

Integrating Sciences and Arts for serving Life

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[1]

[excerpts]

Can a novel approach to the integration of science and art provide a better path to sustaining and evolving an improved human species?

Can human intelligence and creativity, enhanced and empowered with technologies, produce the changes in human behaviors, beginning with present generations, that are necessary for the species to adapt to changes on Earth and for future life beyond Earth? These changes form a complex set of physical and psychological evolutions that will affect critical psychosocial manners of behavior which have not been attainable and arguably cannot be sufficiently attained by our current methods which span from our social contracts and procedures of governance to medical and pharmacological regimens, such as those we have been attempting to employ for control of abuse, crime, degradation of the natural environment and depletion of fine and non-renewable natural resources.

Where does synthetic intelligence ("artificial intelligence") figure into the future picture for the real issues at hand, today, for the human species - actual survival on Planet Earth and with regard to both the natural factors of the environment but the human factors of conflict and violence?

This is only the beginning of a dialog that is long overdue in our society - in our schools, in our companies, in our systems of governance.

[2]

[excerpts]

Monograph on the rise of psychovirus epidemics and species decline and extinction on Earth

v1, mjd, started 21.feb.23

Introduction

We are witnessing an unprecedented and, albeit predictable, an unexpected and once-considered (by the author and others) as an avoidable consequence of natural events linked with the nature of biological life on the planet Earth and the evolutionary path leading to the species of biped hominid mammals known as (by its own nomenclature and declaration) homo sapiens.

There is a phenomenon best described, in terms of its function and outcomes of its processes, as a type of virus. This is not a microbiological virus composed of macromolecular structures involving nucleic acids, proteins, lipid acids, carbohydrates and other components. This phenomenon, or rather, a class of phenomena, is a type of virus in its behavior within an organism. Richard Dawkins coined the term, "meme", in distinction and also similarity with biochemical "genes". We are now embroiled planet-wide in a pandemic with a plurality of meme-type virus infections which affect the minds of individuals and social groups, in a manner that can be described with similar attributes as are used for biomolecular viruses - transmissibility, infectivity, and lethality.

What we have ongoing now, on planet Earth, is a pandemic that is gaining in strength within all three categories and it is capable, perhaps even inevitably so now, of leading to the extinction of the human race as a species, as a civilized and intelligent species, and perhaps ultimately this will be the total extinction of the species, much as happened at least once before in paleolithic times, around 70,000 BCE, due at that time to the consequences associated with a supervolcano explosion in present Indonesia.

If we do not see the extinction of homo sapiens along with many other species of animals and planet - particularly mammalian, amphibian, and aquatic species, due to the present psychoviral pandemic, then we certainly face the strong likelihood of the extinction of what is generally recognized and accepted as civilized human life.

We are that close to the end and it is a severe apocalypse, and most definitely not just a story for generating inspiration among the faithful of some following or another.

Future sections will cover:

The roots in human neurobiology - bad wiring that did serve a purpose and aided survival up to now

Neuroplex disorders, their genesis, and individual/social consequences

The evolution of persistent psychosocial self-destruction beginning with self-non-acceptance, self-hate, self-abuse, and the psychopathology of the HATES

The possibility of ways out from the dungeon labyrinth

The impossibility of achieving such ways out because of the current spread of the psychoviruses

What to do other than sit on the edge of the cliff, have a picnic, and wait for the world to crumble

[3]

[abstract]

Applying Synthetic Intelligence for modeling future population segments at higher risk for rising incidents of dysautonomic and arrhythmic disease

The confluence of the COVID-19 pandemic on a planet undergoing significant climate and environmental changes and a highly mobile human population, has initiated awareness of widespread and chronic disparities in healthcare availability and delivery of services. These are issues facing the global population and within regions and many countries, including those heretofore regarded as having advanced public and private health services. Modeling the future trends of health dispositions and trends is critical for all aspects of the healthcare infrastructure, including new diagnostics, drug discovery and other therapeutics. Public health education is a pressing need in order for effective change that will meet the new dynamics with implementable solutions. Population health disparities are exacerbated by highly nonlinear and unpredictable events such as pandemics of the type experienced with COVID-19. Resilience in response is critical as experience has shown.

By applying Synthetic Intelligence, encompassing several mature forms of machine learning and pattern discovery and recognition ("AI"), we are modeling future health risks for different population segments, focusing upon rising incidents of dysautonomic and arrhythmic disease including autoimmune, inflammatory, and Long-COVID consequences. These disorders and diseases are on the rise, have long-term complications and comorbidities, and are extensively linked to disruption of normal life as well as social productivity. The results from foundational investigations within the informatics and computation domains gives promise for having tools which can be employed in many sectors of healthcare and medicine including for decision-making with respect to emerging requirements of new medications, and thereby, the drug discovery domain can benefit with new insights about health and wellness trends for multiple future generations.

[4]

[excerpts]

RTD and TBD with respect to psyche, ethos, polis and to the therapeutic process for personal psychological balance and for social order and health

v1, mjd, notes started 21.feb.23

This builds upon all the Neuroplex work, and the N-theory / N-therapy, and some things being written (or simply "as is") within "Brief monograph on relations of psychosexual dissonance with divergent abuse and chronic neuroplex type disorders, and suggestions for progressive methods of analysis and therapy.docx" and other related documents. There are some things from late 2021 and early 2022 that touch on this, including aspects of sexuality pertaining to Neuroplex disorders.

The aim here:

To summarize, in a way that can be applied within biomedical, psychological and social actions, how the reflexive topological models about fundamental physics and biology - and in general, any type of system emergence and growth - has a controlling, guiding, determining role in how the mind behaves,

how emotive and cognitive processes develop and are governed, how the topology of mental constructs governs the way that particular "instantiations" of emotions and thoughts and thereby psychophysical responses are possible and guided (determined) in the formation of their attributes, and how pathological forms develop, and how we might address those pathologies with actions that change the underlying psychic topology, like how one may in a geographic and topographical manner change the landscape in order to alter the flow of water, the distribution of nutrients, and other physical factors affecting the behavior of fluids and the growth of vegetation in that landscape.

I want to describe the connections from the very abstract realm of mathematics, about how the topology of some object controls what can possibly happen on the surface and within the object, and move to the realm of the biological and then to the psychological, and in so doing, bring out some ideas about how we can create or change some methods of working with people in order to alter what have become essentially knots and twists and blockages to normal "flow" - in this case of feelings, and thoughts, as streams of formed mental structures ("ideas", "concepts") - so that we can take what has been a normal well-irrigated field originally, but transformed through degraded practices, into a swamp, or a desert, or some combination of other undesirable and counter-productive, "contra-life" environments, degraded eco-systems of the mind, and do something that will aid in bringing that degraded landscape back into a balanced and healthy state.

23.feb.23

"Individuation is one half of the process - the other part is the corresponding collective integration."

"Collective unconscious, yes, but also connective unconscious. This is what must be approached, understood, developed more in each person and in the society."

Just as one may (claim!) speak of different quantum potentials, QP(s) where s = scale, ranging from the photonic to much larger complex orders, so there are different types (orders) of quantum superpositions and entanglement relations, different orders of the topologies that are involved which connect and bind superposed/entangled entities - photons, particles, atoms, BEC, condensed matter clusters and arrays, macromolecular assemblies, cells, and larger distinct biological organisms.

The divisions we make, the lines of separation we make, between what we commonly think of and refer to as "individual" [objects, entities, organisms, persons], are all on the basis of certain agreed-upon parameters of observation and measurement. These are in some ways topological. Think of what we delineate as a cell, as an animal or plant, as a human being.

But now think of those "separated" entities in terms of how they are part of different larger systems, actually, eco-systems. Nutrition and flow of energies into and out from the entities that we classify, by one set of observation criteria, as individual, separable objects. Relations with others, of like type or others of similar type but being groups, not individuals, vary according to where we decide the draw the boundaries, but that depends upon the relationships we are taking into consideration for those entities.

Here we have been talking mostly about physical topological entities and their boundaries and connections for exchange with one another. But now we must consider the psychological domain of interactions and relationships. This is obviously much more complex than the physical when it comes to speaking about boundaries and limits.

Depth psychology focuses upon the individual and the process of individuation and achieving of a stable wholeness as an individual. This must be complemented by a process of "connectivation" and the development, within the individuals and the group as a whole, of the consciousness which is where the individual sees him/herself as a component of the whole (group, social order) - the bringing of the collective and connective unconscious into active consciousness.

[5]

[abstract]

Psychosocioeconomics of Healthcare - the PSD of NpC + PHEBR + OASIS

draft

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Outline

How the social media/network environment-space, in which a huge majority of people are fluent and active, plays an important [future] role in the functionality of the PHIBER and how this will serve better NpC medicine and wellness.

Aims of the PHIBER

Requirements to build and maintain and use the PHIBER

Neuroplex in terms of PSD stressors and stress-maintainer-forces – psychosocial dynamics (including "E" – economics)

Social networking and people's internet-lives and personas and needs

Oasis as COMET (COMEET)

Oasis as health-wellness-inducing-cultivating

Oasis as the optimum vehicle to acquire the anonymous and anonym-izable and also in some cases openly shared data for the PHIBER

Using Oasis with patients, with patient families and care-givers, with providers

Oasis feeding and building PHIBER

PHIBER to the clients of OHI – providers, people, families, companies, institutions

"Full circle" in that ultimately this serves all interest groups and much better than just telling client companies to pay X for "hit or miss and mostly miss" advertising to people. Here everything becomes tailored, focused, and Much More Accurate. So, some companies just want to advertise through Oasis – they get more for their

money. Others want the PHIBER data, to plan and design and produce their products and services – not just advertising.

With Oasis and PHEBR, we change the course and future of social networks, social media, the Internet.

This results in Knowledge, Wealth, Power, and unlike the typical way these are used by those in possession thereof, it enables us to Make People's Lives and the World We Live In Better.

[6]

[excerpts]

Brief monograph on relations of psychosexual dissonance with divergent abuse and chronic neuroplex type disorders, and suggestions for progressive methods of analysis and therapy

v1, MJD, 20.feb.23

[20.feb.23]

The following is presented as a model for causal interpretation and for development of techniques in both analysis and therapy.

Confusion and self-negation, coupled with social negation (familial and close-relation influences, and the inputs from both actual individual sources and from perceived constructs of larger social valuations and opinions), beginning in childhood and progressing through adolescence into adulthood, leads to what can be termed as psychological knots. These are, phenomenologically speaking, knot formations, twistings, contortions, kinkings and blockages in the flow of thoughts and emotions, and most certainly these have physiological components that encompass hormonal, muscular and a full range of both the parasympathetic and sympathetic neural systems as well as those regarded as being subject to voluntary control. These blockages behave in manners that are analogous to the blockages of flow within a hose or pipe when there has been, literally, a twisting, knotting, or kinking action. Medically we associate such processes with the effects manifesting in certain classes of disorders and diseases among which are dysautonomia, arrhythmia, and a number of autoimmune and inflammatory diseases.

Conflict within the mind over identity, authenticity, and value, directed at the self and a person's closest and most intimate attributes, behaviors, unique character traits, and accomplishments with regard to others, contributes to this phenomena of reversal, blockage, and barrier formation that affects a full range of neurophysiological behaviors. Such conflicts are most powerful in matters concerning identity in the context and relationship with other persons, and among the most dominant factors are those concerning identity, authenticity and value in gender and sexuality. This should not be viewed as a bold or unique statement that elevates sexuality to a position of significance that diminishes other factors in a person's life. Rather, we can do well by understanding sexuality as being far deeper and encompassing than the commonplace perspective that focuses upon physical and emotional actions between individuals and that is generalized and indeed limited to actions involving physiological stimulation and actions of the genital systems. In our approach, sexuality is more fundamentally about polarity of energies and their manifestations in behaviors including mental processes of perception, pattern recognition, object classification, cognition and reasoning, and much more that is typically not

considered to be sexual but which is clearly involving predominant polarities and the dynamics between such polarities.

We must address directly the alchemy of mind in the Jungian sense, the dynamics of anima and animus, etc. "Sex" is not just about M/F and "xx" and "xy" genetics, nor about male/female in so many species of life on Earth, but deeper, it is in basic chemistry, it is in particle physics, and it is very well expressed in the Taoist-Confucian traditions, as in Tantra, as ying/yang, ida/pingala, and so forth.

When there are substantive confusions in the natural flow of mechanical energies in some system (biological or non-biological, such as in a human-engineered "machine" or in a structure like a building), we see among the consequences dispersion of energy as heat loss, as overheating, as noise, as dissonance and cacaphony, and there are many other terms. In the science of tribology, the study of flow of some fluids within conduits and pipes, be it water, blood or some other material, we find clear examples of the type of behaviors, on a physical level, that we are pointing to in regard to psychological domains. When there is such blockage linked with a strong, constant, essentially omnipresent set of physiological and psychological states such as involve the all-encompassing space of sexuality, and where the impact of negative responses from other persons regarded as being significant (parents, siblings, peers, lovers, would-be-lovers, potential mates, teachers, persons regarded as influencers and mentors, etc.), the consequent disruption and dissonance of normal (healthy, optimal, non-disruptive) flow is marked by two important attributes:

[1] The negativity is indelibly, inseparably connected with mental states regarding self, the "I am", the most intimate and "central" relationship that a person has, the basis and starting point for any and all relations of the person with everything else in the universe - other persons and indeed all other things - objects, animate and inanimate, "real world" and imaginary, purely in thought-space.

[2] The negativity, when it is sustained, constant, chronic and unabated, when it becomes associated with force and power that is potentially seen as universal and as immovable, unchangeable, when it is seen as a constant source of conflict leading to displeasure and unhappiness for the individual, this negativity grows into self-directed negativity and thence into other-directed expressions of blame for cause and sustainability of the negativity, the dissonance.

This is the foundation for the widespread and cascading phenomenon of self-denial and self-abuse which then develops into directed and transferred-target forms of abuse to others who are associated by a variety of perceptions and reasoned conclusions with being the causes and the sustainers for that which gives rise to the feelings and thoughts comprising the self-abuse.

Now this process leaves the afflicted individual with the foundations and progression of what we term the neuroplex type of disorders, affecting both voluntary and involuntary neurological functions and including fundamental cardio-pulmonary, gastrointestinal, endocrine, muscular and sexual functions, plus the formation of negativity in the form of hostility, fear, negative expectation, and blame, upon those individuals, groups and general categories of other being (particularly other humans, but extending to other living and inanimate beings) who are associated and marked as being causative agents for the self-abuse and underlying "identity-related dissonance and disorder".

The natural progression of this overall pathology leads to a diversity of self-abuse and other-target abuse. Substance abuse is one form, physical violence is another, psychological abuse another, sexual abuse (to self and/or others) is another. Simply put, the person in an internal state of confusion, disarray, denial and "no-go, no-win" mind, proceeds in self-negativity to directed activity that is an

attempt to stop such states by acting against the self and against those others who are linked as causative agents for the underlying negativity.

Now, how to undo these processes? How to proceed in a manner that can, effectively, in keeping with our earlier tribological and topological analogies, undo the knots, untwist the kinks, and get the normal flow of things back to where the individual will be in a physiological harmony that enables the person's own internal system for maintaining equilibrium to keep a balance that reduces and indeed removes the stimuli for self-abuse and abuse of others, and in the process aids to heal the neurophysiological damages of what we term those neuroplex disorders (not all of which can be undone or reversed, once substantive systemic damage has been done to different organs and tissues; e.g., heart, intestines, brain).

[excerpt]

[1]

Multi-faceted diagnostics is important, indeed essential.

This means, the psychoanalytical methods, sure, and also the conventional, standard biomedical tests, but also others, which aim to discern and bring out deeper and less superficially-detectable factors.

Thus, some of the following:

- genetic analysis, seeking for specific identifiable genetic indicators
- more so(!), methods such as SIMOA, looking for different levels of specific molecules, particularly in neurochemistry, that can be pointers to the presence and especially sustained presence of certain moods-states that may not even be consciously recognizable to a person him-herself.
- fMRI - the dynamic, real-time measurement of different brain behaviors
- EEG - with respect to certain cognitive and emotive processes

[2]

The combination of analytical therapies that are shaping-up into what we call N-Therapy, where "N" is both "Neuroplex" but also "N" in the philosophical sense of "Nthsm" and "N-dimensional thinking". (As in work from B. March and what I have been trying to formulate as the topological model of neurocognitive processing, involving how we form and transform ideas and thus memories and how our topology of perception literally changes on the basis of what we are exposed to as inputs and interactions over lifetimes - thus, "TND" and "PSD" theoretical work).

[3]

The value of an analytical (dialogical, diadactic, dialectic, and physical) space as is conceived as the "Aletheion" - a somewhat reconfigurable, redesignable (personalizable) room in which two or more individuals interact and where there is "only room for Truth, for openness, disclosure, revelation, and responding with the "what is" to the encounter within that space.

[4]

Archeo-mytho-poetic expression, guided but fundamentally freeform, and spanning the physical as well as the verbal and in any artistic form of expression. This offers opportunities for persons to reveal what is deep within, about who they feel they are, want to be, fear to be, dare to be, and it is not limited at all to "sexual identity per se" but to all manner of personality and action types. The challenge is for ho this can be Effective in a person's life for reducing the noise, the dissonance, the chaos, and the self-abuse and any other-directed abuse.

[21.feb.23]

Another way of putting things:

Trying to learn about and get a more solid grasp of how the many forms of blockages (I call them knots, twists, kinks) -- and specifically within a person's sense of identity, lead into the "universe" of abuse behaviors of all types.

So, this is about people's very basic identity, including their gender/sexual identity and all the implications thereof ("What am I supposed to be? What am I? what Was I supposed to be, to do, to accomplish" etc.) , and all the role models imposed from the get-go in childhood, both explicit and especially implicit, and how those role models and "identity archetypes and stereotypes" are both reinforced and also pulled apart in opposing directions in the course of social interactions, just plain "growing up" in the contemporary society -----

...This gets into how these blockages lead automatically and undeniably toward and into self-abuse and other-abuse protocols, behaviors. The targets (of "abuse-vectors") are self and "others". The analogy with fluids, flows, and blockages (e.g., in hoses, pipes, etc.) is more than just an analogy!

This pathway that goes into some form of abuse and directedness of that or another is a natural, inevitable course. But it can be "changeable" if some alternative approach, some therapeutic approach, can reach into the person and literally "unkink the hoses".

HOW to do that, well, we know there are many approaches, but a lot of them simply Do Not Work for many individuals, and I see that many of them are not working and will not work for an increasing number of people. This gets into the matter of our present times, the social disorder, and also the role of the internet and how communications and "sense of truth/reliability of information" have changed in recent times.

[7]

[excerpts]

Topology of Pattern Recognition and Learning in Biological and Synthetic Intelligence

v1 mjd 02may22 --- new material starting 06.june.22

@ 02may

In the brain we construct surfaces that represent objects and the objects are of a universe of various types, some pertaining to physical 3D/4D objects and others to entities that can be extraordinarily different from anything physical. The surfaces pertain to what we know or assign as values to different attributes. We construct these objects and match them, map them, against others, looking for the best fits, and therein is how we recognize and classify patterns and proceed to build relations, associations, and inferences about the things in our world. These objects are in multiple dimensionalities, from 2 to n,

but usually in the human brain we don't go much beyond 7 or 8. [refs to some papers by Tozzi, Peters, et al].

In SI (synthetic intelligence) we do much the same. But we can go much much higher in the dimensions and much broader and wider in the scope of making comparisons and tests for similarity between objects.

06.june

Consider spatiotemporal paths of cognitive processing as following a type of DAG. There is no backtracking, only moving forward in time. However, paths can lead from one node to many nodes and from many to one. Time is one dimension. The other dimensions are determined by the framework of action; in other words, spatial movement, or movement among conceptual structures defined by the attributes of those structures – in any case a kind of n-dimensional space. [Refer to Peters, Tozzi, Oro, Deli and others re: capacity of human brain to work effectively in 5, 7, perhaps higher dimensions, and for things beyond the capacity of the brain, we have the additional tools of what we make to assist us – words, the logos, and logic, mathematics, geometry, and other forms, and the implements such as paper and pen, and now, computers and the knowledge-base penultimate of the web, the internet.]

Now let's think of the DAG-nets and how these can be considered as topological structures, as having boundaries, and internal-external surfaces, and regions. Including twists, loops, knots, everything that we can find in any topology.

Picture such constructs, arbitrarily – a set of knotted and twisted objects which are in an n-space, and for simplicity 3-space, and they represent cognitive processes and include the detection, identification, discrimination, recognition, classification acts with patterns, each of which has some semantic value in some context (but obviously not in all possible contexts!).

These constructs, these shapes, may be compared and combined with one another in an almost infinite variety of ways. Like taking knotted and twisted objects made of soft clay, and combining them, in ways that are following the rules for logical combinations – and this can be different from the usual way we think about topology, such as transforming one object into another shape without any cutting action – without any “surgery” – such as from a torus to a cup and vice versa, but as opposed to trying to change a sphere into a cup or torus, where cutting and splicing is required.

So within some Context of Cognition ($C_{og}C_{on}$), there are rules for how cognitive topological entities which include DAG-net actions (that give rise to their shapes) can be combined, at least easily, straightforwardly, and without “mayhem” operations. We may think of this as being like the rules of general thinking, both with respect to formal logic, yes, but also in a more general way. For instance, we have usual and typical ways that we think of how a horse can be transformed, visually, in our minds or on paper or in a graphics design program on a computer, into another type of horse, another type of the family Equidae, or even imaginatively with various members of the orders Artiodactyla (even-toed ungulates) or Perissodactyla (odd-toed ungulates). But it is more unusual, more challenging, more “work”, to transform a horse into a fish or turtle.

We must look strongly and heavily at imagination, fantasy, and error, in order to understand reasoning and “correct” thought processes. (I have been saying and writing this since at least the early 1980s.)

Think about how Morse theory and also other maths incl Ramsey, Delaunay, Voronoi, can be applied to this type of matching and fitting between topological entities, looking for how two or more can either match as similar/identical or fit together in a “congruous and sensible” manner.

As certain topological forms get established in neural processing, they become like chreodes are in the formation of stronger and more dominant pathways for neural excitation in the future. Shapes – topological entities – which define neural activity over time but condensed in spatial configurations – become dominant so that in the future, when activity is nearly or approximately similar, then there is a “gravity” towards the strongest and most common pattern of dynamical activity, reinforcing it. Thus, the tendency to come up with a specific pattern over other possibilities gradually rises and rises and becomes stronger over time unless there are forces for keeping it separate, unique, different.

This is a type of “inverse chreode” in the sense that what we have is not a cutting of a pathway by which energy flows down a course, such as a sand hill, but a congealing and molding and sculpting of a multi-dimensional pattern of neural activity that acts like an object, a shape, to which other and newer activity will be pushed to fit-into and match-with --- unless there are stronger forces for keeping that as a separate and novel/different object.

The more some X is perceived as being a Y and not a Z, the more the class of X will widen and grow and more X will be perceived as Y and not Z. The gradual building of dispositions, trends, and patterns of classifying percepts into specific categories (types), over time. Apply this to human psychology and interpersonal behavior!

Remember that these objects, these topological structures, are dynamic, not static, and they are not in 3D and not in 4D but in multiple higher dimensions. However, observing the brain, such as thru fMRI, we will see things in a 3D+time manner. How to bridge things to the higher dimensionality of the cognitive relations?

[8]

[introduction]

A Necessary Comprehensive Reformulation of Foundational Physics as a Prerequisite for Developing Sound and Practical Next-Generation Theories, Computers and Starships

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Abstract

The dual challenges of non-locality and entanglement have made themselves present in multifarious forms for over a century in physics, biology, and other life sciences including psychology. But in general these are related to issues that recur across the sciences in both scale of size and scale of complexity in structure and behavior, and in one common dialectic that demands a resolution, also called “unification.” The fundamental challenge has been one of integration for being able to preserve invariance, and with that, consistency, integrity and coherence, in theory as well as practice (application) among the most microcosmic and most macrocosmic. The suggestions, much less any

assertions, of meaningful relationships between processes separable by limits of light velocity and deemed to be non-local, or deemed to be negligible due to high levels of external noise and decoherence (by classical interpretations of thermodynamics or otherwise), have generally been met with disdain and disregard in mainstream scientific circles. The argument is now put forth that physics, biology, information science, and the engineering of information through computing machines have together led to a critical and singular convergence of our conceptual frameworks used in these fields and others. This is a convergence of meaning and interpretation about the fundamental components used in describing and representing systems, processes, states, dimensions, and causes, spanning from the notions of substance, space and time. Foremost among such are superposition, entanglement, identity, unity, and also such basics as position, direction, certainty and control. The ultimate goal of this paper is to inspire change in thinking that leads to change in doing, designing and building. The ultimate claim here can be summarized as follows: A radically new computing machine based upon topological components representing the information process may be what is required, as a model and as a functioning machine, in order to demonstrate effectively the underlying theory about how Nature operates as a topological information process that employs form and structure to optimize the construction of information. And such a theory that encompasses action potentials operating within the interactions of particles, nuclei, atoms, molecules, cells, and organisms, is certainly required in order to establish the architecture for a computer that will operate according to similar principles.

Introduction

A. Excerpts taken from the Introduction to the volume, “Principia Physis” [1]

The dual challenges of non-locality and entanglement have made themselves present in multifarious forms for over a century in physics, biology, and other life sciences including psychology. From one perspective these problems may appear to be “only” concerning quantum physics at the Planck-scale or near thereto. But in general these are related to issues that recur across the sciences in both scale of size and scale of complexity in structure and behavior, and in one common dialectic that demands a resolution, also called “unification.” The fundamental challenge has been one of integration for being able to preserve invariance, and with that, consistency, integrity and coherence, in theory as well as practice (application), among the most microcosmic (waves and particles, both massless and massed) and the most macrocosmic (the universe as exactly that, a unity, a whole).

For the most part these problems and the underlying questions have been compartmentalized into separate problem sets and investigations, most of which have circulated only within conceptually-close theoretical circles. Nonetheless, the empirical nature of science has made its presence felt strongly in recent years, with promise of creating a wave of “sea-change” in even the most orthodox of such circles. Advances in sensitivity of experimental apparatus, particularly over the past decade, have reinforced the evidence of observables that, according to conventional and generally-accepted quantum mechanics, chemistry, and neurobiology, should simply not occur. Such observables include a diversity in type and spatiotemporal scale: quantum-level actions including coherence of entangled states among large ensembles of particles, solitonic energy transfer within biochemical processes such as protein folding and nucleic acid twisting, several aspects of enzyme-related catalysis, morphogenic changes in viral surface proteins during cell membrane intrusion processes, and also, at the relatively huge scale of cells and multi-cellular structures, dynamical pattern formation and large-scale bioelectromagnetic resonance within biological neural networks in brains.

The suggestions, much less any assertions, of meaningful relationships between processes separable by limits of light velocity and deemed to be non-local, or deemed to be negligible due to high levels of external noise and decoherence (by classical interpretations of thermodynamics or otherwise), have generally been met with disdain and disregard in mainstream scientific circles of discourse during the same approximately one hundred years. The history of the deBroglie-Bohm-Hiley model of quantum

mechanics, with language of pilot waves, quantum potentials, and something akin or at least comparable to control of large energetic systems by the form and structure of otherwise insignificant low energies, is not only a paramount example but, it is here claimed, an integral part of understanding how to build a way out of the labyrinth in which contemporary physics, chemistry, biology, and other sciences find themselves today.

During this same period of the previous hundred years, there have been several seemingly unrelated developments that, it will be argued, connect in important ways for solving questions about multiple fundamentals in science. Firstly, at the the micro/nano scale, resolving certain dilemmas and paradoxes about non-locality, entanglement and the emergence of gravity and particle structure. Secondly, at the much larger scales of extension and duration, solving conundrums about the emergence of biological form and structure, and the processing of information in complex structures within both biological and synthetic machines such as computers. This century of development has provided important foundations for answering these questions, which seemingly have not been brought together yet in a manner that is clear for each type of problem. Among these foundations achieved have been establishment, with proofs, of limits and bounds with regard to completeness and consistency (Goedel). Almost simultaneously there have been established, with proof by performance as well as in theory, machines for calculating linear series of precisely-defined operations (Turing).

There are two other important sets of discovery and theory that are pillars for a new edifice which does not tear down the old but reshape its topology, so to speak, into a simpler and more elegant – and useful – form. Firstly, there have been experimental detections of quantum entangled state coherence and transmission within biological organisms, consistent with well-established molecular biology and cell biology, and offering answers to how certain very basic processes work within photosynthesis and biomagnetic navigation. Secondly, there have been promising developments in the construction of semi-stable arrays of multiple quantum-entangled atomic-scale objects that can be employed for the massively parallel computations (albeit Turing-principle calculation algorithms) known collectively as quantum computing.

The argument is now put forth that physics, biology, information science, and the engineering of information through computing machines have together led to a critical and singular convergence of our conceptual frameworks used in these fields and others. This is a convergence of meaning and interpretation about the fundamental components used in describing and representing systems, processes, states, dimensions, and causes, spanning from the notions of substance, space and time. Foremost among such are superposition, entanglement, identity, unity, and also such basics as position, direction, certainty and control. These are among the vertices in a complex polyhedron of meaning that has been assembled gradually over centuries and millennia and which now defines how phenomena are seen, correlated, interpreted. The goal of this paper is to refine, realign, and in some cases redefine, but not to break or discard that which holds water, works well, and serves its purpose in theory and practice.

The following points constitute the main arguments of this paper:

First, in order to establish a realistic and usable unification theory applicable to such two fundamental pillars of physical phenomena as quantum mechanics and general relativity, there must be a reassessment of what we mean by such concepts as locality, superposition, entanglement, and also such fundamentals as gravity and force. It is argued that there is a constant and consistent similarity between the structural relationships of phenomena at different scales of both size and complexity in Nature, and that this provides a better way to understand both why and how certain things are the way they appear, including to be in apparent contradiction.

Second, a re-evaluation of these fundamentals will lead to an improved understanding of natural systems in terms of models of representation which involve both description and control. It is argued that models to represent energy and its manifest form as action inherently involve aspects of control involving the environment in which any system operates. The cybernetic aspects of natural systems at

wave-particle, atomic, molecular, cellular, and organic scales will provide a better avenue for descriptive theory and for applications based upon such models. Such cybernetic aspects may be described as “active information” and within physical systems this can be demonstrated as “action potentials.”

Third, a theoretical formulation that includes active information control and action potentials will provide a simpler and more consistent framework to understand relationships that span multiple scales of energetic behavior such as between quantum fields and molecular dynamics including biomolecular processes involved in cellular metabolism and, at the complex neural level, the processes of learning, memory and recognition. This framework will emphasize a topological representation of information and control that spans across different scales including that of biology.

Fourth, such understanding will provide the basis for developing a realistic architecture for a new and generalized form of computation, one that is trans-Turing in nature, not restricted to the arithmetic and logic operations of digital algorithm processing machines and not operating solely on representation of data in Boolean or similar bit/qubit formats. This new type of computation can be characterized by topological information resonance that operates, at a relatively macroscopic scale of molecular and nanoscale components, on the same principles of action potentials that modulate topological structures which represent information. This opens the path to a new type of computer that operates more like atoms in crystals, protein polymer chains, cellular microstructures such as cytoskeletons and nuclei, and brains.

The ultimate goal of this paper is to inspire change in thinking that leads to change in doing, designing and building. The ultimate claim here can be summarized as follows: A radically new computing machine based upon topological components representing the information process may be what is required, as a model and as a functioning machine, in order to demonstrate effectively the underlying theory about how Nature operates as a topological information process that employs form and structure to optimize the construction of information. And such a theory that encompasses action potentials operating within the interactions of particles, nuclei, atoms, molecules, cells, and organisms, is certainly required in order to establish the architecture for a computer that will operate according to similar principles.