Two-Sided Symmetry and Holonic Maps: From Koestler's Holarchy to Intuitionist Geometry and Archetypal Resonance

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Abstract: This paper explores Arthur Koestler's concept of Janus-faced holons within a dynamic holarchy, integrating insights from CPT symmetry, intuitionist mathematics, Michael Schneider's generative geometry, and Karl Friston's free energy principle. It critiques static holonic diagrams and proposes a more resonant, fractal, and bilaterally symmetrical mapping rooted in archetypal forms. Drawing from sacred geometry, musical structures, and biological patterns, the essay argues that reality unfolds through intuitive construction and pre-existing mathematical orders. Holonic development, like nature itself, reflects a deep, two-sided balance—unifying form, transformation, and perception in a cosmological vision where cognition participates in creation.

Key words: Bilateral Symmetry, CPT Symmetry, Free Energy Principle, Generative Geometry, Golden Mean, Holarchy, Holon, Homeostasis, Intuitionist Mathematics, Platonic Forms, Regular Polygons, Sacred Geometry, Two-sidedness.

1. Introduction

Koestler's (1967) visionary concept of the *holon*—a dual-natured entity that is simultaneously a whole and a part—offers a fertile foundation for understanding complex, living, and evolving systems. These Janus-faced holons, each embedded within a larger holarchy, illustrate the layered interdependence of everything from cells to societies. Though Koestler's model has inspired deep insights across disciplines, it remains difficult to faithfully render in diagrams, particularly in the two-dimensional space where most conceptual models are drawn. The limitations of such maps are compounded when we acknowledge that the visible universe is itself already a mediated projection—a kind of map overlaying a deeper, invisible structure.

To explore a more complete rendering of holonic architecture, we must turn toward principles that capture the *generative*, *two-sided*, and *constructive* nature of reality. This essay expands upon Koestler's holarchy by incorporating insights from symmetry physics (notably CPT symmetry), intuitionist mathematics, sacred geometry as taught by Michael Schneider, and the free energy principle in neuroscience and systems biology. These perspectives converge on a powerful vision: that reality, including living forms, is shaped not only by mechanistic causation or genetic codes, but by a resonance with archetypal patterns embedded in the fabric of space-time itself.

1. The Shortcomings of Static Holonic Diagrams

Traditional holonic diagrams tend to resemble organizational charts or nesting dolls, emphasizing vertical hierarchy but including the possibility of some collateral relationships (see Figure 1). However, more complex relationships may be lacking. Venn diagrams, which allow for overlapping

and shared identity, offer a better (if still limited) representation. Static diagrams tend to miss temporal transformations, and the inherent dynamism of biological and psychological development. Koestler himself described processes like *juvenilization*, in which evolution temporarily regresses to an earlier developmental state in order to leap into novelty. Consider the biological stages of the caterpillar becoming a butterfly. In one phase, the holon is a crawling insect; in another, it is a flying one. To capture this transformation in a diagram requires not just nesting or connection, but *trajectory*—a time-like axis along which morphogenesis and branching can occur.

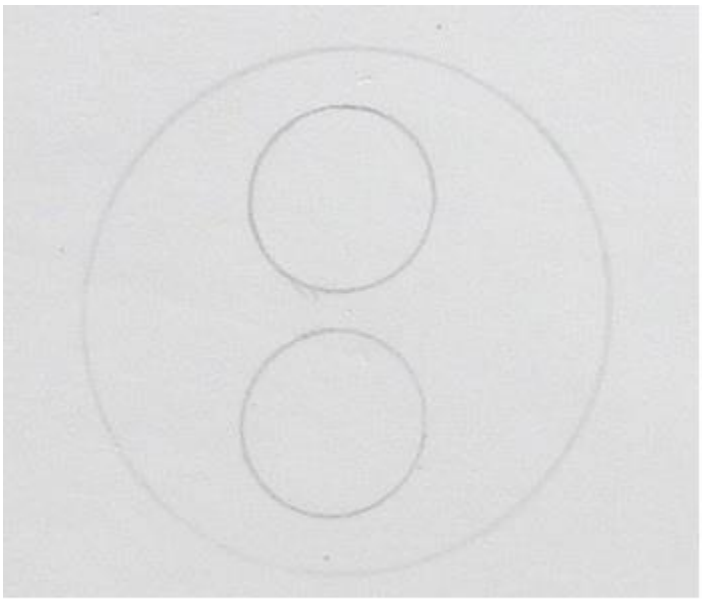

Figure 1. A graphical representation of three holons making up a small holarchy, showing two collateral holons that are nested inside one overarching holon.

Furthermore, holonic diagrams often fall short of acknowledging that the visible world is already a symbolic or representational domain—a "map" derived from deeper, hidden geometries and forces. The structures we observe are shaped by constraints and symmetries that precede and underwrite material expression. This calls for a generative model, one that reflects not merely form but *form-in-time*, process, and transformation.

2. CPT Symmetry and the Emergence of Spacetime

Modern physics offers compelling metaphors for this hidden architecture. CPT symmetry—Charge, Parity, and Time symmetry—suggests that fundamental physical laws are preserved even when particle properties, spatial orientations, and temporal directions are reversed. This principle hints at a *two-sidedness* at the root of reality (Smith 2021), where apparent asymmetries in the cosmos (like the arrow of time) may be projections of a deeper homeostasis.

Applied to holonic theory, this implies that space and time emerge from the dialectical synthesis of opposing manifolds—mirror realities or dual perspectives. The observed three spatial dimensions and one time dimension are thus products of *sublation*, a Hegelian term describing the

transcendence and integration of opposites. This also aligns with Koestler's Janus-faced holons, which maintain both autonomy and subordination—two sides that are always held in tension.

The bilateral symmetry found in biological organisms—from plant leaves, butterflies to human faces—can be understood as a surface signature of this underlying two-sidedness. Other forms of symmetry become apparent with holonic complexification. These are not merely functional or evolutionary; they are ontological. This reveals a deep attraction toward balance and mirrored structure, echoing across levels of reality.

3. Generative Geometry and Intuitionist Mathematics: A Constructive Path Forward

This brings us to a profound alternative: intuitionist mathematics. Founded by L.E.J. Brouwer, intuitionism posits that mathematics is not a discovery of eternal truths, but a *constructive activity* rooted in the intuitive acts of a creating subject (cf., Van Atten 2004). Brouwer identified two foundational acts of intuition: the perception of time-like sequence, and the imaginative generation of species to fill spatial forms.

These principles parallel holonic development. A holon is both generated by and participates in sequences of nested activity; it is a dynamic construction, not a fixed category. In intuitionist mathematics, *truth is not assumed; it is built.* Similarly, the reality of a holon is not a given but a process—constructed through interaction, recursion, and feedback.

Thus, any diagram of a holarchy should be consistent with these principles. It should show how holons are *built* step-by-step, rather than merely labeling a frozen hierarchy. This is where Schneider (1994) offers a valuable visual language.

4. From Points to Polygons: Constructive Geometry and the Monad-Dyad-Triad Sequence

Schneider's work, grounded in the classical tools of compass, pencil and straightedge, provides a method of *generative geometry* that resonates deeply with both Koestler's holons and Brouwer's intuitionism. Beginning with the Monad (a single point or circle, and one holon) and the Dyad (two points or intersecting circles, showing two interacting holons), Schneider constructs increasingly complex forms: the *vesica piscis* (Figure 2), the equilateral triangle (Figure 3, the square (Figure 4), the pentagon, and so on. Lines connecting two points show the holonic work of balance and harmony. These forms are not arbitrarily imposed, but *emerge* from simple, rule-bound constructions—mirroring the self-similar, rule-bound emergence of holons.

The *vesica piscis*, formed by two intersecting circles of equal radius whose centers lie on each other's circumference, is especially resonant. It visually embodies two-sidedness, balance, and the generative tension that leads to new form. Within its almond-shaped overlap, new constructions can be born—a perfect metaphor for the *creative interference* of holons. It also mirrors the CPT-style bilateral symmetry we find in both biology and cosmology.

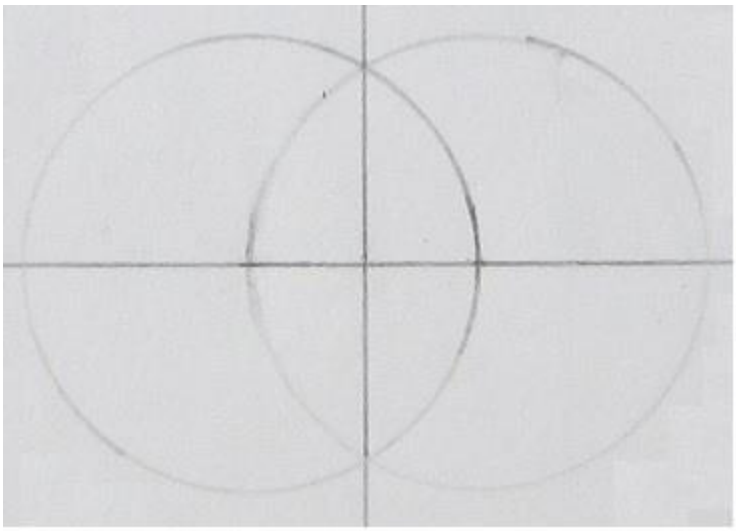

Figure 2. A graphical representation of two holons in perfect balance making a Dyad, shown as two cojoined circles of equal radius, with circle centers located on each other's circumference. The perpendicular crosshairs indicate lines of balance. The horizontal line intersects the center of each circle, and the vertical line intersects the points where the circles cross. The area common to the interior of both circles is called the *vesica piscis*. This diagram not only shows bilateral symmetry across the vertical axis; it shows symmetry across the horizontal axis.

Thus, Schneider's geometry offers more than aesthetic diagrams; it is a form of constructive proof, in the intuitionist sense. Each shape carries a narrative of its becoming. The diagrams are time-encoded, showing not just structure but the *history of construction*. In this way, they fulfill the requirements of a holonic map that is generative, fractal-like, and grounded in the principle of two-sided symmetry. Each of these generated forms is not just a geometric abstraction; it is an *archetypal pattern* found in nature:

- The *Triangle* (3) reflects structural stability.
- The *Square* (4) offers the basis for physical grounding and architecture.
- The *Pentagon* (5) invokes the Golden Mean (see Figures 5 and 6) and appears in the shape of grapevine and maple tree leaves, and in human proportions.
- The *Hexagon* (6) is seen in snowflakes and honeycombs, exemplifying efficient packing and equilibrium (see Figure 7).

Moreover, the *Golden Mean* and *Fibonacci sequence* naturally emerge from the construction of the pentagon, capturing the spiral dynamics of growth found in pinecones, nautilus shells, and galaxies.

Each of these forms reflects a *generative geometry* consistent with both Koestler's holonic structures and the principle of two-sidedness. They are products of recursive balancing between unity and polarity—between self and other, part and whole. That is, Schneider's diagrams are improved holonic diagrams. Skinner (2006) provides a comprehensive account of all the repeat patterns of sacred geometry found in Nature.

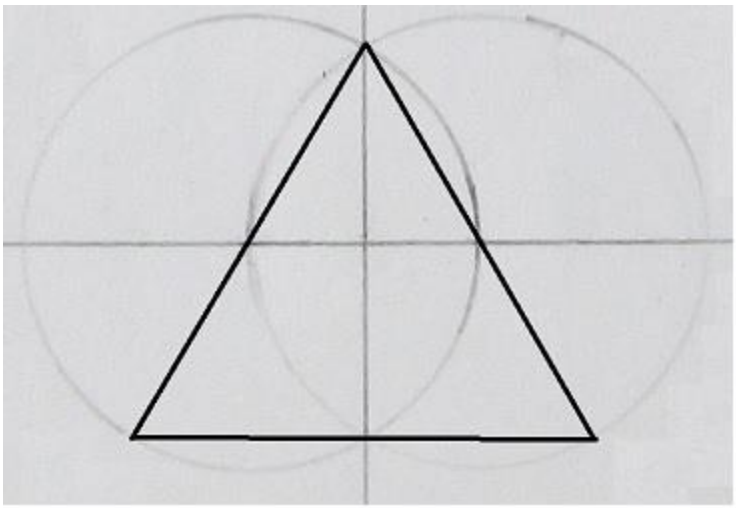

Figure 3. The equilateral triangle or Triad comes immediately from the Dyad, connecting the upper point of the *vesica piscis* with lines that intersect the points where each side of the *vesica piscis* crosses the horizontal axis and extending the lines to connect to each circle, and finally connecting the two sides with a straight line across the bottom. Of the two symmetries coming with the Dyad, only bilateral symmetry remains.

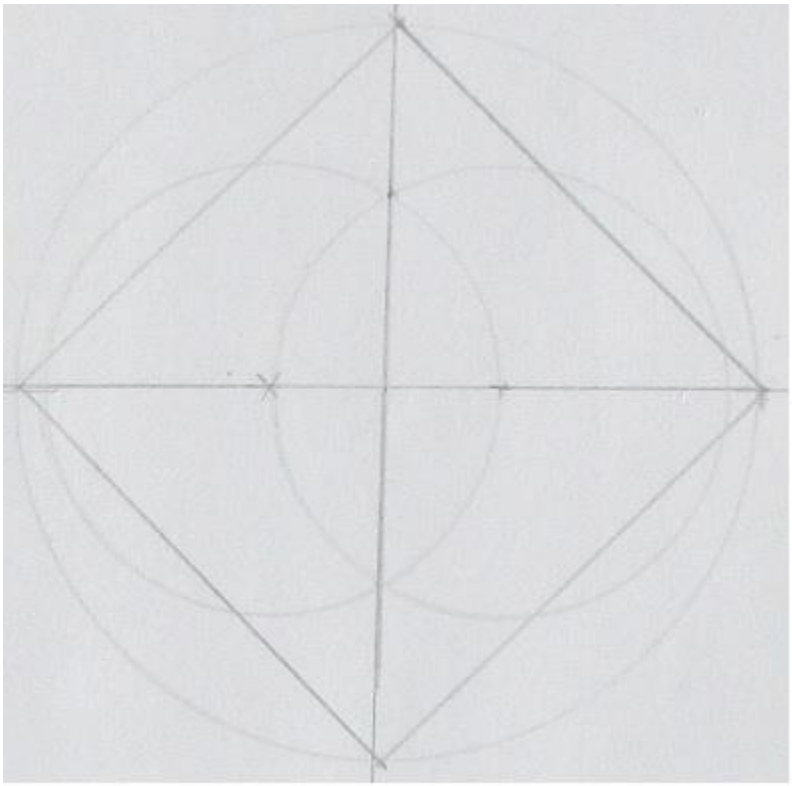

Figure 4. The square is generated by adding a circle of any size to the Dyad, by placing its center where the perpendicular crosshairs meet. A square is created by connecting points where each axis crosses the circle. The finished diagram is symmetric across the vertical and horizontal axes.

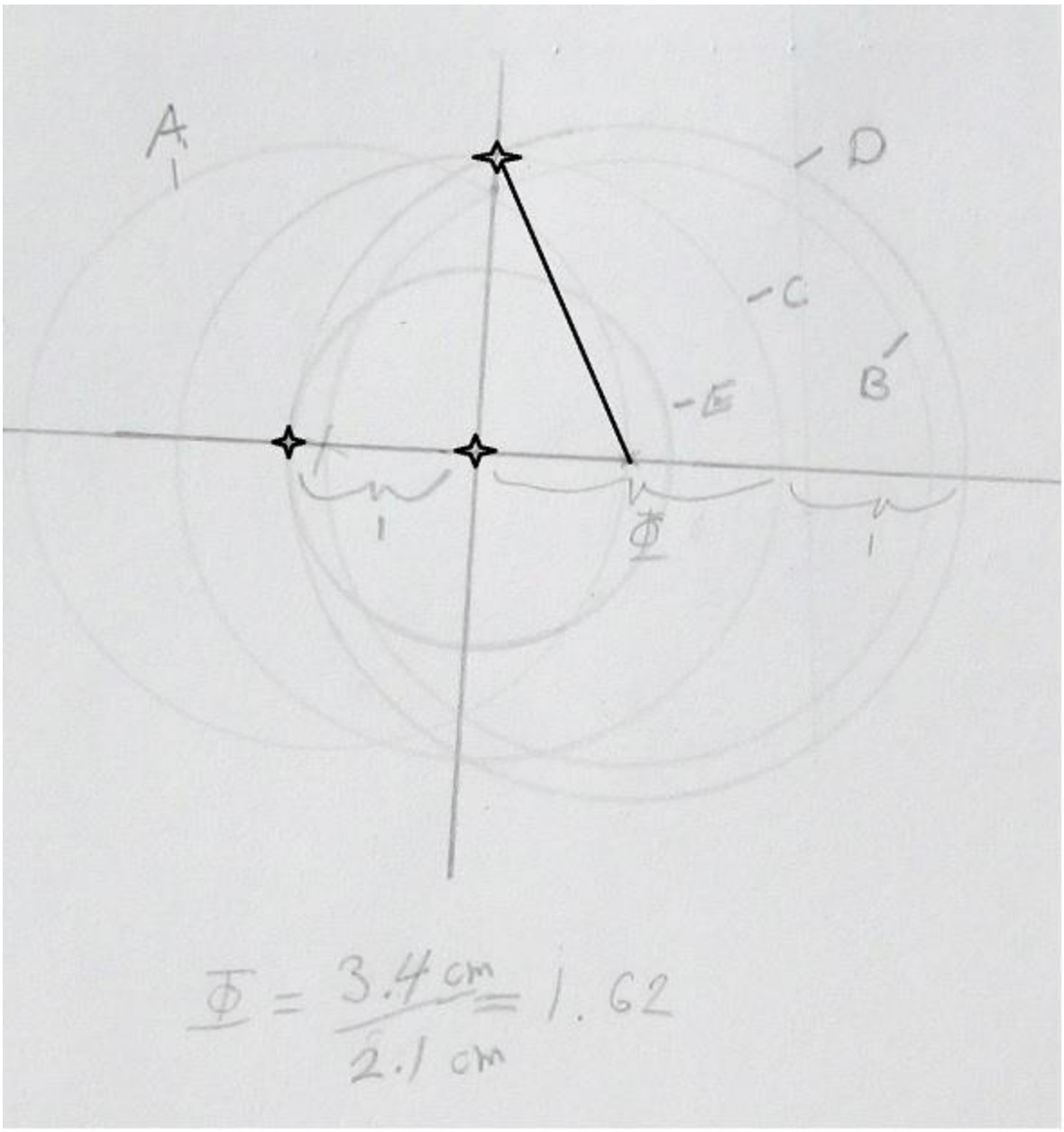

Figure 5. Two circles with common center with radii in a proportion showing the Golden Mean (Φ) can be made by starting with a Dyad (A and B) and placing a third same-sized circle (C) at its center where the crosshairs meet (showing a star). Next place a compass where the *vesica piscis* (made by A and B) crosses the horizontal axis (right side) and extend it to where circle C crosses the vertical axis (marked with star), making the distance given by the solid black line, and making circle D. Place the point of the compass where the crosshairs meet (marked by star), and extend it to where circle D crosses the horizontal axis (marked by star), and make circle E. Circles C and E have the sought proportions, and are both centered where the crosshairs meet.

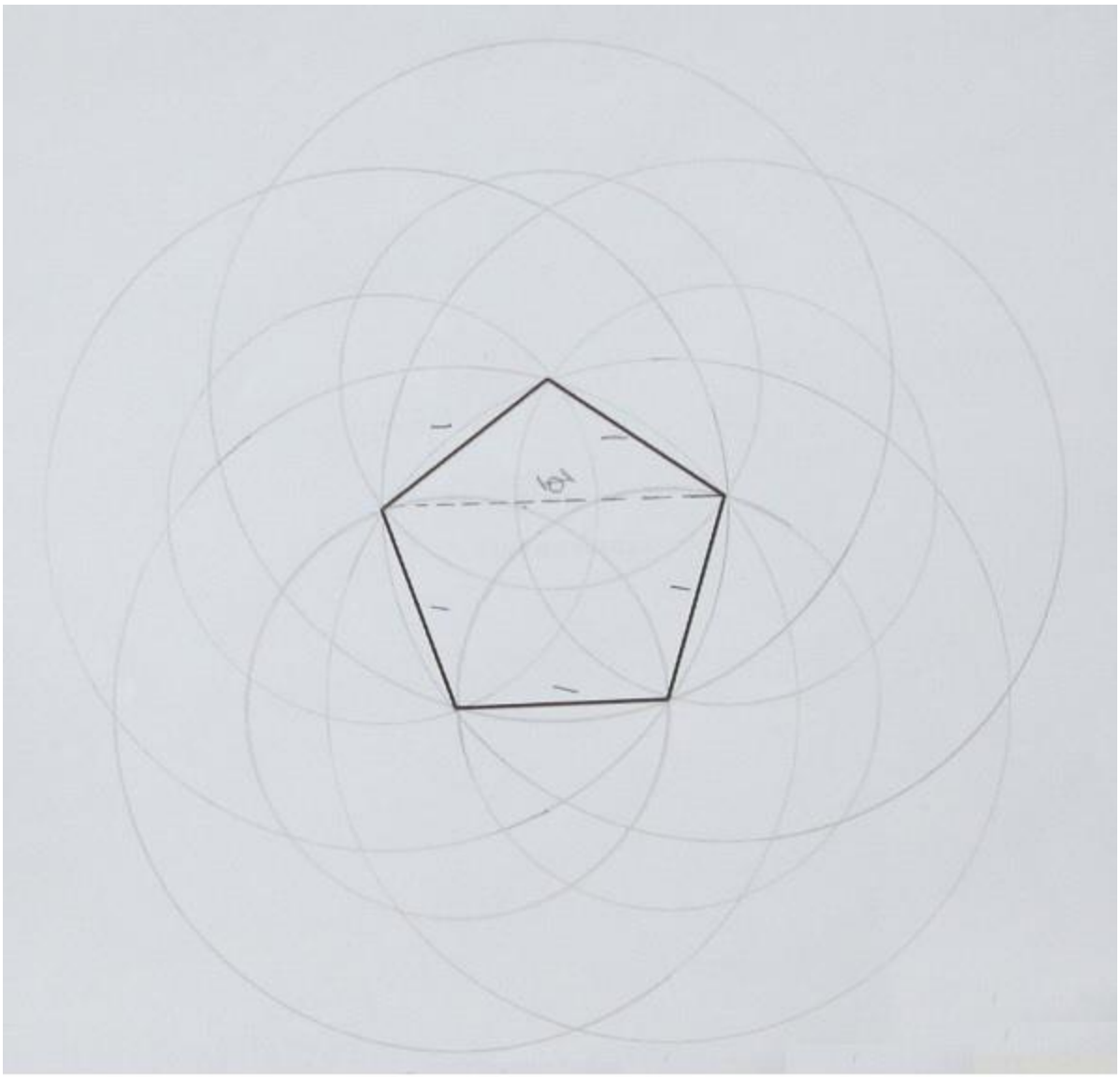

Figure 6. The five sides of the pentagon can be interpreted as balancing lines provided by the *vesica piscis* of five Dyads represented by smaller circles, a conglomeration that is further balanced by the *vesica piscis* of five Dyads represented by larger circles, where the radii of the smaller and larger circles make the Golden Mean. The holonic structure of the pentagon is represented by the collection of circles showing, but additional circles coming from Figure 6 are needed to make a diagram that is more complete. Circles can be added with redundant placements to maintain the demand of bilateral symmetry, and sequential construction.

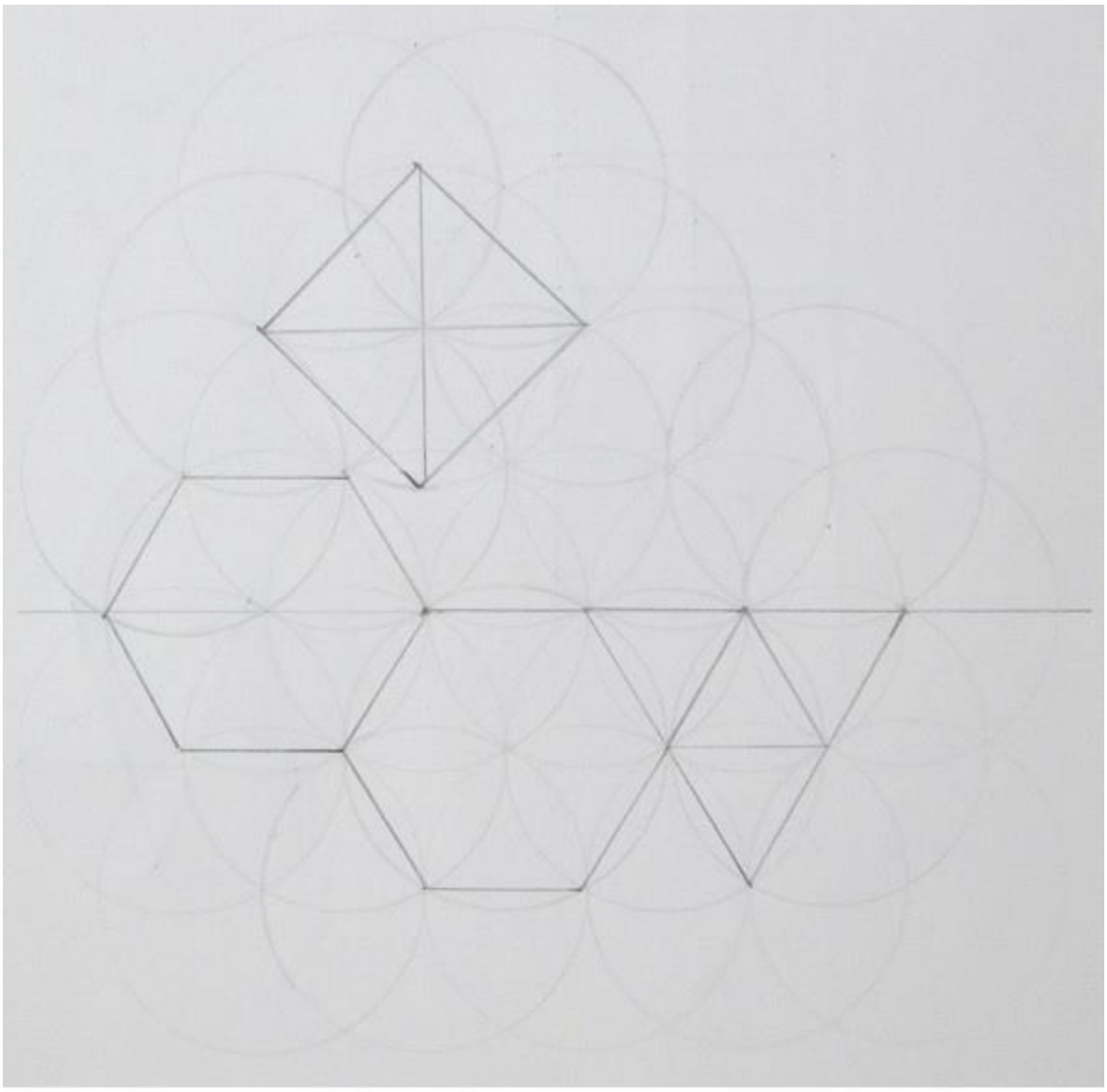

Figure 7. A pattern of circles of common size can be generated by initially centering circles on a line, placing the center of each circle in the circumference of its predecessor, and continuing placing additional circles beyond the line by centering each at the top or bottom of the various *vesica piscis* that are generated. By connecting points of intersection, a tiling of Triads or hexagons form. Squares can also be placed but this pattern of circles does not lend itself to tiling squares.

5. The Heptad and Beyond: Cognitive Thresholds and Archetypal Cycles

Not all forms can be constructed with compass, pencil and straightedge. The *Heptad* (7-sided polygon) and *Ennead* (9-sided) cannot be constructed in finite steps, yet they hold symbolic and developmental significance. Schneider points out that mitosis proceeds through seven stages before

completing its division. The seven notes of the diatonic musical scale—selected from the infinite spectrum of possible frequencies—represent archetypal limits of human discernment.

This is not merely a biological or acoustic coincidence. Schneider argues that our cognitive and perceptual systems are constrained by nested dyads—binary thresholds of attention and awareness. In music, although many fractional notes are physically possible, we attend meaningfully to only seven within an octave. The eighth note (the octave) completes a cycle while lifting it into a new domain—*completion through transformation*.

Thus, the number seven, while geometrically elusive, marks a *psychosensory gateway*, the final step before a return that is not repetition, but transcendence. The number nine then symbolizes *completion beyond completion*, a final turning before something wholly new begins.

This sequence of archetypal numbers (1 through 9 and beyond) maps onto developmental arcs in nature, mind, and myth. It reinforces the idea that holonic development is cyclical and spiral—not linear or strictly hierarchical.

6. The Golden Spiral and the Implied Bilateral Symmetry

Symmetry implies sameness or indifference across different perspectives. Perfect symmetry, taken to its limit, presents nothing distinguishable—no contrast, no difference, and thus no information. It is only when symmetry breaks that distinct perspectives and structures emerge. This broken symmetry makes reality visible, while an underlying perfect symmetry may still support all existence.

If ultimate reality is founded on perfect symmetry, then the asymmetry we observe—such as the dominance of matter over antimatter—must arise from a process that veils this deeper balance. Ontological two-sidedness, when paired with sublation, offers a framework where visible asymmetry arises from a deeper, peaceful dual symmetry.

Though two-sidedness implies bilateral symmetry, the effects of sublation may conceal this in appearances but bilateral symmetry may still show because of the strange attraction derived from the underlying drive that demands homeostasis. For instance, biology often exhibits bilateral symmetry—left and right sides balanced. But even when asymmetry is visible, there remains a subtle pull toward this balanced duality. This invisible symmetry acts as a kind of gravitational center for form, meaning, and life itself.

The Golden Spiral, a shape found in seashells, hurricanes, and galaxies, is one such pattern that does not show bilateral symmetry in two dimensions, yet it can be built from a generative construction that does. In particular, it can be generated from the Golden Rectangle—a rectangle with side ratios conforming to the Golden Mean (Schnieder 1994). While the construction does not generate dual versions, it inherently contains information for *two* spirals: mirror images of each other, even if only one is visible (see Figure 8).

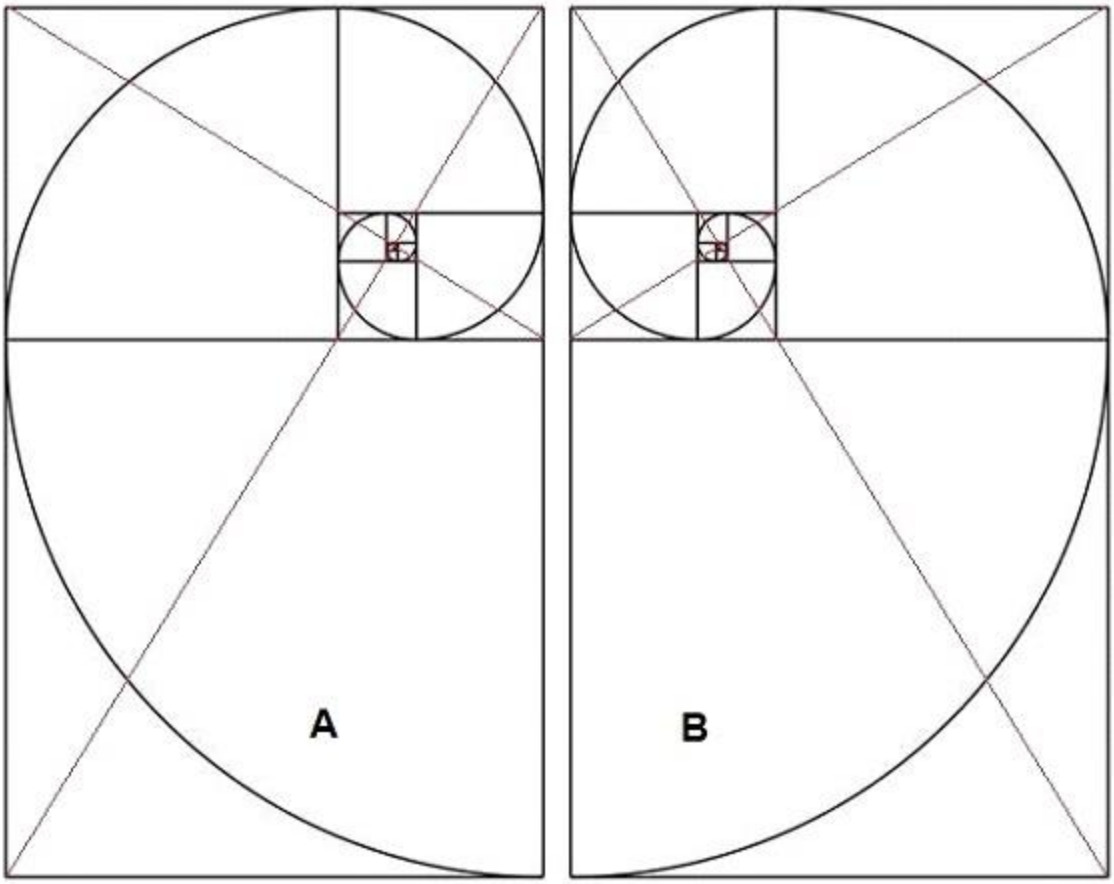

Figure 8. Shows two Golden Triangles A and B, where the ratio of length over width equals the Golden Mean. By crossing the width of each Golden Triangle with a line to make a square, a new Golden Triangle is generated in the space outside of each square. This can be repeated indefinitely, making smaller and smaller squares. In triangle A, the progression happens in the clockwise direction, in B the progression is in the counterclockwise direction. By drawing a ¼ circle connecting two corners of each square as shown, the Golden Spiral is constructed. Each spiral converges to a point where two diagonal lines cross. The two spirals are mirror images of each other.

Bilateral symmetry becomes visibly explicit again when we move into three dimensions, as seen in spiral galaxies. A plane through the galactic core reveals a mirror symmetry, suggesting that the deeper dual nature reasserts itself at higher complexity or broader perspective.

As a second example, the Golden Triangle can also be used to generate the Golden Spiral following Schnieder, and the same dual pattern recurs. Therefore, meaning, art, and biological growth seem to require this kind of mediated balance even as meaning making complexifies more generally. These constructions are not chaotic but guided by an underlying structure that is dual yet unified. The Golden Triangle recurs in various natural forms, including the pentagon—a shape composed of five interlocking Golden Triangles. The pentagon, too, links back to spirals and plant growth patterns,

reinforcing the idea that life unfolds through hidden symmetries and mirrored forms, even when one side remains unseen.

7. Friston's Free Energy Principle and Holonic Homeostasis

These geometric and metaphysical insights find resonance in the empirical domain through the *Free Energy Principle*. Friston (2010) describes life as a process of minimizing surprise—or more technically, minimizing the divergence between predicted and actual states. Organisms survive by maintaining *homeostasis* through predictive modeling. This predictive regulation has a direct analogue in Schneider's golden spirals and sacred geometries: forms that maintain proportional coherence as they grow and adapt. Friston's balancing mechanism is found consistent with Schnieder's more vitalistic process that presupposes Dyadic complexification because that's what Dyads show, the maintenance of balance and alignment making a two-sided agreement allowing a sublation into unity.

The golden spiral, then, is not just a beautiful shape—it is a *homeostatic attractor*. It represents the most efficient and coherent path of unfolding. Friston's principle and Schneider's geometry both point toward a vision of life and mind as processes guided by *pre-existing archetypal structures*, rather than random trial-and-error evolution alone. Genes may provide the instructions for proteins, but the form of a sunflower or a galaxy may be the *result of resonance* between genetic processes and archetypal geometries embedded in the fabric of spacetime.

This vision radically challenges the mechanistic view of evolution. Life becomes not a product of chaos shaped by selection, but an *emergent expression* of deeper patterns—patterns that manifest across scales, from molecules to minds to galaxies.

8. Platonic Forms Revisited: Holons as Constructed Ideals

Traditionally, Platonic Forms are seen as eternal, immutable ideals existing in a transcendent realm. But interpreted through the lens of intuitionist mathematics and generative geometry, these Forms may be re-imagined as *constructed ideals*—truths that emerge through sequential acts of intuition and disciplined generation.

The holon, then, is not merely a metaphysical essence, but a *Platonic form in motion*—an ideal constructed in time, realized through balance, symmetry, and recursive transformation. Each holon is an expression of a more general template, shaped by strange attraction, bilateral symmetry, and the creating subject's choice to follow a path.

From this perspective, nature's abundance of symmetrical forms—the human face, butterfly wings, pinecones, nautilus shells—can be understood as the echo of generative principles expressed through holonic development. These are not accidents of evolution alone but signatures of a creative dialectic that balances freedom and form, unity and multiplicity

9. Toward Holonic Maps that Breathe: Bilateral, Fractal, Constructive, and Archetypal

In light of all these insights, we may now reimagine the ideal holonic diagram:

- It must allow **overlap and intersection**, acknowledging collateral relationships among holons.
- It must be **time-sensitive**, capturing transformation, regression, and metamorphosis.
- It must be consistent with a deeper structure that shows **bilateral symmetry**, reflecting the ontological two-sidedness of reality.
- It must be **constructive**, emerging step-by-step in accordance with intuitionist mathematics.
- It must be **fractal**, echoing similar structures across levels and scales.
- And now, we add: it must be **archetypally resonant**, reflecting the presence of universal forms like spirals, regular polygons, and sacred ratios.

Such a diagram would not resemble a static tree or chart. It would more likely resemble a **mandala**—a recursive, balanced, and spiraling image of unfolding wholeness. It would be as much a work of intuition as of reason; as much about perception and resonance as about logic and analysis.

10. Conclusion: From Geometry to Ontology, from Form to Becoming

In 2010, I attempted to recast space-time geometry (starting with Euclidean geometry and arriving at Riemannian geometry), bringing it in line with both formality and intuition while avoiding the presumed simplicity of sacred geometry (Smith 2010). The irony is that my initial attempt was not only complicated, it was less successful than the present attempt that fully embraces sacred geometry. There is less need for complex mathematics (and other deductions) because an innate two-sidedness will automatically induce two manifolds whenever space-time is characterized by geometry. Hence, visible complexities showing on each manifold will always mirror themselves by showing a deeper bilateral symmetry that sublates into unity. Little more is needed to understand that Koestler's holons, when placed into dialogue with Schneider's geometry, Brouwer's intuitionism, CPT symmetry, and Friston's free energy principle, offer a revolutionary view of reality as both structured and dynamic—both formed and forming. In this view, Nature is not a random canvas, but a living blueprint, unfolding through symmetrical tension, archetypal resonance, and intuitive construction.

Bilateral symmetry, Fibonacci spirals, diatonic musical scales, mitotic stages, and Platonic forms—all testify to a universe that is deeply patterned, yet still open, creative, and evolving. To understand it fully, we must build diagrams that are more than static representations. They must *breathe*, *unfold*, and *sing*.

In these new holonic maps, we do not merely see structure. We participate in its unfolding. As our pencil meets the compass and our intuition meets form, we are invited not just to model the universe, but to become co-creators within it.

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