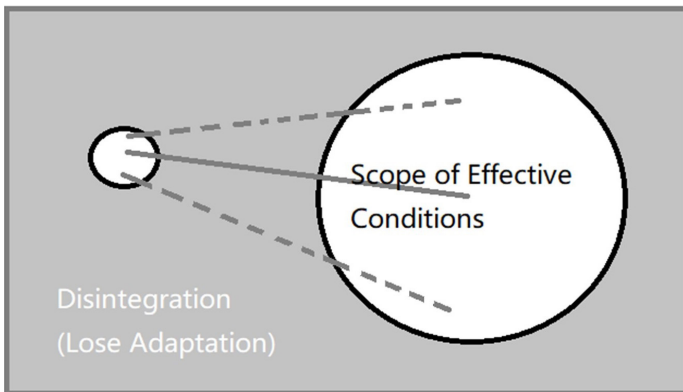


Diagram 4: Structural Coupling. The left circle represents a subject, with its white area representing the range of the possible structural changes that constrain its identity. The right circle represents the range of conditions (perturbations) that effect the subject. Structural-coupling must occur between these two scopes, represented as a drifting line that links these two areas. But when the subject experiences a condition out of its range, the line will reach the grey area, representing disintegration (Loss of Adaptation). Diagram by Ye Chen.

activate metabolic pathways to accumulate sugars or produce proteins to protect their cells.¹⁸ Movements of plants vary, such as when sunflowers (*Helianthus* species) turn towards the position of the Sun. Through this constant interaction / adaptation, plants maintain their integrity.

Despite the myriad possible changes in a beings' internal dynamics or external movements, the mechanism is essentially identical – **to maintain a dynamic balance in their structure by coupling with a given condition.** Behaviours, movements or biochemical reactions are merely different forms of the necessary structural changes for a being to maintain its existence. This means that changes in the internal dynamics of prokaryotes, feeding behaviours of amoebas and movements of sunflowers all express the same general principle of structural-coupling.¹⁹ The difference lies only in their distinct actions, as determined by the range of the subject's structural abilities.

Due to the immense number of neurons in the human nervous system, the number of possible interactions is huge, thus producing a rich human-behaviour domain. This mechanism has the same structural-coupling requirement as those beings without a nervous system – it continuously operates with the environment (conditions): 'The functioning organism, including its nervous system, selects the structural changes that permit it to continue operating, or it disintegrates.'²⁰

We should keep in mind that this process occurs all the time: as first-order autopoietic systems in a cell or as second-order autopoietic systems in metacellular beings. This explains how the act of learning occurs and why people often acquire completely different information from the same book or even the same word. The key lies in how the human organism structurally-couples with a given *condition* – such as a book, the environment, or other possible factors. The condition triggers a structural change.²¹

What we learn or understand is *not* the product of a book's content itself, but instead it is the product of structural-coupling with a corresponding condition (what the subject prefers or what is suitable for it). Linguistic behaviour and self-consciousness follow the same rule. Even though a word and an action are not congruent, structural-coupling brings forth the idea that a word is a description of what we do.²² Our experiences flow according to coherences in our nervous system.

Structural-Coupling of Non-living Beings and Human Society

Non-living physical and chemical substances (such as particles, atoms, elements and molecular compounds) are subject to the same interactions as living beings. But, with their simpler structures, the required conditions for their maintenance is simpler. Since they exist under almost all conditions, abiotic forms occupy most of the universe.

Human society abides by the same conditions, but it does so in a way opposite to those of abiotic systems. Society holds the most complicated and dense structure, and

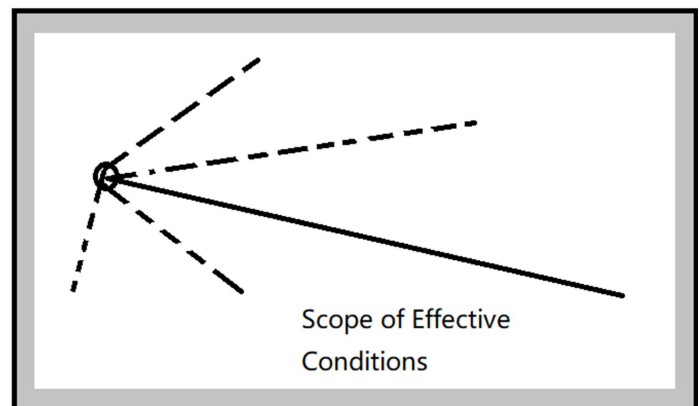


Diagram 5: Structural coupling of non-living substances. The small circle represents the subject, the white area the range of effective conditions, and the grey area disintegration. The shifting lines represent structural-coupling and reach anywhere within the effective conditions. Diagram by Ye Chen.

so it has the greatest flexibility. To maintain its dynamic balance (such as in economics, culture, and politics), society relies on a considerable variety of conditions and any lack of them may threaten its adaptation. The demanding requirements for the maintenance of society also means it has a small range of effective conditions in which to survive.

The range of effective conditions does not mean the number of conditions, but instead the portfolios of conditions. For example, if light or water alone can support a being's existence, its possible portfolio of conditions would be: [light/water] + X, where X is any condition that does not hurt the condition of light or water. If the being needs air, water, light and fertilizer simultaneously, then the possible portfolios of conditions would be [air + light + water + fertilizer] +X, where X is any condition that does not hurt any of these four conditions.

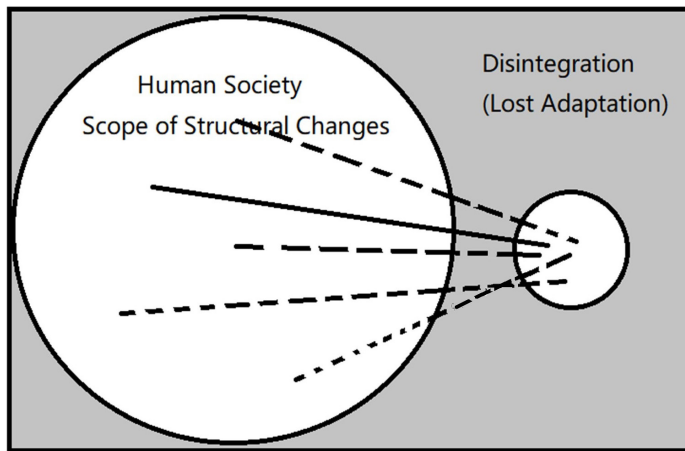


Diagram 6: This image provides a sense of the structural-coupling involved in human society. The left circle represents the subject, the right circle the effective portfolio of conditions, and the grey area is disintegration. The shifting lines represent structural-coupling and can reach anywhere within the range of effective conditions. Diagram by Ye Chen.

Criterion of Structural-Coupling

As to the structural-coupling process for biological beings, according to Maturana and Varela, it is impossible to extract all the environmental variations and decide the ways these fluctuations can cause structural changes in a subject. Thus, we must describe each particular case as the result of random variation.²³ This is true for everything that we are able to acknowledge as a product of structural-coupling.

Structural changes occur, but the specific factors involved are ambiguous.

The structural-coupling of a subject and object is like what takes place in a melting pot. We do not know precisely what happens inside the pot all the time, as we only see the results at each observed moment.²⁴ What can only be certain of is that the subject and object are structurally-coupling from moment to moment. Even if the subject disintegrates, it transforms into another form of being and so it is still structurally-coupling with its corresponding object! Based on this, we can establish a criterion for structural-coupling.

Wang's theory includes the *interactive quality* of a subject and the *interactable quality* of an object.²⁵ Although we cannot acquire the factors involved, we at least know that some properties of the subject are interacting with some properties of the object.

The properties of a subject allow it to make selections of an object's properties, which involve structural changes within the realm of the subject's existence.

An object has countless properties, and those selected by the subject are determined by *which of the object's properties are able to couple* with the subject so as to maintain its *realm of existence*.

Therefore, it follows that: **The subject's function that can interact with certain properties of an object is an expression of the subject's interactive quality, and that part of the object's properties that couples with a subject's interactive quality is an expression of the object's interactable quality.**

A subject is always adapting, and so it is always structurally-coupling with an object. Any drift in the interactive quality will cause a drift in the interactable quality, and, if the interactable qualities drift, it will also result in a drift of the interactive quality. This occurs because they are coupled and correspond to each other. The significance of these concepts is that they abstract and generalize the process of structural-coupling.

We can expand this situation as a 'realm,' which includes all possible structural-coupling situations of a subject in its existence. We can do this because the interactive quality and interactable quality of every being is limited, though hard to specify at each instant. Again, consider the melting pot filled with endless types of structural-coupling that we might never know

The melting pot for a human being, a cat, and a bacterium is different. We don't have to scrutinize the instant changes, but we can explore the interactive quality of each being and the interactable quality it requires. For example,

human beings, in their realm of existence, contain interactive qualities that can be classified as follow:

The Interactive Layer is made up of fundamental particle-particle interactions, such as electrical attractions between an electron and a proton, strong and weak forces of nuclear interactions, and so forth. This layer is basically invariable.²⁶

The Perceptual Layer includes activities within / between cells, heart rhythms, peristalsis, perception, and others.²⁷ These dynamics are autonomic and occur as a result of an organism coupling with conditions that are not consciously controlled.²⁸

The Intuitive Layer is the process of making distinctions based on perceptions through sensory organs, motor organs, and neuron networks. High-level animals possess this layer, which allows for instinctive behaviours, learning behaviours, tool use, and so forth.²⁹

The Reasoning Layer is the ability for logical derivation, abstraction, and organization. Only with this, and the other layers, can human-beings generate knowledge systems.

These layers are vertically connected from basic to complex, following an evolutionary sequence. They allow us to embrace countless interactable qualities, from the most negligible environmental variations to the most obscure philosophical theories – all of which represent our realm of existence as human beings. Our ability is equivalent to an electron embracing the positive charge of a proton, which is *its* realm of existence.

The significance of our interactive quality is to maintain our realm of existence – our identity – by selecting conditions (interactable qualities) from the environment and achieving a dependent relationship with them. **At each instant of structural-coupling, a subject's interactive quality confirms its condition (interactable quality) for the subject's existence.**³⁰ This axiom doesn't mean that the interactable quality is the subject's entire existence; rather, it means that the coupling of the interactive quality and interactable quality merely fulfils the subject's ability to exist.³¹

For instance, when a tiger smells a deer, the tiger's interactive quality (sense of smell) couples with the deer's interactable quality (scent). The coupling-process involv-

ing scent is just one factor in their larger existence. Only through this relatively minor structural-coupling can the tiger launch its hunt and obtain the more important nutrition necessary for its existence.

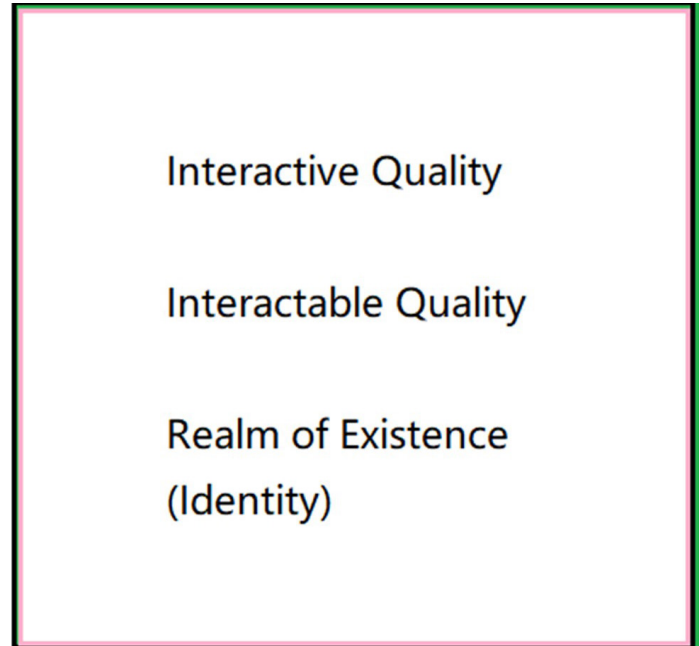


Diagram 7: This diagram shows the three qualities of existence – the interactive quality of the subject and the interactable quality of the object, which together result in the realm of existence. Diagram by Ye Chen.

Everything, as long as it exists, is a result of structural-coupling. The ‘becoming’ of any *identity* is all about the structural-coupling of the interactive quality and interactable quality. What sets identities apart from each other is only in the realm of possibilities of their structural-coupling, which is also the *realm of their existence*. Of all the past disciplines, we either research interactive quality (epistemology) or interactable quality (science), but now we have managed to find an approach to unify the two.

Readers who hold a firm belief in subjective idealism may suggest that this discussion is based on knowledge generated by cognition, and so the emergence of all beings follows no rules but is merely the result of possibilities or accidents. This is a valid approach, but how would it help us understand the world? Indeed, the ‘possibilities statement’ itself is also a ‘rule’ drawn from the cognition of humans. If there is another principle that explains why we are here, how everything evolves to what it is today and eventually reveals the ontogenetic mechanism of subjective idealism, which philosophy should we choose?

The Being of Vertical Interrelation

Earlier, we discussed the horizontal interrelation of a subject and an object. In retrospect, further questions might be raised: How did this situation happen? Why did the subject and object just appear to be functioning like this? These questions require us to trace back the origin of the subject and object – to the ‘beginning of all beings.’ Living beings do not appear suddenly on their own; they are possible only through countless repeated *material transformations* of non-living beings over billions of years.³²

The universe is 13.8 billion years old. Our solar system formed 4.6 billion years ago. Earth with its atmosphere and seas produced abundant molecules, which formed the oldest forms of life, appearing 3.7 billion years ago. This is a continuous process of material transformation, an historical sequence. As Maturana and Varela state: ‘... each one of the stages described arises as an inevitable consequence of the previous one.’³³

This implies that each stage must be a superposition of all previous stages before a new stage can appear. There is no ‘leap’ in the sequence – beings naturally synthesize, transform and evolve from what existed at the start of a process to what the being becomes. According to the mechanism of structural-coupling, the appearance of a subject must be based on successful coupling between its *interactive quality* and an object’s *interactable quality*. Absence of either would not lead to the establishment of a new being, since it would not be born at all or it would disintegrate immediately.

This explains why subject and object are in a natural, harmonious relationship from the beginning (beings that are discordant cannot just appear, except for a brief time). Let us imagine nature conducting random ‘experiments’ over and over. Most of the time, these fail – nothing new is formed. But at a particular moment, one succeeds, and a new being appears. At this moment, the potential being’s *interactive quality* is activated by the *interactable qualities* with which it couples and gives rise to its *realm of existence*.

The occurrence of these three factors (interactive quality, interactable qualities, realm of existence) is simultaneous, or else nothing would happen. **The phylogeny of all beings has nothing to do with inferiority or superiority of their qualities; the only existence criteria is whether the interactive quality of the subject matches up with the interactable quality of the object.**

What does Superposition Imply?

The forming of autopoietic unities infers the presence of a

living being that has been realized by the process of structural-coupling between organic molecules and the right conditions. Maturana and Varela state it in this way:

It was only at that point in the Earth’s history when conditions were right for the forming of organic molecules such as proteins, which have enormous complexity and pliancy, that conditions were right also for the forming of autopoietic unities. In fact, we can assume that when all these sufficient conditions were present in the Earth’s history, autopoietic systems formed inevitably.³⁴

Both the organic molecules and the right conditions had to take place in an historical sequence for a living ‘being’ to form. This implies:

1. The existence of molecules like H₂, CO₂, and iron, which have *interactable qualities* for the phylogenic pathway leading to a living being.³⁵ These non-living beings had to undergo stage after stage of structural-coupling from the Big Bang to the appearance of important elements to form the interactable qualities for a potential living being’s interactive quality to occur and couple with. Thus, the first principle of Descartes’s philosophy, ‘I think, therefore I am,’ can be turned into **‘They exist; therefore, I am, and therefore I think.’**³⁶
2. The forming of autopoietic unities (subject) also has undergone countless stages of evolution, from carbon atoms and hydrogen atoms, inorganic and organic molecules, to bio-macromolecules ... all before it finally joins in an autopoietic system – a living being with an interactive quality (function) distinct from other non-living molecular transformations. The interactive quality of a being, such as the function of metabolism, does not magically appear – it can only take its shape through a progressive process of structural-coupling.³⁷ For human beings, formation of the reasoning layer depends on its historical superposition of the coupling sequence, namely, the interactive layer, perceptual layer, and intuitive layer. The absence of any of the three layers means that their corresponding interactable quality would not result in a reasoning layer.

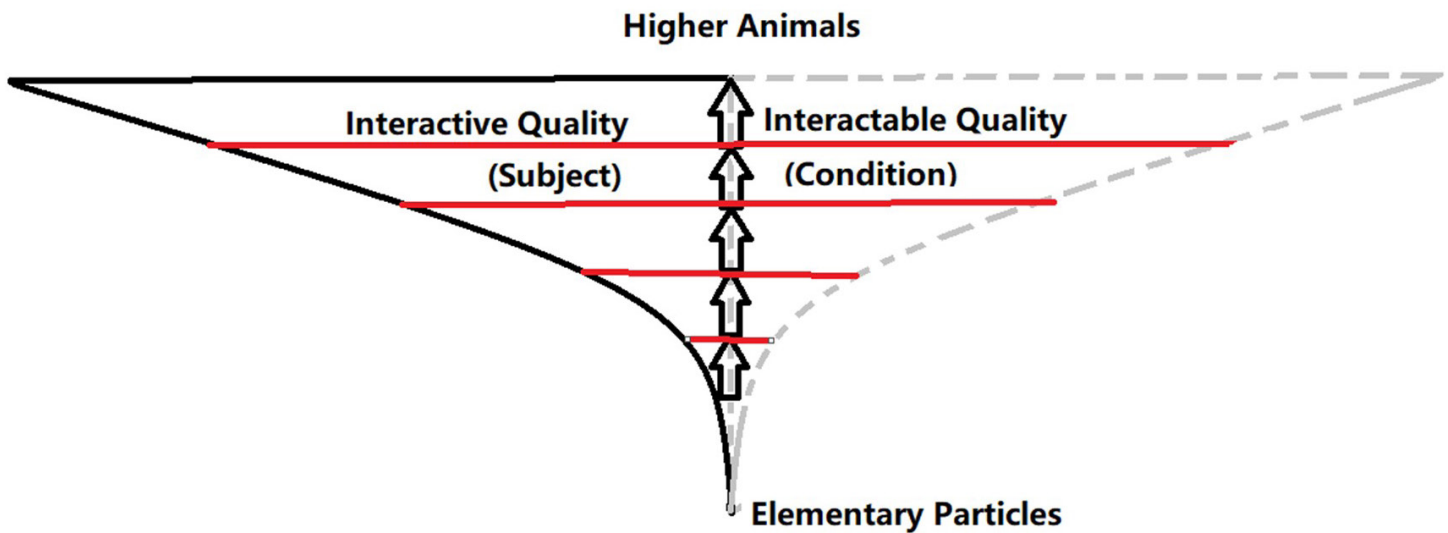


Diagram 8: This image shows the overlying evolutionary phases, from elementary particles to higher animals. Diagram by Ye Chen.

3. There is a **different evolutionary speed of beings**. If we trace back to the source of an auto-poiesis unit, we find the crux of the sequence – the carbon atom. It is the *instability* of carbon that enables it to take the ‘leading role’ as subject to form all beings equipped with a larger realm of interactive quality, while other relatively stable beings, with a narrower realm of interactive quality, become an object, with interactable qualities of environment / conditions.³⁸

Physics gives us certainty, as it selects a few variables and studies their relationships. This however is not the case in biology, since its activities are a product of horizontal structural-coupling, in which each participant variable is a result of the superposition of vertical evolutionary phases. The coupling state becomes too intricate to analyse since both the subject and object has gone through countless stages where countless variables have been involved both vertically and horizontally. This explains why it is so difficult for us to synthesize a living being from scratch.

The evolutionary progress of all beings is of no discontinuity with each evolutionary phase applying the same criteria of structural-coupling.³⁹ There is not supposed to be a sharp intrusion of outside forces. For example, the biological macromolecule is a natural product of evolution from the structural-coupling of organic molecules – if we

look closely at the features of organic molecules, such as self-producing RNA, we find them to be somewhere between non-living and living beings.

Likewise, eukaryotes are a natural product of evolution from the structural-coupling of prokaryotes - a hypothesis suggests that an invasion of prokaryote cells by two smaller prokaryote cells produced eukaryotic organelles.⁴⁰ Structural-coupling of unicellular eukaryotes then formed multicellular aggregates. Increasing cell specialization (more structural-coupling options) led to a natural drift from colonial aggregates to the complexity and diversity of multicellular organisms, which make up present-day plants and animals, including human beings.⁴¹

Not all phenotypic changes are small and incremental.⁴² But the quantity of change, whether it is slight or large, is irrelevant. It is the continuous superposition of structural-coupling in a holistic system that is important. The Cambrian Explosion wouldn’t have occurred if there were no preceding accumulated stages, such as an increase in oxygen from cyanobacteria, ozone formation, nutrient-rich ocean sediments, and other factors.

Same Origin – From the Big Bang Singularity to All Beings

We see multifarious beings in today’s world, but **all of them have been derived in the same vertical evolutionary process**.⁴³ It started 14.8 billion years ago with the Big Bang – a singularity of extreme density that contained all

the energy and space / time of the universe.⁴⁴ It is thought that, at this starting point, there was only one fundamental force. Others came from it as the universe expanded (inflation).

Temperatures dropped with the expansion, and the gravitational force appeared.⁴⁵ Then, the strong force separated, as the energy of the inflation field filled the universe with a dense, hot plasma of quarks, anti-quarks, and gluons. Exotic particles arose, and their interaction gave them sufficient mass to cause the separation of the weak and electro-magnetic forces. In less than a picosecond, the universe's four fundamental forces had evolved – the gravitational, strong nuclear, weak nuclear, and electromagnetic forces.⁴⁶

Hadrons formed, including protons and neutrons. A second after the Big Bang, leptons arose, which included electrons. These decoupled ten seconds after the Big Bang, which produced most of the mass-energy in the universe, in the form of photons. Between three and twenty minutes after the Big Bang, the photon temperature dropped, which allowed nuclear fusion to take place. Some neutrons synthesized with protons to form hydrogen isotopes as well as those of heavier elements, such as beryllium and lithium.⁴⁷

By 300,000 years after the Big Bang, when the universe had cooled enough, electrons rapidly combined with protons to form hydrogen atoms.⁴⁸ Hydrogen and some helium coupled with each other, through gravity, to form early stars and galaxies a billion years after the Big Bang. The continuous collision, interaction and coupling of particles formed other elements, and, by similar mechanisms, inorganic and organic molecules, and other beings were formed, including what it takes to make living beings possible.

What does the Big Bang Imply?

This evolutionary history – from the initial singularity to diversified particles and more diversified substances and living beings – allows us to derive the following ideas.

The phylogeny of all beings, non-living and living, entirely originated from *the one*. This concept of *the one* refers to the simplest, initial 'being.' It was so simple and compact that it unified all fundamental forces and energy into 'one' primordial being – rendering all physical characteristics meaningless.⁴⁹ We can see how new beings are generated from this singular entity, step by step, after the Big Bang. This tells us that all beings (including those beings that we call 'conditions' or 'environment') are **inter-linked** vertically, belonging to the same evolutionary tree and sharing the same root, as they were built upon, one after another.

We need to note that 'force carrier' particles like pho-

tons, W bosons and gluons must be created preceding or at least at the same time as other elementary particles, since the particle-coupling process would require their role as *mediums*. Based on this, we can say that **all beings are fundamentally made of the same 'material.'** Although we cannot describe what exactly the material is, we know that it is derived from the initial being – *the one*. It is that material that produced all beings from simple (with fewer configurations) to complicated (with greater configurations).⁵⁰

But then, how could this same material make up different *forms* of beings? The answer lies in how these same components are arranged. Taking H₂O as an example, it is in different forms when it is ice, water and gas, although its atomic component – H₂O – remains the same. What makes its form vary is its molecular arrangement. As the temperature goes up to 2200°C, some H₂O molecules turn into H, H₂, O, O₂ and OH. When the temperature goes over 10,000°C, the molecules break into atoms, and then into ions and electrons to form plasma.

When we consider H₂O molecules as 'constitution units,' we would call ice, water and steam the 'same being' (in different forms), since they are all composed of H₂O; and we would consider the mixture of H, H₂, O, O₂ and OH 'a different being,' because it is no longer composed of H₂O. But what if we consider the basic elements – hydrogen atoms and oxygen atoms – as constitution units, wouldn't it make H₂O and the mixture of H, H₂, O, O₂ and OH the 'same being,' because they are all comprised of hydrogen atoms and oxygen atoms? Then, what if we consider something even more basic, such as an elementary particle or a fundamental energy unit? **We then find all beings are the 'same beings,' but only constituted in different forms.**⁵¹

As soon as the balance in *the one* is broken, it begins its magnificent process of creating new forms of being. We can imagine that all types of subatomic particles were generated, but most of them couldn't stay in that form, and so they transformed quickly into other forms. This transformation continues, until all beings in the universe remain stable in their forms for a time, creating a state of equilibrium.

It is worth pondering the types of beings that can survive and those that cannot. Only those that can couple with conditions (other beings) survive. **Temporary equilibrium is a state in which all beings have a harmonious relationship, which means that, for each being, its interactive quality can couple with the interactable quality of other beings.**

This harmony was manifested by the Big Bang. Quarks could not bind to form atomic nuclei in the presence of

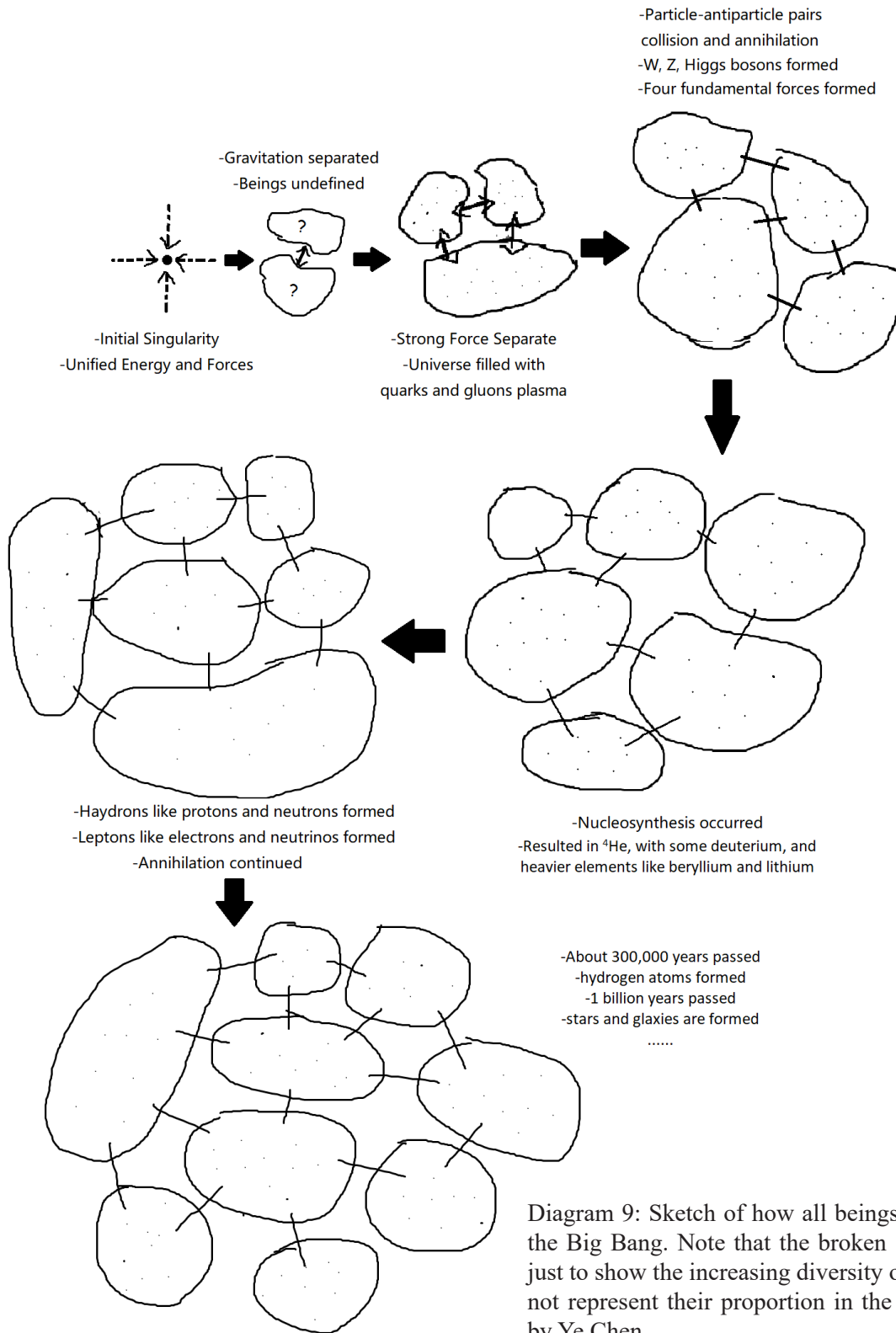


Diagram 9: Sketch of how all beings were generated in the Big Bang. Note that the broken 'energy pieces' are just to show the increasing diversity of particles; they do not represent their proportion in the universe. Diagram by Ye Chen.

high-energy photons because the nuclei would be blasted apart. In contrast, the formation of hydrogen atoms could not occur when the energy of photons was not sufficient.⁵² When a form of being does not meet its existence criteria, it is considered discordant and gets quickly kicked out – it does not disappear, but instead it transforms to become other beings, until it reaches equilibrium, which means it possesses a ‘right’ interactive quality.

This evolutionary progress – from *the one* to a relatively stable state of various types of ‘energy units’ coupling with each other harmoniously – can be viewed as an autogenic ‘separation’ and ‘recombination’ process. This means that *the one* first separated itself and then went through innumerable, continuous changes to keep the derivative beings in a balanced state. Such a separation and recombination process was repeated among energy particles, through which the energy-density of radiation and vacuum transformed into the energy-density of mass.

At the moment when different particles evolved by random coupling, it seems that their *respective evolutionary destinies* were doomed by their formation as beings. For example, the hydrogen atom has a less stable configuration compared to other particles in the universe. It has only one electron, so its orbital is half-filled. As a *dissatisfied particle*, hydrogen atoms, like those of carbon, have an active role in the universe.

Under certain conditions, such as strong stellar winds, a molecular and neutral hydrogen cloud collapses from gravitational instability and a protostar begins to form. Hydrogen fusion takes place in the core, as hydrogen burns itself into helium-4 and releases a huge amount of energy. After accumulating sufficient helium in its core, the star grows into a red giant and the helium begins to fuse to produce beryllium-8, an unstable element that quickly fuses with a third helium-4 and produces carbon-12, followed by oxygen-16, neon-20, and magnesium-24 ... through sequential reactions.⁵³

Then, through further nuclear fusion, sodium and silicon nuclei as well as heavier ones like sulphur, argon and calcium are generated. The energy released by these reactions results in a further expansion of the star to form a red supergiant, during which time, heavier elements up to iron and nickel are formed. Those elements heavier than nickel are produced in rare but spectacular explosions called supernovas.⁵⁴ This separation and recombination process shows how *defective hydrogen atoms* become the ancestor of other nuclei, ‘evolving’ into a variety of elements to form more substances.⁵⁵

In contrast, noble gases – like helium, neon and krypton – have their outer shells full, so they are less reactive and can be considered as having *bleak evolutionary prospects*.⁵⁶ Most elementary particles formed in the Big Bang – such as photons, protons, neutrons, electrons and dark matter – have not yet started their volatile evolutionary journey. They remain relatively still and make up the *majestic background* of the universe – what we could call the ‘living environment’ of the planets.

These examples of interatomic potentials show us that **the different properties that particles are born with determine their different motive power to evolve.**⁵⁷ In this immense and intricate evolutionary ‘tree,’ we see some units develop into the main trunk – a minority – such as some of the hydrogen and carbon atoms that become the principal units of evolution. Some units turn into branches – like the inert elements. Others – the majority – remain part of the background / environment, some of which (like photons) become a medium for structural-coupling.

Illusion of the Independent Being

We must keep in mind that evolutionary ‘stages,’ ‘phases,’ ‘thresholds’ and so forth are merely landmarks created by humans to distinguish one period from another. Likewise, the variety of forms, like atoms, molecules, prokaryotes, eukaryotes, plants and humans are also concepts defined by humans for **the daily necessity of making distinctions**. Our interactive quality, as proposed by Kant (the innate laws of mind) require us to live with a clear classification of different beings, without which we cannot realize the realm of our existence as human beings.

But this also gives us an unconscious yet powerful implication from moment to moment that we are all totally ‘different’ and ‘independent’ beings. We imagine that we are different from the objects that we cognize and different from the environment we are living in. ‘We’ is the subject, and the thing that we act on is the ‘object’ – apparently *something else*. In this way, we gradually set our position apart from the objects that in fact gave birth to us. This is why we believe subject and object exist in contrast to each other, across a border that metaphysics, classical philosophy and modern philosophy are not able to break through.⁵⁸

Conclusion - Finite Interval of Beings

Having read this concrete view of evolution and understood the horizontal and vertical interrelation of all ‘beings,’ we must now rethink the ‘I,’ our ‘self-consciousness’ and ‘mental phenomena.’ They are neither independent nor absolute. **All beings are finite, since they cannot ex-**

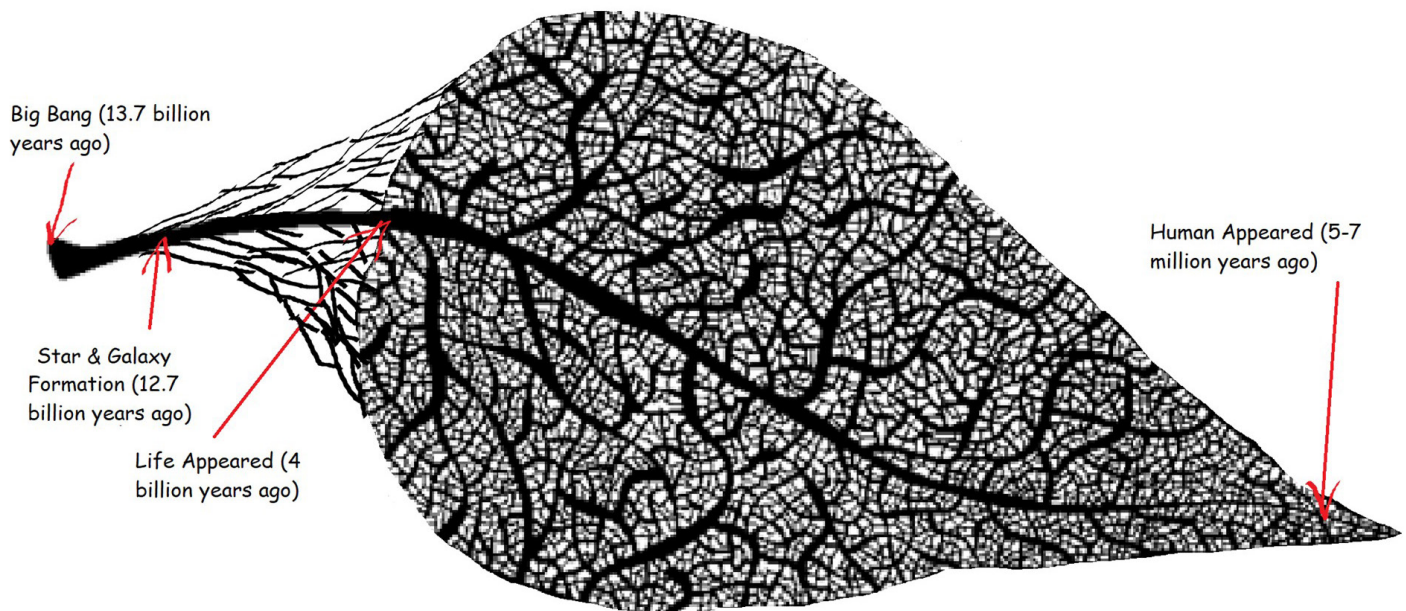


Diagram 10: This leaf can be regarded as a metaphor for the evolution of *the forms of being* – from simplicity and uniformity to complexity and diversity, especially after life appeared. There are plenty of branches, yet, among them, we can identify a main trunk that continuously grows and eventually develops into human beings / human society. Diagram by Ye Chen.

ist just in themselves; instead, they have to couple with and depend on each other horizontally and vertically, as part of the historical sequence through which their being has passed. It is the joint realization of these two directions that permits the realm of existence to become valid in evolutionary history.

Therefore, only the being of interrelation is absolute.⁵⁹ There is no division of inferiority or superiority, subject or object, since all beings have the same origin, are made of the same material, and flow in the same progressive evolutionary river. The difference lies only in their forms.

The horizontal interdependent relationship between beings can be reached only through the vertical superposition of effective coupling, step by step. From the moment of the Big Bang to that of human society, every being and every state of the holistic universe is built on effective structural-coupling.

This is why harmony between all beings is pre-established, as noted by philosopher Gottfried Leibniz.⁶⁰ Evolutionary progress is continuous, without any leap or fracture (nothing can occur on its own), so **the ‘valid’ occurrence of any being can only be based on harmonious coupling with an other / others.** The effectiveness of human cogni-

tion, manifesting in a way such that the interactive quality can maintain its realm of existence as a human – enabling an individual to make distinctions, learn knowledge, and so forth – is a representation of this harmonious coupling.

At the start, all beings are included in *the one*.⁶¹ No matter how time and space are extended, the holistic being (beings as a whole) remains invariant according to the law of the conservation of energy. Based on this, we can build up an abstract *finite interval of beings* in which the question of finity and infinity of extended time and space can be eliminated.

There is only one holistic being that contained all the forms of beings / properties that have emerged.⁶² In this finite interval, all beings are interrelated – horizontally, they are interdependent, and vertically, they are in a derivative relationship. **Present (and new) forms of beings exist as derivatives of former forms of beings.**⁶³

During the Big Bang, there were many types of particles quickly created and destroyed. Should they be considered part of the finite interval of beings? The answer is, ‘No.’ Those beings that appeared and disappeared quickly imply that they were not able to exist (adapt to conditions). Only relatively stable units can be viewed as ‘legitimate’ and be

placed on the large-scale evolutionary tree.

Nonetheless, some of these live-and-die beings may have played an essential role (such as beryllium-8) in the production of other beings. They are considered ‘transitional instants’ that led to stable forms of beings. The finite interval of beings focuses on stable forms and derivative relationships among them.

Having explained the finite interval of interrelated beings, it is necessary to supplement a few philosophical concepts to make our reason complete. ‘Outside interval’ is absolute nothingness / non-existence, or absolute being.⁶⁴ Neither absolute nothingness nor absolute being are related to the beings in the interval. This means that they are in neither an interdependent relationship nor a derivative relationship, and so they are ‘outside the interval.’ Logically, the ‘nothingness of interrelation’ is an empty concept and stays in the finite interval of interrelated beings, referring to those potential beings that have not yet been realized, owing to the failure in structural-coupling, hence the ‘nothingness.’

Let us now settle down to feel the beings around us: not just those visible objects but also the emptiness, air, light – feel them as beings that existed before us, our old ancestors; feel how the coupling between their interactable-quality and our interactive-quality is reached, in such a harmonious way; feel their preceding historical sequence, as well as our structures ... how every cell, every molecule is formed through the harmonious coupling along history, until finally, the gap between human, nature and everything is completely healed.

Preview of the Next Article

In my next article, I will discuss new forms of generation, the conservation force and variation force of beings, and their division-coupling process. We will come back to the criteria of structural-coupling and establish the being of equivalence model, with which we will see how a being is differentiated so as to have an ‘equivalent’ existence. Charles Darwin’s natural selection will be examined, and principles will be drawn from the differentiation process. I will also look at the essence of crises – how the being of differentiation results in an accelerated growth of conditions that leads to harder and harder challenges for human society to confront ...

Absolute Beings/Nothingness

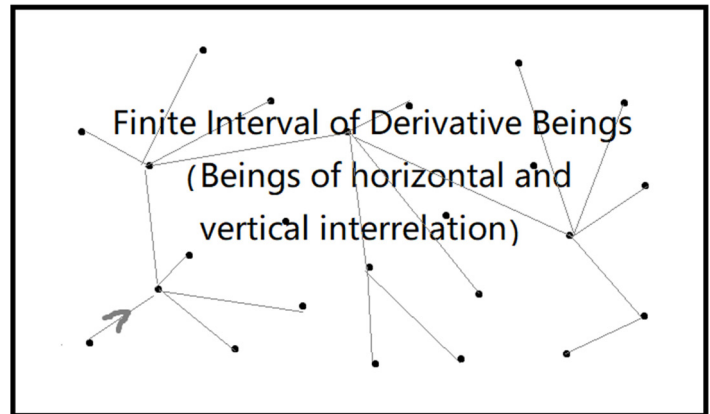


Diagram 11: A Sketch of the finite interval of beings, outside of which is absolute beings or nothingness. Diagram by Ye Chen.

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Endnotes

1. Wang 1998: 205.
2. Prigogine and Stengers 1984.
3. My book, *Introduction to the General Law of Beings*, consists of my reasoning of Wang's fundamental law. Chapter 1 covers the development of philosophy, critiques mainstream research methodology, and provides a brief introduction of Wang's new approach. Chapter 2 supplies the basis of my thought – the first three sections address concepts that one must hold to read Wang's theory, as an essential part of the deduction process, while the fourth to sixth sections constitute a reconstruction of the deduction process. The last section helps consolidate the philosophy through self-questioning and answering. The paper you are reading includes portions of Chapter 1 and the first three sections of Chapter 2.
4. Panov 2017: viz. 395.
5. Checkland 1981.
6. Jackson 2019.
7. Checkland 1981. Jackson 2019: 157.
8. Jackson 2019: 35–39.
9. Aharonov and Bohm 1959.
10. Wang 2002.
11. Wang 1998: 454.
12. The two terms, 'autopoiesis' and 'self-organization' cannot be viewed as equivalent. Autopoiesis, introduced by Chilean biologists Maturana and Varela, entails the maintenance of a living organism's identity. Strictly speaking, when a subject changes its organization, it also changes its identity, which makes the term 'self-organization' inaccurate to describe a subject's structural-coupling activities to maintain its identity. Maturana 1987. Many scholars use 'self-organization' as a synonym for autopoiesis. This is sometimes reasonable, as they tend to focus on the autonomous organizing process of 'a particular subject,' such as that of a society or a management system. There is no shifting of identity under this context, since the research objective is always on that particular subject, in a micro-scale. However, the concept of 'identity' is especially important in distinguishing a being's different positions on its macro-scale, evolutionary route. Thus, only the term 'autopoiesis' fits into the vertical approach.
13. Maturana and Varela 1987: 27.
14. Lewontin and Levins 1985: 4.
15. Varela 1991. Maturana and Varela 1987: 102. It is also possible that a form of being evolves into another form

of being – another situation of losing ‘identity,’ but one in which disintegration does not occur.

16. Taylor and others 2017.
17. Maturana and Varela 1987: 147.
18. Kidokoro and others 2017.
19. Maturana and Varela 1987: 144.
20. Maturana and Varela 1987: 170.
21. Maturana and Varela 1987: 174.
22. Maturana and Varela 1987: 208.
23. Maturana and Varela, 1987: 113–115.
24. The black-box theory addressed by Ashby is also used as a description of this phenomenon, whose internal mechanism cannot be examined and what is producing the results cannot be revealed. Jackson 2019: 98.
25. Translated from Dongyue Wang’s Glossary in Chinese: ‘Gan Ying Shu Xing’ and ‘Ke Gan Shu Xing.’
26. Wang 1998: 168.
27. Albert and others 2014: 1–10. The perceptual layer here is the ability to perceive in a broader sense. To humans, perception refers to the ability to perceive through sensory organs, but cells and molecules also have their ability to perceive and react. Perception does not include a judgement on what is perceived, because that belongs to the intuitive layer.
28. Wang 1998: 168.
29. Aristotle’s laws of thought are typical laws of intuitive judgement – the law of identity ($A=A$); the law of non-contradiction ($A\neq\text{non-}A$); and the law of excluded middle ($A=B$ or $A\neq B$). Wang 1995: 168, 189. Imagine you search for your child in a room of 20 children with just your visual sense or search for a bottle of vinegar among 10 bottles containing flavors of the same color by using just your sense of smell – you are relying on these three laws of thought to make distinctions, otherwise the miscellaneous conditions will trap you in confusion. The stress response is a quick process of making distinctions (immediate judgement) to a given condition. When water suddenly falls above your head, and you immediately close your eyes implies ‘this is the condition my eyes should avoid.’
30. Wang 1998: 130.
31. Wang 1998: 156.
32. Maturana and Varela 1987: 34.
33. Ohtomo 2013. Maturana and Varela 1987: 44.
34. Maturana and Varela 1987: 49.
35. Weiss and others 2016.
36. Wang 1998: 5.
37. Maturana and Varela 1987: 44.
38. Wang 1998: 75.
39. Wang 1998: 38.
40. Moulton 2004: 129.
41. Cooper and Hausman 2013: 4–13
42. Hickman and others 2002: 20.
43. Wang 1998: 7.
44. Hawking 1996.
45. Kolb and Turner 1994: 447–451.
46. Ryden 2003: 196. Allday 1998: 337.
47. Allday 1998: 262–263.
48. Ryden 2003: 117–118. Allday 1998: 264.
49. In the 5th century BCE, both Parmenides of Elea, a pre-Socratic Greek philosopher, and Laozi, a Chinese Taoist philosopher, claimed that all beings began with ‘the One.’ This is seen in Parmenides’ *Way of Truth* and Laozi’s *Tao Te Ching*. Thus, to put the singularity in a philosophical way, we would also call it *the one*.’
50. Wang 1998: 9.
51. Wang 2002: 147.
52. Allday 1998: 261–264.
53. Jones 2010: 35–36, 71–72, 82–83, 150.
54. Haas 2019.
55. Wang 1998: 74.
56. Wang 1998: 74.
57. Wang 1998: 29.
58. Wang 1998: 68.
59. Wang 1998: 7–8.
60. The concept of ‘pre-established harmony’ is borrowed from Gottfried Wilhelm Leibniz (1646–1716).
61. Readers may doubt that science will discover the universe uncovered by the Big Bang and the being before the singularity might be accessed. So, the Big Bang singularity may not be the origin of the universe. But still, the general evolutionary routine is definitive: beings much develop from the simplest/the least properties to the most complicated/the most properties. Therefore, we can still define a philosophical singularity in logic – ‘the One’, the origin that is the simplest/with the least property.
62. Wang 1998: 13.
63. Wang 1998: 7.
64. Wang 1998: 27.
65. Maturana and Varela 1987: 74, 95.