

HEALTH IN AN ECOLOGICAL CIVILIZATION TOWARDS A PROCESS UNDERSTANDING OF THE DIALECTICS OF HEALTH

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ABSTRACT: The past one hundred years has seen major advances in medical knowledge, care and technology, but has this been healthy? These advances have been underpinned by oversimplified misconceptions of reality in the form of mechanical and atomistic metaphysics. These views effectively abstract us from nature and each other while obscuring the holistic roots of the word health. They have provided justification for our drive to harness the potential energy of non-renewable fossil fuels which has allowed us to augment the living conditions for some on our planet, but at the expense of the conditions for life itself. We are now seeing the consequences of our profligate use of energy in the emergence of environmental problems such as the melting of our polar ice caps, extremes of weather conditions and life threatening pollution more generally. This destruction is happening partly due to economic demands for unconstrained linear growth which generates greater dependence on energy intensive technologies. But healthcare is following this trend of linear growth towards even greater dependence on technology, adding to the growing demand for energy globally. This trend is unhealthy as increasing energy use generates larger, more intractable health problems such as Type Two Diabetes. What is needed are further arguments for holistic approaches to health which create the conditions for self-healing rather than energy intensive, entropy accelerating interventions. Such approaches have long been practiced by the healthiest peoples in the world in what are called the 'Blue Zones.' To cultures fragmented by the abstractions of mechanical metaphysics, however, holism no longer makes sense. In this paper, therefore, I will argue for holistic approaches drawing upon what physics understands to be the nature of the Higgs Field and fields in general to reveal the complex nature of our connectedness with all in the universe. I will show holism's ontological primacy through understandings in process metaphysics and modern physics and biology. I will further argue that to avoid extinction we will need to create an ecological civilization which helps heal our dysfunctional relationships with nature. This will require an education in dialectics in order to understand the relationships between contradictory arguments and the implementation of an ethics and politics of eco-poiesis to

generate a feel for the whole that so many today fail to experience. This will create and maintain our connections to our communities. Such deep connections will be necessary for us to take responsibility for continually generating the future potential for diverse, healthy life. A condition for this will be the creation of a holistic health field which, being based in process metaphysics, will act as a higher level constraint to condition more holistic thought and practice.

KEYWORDS: Health; Ecological Civilization; Alfred North Whitehead; Process Philosophy; Biosemiotics

INTRODUCTION

At the Whitehead Conference in Los Angeles in 2015, the process philosophy community, led by John Cobb, committed itself to creating an ecological civilization.¹ This was in response to what it sees is a world rapidly heading towards ecological collapse and increasing fragmentation that makes us impotent to deal with it. Process philosophers understand reality as fundamentally active and approach it from a holistic, relational perspective. An ecological civilization is one which augments the conditions for life, rather than destroys it, on the relational understanding that what is good for life in general is also good for human life; humans are within nature, not outside of it. Cobb has done much to lay the foundation for such a civilization, particularly in his seminal work with economist Herman Daly, *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future*.² In response to Cobb's call, Australian process philosopher, Arran Gare, published in 2017 his most recent book, *The Philosophical Foundations of Ecological Civilization: A Manifesto for the Future*. Gare's book is both an argument for speculative naturalism as a philosophical tradition best suited to the task and an outline of his vision for an ecological civilization generated through a combination of process philosophy, post-reductionist science, particularly ecology and biosemiotics, institutional economics and a renewed, process form of virtue ethics. It is an argument for a

¹ This was at the 10th. International Whitehead Conference, *Seizing an Alternative: Toward an Ecological Civilization*, held at Pomona College, Claremont, California, 2015.

² Herman E. Daly and, John B. Cobb Jr., *For the Common Good: Redirecting the Economy toward Community, the Environment, and a Sustainable Future*, Second Edition. (Beacon Press, Boston, 1994).

radical cultural shift which must start with our fundamental metaphysical categories as the condition for creating a politics and ethics of eco-poiesis, or home-making.³

An important concept in Gare's work is that of health, as an ecological civilization is one which should be generally healthier than our current conditions. In his Manifesto, he argues that ecosystems '...can be healthy or unhealthy.' From an ecological process perspective which, drawing on Daly and Cobb, sees ecosystems as communities of communities, Gare conceives of health in the following statement:

Health is characterized by mutual augmenting of the whole community and the component communities of each other, facilitating their continued successful functioning, their resilience in response to perturbations, new situations and stress, and for ongoing development and creativity to maximize developmental options, and can be measured as such. Characteristically, health is associated with the generation of forms consisting of mutually augmenting centres at multiple scales.⁴

Gare's conception as a process philosopher situates him within the rich tradition of holism in respect to health. Health in its etymology has roots in the notion of wholeness. The word is fundamentally a metaphor analytically composed of four consonants and two vowels, which expresses the sound that we make to express the vague feeling of wholeness we sometimes experience. It is this vague feeling of wholeness and its achievement which is of prime importance to process philosophers and the telos of an ecological civilization. Modern process philosophy emerged to defend holism from the fragmenting effects of mechanical and analytical approaches, particularly those associated with the emergence and development of the reductive scientific method and its focus on de-contextualizing, reducing and quantifying reality in order to control it. Process Philosophy's mission has been to expose these methods as being highly abstract and over-simplified and therefore unable to capture the true complexity and dynamic nature of reality. The purpose of this paper, therefore, is to contribute to the creation of an ecological civilization by deeply

³ Arran Gare, *The Philosophical Foundations of Ecological Civilization: A Manifesto for the Future*, (Routledge, New York, 2017) Kindle DX Edition.

⁴ Arran Gare, *The Philosophical Foundations of Ecological Civilization*, *ibid.*, Ch. 6.

exploring the relationship between health and wholeness revealing some of the fragmenting effects of current dominant approaches to health. These fragmenting effects are products of the continued dominance within human consciousness of 17th and 18th Century deterministic mechanical philosophy and its reduction of all in the universe to individual atoms moving purposelessly through absolute space. This mechanical metaphysics and the scientific method it spawned, originating in theories in physics about the nature of matter, motion and inertia designed to counter the teleological physics of Aristotle, has and does, still influence the view in health that complex, mindful organisms can be reduced to their mindless components. As Terence Deacon argues in his book, *Incomplete Nature: How Mind Emerged from Matter*, it is a view which fails to account for those non-material processes which are fundamental to life such as purpose, values and meaning.⁵ The most recent example of this view is the New Mechanical Philosophy movement which unsuccessfully tries to dress up mechanical reductionism in the new clothing of complexity.⁶ My contention in this paper is that the relationship between holism and atomistic mechanical philosophy needs to be understood, dialectically. In a similar way to that in which psychiatrist, Iain McGilchrist sees the analytical left hemisphere of the brain needing to be subordinated to the holistic right hemisphere, mechanical thinking, which expresses a truth about our nature, needs to be subordinated to holistic thought.⁷

A broader and deeper engagement with process metaphysics will help subordinate (not eradicate) mechanical thinking and in doing so, illuminate the work of a range of brilliant holistic thinkers over millennia largely ignored thanks to the dominance of the mechanical view. One such thinker is Hubert L. Dunn who is credited with introducing the concept of wellness in a paper he presented to a meeting of the Middle States Public Health Association in 1958. Inspired by the preamble to the World Health Organization's constitution in 1948 which stated that, 'Health is a state of complete physical, mental and

⁵ Terence W. Deacon, *Incomplete Nature: How Mind Emerged from Matter*, (W.W. Norton and Company, New York, 2010).

⁶ A recent defense of this movement is in Stuart Glennan, *The New Mechanical Philosophy*, (OUP, Oxford, 2017).

⁷ This is in Iain McGilchrist, *The Master and his Emissary: The Divided Brain and the Making of the Western World*, (Yale University Press, New Haven, 2009) Kindle DX Edition.

social well-being and not merely the absence of disease or infirmity,' this remarkable paper explores a positive approach towards optimizing wellness.⁸ In 1958, Dunn anticipated problems which he believed would plague humanity in the future, such as a shrinking world in relation to communications technologies, an overcrowded and aging world thanks to higher life expectancy with no adjustments to birth rates and mounting tensions due to the increasing tempo and demands of life '...with no corresponding readjustment and strengthening of the inner man and the fabric of his social organization.'⁹ Dunn conceived of health, not as part of a static dichotomy but as a dynamic graduated axis where one can locate oneself moving somewhere between peak wellness and death. He linked the human development process towards greater maturity and wisdom to the process of living a healthy life.

Philosopher of health, David Seedhouse, has also proposed holistic theories of health.¹⁰ For Seedhouse, the foundations of health lie in the social, environmental and cultural conditions from which physical and mental disorders emerge and such disorders cannot be abstracted from these foundations. While this is an important advance on dominant mechanistic and reductionist approaches to health which Seedhouse criticizes, like Dunn and many philosophers these days he fails to engage with metaphysics and root his health foundation in an explicit theory of nature. It is not enough to assume that your theory is holistic because you have combined previously disparate components or added seemingly unrelated ones into your foundation. The nature of your foundation, whether it is static or dynamic, analytical or dialectical, needs to be questioned. This is why my understanding of health is rooted in process metaphysics as a tradition of thought which, I argue, justifies and makes coherent holistic approaches to health while revealing the deficiencies of atomism and reductionism. One of the more successful holistic theories of health in this regard, is provided by Fritjof Capra in his 1982 book, *The Turning Point: Science, Society and the Rising Culture*. As a physicist, Capra

⁸ Hubert L. Dunn, High Level Wellness for Man and Society, A.J.P.H., Vol. 49, No. 6, 1959, at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1372807/pdf/amjphnation00322-0058.pdf>.

⁹ Ibid., p. 787.

¹⁰ David Seedhouse, *Health: The Foundations of Achievement*, Second Edition, (John Wiley and Sons, New York, 2001) Kindle DX Edition.

examines holism in relation to new understandings in physics which reveal the wisdom of some ancient cultures while highlighting errors in the mechanistic approaches of those such as Descartes and Newton, pointing the way to creating a new holistic health paradigm. In Capra's model,

...illness is a consequence of imbalance and disharmony, often stemming from a lack of integration, which may arise at various levels of the organism and, accordingly, may generate symptoms of a physical, psychological or social nature...The development of illness involves the continual interplay between physical and mental processes that reinforce one another through a complex network of feedback loops. Disease patterns at any stage appear as manifestations of underlying psychosomatic processes that should be dealt with in the course of therapy. This dynamic view of illness specifically acknowledges the organism's innate tendency to heal itself – to reestablish itself in a balanced state – which may include stages of crisis and major life transitions.¹¹

A more recent holistic approach to health and medicine comes from physicist and philosopher, Ervin Laszlo and medical doctor, Pier Mario Biava. In their book, *Information Medicine: The Revolutionary Cell Re-Programming Discovery that Reverses Cancer and Degenerative Diseases*, they base their holistic understanding of health on a contentious cosmology of a vibratory, non-random universe in which the manifest world of matter is in-formed, using physicist David Bohm's term, by a fundamental attractor which is itself outside of spacetime. The in-formed coherence of the universe becomes the basis for the in-formed coherence in living organisms and disease is seen as a lack of, or blockage to, access to in-formation. As they argue:

Health is an adequate level of coherence in the organism, a condition brought about and maintained by adequate access to the information that "forms" the living organism.

Disease is a level and form of incoherence in the organism, indicating inadequate access to in-formation. (Diseases can be classified according to the types and levels of the blockages that cause them.)

Diseases are pathologies of in-formation, and they are simultaneously individual and collective. They are individual when they appear to affect a single subject.

¹¹ Fritjof Capra, *The Turning Point: Science, Society and the Rising Culture*, (Bantam, New York, 1983), p. 331.

This, however, is illusory. Given that organisms are dynamic elements in the biosphere, which is an intrinsically whole system, the notion of individual disease is an abstraction. Disease is a factor in the collective condition of living organisms on the planet.¹²

From holistic physicists to holistic biologist, Brian Goodwin also provides a more successful holistic theory of health based as it is in his processual, hierarchical and vibrational understanding of complex living systems. As he argues:

Organisms are intentional agents, engaged in expressing their natures, which have a “qualitative perfection which requires no external completion,” as Kant puts it. Their worth resides in their existence rather than in their results. This is what we see when we understand organisms as part of the complex matrix of relations from which the forms and patterns of living order emerge...The recognition of species as natural kinds, expressing the generic forms of living nature that arise by creative emergence from a dynamic process located at the edge of chaos, carries with it implications about our relationships with the species making up our intricate web of mutual dependence that makes our life on the planet possible. These are now practical issues of life or death that are intimately connected with our attitude toward nature. If organisms are seen as mechanisms, they will be treated as such, and as such we will treat each other. The very concept of health, of wholeness, disappears, just as organisms do from modern biology. A biology of parts becomes a medicine of spare parts, and organisms become aggregates of genetic and molecular bits with which we can tinker as we please, seeing their worth entirely in terms of their results, not in their beings. This is the path of ecological and social destruction.¹³

Goodwin, Capra and Laszlo and Briava, having engaged in rigorous inquiry into the nature of life and the universe, have come to represent the general view in holistic health that living organisms need to be understood as whole and therefore irreducible, with a fundamental tendency towards generating their dynamic wholeness through balancing opposing forces. Illness, or disease in general, which is seen to transcend the abstract distinction between physical and mental, is then understood in relation to fragmenting,

¹² Ervin Laszlo and Pier Mario Briava, *Information Medicine: The Revolutionary Cell Re-Programming Discovery that Reverses Cancer and Degenerative Diseases*, (Healing Arts Press, Vancouver, 2019) p.p. 26-27.

¹³ Brian Goodwin, *How the Leopard Changed its Spots: The Evolution of Complexity*, (Princeton University Press, New Jersey, 2001), p.p. 231-232.

unbalancing obstacles which, given the right conditions, organisms can overcome to restore balance with minimal external intervention. This is in contrast to the mechanistic belief that as faulty, inferior machines we must be continually tinkered with from without to remove all of our flaws to make us more enduring and efficient. It is the nature of fragmenting, unbalancing obstacles, therefore, and our perception of them, as well as our ability or inability to overcome them and restore balance, which are of primary concern. This view can be understood in relation to Georg Hegel's dialectical approach developed in his *Phenomenology of Spirit*, which he characterizes as a historical movement from abstract to negative to concrete.¹⁴ For Hegel, the development of self-consciousness is an evolutionary process in which our abstract, or simplistic views are negated leading to synthesis in the form of a more concrete, or complex understanding (a condition for positive freedom for Hegel). Overcoming the destabilizing effects of negation takes us from a relatively naïve to informed understanding of reality. Applying this to holistic health, we can see organisms grow through encountering and overcoming negating, or fragmenting obstacles, developing more mature levels of dynamic stability. In the case of self-conscious humans, a more informed holism emerges from similar processes.

Through a deep engagement with process metaphysics, incorporating dialectics, which underpins all of my work, I seek to give support to holistic thinkers by deepening understanding of holistic approaches to health, particularly by revealing their ontological primacy, or in other words, their better grip on reality. I will argue that in an ecological civilization health will need to be understood in process terms as a dynamic field. Such a field will be understood as acting as a higher level constraint on multiple other fields generating the conditions for the continual striving for wholeness. The relatively vague and dynamic nature of fields, I will argue, reveals the interrelated and co-dependent nature of life in the universe as well as the potential for taking future alternative paths and can best be made sense of from the perspective of process metaphysics. Such a complex, processual, holistic

¹⁴ Hegel develops this understanding of consciousness development in G. W. F. Hegel, *Phenomenology of Spirit*, (Oxford University Press, Oxford, 1977)

field has yet to be created and so must first be conceived of. From a process perspective reality is never fully realized but is always in dialectical processes of becoming, so for a health field to exist it must be continually conceived of in order to be generated; it cannot be assumed. The current health field, I will argue, is dominated by fragmenting obstacles to health in the form of the abstractions of mechanical and materialist metaphysics which obscure the fundamentally holistic nature of reality and in so doing, ironically force us to consciously generate it, which is the point of this paper.

Of primary importance for an ecological civilization will be the continual creation of conditions which generate potential for new life. I acknowledge that as it is measured and conceived within the mechanical and reductionist paradigm, health indicators have improved dramatically over the past one hundred years and there is much to be thankful for. In many ways human life has flourished. But our success, built as it is on the gross misconceptions of reality generated by mechanical metaphysics, has fuelled a fantasy that we can have total control over natural processes, the consequences of which are already impairing our success. The health problems generated by this defective thinking are too numerous to cover in this paper. Nor is there space to cover the health impacts of inequality and the anti-democratic neoliberal shift to user pays approaches to funding healthcare which leave lower income earners vulnerable.¹⁵ My focus here will be on metaphysics, dialectics, energy use and the concrete example of the growing global problem of Type Two Diabetes, a condition that is already contributing to reductions in life expectancy. The question such health conditions poses is whether we can as a species continue to augment our own health without accelerating entropy and destroying the conditions for life generally. Humanity has made what can best be characterized as a 'Faustian' bargain in being prepared to ultimately destroy our integrity for a limited sense of control.

I present this paper as a general overview of the sorts of ideas and ways of thinking about health which will help define an ecological civilization and

¹⁵ The damaging effects of the neoliberal privileging of private health insurance over universal cover is revealed in Stephen Duckett, 'Coercing, Subsidising and Encouraging: Two Decades of Support for Private Health Insurance' in *Wrong Way: How Privatisation and Economic Reform Backfired*, Damien Cahill and Phillip Toner (Eds.) (Latrobe University Press, Carlton, 2018).

follows on from my paper on *The Obesity Crisis and Semiotic Corruption*.¹⁶ Each of these ideas will require more in-depth elaboration and development in future work. First, however, how has the word ‘health’ come to have lost its original meaning?

TODAY’S FRAGMENTED HEALTH FIELD

As I proposed earlier, an ecological civilization should be one which is healthier than what we now have or have had in the past. But what is wrong with health in the world now? Statistics on global health give a picture of a world which has seemingly been getting healthier according to various measures since 1800. As Ortiz-Ospina and Roser reveal, life expectancy has increased dramatically across the globe with recent gains in developing countries reducing inequalities. There have been major reductions in child mortality and maternal mortality as well as reductions in mortality from communicable diseases such as malaria, tuberculosis and HIV. Vaccination has been perhaps modern medicine’s greatest success here, a practice that arguably has its roots in more holistic processes of self-healing.¹⁷ The data also shows growth in healthcare expenditure in the world and a strong link between such expenditure and improved life expectancy, a link which seems to justify increasing affluence through economic growth. In developed nations like Australia, for example, many of us are living relatively safe and productive lives into our 80’s.¹⁸ Other data, however, reveal that global health is going through a transition from infectious diseases being the major killer to disease related to modern lifestyles, including increased longevity, such as heart disease, cancer, diabetes, obesity and mental illness.¹⁹ These now account for 70 percent of all global deaths,

¹⁶ Glenn McLaren, ‘The Obesity Crisis and Semiotic Corruption, Towards a Unifying Biosemiotic Approach to Obesity’, *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 11, no. 1, 2015 at <https://www.cosmosandhistory.org/index.php/journal/article/viewFile/476/783>.

¹⁷ The history of inoculation and vaccination shows its roots in Indian practices, which could have started as early as 200 BCE, of introducing matter from smallpox scabs to people either through scratching the skin or breathing it in. ‘Early Chinese Inoculation’, *The History of Vaccines*, The College of Physicians of Philadelphia at https://www.historyofvaccines.org/timeline#EVT_1, (Accessed 7/4/2019).

¹⁸ Esteban Ortiz-Ospina and Max Roser, ‘Global Health’, *Our World in Data*, 2018 at <https://ourworldindata.org/health-meta>, (Accessed 18/1/2018).

¹⁹ Regular World Health Organization Reports show the growing concern over what are termed Non-Communicable Diseases as today’s major threats to health and economic development.

most of which are now occurring in poor or developing countries and threaten to reverse life expectancy improvements as we are now seeing in the USA.²⁰²¹ We are also seeing emerging problems with dementia at younger ages, anxiety and depression, allergies, auto-immune diseases, poor nutrition, addiction, sleep deprivation, sedentary behaviour, the re-emergence of some diseases thought to be eradicated and problems of antibiotic resistance, to name a few. But arguably the biggest health threat emerging is anthropogenic climate change which threatens to destroy our species if not most other life on the planet. So, despite undoubted progress in many areas, new more serious problems keep emerging to challenge us largely as a consequence of our progress.

Health problems, even today when so much more is understood about the complex, dynamic and interrelated nature of reality, are still largely seen in a non-dialectical way as being capable of being abstracted, isolated and reduced to their smallest causal factors. For example, Fran Baum, in her historical overview of the evolution of health definitions, argues that modern health has become dominated by a 'clockwork' biomedical perspective. According to her, 'Health is defined as the body operating efficiently like a machine. Any breakdowns in the body system means that it is not healthy.'²² Medical science, as those such as Seedhouse argue, still treats health as reducible to the destruction and manipulation of independent diseased components abstracted from the real multiplicity of relations disease involves. According to Laszlo and Briava,

Modern medicine is largely focused on applying compensatory measures. Faced with a disease, or a condition of less than optimum health, physicians turn to biochemical remedies, to radiation therapy, and if necessary to surgery, to reestablish the coherence of the organism. Modern medicine's therapeutic

'Noncommunicable Diseases Progress Monitor', *World Health Organization*, Geneva, 2017 at <http://www.who.int/nmh/publications/ncd-progress-monitor-2017/en/>, (Accessed 21/1/2018).

²⁰ 'Noncommunicable Diseases Progress Monitor', 2017, op. cit.

²¹ K.D. Kochanek, S.L. Murphy, J.Q. Xu, E. Arias, *Mortality in the United States*, 2016. NCHS Data Brief, no 293. Hyattsville, MD: National Center for Health Statistics. 2017.

²² Fran Baum, *The New Public Health: An Australian Perspective*, (Oxford University Press, Melbourne, 1998), p. 11.

measures offer cures to scores of ailments, but they are not the simplest and the most effective way to preserve and restore health.²³

Mark Beresford, identifies four types of reductionism currently dominating healthcare: evidence based reductionism, where evidence based medicine relies on the necessary over-simplifications of randomised controlled trials and meta-analyses; reductionism in the clinic, which sees more reliance on narrow specialization; statistical reductionism, which relies on limited and restrictive data inputs and greedy reductionism, which seeks the causes of phenomena at the lowest point of reduction.²⁴ In universities and research institutions, we tend to see these reductionisms in the favouring of multi-disciplinary approaches over trans-disciplinary ones, where a pseudo holism is created by bringing mechanistic and reductionist research projects together. Seedhouse similarly argues that the view which ‘...currently overwhelms the thinking of governments, policy-makers and news media throughout the Western world, and our health systems...’ is that health problems only exist in individuals and therefore the focus is on ‘...applying clinical techniques to specific parts of individual bodies and minds’ in abstraction from social and environmental influences.²⁵ He further argues that: ‘Medicine is interested in how these problems are caused, but only secondarily. What matters most, is dealing with health problems as the clinical system encounters them.’²⁶

A good understanding of how and why defective, fragmented thinking is leading us down a perilous path in health can be gained from those who are arguably most directly engaged in creating the conditions for health, holistic farmers. Charles Massy is a human ecologist and a farmer and is part of a tradition of farmers and scientists in agriculture who are rejecting mechanistic approaches and embracing holistic ones. In his recent book, *Call of the Reed Warbler: A New Agriculture, A New Earth*, Massy argues that today’s industrial approach to agriculture is rooted in mechanical and reductionist thinking

²³ Ervin Laszlo and Pier Mario Briava, op. cit., p. 29.

²⁴ Mark J. Beresford, ‘Medical Reductionism: Lessons from the great philosophers’, *QJM: An International Journal of Medicine*, Volume 103, Issue 9, September 2010, p.p. 721–724, at <https://doi.org/10.1093/qjmed/hcq057>

²⁵ David Seedhouse, *Health: The Foundations of Achievement*, op. cit., Introduction.

²⁶ Ibid, Introduction.

which treats the land as radically separate from the humans who exploit it.²⁷ He cites many examples of how this approach has contributed to desertification, salination and toxicity from chemical use which is destroying the conditions for sustainable food growth. He further argues that this is disastrous for health because embracing the old adage that we are what we eat, through excessive human intervention and control and ignorance of the highly complex, self-organizing nature of reality, the nutritional quality of our food has been degraded. Therefore, although we have an abundance of food in developed parts of the world, much of it is lacking in vital micro-nutrients that are necessary for the health of vital ecosystems, such as the micro-organisms in our guts. He cites various studies showing the loss of nutrients today compared to the past and points to some traditional cultures with much more diverse diets and little or no incidences of the non-communicable diseases which now plague the developing and developed world. Massy particularly focuses on epigenesis, the idea that dietary patterns, among other things, of one generation will impact genetically on future ones. He argues that our current industrial approach to agriculture, where private corporations and their scientists are now the authorities rather than holistically oriented farmers, will negatively impact health for generations to come.²⁸

In arguing that at the root of these problems is an inability to understand the dynamic, interrelated, self-creating nature of reality, a lack of an emergent mind, as he puts it, Massy stamps himself as a process thinker. In taking a holistic approach, one he arrived at after directly experiencing the dialectic between natural and industrial approaches to land management, he is able to reveal the problem of fragmentation through narrowly addressing and measuring health through a mechanistic and reductionist lens. He shows us that the improved outcomes in human health we have seen, such as greater life expectancy, are derived by excluding from the calculations the multiplicity of health problems in multiple domains that we have created in the process; problems such as soil degradation and the introduction of new toxins into food systems. Mechanical and reductionist approaches succeed by over-simplifying

²⁷ Charles Massy, *Call of the Reed Warbler: A New Agriculture, A New Earth*, (University of Queensland Press, Queensland, 2017).

²⁸ *Ibid*, Ch. 21.

health problems; reducing their complexity to more limited domains that can be more easily managed to generate clearer outcomes. They deny however, the implications of emergence in which wholes have qualities different to those of their components and so cannot be reduced to their components. It is this myopia of dominant orthodox scientific approaches which distorts the bigger picture creating, from a semiotic perspective which focuses on sign production and meaning, the problem of what Arran Gare has termed semiotic corruption, in which the signs produced by a level of constraint in one field distorts the signs necessary for the generation of life in others.²⁹ The problems with such narrow and over-simplified approaches to reality and their implication in making things worse were famously addressed by Horst Ritter and Melvin Webber in their paper titled, 'Dilemmas in a General Theory of Planning.' Here they introduced the distinction between 'tame' and 'wicked' problems in looking at the limits of scientific rationality and efficiency in addressing problems of immense complexity.³⁰ From a process perspective, all problems are wicked in the sense that they are fundamentally irreducible and from a dialectical perspective, all attempts to solve problems will result in generating further ones which may be even more intractable than the original.

A problem of over-complication through applying simplistic solutions to complex problems is discussed by scientist, Samuel Arbesman, in his book, *Overcomplicated: Technology at the Limits of Comprehension*.³¹ He argues that our seemingly simple quest for control of natural processes has led us to create technologies which we may no longer be able to control because their complexity is beyond our ability to comprehend. Arbesman sums up the problem in saying:

In 1950, Alan Turing noted that machines can and will yield surprises for us in their behaviour. And it seems that these surprises will only increase in

²⁹ Gare uses this concept to understand the way the findings of climate science are undermined by opponents confusing the message. In Gare A., 'The Semiotics of Global Warming: Combating Semiotic Corruption', *Theory and Science*, Vol. 9, Issue 2, Spring, 2007 at <http://theoryandscience.icaap.org/content/vol9.2/Gare.html>.

³⁰, Horst W. J. Rittel and Melvin M. Webber, 'Dilemmas in a General Theory of Planning', *Policy Sciences*, 4:2 (1973: June), p.155-169.

³¹ Samuel Arbesman, *Overcomplicated: Technology at the Limits of Comprehension*, (Penguin Random House, New York, 2017), Kindle DX Edition.

frequency. As we build systems that become more and more complicated, there is a greater divergence between how we intend our systems to act and how they actually do act...Bugs and glitches are the unexpected and unwanted by-products of the complexity of our technology. They are not only inevitable whenever a system is complex enough; they are the first hints that we are inching ever closer to complete dependence on systems that we don't understand well at all. These technological werewolves are the heralds of the entanglement.³²

According to Arbesman, this potentially dangerous situation has emerged due to a lack of thinking over multiple levels, in other words, holistic thinking. He argues that we need a balance between thinking like physicists, which is more abstract and general, and thinking like biologists, who focus in on the details, in order to capture the bigger picture of what is going on; in other words, dialectical thinking.³³ In concluding his book, Arbesman calls for a resistance to either fearing technology or worshipping it, both of which prevent progress in understanding. Instead he argues for greater humility and an understanding of the limits of human knowledge while recognizing that uncertainty will always be an inescapable product of our technological development.³⁴ Arbesman's solutions are similar to Massy's and in line with my own thinking in suggesting that we must learn to be more humble and participate within natural processes rather than continually try to control and manipulate them. The processes of regenerative agriculture which Massy and his tradition are promoting, requires an appreciation of the beauty and creativeness of nature and its ability to heal itself if given the right conditions. These conditions generally require minimal human intervention. Minimal intervention also means minimal use of energy, which in turn means minimal creation of entropy. This then brings us to another related problem with our mechanistic approaches to health; excessive energy use.

According to Arbesman, '...as our technologies become more complicated, and we lose the ability to understand them, our responses tend toward two

³² Ibid., Ch. 4.

³³ Ibid., Ch. 5.

³⁴ Ibid., Ch. 6.

extremes: fear and awe.³⁵ In a paper of mine on *The Triumph of Virtual Reality and its Implications for Philosophy and Civilization*, I examined this feeling of awe by looking at the relationship between technological progress, mechanistic materialist thinking and trans-humanism.³⁶ Trans-humanism is an ideology which fundamentally sees the natural process of human evolution leading to transcendence of our biological constraints. In Zoltan Istvan's novel, *The Transhumanist Wager*, he reveals the goal of transhumanists is to use unconstrained technology to become immortal and impervious to pain.³⁷ An excellent and disturbing example of trans-humanist thinking in health is found in a paper by Renata Bushko, Director of the Future of Health Technology Institute, where she argues that errorless, invisible, continuous and infrastructure-free healthcare can be achieved by introducing Intelligent Caring Creatures (ICC's) or 'healthons' into the human lifeworld. These are artificially intelligent robots that operate autonomously both within and without us to monitor and control our health indicators, relieving our flawed, error-prone biological systems of the burden.³⁸ As I have just discussed in relation to Arbesman, the idea that technology can eradicate error has no basis in reality and therefore the goal of eradicating error is potentially very dangerous for the future of life. Related to this, the main danger of transhumanism is that, as I argued in my paper and Istvan reveals, it is an ideology which does not just aim to augment nature through technology, it often holds biological nature in contempt. It is anti-dialectical in often ignoring our interrelatedness to other levels in nature and in seeking to narrowly define health as the successful overcoming of biological constraints. It is the overcoming of such constraints which has been the key to the successes of modern health practices. In particular, the ability, using technology, to intrude into smaller and faster spatio-temporal worlds, or micro-worlds, and manipulate them to suit our purposes, has been one of our greatest

³⁵ Ibid., Ch. 6.

³⁶ Glenn McLaren, 'The Triumph of Virtual Reality and its Implications for Philosophy and Civilization', *Cosmos and History*, Vol. 8, No. 1, 2012 at <https://www.cosmosandhistory.org/index.php/journal/article/viewFile/292/462>, (Accessed 8/2/2018).

³⁷ Zoltan Istvan, *The Transhumanist Wager*, (Futurity Imagine Media LLC, 2013) Kindle DX Edition.

³⁸ Renata G. Bushko, 'Healthons: Errorless Healthcare with Bionic Hugs and No Need for Quality Control', *Future of Intelligent and Extelligent Health Environment*, (IOS Press, Amsterdam, 2005) p.p. 3-14.

achievements. Intrusions into domains other than our own, however, require energy and have consequences, particularly ones associated with the artificial regulation of rates of processes at multiple levels. They raise two further major problems with our current approaches to health.

The first is the problem of the high energy use of our medical interventions and the second is our related lack of appreciation for the probable devastating consequences of such high energy interventions. Much of the success and rapid improvements in health over the past 100 years, or more, I argue, particularly for the most privileged, have been strongly correlated with fossil fuel use. Currently over 80% of our global energy comes from fossil fuels and in a 2012 study, it was estimated that 8% of total US greenhouse gas emissions were generated by health-related services which is equivalent to Australia's total greenhouse gas production.³⁹ A 2016 paper calculated that the practice of healthcare generated enough pollution to kill anything from 44,000 to 98,000 people per year in the U.S., a similar number to those who die in hospitals from medical errors.⁴⁰ Despite this, the development and application of new energy consuming technologies is a major driver of today's healthcare with a new push into digital health technologies.⁴¹ This suggests that the very systems designed to improve our health are partly responsible for undermining it.

The relationship between growing human prosperity, including improved health, technology and higher energy use has been examined in great detail by Vaclav Smil in his recent book, *Energy and Civilization: A History*. Smil, particularly points to the unprecedented improvements in human health brought about by the exploitation of fossil fuels to generate electricity when he says:

No other form of energy has had a more wide-ranging impact on rising quality of

³⁹ L.H. Brown et. al., The Energy Burden and Environmental Impact of Health Services, at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3519304/>, (accessed 20/7/2017).

⁴⁰ Matthew Eckelman and Jodi Sherman, 'Environmental Impacts of the U.S. Health Care System and Effects on Public Health', *PLoS One*, 11 (6), 2016 at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4900601/>, (Accessed 14/2/2018).

⁴¹ Al-Razouki Mussaad, Seven global medical technology trends to look out for in 2017, *World Economic Forum*, 2016 at <https://www.weforum.org/agenda/2016/12/seven-global-medical-technology-trends-to-look-out-for-in-2017/>, (Accessed 14/2/2018).

life than the provision of affordable electricity: on the personal level the effects have been pervasive and life-spanning (premature babies are kept in incubators, vaccines to inoculate them are kept in refrigerators, dangerous illnesses are diagnosed by noninvasive techniques in time to be treated, the critically ill are hooked up to electronic monitors).⁴²

While there is non-linearity in the relationship and Smil is careful to stress the complexity of history and not reduce it to energy use, he reveals that the improved health, longevity and material prosperity that many modern humans enjoy would have been ‘...impossible without abundant, inexpensive and precisely controlled flows of energy...’ thanks to the burning of fossil fuels and despite the recent shift to renewables, this dependency is not likely to reduce in the short term as our demands for energy continue to increase.⁴³ What Smil reveals is the complex dialectic playing out between the costs and benefits of higher energy consumption. A particular focus of Smil is on attempting to calculate the optimal energy use in gigajoules (GJ) per capita for sustaining a good quality of life. He correlates health indicators with energy consumption and finds that:

Physical conditions that now prevail in affluent Western societies – infant mortalities below 10, female life expectancies above 80 years, and, needless to say, a surfeit of food – can be combined with high rates of house ownership (more than half of households), good access to post-secondary education, and HDI above 0.9 at energy consumption levels as low as 110 GJ per capita.⁴⁴

But even at levels of consumption above 50 GJ, he argues, studies show that there are rapidly diminishing returns and even no gains in quality of life. The problem he identifies is that affluent, developed countries such as the U.S. and Canada, have per capita consumption levels three times the 110 GJ figure and this is increasing as dependence on energy outstrips efficiencies in energy intensity. Developing nations are also rapidly increasing global consumption.

⁴² Vaclav Smil, *Energy and Civilization: A History*, (The MIT Press, Cambridge, 2017), Kindle DX Edition, Ch. 9.

⁴³ Vaclav Smil, *Energy at the Crossroads: Global Perspectives and Uncertainties*, (The MIT Press, Cambridge, 2003) Kindle DX Edition, Ch. 1.

⁴⁴ Vaclav Smil, ‘*Science, energy, ethics, and civilization*’, in *Visions of Discovery: New Light on Physics, Cosmology, and Consciousness*, R.Y. Chiao et al. eds., (Cambridge University Press, Cambridge, 2010), p. 725.

Smil concludes that to ‘...so operate as to stabilize the total mass of the organic system, to limit the rate of circulation of matter through it, and to leave an unutilized residue of matter and available energy in order to ensure the integrity of the biosphere,’ humanity needs to consume no more than 75 GJ per capita.⁴⁵

As I discussed earlier, technology obsessed health services are a large contributor to growing energy demand. The move towards digital health through use of mobile phones will create efficiencies but also grow the ever-expanding demand for energy with Smil predicting that the electrifying of the world’s information and communication networks will consume 10 percent of the world’s electricity generation by 2020.⁴⁶ Given the current global reliance on fossil fuels and the accelerating impacts of climate change, this is unsustainable, particularly given our increasing demands for energy in other fields. For continued healthy conditions for life on the planet to continue, or regenerate, our health services, like all others, will need to be more conscious of their energy consumption and aim at Smil’s figure of 75 GJ per capita. Even with the transition to renewable energy, therefore, which we are seeing, the case can be made for lower energy approaches to healthcare to reduce the strain on resources and ecosystems more generally and slow the rate of entropy. Towards this end, we should adopt the sort of hierarchy of therapeutic intervention developed and adopted within the naturopathic field, a move which would make a largely mechanical, reductionist and transhumanist health field, uncomfortable.⁴⁷ Whereas conventional medicine now increasingly uses energy intensive technologies as the first line of defence against disease, the naturopathic therapeutic order sees such interventions as the last resort. This is based on a holistic view similar to farmers like Massy, that before we seek to intervene to actively cure a problem, we should first remove any obstacles which may be preventing the problem from curing itself, a process those such as Massy and Smil have shown uses far less energy and produces more

⁴⁵ Ibid., p. 728.

⁴⁶ Vaclav Smil, *Energy and Civilization*, op. cit., Ch. 9.

⁴⁷ J. Zeff, P. Snider & S.P. Myers, 'A hierarchy of healing: the therapeutic order', in J. Pizzorno & M.T. Murray, *Textbook of natural medicine: volume 1, 3rd edn*, (Churchill Livingstone Elsevier, St Louis, Missouri, USA, 2006), pp. 27-39.

sustainably healthy results.

These emergent problems suggest that the story of human health told by some of our global health data, that it is a simple linear progression, is a misleading one. To understand the true complexity of this story a holistic, dialectical approach is needed. For example, in 2002, political scientist and statistician, Bjørn Lomborg, wrote a paper titled, *How Healthy is the World?* The paper also included a commentary on Lomborg's contribution by epidemiologist, Anthony McMichael, titled, *Gilding the Global Lily*.⁴⁸ Lomborg is well known for being a supporter of economic development through technology, free markets, free trade and pareto optimality and for being optimistic about humanity's future. He therefore tends to focus only on economic indicators of health and is among those who see linear progress tied to economic growth. He argues that humans have never been healthier based on data showing increased longevity, increased prosperity and increased welfare. He also expresses confidence that food production will be able to keep up with population growth without the need for more de-forestation and that availability of cheap energy will increase. Perhaps most controversially, he argues that climate change will not have a severe impact on humanity and so is not a priority. In his reply, McMichael, known for his expertise on the effects of climate change on health, argues that Lomborg's optimism reveals a '...a blend of naivety and ignorance.'⁴⁹ Underlying humanity's successes in solving local problems and increasing wealth, leisure and life expectancy is a growing 'ecological deficit' as natural systems deteriorate under the weight of our exploitation. This poses long term threats to health. McMichael also stresses that those such as Lomborg make the mistake of believing that past performance will guarantee future success. He distinguishes between what he calls linear and systemic optimists in arguing that:

Researchers broadly comprise linear optimists and systemic optimists. Linear optimists, including most economists and demographers, see progress as a linear and open ended process, buoyed up by human ingenuity, technological advance,

⁴⁸ Bjørn Lomborg, 'How Healthy is the World?', *BMJ*, 2002 Dec 21; 325(7378), p.p. 1461–1466, at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC139042/>, (Accessed 11/2/2018).

⁴⁹ Ibid.

and market stimuli and unconstrained by ecological limits. There is a cornucopian world view, based on a “growth is good” philosophy. Systemic optimists, which include most environmental scientists, most ecologists, and many social scientists, believe that the natural and social worlds comprise complex systems with non-linear processes, thresholds, and feedback processes. There are optimal conditions and natural limits. This group recognises that development is not synonymous with growth and seeks out sustainable strategies. Their optimism is predicated on humans' capacity—albeit latent—to imagine the future and act pre-emptively.⁵⁰

It is dialectics such as this which reveal that the true story of global health is a highly complex, multi-level one. The story of human progress at one level cannot be abstracted from the stories of the damage such progress has inflicted on multiple other levels of reality. As long as human health improves at the expense of other species and the natural conditions for life, we are nowhere near the pareto optimality Lomborg pursues and we cannot call ourselves healthy. Systemic or non-linear optimism is rooted in process philosophy which recognizes the irreducible complexity of emergent processes and the importance of natural limits, or constraints as the condition for healthy order. At the same time, as a dialectical thinker, I cannot deny the emergent nature of linear thought in human beings and our ability, to not only imagine unconstrained development, but to act in a fixated way to try to make it our future reality. Our rapid technological development and improvements in the quantity and quality of life for many, as well as the brilliant and dedicated work of many of those working in the field, are to be appreciated as achievements of abstract thought and not simply dismissed as all problematic. After all, philosophy itself is an achievement of human abstract thought and so creates its own problems. That is why it is the relationship between Lomborg and McMichael and not their views in isolation which needs to be the focus and which points the way towards more holistic approaches to health. Through a dialectical understanding, creating progress towards better health can be seen in relation to its true multi-levelled complexity where human potentiality is always in relation to the natural limits to our development, which are the conditions for our existence in the first place. From this perspective, Lomborg's

⁵⁰ Ibid.

view, while expressing an important human perspective and mode of thought, is revealed to be lacking the multi-levelled complexity of the more holistic perspective of McMichael. Lomborg's view, therefore, should be subordinated to McMichael's. Dialectical thinking, however, which has been acknowledged as the highest level of cognition in humans, faces many obstacles, the greatest of which is perhaps the dominance of mechanical metaphysics.⁵¹

From the perspective of a holistic process metaphysician, the successes and emerging failures in global health have their origins far deeper than the simplistic economic arguments of those such as Lomborg. They are fundamentally the products of misconceptions of the nature of reality. As I discussed earlier in the paper, process philosophy emerged to challenge the dominance of mechanical metaphysics and scientific materialism emerging with the Enlightenment arguing that it commits the fallacy of misplaced concreteness. The history of this dominance and its damaging effects, particularly on the environment, are discussed at length by Gare in his major work, *Nihilism Inc.: Environmental Destruction and the Metaphysics of Sustainability*.⁵² This is a story of humanity losing its sense of reality through uncritically immersing itself in the abstract products of its imagination. Gare's work, however, represents many generations of holistic, process oriented thinkers who have strongly critiqued the defective view of reality that emerged with the scientific revolution. These mechanistic and reductionist approaches are based on outmoded substance metaphysics which sees the world as primarily analyzable into unrelated solid, static, parts, a view that I will show later in the paper has been revealed to be fallacious by the field theories of today's physics. This view denies the ontological reality of higher level composite processes and the relational nature of dialectics as well as immanent causation, or the self-generated purposeful behaviour of such processes in relation to the complex worlds they exist within. According to process thinkers, such as Gare, this type of limited thinking has dominated and is dominating modern science and thus

⁵¹ Psychologist, Michael Basseches argues, like Piaget, for dialectical thinking as the goal of intellectual development, in Michael Basseches, 'The Development of Dialectical Thinking as an Approach to Integration', *Integral Review*, 2005, at https://www.researchgate.net/publication/26507960_The_Development_of_Dialectical_Thinking_As_An_Approach_to_Integration.

⁵² Arran Gare, op. cit.

all of our approaches to problem solving in fields which rely heavily on science such as politics, business and education. So it should be no surprise that the current health field, dominated as it is by biomedical science, is also dominated by this limited way of thinking.

Ignoring the multiplicity of causal factors which are related in complex ways in health problems, or the lack of holistic thinking, leads to the emergence of all sorts of unforeseen consequences, such as the range of new health problems we see. Examples of this have been the emergence of antibiotic resistant bacteria due to a narrow, over-simplified approach to antibiotic use as well as Type Two Diabetes, a disease related to seemingly positive technological efficiencies in transport and food production and distribution. So while we have achieved great things in the short term, the flawed foundations for these achievements sees us deluding ourselves about the extent of our control eventually leading to even greater problems capable of compromising the future of life itself. What I am promoting is the unpopular view in a predominately utilitarian world, that the means by which we approach problems such as health are as important as the ends. It is not enough from an ethical perspective to merely point to the positive outcomes of our medical interventions. We need to also deeply examine how and why we achieved them, how they are related to other levels of reality and what the possible implications could be.

PROCESS PHILOSOPHY AND FIELDS

‘Men do not know how that which is drawn in different directions harmonises with itself. The harmonious structure of the world depends upon opposite tension like that of the bow and the lyre.’ Heraclitus, Fragment 51.

Having argued that mechanical, atomistic and reductionist thinking still dominates our unhealthy approaches to health, I will now propose a better way of understanding not only the importance of holistic approaches but their ontological primacy and therefore, their need to subordinate abstract mechanical ones. In his article, *The Folly of Scientism*, biologist, Austin Hughes, argues that in contrast to Stephen Hawking’s and Leonard Mlodinow’s claims that philosophy is obsolete, ‘...there has arisen a curious consilience between the findings of modern cosmology and some traditional understandings of the

creation of the universe.⁵³ There is perhaps no better example of this than the similarities which can be seen between modern cosmology and biology and the intuitive insights of Heraclitus of Ephesus from over 2,500 years ago. As the physicist Werner Heisenberg wrote in his book, *Physics and Philosophy*: 'We may remark at this point that modern physics is in some way extremely near to the doctrines of Heraclitus. If we replace the word 'fire' by the word 'energy' we can almost repeat his statements word for word from our modern point of view.'⁵⁴

For Heraclitus, the fundamental stuff of reality was fire which because of its dynamic nature revealed the universe to be in flux, or in process of becoming. He was regarded by Georg Hegel as the earliest dialectical philosopher in seeing reality as relational, held together by the 'Logos' of a tension between opposing forces.⁵⁵ As well as anticipating our current understandings in modern physics, Heraclitus also helped inspire the emergence of process philosophy. Following Heraclitus, process philosophy also argues that reality is fundamentally active, relational, vibratory and dialectical and that what we perceive to be independent, solid physical structures are the products of complex, vibratory processes. According to Gare, from the perspective of process philosophy,

...the world is seen as self-ordering patterns of activity, patterns of patterns of activity, and so on, which has to be understood pre-eminently from the inside by us as participants in the world, the beings through which the world is becoming more conscious of itself and its significance.⁵⁶

Because all in the universe is activity, process philosophers such as Gare, drawing on Friedrich Schelling, argue that the patterns which form the ordered structures of the universe, such as consciousness, emerge from the limiting, or constraining of this underlying activity.⁵⁷

⁵³ Austin L. Hughes, 'The Folly of Scientism', *The New Atlantis*, Fall, 2012 Issue.

⁵⁴ Werner Heisenberg, *Physics and Philosophy: The Revolution in Modern Science*, (Penguin Books, London, 1990), p. 29

⁵⁵ A discussion of the influence of Heraclitus on Hegel's dialectics is in C. M. Howell, 'Hegel's Reading of Heraclitus: A Discussion of the Foundations of Hegel's Dialectic,' at https://www.academia.edu/28884735/Hegels_Reading_of_Heraclitus_A_Discussion_On_The_Foundations_of_Hegels_Dialectic, 2016, (Accessed 24/12/2017).

⁵⁶ Arran Gare, The Role of Environmental Thought in the Twenty First Century, *The Journal of Environmental Thought and Education*, No. 10, 2017, p. 4.

⁵⁷ An understanding of Schelling's process nature philosophy and his influence on Gare and modern science more generally, can be found in Arran Gare, 'Overcoming the Newtonian Paradigm: The

In embracing Heraclitus, it is clear that Heisenberg, one of our greatest physicists, was also moving towards a process approach to physics.⁵⁸ But so, I argue, is physics in general. By this I mean that physics is moving away from trying to identify and isolate the fundamental material substance of the universe to an acknowledgement that such a substance may never be found. Jim Baggott has documented some of the history and nature of this shift in his book on the concept of mass. In regard to this concept traditionally being understood in terms of substance, he concludes that:

Modern physics teaches us something rather different, and deeply counter-intuitive. As we worked our way ever inwards – matter into atoms, atoms into sub-atomic particles, sub-atomic particles into quantum fields and forces – we lost sight of matter completely. Matter lost its tangibility. It lost its primacy as mass became a secondary quality, the result of interactions between intangible quantum fields. What we recognize as mass is a behaviour of these quantum fields; it is not a property that belongs or is necessarily intrinsic to them.⁵⁹

The difference with process philosophers is that this reality has never been considered counter-intuitive. Rather, it is the idea that nature is primarily static, atomistic immutable substance which has seemed odd. Central to this shift in understanding has been the embracing of the concept of field. In another recent work by Gare, he gives a further example of consilience between today's science and traditional understandings in revealing the importance of the concept of field in process thought and its roots in Ancient Chinese Daoism.⁶⁰ Gare focuses on the work of 20th Century developmental biologist and philosopher, C. H. Waddington and his concepts of morphogenetic fields, chreods and homeorhesis. Influenced by the process metaphysics of Alfred Whitehead and the vague Chinese concept of Dao, or

Unfinished Project of Theoretical Biology from a Schellingian Perspective', *Progress in Biophysics and Molecular Biology*, Vol. 113, Issue 1, (Elsevier, 2013).

⁵⁸ In the original versions of *Physics and Philosophy* where F.S.C Northrop writes the Introduction, Northrop points out that Heisenberg argued that quantum physics re-introduced potentiality into physics, giving him much in common with Whitehead.

⁵⁹ Jim Baggott, *Mass: The Quest to Understand Matter From Greek Atoms to Quantum Fields*, (Oxford University Press, Oxford, 2017), Kindle DX Edition, Ch. 16.

⁶⁰ Arran Gare, 'Chreods, Homeorhesis and Biofields: Finding the Right Path for Science through Daoism', in *Progress in Biophysics and Molecular Biology*, Vol. 131, 2017.

'The Way', Waddington's concern was to re-define modern biology in such a way as to account for complex vibratory processes. A chreod is a trajectory rather than a state and homeorhesis refers to a trajectory which tends to return to its path after having been perturbed. Through this, Waddington was able to conceive of biological development processes as relatively robust trajectories within morphogenetic fields conceived of topographically as landscapes of peaks and valleys which define the course of chreods. As Gare states:

Chreods are paths. They individuate to become paths within broader paths. The paths are within and guided by fields, but fields are generated and transformed by what they guide. They are aspects of processes. As [Joseph] Needham wrote, the notion of field is 'not a mere geometrical picture of a momentary time-slice in the organism's history but is dynamical.'⁶¹

The shift, documented by philosophers and historians of science such as Mary Hesse and Baggott, from substantial particles being fundamental, to dynamic fields, has been a positive development for process philosophy.⁶² It has affirmed what Whitehead and Whiteheadian scholars, such as Murray Code have argued, that reality is fundamentally vague, vibratory and impossible to precisely define through mathematical deduction.⁶³ It has also revealed the problem of what Whitehead called the fallacy of misplaced concreteness. This is committed when the static and fragmented picture of reality produced by precise definitions and measurements, comes to be considered as primary rather than as highly abstract.⁶⁴ Such thinkers, such as the New Mechanists, see reality as primarily constructed from its independent parts whereas the holism of process philosophers comes from starting with reality as a vague undivided whole within which, through causal processes of constraint, processes are able to distinguish themselves. From a holistic process view, the importance of

⁶¹ Arran Gare, *ibid*, p. 75.

⁶² Hesse addresses the problem of action-at-a-distance in the development of field theory as well as the importance of analogies in scientific progress in Mary B. Hesse, *Forces and Fields: A Study of Action at a Distance in the History of Physics*, (Philosophical Library, New York, 1962).

⁶³ Code reveals the limits of rationality and system by arguing for their grounding in vagueness in Murray Code, *Myths of Reason: Vagueness, Rationality and the Lure of Logic*, (Humanities Press, New Jersey, 1995).

⁶⁴ Whitehead initially used this concept to critique the idea of simple location of instantaneous material configurations being understood as primary in Classical Physics in Alfred N. Whitehead, *Science and the Modern World*, (The Free Press, New York, 1967), p.51.

making explicit such fundamental metaphysical views is stressed in order to reveal the problem of misplaced concreteness. In relation to fields, Gare emphasises their fundamental vagueness. Most criticism of Waddington's concept of morphogenetic fields was in relation to its vagueness, but Gare, inspired by C. S. Peirce, makes the case for 'real vagues' and the need for general terms to keep processes open and facilitate their future investigation and further refinement.⁶⁵ Such a view is in the spirit of speculative naturalism and can be seen in Anton Markoš working definition of biological fields, which Gare quotes:

A field is any entity whose components know of each other and therefore behave differently than when removed from the field. The verb 'know' stands for coherence and nonlocality. It follows that (1) changes in any part of the field are felt in all places within the field (coherence), and (2) such changes are inherent in the field, not a product of any external forcing (nonlocality).⁶⁶

A development which has given further support to process metaphysics and in particular, the views of Gare and Schelling that order emerges from the limiting, or constraining of activity, has been the discovery of the existence of the Higgs Field through revealing the Higgs Boson. The story, as Baggott tells it, is that the conception of the Higgs Field was necessitated by the failure of the Standard Model of Physics to account for mass. There was symmetry to subatomic particles which suggested that they should all be travelling at the speed of light, meaning that the order and weight of the universe we experience should not exist. It was proposed by physicist Peter Higgs, among others that a universal medium must exist filling the entire universe which can break the symmetry, providing some particles with a third dimension as well as mass.⁶⁷ This use of the term particle comes from quantum physics, which argues that fields are not continuous but are generated by the actions of multiple local excitations, or quanta, vibrations of such a minimum level that they exhibit the behaviour of something particulate. Force carrier bosons, such as photons and

⁶⁵ Arran Gare, 'Chreods, Homeorhesis and Biofields', op. cit., p. 66

⁶⁶ Anton Markos, *Readers of the Book of Life: Contextualizing Developmental Evolutionary Biology*, (Oxford University Press, Oxford, 2002), quoted in A. Gare, *Ibid.* p.p. 4-5.

⁶⁷ Jim Baggott, *Mass*, op. cit, Ch. 13-14.

gluons, are such excitations. As evoked by a short story by Henry Miller, a quantum particle ‘stands still like the hummingbird.’⁶⁸ This suggests, I would argue, that quantum fields cannot be reduced to local excitations but be understood holistically as a dialectic between the whole and the dynamic parts of the field.

Before going further, I should point out that as a philosopher based in the humanities, I do not pretend to fully understand the complex mathematics underpinning modern physics standard model of reality. No doubt physicists reading this paper will find my understanding grossly inadequate. I am also aware that our understanding of the Higgs field is in its earliest stages and many questions remain unanswered. What I can work with, however, are the many stories, metaphors and analogies which physicists must necessarily use in order to make sense of their mathematical models and communicate their meaning to a broader audience. Narratives in particular are of primary importance to process thinkers because they express the temporality of existence and metaphors and analogies indicate the creative, emergent nature of human thought and language in which wholes are created from partialities. In helping people to better understand the nature and implications of something vague, like holistic fields, it is vital to create a way of being able to imagine it as being like something else. For example, in a 2015 article on the Higgs Boson, Graham Templeton makes the analogy that the Higgs Field acts like a prism acts on light through a process of symmetry-breaking. He says that: ‘A prism breaks the velocity-symmetry of different wavelengths of light, thus separating them, and the Higgs field is thought to break the mass-symmetry of some particles which are otherwise symmetrically massless.’⁶⁹ As physicist and science communicator, Brian Greene, imagines it: ‘Mass is the resistance an object offers to having its speed changed.’ He also uses the metaphor of a field of molasses in which some particles become stickier than others.⁷⁰ The idea of

⁶⁸ Henry Miller, ‘Stand Still like the Hummingbird’, in *Stand Still like the Hummingbird*, (New Directions Books, New York, 1962), p.p. 184-194.

⁶⁹ Graham Templeton, ‘What is the Higgs Boson and why is it so important?’ At <https://www.extremetech.com/extreme/208652-what-is-the-higgs-boson>, 2015, (Accessed 24/12/2017).

⁷⁰ This was part of an explanation Greene gave for the Higgs Field on the USA PBS Charlie Rose television program, quoted in Andrew Zimmerman-Jones, ‘The Discovery of the Higgs Field’, at <https://www.thoughtco.com/what-is-the-higgs-field-2699354>, (Accessed 4/1/2018).

spontaneous symmetry-breaking is central in Baggott's analogies. He uses the analogy of the symmetry-breaking which occurs in the phase transition from water to ice, with ice crystals being more ordered and less symmetrical. Experiments show that when using ultra-pure water in a perfectly smooth container, ice crystals do not form; what is known as 'supercooling'. As Baggott puts it, the crystals need something to hang on to, such as impurities in the container walls. The Higgs field was conceived of to account for impurities that some sub-atomic particles must be able to hang on to in order to transform.⁷¹

What unifies modern physics, however, is the idea that mass is related to velocity and so the Higgs Field creates three dimensional structure and differences in mass by altering the velocity of those quanta which interact within it. This is determined by the nature of interactions. Another popular analogy made in this regard, is the difficulty in getting across a crowded room.⁷² Someone unknown to the crowd and innocuous will move through quickly with little interaction whereas someone famous will be repeatedly stopped and spoken to and will find it difficult to cross. The unknown person can be likened to a photon, which gains no mass and moves quickly and easily through the Higgs Field without interacting, whereas the famous person can be likened to a W-boson, which gains much mass through its continual interactions which slow its movement down. We can also say, perhaps, that through constant interaction the celebrity takes on more dimensions, or depth, but that might be a stretch in the case of some celebrities. While biosemioticians generally argue that semiotics emerges at the level of complexity of living processes, this analogy lends itself to a semiotic interpretation.⁷³ In this sense the Higgs Field is selective in that it affords no meaningful signs for the photon whereas it affords a multiplicity of them for the W-boson, generating a high level of interaction. All of this is presented as an explanation of how it is that atoms can form and we can have any enduring slower-than-speed-of-light structure in the universe

⁷¹ Jim Baggott, *Mass*, op. cit., Ch. 14.

⁷² This analogy was created by British astrophysicist, David Miller and won a competition proposed by the UK Science Minister in 1993 to provide him an easily understandable description of how the Higgs Field works.

⁷³ This is argued in M. Dix, 'Living and Knowing: How Nature Makes Knowledge Possible', *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 9, no. 1, 2013, at <https://www.cosmosandhistory.org/index.php/journal/article/viewFile/323/552>.

at all.

The Higgs Field, I argue, reveals that structure in the universe emerges through the action of constraints on activity, breaking symmetries and creating multiplicities of different spacetime trajectories forming different patterns of activity. Its non-zero value means that it has no direction, like electron fields, but exists evenly everywhere in the universe having emerged a trillionth of a second after the Big Bang. It therefore provides the medium within which slower-than-speed-of-light processes can emerge. Reality, therefore, and what distinguishes things within it, is now understood in relation to the differing speeds of processes and their interactions within fields rather than a collection of independent material objects, a reality which has been argued for by process philosophers for some time. It also gives weight to hierarchy theory in ecology which holistically looks at nature as a complex multiplicity of interrelated nested levels and argues that larger, more perduring levels provide the conditions for smaller and faster ones. This hierarchy of levels can now be understood as trajectories, or chreods, of differing masses due to their differing velocities.⁷⁴ In ecological terms it can be likened to the large, heavy and relatively longer living tree canopy of a rainforest which regulates the speed and frequency of interactions amongst smaller, lighter and shorter living organisms within the forest. It is the nature of such ubiquitous dynamic fields, I argue, which reveals to us the true holistic, processual nature of our universe as well as the inadequacy of treating objects abstractly as though they are independent of such fields.

It is process philosophers throughout millennia who have anticipated this shift in modern physics towards ultimate reality being understood in holistic terms as vibratory fields and so it is process metaphysics which helps make sense of such fields, something many particle physicists still have not grasped. Process philosophy also reveals its holism through its non-reductionist methods of inquiry. For example, the conception of the holistic health field I am proposing requires what philosopher C. D. Broad called, speculative philosophy, which he distinguished from critical philosophy. Critical

⁷⁴ For a discussion of hierarchy theory and its application through Gare's process metaphysics, see Glenn McLaren, 'Unifying Process Philosophy' in *Applied Process Thought 1, Initial Explorations in Theory and Research*, (Ontos Verlag, Heusenstamm, 2008).

philosophy involves analysis and critique but speculative philosophy requires both synopsis, ‘...the deliberate viewing together of aspects of human experience which are generally viewed apart’⁷⁵ and synthesis, the supplying of a ‘...set of concepts and principles which shall cover satisfactorily all the various regions of fact which are being viewed synoptically.’⁷⁶ In following Broad, I take a speculative naturalist approach. Speculative naturalism, which Gare promotes, is a holistic approach in that it incorporates synopsis, synthesis and analysis in its methodology. It is a dialectical approach aimed at creating a new synthesis to overcome the polarization in philosophy between analytic approaches in which naturalism is equated with scientism and continental approaches equated with idealism.⁷⁷ In this, speculative naturalism seeks to transcend the divide which has developed between nature and culture appreciating instead the complex interactions between the constraints of our physical, biological and socially constructed worlds. The great process philosopher Whitehead also promoted speculative philosophy as a form of philosophical thinking which is open to possibilities. In the spirit of speculative naturalism, Gare adopts Whitehead’s speculative dialectical approach but rejects his analogy of mind, preferring Schelling’s nature philosophy as a condition for the emergence of mind from nature.⁷⁸ From this, Gare has constructed process metaphysical categories which are based on Bergsonian aural analogies rather than Whitehead’s mind ones.

In drawing on Gare’s process metaphysics as a more adequate and up-to-date synthesis of process thought, I do not primarily use the language of Whitehead, of concreting of actual entities, but even more vague and general language of activity, order, potentiality, process, structure, event, cause and spatio-temporal location. Structure, for example, is understood as ordered

⁷⁵ C. D. Broad, ‘Some Methods of Speculative Philosophy’, *The Aristotelian Society*, Vol. 21, Issue 1, July 1947, p. 4.

⁷⁶ *Ibid*, p 16.

⁷⁷ For a discussion and defence of speculative naturalism see Arran Gare, ‘The Case for Speculative Naturalism’ in Arran Gare and Wayne Hudson (Eds.), *For a New Naturalism*, (Telos Press, Candor, NY, 2017).

⁷⁸ Gare’s arguments against panpsychism and for a Schellingian approach to an emergent theory of mind are in Arran Gare, ‘Process Philosophy and the Emergent Theory of Mind: Whitehead, Lloyd Morgan and Schelling’, *Conrescence*, Vol. 3, 2002.

potentialities for ordering produced and maintained by processes and causation is understood as both immanent and conditional, accounting for both self-creation and the role of external constraints in conditioning it. Aural analogies lead to understanding processual reality as more like music than matter, or thought. In other words, one can gain a better appreciation of the processual nature of reality by listening to it rather than just seeing it.⁷⁹

So the question now is, how does this holistic, processual, speculative naturalist understanding of the Higgs Field help us understand a conceptual field of health? Like the Higgs Field, my proposed health field is irreducible and ontologically real but whose existence can be affirmed through being able to detect particular excitations, or quanta within it. Like smashing protons together, this requires investing energy in creating and observing dialectical tensions which reveal in their decay the level of coherence and integration of fields as well as their boundaries, albeit fuzzy ones. This should reveal that the holistic health field I am conceiving of will provide the medium through which all living processes interrelate. As a constraining field, it will act by affecting the velocity of processes within it to create a temporal hierarchy of synchronized vibratory processes necessary for the perdurance and integrity of living trajectories. Unlike the Higgs Field, these are more complex levels of communicative processes involving living, meaning creating and interpreting organisms which suggests that they are also semiotic processes related to both the quantity and quality of interactions within the field. It is the nature of these interactions which reveal, as Heraclitus speculated, the dynamic tensions or edge of chaos conditions essential for life.⁸⁰ With this in mind, I can now discuss the conditions for creating a conceptual holistic field of health which can augment the conditions for an ecological civilization.

⁷⁹ Gare's process metaphysical categories can be found in his major work, Arran Gare, *Nihilism Inc.: Environmental Destruction and the Metaphysics of Sustainability*, (Eco-Logical Press, Como, 1996), Ch. 13.

⁸⁰ I discuss the nature of semiotics and biosemiotics in my paper on *The Obesity Crisis and Semiotic Corruption* as well as the edge of chaos conditions of tension in which life exists. Semiotics and biosemiotics studies the nature of meaning creation in communication systems and is drawn from C. S. Peirce's three part concept of object, sign and interpretant.

A HOLISTIC HEALTH FIELD IN THEORY AND PRACTICE

I have been arguing that a deeper understanding of holistic health can be achieved through conceiving it in the vague sense of a dynamic field which acts as a higher level constraint on the thinking and practices within the field. The excitations created by the dialectic between linear and systemic optimists, among others, reveals, both the existence and nature of the current health field. It reveals that it is not healthy at all, but one dominated by the abstractions of linear, mechanistic and reductionist thought, as evidenced by the growing trends towards enhancing human health through increasing technological dependence and energy dissipation with little thought or regard given to effects on other fields. From a process field perspective, healthy fields are those which create the potential for emergent conditions for the generation and dynamic stability of wholes at multiple levels. The current mechanistic health field acts not as a facilitative higher level constraint which conditions the generation of unified wholes, but rather, health destroying fragmentation and hyper-specialization. This is consistent with a field that is in a process of decay in its evolutionary history.⁸¹ Using fossil fuels to pump energy into human health systems accelerates lower level processes in such a way as they get out of sync with others which are necessary for human health. An appropriate analogy might be that I am running a marathon but at a pace that I cannot sustain and one that leaves my support crew with food, water and medical supplies, lagging behind and unable to catch up. This ultimately has a fragmenting rather than a unifying effect because it leaves humanity isolated from its support systems. In focusing on the individual, as Seedhouse argues current health systems do, it also isolates humans from each other. Despite the arguments of those such as Seedhouse, Massy, Arbesman and Smil, therefore, we are far from creating a holistic health field.

As I discussed earlier, the Higgs Field creates the conditions within which slower-than-speed-of light oscillations can emerge which creates the potential for them to synchronize with each other in ways which generate unified structures composed of multiple patterns of processes of differing scales and rates. Current measurements in physics, however, show that the universe is

⁸¹ Jack Cohen and Ian Stewart discuss the process of decay in evolutionary processes involving fragmentation through hyper-specialization in Jack Cohen and Ian Stewart, *The Collapse of Chaos: Discovering Simplicity in a Complex World*, (Penguin Books, London, 2000) p. 140.

continually expanding at an accelerating rate such that galaxies are moving further away from each other. This seems to suggest that the universe is fragmenting. On the other hand, it is speculated that this expansion will culminate in a relatively even distribution of energy; what is termed 'heat death', which suggests a universe moving towards eventual unity. Physicist Sean Carroll argues that this 'arrow of time' moving towards equilibrium is determined by the low entropy state of the early universe and what we understand as cause and effect in the human domain is the process of the universe moving towards higher entropy.⁸² Carroll tends to favour an *ekinological* view of the universe and the purpose of life rather than a teleological one; that everything can be understood from those low entropy conditions in the early universe. Biologist, Stanley Salthe on the other hand, argues that achieving equilibrium is the telos of the universe and accelerating the dissipation of energy from low to high entropy is the telos, or final cause for life in the universe.⁸³ It seems that the physicist is looking back while the biologist is looking forward, but both agree that the laws of thermodynamics are fundamental to our understanding of the nature of the universe and the emergence of life within it.

Thinking dialectically, what is important for human beings to understand is that we emerged as a condition of the tension created by the asymmetrical conditions of the universe in its transition from low to maximal entropy. As Heraclitus insightfully understood, living processes are embodiments of such tension and so any overarching constraining field must be one which creates the potential for the continual generation of such tension and active resistance to increasing entropy, or what Ilya Prigogine and Isabelle Stengers termed, 'far-from-equilibrium' conditions.⁸⁴ This reveals that living processes are an emergent tension between chaos and order where a functional structure can perdure and also anticipate and respond to change and uncertainty. As Torday

⁸² This is in Sean Carroll, *The Big Picture: On the Origins of Life, Meaning and the Universe Itself*, (Oneworld Publications, 2016) Kindle DX Edition, Ch. 7.

⁸³ Stanley Salthe, 'Maximum Power and Maximum Entropy Production: Finalities in Nature', *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 6, no. 1, 2010 at <http://www.nbi.dk/natphil/salthe/Cosmos&History6.Power.MEPP.pdf>.

⁸⁴ Ilya Prigogine and Isabelle Stengers, *Order out of Chaos: Man's New Dialogue with Nature*, (Verso, 2017) Kindle DX Edition, Ch. V.

and Miller Jr. argue, in their efforts to synthesise Western reductionism and Eastern holism, life can be understood as self-referential systems which continually seek to resolve ambiguities which imbue living processes.⁸⁵ In other words, living processes are syntheses generated by dialectics. This tension is generated by multiple relationships of a quality which has enabled human structures to emerge and be capable of resisting entropy in such a way as to be able to generate a quality of complexity which makes the universe conscious of itself. It is the Higgs Field which creates the potential for this tension to emerge more generally, but it is the Holistic Health Field which creates the potential more particularly for life to emerge and perdure. This is not holism in the sense of creating some perfect unity, or symmetry, therefore, but holism as the generation of oscillations of the right frequencies and amplitudes to generate life. The journey to wholeness I spoke of in the Introduction is a journey towards understanding our vibratory, edge of chaos nature and learning to attune our self-consciousness to it.

It is health in this relational and vibratory sense of wholeness which is central in Gare's holistic model, one that is influenced by those such as Capra and Goodwin, who I quoted in the Introduction. The idea of communities of communities in Gare's model comes from the ecological approach of Herman Daly and John Cobb in their book, *For the Common Good*, in which they argue for a shift away from the modern notion of the autonomous individual to the social one of person-in-community.⁸⁶ In Gare's metaphysics, order emerges through the actions of constraints on activity, producing a multiplicity of distinct trajectories or processes distinguished by different frequencies and amplitudes, or different rates and scales. Communities can be understood as such trajectories which can be conceived of as spatio-temporal fields. Drawing from hierarchy theory from ecological science as developed by Howard Pattee and Tim Allen, spatio-temporal fields are understood as nested levels of constraint with higher, larger and slower fields constraining constituent smaller and faster

⁸⁵ John S. Torday and William B. Miller Jr., 'The resolution of ambiguity as the basis for life: A cellular bridge between Western reductionism and Eastern holism', *Progress in Biophysics and Molecular Biology*, 131, Elsevier, 2017, p.p. 288-297.

⁸⁶ Herman E. Daly and John B. Cobb Jr., op. cit., Ch. 9.

ones which are irreducible to each other.⁸⁷ A human being, therefore, is a community related to a multiplicity of communities, some of which we constrain and some which constrain us. Gare also uses the term ‘centres’ to refer to such communities drawing upon the work of architect Christopher Alexander’s holistic field understanding of living processes.⁸⁸ Examples of higher-level constraints from a human perspective would be the biosphere, rainforest tree canopies, state institutions such as the health system, or our families. Constituent processes would be the multitude of oscillating communities which we as a whole constrain to act in the interests of the whole, such as smaller communities of cells, bacteria, organs, children and even the quantum vibratory processes that are essential to life.⁸⁹ At levels above and below us, there is both upward and downward causation interacting with immanent and conditional causation conditioning what is possible from above as we condition what is possible below. This is the idea of positive freedom, or freedom to, in which emergent constraints create new potentials (this can be distinguished from negative freedom, or freedom from constraint). A healthy community is one that is able to create and maintain the integrity of its trajectories in the face of perturbations while augmenting the potential for other trajectories to do the same so that these other trajectories can also contribute to health, or the whole.

Here Gare draws on Conrad Waddington and his concepts of chreods and homeorhesis which I discussed earlier. The constraints of the particular trajectories, or chreods they co-create are what gives communities perduring order and when perturbed they will tend to return to co-creating the entrained path. This is a process of self-stabilization. Large enough perturbations,

⁸⁷ My entry into this enlightening field was through T.F.H. Allen and Thomas B. Starr, *Hierarchy: Perspectives for Ecological Complexity*, 2nd. Ed., (University of Chicago Press, Chicago, 1982).

⁸⁸ Gare discusses the ideas and influence of Alexander and his similarities to Heidegger in Arran Gare, Architecture and the ‘Global Ecological Crisis: From Heidegger to Christopher Alexander’, at https://www.academia.edu/7440830/Architecture_and_the_Global_Ecological_Crisis_From_Heidegger_to_Christopher_Alexander, (Accessed 25/2/2108).

⁸⁹ Quantum processes in living systems are being revealed within the relatively new field of quantum biology and are discussed in Jim Al-Khalili and Johnjo McFadden, *Life on the Edge: The Coming of Age of Quantum Biology*, (Broadway Books, 2016) Kindle DX Edition.

through sensitivity to radically changed conditions, can put communities on a new path for better or worse which will then affect relations with both constraining and constrained levels. Such levels should be understood as semi-autonomous, however, meaning that they can be limited in their impact and buffered to some extent from the impact of other levels. Less proximal higher level constraints, for example, may not be as affected meaning that paths can change or be obliterated at lower levels without necessarily destroying the conditions as a whole. Healthy constraining fields seem to actually encourage such heuristic processes at lower levels as evolutionary experiments, similar to a parent allowing their child to explore broader domains to expand their consciousness. What we see here is an ongoing dialectical tension between autonomy and co-dependence. When autonomy is accelerated beyond co-dependence the result can be the large perturbation and destruction of the higher level constraints which are generally more disastrous; destroying the biosphere, for example.

As I discussed earlier in relation to complexity theory, the trajectories of communities are vibrations of particular frequencies and amplitudes which generate tension between order and chaos.⁹⁰ An example of such tension was given earlier by Smil in his data revealing that particular levels of energy consumption per capita need to be reached to achieve a good quality of life by certain measures, but increases beyond this bring diminishing returns. The telos of life in this sense is not to continually accelerate growth processes and increase energy dissipation, as Salthe seems to suggest, but to generate a particular tension or stability in the face of continual change, or perturbation. More complex communities have to go through a growth process to achieve such stability and when reaching that phase only continue growth sufficient to maintain stability. This involves a dialectic between positive and negative feedback processes, such as the dynamic balance between muscle growth-promoting hormones and myostatins acting to generate muscle size which

⁹⁰ My early introduction to edge of chaos theory was through Brian Goodwin's work, in particular *How the Leopard Changed Its Spots*, op. cit., p.p. 181-195.

provides us degrees of freedom attuned to our gravitational field.⁹¹ Lifecycles of communities are determined by how long they can maintain this stability in the face of the larger movement towards higher entropy. Biological Anthropologist, Barry Bogin shows, through his application of life history theory, how this development process is a complex relationship between different rates of growth of constituent processes. For example, skeleto-muscular development slows in infant and juvenile humans to enable energy to be channelled to increased brain development. Puberty then sees a spurt in growth in other constituents until sexual maturity and a relatively stable pattern is achieved.⁹² The journey to wholeness therefore, is one that moves through the relatively unstable process of rapid growth towards an extended period of stability and to the eventual instability of decay; it is not about continual acceleration of growth. From this perspective, humanity's use of fossil fuels can be seen as an accelerant of growth, but growth in which the capacity to stabilize and endure is compromised. It is the generation of living processes that are continually explosive and volatile, rapidly increasing entropy, rather than slow-burning and dynamically stable. Evolutionary success, therefore, I argue, should be valued in relation to a history of perdurance over long periods with little need to change once mature. From this perspective the sandworm, which is estimated to have existed on the planet relatively unchanged for 600 million years, is a more healthy and successful form of life than human beings may prove to be due to its ability to be in sync with the proximal levels above and below which constitute its world, including its limited degrees of freedom to affect the integrity of higher constraining levels.⁹³

When I use the phrase, 'constitute its world', I mean this in the sense in which German biologist Jacob von Uexkull uses it in relation to his *umwelt* theory. The fields of relations which are of most significance to communities

⁹¹ N.R. Lozier, J. J. Kopchick and S. de Lacalle (2018) Relative Contributions of Myostatin and the GH/IGF-1 Axis in Body Composition and Muscle Strength. *Front. Physiol.* 9:1418. doi: 10.3389/fphys.2018.01418 at <https://www.frontiersin.org/articles/10.3389/fphys.2018.01418/full>.

⁹² Barry Bogin, 'Modern Human Life History: The Evolution of Human Childhood and Fertility', *Evolution and Human Life History*, 2006, at http://grammar.ucsd.edu/courses/hdpr/Readings/BOGIN_SAR.pdf, p.p. 218-220.

⁹³ G. Murchie, *The Seven Mysteries of Life: An Exploration in Science and Philosophy*, (Mariner Books, New York, 1999), p. 481.

constitute their *umwelts* and define their boundaries, and the recognition of their significance and meaning emerges through semiotic processes. Influenced by the field of biosemiotics, which unites von Uexkull's insights with the semiotic theories of C.S. Peirce, semiotic processes are understood through Peirce's three-part structure of sign, object and interpretant, understood dynamically through Gare's process metaphysics.⁹⁴ The holistic health field, in this sense, can be understood as a semiosphere generating signs which afford holistic interpretations of the particular excitations or dynamic objects within it, making holism meaningful for interpretants.

An important influence from biosemiotics, are the theories of anticipatory systems conceived and developed by mathematician Robert Rosen.⁹⁵ Rosen argues against mechanical and deterministic mainstream physics and biology which tends to only focus on causation from past to present seeing communities as only reacting and adapting to past events. For Rosen, communities are also anticipatory systems which can only create and maintain the integrity of their structure by projecting models of themselves into the future and striving to realize these models. At the most fundamental level, these are the temporal patterns that most of us are able to successfully generate. They are evolving healthy models, which can also be understood as relatively stable chreods, in that they unconsciously condition the actualization of wholeness; actualization which in process understanding is at the same time, potential. Rosen therefore, like Salthe, emphasizes the reality of final causation in living processes.⁹⁶ There are multiple anticipatory models within a living community existing at different spatio-temporal levels which can also be understood, I argue, as fields. Most of these anticipatory fields operate below the level of self-consciousness and don't come to our attention until they are in error. Error occurs when an anticipatory field fails to match its projected future conditions. A good example is the problem of semiotic corruption I mentioned earlier in the paper. This is when the signs within an *umwelt* that condition our healthy models of ourselves are corrupted, such as when a cancer cell disguises its presence in order to deceive

⁹⁴ I discuss some of the history and nature of biosemiotics at some length in my paper on 'The Obesity Crisis and Semiotic Corruption', op. cit.

⁹⁵ I also discuss the theories of Robert Rosen in some detail, Ibid., p.p. 205-207.

⁹⁶ Ibid., p.p. 205-207.

the immune system. Such corruption does, of course, lead to a range of pathologies. The possibility for error, however, is also a positive force in that it contributes to the indeterminacy of life and generation of potential through our inability to model all future possibilities in changing environments. Contrary to the views of linear optimists such as Renata Bushko, therefore, who I discussed earlier as someone wanting to use technology to eradicate error, it is error which generates the dialectical, edge of chaos conditions fundamental to life in which a level of uncertainty can be anticipated by projecting multiple scenarios of the future to prevent a community becoming too ordered and locked in to only one model. Biologist, Brian Goodwin reveals the healthy human heart to be an excellent example of an anticipatory system at the edge of chaos with the potential to accelerate from 60 beats per minute to 200 in anticipation of higher energy demand.⁹⁷

The strength of biosemiotics is that it takes consciousness and meaning creation seriously, revealing how value is intrinsic to living processes.⁹⁸ In regard to value, what helps distinguish low from high levels of consciousness, I argue, are the degrees of freedom communities have in conforming to their largely unconscious healthy anticipatory models. Communities with low levels of consciousness will have less capacity for anticipating uncertainty and so will be restricted to a narrow range of conditions in their worlds. The sandworm, for example, cannot model a future skiing holiday in the French Alps. Human beings, on the other hand, can use their powers of abstract thought to draw away from immediate experience and overlay their fundamental healthy anticipatory models with more abstract ones created through their imagination. This is both the blessing and curse of synchronic thinking which exists in a dialectical relationship with the diachronic, or temporality. Here humans, using memory and self-conscious reflection, are able to select moments of experience from temporal flux and imagine everything happening at that moment, seemingly abstracted from time. This is a condition for the development of abstract thought and augments analysis, but it can often lead to humans becoming lost in their abstractions and treating the static, synchronic world

⁹⁷ Ricard Solé and Brian Goodwin, *Signs of Life: How Complexity Pervades Biology*, (Basic Books, New York, 2000) Ch. 4.

⁹⁸ The value laden nature of semiosis is argued for by M. Dix, 'Living and Knowing', op. cit.

they imagine, as primary (committing the fallacy of misplaced concreteness). Thinkers such as Plato (his theory of the Forms) and Descartes (his mind/body dualism) were guilty of committing this fallacy of misplaced concreteness as well as those who promote deterministic mechanical and reductionist views today. These products of human imagination can sometimes augment our healthy models, but particularly when they are reified, they can come into conflict with them. To illustrate this, as well as summarize my thinking on health developed so far, I will draw on a particular example of a complex process which is gaining interest in the health field due to its relationship to a major growing disease problem. The disease I refer to is Type Two Diabetes and the related process is that of pulsational insulin secretion.

THE HOLISTIC HEALTH FIELD AND DIABETES

According to the WHO Report in 2016, Type Two diabetes is on the rise with over 420 million adults now living with it globally compared to 108 million in 1980. Also, this rise is no longer confined to the affluent developed nations.⁹⁹ It has become such a problem that many see it as a major threat to continued increases in lifespan in the world, though of course, this threat pales in comparison to climate change. A recent positive development in research from a process perspective has focused on the oscillating, or pulsational nature of insulin secretion. Insulin secretion oscillators are incredibly complex processes and provide an excellent example of life involving the synchronization of vibrations over multiple spatio-temporal levels. As summarized in a 2015 paper on the subject:

Insulin secretion occurs in a pulsatile manner in the plasma of both humans and animals, with fast pulses exhibiting a period in the range of 5–15 minutes, and slower ultradian oscillations having periods ranging from 80 to 180 minutes. Insulin pulsatility is disrupted in diabetes, most clearly as reduced pulse amplitude, and this appears to be an early marker of diabetes, as it is observed not only in prediabetics but also in first-degree relatives of patients with diabetes who lack significant metabolic abnormalities. Conversely, pulsatile insulin is more effective at mediating the metabolic effects of insulin,

⁹⁹ World Health Organization, *Global Report on Diabetes*, 2016, at http://apps.who.int/iris/bitstream/10665/204871/1/9789241565257_eng.pdf, (accessed 16/7/17).

most clearly suppression of hepatic glucose production but possibly also enhanced uptake by peripheral tissues. The pulsatility of insulin secretion is intrinsic to the islet and may involve close coupling between slow metabolic oscillations mediated by glycolysis and faster oscillations involving beta cell ion channels and Ca mediated negative feedback.¹⁰⁰

Type Two diabetes, is defined as a non-communicable disease, which, from a biosemiotic perspective, emphasising life as fundamentally communicative, makes little sense. While there are epigenetic pre-dispositions and continuing chicken or egg arguments about the relationship between insulin resistance and obesity which add complexity, it is generally regarded to be a modern lifestyle disease associated with living in obesogenic environments. As Diabetes Australia suggests, it is a disease with no cure as yet but which can be ‘...managed with a combination of regular physical activity, healthy eating and weight reduction.’¹⁰¹ This appears to be effective for the percentage of those with the condition who are not obese as well.¹⁰² The nature of dietary and exercise interventions has generated perhaps the most contradictory body of scientific evidence in any scientific field, generating *umwelts* of confusion for diabetics.¹⁰³ Much of this stems from a mechanistic and reductionist focus on particular nutrients and diets proposed as cures for the condition in isolation from other factors. For example, dietary recommendations can oscillate from high carbohydrate, low fat vegan diets to high fat, no carbohydrate carnivore diets and each can cite a range of scientific studies that support their claims. Others, such as Eran Segal and Eran Elinav, argue that the condition is so complex and each individual so unique, that generalizations cannot be made and the future of treatment is personalized programming.¹⁰⁴ These

¹⁰⁰ Leslie S. Satin, et. al., ‘Pulsatile insulin secretion, impaired glucose tolerance and type 2 diabetes’, *Molecular Aspects of Medicine*, at <http://trinahealthks.com/wp-content/uploads/2015/09/Pulsatile-insulin-secretion-impaired-glucose-tolerance-and2015.pdf> (accessed 17/7/17).

¹⁰¹ ‘Type 2 Diabetes’, *Diabetes Australia*, at <https://www.diabetesaustralia.com.au/type-2-diabetes>.

¹⁰² Allan Vaag and Søren S. Lund, ‘Non-obese patients with type 2 diabetes and pre-diabetic subjects: distinct phenotypes requiring special diabetes treatment and (or) prevention’, *Applied Physiology, Nutrition, and Metabolism*, 2007, 32(5): 912-920, <https://doi.org/10.1139/H07-100>

¹⁰³ I discuss some of the sources of these contradictions and the corrupting of science by private interests in my paper on The Obesity Crisis and Semiotic Corruption, op. cit.

¹⁰⁴ Eran Segal and Eran Elinav, *The Personalized Diet: Why One-Size-Fits-All Diets Don’t Work*, (Vermilion, London, 2017).

contradictions necessitate a broader perspective which can both make sense of them and transcend them. Here, I argue, is where a holistic process perspective is needed.

From the holistic process perspective I am proposing, a constituent healthy anticipatory field that helps create homeorhesis, or keeps us on our healthy trajectory, are the anticipations generated by our insulin secretion oscillator community that is constrained within our endocrine field. Healthy oscillators have regular pulses of insulin of a long enough frequency necessary to replenish insulin stores, which allows for high amplitude pulses, and avoids down-regulation, reducing sensitivity to glucose. Those with Type Two Diabetes have disrupted oscillators with not enough rest periods which generate negative feedback and loss of sensitivity. The role of feedback loops suggests that this is fundamentally a semiotic process where healthy signals are being corrupted. As far as I know, sandworms do not suffer from Type Two Diabetes. Humans do, I argue, because our greater degrees of freedom due to our self-consciousness can create the conditions for our behaviour at higher constraining levels to conflict with the healthy models at lower levels. This is fundamentally a case of committing the fallacy of misplaced concreteness. Unlike sandworms, human beings become lost in their abstractions. For example, we make choices consciously and subconsciously to consume abstract food such as highly processed drinks laden with refined sugar, rather than water. But, as the idea of obesogenic environments suggests, we do not make these choices in abstraction from other fields, such as food processing industries using their market power to constrain us to particular choices to serve their interests, or economic fields which generate excessive stress and deprive us of adequate rest. Because food is always readily available in the developed world through our fossil-fuel driven global food distribution chains, the relatively flat conditions are created where we can choose to continually eat putting constant demand on oscillating processes. Recent research has also shown that diabetes is related to relatively flat sedentary behaviours associated with humans sitting for extended periods and for various reasons, failing to include adequate physical activity into their

routines.¹⁰⁵ In other words, the frequencies of oscillations associated with multiple levels of the abstract products of our imaginations and the consequent habits they form at higher constraining levels, put us out of sync with our constituent levels of oscillations. In the case of Type Two Diabetes, the frequencies of our abstractions are too fast and constant to allow for large enough amplitudes of insulin to be generated and released.

But it gets worse for human beings. The abstract, imaginative powers that we have developed to control and manipulate the oscillations of our planet's vast energy reserves, largely in the form of fossil fuels, has given us the potential to disrupt the oscillations of higher constraining oscillating levels, such as circadian rhythms, ocean currents and weather patterns, oscillations that are vital to the continued existence of life in general; something the sandworm cannot even dream of doing. One of the more worrying examples of this is the slowing of the polar vortex due to warmer temperatures in the Arctic. Here we see that the acceleration of human activity has flattened temperature differences between the Arctic and temperate zones leading to larger and slower oscillations of the vortex and a weakening of containment of cold air in the Arctic region.¹⁰⁶ The acceleration of our own growth, therefore is destroying the edge of chaos conditions at higher levels producing instead, extreme fluctuations. This reveals that health is a deeply ethical concern about our impact, not just on proximal constraining and constrained levels, but on the future of life as a whole. As the previous section revealed, humanity is not only engaged in such unethical disruption but it is accelerating and our abstract mechanical approaches to reality have left us so fragmented that we are unable to associate ourselves with it, or comprehend the scale of our damage. So despite the progress we have made in limited domains that is celebrated by the linear optimists, the bigger picture reveals that humanity is deeply unhealthy.

So how do we improve our health, or wholeness? Here I believe the human development process and the development of an ecological ethics, or eco-

¹⁰⁵ Paddy C. Dempsey, et. al., 'Benefits for Type 2 Diabetes of Interrupting Prolonged Sitting with Brief Bouts of Light Walking or Simple Resistance Activities', *Diabetes Care*, 2016, June, 39(6), at <https://doi.org/10.2337/dci15-2336>, p.p. 964-972.

¹⁰⁶ Bob Berwyn, 'Polar Vortex: How the Jet Stream and Climate Change bring on Cold Snaps', *Inside Climate News*, Feb 2, 2018, at <https://insideclimatenews.org/news/02022018/cold-weather-polar-vortex-jet-stream-explained-global-warming-arctic-ice-climate-change>.

poesis, is central. Perhaps the best synopsis and synthesis of developmental psychology which has influenced me is provided by the enigmatic philosopher and psychologist, Ken Wilber. He links the perennial philosophies associated with the Axial Period to the more modern theories of those such as Kohlberg, Loevinger, Maslow, Piaget, Gilligan and Habermas, as well as modern neuroscience. What emerges is a convergent story of what constitutes a good human development process.¹⁰⁷ This is one which involves the integration and transcendence of ego-centrism and the continual de-centering of the self. It involves an expansion of consciousness over time to include larger wholes, from understanding your immediate primary relationships to understanding yourself as one with the universe. As I argued in my paper on *The Triumph of Virtual Reality*, a key component of this story is our relationship with technologies, particularly information technologies. At an early age human beings enter into the semiotic realm of information technologies augmenting our abilities to think abstractly and synchronically. This is a condition for the development of our self-consciousness, but one which also has an alienating effect separating us from our worlds and each other, a theme which is common to most adolescent literature. Much of our lives are then spent trying to understand this alienation and the nature of our relationships with everything. In the holistic process tradition I represent, which has similarities to Buddhist views such as Wilber's, maturity comes through the ability to re-connect. It is the ability to create a coherent narrative out of the fragments of a life and create a sense of wholeness. It is coming to understand that the feelings of separateness we suffer are abstract and that we always were, and are, connected with everything and everyone. One does not transcend nature; one transcends the abstractions which alienate us from it.

To use an analogy, in order to live healthy lives, in the Aristotelian sense of actualizing potential, newly hatched green turtles must first make their way across sand dunes and exposed beaches to reach the water. Many don't make it. For those that do, a life of exploring the oceans ensues until such time as they return to the beach to create new potential. Humanity has its own beach to traverse which is getting wider each day, abstract thought. While often

¹⁰⁷ Ken Wilber, *A Brief History of Everything*, (Shambhala Publications, Massachusetts, 1996).

compromised by genetic and epigenetic problems, most of us come into the world as naively whole; unable to distinguish ourselves from other processes. With our immersion into the abstract semiotic realm of the products of human imagination, such as language, as I have just discussed, our self-consciousness develops. This, however, generates a dialectic between the unifying nature of consciousness and the sense of fragmentation and alienation experienced by the self. This dialectic helps generate humanity's quest to become whole again through a process of re-connection.

In Hegelian terms from his *Phenomenology of Spirit*, it is the dialectical movement from abstract to negative to concrete.¹⁰⁸ A dialectic of health involves developing an understanding of the Heraclitean unity of opposites that is the condition for our integrity as wholes; an understanding of the multiplicity of tensions that hold together communities of communities. A life lived within the illusions of the products of human imagination generates abstract views on the nature of existence. As Hegel stressed, one of these illusions is to see ourselves as primarily individuals rather than social creatures (he argued in his Jena Lectures that our consciousness development is tied to our relations with others through a dialectic of recognition).¹⁰⁹ Other illusions are that we can come to see ourselves as immortal, impervious to consequences of our actions, able to reason ourselves out of any problem, unrelated to anything beyond or within ourselves and of course, on a simple linear path to greater progress. These simplistic abstractions inevitably meet a negative force. In the case of a diabetic, it may be their abstract belief in being impervious to disease encountering the unexpected shock of being first diagnosed and labelled with the disease. In response, the diabetic may choose to ignore it and maintain their illusions which may lead to their premature disintegration, or they may come to reflect on and better understand their finite, interdependent nature and choose to be more conscious of their future habits. The path to more concrete understanding is to learn to appreciate the irreducible complexity of reality and how life generates order against this complex background.

¹⁰⁸ Hegel develops this understanding of consciousness development in G. W. F. Hegel, *Phenomenology of Spirit*, (Oxford University Press, Oxford, 1977).

¹⁰⁹ Leo Rauch, *Hegel and the Human Spirit, A Translation of the Jena Lectures on the Philosophy of Spirit (1805-6) with commentary*, (Wayne State University Press, Michigan, 1983), Part II.

As I argued in a previous paper of mine, *Climate Change and Some other Implications of Vibratory Existence*, the development process can be likened in an aural sense, to jazz musicians keeping to the rhythm but straying from and creating new melodies.¹¹⁰ After such heuristic experiments they ultimately find their way back to the original melody but are changed along the way. Rather than a loop, therefore, returning you to the origin, it is an open-ended spiral representing a continual dialectic between, what Gilles Deleuze termed, difference and repetition.¹¹¹ Unfortunately, while we may anticipate it at some level, many of us don't find our way back to the melody and remain lost in abstractions. It is in this limbo of retarded development where the tensions which hold communities of communities together break down. Retarded development, for example, can leave people stuck in a phase of egocentricity. Such narcissists, in not comprehending their co-dependence on larger wholes, can seek to undermine them in their own self-interest. They become like cancer cells seeking to assert and reproduce themselves at the expense of the whole. A healthy community, within an *umwelten* of other diverse healthy communities, can develop an augmented immune system, itself a community, which can recognise and eliminate fragmenting forces (perhaps a good way to understand the importance of our relationship to our gut bacteria). These are not entirely eliminated, however. From a dialectical perspective, the ability to create and maintain wholeness requires that communities continually confront the negative in the form of the challenges of fragmenting forces. This suggests, perhaps uncomfortably, that healthy and cancerous cells exist in a co-dependent relationship, but one, hopefully, in which the cancer cells remain subordinated. This can help us also understand why it is that the removal of so-called harmful bacteria from our worlds can compromise the effectiveness of our immune systems. It is an example of privileging linear progress in order to overcome natural constraints over the complex reality of dialectical relatedness.

From a dialectical perspective, health can be conceived abstractly as a point or moment in time, but this is within the more fundamental context of health

¹¹⁰ Glenn McLaren, 'Climate Change and Some Other Implications of Vibratory Existence', *Cosmos and History: The Journal of Natural and Social Philosophy*, vol. 5, no. 2, 2009 at <https://www.cosmosandhistory.org/index.php/journal/article/viewFile/146/251>

¹¹¹ Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton, (Continuum, London, 2004).

being the process of a whole life. The history of developmental psychology gives us deep insights into the journey human communities must create in order to mature and develop what I call an informed holism, which understands the qualities of relationships at multiple scales we must augment rather than destroy. This is in contrast to what I term, naïve holism, which I associate with those communities which experience life more concretely, including those communities known as the ‘Blue Zones’. The ‘Blue Zones’ were identified by researchers such as Dan Buettner as areas containing the healthiest people on the planet.¹¹² What characterizes these people, I argue, is a pre-Enlightenment view of reality where community, spirituality and common purpose are valued over the abstractions of modern societies, such as individualism. Where excellent health is not dependent on expensive and energy intensive technologies. This can be understood once again in reference to Hegel. In his book, *A Short History of Ethics*, Alasdair MacIntyre argues that the central problem driving Hegel’s philosophy was ‘...why are modern Germans (or Europeans in general) not like ancient Greeks?’¹¹³ His answer was that post the Protestant Reformation, the individual and the state were separated with the individual looking to the transcendent criteria of a reformed Christianity for guidance ‘...rather than to those implicit in the practice of his own political community.’¹¹⁴ Following the Enlightenment and Scientific Revolution, I argue, this transcendent criteria also became the mathematical abstractions of Classical Physics and its mechanical view of a lifeless, meaningless universe. Generations of new abstractions building on these abstractions have removed humanity further and further from their organic, concrete reality, something that did not seem to occur within the ‘Blue Zones’. Those of us living in our post-industrial virtual worlds, therefore, must consciously peel back the layers of abstraction to reveal what those in the ‘Blue Zones’ understand intuitively. Those who are given the opportunity and bother to undertake this arduous task through philosophical reflection and deep inquiry into the nature of reality and succeed, can develop what I call,

¹¹² Dan Buettner, *The Blue Zones: Nine Lessons for Living Longer From the People Who’ve Lived the Longest*, Second Edition, (National Geographic Society, 2012) Kindle DX Edition.

¹¹³ Alasdair MacIntyre, *A Short History of Ethics*, (Routledge, Oxon, 2002), p. 192.

¹¹⁴ *Ibid.*, p. 192

informed holism. Informed holism, is that which is created by communities who have suffered the trauma of information exposure and have not just survived, but have successfully integrated and transcended this crisis to reconnect with concrete reality. Profound holistic thinkers such as Capra, Goodwin, Dunn and Gare, are examples of this.

An informed, more concrete understanding reveals the complex tension of edge of chaos conditions which are the conditions for life. In my Ph.D Thesis, back in 2004, I argued that such conditions could be understood as the naturalistic foundation for an ecological form of virtue ethics, something philosophers have been in search of for millennia. Aristotle recognized that ethics is not primarily about following abstract rules but developing good character which is recognized within a community as good practice. This requires a development process towards becoming more virtuous. For Aristotle, the cardinal virtues of prudence, temperance, courage and justice are all related.¹⁵ One must develop the intellect, the virtue of prudence, to rationally determine the mean between extremes, so developing the virtue of temperance, as well as develop the virtue of courage to practice the mean in the face of extremes of emotion while also acting for the good of the whole, the virtue of justice. Similarly, the holistic health field is one which conditions intellectual development and practice towards more moderate behaviour which self-consciously recognizes the complex, vibratory, edge of chaos conditions for life. Courage is then required to create and maintain such moderation against the polarizing forces of abstraction as well as actively seeking to extend this holistic understanding to all in the spirit of justice. A complex ecological virtue ethics, therefore, emerges from the conditions of a holistic health field revealing good human health to be related to good character development. This then leads to an understanding of eco-poiesis in which we humans come to realize the weight of responsibility we have to create and maintain a multiplicity of interrelated healthy homes. This also reveals the highly abstract and dangerously fragmenting effects of over-simplistic and reductionist consequentialist and

¹⁵ James M. Stedman, 'Aristotle's Cardinal Virtues: Their Application to Assessment of Psychopathology and Psychotherapy', *Practical Philosophy*, 10:1, (web edition, 2011; originally published July 2010) at <http://www.society-for-philosophy-in-practice.org/journal/pdf/10-1%20057%20Stedman%20-%20Aristotles%20Virtues.pdf>

deontological approaches to ethics, which retard human development.

A sign of informed holism is, I argue, an understanding of health, or wholeness as a constraining conceptual holistic field. But how does this help the Type Two diabetic? Health, in the sense of a multiplicity of different vibratory processes synchronized in such a way as to all be contributing to the integrity of the whole community, is generally invisible to humans until we get sick; an anticipatory error. A diagnosis of Type Two diabetes is like a local excitation which can potentially reveal the existence of the health field in the form of signs (think of the experience of people being diagnosed with an illness and entering the whole new *umwelt* of the medical system for the first time). The question is then one of whether the field promotes a journey to wholeness or whether it promotes a fragmenting, energy intensive quick fix; a diachronic process or a synchronic point. While immediate, intrusive, acute medical intervention will still be necessary in many cases, from within the holistic health field I propose, the signs will be conducive to making the diabetic aware of the need to recreate wholeness and get back in sync with a multiplicity of vibratory processes, fields or communities. This will be a process of developing maturity, re-connecting and removing obstacles to self-healing and will empower communities at multiple levels to take greater responsibility for creating and maintaining the relationships between these processes. The quality and quantity of their interactions within the field can alter velocities such that, for example, the frequency of food consumption can be slowed down and frequency of physical activity sped up. A recent good example of this is research showing positive effects on diabetes from intermittent fasting, providing rest phases which can allow insulin secretion oscillators to re-synchronize.¹¹⁶ Provided that the oscillating fields have not been completely destroyed, changes in the oscillations of higher level constraints can then alter the frequency of insulin pulsation allowing for replenishment and higher level amplitudes of secretion. This in turn can alter the rates at which other pulsatile processes operate such as cortisol secretion, or heart and brain oscillations, as well as slowing global processes which accelerate entropy, such as the food

¹¹⁶ Wei Min, et. al., 'Fasting-mimicking diet and markers/risk factors for aging, diabetes, cancer and cardiovascular disease', *Science Translational Medicine*, Vol. 9, Issue 377, 2017.

processing industry and political and economic demands for unconstrained growth. Such healthy constraints can in turn reduce the acceleration of entropy produced by primary use of energy dissipating technologies.

The point of a holistic health field, therefore, is that it is not just about the individuals within it, the myopic focus of the mechanistic field. As a higher level constraint, a holistic health field will regulate rates of processes more generally such that the tension of edge of chaos conditions can be continually created. The problem within the mechanistic health field is not that there is no relationship with holism, but that it is not properly recognized and so fragmentation is dominant. In such a field, the knowledge and respect for dialectical relationships is less than the demand for linear progress at any cost. The conditions for the continued healthy existence of living communities and the creation of potential for healthy life, therefore, will be dependent on the creation and continued existence of the medium of the conceptual Holistic Health Field. This field will constrain within it a dialectical relationship between holistic and fragmenting forces, such as products of our retarded consciousness development like the field of reductionist bio-medicine and linear optimism, but will condition understanding of the relationship and its nature rather than reductionism. Ironically, like the Higgs Field, it will need to be continually created by our collective imagination, but in a self-conscious way that does not get lost in abstraction. But also like the Higgs Field, the conceptual health field constrains real complex relationships at multiple levels which we humans, as self-conscious abstract thinkers must learn to recognize, respect and co-create. In a secular culture, such a field could become an institution that communities could develop a reverence for, in the way in which religious faith works for those in the 'Blue Zones.' If somehow we managed, using our imagination, to destroy the Higgs Field, then all order in the universe would cease to exist. Similarly, if we cannot create and maintain the holistic health field, then perhaps all life in the universe may cease to exist.

CONCLUSION

The call for an Ecological Civilization is a response to the alarming extent of ecological destruction we are seeing in the world today undermining the conditions for life. It is a call to process-oriented philosophers and scientists to

engage in the difficult job of creating the theoretical framework for such a civilization to begin healing of humanity's dysfunctional relationships with the natural conditions for our existence. I present this paper as a contribution to that project by conceiving of how health should be thought of holistically in such a civilization, drawing on an analogy with the Higgs Field. Many in the current health field may read this and not see how it relates to them. There are many who are already holistically oriented, or consider themselves to be, and so will feel as though progress is already being made and all that is required is a little tinkering. The evidence, however, such as the increasing dependence on energy intensive technologies, the emergence of new, more challenging health problems and ecological destruction, suggests otherwise. The reality is that we can no longer afford the luxury of a fully electrified world and for most we must return to more traditional, holistic, low-tech and low entropy approaches to health which we know from the 'Blue Zones', are actually more effective. Otherwise, we are facing a future in which immediate survival will be our only concern and developments of self-consciousness will be lost.

The full implications of holistic approaches to health are not being understood and acted on and so it is necessary to continually make the case for them and, as I hope to have done here, show holism's ontological primacy in its relationship with process metaphysics and modern physics and biology. The creation of an ecological civilization will require an education in and implementation of, an ethics and politics of eco-poiesis to generate a feel for the whole that so many today fail to experience. This will create and maintain our connections to our communities. Such deep connections will be necessary for us to take responsibility for continually generating the future potential for diverse, healthy life. A condition for this will be the creation of a conceptual Holistic Health Field which, being based in process metaphysics, will make sense of what it is to be whole in complex, dynamic worlds. Just as the Higgs Field helps unify our understanding of the nature of existence, so the Holistic Health Field will help unify our understanding of what constitutes good lives.

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