



9-1-2020

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Recommended Citation

Jackson, W. J. (2020). All the inbent fractals of connection. *International Journal of Transpersonal Studies*, 39 (1). <http://dx.doi.org/https://doi.org/10.24972/ijts.2020.39.1-2.90>



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All the Inbent Fractals of Connection

(Commentary on Marks-Tarlow's "A Fractal Epistemology for Transpersonal Psychology")

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It is a wonder the way the psyche can reflect, and reflect on, the universe. And the ways the psyche works with images constitute a marvel. As an historian and comparativist of religions, I continue to be amazed at the power of religious symbols. In my works on *bhakti* (religious devotion) in India I have studied the archetypes in the life-stories and lyrics of South Indian singer-saints, Tyagaraja, Purandaradasa, Annamacharya and Kanakadasa. I also explored fractal patterns in the *bhakti* community (Jackson, 2007).

I was invited to comment on Terry Marks-Tarlow's (2020) proposal for transpersonal psychology to explore a fractal epistemology because I also wrote a book, *Heaven's Fractal Net*, which explores fractal shapes and fractal-like images in cultures around the world. (Jackson, 2004). A primary reason I wanted to write that book was to show the ways fractals demonstrate how seemingly paradoxical descriptions of *Atman*, meaning "Self" in Hinduism's Vedanta philosophy, can be visualized. *Atman* is spiritual consciousness, shared with all others, and remains in a state of fullness even when some of it is taken away, etc. Since *Atman* is seen as the spiritual Self in all people, and in all living creatures, the concept relates to such concepts as equality of spirit, self-similarity or degrees of sameness, cosmic consciousness, and how existence is multiple yet can be considered "all one." Most of the images in *Heaven's Fractal Net* were meant as objects of contemplation, beautiful functional structures of wonder.

My commentary is not a critical analysis so much as an attempt to stretch the mind of the reader with an evocative call to open up the sensibilities to a recently discovered/invented branch of mathematics not yet fully understood, yet deeply resonant with spiritual yearnings. As an emeritus professor of religious studies, I work with metaphor as transpersonal archetype, and this essay concerns the potential for fractal geometry as metaphor to expand

spiritual sensibilities, especially the subjective sense of awe and wonder at the cosmos.

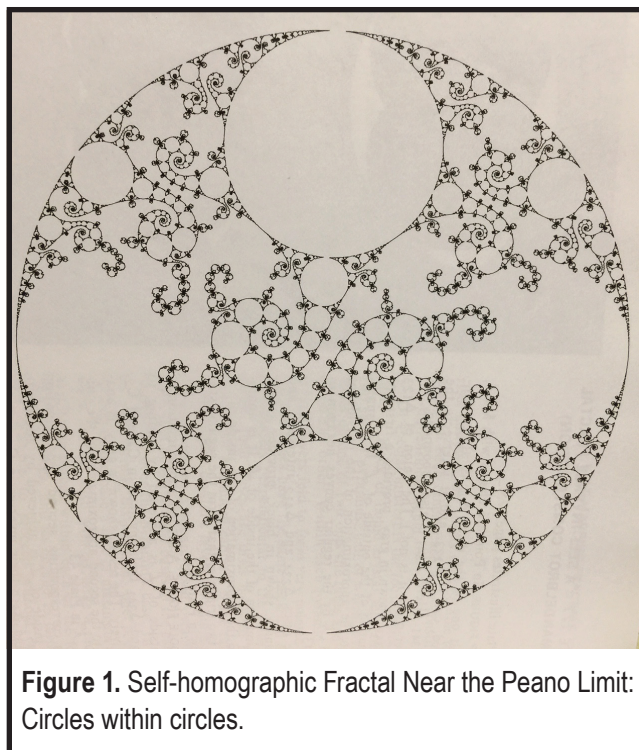


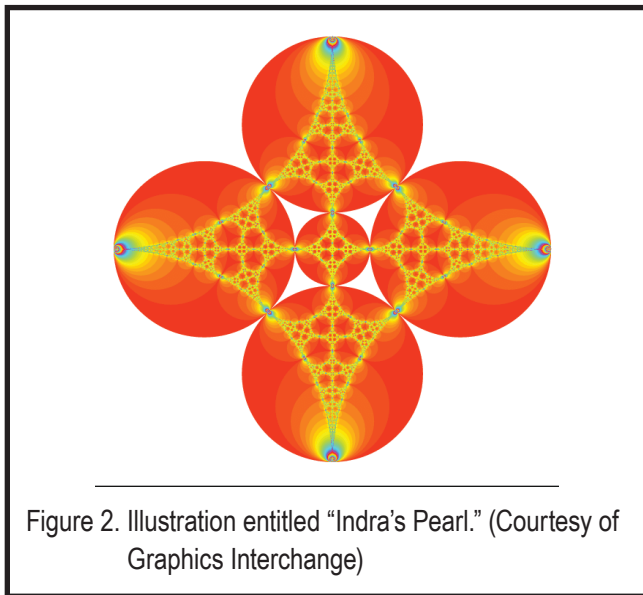
Figure 1. Self-homographic Fractal Near the Peano Limit: Circles within circles.

The Hindu and Buddhist image of Indra's Net is ancient, a fractal network which visualizes mutual interrelatedness. Here is a Buddhist description:

Far away in the heavenly abode of the great god Indra, there is a wonderful net which has been hung by some cunning artificer in such a manner that it stretches out infinitely in all directions. In accordance with the extravagant tastes of deities, the artificer has hung a single glittering jewel in each 'eye' of the net, and since the net itself is infinite in dimension, the jewels are infinite in number. There hang the jewels, glittering 'like' stars in the first magnitude, a wonderful sight to behold. If we now arbitrarily select one of these

jewels for inspection and look closely at it, we will discover that in its polished surface there are reflected *all* the other jewels in the net, infinite in number. Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that there is an infinite reflecting process occurring (Cook, 1977, p. 2).

In the network of pearls, light illumines, reflects, unifies and warms with mutual interactions among the pearls. Humanity and all sentient beings share consciousness, in various degrees. Wholeness is imaged well in this cosmic vision, and Stanislav Grof observes that “In holotropic states we transcend the narrow boundaries of the body ego and encounter a rich spectrum of transpersonal experiences that help us to reclaim our full identity.” (Grof, 2008, p. 6) (Grof & Bennet, 1992). Images like this help us picture a mock-up of our situation, and the potential we have for fulfillment in such a context. I think it will be useful to explore briefly some other powerful images in history, before considering the power of fractal images to convey ideas, situations and patterns.



Images are humanity’s way of picturing and understanding complex realities. A coin in a *New Testament* parable serves to show the way we can relate to seemingly contradictory realms – spiritual and worldly matters: “Give unto Caesar that which is Caesar’s....” A three-leaf clover in Patrick’s hand could explain the mystery of the trinity—a simple three-in-one trick to show the reason a way around

a stumbling block. We know that not all people are receptive to images in the same degree. Buddha held up a single lotus flower silently, and a teaching was transmitted to those who got it. Not all present understood or resonated with the intended meaning, but those who did spread the teaching down the ages. It endures for those who are able.

I will give a more modern example also. One day Professor Harvey Cox, author and faculty member at Harvard Divinity School, came into a class in which he was not the usual professor. His basic message was that having taken a psychedelic at an earlier time in his life, he wanted to tell us that, instead of calling psychedelic states “altered states of consciousness” (which suggests there is one main legitimate state of consciousness and others are alterations of that), he thought it was better to say “alternate states of consciousness,” not giving so much priority or privilege or importance to ordinary everyday consciousness. Forty years later I still recall his message clearly, in part because he was wearing a top hat, a unique type of headgear which rises high from the head and represents a different status or state of mind, in comparison with say, a beanie, a bowler or a baseball cap.

Some images are emblems—for example, the flag under which a ship sails. In the history of America there have been trial-balloon emblems to signify the citizens’ togetherness. Hands clasped in a circle; a snake cut up into 13 segments with the motto “Don’t tread on me”; and the goddess Liberty, a gift reminding the nation of its promise to be a refuge for the tired and poor. These symbols and others are held up to encourage people to identify with all the others in the country, and to serve as a method to foster loyalty, to see citizenship as different kinds of people sharing in a common good, and complementing each other with different skills and backgrounds. Such metaphoric emblems serve to unite people in affirming a simple identity.

Metaphors can work powerfully, especially for those who are attuned to them. Professor W. C. Smith, an historian of religion with whom I studied, told me that the metaphor of “God the Father” was something he understood more deeply only after becoming a father himself. We resonate with some images depending on memories of experiences,

associations, imagination, and personal needs. I am not a mathematician; it is the visual aspects of fractal geometry with which I especially resonate. Each person resonates according to individual traits.

Images are the language of the unconscious; images are the alphabet of the *anima mundi*, the world soul's voice, *The Voice of the Earth*. (Roszak, 1993). The unconscious tries to speak in dreams, in intriguing stories, telling us things we need to know. Our responses are not always conscious either. We are conditioned with slaps and kisses to like and dislike certain kinds of things. Idol worship and idolatry have negative connotations to many monotheists, but in India I know people to whom "idol" means "sacred image," not "false god." With such a wealth of sacred images Indian thinking tends to see all the names and forms of the sacred as transparent, symbolic representations we can relate to.

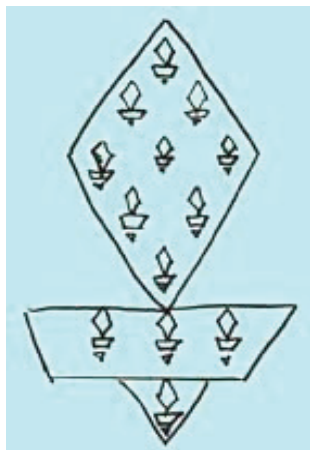


Figure 3. *Kolam*, drawn image of a lamp made of lamps which I saw in Tamil Nadu, south India, circumambulating Arunachala Mountain, Tiruvannamalai village. (I have sketched the image in black ink; the original was white rice-powder lines on tan earth.)

Some images are important and powerful because they convey something that is considered sacred or capable of extraordinary showings. The image of light in the mystical poetry of writers around the world is an example. All sighted people have experiences of the sun as revealer, clarifier,

enlightener, et cetera. The physical make-up of the eye allows for experiences of light which are inspiring to the depths—they are unforgettable half a century later. Light, literally the light experienced in the excitable eye cells—tessellation vision itself—is an experiential revelation of the light of consciousness, exploring and learning. Mandalas are visual focal points, circles picturing deities, worlds, deadly sins—geometrical charts and reminders of programs to focus on throughout the pilgrim's progress of our lives.

Fractal images in their modern computerized examples are not exactly sacred, because they're not part of a tradition with religious stories, as ancient sacred images are. But fractals do have an intrinsic cache, a drawing power, and for good reason. They are in many cases innately attractive, appealing with a charming beauty. The kinds of order they point out can have a fascinating appeal which excites curiosity. And fractals are uncanny, and "the uncanny" has potential for becoming revered, honored, considered sacred. Nature's fractal examples are plentiful and purposeful.

What do we mean by "uncanny"? The uncanny is paradoxical—a kind of thinking Aristotle could not accept. Uncanny phenomena seem to obey laws we are unfamiliar with, and to break laws we know. The uncanny straddles a line—hermaphrodites; eclipses, premonitions, synchronicities, dreams. The uncanny is somehow a paradoxical situation of "both/and" when the usual is more Aristotelian, insisting on "one or the other." I suppose rainbows are uncanny, sun with rain.

Fractals are "not a panacea" as Benoit Mandelbrot was not shy in pointing out. (Mandelbrot, 1982, p. 3). They have a light of nature's wisdom, a sign of consciousness; they show deep natural patterns and arrangements. They work with a subtle power—think for example of the many functions of branching shapes—in rivers, nerves, blood veins, and tree branches. The light they shine can be applied in various fields. As images of wholeness, fractals have a unique capacity to help envision ways of reconciling a variety of co-existing views. The paradox of fractals is seen in all the ways they show the part is whole and the whole is part.

In India, Jain philosophers wanted to recognize in their view that there were seven schools of thought, and that all had a right to exist

with a particular view. *Syadvada* is the Sanskrit name of that concept—"somehowism"—because *somehow* all these different views exist and can be argued and held by different schools. "Seven-valued" Jain philosophy promotes looking at other views with respect, tolerating other views, and practicing the virtue of *ahimsa* (nonviolence) in the realm of thinking, as well as the physical world. It is democratic, like a jazz ensemble, which involves sharing the stage and conversing with different instruments, and it brings together noble souls round-table style. Jains hope such a view can bring a healing touch to the psyches of a war-torn world, achieving more brotherhood.

What is it that the shapes of fractals can illuminate? Observations of the way things are. Psyche fractals can help illuminate the art of seeing and explore the science of wholeness. Mandalas in Tibetan Buddhism (perhaps like "Rose windows" in cathedrals) are images which can be gazed upon as circular expressions of wholeness, the whole situation up and down, North, East, West, South, allowing one's intuition to take it in. In one of Jung's letters he referred to a confused person he knew. "The man was confused and bewildered, so something had to happen to give him clarity about the whole situation. The mandala was a sort of letter from the unconscious meant to clarify his mind ... to bring order out of a state of confusion ... it is like an amulet. ... Amulets often have a mandala form" (Jung, 1984, pp. 114–124). Fractals can be like that too.

Marks-Tarlow's (this issue – and all subsequent references refer to this paper) paper aims "to present an epistemology for the field of transpersonal psychology that helps to heal an ever-widening schism between these two positions [belonging either to the humanities or hard sciences]. To honor the call for objective rigor, I offer up the mathematics of fractal geometry as model, method, and metaphor for otherwise ambiguous and inaccessible transpersonal phenomena." (p. 56). Models, or conceptual frameworks, determine a lot in our thinking, and the nonlinear models which fractals offer can expand our more linear presuppositions considerably.

The need for coming together, merging the disjointed disconnected parts of what could be an organic whole, as a family belonging together, is apparent. Though naturally there are varied slants of

theory and practice in an intellectual community, it is like an ecosystem in which all the members need each other for the whole system to be complete. Marks-Tarlow's plea is to consider the benefits of experimenting with fractals as model, metaphor and method for coexisting, sharing and cooperating among transpersonal psychologists, an invitation to try out the promising potential of fractals.

What Is So Special About Fractals?

There is comfort in enchanting forms and artful messages. It has been said that enchantment—such as a mother's voice humming a soothing lullaby—is the oldest kind of medicine there is (Jung, 1987, pp. 410–423). Of course Jung was referring to other kinds of enchantment than fractals—he died in 1961, before Mandelbrot made his breakthroughs in fractal research. Nevertheless, fractals represent a technology-age enchantment. They intrigue school kids who otherwise are not interested in math, and evoke reverence in students of architecture and other design fields. They can provide a tool for pattern recognition in nature, in literature, art and human relations. They are an imagination-spur, a reminder to think about intertwining relationships, to focus for a while on thinking about connecting dots.

There are reasons to revere some things, even in a secular worldview—family, elders, selfless patriotism, masterpieces of art. We revere them for their depth of enchantment, their ability to resonate in our reflections. "All great art contains at its center contemplation, a dynamic contemplation," Susan Sontag (2012, p. 31) wrote. We could define contemplation as consciousness focusing on a deep issue. Fractals are potentially like that too. They inspire contemplation as well as participation. Like a mandala, a fractal can be gazed upon in meditation, and drawn or built in 3D; it can be danced, it can be a chart (Jung, 1987, pp. 410–423).

As a rainbow or a tree can be a spiritual sign and a visual parable, fractals serve a similar purpose by displaying the beauties of such features as self-similarity, which is a great mystery as well as an obvious echoing, and organic wholeness, a sense of oneness and naturally inter-fitting parts. And fractals visually suggest infinity. At times in the past the concept and manifestations of infinity caused fear

among those with a mathematician's view because it seemed uncanny, a freakish monster-like aberration of finite norms. The unfamiliar and endlessly expandable can at first seem outlandish; the finite seems more under control. But visual suggestions of infinity can also represent consciousness. The Hindu view of the ultimate is that a subtle spiritual consciousness which is the basis of existence—Brahman, the formless *sat-cit-ananda* (literally “Being, awareness, bliss”) is shared by all. Intellectual and other kinds of consciousness share some of the qualities of infinity, adapting to endless possibilities, lighting the way to understanding. Fractals help us envision the dynamics of this kind of view.

In some cultures fractals are prominent motifs in structures and organizational schemata, in others they are present but less obvious. Many mountain-like temple silhouettes in India feature fractal-like shapes—little zigzags inside larger zigzag contours making up the overall zigzagging structure. For more on this, see my Hindu Temple Fractals post on academia website (Jackson, 2002).

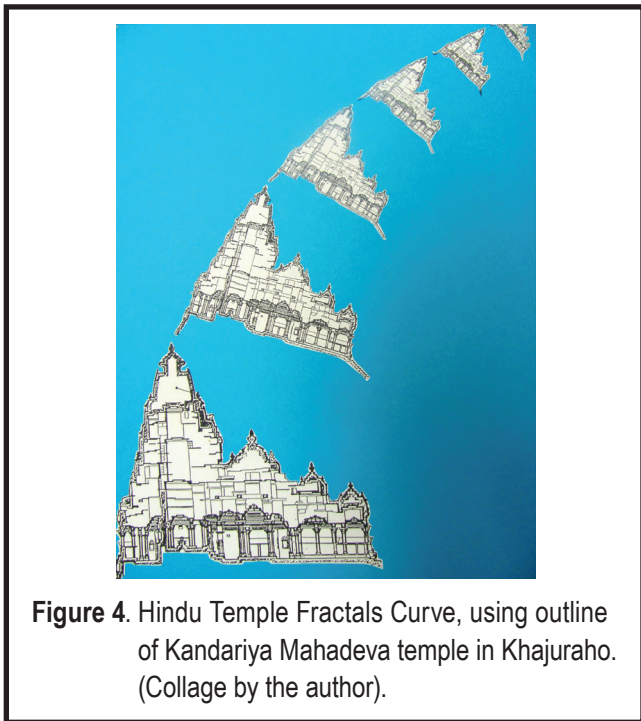


Figure 4. Hindu Temple Fractals Curve, using outline of Kandariya Mahadeva temple in Khajuraho. (Collage by the author).

Ron Eglash's (1999) book *African Fractals* illustrates and discusses fractal ways of designing and organizing in some African cultures, favoring self-similar shapes in composing the lay-outs of villages, and individual family compounds.

These traditions select simple memorable functional fractals as a principle for organizing space and expressing harmonious order. They make good sense as a convenient method, repeatable for generations, self-regenerating. Instinct or traditional wisdom—both are memory sources of what worked in the past—to organize matters according to self-similar favored shapes.

What are fractals, that we should be so mindful of them? What makes them important? For one thing, as mentioned above, fractal structures are “useful” to nature, suiting form to function, in a variety of ways. I'll give a couple of examples.

For *strength*, one kind of fractal structure is composed of bundles made of bundles, made into a single bundle—as the cross-section of a palm tree trunk is made of bundles of bundles of fibers. In the ancient Hindu text *Hitopadesha* (Book of Good Counsels) there is a verse translated by Sir Edwin Arnold which describes this kind of structure: “Small things wax exceeding mighty, being cunningly combined:/ Furious elephants are fastened with a rope of grass-blades twined.” (Wilson, 1900, p. 11). Airplane cables and the steel cables for suspension bridges are constructed in this bundled manner as well. Fiber optic cables and nerve structures in the human body, all these structures are tightly packed strand-bundles, making a powerful braided strand out of many small interwoven strands, a mighty form made of tiny fibers, bound and bound and bound.

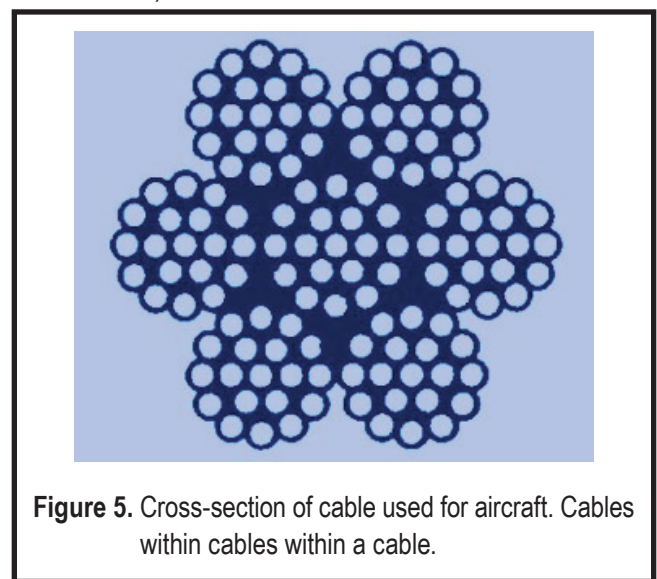


Figure 5. Cross-section of cable used for aircraft. Cables within cables within a cable.

Other fractal shapes in nature are for *distribution and circulation*, branches spread out

filling an area—rivers, trees, blood vessels, lungs. Fronds of ferns have frond-shaped leaves, each one having fern-shaped divisions.

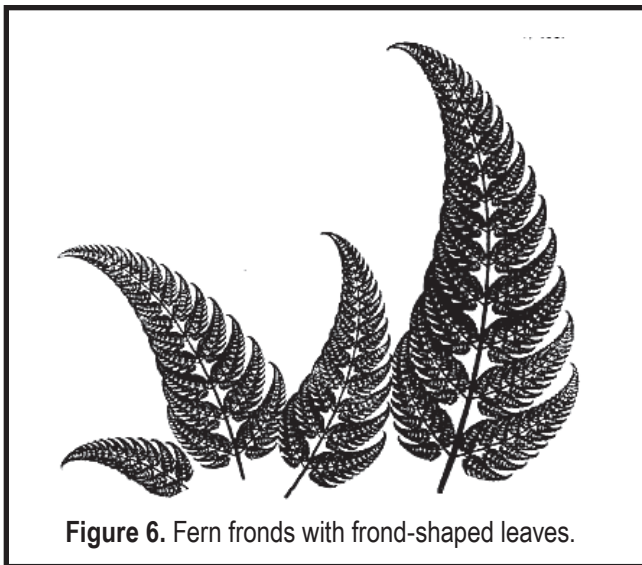


Figure 6. Fern fronds with frond-shaped leaves.

Some clouds have fractal shapes, and the wind has a fractal dimension—it comes into existence as waves of energy released from the burning sun, spreading out into the atmosphere. The wind’s fractal aspects have been researched. For example: “In this paper the concept of a fractal and its dimension is presented. The fractal dimension of the horizontal component of several wind speed time series is determined by the variation method.... The fractal dimension is related to the universal estimate of the decay rate of turbulent kinetic energy in the wind.” (Syu & Kirchoff, 1993, p. 151). The sun is the generator of winds, and a model of behaviors, too, in a manner of speaking.

Some human experiences are rather universal; experiencing sunlight, the greatness of the daily sun, for example. Anyone can experience fractals in the world around us. For example circle patterns are a sign and symbol, up in the sky, and here. Emerson cited ideas which Plato philosophically wrote: “By us it is asserted that God invented and bestowed sight on us for this purpose—that on surveying the circles of intelligence in the heavens [sun, moon, stars] we might properly employ those of our own minds which though disturbed when compared with the others that are uniform, are still allied to their circulation; and that having thus learned, and being naturally possessed of a correct reasoning faculty,

we might by imitating the uniform revolutions of divinity, set right our own wanderings and blunders” (Emerson, 1940, p. 485). Consider how over the centuries philosophers like Plato have understood our relation to natural occurrences around us—thinking of self-similarities on various scales. The humanities offer many meditations on how human life relates to the universe, and shares some self-similar aspects. Emerson cited *Plato’s Republic*: “By each of these disciplines a certain organ of the soul is both purified and reanimated, which blinded and buried by studies of another kind, an organ better worth saving than 10,000 eyes, since truth is perceived by this alone.” (Emerson, 1940 p. 485). Consciousness determines fate in this view—what you see is what you get, no more, no less, in Plato’s understanding of the crucialness of seeing: “The soul which has never perceived the truth, cannot pass into the human form” (Emerson, 1940, p. 484). Perhaps this is a way of saying that familiarity with reality (inner and outer) and veracity is a norm for human life, in the philosopher’s worldview.

Emerson wrote in his essay “Circles”: “The eye is the first circle; the horizon which it forms is the second; and throughout nature this primary figure is repeated without end. It is the highest emblem in the cipher of the world” (Emerson, 1940 p. 279). A series of roundness experiences—circular-motif fractals potentially extend this arrangement, take it to further levels of awakening.

Jung dilates on this topic too, reflecting on how the sun is a great life lesson, an exemplary image of energy and generative power, played out in so many similar smaller existences:

Out of the unfolding embrace, the enveloping womb of the sea, the sun tears itself free and rises victoriously, and then, leaving the heights of noonday and all its glorious works behind it, sinks back into the maternal sea, into the night which hides all and gives new birth to all. This image was the first to become—and with the most profound justification—the symbolic bearer of human destiny: in the morning of life, man painfully tears himself away from the mother, from the home-hearth, and fights his way up to his full heights.... And once he has reached the

noonday heights, he must sacrifice his love for his own achievement, for there can be no standing still. The sun also sacrifices its greatest strength to hasten forward to the fruits of autumn, which are seeds of immortality: in children, in works, in fame, in a new order of things, which in their turn begin and complete the sun's course over again." (Jung, 1961, pp. 294–295)

Life on earth needs sun, and in our lives we reiterate in multiple ways the cycles of growing and decline.

Mandelbrot noted that fractals were not invented by him, but discovered. Timeless and already there, following their system's own rules, like the ways of nature, they are summations of inevitabilities in physics, like water rolling downhill in a watershed obeying the law of gravitation to make branches. Natural fractals seem like summations of natural wisdom and changes, like the rough textures of tree bark, buds and seed clusters, structures of lungs and brains. This "already there" or "order for free" quality is like Fibonacci numbers, and music in the experience of some composers, jazz artists, and raga originators in India; the patterns seem to already be there in the logic of the system, so the potential is uncovered, not invented.

Mandelbrot explored and brought to light the nature-secret image of fractals, explored it for mathematical aspects and various applications. Mandelbrot would agree that there are multiple uses for fractals, many as-yet unknown. If you use a cell phone, you should know that cell phone antennas employ a fractal shape: squares within squares within squares. Some poets, musicians and writers have already found fractals to be very useful. Listen to the Oscar-winning song lyric in Disney's movie "Frozen" for an evocative mention of the term "fractal." Writer David Foster Wallace employed a fractal model (the "Sierpinsky Gasket") for his novel *The Pale King*, and used the concept of fractals to great effect in a story "Good Old Neon" in the final paragraph: "... **this is what it's like**. That it's what makes room for the universes inside you, **all the endless in-bent fractals of connection** and symphonies of different voices, the in-finites you can never show another soul" (Wallace, 2004, p.

179). As fractals are being explored in various other fields, Marks-Tarlow is voicing the need to explore possible uses of fractal potentials in transpersonal psychology.

Reaching for order, reminding us of inherent patterns, fractals are inspiring. We want to consider fractal wisdom, and explore it on our own. To recognize situations and patterns, and see details of possibilities, to explore and develop useful answers, and to make conjectures, and conceptualize further visions, hitherto hard-to-delve-into deeper possibilities. Fractals can constitute a space for thinking, a game arena, a chart with which to brainstorm. A rainbow of diversity depicts a spectrum, it is a rather linear composition, a series of colors, while fractals are nonlinear reiterations, providing ways to think about complex issues. Even after years of familiarity, fractals are often capable of suggesting further useful explorations, fresh insights.

Mandalas have a variety of uses in Hinduism and Buddhism and New Age religions. And as the mathematical genius and mystic Pythagoras explored number and philosophical wisdom, today other Pythagoras-type creatives can pioneer with fractals both for beauty and math—images of neutral geometrical diagrams, yet images to wonder with, paths to imagine and figure out relationships, chart practical matters with elegant natural figures of thought. We can nurture the potential in new Pythagoras, inquiring seekers, researchers exploring the boundaries, pushing the envelope, fathoming potentials of fractal studies.

There are unforeseen ways (and fractals are one of them) in which interactions and activities involving parts of a whole can bring a further fruition, like dynamic relations between realms of verbal and visual, music and ritual, conscious and unconscious aspects in individuals. For visualizing the relations of humanities and hard sciences among transpersonal psychology professionals, Marks-Tarlow suggests trying out fractals as potentially able to help us envision the overarching harmony. The visual example of fractals helps us think in a more holistic nonlinear way, with more freedom to realize relationships of parts within wholes, mindful of necessity.

Seeking the Goals of Marks-Tarlow's Plea: Reflections in a Network of Pearls

Marks-Tarlow's plea is an attempt to envision more sense of wholeness in the community of interpersonal psychology. Divergences among types of psychologists include: More scientific rigor or less, more theory or more practice, more introverted or more extroverted, more prosaic plain everyday life or more psychedelic revelations, more humble and practical or more big picture, Humanities or Hard Sciences, more brain neurology or more myth literature and art.

The schools of transpersonal psychology addressed in Marks-Tarlow's plea are characterized as valuing multiple approaches—using as many as three other schools or therapies in defining their approach. Because Transpersonal Psychology is diverse and eclectic in its various practitioners' methods, visualization of their wholeness/partness could help provide a sense of overall coherence and cohesion. Fractals could offer conceptual images to accommodate these needs. Because epistemology studies the theory of knowledge—methodology, valid proofs and concern with the scope and boundaries of a field, it is foundational even if it develops over the years, catching up to actual practice and experience. Epistemology also involves researching and critically thinking about factors that distinguish justified belief in the factual from unproven opinion.

Marks-Tarlow's proposal is a call to explore ways of fitting together, the benefits of fitting together rather than being split apart—a consortium, with family resemblances. Fractals can help this community contemplate its self-organization. Visualizing understanding of the whole, together, refining interrelationships, increasing contextual coherence in community terms. The necessary resources to re-vision the relationships among differing styles of transpersonal psychology include fractal designs of timeless nature along with tools specific to our age—computers, statistics, et cetera.

We seek a harmony, and some fractal images show how contrasting aspects are interrelated or even complementary, how each is in the other—interrelated by sharing mutuality. We hope to

visualize harmony in the fractal forms of templates of organic beauty, economy of function. An elegant fractal functions well in doing this—not a grotesque Rube Goldberg Machine which just grew any which way it might have happened by happenstance.

Some fractals can help expand the canvas of our imaginal possibilities. Marks-Tarlow's insightful writings about the "fractal self" explore how fractal geometry helps us think about relativity, and can lead to a non-linear dynamical theory of self. (Marks-Tarlow 1999). Her article on "Fractal Self at Play" is a helpful exploration of rich observations about development of the self. "A fractal model suggests that the whole of the self, intact during early play, exhibits self-similar resonances in the content and forms of self-expression throughout life" (Marks-Tarlow, 2010, p. 31).

Fractals can add a new element or dimension to charting our understanding of human interrelations. Used this way, a fractal is a model, metaphor, schematic template of wholeness. To chart psychological conditions, to get together those who feel asunder, fractals are a worthy candidate, a potentially helpful conceptual tool for transpersonal psychology to employ. How are professional decisions like this made, the adopting of a valuable tool? Usually through study, debates and conference meetings and votes and usage. How do things become part of the culture in America? America's embrace of the pragmatic is a traditional value in American history. If it works, it is good, Americans of the past have philosophized.

Whether for mathematical precision regarding some matters or philosophical exploration, fractals constitute a unique tool for thinking. They concentrate information in visual representations. Like the *dhyana shlokas* ("rhymes to meditate on" used by teachers and students in old India, Sanskrit couplets composed to represent important ideas) fractals can help us focus and further consider patterns. *Dhyana shlokas* are brief summary verbal statements presenting distilled principles capable of being applied to various life situations. Fractals can offer that kind of focal point as well, to see situations anew.

While there are natural resistances in all fields to any suggestion of innovation and change, nevertheless, improvisation, experiments, and obser-

vations always continue the processes of learning. As noted, Mandelbrot himself famously said fractals are not a panacea, so a cautious optimism is required. Fractals display ways to conceptualize and organize, ways to exercise the imagination, ways to explore the unseen spaces of possibility; they offer a multi-dimensional canvas for picturing potentials.

Tapping Hidden Fractal Wisdom Like the Swan

What is the medium through which the conscious and unconscious have their exchanges? There must be a medium in which they conduct their back-and-forth exchanges. What medium includes or welcomes the language of the hunch, urge, nag, revulsion, dream, chance, synchronicity, wit, inspiration by forces that awe us; reflections which occur to us at play, hiking, running, swimming, and while pursuing archetypal images, bringing new ideas and insights?

The medium is invisible, weightless, subtler than earth, fire, water or air.

Consciousness is a mystery—as is the unconscious. The conscious approach includes education, research, study, discussion, gathering knowledge, and deepening understanding that way. Though mysterious, in its own way the unconscious also contributes much to our assessment of the situations in which we find ourselves. In decisions and in guesses the unconscious plays a part. The unconscious is regularly giving us back a view, an instinctive clue; seeming to slumber it is alert, providing needed ideas. Needless to say (because this is addressed to those familiar with psychology) while writing this essay I have sought clues from the unconscious. I have gathered them, and have sought to organize them coherently.

Much depends on the odd structure of the psyche which possesses a dual-potentiality, “Everything of psychic origin has a double face. One face looks forward, the other back. It is ambivalent and therefore symbolic, like all living reality” (Jung, 1961, pp. 115-116). As the Romans had Janus as double-face god of doorways, drama has tragedy-and-comedy masks, and some fractals have intricate borders of mirror-like contours, yin and yang polarities contrasting, bargaining and dancing with each other every step of the spiral way.

Transpersonal psychology depends on conscious analysis as well as openness to learning from the unconscious. My honest unconscious illuminates what I do not consciously know by reminding me—it wakes me up in the middle of the night and I think “Oh yeah!—there’s blind spot, a background dimension to explore.” I find that the unconscious is more demanding—it contacts one via dreams, and nagging questions—focusing on specific points *within the whole project* to include for holistic accountability—neglected corners, blind-spots, shadowy assumptions, pushing me to take a closer look, for a fuller comprehension of the subject matter with which I am concerned. The wisdom of uncertainty is reliant on the unconscious sense.

Jung urged caution in regard to accessing the unconscious with psychotropics, et cetera.

“If you are too unconscious it is a great relief to know a bit of the collective unconscious. But it soon becomes dangerous to know more, because one does not learn at the same time how to balance it through a conscious equivalent.... We think it is enough to discover new things, but we don’t realize that knowing more demands a corresponding development of morality” (Jung, 1976, p. 173). In the origin story of major Western traditions, Adam and Eve ate from the tree of knowledge of good and evil, and it was complex.

Knowledge from personal experiences of the unconscious can offer fresh perspectives and challenges. Aware of the unconscious we explore possibilities to work with it, and “In dreams begins responsibility” (Yeats, 1914, N.p.). Being “woke” in current vocabulary is a state related to this—awakened awareness of the ignorance inherited from past societal injustices, like institutional racism. Cooperating with the unconscious is rewarding in understanding if not always comforting—there are frustrations involved in “being conscious in an unconscious society” (Davis, 2017). Some truths may be inconvenient.

James Hillman’s insights into the unconscious and archetypes in literature are profound resources (Hillman, 1979, 1997). And Stanislav Grof has researched the realms of the human unconscious with appropriate care, and found valuable and enduring insights into human nature (Grof, 1975). Grof’s

explorations of healing holotropic experiences and related topics integrate Freudian, Jungian, shamanic, and wisdom traditions and are fearlessly non-reductive. Grof personally experienced geometrical imagery, including shapes he identified as visual fractals during a dramatic crucial moment of his life and research (Van Nise, 2011). Boundaries are fluid in the experiences of healing holotropic states, and fractals can depict boundaries with precision and the vitality of playfulness.

So let us patiently consider some aspects of relating to the unconscious, because in my view it is not just valuable but essential to the project we are discussing. Just as the fractal structures have often been beneath the surface of forms and processes of nature, so too, the expression of wholeness in human interactions is not always seen by the conscious mind, but may be fathomed indirectly. Treasures are often buried under the earth, out of sight, because they are valuable. Once, when I spoke with Benoit Mandelbrot on the phone, he had recently been in Italy at the Vatican, and he spoke about how in architecture there are hidden fractal principles which someone with a developed fractal sensibility would see, but people without any background in fractals would not notice. Similarly, being a new discovery for thinkers in the sciences and humanities to come to terms with, fractals might best be approached not only with a rational mathematical thinking, but also with a contemplative, reflective mind and in a spirit of self-understanding. To know oneself is a profound, mysterious, ongoing process.

I identify with my Harvard mentor J. L. Mehta, a philosopher from India. He sensed that in our time people are losing their ability to be contemplative, becoming more absorbed in media, technology, calculative thinking and surface concerns. Some see this as the triumph of secularism and technology. Mehta wrote: "the only thing we can do is not to deny or to look for ways of escape from technology, but by standing undesperingly within it to develop ways of thinking which have been ignored or sidetracked in the central philosophical tradition of the West." (Mehta, 1992, p. 18). Paraphrasing Mehta, we might say that those traditions and individuals who know the psyche have riches in reserve to contribute to the quest of a planetary thinking and a

cohesive psychology. Fractals are a nonlinear, non-Euclidian resource, which engender a sensibility, a way of thinking. Like acupuncture, and like the genetic structure of DNA, they offer a set of possible configurations of a system with which we are not familiar. New thinking begins with subtle hints and hunches, possible paths to pursue—threads of thought emerging from the unconscious.

Fractals voice an emerging realization in our time, articulating the spirit of the age in which we live, with its new studies in Chaos Theory, Dynamical Non-Linear Systems Theory, et cetera—and our needs. We hope to let the emerging insights speak from a deeper level of our consciousness than the ego. How to reach that understanding? What are conducive activities to enable listening when "depth calls to depth," when the wholeness imaged by fractals calls and resonates with the wholeness of our being?

The richness and authenticity of psychology comes from experiences of the unconscious, and reflecting upon those experiences. Divorced from the unconscious, psychology cannot go deeply enough. Wild hairs of inspiration from our unconscious may tickle our nose and nethermost and our highest vision to provide something new when needed. That is the hope. Jung reminds us that the individual is the carrier of access within, able to reach the collective unconscious.

But in our age of attention-demanding media and busy schedules, how do we get in touch with the unconscious? What are some ways to be open to that realm's clues? Although one meaning of "unconscious" is "not controlled or known consciously," still, accessing the unconscious is possible by receptivity to the ways the unconscious expresses itself. Receptivity is the medium for this exchange between conscious and unconscious, this conversation, this sharing.

How in touch are we with the unconscious? As with Tao and one's own shadow, "you cannot get close to it, and you cannot keep it at arm's length" (Lau, 1963). Maybe it is not always easy in a fast-moving world of noise and distractions. We are not so aware of unconscious elements of our behavior. I am told that in neurobiology currently the unconscious is a topic of much renewed interest. For

example, in regard to the subcortical brain processes below the conscious threshold of awareness, and in implicit processes and biases in human behavior.

If we list some of the focal points for learning from, and being inspired by, ideas from the unconscious, they include the following: Dreams and fantasies, experiences of nature—mountain climbing, swimming, hiking, sleeping in the wilderness, twilight and moonlight meditations, food and dance, music and play. Music involves “unconscious counting” which moves us in ways we do not fully understand. Rhythm in music is a fractal because every moment is different, adding a variation to each beat’s self-similarities. Music can be explored for its fractal mathematics (Hsu & Hsu, 1990). And improvisation exercises, observing breathing, contemplating clouds and stains on walls, spending time with the trees of a forest, silent fasts, experiences of weather and animals, poetry and myths, the shaman tradition, trance, altered states of consciousness, thinkers like Aldous Huxley, Terence McKenna, and also learning from the child state (“From the mouths of babes oft times come gems”), and keeping notebooks which allow us to stay in touch with our moods and transformations as we go through time, constantly changing, observing and learning. Notebooks are a kind of artificial memory of jotted-down dreams, thoughts, observations, and conjectures, helping us reflect on elusive matters over a longer period of time than short-term memory.

The unconscious may give us ideas during various processes, like sketching, doodling and coloring; in daydreams, weaving and gardening, we can be receptive to intuitive impulses, considering details and being mindful. In appreciating products of rhapsodic intellect, in experiences of night, and in exploring light and the physiology of vision, in symbiotic relationships, the depths emerge. Fractal shapes, boundaries and integrities disclose themselves. As a guru once told his student, “If you meditate at dawn you may realize that there are angels that go around giving gems to people who sit silently.” As media and technology drown out subtler inner impulses from our depths, we need to make an effort to work with our inner resources, too—the touchstone of our humble humorous human psyche—following our curiosity and the impulses of

exploratory questions. Gregory Bateson contributed rich thinking about this in books such as *Mind and Nature: A Necessary Unity* (Bateson, 1979) and *Angels Fear: Towards an Epistemology of the Sacred* (Bateson & Bateson, 1987).

Answers to our burning questions, ways to go beyond our impasses, can sometimes come from the unconscious. There are examples of these inspiring experiences in the history of scientific discoveries. The unconscious has its own space and time, and finds wiggle room and unthought-of alternatives where the conscious mind remains stumped. If you get an idea at 3 AM, you can write it down and check out its usefulness later, when you are in a receptive yet questioning mood. The exact points at which to explore and try applying fractal sensibility depend on the needs of professionals in the field, thinking about specific cases. (For example, if a parent commits suicide and his child grows up to have a pattern of abandoning people in his life, might it be a fractal pattern? Or, if episodes of depression dispersed over the years are experienced as self-similar states of different magnitude, might a fractal reflect that?) It is becoming more and more apparent that someday every well-educated person will have “Fractals” in his or her vocabulary. And with America’s pragmatism, the usefulness of fractals will make this kind of geometry a part of the transpersonal psychology culture as a needed resource, and reminder of identity.

Regarding mood and attitude, I heartily recommend the one which Henry David Thoreau advocated and practiced in pursuing his understanding of aspects of nature. He enjoyed a genius-level anticipatory approach to the discovery of nature’s secrets and exploration of nature’s mysteries. He cultivated a “thrilled and expectant mood” because his experience showed him that people typically only see what they are prepared to see. Sight sees shiny objects fast, and fathoms shadowy depths last. If there is “no intention of the mind’s eye to see nature’s secrets and subtleties” we see only as much beauty in the landscape “as we are prepared to appreciate, not a grain more.” (Dann, 2017, p. 256). No doubt Thoreau’s contemporaries’ habits and attitudes gave him evidence for this observation. (Dann, 2017, p. 256). “We find what

we expect.” We notice what we are thinking about, focusing on, looking for, intent on seeing. The depths of a muddy spring gradually clear if you have been waiting for it a while. Powers of observation are trained, educated, honed, nurtured and coached (Dann, 2017, p. 256).

In our age of government defunding of science research and downgrading the importance of science by denying climate change, there are still many exemplary thinkers who respect scientific expertise, and value the facts earned through experiment, whether convenient or not. Karl Popper put it well: “Knowledge consists in the search for truth... it is not the search for certainty.” (Popper, 1995, p. 4). Science is not a closed book but an ongoing search, an evolving process.

We delve into and sort out the issues we are confronted with, and the process of finding clarity in chaotic situations, of finding knowledge in the midst of ignorance, is a heroic struggle. Discerning the perennial philosophy’s timeless truths or spiritual meanings is at the heart of being a seeker. There is a memorable image for this practice in south India—the swan is a mythological creature who is able to separate milk from water when drinking a mixture, taking the milk and leaving the water. The swan is symbolized by hands held palms together as in prayer, with fingers like wings and thumbs nearest the heart, like a swan tasting truth there. The milk represents the timeless truth or eternal reality found mixed in the changing world of *samsara*, focusing on the enduring spiritual value. Similarly, the Buddhist mantra “The jewel is in the lotus” (“*Om mani padme hum*”) means finding the ultimate in the world of growing and declining. We humans seek clarity and coherence in our world of turmoil.

Is there anything as crystal clear and enduringly recognizable as the image of a fractal snowflake? Snowflakes have been around a long time, but we see them anew when looking with a fractal sensibility. As we incorporate new knowledge, transformations inner and outer occur. Epistemology keeps us honest about our knowledge. “To have a *Weltanschauung* [worldview] means to make an image of the world and of oneself, to know what the world is and who I am. Taken literally this would be too much. No one can know what the world

is, and as little also can he know himself; but *cum grano salis*, it means the best possible knowledge—a knowledge that requires wisdom and the avoidance of unfounded assumptions, arbitrary assertions, and didactic opinions” (Jung, 1961, p. 247). With our modesty tempered by this knowledge of the scale of the universe and the depth of our psyches, fractal research is promising, still at the beginning of its career, continuing to uncover life-changing perspectives and applications.

Fractals—for when you’re trying to be specific yet infinitely deep about the personal and the cosmic.

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About the Author

William J. Jackson, PhD, is a Professor Emeritus who taught courses in comparative religion and Asian traditions in the Department of Religious Studies at Indiana University-Purdue University at Indianapolis. He is the author of books and articles about archetypes in the lives and works of South Indian singer-saints, and books such as *Heaven's Fractal Net: Retrieving Lost Visions in the Humanities* (Indiana University Press, 2004), and *The Wisdom of Generosity* (Baylor University Press, 2008), and *American Tricksters: The Shadow Side of a Culture's Psyche* (Cascade Books, 2014). Jackson expands upon the relevance of fractal geometry to transpersonal psychology by illuminating spiritual archetypes, inspiring wonder and awe, as well as providing a visual lexicon for paradoxical concepts, such as existence as multiple, yet "all one" simultaneously.

About the Journal

The *International Journal of Transpersonal Studies* is a peer-reviewed academic journal in print since 1981. It is sponsored by the California Institute of Integral Studies, published by Floragrades Foundation, and serves as the official publication of the International Transpersonal Association. The journal is available online at www.transpersonalstudies.org, and in print through www.lulu.com (search for IJTS).