

What are the Laws of Nature Anyway?

Part II: The Holistic Vedic Model

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ABSTRACT

Like many terms in modern science, 'laws of nature' are used as if the meaning is clear. After hundreds of years of objective research, however, whether the laws exist on their own or are just ideas such as equations, and whether they are universal and guide change or are just empirically identified patterns, seem to be not yet known. Also, there is little certainty about their whereabouts if they really do exist. Scientific progress from concrete matter to energy to abstract information, and to the interdependence of objective and subjective, brought these issues to prominence again. In Part I, perspectives of a selection of well-known theorists including Paul Davies, Roger Penrose, Henry Stapp, Max Tegmark, David Bohm, and Albert Einstein are reviewed. In Part II, the ancient holistic Vedic account as re-clarified by Maharishi Mahesh Yogi is then shown to offer a more comprehensive meaning of 'laws of nature.'

Key Words: laws of nature, emergence, ontology, levels of reality, unified field, Vedic 3-in-1 account

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Introduction

Part I of this paper summarized views of a selection of prominent theorists about the laws of nature, revealing a direction of progress from the one-level reductive model of *physical realism* or *emergent materialistic monism* toward a holistic three-level model. The levels can be summarized as (1) our familiar physical universe, (2) a subtler information field associated with real nonlocal mind, and (3) a transcendent unified field as the 'source of everything.'

Part II begins with a discussion of how this progress also extends to a third approach to emergence theories beyond epistemological and

ontological emergence, necessary for a coherent view of how real minds influence matter in free will. Then the completely holistic 3-in-1 Vedic model as re-clarified by Maharishi Mahesh Yogi is introduced and applied to address major dilemmas in reductive contemporary science about the laws of nature.

Part II will conclude with the integration of reductive and holistic views about where the laws of nature exist, and an interpretation of how the Vedic account of laws of nature addresses the seven questions initially posed to structure the discussion in Part I. Again, here are the seven questions about the laws of nature:

Are the laws of nature invented or discovered?

Are the laws independent of or dependent on us as observers?

Do the laws precede phenomena governed by them, or are they emergent with them?

Are the laws eternal, or do they change according to contexts?

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How does the order implied by the laws reconcile with *fundamental* quantum randomness?

Do the laws or anything else including us have any power to choose what happens?

If laws of nature really exist, where are they?

Three approaches to emergence

Trying to account for mind over matter without acknowledging mind as an ontologically real level of nature underlying matter (questions 6 and 7) relates to the two notions of emergence mentioned in Part I that posit emergent properties with increasing complexity. In reductive physicalism, higher-order emergent properties are reducible to (*supervene on*) their lower-order parts or bottom-line physical constituents. But the higher-order, more holistic emergent properties cannot have real causal power over the parts from which they emerge if they are entirely due to the lower-order parts of brain biology.

This reductive view, sometimes called *epistemological emergence* (e.g. Ward, 2010, p. 283), does not allow for higher-order top-down causal control of the lower-order parts. Rather, it is only bottom-up causation where the higher-order unitary whole has no ontologically real existence other than its underlying parts. Physicist Henry Stapp (2010, p. 108) calls this view ‘totally irrational,’ with “false precepts of classical mechanics that leave mind and consciousness completely out of the causal loop.”

This reductive physicalist view is generally consistent with *emergent materialistic monism*. It is monism because only physical reality exists; and it is emergent in the sense that complex and higher-order processes emerge from lower-order physical processes. But they remain nothing other than (*supervene on*) the lower-order processes: social processes emerge from psychological processes, which emerge from biological processes, which emerge from inert physical matter. This view is sometimes taken further to posit that physical processes come from randomly fluctuating quantum fields emerging in the big bang, and ultimately from *literally* nothing (e.g., Krauss, 2012).

Intuiting the inadequacy of these views, in recent years an alternative has become popular which recognizes and tries to incorporate holistic ‘top-down’ causal mechanisms. It refers to properties emerging into a super-ordinate

system-in-itself (biological organism as a unitary ‘self’) not completely reducible to its underlying parts or their relationships. It also posits that the unitary whole has causal power to direct the underlying parts.

In this meaning of emergence, the non-reductive whole emerging from the parts is more than the sum of the parts and somehow can direct the lower-order physical parts. Sometimes called *ontological emergence* (e.g., Silberstein and McGeever, 1999; Ward, 2010), it seems to be a misnomer. In this view, as with epistemological emergence, the causal chain has no breaks to insert a new causal influence. It is not *ontologically real* emergence because there is no new and real level where the whole as a ‘higher-order causally efficacious system’ exists (Scharf, 2012). It thus also is not freed from Stapp’s characterization as ‘totally irrational.’

The emergent whole can be said to be greater than the sum of its parts in the sense that new capabilities and behaviors emerge from increasing complexity and integration of the parts. But this doesn’t mean that a complex collection of interconnected parts *creates* a higher-order ontologically real level in addition to the physical. The closed physical causal chain is not broken to insert super-ordinate, top-down power that actually could direct unitary behavior (related to the ‘binding problem’).

Regarding brain function, neural complexity allows new behaviors. But importantly, no new and real level of nature with causal power over brain and behavior (such as in a unitary ‘I’ or real self) emerges inside or outside of neurons—again, no real mind, no causal power, no free will. It thus is perhaps better termed *epiphenomenal emergence* rather than ontological emergence.

One currently popular approach to circumvent this issue is to get rid of ontology (and substantivalism or substance), by considering *reality* only in terms of relations, even *relations without relata* (Ladyman, 2009; Boyer, 2013). Called ‘ontic structural realism’ (Ladyman, 2009), in effect it throws out the ‘baby’ (real particles/objects) with the ‘bath water’ (quantum probability waves) in striving for a more abstract view beyond historical views of physical scientific realism and the classical determinate causal chain of events.



Progressing beyond the theory of a meaningless information field, in Part I models were summarized that propose a real level of nature in addition to the physical, with real minds. Logically, this additional level could cause changes in the physical causal chain. This means that the physical causal chain is *open* deeper in the 'quantum smear' (Stapp, 2010). It just didn't look open from the gross, coarser-grained physical perspective of 'objective' physical measurement processes associated with the indirect third-person approach to gaining knowledge. These more integrative theories relate to a third meaning of emergence, consistent with a holistic unified field-based perspective as the orderly source of everything.

In this third meaning of emergence, the whole precedes the parts, and the parts emerge from the whole as limitations of it. Instead of the reductive physicalist worldview that consciousness and mind are epiphenomenal and fundamentally non-existent, they are the basis of matter and direct its orderly expressions all along the way in 'evolutionary pathways' (Davies, 1991). Real non-physical mind underlies physical parts and guides behavior at each stage (Boyer, 2008, 2014).

Recent progress in quantum biology reflects the continuing pursuit of determinate causal mechanisms in the direction of more abstract nonlocal field dynamics subtler than concrete local physical mechanics. But as discussed in Part I, Ward (2010) has pointed out that top-down causal influences require a real level of nature that directs the physical, a field of consciousness or cosmic mind that has not been, and cannot be, accounted for within the physical.

This third meaning of emergence relates to the *consciousness→mind→matter* ontology, opposite of the *matter→mind→consciousness* model of reductive physicalism and emergent monism in which conscious mind is non-existent or just an epiphenomenon of the brain. This meaning of emergence is the only one that logically supports the causal intentions of real mind, whether a nonlocal individual mind or a cosmic intelligence. And it means that the physical causal nexus is not completely closed as it appears to be on the gross, coarser-grained physical level. This holistic *unified field-based* understanding of emergence refers to detailed and diverse expressions of capabilities inherent in the whole. The ultimate wholeness is the

unified field, the bottom-line source of order in nature, related to a 'supreme informational principle,' 'primordial consciousness' that is cosmic, and 'Platonic Forms' (Ward, 2010), as discussed in Part I.

In the view of reductive physicalism, there is physical reality, sometimes speculated and assumed to emerge from an infinitely dense and infinitesimally small singularity or even possibly 'nothing;' and all real phenomena are nothing other than physical matter. This is the one-level ontology of physical realism, materialistic or emergent monism. Consistent with this one-level ontology, the entirety of nature spontaneously and inexplicably happened to emerge ultimately from literally 'nothing.'

In contrast, the view of the relativistic physical spacetime gravitational field (matter) plus 'nothingness' as an ultimate, transcendent unified field can be called a two-level ontology. But these one-level and two-level models are not rich enough to account for real mind. They don't incorporate cutting edge progress in information space and 'quantum mind' emerging in the three-level models introduced in Part I, which are converging toward the Vedic 3-in-1 account.

'God' and the unified field as the source of everything

In the completely holistic Vedic account, the totality of nature includes both the expressed aspect and the unexpressed aspect, manifest and unmanifest, immanent and transcendent. The unexpressed aspect can be described as outside *from the view of the expressed*. It is transcendent and completely separate, from a particular state of knowledge. But from a unified state of knowledge, the expressed is ultimately nothing other than it.

To be consistent, the reductive view of finite spacetime needs to be understood as within the infinite eternal 'spacetime' of the unified field. With respect to corresponding theistic views, notions of 'God' and the finite universe, infinite and finite, immanent and transcendent, can be understood in terms of an underlying unity, in which 'God's' creation remains within the omnipresence of 'God.'

In his 2012 book *A Universe from Nothing: Why there is Something rather than Nothing*, physicist Lawrence Krauss relates the contrast between nothing and 'God' to secularism versus



religion. Unfortunately these views are characterized in terms of scientific versus theological beliefs about the source of order, and whether 'God' as Creator of the universe really exists.

Fortunately unified field theory brings back into the scientific picture the core qualities that Newton—and historical views generally—attributed to 'God.' Whatever else is attributed to 'God,' at least 'God' as *omnipresent, omnipotent, infinite, and eternal* has the same qualities as a completely unified field. In this unified view, 'God' must be in each of us, if 'God' is omnipresent and infinite. The view of an external 'God' as separate from creation, and from us as created beings, is restrictive of 'God' if it doesn't give proper due to 'God' as omnipresence. Sometimes this point is accounted for using the impersonal term '*Godhead*.' In the Vedic account, these views are associated with particular stages of knowledge development beyond the ordinary waking state in the progress to the state of unity consciousness (Maharishi Mahesh Yogi, 1967).

The arguments by Krauss (2012) for 'something from nothing' and his characterization of counter-arguments both reflect the current reductivism. These parts of his arguments actually seem similar to theistic views that place 'God' as the Creator or First Cause in an undefined 'somewhere' outside the universe (for Krauss, a 'complicated nothing,' a quite paradoxical notion). It also is a prominent religious view that a transcendent 'God' created the universe out of nothing (*ex nihilo*).

The issue for theologians is then what and where 'God' is. If 'God' is real, and outside the universe, then the universe doesn't include all of reality. A more integrated view is needed, including a coherent explanation of the means 'God' used to create the universe. How to bridge the gap between a transcendent 'God' and the manifest creation has long been a core issue in theology. It relates to current issues brought out in this paper of how to bridge holistic unity, reductive 'nothing,' and the real world that science historically believed it was investigating.

In cosmology and in theology, what might be distinguished as the impersonal view of 'God' as at least all-encompassing, omnipresent unity does not translate into the big bang as an explosion, but rather an implosion or *condensation* (Boyer, 2007). Creation then would be the phenomenal emergence of concrete levels

and parts within the omnipresent wholeness of 'God' (or the infinite eternal unified field). In other words, the whole creates and permeates the parts. That integrated view is fundamental enough to unite science and religion. It has gigantic implications for a coherent model of nature and our place in it that reductivism doesn't have.

In reductive physicalism, the gross surface level of nature is the primary locus of experience and understanding. The 'consensus' inflationary big bang theory is a product of this engrained reductionism and physicalism. This theory needs re-evaluation based on more expansive views that now include a nonphysical, nonlocal information field underlying the physical (Boyer, 2014). The only notion in inflationary big bang theory suggestive of this more inclusive ontology is the superluminal *inflaton* (inflationary) field. But further, quantum information field theory is beginning to incorporate semantic meaning rather than just meaningless random bits of information, another step necessary for a deeper ontology of nature that includes real minds.

Unified field theory also crucially brings back into the scientific picture *inherent order*, rather than *fundamental* randomness. This concerns another historical contrast between science and religion, related to the concept of *omniscience* and the orderly source of natural law as an attribute of 'God.' With the unified field as having inherent order as a lowest or no entropy state, the contrast then becomes unified field theory and holistic science on the side of 'God' and religion, versus *fundamental* randomness and 'nothing' on the side of reductive science.

The reductive view is commonly associated with scientific secularism. But arguments for the view rarely address the unified field perspective compatible with religious views of 'God' as infinite, omnipresent, and inherently orderly. They also don't address nonlocal mind, beginning to be addressed in three-level models discussed in Part I. This major progress is consistent with both science and religion, helpful for bridging gaps between them in the past hundreds of years.

The holistic view of the unified field as the source and container of everything can be associated with the theistic view of *panentheism*. In this view, causal efficacy ultimately could be implemented on any level of nature, due to the existence and permeability of the totality of



nature at every level and every part. Biochemist/theologian Arthur Peacocke (2010) explains:

“...[P]anenthesim...[is] the belief that the Being of God includes and penetrates all-that-is, so that every part of it exists in God and (as against pantheism) that God’s Being is more than, and is not exhausted by, it (p. 261)... For God is best conceived of as the circumambient Reality enclosing all existing entities, structures, and processes and as operating in and through all, while being more than all.... In this model, there is no ‘place outside’ the infinite God in which what is created could exist. God creates all-that-is *within* Godself...[I]f God incorporates both the individual systems and the total System-of-systems within Godself, as in the panentheistic model, then it is readily conceivable that God could interact with all the complex systems at their own holistic levels. For God is present within the wholes as such, as well as the parts” (p. 262).

While maintaining either our scientific secular or particular religious perspective, we are fortunately progressing toward unity, and toward causally efficacious real minds with free will within the purview of a rational, coherent scientific view. As quantum physicist Werner Heisenberg (truthcontest.com, 2014) is quoted as stating, “The first gulp from the glass of natural sciences will make you an atheist, but at the bottom of the glass God is waiting for you.”

The completely holistic Vedic account

The Vedic tradition is not a faith-based religion (for example, no system of doctrinal conversion). It rather is held to be an *ancient science* emphasizing both theoretical consistency and empirical validation, from which various religions and philosophies have drawn parts.

A pivotal contribution to its reemergence is its completely holistic re-clarification by Maharishi Mahesh Yogi, who has focused on testing it in a scientific context as *Maharishi Vedic Science and Technology*. Translated as “total knowledge” (Maharishi Vedic University, 1994), *Veda* concerns total knowledge of the laws of nature, like the pursuit in modern science.

In the ancient Vedic tradition, as well as other traditions albeit with various cultural and language differences, there is purported to be a

universal essence of nature. This has obvious correspondence with the unified field (Hagelin, 1987; 1989). The most parsimonious explanation is that ancient and modern scientific views converge on the same unified field (Hagelin, 1987).

Logically, there is only one completely unified field. It can be likened to mathematical concepts of empty set, or zero, or one (Oneness), and also to the philosophical terms of eternal Void (emptiness or *nothingness* from the reductive view) and eternal Being (fullness or everything from the holistic view).

Within the unified field are finite levels of nature phenomenally expressed in increasing limitation from subtlest to grossest—somewhat akin to sequential symmetry-breaking. Individual subjective minds and objects of sense (object-subject duality) both emerge within the infinite eternal unified field of universal *Being* that is consciousness itself. This account describes the infinitely self-interacting unified field of pure existence, within which phenomenally exists a subtle nonlocal, object-interdependent level, which in turn permeates the gross local, object-independent level of our familiar physical world. Importantly, this means that space does not begin from an infinitely dense singularity, Planck-size quantum, or reductive ‘nothing’ banging outward. Rather, infinite eternal ‘spacetime’ *condenses* into subtle nonlocal and gross local mediums of spacetime with different textural limitations (Boyer, 2007, 2010, 2012). Maharishi (1976, p. 129) explains:

“This process of consciousness becoming aware of itself creates an unmanifest spacetime geometry within the field of consciousness. The unmanifest space-time curve within the field of consciousness is at the source of space-time curvature....”

To explain phenomenal manifestation, the unified field is described as the simultaneity of wholeness and part, infinity and point. In each point is infinity, and the infinite singularity contains infinity of points. It is not just the reductive notion of an infinitesimal point but also *at the same time* the holistic notion of infinite expanse: simultaneously infinity/point, wholeness/part, universal/individual. The ultimate non-dual unified field—Singularity, Oneness, Unity—is attributed two coexisting opposite qualities: infinite silence and infinite dynamism.



To explain how the opposites of infinite silence and infinite dynamism coexist, the unified field is described as infinitely self-interacting, instantaneously referring or curving back on itself. *Infinitely self-interacting* dynamism means eternal silence. As Maharishi (2004) has stated: "Silence and dynamism—they are one thing, not two things."

As an additional step to explain phenomenal manifestation, tacit in the concept of two qualities is how they interact, which relates to a third quality. These three qualities directly relate to the trinity of knower/observer, known/observed, and process of knowing/observing.

In their unified state, these three qualities are the self-referral 'nature' of consciousness itself, the all-encompassing infinite eternal unified field of all existence (called *Samhita*). The 'curving back' is a way of explaining levels of phenomenal creation as degrees of self-interaction: an infinitely self-interacting field (infinity in each point), a nonlocal self-interacting field with high interdependence or 'entanglement,' and a gross self-interacting local relativistic gravitational field with non-self-interacting objects that appear to interact independently in the physical world. The unified field as infinitely referring back to itself also means *self-referral*, wakefulness of itself, consciousness itself, the essential nature of consciousness in the Vedic account. This cyclic reverberation or 'curving back' expressed to various degrees throughout phenomenal nature is described in the Vedic text the Bhagavad-gita. It is translated by Maharishi (1997, p.37) as:

Prakritim swam avashtabhya visrijami punah.

Curving back upon My own Nature, I create again and again (Bhagavad Gita 9.8).

Three fundamental ingredients within the 3-in-1 Vedic account

In quantum field theory, the universe continuously exhibits zero point motion or 'quantum jitter' whether in its particle, force, vacuum or ground state. This quality of activation is theorized to be an *inherent dynamism*. Also, Higgs field theory relates to a viscosity or *resistance to change* throughout nature to explain mass. Further, while some quantum theory interpretations attribute *fundamental*

randomness to the universe, unified field theory is a contrasting view of fundamental supersymmetry and lowest entropy, or *inherent order*. These three ingredients are associated with three fundamental qualities, principles, or 'forces' in the ancient Vedic account.

In Vedic terms, these three fundamental principles or qualities (collectively called *gunas*) are *rajas*, *tamas*, and *sattva*. They are held to be inseparable and continuously interact to create all phenomenal diversity. They also structure the gradient from the eternal infinite unified field to the phenomenally finite interdependent subtle level and then the object-independent gross level—within the unified field. The gross level is associated with ordinary inert, relatively disorderly matter/energy (more *tamas*) with little if any explicit intelligence; and the more abstract subtle level is associated with increasing orderly intelligence (more *sattva*). The principle of activation or energy (*rajas*) extends across these principles and levels. Maharishi (1967) describes the emergence of these principles in *Veda* in the process of phenomenal manifestation:

"The first manifestation of creation is the self-illuminant effulgence of life, called the Veda. The second step in the process of manifestation is the rise of what we call vibration, which brings out the attributes of prakriti, or Nature—the three *gunas* [*sattva*, *rajas*, and *tamas*].... Here experience begins in a very subtle form: the trinity of the experiencer, the experienced, and the process of experience comes into existence. This is the beginning of action in the process of creation (p, 206).

The entire creation consists of the interplay of the three *gunas*—*sattva*, *rajas* and *tamas*—born of prakriti, or Nature. The process of evolution is carried on by these three *gunas*. Evolution means creation and its progressive development, and at its basis lies activity. Activity needs *rajo-guna* to create a spur, and it needs *sato-guna* and *tamo-guna* to uphold the direction of the movement.

The nature of *tamo-guna* is to check or retard, but it should not be thought that when the movement is upwards *tamo-guna* is absent. For any process to continue, there have to be stages in that process, and each stage, however small in time and space, needs a force to maintain it and another force to develop it into a new stage. The force that



develops it into a new stage is sato-guna, while tamo-guna is that which checks or retards the process in order to maintain the stage already produced so that it may form the basis for the next stage” (p. 128).

Consistent with the Vedic model, the progress in modern science from surface to deeper underlying levels, gross to subtle, involves increasing abstraction from mass to energy and now to a more abstract non-material information field. This view of nature in terms of levels is directly toward the holistic Vedic 3-in-1 account.

Even deeper correspondences between Vedic terms and modern scientific terms can be made, which requires deeper understanding of both. Maharishi has made an invaluable contribution of connecting the language and concepts in ancient Vedic science with modern science. Although Vedic terms initially may be somewhat confusing, in both approaches can be seen a profound correspondence with the three fundamental principles of nature.

For example, the name *Brahma* can be related to the quality of *inherent dynamism*; the name *Shiva* to *inherent resistance to change* (and ultimately eternal silence); and the name *Vishnu* to *inherent order* (but also incorporating inherent dynamism from the perspective of duality rather than trinity); and combining all three in *Prakriti* (Nature, or Universal Mother) as the 3-in-1 self-interacting dynamics of the unified field (also *Samhita* of *rishi*, *devata*, and *chhandas*). These principles can be associated with knower, known, and process of knowing as well as other trinities mentioned earlier. A correspondence also can be drawn with expressions of the trinity in religious traditions, such as for just one example in Christianity, a very abstract view of the trinity of Father, Son, and Holy Spirit. Gregersen (2010, pp. 324-325) points in the direction of this view:

“[T]heology should take a strong interest in scientific suggestions of a comprehensive concept of matter as a field of mass, energy, and information. The Christian idea of a Triune God – Father, Son, and Holy Spirit – may even be seen as a preadaptation to later developments.... The “Father” is the ultimate source of divine life and the existence of cosmos, the “Son” or the Logos is the formative principle in God, and functions also as the informational resource of creation, while the “Holy Spirit” is the divine energy that also energizes the world of the living....

God is present in the midst of the world of nature as the informational principle (Logos) and as the energizing principle (Spirit). Only the originating principle of the Father remains consistently transcendent.... A theological ontology will thus assume that God is intimately present at the core of physical matter as described by the science (and beyond that), without thereby conflating God the Creator and the world of creation.”

Carrying this correspondence further, the ‘Father’ can be associated with different expressions of ‘knower’ (observer), the ‘Son’ with ‘object’ (known, or observed); and the ‘Holy Spirit’ with ‘process of knowing’ (observing). The ‘Son’ is the manifest expression of the ‘Father’ (in the ‘flesh’) connected by the ‘Holy Spirit’ to the ‘Father,’ the omnipresent transcendent totality that is comparable to some degree with the 3-in-1 Vedic account. All three are one.

Linking the 3-in-1 Vedic account to particle physics

The Vedic account of course needs to be carefully examined to draw precise correspondences with modern physics. One speculation is that ‘sattva’ can be related to *inherent order*, the maintenance operator, and on the gross physical level to the attractive force of gravity. ‘Tamas’ can be related to *inherent resistance to change*, the dissolution or annihilation operator, and to the viscosity of space associated, for example, with Higgs field theory. However, the concept of the Higgs field as a viscosity seems conflated somewhat with ‘repulsive gravity,’ associated with the inflaton (inflationary) field. In the Vedic account, a ‘repulsive’ or activating force is associated with ‘rajas’ and *inherent dynamism*, energy, the activation principle in nature.

But other correspondences reasonably can be made, such as the creative principle with inherent order and the maintenance principle with inherent dynamism, similar in physics to associating the creative operator with propagation and maintenance operator with activation (similar to Gregersen’s quote above). As we approach ultimate unity, inevitably distinctions can become less distinct, toward all parts reflected in each part.

Further, the three fundamental principles, qualities, or forces (gunas) differentiate into five subtle constituents (tanmatras) and five gross



constituents (mahabhutas). Correspondences can be made between the five gross constituents (mahabhutas) on the physical level in the Vedic system and particle-force fields identified in physics (Hagelin, 1989; Boyer, 2008, 2012).

However, it would be inappropriate to interpret these five constituents as primitive notions associated with pre-scientific beliefs sometimes attributed to ancient mythologies. They relate to abstract dynamical structures quite relevant to contemporary physics.

For example, the concept of 'fire' concerns principles of transformation such as radiation, luminosity, oxidation, and combustion—as well as the sense of sight. The qualities of the five fundamental constituents are expressed in sequence, somewhat akin to symmetry-breaking. Space contains the properties of the others (air, fire, water, earth) in latent form.

The five fundamental constituents in the ancient completely holistic Vedic account are space (akasha), air (vayu), fire (tejas), water (apas), and earth (prthivi). In this account, there is a natural design relationship between the observed and the process of observing, objective and subjective. These basic five constituents also have direct correspondence respectively with the five senses of hearing, touch, sight, taste, and smell.

To link this system to the fundamental physical particle-forces identified in modern physics, one reasonable speculative correspondence (Boyer, 2008, 2012) is that 'space' is most closely associated with gravity (but also would encompass the other fundamental strong, weak, and electromagnetic forces in latent form). Likewise 'air' might express the gravitational and strong forces (with the weak and electromagnetic forces latent). In the same sequence, 'fire' might express the gravitational, strong, and weak forces (with the electromagnetic force latent). In this comparison, 'water' and 'earth' express all the four forces but are most associated with the electromagnetic force, perhaps 'water' more with electricity and 'earth' with magnetism. The magnetic force would represent the most tangible and restricted form of 'curving back on itself:' a dipole in which attraction and repulsion are in a circular path of the same magnetically charged object.

"Constitution of the Universe:" Overview of the Vedic account of the laws of nature

To relate the completely holistic Vedic account to laws of nature, Maharishi provides a clarifying analogy of the "Constitution of the Universe," the total collection of all the laws of nature. Depending on context, this phrase is associated with "Veda" (total knowledge), 'home of all the laws of nature,' 'Prakriti' (Nature), 'unified field of natural law,' and 'Atma' (universal Self), as well as other concepts and terms.

The indivisible 'nature' of the unified field can be *intellectually analyzed* in terms of the coexistence of the opposite qualities of infinite silence/infinite dynamism, and also unity/diversity. In the ancient Vedic knowledge system, these concepts are associated with Vedic names representing universal laws and principles. For example, sometimes infinite silence is associated with *Shiva*, and infinite dynamism with *Vishnu*. The approach is completely monistic or non-dual, while also recognizing the phenomenal unity/diversity of nature in its totality as well as the fundamental 3-in-1 trinity. Different views are prominent at various stages of understanding in a developmental sequence of higher states of consciousness:

"Reality, therefore, has two aspects, Unity and diversity, or silence and dynamism. A truly enlightened perspective is the one that transcends both of these values, yet, at the same time, puts these two contradictory values together, allowing the coexistence of opposite values.... The Vedic Literature repeatedly mentions that Shiva is in the heart of Vishnu, and Vishnu is in the heart of Shiva. According to Maharishi, this can be understood as the coexistence of silence and dynamism, or the true oneness of Shiva and Vishnu. In this perspective, Shiva and Vishnu can be seen as both one and the same, and yet as two different aspects of the Unified Field of Natural Law. It is in this manner that... [they] are different from each other, because they administer different aspects of reality, and yet remain one undifferentiated wholeness of Natural Law" (Nader, 2000, p. 333-334).

The phrase 'laws of nature' is associated with *Devata*, a common term in Vedic literature. Maharishi translates a verse from the Veda (Rk Veda 1.164.39) that identifies where Devata exist:

“*Richo Ak-kshare parama vyoman*

Yasmin Deva adhi vishwe nisheduh.

The verses of the Veda exist in the collapse of fullness... in the transcendental field, in which reside all the... (Devatas), the impulses of Creative Intelligence, the Laws of Nature, responsible for the whole manifest universe” (Maharishi Mahesh Yogi, 1997, p. 18).

The term Devata refers to the laws of nature, or collections of laws of nature, with specific functions that administer or direct the creation, maintenance, and dissolution of the entire universe. With obvious similarity to the modern scientific views summarized in Part I, Devata, or the laws of nature, are said to ‘reside’ in the transcendent eternal unmanifest field, which by its omnipresent nature is also present in every point of creation:

“The Vedic Devata are the administrators of every aspect of creation. In the same way that the law of gravity exercises its ‘rulership’ over the attraction between different masses, the Vedic Devata exercise their administrative role over every form and function. For example, the Devata that administers silence is called Shiva, and the Devata that administers dynamism is Vishnu.

The Vedic Devata are not separate from the ultimate reality of the Self—Atma—the Unified Field. Every point in creation, manifest or unmanifest, animate or inanimate, microscopic or cosmic in dimension, in its ultimate reality is nothing but the Unified Field. Every individual Law of Nature or any collection of the Laws of Nature, acting under any circumstances within time and space, is nothing but the dynamics of the Unified Field. Every ant or elephant, every bird or tree, every human being...and the Devata themselves, ultimately are the Unified Field...

The Devata are present in the physiology of everyone, no matter what one’s race, belief system, or religion, no matter which political party one associates with, or in which geographical area one is born... The Devata, therefore, are presented here not as religious, philosophical, or poetic concepts, but as a scientific reality” (Nader, 2000, pp. 333-334).

This view has some similarities to the notion of ‘Platonic Forms,’ but is also integrated into each of us as individuals at the deepest level of our own nature—not just outside of individual minds. These abstract ‘ideal forms’ are objective and independent of individuals only if we think of our individuality as independent and separate, which is the predominant experience in the ordinary waking state of consciousness. But this is a phenomenal experience in this particular state, which emphasizes object/subject duality and does not include direct experience of unity.

In the Vedic model, the laws of nature are *locatable* as residing in the transcendent eternal infinite field. This can be associated with views discussed in Part I of this paper, such as Davies’ (1991, p. 67) view of the laws of nature as the transcendent eternal source of “evolutionary pathways.” As a field of all possibilities (such as Hilbert space), it is consistent with Stapp’s view (though Stapp does not explicitly associate consciousness with it) and with Ward’s view of consciousness as the ‘carrier of all possibilities.’ It also is sometimes associated with the concept of the ‘cosmic computer’ (Routt, 2005) that calculates and coordinates all cause-effect actions in nature, akin to Lloyd’s (2010, p. 102) “giant quantum computer,” and Tegmark’s ‘Mathematical Universe.’ Each of these phrases represent different angles in the direction of the ultimate totality of nature as a field of lowest entropy, highest intelligence/order, and the source of all the laws of nature.

Applying the statement, “Knowledge is structured in consciousness” (Maharishi International University Catalogue, 1974/75), Maharishi (2004) points out that the integrated functioning of nature is structured in the self-referral field of consciousness itself:

“Functioning of the physiology is the demonstration of the outside functioning, but the *actual* functioning takes place within the self-referral field of consciousness.”

Another major point linking meaningful information and order in the Vedic account is the concept of *Karma*, the principle of orderly cause and effect. It is also related to the principle of *Dharma*, which refers to action in accord with the laws of nature, the directional value of the laws of nature. This brings *meaning* and *value* to action and its consequences. It can be associated with the arrow of time (time is unidirectional from past to present to future). In addition to temporal



direction, it implies an evolutionary direction (predisposition or inherent value) throughout nature, akin to the concept of 'evolutionary pathways' (Davies, 1991) in Part I.

In this view, the purpose of change in nature is the expansion of happiness, and the natural tendency of life is toward increasing happiness in higher evolutionary states (Maharishi, 1963, 1967; see also Dalai Lama and Cutler, 1998). Choices of actions in accord with the progressive evolutionary direction of nature—Dharma, also called the 'force of evolution' (Maharishi Mahesh Yogi, 1967)—naturally result in expanding happiness. Correspondingly, choices for action in a less evolutionary direction result in reduced happiness, according to the determinate laws of nature. In other words, survival is purposeful.

It is determined that action will lead eventually to realization of the universal value of life reflected in the individual: "*Karma* according to *Dharma* (Maharishi, 2005)." To what degree this is occurring depends on choices freely taken and reactions to their inevitable consequences. This integrates the scientific principle of cause and effect in a universal moral philosophy, based on inherent 'evolutionary pathways' (Dharma) in nature. Recall Eddington's (1974) quote from Part I of this paper that "... [We] are no longer engaged in recovering from Nature what we ourselves put into Nature, but we are at last confronted with its own system of government."

In ancient Vedic science, the extremely subtle association of Devata with the 'laws of nature' places them as residing in the unmanifest transcendent field, the level of the unity of individual/universal, personal/impersonal, part/whole, point/infinite values (Samhita). The abstract, universal, self-interacting unity of natural law is embodied in individual principles/laws of nature that govern specific ranges of phenomenal expression of totality throughout the entire manifest existence.

In this model, Maharishi likens laws of nature to the administration of a national government. Each 'office' represents the entire government, but also covers a specific area of administration. In its jurisdiction of a specific area of the government, the office also is responsible for upholding all the laws that make up the entire government consistent with its fundamental constitution.

This association can be taken to include not only the office of administration but also an officer or administrator. The concept of 'officer' also represents both the office and the entire government, overseeing specific actions within the entire set of laws drawn from its constitution. Similarly, specific laws of nature can be viewed as particular jurisdictions within the total potential of natural law or *Constitution of the Universe*. In some cultural traditions, the impersonal aspect of Oneness or the totality of nature is emphasized; in others a more personal representation is emphasized. Ancient Vedic science can be said to accept all of these personally preferred views to support natural progress to complete knowledge and experience of the laws of nature and their relationship to the universal level of individual life. It emphasizes a systematic, scientific approach to knowledge development that is both impersonal/objective and personal/subjective.

Maharishi Vedic Science and Technology emphasizes the scientific nature of the devata value, as specific vibratory patterns or fluctuations within the unified field that contain both *name* and *form* (*namarupa*). The name relates to specific vibrations of sounds and syllables in the language of Veda, associated with fundamental laws of nature that shape phenomenal objects. The form is associated with vibrations that are the specific embodiments or instantiations of the object named.

Although mathematics is sometimes thought of as the 'language of nature,' it may be better characterized as the language of logic and intellect. It is an efficient way to represent natural orderly principles—somewhat like English is sometimes called the international 'language of commerce' or French is sometimes described as the 'language of romance.' Laws of nature can be represented quite well via mathematics. However, it is significant that this form of language expression does not capture the vibrational form of the object in its representation (*namarupa*). In ancient Vedic language, both the vibrational form of the object and the vibrational form of the sound (its name) are consonant; and ultimately, the form engenders the name. This relationship characterizes the 'language of nature,' approximated to various degrees in different culturally-based languages around the world, as well as in more abstract conceptual representations such as in mathematical symbols.



Unifying the impersonal and the personal

Applying further the government analogy to 'laws of nature,' in a governmental hierarchy the highest level is frequently identified to be the office of the president, and its administrator as president or sometimes king or queen. With respect to the government of nature, this highest unitary embodiment is conceptualized in various religions as some image or concept of 'God.' From unity to diversity, it can be said that omnipresence, omnipotence, and omniscience are expressed to various degrees. Specific expressions are structured in a hierarchy of infinite totality to limited subtle and gross phenomena.

Again, one approach to explain this hierarchy in physics is spontaneous symmetry-breaking of the unified field into the fundamental quantum particle-force fields and then into localized expressions in the vast diversity of physical phenomena (such as the periodic table, or as fine-and coarse-grained layers of physical objects). In the more personal and personified religious traditions, the hierarchy is frequently depicted more subtly as including levels of God's Kingdom. The hierarchy includes personified levels of nature from angels or other celestial attendants of God or the Godhead to grosser levels such as humans, animals, insects, plants, and inert elements. These can be associated with specific laws at various ecological levels, somewhat analogous to national, state, county, and local municipal codes and ordinances. In Vedic science, these hierarchical levels and the laws of nature can be understood as comparable—whatever the personal beliefs or language affiliations are.

In scientific progress toward a unified view, the impersonal, third-person, experimental, objective approach inevitably needs to include personal, first-person, subjective experience for integrated understanding and experience of the totality of nature. The third-person experimental approach that views the world as outside and independent of subjectivity—the known—needs to be integrated with the first-person experiential approach—the knower. Including the scientist/observer as a real conscious mind that influences nature is a crucial stage of scientific progress. In this personally meaningful experiential context, Maharishi (1972) explains that knowledge resides in the knower; and *without knowing the knower, knowledge is baseless.*

It is important to recognize that there are no indirect third-person objective experiences that are not also direct first-person subjective experiences. The objective means to gain knowledge in modern science has gone beyond its founding assumption of object-subject independence—via quantum field theory. Further progress is incorporating *meaningful* information, not only theoretically but also empirically—which also means *experientially*.

Fortunately we have arrived at the time in which the objective third-person approach in modern science is bringing the scientist back to her or his own first-person subjective experience. This progress is bringing in the direct first-person empirical approach that is the specialty of the aspect of ancient Vedic science and Maharishi Vedic Science and Technology.

With respect to first-person empirical experiences, throughout recorded history spiritual and artistic expressions have been replete with visual and verbal imagery attempting to depict a fuller range of nature than the 'objectified' gross physical level. It is significant that reports of such subtle visionary experiences have been more frequent in individuals who have devoted their lives to spiritual development and refinement of mind and body.

To develop universal scientific knowledge, it is necessary to have not only understanding but also direct experience of *universality*, of unity, in which the division of object/subject in ordinary thinking is transcended. Maharishi (1967, p. 444) states: "Transcending thought is infinitely more valuable than thinking."

Subjective means to gain knowledge involve direct experience of 'referring back' to the simplest state of inner silence, the self-referral ground state of mind. Through repeated experience of deeply restful inner silence, consciousness itself, deep-seated stress is naturally dissolved. This unfreezes the inherent capacity to validate the full range of nature in the fine fabric of one's consciousness. Vedic texts state that when fully awake, the structuring dynamics of nature (*Devata*) are available to direct empirical validation (Maharishi Mahesh Yogi, 1997).

Different geographical regions with local laws/principles influence cultural patterns that shape inner experiences—regional languages,



lifestyles, music, art, social systems, and so on. In the same manner, religious depictions of 'God' and various levels of nature such as 'heaven' also have culturally specific features. Frequently what is imagined—or observed—is interpreted in the context of one's own cherished cultural background. In other words, beauty and *reality* are in the 'eye of the beholder.'

This means that laws of nature apply universally and impersonally. In personal experience, however, it is reasonable to expect that the specific way in which these abstract laws are described and depicted would reflect personal and culturally specific qualia. This is important in the study of Vedic Devata as laws of nature, and in natural refinement of the 'eye of the beholder.'

More broadly, the universal and individual levels of nature need to be integrated: formless and form, unmanifest and manifest, need to be recognized and experienced in their ultimate unity. Wholeness needs to be experienced in every part, infinity in every point.

In the research in Maharishi Vedic Science and Technology on the devata or process of knowing value of nature, these two major aspects of natural law are tangibly integrated (Nader, 2000, p. VIII):

"The profound insights into ancient Vedic Literature, brought to light by His Holiness Maharishi Mahesh Yogi over the past 40 years, have guided the discovery that the laws that construct the human mind and body are the same as those that give structure to the syllables, verses, chapters, and books of the Vedic Literature, and to the administering intelligence of Natural Law described in the Vedic Literature as Vedic Devata.

The human physiology (including the DNA at its core) has the same structure and function as the holistic, self-sufficient, self-referral reality expressed in Rk Veda.... Various groups of components of the human body have also been found to correspond in structure and function to the administering intelligence of Natural Law described in the Vedic Literature as Vedic Devata.... Study of physiology in terms of the structure of Veda is that revelation of our scientific age which raises the individual dignity of human beings to the cosmic dignity of the universe."

What about moral 'laws'?

If modern science can be said to have a goal, it would seem to be the goal of accurate total knowledge of the laws of nature. And the goal of its technological applications would seem to be to live the full value of that knowledge in everyday life. Religion has corresponding goals. At least traditionally, both generally hold the practical view that there is natural order in the universe, that knowledge of the laws of nature can be gained, and that action applying that order can benefit our lives. The task is to give a rational account and experience of that order, its source, and its effects.

Conflicts between religions come in part from different cultural traditions, and also from different levels of understanding and experience of universal knowledge that is the essence of every religious tradition. Modern science has attempted to avoid these conflicts by establishing an unbiased, 'objective' approach to validate theoretical knowledge of natural laws.

At this stage of its development, the most fundamental accepted laws of nature concern relativity theory and quantum theory (attempting to be reconciled in unified field theory), and evolutionary theory. A core principle of relativity theory is that there is no absolute background or frame of reference of space and time, unfortunately popularly translated as 'everything is relative.' Also, a core principle of some interpretations of quantum theory is that nature is *fundamentally* random. Along with the related view of evolutionary theory as random genetic drift, these views have fostered secular beliefs in moral relativism and the meaninglessness, purposelessness, and groundlessness of our lives.

These most successful theories in modern science can be viewed as having had fragmenting and dissipating influences on society. Fortunately, the concept of a unified field with fundamental order is leading beyond these views and back toward an integrated and meaningful unified view.

In our modern society, the scientific tradition has been the most widely accepted and revered approach to gain knowledge—this is an Age of Science. It is in this context that scientific descriptions are most prominent in Maharishi Vedic Science and Technology. The scientific descriptions help avoid misinterpretations of ancient Vedic science that sometimes have led to its misclassification as religion, fragmented



interpretations of its complete holism, and loss of its systematic direct means of empirical validation. Maharishi Vedic Science and Technology emphasizes direct experience of ultimate unity, glimpsed though reason in modern science and historically accepted through intuition and faith in various religions.

Maharishi has repeatedly brought attention to the importance of personal development within one's own cultural tradition, which frequently includes religious histories and beliefs. The emphasis is on systematic means to develop total knowledge and directly validate it in one's own experience. It bridges the gap between rational/empirical validation in the scientific tradition and intuition/faith in religious traditions. It is systematic development of the ability to validate universal knowledge that is the essence of cultural, religious, and intellectual traditions.

Systematic and reliable means to experience unity by effortlessly settling down the mind and transcending subject/object duality is the missing active ingredient that fosters development of the full value of one's own background—whether religious, secular scientific, both, or neither. In this view, our level of understanding and experience is affected by the functioning of our mind and body. As we evolve through higher stages, the meanings attributed to scientific findings and religious scriptures also evolve, becoming deeper, more abstract, and universal. Any approach can be said to lead to ultimate knowledge when the mind is allowed to contact its holistic basis—the unified field of all the laws of nature, the Will of God, or however one feels most comfortable in labeling it. It is through direct experience of unity that deeper understanding naturally develops. And increasing refinement of mind and body stabilizes it. Anecdotal reports suggest unifying and visionary experiences arise spontaneously as mind and body are refined.

Human actions naturally have lawful consequences in degrees of beneficial, detrimental, or mixed effects that accumulate to produce increased health and happiness, or disease and suffering. In the Vedic account, sensory experience relates to the effects on mind and body of the objects of sense. The five subjective senses are directly correlated with the five objective constituents or elements. The objects are built of the qualities of space and

sound, air and touch, fire and sight, water and taste, and earth and smell. The five elements and qualities combine to produce the phenomenal objects and their corresponding qualia.

Experiencing the different objects of sense—whether by ingesting them through consumption of food, through respiration, or through even visual and auditory perception—affects the individual consciousness-mind-body system that is the basis for intuitive, reasoning, and perceptual experiences. This fundamental design correspondence provides an integrated system for health-promoting behavior in accord with lawful patterns throughout nature.

It thus can be understood to provide a framework for a system of moral and ethical behavior. In this framework, morality and ethics concern the promotion of mental and physical health toward optimal functioning through increasing attunement with the unified totality of natural laws in natural and inherent 'evolutionary pathways,' or Dharma.

It is quite unfortunate that in modern society morality has become divorced from a scientific framework for optimal physical and mental health. The original intent of moral codes was to guide higher development based on the deeper, subtler interconnectedness and cause-effect relationships of behavior and its natural consequences. Overlooking these subtler relationships, moral injunctions were misinterpreted as seemingly arbitrary rules that 'God' commands humans to comply with to receive favor, and that are to be followed as a matter of faith even if not validated by reason and experience. Divorced from their practical underpinnings and meaning for daily life, interpreted crudely with respect to only short-term immediate effects, their relevance to daily life was reasonably doubted.

This fragmenting view was exacerbated by the difficulty of validating the subtle cause-effect relationships using only objective third-person methodologies, and also by views that nature is fundamentally random, value-less, and meaningless. It has been a major quandary in modern science how nature can be universally deterministic and lawful on the one hand, and on the other hand *fundamentally* random. This is due to overlooking levels so subtle that causal relations governing them were not apparent within the constraints of modern 'objective' methodologies.



As modern science has progressed to deeper and more integrated understanding, there is growing recognition that some religious injunctions have practical validity in natural medicine and preventive health. And on the other hand, some religious believers are broadening their understanding of the universal meaning of their cherished scriptures. Both secular and religious approaches can be said to identify natural laws, with the same intent to apply the laws to reduce suffering. Attention to the holistic basis of both secular and religious approaches is said to be the missing ingredient in both science and religion as they are now practiced that will bridge the gap between them.

In the model of the 'Constitution of the Universe,' the laws of nature that structure actions and consequences are the same laws that are the basis of moral codes. We have free will, and our choices have obvious short-term and not so obvious long-term effects that either result in improved health and increased happiness or not, according to their natural consequences. In scientific terms, health and happiness depend on optimizing interactions of our genes, behavior, and environment. In religious terms, God gave us free will to act in accord or discord with God's Will, or natural laws. In God's unbounded mercy, laws of nature give practical feedback on how to reduce suffering, which builds faith and commitment for continuing progress to our inevitable reward in permanent fulfillment—which also can be thought of as gaining total scientific knowledge and mastery of the laws of nature.

In the following quote, Maharishi (1967, pp. 26-27) summarizes a profoundly integrating view of scientific laws of nature and religious moral principles, also addressing key points in this paper:

"Dharma is that invincible power of nature which upholds existence. It maintains evolution and forms the very basis of cosmic life. It supports all that's helpful for evolution and discourages all that is opposed to it.

Dharma is that which promotes worldly prosperity and spiritual freedom. In order to understand the role of dharma in life, we have to consider the mechanics of evolution.

When life evolves from one state to another, the first state is dissolved and the second brought into existence. In other words, the

process of evolution is carried out under the influence of two opposing forces — one to destroy the first state and the other to give rise to a second state. These creative and destructive forces working in harmony with one another maintain life and spin the wheel of evolution. Dharma maintains equilibrium between them. By maintaining equilibrium between opposing forces, dharma safeguards existence and upholds the path of evolution, the path of righteousness.

Man's life is so highly evolved that he enjoys freedom of action in nature. This enables him to live in any way he desires, either for good or for evil. As he behaves, so he receives. When the good increases in life and the positive forces tend to overbalance the normal state of existence, then the process of dharma, restoring equilibrium, results in feelings of happiness in the heart and satisfaction in the mind. In the same way, when evil increases in life and the negative forces predominate, the power of dharma, restoring balance, produces sensations of pain and suffering.

Life is as we want it — either suffering or joy. When we allow the positive and negative forces to remain in their normal state of equilibrium, we live through normal periods of life. Assisting the growth of negative forces results in suffering; when we help the positive forces to increase we share the joy of life. 'As you sow, so shall you reap', expresses the role of dharma in practical life."

In this account of 'Dharma,' constitutions of national governments and laws for individual and social behavior derived from them approximate the laws of nature. These 'man-made' laws are effective according to the degree they are in accord with the laws of nature and the 'Constitution of the Universe.' This depends on the level of development of the individuals and societies that make the laws and aspire to live in accord with them.

Regarding this point, Maharishi (1967, p. 133) refers to a verse from the Bhagavad-gita: "You have control over action alone, never over its fruits...." Thus humans have real free will to choose what to do; but then the laws of nature automatically compute the inevitable consequences (Boyer, 2014).

Reconciling holism and reductivism

According to the completely holistic Vedic account, it is not that survival behavior, intentional top-down causation, self-awareness, and consciousness are *created* as emergent properties in the processes of biological evolution. Also, it is not that these higher-order processes did not exist in latent forms before their emergence, or that there is no inherent direction or purpose to them.

In contrast, through long periods of time they become expressed in higher stages of development. In the human species, they are increasingly prominent in evolution toward full potential, reflecting increasing free will (Boyer, 2014). Evolution is impelled and guided by causal dynamics of subtler, holistic 'evolutionary pathways' (Dharma). In this context, emergence refers to higher-order expressions of latent functions—not emergent, unreal epiphenomena.

Experiential reports of higher development appear throughout religious and spiritual traditions, as well as the scientific tradition on occasion. But their descriptions have been quite obscure. With advances in modern science, subtle relationships in nature, historically related to moral injunctions but difficult to validate, can fit into a rational scientific view.

Phenomenal nature is said to be an eternal cyclic process of the evolution of parts from ultimate wholeness, and then evolving to reveal the wholeness in each part. This is a never-ending self-referral process across vast eons of time. The theory of evolutionary biological emergence can be viewed as consistent with one part of this self-referral cycle. In other words, higher-order, top-down mental processes emerge with increasingly complex physical structures. But these complex structures are shaped by subtle non-physical processes all along the way.

As the field of all possibilities, the unified field of universal Being is its own self-referral physiology, and contained within its fine fabric is the intelligence and energy that manifest all phenomenal sentient beings and insentient objects. Its grossest levels appear to be inert particles or atoms such as in rocks and earth. On this level, the inherent intelligence and energy of nature appear the least integrated, and mind and matter appear independent (mind/matter duality).

At the subtle level, energy and intelligence are more integrated. This level has more the character of mind and thought forms than gross physical material forms. It is the subtle mind that initiates and directs the gross body to move, carried out through subtle nonlocal field dynamics that are automatically expressed in the gross local domain in classical biophysical mechanics. Objects and processes in the subtle relative level reflect locality while at the same time are nonlocal and interdependent, exhibiting more the coexistence of point/infinite value, personal/impersonal, individual/cosmic. At the infinitely self-referral level, unity predominates.

Modern science attempts to account for higher-order subjective mind and consciousness in terms of lower-order, bottom-line, inert energy/matter as quantum force-particle fields. These fields eventually synthesize into complex biological organisms that can sense, think, and appear to become conscious of surroundings for survival value through entirely blind, meaningless random mutations and natural selection.

Biological survival is considered basic to natural selection, but there is no coherent account of how the *value* of survival gets into the closed determinate physical causal chain that began long before biological organisms existed. Complex higher-order biological organisms, with minds and consciousness, were said to be due to (supervene on) lower-order inert processes—epistemological emergence. All causal effects were believed to be bottom-up.

As increasingly complex physical structures spontaneously happened, empirically some were both more stable and more adaptable, and thus able to last longer. In this view, the difference between living and non-living is a matter of systems that are complex and flexible enough to maintain 'themselves' over time. And also just by chance, these systems developed the incredible ability to function as a whole unit, and also to make copies for individual and group survival.

Then it was recognized that in building unitary-behaving biological systems, there must be some means for the holistic outcomes or products to guide the lower-order processes into units that are more than the sum of the parts—so-called ontological emergence. But all the higher-order and lower-order processes remain in the closed causal chain, so there was no top-down causal guidance by a real 'biological self.'



Then arguments were made for 'self-organizing systems' to emerge spontaneously and randomly without any planned precedents. But these unitary systems are now becoming recognized to require at least some order, or intelligence. The major current speculations include that the order is added from outside as in artificially intelligent systems, or from outer space such as in meteors, or from infinite possibilities of random fluctuations of 'nothing.' The 'right values' of nothing led to a non-random information processing system, which since has maintained and systematically built on the first instance of non-random order, eventually creating biological organisms that can know themselves and their world, out of chaos and randomness.

This part of the story—largely consistent with the Vedic account—emphasizes synthesizing of parts into wholes. What is needed for a coherent account is the other part of the cycle: the unified field of nature as fundamentally orderly and whole that phenomenally diversifies into parts, and then synthesizes into higher levels of development—detailed in Veda.

In the analysis part, nature manifests from wholeness to parts, from unity to diversity. The transcendent infinite eternal unified field of consciousness itself, the 'home of all the laws of nature,' the simplest state of nature, phenomenally diversifies within itself, and then progressively unifies from parts back to wholeness, within itself. Cosmic evolution involves condensing from wholeness to parts in phenomenal diversification, and synthesizing parts into wholeness in unification, instantiating an eternal self-referral cycle.

As enumerated in the *Sankhya* model of ontological levels of nature in Vedic literature (Maharishi, 1967), the sequence is from the unmanifest unified field of consciousness (*Purusha/Prakriti*) to the subtlest level of manifest nature (sometimes called *Mahat* or cosmic ego), to *Ahamkara* (cosmic intellect, also called *Buddhi*), to *Manas* (cosmic mind), to the *Indriyas* (organs of sense) and *Karmendriyas* (organs of action), to the *Tanmatras* (subtle objects of sense, the five essences of space, air, fire, water, and earth), and finally to the *Mahabhutas* (gross objects of sense, the five gross elements) (e.g., Boyer, 2012).

Because these levels of nature make up the entire structure of nature and everything in it, they also make up the levels of the individual human being, including transcendent consciousness itself, levels of subjective mind, and levels of objective body and the environment. This is described in the Vedic literature, such as this verse from *Brihad-Aranyak Upanishad* (1.4.10) concisely summarized by Maharishi (2003) as:

"Yatah pende, yatah bramande.

The individual is cosmic."

Conclusion

With the phenomenal structure of levels already existent in nature to be observed, we humans eventually began scientific observations of the grossest surface level. This level appeared to be inert, independent of subjectivity, devoid of sentience, and the most *real* from the limited object/subject duality of the ordinary waking state. With top-down subtle guidance in 'evolutionary pathways' (Dharma), the parts long ago naturally congealed into more complex wholes as biological organisms (Boyer, 2014). With more refined experiences in higher states, the subtler, interdependent, non-physical level of nature associated more with sentience and subjectivity which guides the physical level appears more *real* (even hyper-real). In the highest state, all phenomenal levels are experienced as *Maya*, the phenomenal world of ever-changing 'measurable' existence.

This again is the completely holistic Vedic 3-in-1 account, experienced as relatively *real* at gross levels, relatively *much more real* at subtle levels, and *total reality* at the transcendent infinite eternal unified level. Applying this account to the seven questions in the Introduction, the laws of nature are: 1) discovered, 2) both independent of and dependent on us as observers, according to the stages of understanding and experience in the different states of consciousness, 3) prior to phenomena governed by them, with complexity as permutations of them, 4) eternal, 5) fundamentally orderly, 6) information structures that shape what happens in phenomenal nature, but that also allow for real free will, and 7) the ontologically real structuring dynamics (*Devata*) of phenomenal nature in unmanifest universal Being (*Prakriti/Purusha*).



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