Chapter 3

Wellness and the universality of gesture

Beginning from a point of Health · Comparing Germ and Cellular theories · Salutogenesis (Aaron Antonovsky) · Hermeticism · The risk and illness myths in popular culture · Zombie apocalypse · A more general view of Wellness · Symptoms · Wellness as a state of mind · Telos and the Dao · Physical expressions of wellness : Pulsation, polarities & gestures · Muscles · Tremor · Resonance and the 10Hz refresh · Rhythms

…

We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time.
…
Not known, because not looked for
But heard, half-heard, in the stillness
Between two waves of the sea.
Quick now, here, now, always--
A condition of complete simplicity
(Costing not less than everything)
And all shall be well and
All manner of thing shall be well
When the tongues of flames are in-folded
Into the crowned knot of fire
And the fire and the rose are one.

T. S. Eliot, Little Gidding

Beginning from a point of Health

> To find health should be the object of the doctor. Anyone can find disease.
>
> AT Still—Philosophy of Osteopathy[1]

Like all creatures on the Earth, the pages you are reading constructed themselves organically over the course of several years, and had their own beginnings. In a very real sense, one of those beginnings was the American Civil War, in which Andrew Taylor Still[2] fought for the Unionists in Kansas (not the safest choice of sides in that particular state), and practised as a field surgeon. That in itself must have been a life-changing experience. Many families have been turned upside down by war, both directly and indirectly. I grew up in the scarred aftermath that the two world wars had stamped on two generations of my own family. My father's father was an accomplished car mechanic in the early days of motor transport, and had been an ambulance driver on the front for the full four years of WW1. So far as we know he never talked a word to anyone about what he saw and heard. I didn't know him enough to be able to comment on how his general personality might have been affected by this, and just have one memory of him sitting up in bed a week or so before he died. But I do know that a few years after returning home he had to endure seeing his life savings being wiped out by a year of convalescence from pleurisy – an illness that I have come to think of as a physical expression (*"somatisation"*)[3] of trauma and grief.

AT Still not only had to live beyond the screams coming from the anaesthetic-free amputations he performed. Having been a typical 19th century doctor, issuing heroic medicine of opium and mercury salts that literally either killed or cured, he found himself powerless to help as two of his children were taken by meningitis. Something snapped, and he vowed to find a form of medicine that would heal without causing harm[4]. His system eventually became known as "*Osteopathy*" : a word that literally means something like "*treatment of the bones*". Maybe it was given this name because Still spent hours studying bones as a means to understand how muscles worked. He used to carry a few human bones round in a bag and if he had nothing to do for a while, would take out a femur or a rib, sit down on a convenient spot at the side of the street, and absorb himself in the intricacies of ridges and furrows and protuberances that had been shaped by the forces and demands of soft tissue. Times have changed, and I can't imagine that very public examination of human remains lasting very long in the modern high street. Back then he was just considered eccentric.

Still's determination and vision led him to be able to treat with a near 100% success[5] rate such serious illnesses as meningitis, tuberculosis, diphtheria and typhoid – purely by systematically mobilising the tissues and fluids of the body. He was something of a maverick, because the tide was turning towards pharmacological and surgical

medicine just as he was discovering ways to avoid the use of chemicals and drugs and surgery in the vast majority of cases. Still's underlying philosophy was simple but profound – that the body and mind (i.e. the whole human being) is a self-healing organism, and it is best helped by directly encouraging and releasing the potential of the self-healing capacity. So far as he was concerned, this release of potential was in turn largely related in a *physical* sense to the free flow of blood, lymphatic fluid and cerebrospinal fluid.

> Sickness is an effect caused by the stoppage of some supply of fluid or quality of life.
>
> –Autobiography of A. T. Still

His unusual way of viewing the world came out of a broad range of influences. Still (1828 – 1917) was born in a frontier family, and was raised in close contact with Shawnee native Americans. He took the Hippocratic Oath[6] very seriously, and lived by it. Like most American doctors and professionals of that time he was a Freemason[7], and saw his craft as being part of an inherently spiritual tradition that went back to the very beginnings of civilisation. He also took the spiritual aspect of Freemasonry seriously, and it is relevant that his wife Mary Elvira was a practising Rosicrucian[8]. The particular American frontier brand of Freemasonry AT Still practised was in turn strongly influenced by the New Thought Movement[9] – led by people such as Ralph Waldo Trine[10] … Which was itself an offshoot of the teachings of the 18th Century Christian Mystic – Emmanuel Swedenborg[11]. If you have ever read and New Thought authors such as Trine (or Thoreau or Emerson[12]), you will recognise that their works are shot through with a deep and pervasive love and awe of nature.

At the same time that Still was developing his radical hands-on approach to treatment of diseases, a great battle was being fought out in the academic and medical circles of Paris. Louis Pasteur had published what became known as *Germ Theory*[13] – the idea that all illness is caused by an invasion of alien pathogens into a previously (and presumably) pure body. Meanwhile, Claude Bernard and Antoine Bйchamp were developing "Cellular Theory" (originally called *Microzymian Theory*[14]) – which states that illness arises only when conditions in the body allow it to do so. Pasteur's opponents were no lightweights. Bernard was the first person to define homeostasis in modern scientific terms, and was the founder of experimental physiology; whilst Bйchamp was one of the founders of modern applied organic chemistry. On a historical level, Germ Theory "won" the debate, and all modern medicine is now founded on it. In reality, Cellular Theory was never disproved[15] – just increasingly ignored. So the more ecologically resonant aspects of Claude Bernard's theory of Homeostasis were conveniently discarded and forgotten in favour of a system based on textbook physics and chemistry. That's not to say that the textbook physics and chemistry is not part of what is happening – but one cannot describe an ecology or the intimate interrelationships between people in a village with pure physics or chemistry. It is telling that Pasteur stated in his deathbed recant[16], "*Bernard was correct. I was*

wrong. The microbe (germ) is nothing. The terrain (milieu) is everything."

From a conceptual point of view, in Germ Theory, health (with a small "h") is an absence of illness, whereas for Cellular Theory, "Health" (with a capital "H") is a recognisable dynamic and adaptive optimal state; being a significant extension of what is now termed "homeostasis". Cellular theory proposes that Pasteur's Germ Theory is correct once conditions deteriorate to an extreme point. But before then, the situation that allows or inhibits a disease is the overall Health of the person – the "territory" or *milieu*. There are many echoes of modern ecology. A principle of Health presupposes that there is an organic intelligence that is constantly seeking an optimised equilibrium and wellness/health. It is only when that equilibrium is lost[17] that germs may become dangerous. Shoot a few wolves and there may be a plague of elk, who then eat leaf buds in spring, which eventually make the river banks unstable[18]. Spray all those pesky weeds with weedkiller, and next year there is a disturbing absence of butterflies and swallows. If you grow brassicas you might not be bothered that there are less cabbage whites, but the tens of thousands of insects the swallows would have eaten do become a problem. Further spraying to get rid of those pests, and pollinators are affected – and then it gets really serious. Being a man of his historical time, Still was also caught up in this question from a different point of view – how not to kill his patients. In retrospect one can say that through his personal history and love of life he was inexorably drawn towards Cellular Theory – and "Wellness". He experienced Wellness as an active principle in the bodies of his patients.

> The Health is our indwelling and natural perfection. It is a wisdom and intelligence that maintains balance harmony, and homeostasis, it keeps all physiologic functions in balance, it heals a cut finger or injured bone to perfection, restoring the original form. The Health is always present.
>
> AT Still, quoted from http://www.dynamicpotency.com/

For now lets say that my outlook had also been, for some time and for various reasons, strongly oriented towards the paradigm of Wellness. In 2004 I had already been a practitioner of Craniosacral Therapy (CST) for about 10 years. Through direct experience I had already seen how well a deliberate and sustained attention to Wellness works when applied in practice. CST is itself a modern offshoot of Classical Osteopathy, and – even though I did not know much of the history or underlying philosophy at the time, something about AT Still's Cellular frame of mind had been passed on via my teachers and was revealing itself in front of my eyes during treatments. So I had developed a deep trust in Wellness, and a strong belief that the body does nothing by accident, and everything that it does has a meaning and a purpose.

As a philosophical basis for "health interventions" (physical and psychological therapy), Wellness is virtually diametrically opposite to that of modern allopathic medicine – whose entire system of diagnosis and treatment is focussed on identifying path-ogens and path-ology and then curing, or alleviating, illness. *Páthos* (*άθος*)

originally meant suffering (I feel/suffer – i.e. an enhanced awareness of the bad stuff in life), of which disease was only one type of suffering. *Páthos* was a broad term that included pain, suffering, death, misfortune, calamity, disaster, misery, any strong feeling, passion, emotion, or state (of mind/being) or even an unfortunate incident. The idea of *páthos* is not so different from the Buddhist concept of *dukkha* – whose original meaning was countable and uncountable – reflecting how one can enumerate illnesses[19], but actually they are innumerable, each person suffering slightly differently from the next.

The philosophical *choice* to focus on Illness / germs / pathology / suffering – runs very deep through our medicalised society to the point that it is taken for granted. The fact that this perspective *is a choice* is therefore essentially invisible, and so it affects how we think about everything without us realising that it IS (was) a choice. One only has to look at a selection of "Health" magazines or articles in newspapers or TV to realise that the main focus of attention is on illness – or at the very least, how to prevent illness – rather than on Health. And articles about Health tend to be either soundbite simplifications, or focussed on a specific something that can be purchased that appears to be able to cure everything[20]. No matter how well meaning these articles may be, the superficial view of health (and how it might be attained) are usually just a rebranded version of an allopathic world view.

Comparing Germ and Cellular theories

> If we surrendered
> to earth's intelligence
> we could rise up rooted,
> like trees.
> ~ Rainer Maria Rilke

Although we will eventually be interested in processes that are not directly related to organic disease as it is commonly viewed (but rather, are caused by overwhelm and shock) – there are several benefits to exploring the contrast between Germ and Cellular paradigms. The Cellular perspective is largely unfamiliar, and so needs something of an introduction. The ideas behind Cellular theory have gained fairly wide acceptance, and over the past few decades, biological and ecological sciences have largely come out in its favour[21] - even though this is not usually stated overtly, and culturally we still think very much in terms of Germs[22]. Secondly, as a result of studies of somatisations (e.g. Scaer 2014[23]), there is an increasing recognition that physiological and immune processes that deal with infections are intimately connected to (and hard to distinguish from) processes that maintain our personal and social boundaries, or that respond to non-infective threats to the homeostatic balance. These ideas are so radical and have such broad implications that – although they have been nominally accepted in medical circles, they are still really only paid lip service in most medical (and psychological)

practices.

To give just a few examples of how the immune function is intimately related to psychology, brain function and other aspects of homeostasis …

- Immune functions of the brain are intimately related to certain psychological disturbances, and there is a clearly recognised two-way relationship between stress and immune function. The capacity of the immune system to provide protection decreases as psychological stress increases. Likewise, loneliness and unhappiness weaken the immune system.
- The only structural difference between Einstein's brain and a "normal" brain – is the unusually large proportion of glial (immune) cells[24].
- Digestion is strongly related to the immune system – if only because when we take food into our bodies, the digestive system has to both absorb and provide some kind of barrier to infection. This starts with lysozyme in saliva, stomach acid, and eventually the microbial colony of the gut. But the human microbiome has been found in many studies to influence emotional and mental state – for instance, the largest production and store of serotonin in the body is via gut bacteria.

Most importantly, the Cellular perspective is a mindset that is most aligned to the way that the human body-mind has evolved. This biologically congruent mindset provides a very simple and direct route out from trauma and back to health.

Germ theory states that disease arises from microorganisms outside the body, and that microorganisms are generally to be guarded against. (Or as a natural extension of that perspective, joints "wear out".) Microorganisms (including viruses) are seen as primary causal agents of disease and are therefore "bad". Look at all those disinfectant adverts ("*99% of germs – dead!*")[25] – and in fact as a society we tend to equate inherently "bad" germs, and illness with bacteria, and health with cleanliness (implying dead bacteria). Mainstream medicine is gradually changing its views on "germs", in the light of antibiotic resistance and recent research on the human microbiome (gut bacteria). But even when confronted with a potential return to the days preceding antibiotics, old ways of perceiving the world take decades to die out; with Germ Theory continuing to be a foundation for the practice of medicine. Given that the territory of Germ theory is the end-point of a Cellular, ecological view of health, illness is endemic in society partly because it is *expected to be* a normal part of life. The attitude is pervasive throughout our society. Likewise in agriculture, insects and fungus are seen as pests to be eradicated rather than parts of an ecology that could be optimised.

From a Cellular point of view, disease arises from microorganisms which in most cases already co-exist within the cells of the body. They are not invaders as such. Many of these intracellular microorganisms normally live in a comfortable symbiotic (or at least neutral and contained) relationship with our immune system - and even directly assist the metabolic processes of the body.

The forest is a carcass. The forest is a dying system on which the decomposers are beginning to feed. If you know forests very well, you know that you can go out this morning and strike a tree with an axe. That's it. Or touch it with the edge of a bulldozer, or bump it with your car. Then, if you sit patiently by that tree, within three days you will see that maybe twenty insects and other decomposers and "pests" have visited the injury. The tree is already doomed. What attracts them is the smell from the dying tree.

We have noticed that in Australia. Just injure trees to see what happens. The phasmids come. The phasmid detects the smell of this. The tree has become its food tree, and it comes to feed. So insects are not the cause of the death of forests. The cause of the death of forests is multiple insult. We point to some bug and say: "That bug did it." It is much better if you can blame somebody else. You all know that. So we blame the bug. It is a conspiracy, really, to blame the bugs. But the real reason the trees are failing is that there have been profound changes in the amount of light penetrating the forest, in pollutants, and in acid rain fallout.

People, not bugs, are killing the forests[26]

We live immersed in a world of microbes and viruses[27,28]. One of the latest advances in medicine is the recognition of the importance of the human microbiome[29] – the collection of endogenous bacteria and viruses that live in our gut, on our skin and are essential to life. We have evolved with these for so long that they provide important immune functions, generate important chemicals for our body such as enzymes; and if completely stripped of all "non-human" cells and DNA we would die in less than an hour. There is a true symbiosis between the human organism and the internal (and external) microbial ecosystem that has accompanied through evolution. This is perhaps made less easy to see by the way that creation myths (such as Adam and Eve) permeate Western culture, resulting in an doublethink. We "believe" in Darwinian evolution ("man arose from apes") and at the same time there is an unconscious assumption that humans somehow started afresh, and we are somehow separate from all that evolutionary history, pristine in our human-ness.

The human microbiome may be compared directly to colonies of bacteria and fungi, supported by a balanced ecology of insects and worms are the basis for healthy plant roots and soil fertility – and this is so true that it is not really an analogy – it is a statement of reality. The numbers keep changing as microbiome research continues, but at time of writing the best estimate is there are roughly as many bacterial cells in the human body as there are human cells, and there is up to 10x as much non-human DNA in a human body as there is human DNA! This is equivalent to a rainforest level of ecological complexity, existing inside us. We are part of an ecosystem – we ARE an ecosystem ... We depend on the internal ecosystem for our survival, just as much as we rely on the ecosystem of the so-called "external environment".

When animal life exploded some 800 million years ago, microbes had already

> *existed on Earth for maybe three billion years. A major innovation in animal evolution was the gut—a tube that takes nutrients in one end and expels waste from the other. It is even possible, argues Margaret McFall-Ngai, a microbiologist at the University of Wisconsin–Madison, that microbes drove the evolution of the gut directly. Plants only succeeded in colonizing land when they had developed relationships with microbes that helped them extract vital nutrients from soil. Perhaps one evolutionary innovation of animals was to scoop up the microbial communities necessary for survival and to take them along for the ride, achieving mobility.*[30]

One could say that there is a continuity of ecologically balanced, cooperative, mutually interdependent, **Symbiotic** Life. At some relatively arbitrary point on that continuity it is possible to identify a separate living organism called a human being. The principle of individuality has been chosen so strongly by European philosophy and culture - that it has become hard to see anything except the division between humans and everything else. But it is an arbitrary point. The smaller end of "e*verything else*" is constantly entering us, leaving us, keeping us alive, and moving through us, surrounding us, living a happy and fruitful life *within* us. Bacterial Life is swimming in the air we breathe and bathe in[31], it is transferred during our contact with the ground. The consumption of raw unsterilised plant food and moving through ecologically healthy landscapes connects us to soil microbial colonies, and many (if not all) of those vital intestinal bacteria are found in soil. The complete "naturalness" of our place in all these so-called germs is underlined by the fact that children playing in dirt have better health than children raised in a disinfected environment[32]. I find it interesting how the science that has assisted a separation from Nature / Gaia is leading us inexorably back. Not like spirituality does in a whole-being manner – such as the traditions of mystical Christianity or Daoism. Rather, it's like someone has taken a 10,000 piece jigsaw puzzle of Half Dome in Yosemite valley, and scattered just a handful of its pieces on the table. Everyone around the table can argue about what the full jigsaw might look like, but as one piece at a time is added to the scattering on the table, if there is any interest at all in the bigger picture that might unfold there are less and less options for interpretation.

One recent finding[33] is that a particular bacteria that is usually considered healthy occurs in greater proportion in patients with psoriasis – indicating that the overall ecological balance[34] may be as important (or more important?) than specific bacteria. It also appears that the capacity to have higher cognitive functions and memory may have arisen from a symbiotic relationship between a virus and neural cells[35]. The mammalian placenta only came into existence because of the absorption of a retrovirus into the genome[36,37]. In fact, about 20% of human DNA consists of endogenised viruses[38] and it would appear that viruses (the "human virome") might be as important to the maintenance of a healthy gut ecology as are bacteria[39]. There is even "dark" DNA that does not seem to come from anywhere (i.e. any kind of micro-organism known to us so far). In the future we might find that non-cellular organisms similar to

slime molds are also part of our internal ecology. All of this raises fundamental questions about the immune system, and biological identity – which we will revisit later.

> If I could live my life over again, I would devote it to proving that germs seek their natural habitat – diseased tissues – rather than causing disease.
>
> – Rudolf Virchow[40]

Germ theory also has quite rigid views on the way microorganisms work. The function of microorganisms is considered to be constant. It is assumed that the shapes and colours of microorganisms are constant, and every disease is associated with a specific micro-organism. In Cellular theory we see something (again) far more reminiscent of soil ecology. The function of these symbiotic organisms changes to assist in the catabolic (disintegration) processes of the host organism when that organism dies or is injured – and this assistance may be chemical (e.g. enzymes) or mechanical (phagocytosis). Cellular theory also states that microorganisms change their shapes and colours all the time to reflect the medium they have to adapt to. i.e. they use *metamorphosis* as a strategy to meet to the demands of their environment. This has been seen increasingly in modern biology, and has required reclassification of some species. And just as single cells distinct from a large organism can vary when alive, so can cells that are part of an organism[41]. As such, every disease is associated with a particular condition and specific kind of *pre-existing* loss of internal ecological balance – rather than being *caused by* a specific microorganism. So in Cellular theory the *specific* microorganisms found in diseased tissue are almost inevitably behaving in an opportunistic manner, *and come later as a result of the imbalance*. This is seen in *candida* infections. The *candida* generate a (mental-emotional) sugar craving, thus sustaining the imbalanced gut environment that allows them to thrive. The fact that gut flora can change mental processes by inducing cravings, and that the gut produces and holds the greatest store of neurotransmitters in the body – is another modern discovery that supports Claude Bernard regarding the degree of integration and interwoven-ness of all processes in the body. It also raises some fundamental questions regarding consciousness and what "being human" really means.

Given the Germ idea that disease comes from the outside it naturally follows that disease can "strike" anybody, and to prevent disease we have to "build defences" and kill the bad bacteria. In contrast, Cellular theory says that microorganisms only become "pathogenic" as the ecological health of the host organism deteriorates. Hence, the condition (loss of Health) of the host organism is the primary causal agent. Disease is built by unhealthy pre-existing conditions. Therefore, some people are less susceptible because their lifestyle (and way of thinking!) cultivates a healthy internal ecology. And for the same reasons, some people are more susceptible – there is a decrease in the vitality, responsiveness, adaptive capacity, and resilience of their immune system. There are many possible reasons for this increased susceptibility;

including mental state, pollutants, diet, conditions of gestation (before birth), general stressors on any part of the metabolism, etc., etc. One can simply say that their whole being is less adaptive, perhaps because it is already using some of that adaptive capacity to deal with other stressors. Therefore, to prevent disease we have to create and nurture conditions that predispose health[42] and particularly conditions which increase the healthy **adaptive capacity** of the organism and the person. The term "*Adaptive Capacity*" will keep cropping up, and is a fundamental principle of Health[§].

There are many levels at which adaptive capacity can function, from the psychological down through to the cellular. Everyone has an experience of how adaptive capacity can be reduced by multiple demands. If one person speaks to you and asks questions, that is normal. If two people try to engage with you in different ways – that starts to strain the ability to respond, and it is harder to pay either of them the same quality of attention. And so on. The more demands, the less is available to deal with each, and even if we focus on one there is more energy spent in the effort of focussing so hard in one direction and blanking out what is coming from another. I would also guess that most people can understand the idea of psychological adaptive capacity – since it is quite clear that some people possess far more resilience to life than others. Perhaps the most common mistake made is to attribute that extra resilience almost exclusively to genetic inheritance or even to some mysterious quality called "character" (that is also often assumed to be inherited, and therefore to be an expression of "good genes"). Mouse models of resilience indicate that behaviourally adaptive resilience is epigenetic – i.e. it is programmed through experience to change how their genetic potential expresses itself physiologically and through the microbiome. If not directly re-programmed, that imprint continues to affect methylation/gene expression and microbiome ecology for several generations, but is still usually a matter of expression rather than genetic mutation/inheritance.

If we look at how this plays out at a cellular level, the details are only just beginning to be explored. Up to now there has been an almost casual disregard for the biological detail, partly because of lack of tools to explore it, but also because of a lack of imagination for how intelligent and adaptive individual part of the human cellular ecology might be. A recent research paper[43] has shown that the human immune system monitors the level of activity of a pathogen (*P. aeruginosa*), and changes its response based on the population density of the bacteria inside the body. This is an intelligent response to the fact that the bacteria themselves employ "quorum sensing" to determine whether their total presence (or concentration) has reached a critical mass at which it can explode outwards. The body detects the bacteria's own quorum signalling as a means to decide how to respond most efficiently. So this paints a very different picture of an immune system. Instead of one that tracks down and kills every single example of a "foreign" bacterium, the immune system maintains a delicate ecological balance, tolerates small numbers of even very toxic bacteria, and only acts

§ An important aspect of adaptive capacity is the ability to set appropriate boundaries. This topic is covered in detail in Chapter 3.1.

when something gets out of hand. This is another wonderful example of the conservation of effort found in all of Life. So adaptive capacity here is (i) the ability to sense levels of activity of potentially dangerous bacteria, (ii) the ability to be **well calibrated** to that particular source of potential danger, so that it is responded to only if necessary, and (iii) the ability to mount a suitable defence (or to initiate some response that restores a proper balance) if necessary. From that is is perhaps possible to see that pressure from some other metabolic direction (causing a reduction in total adaptive capacity) might impair the delicate sensitivity necessary for the immune system to adapt effectively in this way.

So whilst in Germ Theory, Health is defined as an absence of illness – in Cellular terms, Health is defined as *a dynamic optimisation of energy expenditure required and maintenance of homeostatic balance - in response to demands from the internal and external environments.* That statement would not be controversial at all in modern medicine[44] - and I am certain that when looking specifically in terms of infectious diseases, both Cellular and Germ theory are correct in their own particular setting. However, there would be quite a lot of argument as to where the dividing line is between them. For our purposes, this would be missing the point, because it is the whole mindset and way of perceiving the human body-mind, homeostasis and the immune system that is important. Approaching from a point of view of looking for illness ("fixing the problem") inevitably results in different observations, different conclusions and different "solutions" compared to those which arise when the starting point is a focus on health ("looking for Wellness") and what might increase and sustain it. So whilst surgical interventions, antibiotics and other pharmaceuticals are without a shadow of doubt sometimes absolutely necessary – I can say from my own professional point of view that sometimes there are a lot more options available designed to build health that could prevent the need for surgery or would reduced the need for certain drugs.

Salutogenesis

Aaron Antonovsky (1923 – 1994) was a sociologist who developed a theory of mental health based on an internal "sense of coherence" and a positive outlook on life. One of his great insights came when he interviewed women who had survived the Nazi concentration camps[45].

> *To his surprise he found that, among these women, there was a [significant] group [about 29%] that had the capability of maintaining good health and lead a good life in spite of all they had gone through. As Antonovsky said himself "How the Hell can this be explained?"*

In contrast, in a general western population only about half of people have that sense of a positive future. He went on to develop a theory of mental health, defining a defined Sense of Coherence (SoC) as:

> *...a global orientation that expresses the extent to which one has a pervasive, enduring though dynamic feeling of confidence that :*
>
> *(1) the stimuli deriving from one's internal and external environments in the course of living are structured, predictable and explicable;*
>
> *(2) the resources are available to one to meet the demands posed by these stimuli; and*
>
> *(3) these demands are challenges, worthy of investment and engagement.*

This is not so different from the experiences of Viktor Frankl, a Holocaust survivor, of the ghetto of Theresienstadt, and then Auschwitz. In his book *Man's Search for Meaning*, written in the weeks following his release from Auschwitz, he described[46] what he had learned about human nature, resilience, and what had kept him alive. He considered that his capacity to live came from a sense of ***meaning***. i.e. of having a meaningful life - and for Frankl that in turn came from purposeful work, love, courage in the face of difficulty, and was further supported by an enduring sense of humour and dignity. He took great comfort in the companionship of other people. He was deeply self-forgiving, noting in a short sentence that rings like a giant bell in the depths of the ocean ... "*The best of us did not survive*". All this was founded on a deep spiritual belief, and there are several ways that one can interpret that – a belief in Life itself, or a belief in a fundamentally loving God. Frankl had a belief that goodness can be found wherever one looks (with the proviso that there is also evil). He was surrounded by evil, and so deliberately looked for the "good stuff", finding humanity and empathy also in some of the concentration camp guards[47]. Of course, Frankl entered World War II as an eminent professor of psychology in Vienna, and had already had some profound understanding of the human condition. One could say that his experiences as a Jew in the Third Reich gave him the ultimate opportunity to put his theories into practice. Viktor Frankl's entire life history tells us he is someone we should listen to very carefully, if we wish to understand how the best aspects of humanity can survive whatever might assault it.

> It always seemed to me as if the real milestones were certain symbolic events characterized by a strong emotional tone. You are quite right, the main interest of my work is not concerned with the treatment of neuroses but rather with the approach to the numinous. But the fact is that the approach to the numinous is the real therapy and inasmuch as you attain to the numinous experiences you are released from the curse of pathology. Even the very disease takes on a numinous character.
>
> *C.G. Jung in a letter to P.W. Martin, 20 August 1945 (Jung 1973, 1: 377)*

We will come across these exact concepts (structure, predictability, resourced-ness, and self-value – particularly within the community) later when looking at practical applications. Antonovsky noted from his observations of people who had emerged

from trauma more or less unaffected that everyone in stressful situations develops an attitude designed to help them to cope, and that some attitudes serve better than others in maintaining long term mental health and an expansive and optimistic sense of the possible future – *which in turn also leads to them having good physical health*. This is reflected in more recent research by Bonnano[48], showing that a non-survival-oriented mindset provides an improved quality of access to internal "feelings" - that in turn make for better quality choices and decision-making. Antonovsky's wife, Helen, developed a questionnaire to measure SoC. A 2005 metastudy[49] of several hundred population measurements of SoC from many different countries[50] showed a consistent correlation between SoC and mental (and physical[51]) health – a finding echoed by later work into psychoneuroimmunology.

SoC has three components[52] :

- *Comprehensibility* (cognitive component): a belief that things happen in an orderly and predictable fashion and a sense that you can understand events in your life and reasonably predict what will happen in the future.
- *Manageability* (behavioural component): a belief that you have the skills or ability, the support, the help, or the resources necessary to take care of things, and that things are manageable and within your control.
- *Meaningfulness* (motivational component): a belief that things in life are interesting and a source of satisfaction, that things are really worthwhile and that there is good reason or purpose to care about what happens.

He considered the third of these factors – motivation – to be by far the most important. Of the many possible conclusions one can draw from his work, the relationship between a positive mental focus/attitude and good mental/physical health is profound.

Stress-Diasthesis

Stress-Diasthesis (S-D) is

> *"… the theory that mental and physical disorders develop from a genetic or biological predisposition for that illness (diathesis) combined with stressful conditions that play a precipitating or facilitating role."*

Salutogenesis is often confused with the S-D model. Or more often, the S-D model is used to explain the observations made by Aaron and Helen Antonovsky – another though less extreme example of the DNA-centred "it's all in the genes" way of viewing health that has become so prevalent. S-D has a lot going for it in many ways. The idea that illnesses develop because there are predisposing factors takes us at least part way on the path back to a health-centred way of viewing the world, and this particular viewpoint will be an important part of the discussion about pathologies arising from dissociation in later Chapters. It is particularly important in that it suggests a different way of characterising illnesses and pathology that escapes the symptom-oriented model

adopted in Western medicine. Given a "predisposing factor" point of view, many different classes of symptoms (and combinations thereof) can arise from a very similar cause. And many different causes can potentially create (superficially) similar symptom patterns – provided that one restricts the field of observation to the symptomatic area and ignores what is going on in the rest of the body-mind. However, the weakness of the S-D approach is once again that it focusses on the problem and on the pathology rather than on the inherent health in the body and the capacity of the body to self-heal. If one focusses on the innate self-regulatory and homeostatic working of the body, then every response is a healthy one – and understanding the *apparently* pathological responses in terms of Heath provides a direct route to understanding how the body can be assisted back to a homeostatic optimum. In contrast, the S-D approach might at its best also travel on this route of Wellness, but might equally say that someone is inevitably ill "because of their DNA", or is irrevocably sensitive to certain chemicals or has been infested with a virus from a tick bite *in a way that cannot be helped by medicine*.

> Such reciprocity is the very structure of perception. We experience the sensuous world only by rendering ourselves vulnerable to that world. Sensory perception is this ongoing interweavement: the terrain enters into us only to the extent that we allow ourselves to be taken up within that terrain.
>
> — David Abram, Becoming Animal: An Earthly Cosmology

Theodore Roszak and Ecopsychology

It could be argued that ultimately the models of health described above are all incomplete subsets of a more fundamental idea that we have all evolved embedded in the natural world, and that even (or maybe even *particularly*) mental health is dependent on that evolved embeddedness being a *lived experience*. Theodore Roszak was a history professor at California State University, who recognised this evolutionary embeddedness at a time when our culture was becoming more and more alienated – indeed, at a time when human alienation from the natural world was coming to be seen as "natural". It's interesting looking back in time to Roszak[53, 54] and the social revolution of the 60's. Personally speaking, growing up in the early 1960's in the industrial north of England, I was still able to play in wildflower meadows and all the local farms were essentially (in modern terms) "organic". Historically, this was also the time that intensive chemical farming and pharmaceutical medicine really started to dominate our relationship with the human body-mind and with the soil and our food chain. Rachel Carson's "Silent Spring" was published (1962) around the same time that Roszak was studying for his PhD, and was probably a powerful influence. Roszak essentially said that the hundreds of thousands of years living as part of a natural environment as "just" another life form getting by from day to day (not to mention the time spent up to then evolving into a hominid) has been formative in the way our

whole body – including our neurology – is shaped. So it is not surprising that the Welsh phrase "*dod yn ôl at fy nghoed*" (meaning "to return to a balanced state of mind") literally means "*to return to my trees*". Excluding and separating ourselves from that environment and removing ourselves from the experience of living as an embedded "part" of it (ecosystems don't really have "parts" – they are in reality a continuous whole) has created illness. He talked about how our culture is essentially insane because of that separation, and mental health treatment simply replaces one form of insanity with another.

Of course, living for real in an ecosystem, so we are also the prey as well as the predator, and having to navigate the normal variations of food and water supply, and so on – is not always the Disney-esque experience most people would like. However, the experience of people who really have lived in that embedded state is often that they find the constructed industrialised and technological world to be the more difficult place to live! This is not a state that can be achieved by a week camping in the woods. That being said, there are ways that ecosystem-embedded animals (and human animals) use their sensory system and perception that work according to our true biological makeup. These are easy to learn – because they are "natural" and our neurology response quickly to them – and they will be explored in later chapters. So from this point of view, health can be defined as a state in which the body-mind is being optimally lived in, in the manner to which it evolved to be lived in. This definition naturally includes a more internal relationship with the body and the senses, but also necessarily includes a sensorimotor relationality with a living "external" environment. Implicit in this is the fact that the internal and external relationalities – our state of embodiment (on our bodies) and experience of interaction with the richness of other life – is a continuum. To (again) quote David Abram[55],

> Today the only things you can enter into relationship with are other humans. Yet the human nervous system still needs the nourishment that it once got from being in reciprocity with all these other shapes of sensitivity and sentience. And so we turn toward each other, toward our human friends and our lovers, in hopes of meeting that need. We turn toward our human partners demanding a depth and range of otherness that they cannot possibly provide. Another human cannot possibly provide all of the outrageously diverse and vital nourishment that we once got from being in relationship with dragonflies and swallowtails and stones and lichen and turtles. It's just not possible. We used to carry on personal relationships with the sun and the moon and the stars! To try and get all that, now, from another person — from another nervous system shaped so much like our own — continually blows apart our relationships, it explodes so many of our marriages, because they can't withstand that pressure.

Hermeticism

Otherwise known as the Secret Doctrine, Hermeticism had been passed down in various strands that wove a thread all the way back through to the empires of Rome, Greece, and at least as far back as Ancient Egypt. "Hermetic" means closed or hidden, and the secrecy that surrounds Hermeticism is still very much present in its practice even in this 21st century age of information. It was the mother-lode of spiritual mysticism that informed the long line of Alchemists in both the Christian and Islamic worlds right up to very recent times (Jung was a practicing Alchemist). And sometime during the construction of the first great cathedrals of Europe in the early medieval period, it gave birth to Freemasonry.

The influence of this line of thought and human effort cannot be over-stated. Alcohol (al-kuhl, "the distillate") was just one of the scientific discoveries made by Alchemists, the geniuses of their age[56]. Alcohol is a purified, concentrated version of wine, discovered because Alchemists[57] were continuously attempting to distil and condense pure forms of matter and spirit. These skilled chemists were responsible for many of the early discoveries of pure elements and the characterisation of properties of basic chemical compounds. Isaac Newton was far more interested in Alchemy than in gravity or optics. It is difficult to name any major Western historical figure before about 1800 – be they from religion, politics, literature, "society", science or the arts – who was not involved in hermetic practices in one form or another. For example, most of the founding fathers of the USA were Freemasons; and William Blake was certainly not alone amongst the romantic poets for his interest in the secret doctrine.

It is important to stress that the hermetic fabric that lined much of history had an almost unlimited capacity for adaptation. Sometimes it was practised outside the Christian (or Islamic) faith as a Deist or even pagan practice. More often these Alchemists - both priests inside the Church (such as Luther) and laymen (such as Newton, Blake or Jung) - were deeply Christian in their outlook. Their hermetic/ Alchemic practice did not detract from their overt religion (Christianity), but rather, was a tool – a lens that magnified their living experience and understanding of Christ. So far as I am aware, Islam is slightly different, and hermetic practices were more confined to one particular sect – Sufism.

Even up to the beginning of the 20th century, the lineage of Paracelsus[58] was so pervasive that many practising doctors were also members of Masonic lodges, particularly in the USA. By this time, some versions of Freemasonry in the US had taken on a form almost unrecognisable in Europe, being heavily influenced by the *New Thought* movement[59]. Despite this societal nod to the roots of medicine (Paracelsus, Asclepius, Hippocrates), by the beginning of 19th century something important had already been lost. Medicine had largely deteriorated to a heroic act of kill-or-cure, in which extreme blood-letting and liberal use of opium and salts of mercury were commonplace. It was a dangerous time to need a doctor.

In contrast, Paracelsus was a natural physician …

> The art of healing comes from nature, not from the physician. Therefore the physician must start from nature, with an open mind

The above quotation arises from what was at times a heretical belief - that God and Nature are indivisible. God is Nature, just as Nature (Creation) is God. Humans may be special in some ways, but we are still a part of nature. Which leads to the implication that humans too, as created living beings, are a very small aspect of God. Although he was certainly not the first person to do so, Spinoza is probably the best known western philosopher to take up this line of argument. Thus, one can consider the way that the human body is a thing of nature, and therefore contains a seed of the divine – indeed – is a part of the divine. Which in turn is the life force, and the ordering principle that ensures health. So the way that the human body-mind reflects nature and embodies the natural life force – is a fundamental frame of reference when one wishes to return the body-mind to health. Early Celtic Christianity – having a larger dose of paganism embedded in its practice than the doctrines coming out of Rome – probably also contained this core principle of God=Nature.

Paracelsus's words also imply that healing comes from inside – that there is a divine healing force inherent in Nature, and therefore inherent in the vessel of the human body. This has to be true even today, even in hospitals practicing the most scientific of medicine. For, regardless of what medicine is applied, it is the body that adapts, repairs itself, survives and ultimately recovers[60]. Medicine – in whatever form – can never be more than an assistant to biological processes that we have very little understanding of. If the patients body does not in some way repair itself (regardless, in spite of, or with the assistance of medicine), then they will die.

Paracelsus described a holistic view of health – where the whole body responds and acts as a single unified and coherent organism …

> "Once a disease has entered the body, all parts which are healthy must fight it: not one alone, but all. Because a disease might mean their common death. Nature knows this; and Nature attacks the disease with whatever help she can muster".

The risk and illness myths in popular culture

The dominance of the *ideas of* germ theory in our culture has created some great distortions in the way that we think of health and illness. One aspect of this is the popularisation of the epidemiological view of health and risk. It has been widely acknowledged that our brains are not particularly well organised to understand risk... To put this in a very small nutshell, the mental faculties that would give a more accurate view of real risk are only available when we feel safe, and as soon as risk is being considered, this decreases the sense of safety. In risky situations the brain takes everything personally and looks for possible dangers. So in a very general sense (there is no such thing as an average human response) the intensity of threat from risk that we experience tends to be over-inflated for personal matters like cancer, and deflated for more general matters such as global warming.

Medical epidemiology is a science that looks at the statistics of illness and mortality in an entire society. Its main function is to cater for public health decisions such as the provision of adequate medical services. For example - if you know that there is a 1% annual incidence¶ of broken bones due to accidents in the general population, then it is possible to arrange for orthopaedic, A&E and remedial services to cater for that number of people coming through a hospital. But here we immediately hit the mismatch between personal experience and epidemiology – in that there is no indication as to which *specific individuals* will come into those beds or need a plaster cast. So in most cases the statistics cannot be converted into individual experience. There are always high risk groups – and maybe we can say that 5% of horse riders are likely to break a bone, it might appear to become more personal – after all – the maths say that if there is a greater risk, then it's starting to get more personal. However, in reality it is still only personal to the specific people who do break a bone, and remains irrelevant to everyone else, because they do not break anything. The statistics assume that everyone has an equal chance of breaks – but this is never true. Some people are stronger, or more coordinated, or have better horse riding skills. Other people ride skittish horses.

And the *meaning* of a broken bone is not a fixed thing... To one person a broken bone would be like the world had ended; whereas other people might enjoy danger and not experience a broken bone as being a particularly big deal – they would not classify it as a desperate problem, more an irritation – a hiccup that is just a normal part of living. The playing field is far from level, but that 5% figure is incorrectly assumed to mean that each year every single horse rider has an equal 5% chance of breaking a bone.

Of course, one can deliberately take safety measures – like choosing to ride a placid Shetland pony instead of mounting a nervous 15 hand Arab. But here we come to another distortion, because the act of applying safety measures is also a very un-level playing field. I think it's fairly widely recognised that people who worry excessively

¶ The figures I am using here are intended as an example, and are not real!

about having accidents - tend to be more likely to have accidents precisely because they are worrying about them. The same goes for illness, because the immune system is simply less effective when we are stressed (and the blood-brain barrier more permeable, increasing the potential for infections of the central nervous system). A fearful rider is less skilled, less able to calm and steady the horse. And the very thinking about an accident almost programs the body to make that particular set of clumsy and unskilful motions. All of this creates a very ambivalent and nuanced relationship between awareness of safety, perception of the meaning of a broken bone, the individual's internal mental state, other causal factors and – whether that specific individual will break their leg. The usual assumption is that there is a bag of 95 white marbles and 5 black ones, and each person blindly dips their hand into it, and if they come up with a black marble, then they break a bone – or get cancer, or whatever the particular epidemological statistics refer to. The individual reality is completely different. For the individual, it is not a random bag.

The same goes for illnesses, and it is important to remember that epidemological statistics are based on the whole population; and the average is considered to be "normal". Blood tests are assessed on the "normal range", as if everyone has the same physiology, and as if average is implicitly healthy. In fact, for various reasons described later (mainly in Chapter 9), the average person in a modern industrialised western country is not healthy at all. So the norm that epidemological studies find – certain rates of heart attack, cancer, osteoporosis, mental health difficulties, autism, etc. – are not actually normal from a biological perspective. They are normal for the maladaptive and pathology-oriented culture that we live in. The view that these are normal then leads to an assumption that illness at the levels we see is normal, and high impact and costly public health interventions also become normal and reasonable. I say it is not normal. When I was going to primary school in northern England the 1960's there was not a single child in my class who suffered from life-threatening allergies. Compare this to the present-day, where lethal nut allergies are common[61] (even bags of peanuts have been seen with the label "*Warning! May contain nuts*"); and up to 40% of children in US schools suffer from asthmatic respiratory issues and allergies[62].

I have to admit that at school age, I was mildly Aspberger spectrum, as were some other children in my school classes – all slightly odd, slightly dysfunctional in situations that demanded social skills. But this was quite low level compared to the degrees of Autism, ADHD, anxiety, depression and other mental health problems seen today in a similar sized group of children in a typical school. Without the diagnostic stigmatic label we were just at one end of a wide but normal behavioural range, and teachers adapted their approach to suit the children they had (instead of attempting to adapt the children to the teaching methods and curriculum : an exercise in making square pegs fit round holes). Generally speaking, society in the UK has become a lot less tolerant of deviation from the perceived norm in mental-emotional states over the past 50 years, as public awareness of them has increased. The increasing awareness added to a parallel

lack of cultural acceptance is just one of the pressures that adds fuel to the fire. As class sizes have increased, curriculums become more controlled by the system (and so the teachers are now less able to be adaptive), people who do not fall into the norm are in danger of falling out of the range of behaviour that can be accommodated in a classroom. They then need to have special treatment in school, and this expensive resource is only available through the "system" if a diagnostic label has been gained. And so it escalates. Ignoring all the extraneous causes for increased ADHD and Autism and other so-called mental health issues, the functional separation of these children and adults (so they become a "them" rather than part of the collective "we" of normality) makes the problem far bigger than it need be. This is yet another result of a pathology-focussed cultural mindset. It should be recognised that - even if germ theory is correct for germs, its pathological focus does not translate happily into mental health and other more social and behavioural spheres.

Risk is also a much misunderstood phenomenon. All environments, whatever their risk level, require different responses in different contexts; but just like the statistics in which it is based, risk is usually considered to be something in its own right, independent of context. Which in turn creates a lot of problems. My first employment, about 40 years ago, was in the coal mining industry, and I worked in various positions, including two years on an underground coal face. Risk there was rather different from risk in my life outside it. Any non-fatal accident involved at least an hours journey either on stretcher out or for a doctor to get on site. There were many potential fatal accidents waiting to happen in every workplace, where one could end up being carried out of the mine in a lot of plastic bags. I remember quite clearly one job where I had to walk directly next to a 200[§] horsepower panzer conveyor (a set of steel bars being dragged by two sets of chains made of half-inch thick steel over a steel bed, emitting well over 100 decibels of engine noise, bangs, crashes and metal-on-metal screeches) in a very confined space. There were lots of ways in which contact with the moving parts could trap clothes and drag someone round in small pieces back through the 4 inch high return slot. On one particular day when I was making this journey a girder was pushed by falling rock and smashed into the wall a couple of feet in front of me, with enough force to kill a small elephant (or maybe a large one). On the same coalface I once saw someone almost have their skull popped open when their helmet became trapped above a 180 ton hydraulic roof support as it was raising (we managed to signal so the operator took his hand off the control lever – just in time). Despite all this, I witnessed only one serious injury in five years.

The thing is – real and present dangers are very different from "*what if*" and statistical dangers. There is a very different mental process, because the thing is there in front of you. All of the senses become heightened. Usually the response is instinctive and non-conscious, because life-or-death decisions tend to be carried out by primitive parts of the brain that work a lot faster than the frontal cortex. If thinking happens at all (and

§ 200 horsepower is roughly equivalent to the maximum power available from a 2.5 litre car engine.

often it only happens in retrospect, or as a slightly distant and impersonal overlaid narrative), the question in mind is … "*that IS dangerous … how should I behave to make sure I am safe?*" Note that this is not "*what can I do to reduce my risk?*" - because "*reducing the risk*" of immanent and painful death is a totally insufficient, inadequate and inappropriate response when potential death is staring you in the face. The moment demands that one acts in full knowledge of the risks and modifies behaviour accordingly. But in a real situation in which there is mortal danger, thinking usually reduces to near-zero, and there is just a continuous presence of *assess-decision-action,* with virtually no thoughts in the way these are commonly experienced.

It is also not possible to be in a constantly dangerous situation and be in control and simultaneously be in fear – because the fear itself makes reactions less controlled, thoughts less rational, balance less steady, and severely limits the possible choices… When the danger is noticed but one feels in control, then risks are taken, but with calculation – because when the danger is obvious, the simple act of recognition automatically gives one a certain degree of control and choice. Since my safety also depended on everyone else not leaving potential death traps, the automatic thought on every action was also "*am I doing this in a way that keeps everyone else safe?*" The resultant slow and thoughtful way of moving and carrying out every task was interestingly meditative. The majority of accidents occurred because people lost concentration by being too hurried or distracted, or just forgot to look after their mates.

None of this immediacy exists when the world is relatively safe, so when walking along a normal street, it is almost impossible to maintain the same methodical and very focussed way of moving and thinking that are necessary in a heavily mechanised coal mine. Nor would that be appropriate... It would be a great waste of mental and physical energy to up my survival readiness to the same degree in a relatively safe environment, because focus on one thing reduces the capacity to focus on something else – it sacrifices a broad adaptive capacity in order to achieve a very narrowly focussed adaptive capacity. In fact, it would be an *unhealthy and maladaptive* use of energy and attention – because Health is a state that is optimised to circumstance.

When analysed in terms of what might possibly go wrong, even relatively safe - life is inherently risky. 100% reduction in risk is impossible in any industry (though it is possible to get very close – as the Canadian mining industry has showed since the 1970's)[63]. Reducing risk to near-zero means making everything known, controlling every situation, which very quickly starts to interfere with life[64]. And the fact is that everybody dies sometime. It's the one thing that we know is going to happen in life with 100% certainty. So there is always the choice to see the normal everyday world as being relatively safe or relatively risky. Both are true in their own way, but the direct results of that choice are two very different mindsets. When the world is viewed as an inherently dangerous place, there are always more attempts to control it, and the focus is on danger. Curiosity and the drive to explore is replaced by a conservative mindset

that seeks familiarity and the known. So most "*health advice*" consists of giving simplified formulae for health – for "r*educing the risk of death*" ...

An apple a day keeps the doctor away.
Take this herbal extract supplement and live to be over 80 years old.
Maintain your sperm count by avoiding contact with soft plastics.
Avoid cancer by eating more fruit.
Take an aspirin a day and reduce your risk of heart attacks.
Do this specific set of yoga stretches to prevent back pain.
Etc...

In reality, all of these soundbites are bad advice for someone, and some of them are bad advice[65] for everyone! They are straws that are grasped in the face of a world view that assumes the world is dangerous; that bodies are fragile and inevitably become ill; and that death is something we all have to avoid(!) The idea of cheating death gets carried through the specific language used to report - "*a thousand people were prevented from dying...*" This way of thinking of death as the ultimate evil is so entrenched in our society and language that it is difficult to find a common phrase for "*becoming well and safe again after a potentially fatal illness or accident, to then be able to live out our proper lifespan (whatever that might be) – after which our bodies will inevitably return and take up different roles in the natural cycle of energy*" - that does not imply that death has been cheated. You may consider this argument to be simply a matter of glass half-full/half-empty (celebrating life vs avoiding death), and in some ways it is exactly that. However, this frame of mind (pathology vs wellness) fundamentally changes our relationship with Nature, and specifically with the part of Nature that is my / our / your body. On the one hand, Nature is unknown and feared. On the other hand, we fully participate in and celebrate Natural processes of life – including the process of death.

In contrast to these Western cultural distortions, the herbalist David Woodgate[66] relates the following conversation :

> In Siberia I asked a nomadic reindeer herder "What happens if you get ill?" He was a little confused by the question and answered the best he could, "We don't get ill. People get injured sometimes but if you are getting plenty of exercise, interact with a strong community, and eat a nutritious diet without added junk, it is difficult to get ill".

It is almost universal that "uneducated, primitive, ignorant" societies attribute most of what we call "illness" to spiritual forces. If one looks at their position with an open mind, it can be readily seen that they have as much a common sense of "pathology" as anyone in the West. They take it for granted that fire will burn or even kill, eating old, smelly and discoloured meat is dangerous, some plants can kill if you eat them (or at least cause vomiting or stomach cramps) – their life is well structured around avoiding such hazards and teaching their children to use these things wisely. However, given

that one does not do something stupid, things that come for no apparent physical reason must have a non-physical cause. This is remarkably like everyday experience once the germ theory is taken to be only one of a possible range of parallel and occasionally optional truths.

> I live my life in widening circles
> that reach out across the world.I may not complete this last
> one
> but I give myself to it.
>
> I circle around God, around the primordial tower.
> I've been circling for thousands of years
> and I still don't know: am I a falcon,
> a storm, or a great song.
>
> From Rilke's Book of Hours. Original in German

Zombie apocalypse

Perhaps the best indicator of personal attitudes to health, wellness and pathology is to look at images in popular culture. The last decade or so has seen a steady rise in popularity of zombies – in films, books, plays, fancy dress parties, children's toys. We are now surrounded by zombies and other "un-dead" archetypes, such as vampires. Zombies and vampires follow the rules of germ theory. You are healthy, whole, pristine, until a virulent and unstoppable "other" infects your body. Then you change into something that is only half alive, and which the infection has given a compulsion to infect others. In the case of zombies, the infection continues remorselessly until all of the world is undead, frothing black blood at the mouth and waiting to pounce on anything that is human and still alive. There are several sub-plots. The virus only affects humans – we are operating along different rules to the rest of the natural world, and are in our own little disconnected human bubble of cause and effect. The zombie virus is usually assumed to have started out as a man-made biological warfare agent gone out of control. This in itself is not unreasonable, as gene editing becomes more sophisticated and humans continue to play God and make changes to Nature - because we can. The zombie half-death looks like a terrible and meaningless immortality. Death is to be feared, and humans are reduced in this death to something disgusting that further spreads death. Death itself is infectious. The zombie theme of *fear-of-death* is also to be found in modern American and European versions of Halloween. In other cultures, All Saints Eve is not a fear of death – but rather a *celebration* of the dead (our ancestors) and of the principle of death (the composting that is a vital link in the cycle of life). Personally speaking, I cannot as yet decide whether we have to learn to accept death in order to be able to fully live – or whether it is a full immersion in life that makes one able to embrace death as a friend when its time has come. Whichever way round, fear of death is essentially a fear of life, and is a very human sickness.

> It is not death that a man should fear – instead, he should fear never beginning to live.
>
> — Marcus Aurelius, Meditations

The zombie infection is also based on an inherent societal fear of viruses and bacteria. It is not so long ago (just a couple of hundred years) since sanitation and hygiene began to be considered as an answer to the widespread illnesses and early deaths seen in Europe. The incident of the Broad Street pump of 1854[67] was one of the first intimations that cholera might be transmitted by some kind of pollution in water. In the present day way of thinking, everything is caused by a virus or bacterium. But the reality has really not been thought through very carefully, leading to a general fear of viruses and bacteria, and a general obsession with antimicrobial cleaning products. It is ironic that we pay good money for these cleaners, and in fact, the greatest agent of bacterial transfer between humans is via coins and banknotes. The human body (like all other animals) have its own microbiome – an ecology of thousands of different types of bacteria mainly on the skin and in the gut; with about the same number of cells and amount of genetic material as is found in "human" cells[68]. What is less widely known is that we also have our own virome[69,70] – trillions of viruses around us and inside us. Every gram of fecal matter contains about a billion viruses, many of which have not been classified. It may even be that antibiotics work because they alter the bacterial ecology that supports particular types of virus[71]. And the virome has even been found to alter genetic expression.

So we are not pure unsullied humans who get a viral or bacterial infection simply because a virus or bacteria happens to come along. Rather, it is a curious question as to why we are affected by microorganisms and viruses (i.e. we become ill) *only sometimes*. But for most of the time we are surrounded by them and "*infested*" by them[72] (another word implying their fundamental unwholesomeness) - and nothing bad happens. The usual view of the human immune system is that it keeps all the bad guys out and maintains a purely human environment on the inside. Faced with the fact that both bacteria and parasites preferentially inhibit and encourage different viral strains – and vice-versa – leads inevitably to the conclusion that it is the total human-viral-bacterial-parasitic ecology that is important. "The terrain is everything" – and the viruses and bacteria themselves are a living part of that terrain. With this different view of infection comes the possibility that a healthy immune system is better viewed as a biodynamic market gardener of that ecology - making life harder for weeds, keeping them controlled wherever there are particularly delicate crops, and deliberately cultivating companion plants (organisms) that help to keep the garden in order.

Friedrich Nietzsche considered[73] disease to be a state of dis-integration; as opposed to the state of integration that is present when there is health. Or perhaps that is better said in reverse: the state of health that is present when there is integration, both within the ecology of the body and beyond into the ecology of human community and the greater community of Life. So the body, the being, the relationships it takes part in, and the internalised and externalised movements that operate within and continuously

redefine those relationships – are functional within their reality. Once one looks beyond the false zombified living and healthy/ dead and diseased dichotomy, it is possible to see that *"you can live normally and healthily, and yet also be abnormal, pathological and mortal"*. This is only possible because every human organism does not stand alone, but exists within the context of its own evolution and development within the context of all other life. Just as each cell in the body has a lifespan, after which it is replaced but the body continues to live, so the branch of life's exuberant diversity that we call "human" contains many sub-cells – almost 8 billion as of April 2020 – that come and go, but Life continues.

> Wine got drunk with us,
> not the other way [round].
> The body developed out of us,
> not we from it.
>
> We are bees,
> and our body is a honeycomb.
> We made the body,
> cell by cell we made it.
>
> -- Rumi (The Elightened Heart, Mitchell)

A more general view of Wellness

The Germ/Cellular debate is interesting from many points of view, but there a paradigm of health or Wellness raises far broader issues. Claude Bernard saw wellness as a mobile, adaptive and holistic process whereby the body constantly optimises itself to suit its environment and any other demands being placed on it.

Demands on the body's adaptive capacity are numerous. Whenever we think, the brain takes up to 1/3 of blood circulation, along with its sugar and oxygen. Moving (walking, running, or even just standing still) requires energy. Digesting food takes energy! Eating food also places great demands on the immune system as we take large volumes of foreign substances into our body, some of which are mild toxins, or cannot be broken down without certain shifts in liver metabolism. Bones, muscles and ligaments are constantly adapting to variations in load, and are re-working themselves, reabsorbing excess tissue or putting on more bulk. A change in emotional state usually creates a change in breathing rate which affects available blood oxygen and O_2/CO_2 balance. Entering a warmer or colder room requires adjustments so that core body temperature remains within a narrow range. A small graze requires changes in immune response, with accompanying alterations in hormone balance that demand further secondary adaptation. There is an almost endless list of everyday circumstances that demand adaptation by the body, and all of them are catered for!

This continuous dynamic optimisation of the internal environment is inconceivably

complex... It is not just one system that adapts, even to a single infintesimally small change in conditions – everything adapts, because everything is dependent on everything else. Various fashions constrain the popularised (and maybe even the scientific) views of Health. For the past 100 years or so the fashion (with regard to both the nervous system and the mind) has been to become more and more brain-o-centric. A similar fashion for muscles since Andreas Vesalius first described the dissection of a real human cadaver in 1543 in *De Humani Corporis Fabrica* – has resulted in a historical ignore-ance of connective tissue[74]. Vesalius, having as a hunter previously dissected deer and rabbits for meat, stripped away the connective tissue to find the muscles. This butcherer's way of viewing the connective tissue as more or less irrelevant and of little interest has been a feature of anatomy books right up to the present day. Everyone knows about muscles – because they are obviously important – because anatomy books focus on them. Similarly, the discovery of Cells led to a focus on the cellularity of Life, at the expense of other aspects. For instance, the extra-cellular matrix has been found to have something of an intelligence of its own, as it appears to coordinate and control the activity of cells (and cell groupings such as organs) within itself. And recently the revolution in biochemistry has led to an uncompromising focus on proteins and then RNA and DNA. Just as the original simple fallback position of Occam's Razor (as William of Ockham intended it to be used) was "God made it", the fallback position of modern biology is "DNA made it". For human functional biology, it is the brain that controls almost everything and is the seat of everything that is of any human importance. Everything takes place in cells; and the most important part of a cell is the nucleus, because it contains DNA. And muscles may be isolated in a way that implies the tissue that connects them to everything else (apart from the specific ligaments at the origin and insertion points) does not have any importance in movement.

All these ways of seeing the body or the organism as being dominated and controlled by one organ or feature arise form a reductionist scientific methodology that emphasises the parts rather than the whole. Once a part is removed, it can be conceived of as having great importance – greater that anything else. In a similar way to the media focus on a few public figures who "run" a country, ignoring that it is the sewer worker that prevents them being covered in faeces, and their hairdresser maintains their appearance of unflappableness. In essence, Germ theory is reductionist, whereas Cellular theory is holistic. At its height, brain-o-centricism went so far as to state that – since babies have not yet wired their brain like an adult, they must be automatons, and incapable of feeling (both emotional and physical) or thought. This was a natural corollary of a philosophy that required animals to be unfeeling – a position that was also justified by them not possessing a human brain, and therefore being incapable of consciousness. This was a simple extension of the idea that only humans think, and only humans are truly conscious, and the only reason his is so is because if the properties of the adult human brain (yes – it's a very circular argument). This is an incredibly arrogant and unforgivingly [white, Western, Christian]

anthropocentric belief system - that is very convenient because it excuses and makes acceptable many of the worst kinds of human abuse of the natural world. This debate continues - though the recent laws that have given whole landscapes equal legal rights as humans[75] (and that have recognised that animals are sentient beings) show that we have at least started to come down off that particular high horse. I believe we have collectively a long way to go, considering that Australian aborigines were only officially recognised as human beings on 27th May 1967, and many other indigenous peoples are still treated in a rather "animal farm" kind of way as being sub-human.

Important as the brain and DNA are, they exist in a system that is fundamentally whole – holistic – and so they should rightly be viewed in context with everything else. Perhaps one reason this is not done is that it is far easier to think in terms of a single system than to think in terms of the whole. But that doesn't mean we should not try. Aristotle (appears to have) provided a philosophical system that could be used to view something from the outside – as an observer – in a reductionist fashion; and this has become the default position both scientifically and culturally. Wolfgang von Goethe devised a similar framework whereby one can view the whole. To view the whole, it is necessary to follow exactly the opposite course. Instead of becoming a dispassionate external observer, the Goethean approach is to *experience* the world (or some specific aspect of it we wish to study) by *immersing* ones whole being in it, and *actively* ***participating***. Health is also a fundamentally a participatory process, and Goethe's participatory way of scientific investigation is a philosophy that is completely congruent with what is being investigated. At the very least, I would personally be slightly suspicious of any theory about the human body or mind that did not resonate with any of my experiences, and which contains no reference to the living embodied experience of the beings to whom it refers.

A few of the survival strategies that Life has found useful were discussed in Chapter 2 :

- Retention of what works (conservatism)
- Energy Efficiency and Frugality
- Integration
- Dis-integration, Fragmentation, becoming plural (and indeed, reproduction)
- Adaptive capacity
- Extreme adaptive capacity, Dormancy and other hibernatory states
- Exploration & curiosity
- Sense of self-other : Cooperation, Community, Family and Friends (Symbiosis)
- Control of the external environment
- Ingenuity
- Communication
- Ecological integrity

Of course, this is neither a complete list, nor does it reveal anything about how those strategies came to be chosen in the first place. In fact, my choice of them is itself somewhat arbitrary. Stephen Harrod Buhner has written some wonderful books based on a participatory relationship with Nature. In "the Secret Teachings of Plants" he begins[76] with a review of the energetics of Life, and uses the analogy of a clown on a unicycle to describe the nature of homeostasis. There are so many different pulls on a living organism's physiology – which include external stressors, internal processes, and what its desire/need to move and interact with the environment is – all of these are constantly shifting; just as small movements of the pedals, or a gust of wind, or deliberate changes in direction or focus of attention affect the clown's balance. The seat on top of the unicycle is fundamentally unstable, and this gives the clown-unicycle the greatest possible opportunity for creative movement. Likewise in a living organism, the inherent lack of stability and need for constant re-adjustment give it the flexibility that it needs to deal with any situation. So the analogy goes on … the point being that it is not just one muscle in the clown that keeps the unicycle vertical – it is her whole being.

The changes in "information" that cause the whole system to shift its balance point can be virtually imperceptible – this is a truly chaotic arrangement, and so has a hierarchy of relatively stable states to which the whole physiology converges. Similarly, for anyone skilled at riding a unicycle, or even a bicycle – eventually they are able to keep it apparently still by controlling the balance point with a series of very rapid and non-conscious adaptive movements with the handlebars, pedals and shifts in whole-body balance[77].

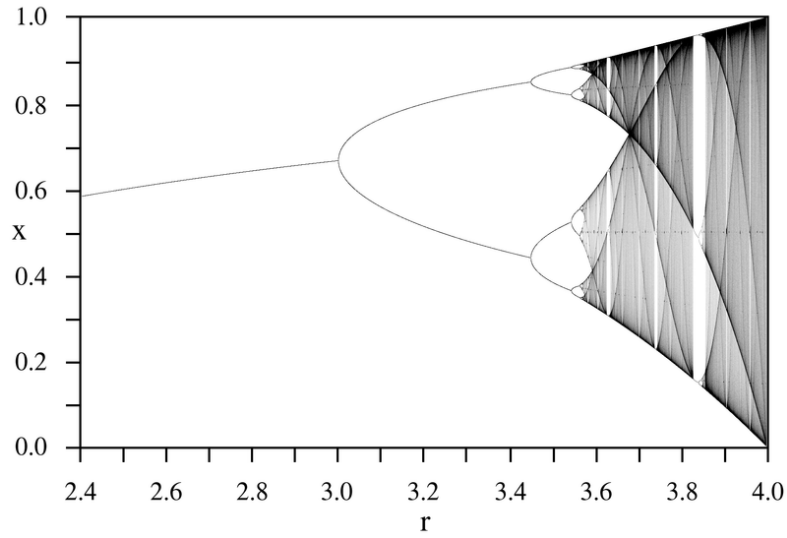


Figure 2.1 : Bifurcation diagram

Credit : PAR, Public Domain, https://commons.wikimedia.org/w/index.php?curid=323398

This kind of **unstable equilibrium** is described *mathematically* for chaotic systems by means of a bifurcation diagram (Figure 2.1). Note that this diagram uses just two axes to represent a multidimensional, interconnected and often highly subtle system with an almost infinite number of possible "stressors". *For the purposes of this analogy*, the **vertical axis (x)** shows the energy expenditure necessary to maintain each quasi-stable state, whilst the **horizontal axis (r)** shows an index that represents the sum total of all environmental and internal stressors. As **r** (stress) increases, total adaptive capacity

decreases. The relationship is not quite so simple as this diagram shows, because adaptive capacity is also related to rate of energy burn and energy efficiency – so the two variables (**x**,**r**) are interdependent. However, as a visual description of how living systems actually function, it's surprisingly accurate. If stressors are relatively small, there is only one stable state, that shifts a little and becomes slightly less efficient as stress builds (the curved line on the left of the diagram), but then changes rapidly once a threshold is reached (the bifurcation point). The organism flips into a polarised response; one pole being a high burn state, and the other pole essentially conserving energy. As stressors increase, there are then further, more rapid bifurcations. This is a process of **fragmentation**. In very general terms it doesn't make that much difference which stressors the organism is being subjected to – it is the *total* degree of stress that it is subjected to that determines its capacity to respond (i.e. that consumes adaptive capacity). Note that I am using the word "*stress*" to denote anything from mortal threat, to coldness, to dehydration, to toxicity, to insufficient social support … etc. etc. Another way to describe this might be "*an accumulation of insults*".

To summarise, as stress accumulates, the natural response of the organism *in Wellness* is to dis-integrate in order to attend to everything that it needs to attend to. The degree of fragmentation increases almost exponentially as stress increases beyond the first bifurcation/ fragmentation. **But** – *the bifurcation diagram of Figure 2.1 is fully reversible, and as stress reduces, so do the number of bifurcations/physiological fragments.* What these bifurcations actually mean in reality is very context-dependent, and will be given more attention in Chapter 7.

When a living organism responds to the tiniest shift in its environment, its *whole* being responds – not just one physiological "system", as defined in a textbook. Whatever the means of input that changes – food/chemical or sensory or physical – all of these carry meaning that transcends the particular medium that the message is received in. Just as you might receive an invitation to a party through email, or letter, or text, or word of mouth, or find it written in sand on the beach… the meaning is the same. And it is the *meaning* that then cascades down through every part of the organism to produce a response. So healthy Life is always in a state of disequilibrium, and within that state – like the clown – is seeking a balance point that suits all of the demands of each moment.

Possibly the most important question is – what is the clown focussing on when she is sitting on top of the unicycle? Is she thinking about all the different ways to fall? Or is she thinking about how to balance? Anyone who has learned to ride even a two-wheeled bicycle can tell you straight away that if the focus is on falling, then inevitably, there will be a falling. And at the final stage in which one has learned to ride the bicycle, all of the body's senses and muscular responses are focussed on maintaining balance, not on avoiding falling. More and more practice results in a fine-tuning of unconscious control pathways so that even the slightest wobble of the bicycle is corrected almost as soon as it occurs, leaving the impression of a smooth and

effortless journey to its rider. Likewise, Wellbeing, along with homeostatic balance and response to the environment - is something that the whole organism strives *towards*, simply because that is the focus of dynamic equilibrium in a world that is constantly taking it out of equilibrium.

Symptoms

If wellness is a constantly shifting equilibrium, then the experience of wellness will also shift. Anyone who has been extremely healthy will recognise the experience of a hale, bright, optimistic, light expansive state of body-mind. The tissues are slightly pressurised with fluid so that the skeleton is hardly involved in support, and except under strong loading is more concerned with maintaining shape. The skin looks healthy (indicating that we know what health looks like, even if it is hard to define), being just the right colour and free from blemish. The eyes are shiny. This is the ground state of health. It looks slightly different in different people because their constitution is slightly different; and traditional medicines from all cultures on all continents across all historical times up to 19th Century Europe recognised this individual variation and universally applied a four element system to describe it[78].

But what happens when the homeostatic process is stressed beyond its ability to maintain this optimum equilibrium? The result is what we call symptoms. It may be true that at some point the symptoms are signs that the homeostatic balance has been lost and is in mortal danger. But there are many symptoms that occur before this extreme point that are simply the body-mind's way of temporarily adapting and intelligently responding to its condition. Mental *distress* is viewed in very different ways in different cultures. Where it is pathologised (i.e. viewed as being "wrong"), it tends to get entrenched. Where it is seen as a sign of feeling unsupported within a community – and then the necessary support is provided – then conditions seen as difficult in the pathologising culture are not so difficult.

> *"We had a lot of trouble with western mental health workers who came here immediately after the genocide and we had to ask some of them to leave. They came and their practice did not involve being outside in the sun where you begin to feel better, there was no music or drumming to get your blood flowing again, there was no sense that everyone had taken the day off so that the entire community could come together to try to lift you up and bring you back to joy, there was no acknowledgement of the depression as something invasive and external that could actually be cast out again. Instead they would take people one at a time into these dingy little rooms and have them sit around for an hour or so and talk about bad things that had happened to them. We had to ask them to leave."*
>
> *~A Rwandan talking (in an interview with Andrew Solomon) about his experience with Western mental health Aid*[79].

Similarly, physical symptoms are often misunderstood. If the body has to heal itself or deal with something difficult, then homeostasis is not necessarily comfortable. A broken bone often aches when it is healing, and that is normal. Infections that have passed through the external immune system/barrier and are being dealt with by the internal inevitably create symptoms. So a cold/flu causes the nose to run, possible sneezing, or even a high temperature if it is serious. If we did not experience these symptoms, the outcome would be death, because they are all part of the normal homeostatic response. Sneezing and fluid leaving the nose are ways to flush out the upper respiratory tract. Running the body at a higher temperature is one way that the immune system creates a hostile environment for bacteria and viruses that have got out of control. Remember that it does not have to kill them off completely – but rather, restore homeostatic control, which includes a symbiosis of viruses, bacteria and other organisms which may include so-called pathogens - in a way that promotes optimum health in the circumstances. Much of the above is common knowledge, but very few people seem to join the dots; and a pathology-focussed culture tends to view all uncomfortable or unpleasant body sensations as being inherently bad. The fact is that all but the most extreme are inherently good – they are a result of the body's attempts to regain homeostatic balance and control.

Given that there is a symbiotic relationship[80] between the "human" body and the "microbiome/virome" - we already know that the immune system employs bacteria in the skin and digestive tract and eyes. And antibiotics can harm the body's defences against some pathogens by also affecting "friendly" bacteria[81] and reducing the capacity of lung tissue to withstand a viral attack. And whilst hand washing in hospitals to reduce skin load of streptococcus and other similar necrotic bacteria is useful, hand washing can increase the load of E. coli on hands because bacteria in the skin naturally kill E. coli. What if the immune system also employs viruses in a similar way to help it against other more dangerous infections? A recent study[82] has found that certain strains of flu virus kill bladder cancer cells. Which could explain why the "common cold" is so common, in that the immune system may preferentially allow this mild virus in on purpose?

Wellness as a state of mind

It is almost impossible to think in terms of Wellness in a 21st century western culture. I say this from experience, having made a sustained effort over about 15 years to think in terms of wellness rather than pathology. The *idea* of illness is so embedded in our language and linguistic structure and in the minutiae of moment-to-moment assumptions and expectations – that escaping it fully requires hard work and determination. It also demands a resolute simplicity in order to counter the sophisticated knowing focussed on illness.

If Adam and Eve received any thoughts at all from the apple they ate, those thoughts must have included a knowing of the hazards of life and an associated fear of their own

physical mortality. As a teenager and young man, I took many risks, and am sometimes a little surprised when I look back at that time – that I am still alive. Danger becomes more dangerous if we think about it. A rugby player or competition martial artist who thinks about how the impact will hurt – will get hurt and probably badly damaged. Whereas the ones who do not contemplate injury tend to bounce – they have far greater physical resilience. Babies and toddlers also tend to bounce, and even if injured they can be very quick at recovering and returning to normal activity.

I am fully aware that many people reading this will have some background monologue going through their head along the lines of "*ah but – what about those who are badly injured or end up dead?*", or "*ah yes – and then later in life they will regret all that damage...*". What can I say? Those are purely cultural messages – they are not *necessarily* Truths (with a capital T); and in other cultures you would not have had that particular kind of fear of life repeatedly drummed into your thoughts. And (to continue with the rugby player analogy) the very thinking of them makes injury more likely, and recovery from that injury more difficult ... To the extent that instilling a persistent (adult-erated) fear of injury and illness on children is extremely damaging in many ways. Teaching children to focus on danger is not a strategy that suits the integrated, Cellular, holistically connected organism that is a human body-mind.

Although a focus on illness, disease, injury (what I call "pathology") might now be considered culturally normal and a necessary precaution; it was not always so. Thoughts of illness have increased many times beyond its level in the (say) 17th or 18th centuries because we have gained more tools to treat it, and the science of pathologised (Germ-oriented) medicine has been taken into popular culture increasingly since Pasteur and the mid 19th century. Much of this is due to simply learning how disease works, because once one knows something it is almost impossible to un-know it. If this knowledge of pathology is not balanced by a *knowing* of Wellness, then inevitably there is a disproportionate emphasis on pathology. The thing is that *knowing* wellness is far ore of an experiential process than an intellectual one. Just as an emphasis by the media on news of war and violence gives a disproportionately pessimistic impression of the world being a dangerous and violent place. I don't think many people in this supposedly scientific and rational culture realise the effect that any form of unbalanced knowledge can have. Along with an unbalanced knowledge of pathology has come an increased fear of death – because a medicalised culture brings with it the myth that death is cheat-able. If death is recognised socially as being normal, then it receives far less healthy focus.

If one considers an ant or a dog (or any other living creature) – they do not appear by their actions to focus on whatever might ail them. Instead, they continue to do their best to function as if everything is normal. If a dog or an ant loses a leg, it will do its utmost to engage with life by using the remaining three. If an illness makes them unable to function, all animals have a response – in that they lie down and conserve their energies, and wait for the illness to pass. Some will even self-medicate in quite

sophisticated ways – the book "Wild Health" by Cindy Engel[83] is well worth a read. For instance, chimpanzees deliberately eat antiparasitic herbs in exactly the correct sequence to interrupt the lifecycle of the intestinal worms, and in exactly the correct dose – so that they kill the parasites, but do not make themselves ill with the toxic compounds in the plant.

Engel's research has been extended[84,85], as has the list of self-medicating animals, to include moths, ants and fruit flies. It is clear that animals (and fruit flies!) do not think in the way that a human being thinks. Nevertheless they are conscious, sentient, intelligent and responsive – such that they are able to recognise plants that may heal them, to use those effectively, not over-dosing, sometimes even using them prophylactically. If this is not directed by rational analysis, it must be directed by something else. Based on my experience of embodiment and the principles of Wellness (and observation of animals!), I would say that :

- Except in extreme situations, the animal's default position is a *desire to be well* (as opposed to a fear of illness). Just as its position is a desire to be safe – rather than a fear of lack of safety. It is true that traumatised animals do focus on danger rather than safety. But this is a pathological stance, because it significantly reduces their capacity to explore.
- This desire to be well may lead to a search for something that will assist that (there are lots of variations in animal behaviour in this regard).
- Then there must be recognition of the thing that will be useful… Maybe there is a memory of a particular herb in a particular place, but I am particularly reminded of the way our dog used to carefully and exquisitely sniff each blade of grass until he found one that was just right. I came to suspect that he could smell variations in soil bacteria, and recognised that the particular thing he smelt was the one he needed. This also brings to mind elephants who will travel several hundred miles to visit a particular mineral lick that provides a particular element missing in their normal diet.
- The recognition is internal – a somatic sense of Wellness that arises when the herb (or whatever) is connected with.

Of course, for an animal in a completely natural and unaltered environment, self-medication may in most circumstances just be a matter of just eating what is there in front of you. We feed domesticated animals single species grain and put them in fields of largely single species grass. But in the wild a typical grassy meadow might contain up to 100 different species of plant, many of which have medicinal properties[86]. Given such a broad spectrum of possible food, it's really hard to know whether browsing animals such as sheep and cattle do not actively prefer to browse certain kinds of plant in certain proportions at certain times of day. So what would we (humans) eat if we had the chance? As modern urban humans our diet is pretty inadequate and monotonous and medicinally bland when compared to our distant ancestors. Study of

the remains of burnt out Bronze Age homes reveal that over 100 different types of foraged edible plant were on the menu. Consider also that a recent analysis of the bones of women from a similar period in time showed that they had more upper body strength than modern Olympic athletes[87]. True – this was due to the hard work of preparing food and making clothing; but one does not develop that kind of strength with an inadequate diet.

For us as humans, thoughts are very problematic in using the innate skills that are more easy for a chimp or an ant. In identifying an **internal biological recognition** of what is medicinally useful, over-thinking just creates confusion. In fact, all stages of of this process can be confused and interrupted by thoughts, and indeed, thoughts (especially of the kind "*I should ...*" or "*someone told me to ...*") interrupt and confuse these more instinctive knowings. Indeed, thoughts can have the opposite effect (to the natural one seen in animals) when they are focussed on pathology instead of Wellness. Later in this book (Chapter 4) I will be looking at neurological feedback loops, and would just like to point out at this stage that thinking about anything tends to orient our entire neurology and immune response in that direction. The feedback loops in question are largely meant to relate to survival in the external world; so if they are turned inwards at the body in anxiety or worry or in doubting our senses, nothing good will result.

Today I asked my body what she needed
Which is a big deal
Considering my journey of
Not Really Asking That Much.

I thought she might need more water.
Or protein.
Or greens.
Or Yoga.
Or supplements.
Or movement.

But as I stood in the shower
Reflecting on her stretch marks,
Her roundness where I would like flatness,
Her softness where I would like firmness,
All those conditioned wishes
That form a bundle of
Never_Quite-Right-Ness,
She whispered very gently:

"Could you just love me like this?"

-- Hollie Holden[88]

It is impossible for something with a deep biological or spiritual drive to be suppressed for long. Even if its initial re-emergent expression is a little misdirected, it will inevitably push back up into the light like tormentil flowers rise from the bleakest

moorland in summer. So a wellness/health culture has grown during the past couple of decades. Yes – it's a little misdirected, as Hollie Holden captures so well. The answer to health appears to be this or that vitamin tablet or exercise program or diet. Or maybe certain immunisations and an aspirin a day to keep the blood thin. Or organic food, or regular holidays, or a particular body fat content, or a particular blood cholesterol level. All of these may be well and good, but they miss the point. Wellness is a state of being and a way of life that is essentially thoughtless because it is instinctive - not a fad or consumer product. Part of Wellness is biological – there are certain biological necessities that go far beyond the need to go to the toilet! And part is more of a Spiritual nature – whether you conceive of that as being in a symbiotic relationship with Nature, and/or have a more numinous view of it.

In Shakespeare's time "sophisticated" had a meaning similar to "adulterated" or deceptive or misleading. It is somewhat telling that its modern meaning has turned back round to something more like its original Ancient Greek meaning ("wise") - so "sophisticated" refers to something that is elegant or complex or fashionably witty and erudite. All of the Health fads and medicalisations are essentially Shakespearean sophistications. One of the difficulties in gaining a Wellness-based mindset is that it requires that one does not think so much, but rather, experience and **participate**, and through those two processes recognise Wellness and where it originates and what nourishes it. That is not to completely dispose of any rationality. This is such a large and complex topic, it will be also be covered in more detail in Chapter 5.

God is Nature
Love Life, God : God is everywhere
Friends – do not think that God belongs to you : You belong to God.
Bruno Groening (1906 - 1959)

Telos and the Dao

The Greek philosopher Empedocles and the Chinese Daoists had very similar ways of describing the interdependent world of Nature, and particularly the processes of Life.

> No mortal thing has a beginning, nor does it end in death and obliteration; there is only a mixing and then separating of what was mixed, but by mortal men these processes are named "beginnings."
>
> — Empedocles, The Fragments of Empedocles

Wellness is a process of Life that includes both birth and death, which – as Empedocles points out – is essentially a cycle of order and chaos, of structure and de-struction. There is in effect no beginning and end – just a continuity of waves and tides meeting the shore. The shoreline's rock and sand is sculpted and moved by the water's motion, just as the water's forces are damped and each wave or tide eventually retreats and is

replaced by the next. It is only the fact that Life de-structures, retreats and decays - that allows Life to exist at all. So the *right kind* and the *correct balance* of de-structuring (fragmentation, dissolution) is in essence as important as cell aggregation and growth. The dissolution of one life form allows more, perhaps newer or more intricate or complex lifeforms to follow on. Animals that feed on other life forms can only exist if life can be de-constructed into its basic building blocks – otherwise there would only be life that derives its food directly from raw energy (such as plants using sunlight to photosynthesise, or archaea and protists using heat or energy released from sulphur compounds). Even embryological development requires phases of erosion of one set of cells that had a temporary or bridging function – e.g. the frenulum should dissolve just immediately prior to birth so that the tongue can move properly for feeding (and later for the development of speech)[89].

> Who can see the wind?
> Neither I nor you:
> But when the leaves hang trembling,
> The wind is passing through.
>
> Who has seen the wind?
> Neither you nor I:
> But when the trees bow down their heads,
> The wind is passing by.
>
> — Christina Rossetti

Chinese culture was based on similar principles, Daoism being essentially the study of Nature as a source of wisdom. The idea is that if we observe Nature with the right eyes we can directly see and comprehend the most fundamental principles on which all of the universe is based; and can then apply these principles in the context of our personal life. Thus, in living by laws that are even more fundamental than life itself, we are in complete harmony with all around us.

The **Dao** is a current that underlies all Nature and all Life. It is founded on the polarity of Yin and Yang (Appendix 2), which come and go, constantly balancing each other, yet never succumbing to stagnation. **Li** is the unmistakable yet impossible to define pattern in the physical world that arises when the Dao expresses itself in perfect balance … The shape of waves on water; or the grain of wood; the way that hair hangs over the face and shoulders; the pattern of light passing through leaves; or the movements of grass in the wind. We can mention these things and immediately everyone who has experienced them knows what they are… But describing them definitively without losing something of their qualitative presence - is virtually impossible; as if there is actually nothing that can be grasped. It is the working of the Dao made visible.

As the Yin and Yang come and go in various depths and interrelationships, so embryos from, seeds fall to Earth, and spent leaves and the bodies of our ancestors become the Earth from which they came.

From *Telos* (*ἔλος*) comes the idea that everything has an intrinsic purpose. With regard to Life in a single organism, or embedded in a symbiotic chain (i.e. all of life!) - its purpose is Life itself. Each part is necessary for each other part, and without one, the whole is very different, and maybe not even viable at all. The tarantula living without a companion frog would lose many of its young to parasitic insects. One does not need to know *how* this giant hairy spider and its small amphibious friend came to share the same house. One can simply say that one aspect of their Telos is to provide for each other. The frog protects the spiders young by simply eating its normal food, and presumably recognises that the spider, although capable of making a meal of it, will instead protect it. The spider protects the frog simply by *not* eating it and also by its presence dissuading other predators. And maybe there are other purposes that are less visible. One is forced to ask – Do they *recognise* each other? To what extent is this partnership conscious? And if it is not, how does it come about? Modern evolutionary biology tends to assume that all form (i.e. the physical attributes of a particular species) is purposeful, and yet shies away from the existence of conscious purposiveness in anything outside the human brain. And so Teleonomy (purposeful design) is yet another (rather tautological) way that Life might be defined.

> The Way bears them;
> power nurtures them;
> their own being shapes them;
> their own energy completes them.
> And not one of the ten thousand things
> fails to hold the Way sacred
> or to obey its power.
>
> Their reverence for the Way
> and obedience to its power
> are unforced and always natural.
> For the Way gives them life;
> its power nourishes them,
> mothers and feeds them,
> completes and matures them,
> looks after hem, protects them.
>
> To have without possessing,
> do without claiming,
> lead without controlling:
> This is mysterious power.
>
> — Tao Te Ching (Chapter 51), transl. Ursula LeGuin[90]

Telos is also the root of *"Entelechy"* – the idea that there is an inner formative force that expresses itself through an organism. The organism provides the means by which the force may express itself; and the force is an ordering principle whose expression is by definition both the existence and Health of the organism. In a modern DNA-o-centric world, Entelechy might translate into the genetic code : which allows an organism to

live, is the means by which it reproduces, and which organises its embryological development. It might equally refer to Rupert Sheldrake's *morphic resonance* ... a resonant pattern - maybe from the past, maybe a field of consciousness - that determines how something might self-organise in the future. This idea that there is an **ordering principle** (of whatever form that might take) is an important aspect of the paradigm of Health and Wellness. The divine natural order intimated by Groening (and other 20th century Christian mystics such as Jacob Lorber), the Dao, the musings of Emerson and Trine, and the Telos of Empedocles - have arisen in many quite separate cultures and times; but all point to a philosophy grounded in a Wellness and Health that pervades everything, and is universally accessible, if only it is cultivated. They all state that one must *deliberately* connect to this ordering principle (the source of Wellness) in order for it to work as it is supposed to. Neither is this something that can be forced – as is stated by this section of the Tao Te Ching…

> In the degradation of the great way
> comes benevolence and righteousness.
> With the exaltation of learning and prudence
> comes immense hypocrisy.
> The disordered family
> is full of dutiful children and parents.
> The disordered society
> is full of loyal patriots.
>
> — Tao Te Ching (Chapter 18), transl. Ursula LeGuin[91]

As seen in the quotation from Bruno Groening above, Love is often seen as the ultimate ordering force ...

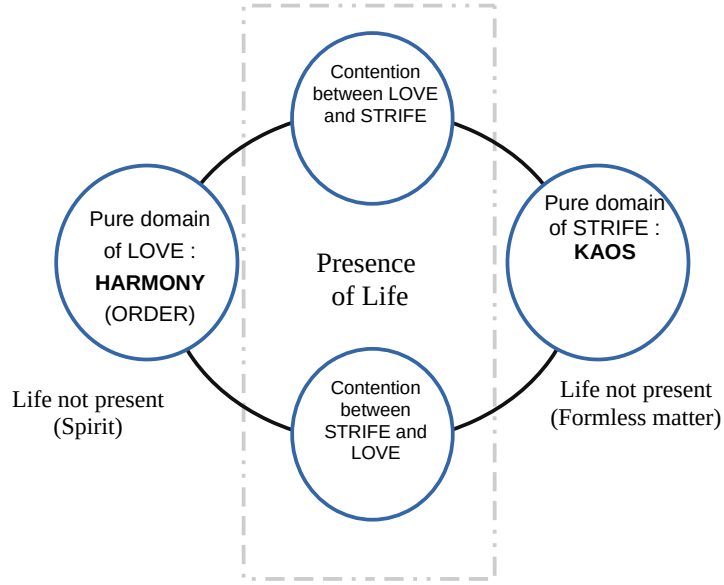
> The force that unites the elements to become all things is Love, also called Aphrodite; Love brings together dissimilar elements into a unity, to become a composite thing. Love is the same force that human beings find at work in themselves whenever they feel joy, love and peace. Strife, on the other hand, is the force responsible for the dissolution of the one back into its many, the four elements of which it was composed.
>
> — from The Fragments of Empedocles

This polarity of love and strife is a little difficult in modern eyes, mainly because of the way that we view them. In reality, Empedocles was referring to the forces and tendencies of chaos, dissolution and separation that complement the forces of structure, order, organisation and attraction. The diagram shows Love balanced with Kaos. Understanding this cosmology requires a recognition that everything exists as a polarity - including the elements of polarities. As such, polarities are always most creative and contain motion when less extreme, and tend to stasis and oblivion when more extreme. So Matter is condensed deadness (the nature of matter is solidity), but Kaos is also expressed in the ubiquitous formlessness of Brownian motion, and so there is an inward pole (condensation to a solid lump) and an outward pole (formless gassy

matter). Similarly, Love reaches out to infinity (the outwards pole), but is also brings everything together (the inwards pole) by expressing resistance. So Love creates form by resisting the motion of Kaos. In this system, "Love with a capital L" exists as something like the Dao, whereas love (with a small L) and strife are more like the Yin and Yang, that arise from the working of the Dao.

This cannot be understood by staying within the usual limitations of meaning of "love" and "chaos". Life requires chaos so that it is dynamic and responsive – and physiological homeostasis is always lingering on the edge of chaos when in a state of health. If love is a force of attraction (Newton had originally set out so discover the principles of Love when he described Gravity), then at some point it becomes too extreme, and draws everything too tightly together in an excessively rigid and unyielding order. Similarly, if chaos is the bread and butter of dynamic physiological adaptation, at some point the chaos becomes excessive, and leads to dis-integration. One can also couch Empidoclean love and chaos in terms of known and unknown. Much of sensory activity is tied into expectation of things we have already encountered and anticipation of experiences that we have already experienced. How does one move form known to unknown? The unknown has no structure unless that (interpreted) structure is funnelled through process that are already known.

In modern terms (we tend to think of biological structures rather than Yin/Yang or Empedocles' four elements). As an example, the cells of an embryo proliferate very quickly, more so in some areas than others. It is the stasis - the resistance – provided by the less active cells that provides a fulcrum around which the expansive more chaotic growth rotates. Thus form arises through a combination of matter in motion that meets resistance. Apoptosis – programmed cell death - is a function of cells that we cannot live without. If cells do not die when they are damaged, then what results is Cancer – a proliferation of cells that have no place in a healthy organism, and that strangle and choke it like a spurt of bindweed in an untended garden. The interplay of the **polarity** of adhesive forces and destructive forces is one aspect of what we might think of as Health.



The Cosmic Cycle of Empedocles

Copied from https://commons.wikimedia.org/w/index.php?curid=24591060

The Tao begot one.
One begot two.
Two begot three.
And three begot the ten thousand things.

– Lao Tzu (Tao Te Ching, chapter 42)[92]

Physical expressions of wellness

Life expresses itself through movement – particularly in Wellness. In fact one can *almost* definitively state that if something does not move at all, then it is not alive. The dehydrated and other hibernatory states that some micro-organisms, seeds and larger animals use to survive are essentially little deaths – they are very close to death, and often do not succeed and continue through to death. And the kinds of movement that life expresses itself in have certain forms that are universal – or even archetypal in nature. Possibly the most fundamental of these gestures, and the basis for all other movement is **pulsation**.[93] Pulsation itself is a gesture that embodies an even more fundamental principle – that of **polarity**.

The Daoist philosophy of ancient China captured the essence of polarity in the principle of Yin and Yang, expressed in an ever-turning wheel. These polarities are hardly ever absolute – so in a land of giants, a man standing over 6 feet tall is not tall at all – and are in one sense descriptions of how contrasts have an energy in their own right. If there is contrast, then there is the potential for *something* to move or to express itself. It is not unusual to talk of a body of water and the plants and landscape around it to have the quality of "stillness", but everyone knows that there is no absolute stillness – somewhere beetles are moving. The clouds are drifting across the sky. Leaves and grass shift in the tiniest of breezes. Somewhere under the water fish swim and dragonfly nymphs hunt. But nevertheless the experience is stillness. Not as an absolute quality, but as a relative and *experienced* quality – we have *participated in stillness*. Likewise, one cannot compare a swallow's flight to the speed of photons or the relative movement of the Earth through space. But when we *participate* in its flight through our senses, we *experience* something very fast.

Pulsation, polarities, gestures

A healthy living organism maintains an equilibrium by swimming within this constant turning of Yin/Yang. A few examples are listed below.

YIN	YANG
Dark	Light
Moist	Dry
Earth	Sky
Inwards / Internal / Absorption	Outwards / External / Excretion
Stillness	Movement
Pulling in / Embracing	Reaching out / Rejecting
Connection	Disconnection

The first important thing to recognise about these qualities or processes is that they are complementary in their opposite-ness. So an oscillatory motion about a neutral midline can also be seen as a polarity – such as the left-right wriggle of a fish, or the great front-back motion of a whale's flukes.

Single cells, colonies of undifferentiated cells and colonies of symbiotic simple life forms (such as Kefir or Lichen) can teach us a lot about what it is to be human, how we came to be human, and what how our biological body is organised. Despite the extraordinary complexity of the human brain, these tiny organisms encompass most of the responses available to humans. Single cells also synthesise and use most of the neurotransmitters that we use. *Myxogastria* slime molds are particularly interesting. Consisting of Eukaryotic (membrane-enclosed) nuclear material floating freely in protoplasm *without* an external cell wall, they probably represent something of a transition between a-cellular and cellular life. There is something primaeval in the way that these undifferentiated cells create a single quasi-membrane to contain their common protoplasm; organise variations in the viscosity of the protoplasm so that it contains an active network of flow channels; and direct rhythmic fluid movement in these channels (cytoplasmic streaming). The streaming of cytoplasmic fluid brings in new food and removes waste products; and is powered by movements within the actin fibres – the "cytoskeleton" – and by local changes in osmotic potential (the shifting of water and charged particles to-and-fro across membrane-like compartments). Slime molds are also well known for their ability to crawl (or more accurately, *ooze*) towards food. These shifts in internal fluid movements and in externally directed motion are coordinated simultaneously across *all* of the cells in the slime mold. For *Dictyostelium*, this occurs over a uniform cycle of 200 seconds, in a way that suggests they are keying into a universal (environmental) "clock" rather than an internal one.

Humankind (and possibly all self-reflective/self-aware air breathing animals including corvids, parrots, cetaceans, elephants) lives within its own sea – we breathe in and out. There are spiritual traditions that talk of the breath as being a connection to the infinite. We draw in the air, bringing the infinity of space into our bodies, as our ribs expand

out like the mantle of a jellyfish – we expand into the diffuse realms of the space that surrounds our bodies. Then we breathe out – becoming small again, coming down to Earth, embodying, condensing, solidifying. This breath in, breath out, breath in, breath out is a living symbol of the polarity that defines our place in the cosmos, a lightning rod held in suspension between spirit and matter. And within that sea we require some means of navigation – a sense of magnetic flux, the position of stars, the scent of a forest of kelp – all these and more are symbols and signs between staging posts, moments, lifetimes. Steiner talked of bony fish (such as salmon) – how they (as living creatures) experience the sea to be seamlessly continuous with their internal body fluids; so that they exist as breathing motes in a seemingly endless ocean.

Muscles

As pointed out on a TED talk by Daniel Wolpert[94], the entire central nervous system has developed with the primary intention of controlling motion. In animals, motion begins as a simple oscillation. Gerald Pollack's description[95] of muscle action is one in which the fully extended and relaxed muscle fibre contains the highest potential energy. It is almost as if by relaxing and extending the muscle is recharging its battery, just like a portable 12V power tool; and the battery contains most charge when the muscle is most elongated. This is reminiscent of Martial Arts training, in which the aim is to move with completely relaxed muscles that only tense up in short explosive bursts, and then return immediately to a state of relaxation and elongation[96]. It is also relevant and accurate to think of the extended/ relaxed muscle fibre as being straight, ordered and hydrated, whereas the contracted protein is dehydrated, disordered and folded into itself... echoes of Rilke...

> I want to unfold
> I don't want to stay folded anywhere,
> because where I am folded,
> there I am a lie…

With this hydration comes a fluid expansion. It is usual to think of the musculoskeletal system as working from pure contraction and relaxation. But contraction when living under a gravitational filed results in heaviness, and healthy people tend not to experience heaviness – they experience their bodies as being almost weightless. If the possibility of fluid expansion from within the various compartments of the body is added, then there is an explanation for the physical experience of elongation, buoyancy and lightness of being that can arise during motion. Whilst we (as humans) tend to equate movement with muscles, there are many organisms that move without the use of muscles. This includes the human embryo – which right from the very start is mobile, twisting, pulsating and writhing long before muscles have coalesced from the mesoderm, and before those muscles have become innervated and connected to any motor centre in the spine which has any kind of capacity to mediate contractile behaviour. Initially these motions are inside the egg – mediated by microtubules. External motion is provided by the cloud of nurse cells and sperm that roll the egg /

blastocyst on its way through the fallopian tubes. As the blastocyst forms, the first external self-generated movements occur – as orthogonal (90°) rotations between cells as they separate to complete mitosis. The contractions of innervated muscles, spinal reflexes and control via central nervous system are emergent from an already moving organism, and progress that motion through into larger scales as the embryo grows and takes form. And the movements themselves have important feedback roles in setting up neurological connections and control loops in the spinal nerve roots and central nervous system. The non-uniqueness of muscles continues into adulthood, as has been found recently (Pollack op. Cit.) - connective tissue is itself contractile; and muscles are simply more efficient at generating motion and have a greater range of motion. Like many developmental gestures, the capacity to move without the use of muscles is retained – in contractile connective tissue and in the expansive force of fluid in compartments of connective tissue - and continues to be used *in addition to* muscular power.

Pollack also describes a muscle fiber comprised of three different types of protein, the largest of which is Titin, an immuniglobulin. Another common experience is that it is possible for the body to be "armoured" - i.e. the superficial muscles engage and form a hard defensive shell, whilst the muscles retain their full range of motion. Although it is pretty well impossible to prove (so far as I am aware, the only methods available to investigate muscle fibers are invasive), I suspect that these immunoglobulins are the source of muscle armouring – in essence, a physical expression of an immune-like response.

Tremor

Since primitive motion is oscillatory, it can most easily be seen in human metabolism in the various forms of tremor. Physiological Tremor[97,98] occurs at a frequency of about 8 to 12 cycles/sec, which is an interesting number, since it is also the frequency of Alpha Waves[99]. One question that arises is – does this tremor originate in the nervous system, the muscle fibres themselves... or both? Recent papers[100,101,102] suggest the latter, with the nervous system achieving fine control by acting as an *inhibitor*.

Firstly, it is important to distinguish between different types of tremor, though we will eventually bring them back together into a common framework. Also, although I use the word "muscle", the implication is that connective tissue also takes an active part in contractile cycles. Physiological Tremor (PT, also termed Kinetic Tremor when its amplitude is large) was first described by Lippold (op cit) and is a very low level background tremor that (apparently) occurs in all people during muscle contraction and is thought to occur during normal activity of nerves/muscles. Quoting from his original paper :

> *We have found in examining a large number of normal human subjects that most {my emphasis} of them have some tremor superimposed on their muscular activity. The amplitude of the tremor usually does not exceed 2 percent of the physiological*

range of movement ... One ingenious and plausible idea imagines the muscle to be acting as a low-pass filter that screens out all impulses except those at about 10 cycles per second. We know that during a voluntary contraction motor units composed of functionally identical muscle fibres start discharging at about seven cycles per second and then accelerate up to 30 or 40 cycles per second as the strength of the contraction increases.

Essential Tremor (ET)[103] was first described medically in 1817 by James Parkinson, and although similar to Parkinson's disease, it is not the same – i.e. it is not caused by an organic lack of dopamine. It does not occur when resting or relaxed – only when voluntary movement is occurring; it is bilateral and affects mainly the hands; and generally increases in both incidence and severity with old age and social anxiety (though it can start at any age). The indication is that it is probably in many cases a physical expression of non-conscious fears, which become exacerbated in a feedback loop as the shaking interferes with normal social interactions, and so appears to be a general reduction in ability to inhibit Physiological Tremor. In fact, the general presentation is remarkably similar to the uncompleted psychological processes first described by Pierre Janet. ET is particularly characterised by abnormal high amplitude bursts of EMG activity (active use of muscles does not induce these bursts) with a frequency of between 4 and 12 Hz. Both burst frequency and phase may be different for different muscles. On the other hand, Parkinson's disease is very different, being characterised by a continuous high amplitude EMG burst pattern with a frequency of about 4 – 5Hz.

Postural Tremor (also called Action Tremor) occurs when a fixed stress position (i.e. with a relatively high gravity load) is taken up and then retained. Eventually the muscles begin to shake with relatively low amplitude EMG bursts at 5 – 9Hz (i.e. a more constrained version of ET). The physical amplitude may be anything from very small through to whole-body shaking.

Hypothermal shivering, initiated centrally by the hypothalamus is another important form of tremor, in which the metabolic cycle of the muscles is unleashed with no organised central control to direct their force. Shiver frequency is typically 5-10Hz, and varies from muscle to muscle, with shivering becoming more strong in bursts of a few seconds. Muscles no longer function when core body temperature falls below 34 C[104], so this kind of shaking is a last ditch attempt by the body to keep muscle function available : Without movement there are no choices that can be made to ensure survival. The body is also capable of temporarily resetting its core temperature baseline in cases of infection (and possibly shock) so as to induce a quasi-hypothermal shiver. Perhaps as a result, we have no innate ability to know our core temperature (although as far as I know, the only bodily senses capable of calibrating to an absolute value are the external senses of touch and vibration – which group includes the auditory and balance senses – and the magnetic sense).

There are also various other tremors associated with major problems with the CNS (e.g.

Cerebellar tumours, hydrocephalus/MS, Lithium and heavy metal poisoning) and drug/alcohol withdrawal or major nutritional deficiencies. Shock of various kinds (post-anaesthetic shivering, intense pain, internal bleeding, fluid loss or other major disturbance of the viscera, bone fractures, etc.) and ADHD can also be associated with tremor, as can any temporary Adrenaline excess. Visceral, shock or infection-induced shaking is termed chills or rigor.

All studies of PT have found that – although gross muscle activity is directed from the brain - the tremor is a purely local phenomenon with feedback between muscle and local reflexes. i.e. there is a resonance between the mechanical properties of the muscle and the local reflex arc. It could be said generally that visible (high amplitude) tremors and gross tremors associated with EMG bursts and/or frequencies that fall below the normal approx 10Hz[105] range are caused by (first) a loss of central control, followed by a degradation of the resonant connection between reflex arc and muscle and between different muscles. Thus, part of this tremor does not arise from any neurological signal, but rather is a physical process in the muscle which includes factors such as muscle elasticity and ATP/Calcium cycling rate. The similarity to cardiac muscle is immediately obvious, and it would seem that cardiac muscle acts exactly the same as ordinary muscle, but at a higher amplitude, lower frequency, and with (even) less need for external stimulus. And, just as with cardiac muscle, nerve action potentials are capable of modulating the frequency of other types of muscle contraction to some limited degree around a physiological baseline frequency.

This background frequency has usually been considered to be some kind of "hunting" phenomenon familiar in control systems, where the feedback mechanism is inefficient – and therefore slightly overshoots the ideal required level of damping/stimulus. Given several hundred million years of evolution and the extraordinary efficiency and adaptability of body physiology, I am a little doubtful of this explanation. In fact, the neurology appears to show that a sustained smooth movement is the result of a series of rhythmic pulsatile movements arising from several different centres – including the primary sensory cortex[106], cerebellum and olive - whose individual contribution varies dynamically[107]. Different rhythmic drivers are added together in a complex network of neural circuits, that in turn (in the case of smooth muscle) also modulate an intrinsic pulsatility arising from the tissues themselves. So the basic type of motion available to the body is a short transient contraction (PT), and whilst this has remained its physiological basis for motion, Nature has found ways to modify this to produce an almost infinite range of different movements.

The role of dopamine in controlling muscle tremor is well known due to its association with Parkinson's disease and the production of dopamine (or lack of it) from the Substantia Nigra. Without the regulatory action of dopamine, the amplitude of tremors becomes excessive due to the high amplitude relatively low frequency bursts that are produced by the motor cortex. Although this may not tell us a lot about the causes of Essential Tremor (ET)[108] and Parkinsons disease, it may give some indication as to the relationship between dopamine (which is produced when we experience "positive"

feedback for our actions – a reward mechanism) and the general firing/use of muscles. It would make a small amount of sense that a no-reward (low dopamine) environment might induce a preference for random movements. On the other hand, high dopamine tends to be associated with curious exploratory outgoing behaviour, whereas low dopamine tends to be associated with its opposite, which is more or less categorised as anxiety. This is quite clearly visible in healthy/happy dog behaviour (compared to the behaviour of dogs who have been badly treated), and in people suffering high anxiety, who become increasingly edgy and "jittery". Thus, dopamine is a neurotransmitter that mediates between activity (movement) and the type of relationship we have with the outside world, modulating the type of behaviour (peaceful vs anxious) that is used to express moderate to high levels of adrenaline. The ability of dopamine to increase the smoothness of movements is visible even in normal human body language (as well as that of animals).

Resonance and the 10Hz refresh

The physics of resonant systems has been applied to analyse muscle tremor[109], and some interesting results emerged. It would seem that the most efficient muscle usage possible involves continuous resonant interaction between agonist and antagonist, such that the mechanical-elastic properties of the muscle are fully used. This means that in most efficient usage/movement, there is a continuous vibration occurring between muscles, and remarkably little difference between physical force exerted by either agonist or antagonist. The optimal vibrational rate is slightly higher than the dynamic load frequency, so – if the muscles are to attain this efficiency - they require modulation via some external stimulus which is able to use proprioceptive feedback - which is a pretty good description of how the neuromuscular system works. This load-frequency relationship was picked up by Lippold (see previous quotation from his Scientific American paper). As the load becomes heavier and the movement less dynamic, this type of efficiency becomes less attainable. If an optimum efficiency is attained, then calculations indicate that the muscle agonist/antagonist group can provide a force of up to seven times the force that can be applied by a static muscle contraction. Having worked in heavy industry for some time and moved some very heavy loads "by hand", I can personally say that anything is easier to move when a dynamic movement is applied rather than a static lift or push. I had always attributed this to simple momentum, but maybe there was more happening than I was aware of. Again, I am also reminded of the smooth and effortless floating motion that occurs in Qigong and Taiji. Attaining these muscle efficiencies requires good connection to the CNS (afferent proprioceptor information and efferent action potentials to provide a resonant timing signal), an uninterrupted ATP/Ca cycle (i.e. a plentiful energy supply – although of course, less energy is needed when a high efficiency resonance is attained!), and a well tuned local resonance between muscle and spinal reflex.

Moving laterally from this, we have already noted that the entire function of the CNS could be said to revolve around movement. There is an interesting study available online[110], looking at the ability of the human brain to take in new information of any kind. It would seem that we are incapable if assimilating information at a rate faster than 10 bits per second (10 Hz). Since all information is processed by the premotor cortex in order to ascertain meaning (and all meaning for the primitive brain is symbolically represented by movement), it could be that there is something quite fundamental about a ~10Hz "refresh rate" for many different parts of the human organism. For example, the peripheral nerve conduction speed is about 30m/s, so this gives a small but adequate margin for signalling through a 2m long body at a rate of 10Hz and is just about fast enough to allow consecutive two-way signalling at that frequency.

Another aspect of muscle resonance is to be found in evolutionary biology. Initially, at a primitive level of organisation, movement was rhythmic and undifferentiated. This may be seen today in the pulsatile motion of flagellae and the swimming actions of the simplest of sea creatures. No nervous system is necessary – all that is required is that the action threshold (for phase change of bound water around the "muscle" protein) is exceeded. And in the simplest of organisms, that protein is Actin. So without a nervous system, the frequency of motion is unmodulated, has a limited set of choices (if any) as to when it is turned on/off, and is largely controlled by propagation of the ATP/Ca exchange cycle and its associated phase change front through the contractile tissue. As organisms become more complex and gain a functional (central) nervous system and symmetrical structure – say a primitive (chordate/vertebrate) fish – then this simplicity is enhanced slightly by the ability of the fish to rhythmically contract alternating sides. Here we have the classical lateral fish muscle groups coming into action, with very little initial need for anything complex.

Sophistication first comes about through tuning the muscle rhythmicity to the hydrodynamics of the animal (via the kind of proprioceptor-pulsed modulation feedback loop described above) and by propagating the wave of contraction/relaxation down each side (rather than just contracting alternate entire lateral muscle groups), producing a sinuous snake-like (or of you will, fish-like) motion. Thus, rhythmicity is not only inherent in the way that individual muscle fibres work, or even muscle bundles or agonist/antagonist pairs. Rather – rhythmic motion is hardwired into the entire neuromuscular system, and rhythmic motion not only connects us to this ancestral form of motion, but also uses the most primitive and fundamental parts of the neuromuscular system – probably in the most efficient way. One version of this in a human body is peristalsis of the digestive organs.

As we add fins, the movements remain rhythmic, but now gain some complexity, with lemniscate (figure of eight) movements and small changes in "static" position becoming possible. Adapting musculature to these movement patterns results in the whole-body slings (lateral line, front, back) and functional spirals described by Myers[111], along with many spiral muscle groups and joint surfaces. And so on. As the movements become

even more sophisticated and less obviously rhythmical, then there is a greater and greater need for proprioceptive and other sensory feedback loops to be engaged as the muscles are used, relating the muscle firing and joint position to the intended motion and also checking that an appropriate level of force is being applied. This feedback system has been recently explored in a simple tactile experiment[112]. The results indicate that movement and the sensory system are very deeply connected. Another example may be found in the primitive "speech" of the Gelada monkey, which makes a kind of transitional sound between primate screeching and human speech – here again we see the less sophisticated version [of speech] being far more similar to a simple rhythmic muscle action[113].

Taking the principle of tremor into a broader context...[114]

> *We frequently shake when we are cold, anxious, angry or fearful. We may also tremble when in love or at the climax of orgasm. Patients sometimes tremble uncontrollably, in cold shivers, as they awake from anaesthesia. Wild animals often tremble when they are stressed or confined. Shaking or trembling reactions are also reported during the practices of traditional healing and spiritual pathways of the East. In Qigong and Kundalini Yoga, for example, adepts who employ subtle movement, breathing and meditation techniques may experience ecstatic and blissful states accompanied by shaking and trembling.*
>
> *All of these "tremblings" experienced in diverse circumstances, and having a multiplicity of other functions, hold the potential for catalysing authentic transformation, deep healing and awe. Although the fearful trembling of anxiety does not in itself ensure a resetting and return to equilibrium, it can hold its own solution when guided and experienced "in the right way". The distinguished Jungian analyst Marie-Louise von Franz notes : "The divine core of the soul, the self, is activated in cases of extreme danger". And in the Bible it is said that "God is found where you have trembled".*

Tremor does have other physiological functions, though it is not necessarily constrained to this ~10Hz window. Ocular Microtremor (approx 80Hz in humans) is one way that the eye scans the field of vision in a series of "saccades". This provides a means to assess temporal change[115], and may be important in trajectory tracking. Similarly, one could consider peristalsis and the cardiac pulse to be very slow forms of tremor. They all exhibit the utility of a hardwired rhythmicity which may then be modulated by more sophisticated (and evolutionarily more recent) feedback and control mechanisms.

Rhythms

The 10Hz rhythms of the body and nervous system (previous section) integrate movement and many cortical functions, and the electrical pulse of the heart passes through all tissues and the space around us, entraining neural activity not only in our

own bodies, but even potentially in people who happen to be within a few feet of us. There are just a small part of the many different ways rhythmicity is important for the body We live in a pulsatile and rhythmic body[116] that participates in a fundamentally pulsatile world[117,118]. It is now estimated[119] that about 80% of our protein-coding DNA is responsive to the circadian body clock, as is our immune system, and our entire physiological (homeostatic) balance. The longer cycle of the seasons is also recognised, and affects the physiological emphasis on fat and sugar metabolism – whether we burn everything or whether we store it ready for winter. Fructosaccarides have been found to be a strong seasonal signalling chemical, and even people on a very healthy diet tend to put on fat at any time of year if they eat autumnal fruits – as if their body is using the fruit sugars to determine that it needs to prepare for al long hard winter.

The diurnal/circadian cycle is probably the most important in regulation of the autonomic nervous system, and although in principle strong sunlight can enter virtually any superficial soft tissue, it is light entering the brain through the superior sphenoidal sinuses and optic nerves that triggers the circadian clock. This in turn synchronises the clocks found in most cells of the body, so that they all work according to the cycle of day and night. The digestive system has an ideal cycle of activity and repair that should be synchronised with the sleep cycle. Skin growth, macropjhage production, and many other functions of the body live in an alternating state of activity and rest which is so powerful that even viruses and parasites that affect humans (such as malaria) are sensitive to the human circadian clock, and time their activity to have best chance to survive. The diurnal clock itself is not just a back and white on/off system, but rather a complex rolling cascade that sees increased activity of different organs at differing times of day. So (amongst other things) the circadian clock is yet another way that the body distributes its resources and conserves energy so that everything is not used up at once. So the resistance to infection *from the outside* is strongest during the day when we are more active and more likely to come into contact with infectious material, and the internal immune response is strongest at night when we are asleep and more resources are available for maintenance. As a general principle (Chapter 10) the body encapsulates all insults and deals with them as and when it has the resources to do so; and so the general stress-encapsulation response that is characteristic of trauma appears to be a longer term adaptation of the system of immunity and damage repair that operates through a 24-hour cycle, and is intimately connected to the Sympathetic-Vagal balance of the Autonomic Nervous System (ANS).

The temptation when thinking of the ANS is to simplify it into a Vagal/Parasympathetic polarity, in which case we would simply describe the circadian rhythm as more Vagal tone at night and more Sympathetic tone during the day (especially in the morning). In reality the whole arrangement is far more nuanced. There are for instance *at least* three distinct zones of Ventral Vagal activity[120]. One is related to active socialisation (such as making eye contact or talking with friends or negotiating a heated exchange at work), and includes socialisation during play. Another being more passive, that might be

characterised by Forest bathing (Shinrin-yoku) or sitting outdoors listening to birdsong, or *watching* children playing – all of which generate a heartful appreciative somatic response and a sense of peaceful expansive presence. Another is involved in submission-socialisation – one means by which we socialise ourselves out of dangerous situations as an alternative to fighting or flighting. Whether these three very different ways of responding to and being in the world can be considered to related to distinct neuro-anatomical functional structures is rather less clear. Even non-differentiated Vagal systems such as those found in fish can take part in the expression of socialisation behaviour.

Healing is a word that we don't even like, that is absolutely inaccurate, and has nothing to do with what is really happening. Healing is nothing more than allowing the natural state of wellness ... but the word healing distorts it because it gives the attention to what is wrong. All of you are many more times healthy than you are ill ... even those of you who have been diagnosed as terminally ill. You are many times more well than you are ill.

There is not such a thing as healing. We would say there is such thing as acknowledging your wellbeing ... or acknowledging the lack of it. Acknowledging the well-being brings about wellness ... Acknowledging the lack of it brings about illness. It is as simple as that. Wherever you have your attention is what your body is doing.

Your society for the most part has you looking at illness and guarding against it ... with doctors offering free check-ups just to come and probe a little, just to see if they cannot find just the slightest little clue of something ... Something to get you back in there for a second time and the third time and the fourth time; something to get your thoughts focused upon something ... some sort of seed of doubt to plant within you. And we say ... why would you want to look for something you don't want to find?

We encourage you ... to look for your wellness. Are there wellness clinics? Are there places that you go and talk about how good it is? Are there places where you go and talk about how good it feels to be in your skin? Are there places that take naps together ... and when they awaken they all bask in the spirit of well-being and feel the comfort of the mattress beneath ... and breathe in the air and the feeling of that? Or are most of these clinics illness clinics?

Abraham Hicks

Notes : Chapter 3

1 Quotations from AT Still are mainly from http://osteopathichistory.com/pagesside2/Analects.html

2 John Robert Lewis (2012) A T. Still: From the Dry Bone to the Living Man. Hardcover: 384 pp. Dry Bone Press. ISBN-13: 978-0957292703

3 A *somatisation* is a leakage of material which begins as a mainly psychological issue – into the physical body – producing very physical effects.

4 "*I began to see during the civil war, in that part of the states of Missouri and Kansas where the doctors were shut out, the children did not die.*" AT Still

5 This must be treated with some caution and viewed in context. AT Still lived at a time before modern medicine was available, and spent his whole life using whatever tools were available (mainly his wits and his hands) to help his patients. Although he left a set of guidelines for treating different serious illnesses, his approach was not really formulaic, and was as much based on his assessment of each person there and then – as his knowledge of what had worked in the past. So while in theory his bodywork approach could be used today to help serious illnesses, there are many reasons why it does not happen. One is that there are other methods used by mainstream medicine – and it would be considered unethical not to use them. The fact that these mainly pharmaceutical interventions are used means that there is nobody around now with Still's vast experience of using non-pharmaceutical interventions. In my personal bodywork practice I become more expert at dealing with the kind of cases that come through my door more often – and anything outside my range of familiarity is always a steep learning curve. Going through that learning curve when someone is on the point of dying – and when there are other tested methods available – would be dangerous and inappropriate. The universal availability of mainstream medicine means that most bodywork interventions today are used in non-critical situations. This is even the case in the USA, where Osteopathy is nominally a part of mainstream medicine, because there are legal requirements for training of doctors and treatment of patients – both of which enforce the use of medicines.

6 Actually the "first do no harm" is a modern addition to the original oath, but is still form the Hippocratic school. *"Practice two things in your dealings with disease: - either help or do not harm the patient"* is found in Epidemics, Book 1, translated in Lloyd, Geoffrey, ed. (1983). Hippocratic Writings (2nd ed.). London: Penguin Books. p. 94. ISBN 0140444513.

7 See e.g. Jonathan Black (2010) The Secret History of the World. Paperback 608 pp Publ. Quercus; 2nd Revised edition ISBN-13: 978-0857380975

8 Rosicrucianism is a mystical form of spirituality, whose influences include Christianity, the Kaballah, Alchemy, and the European Hermetic tradition.

9 David B Fuller (2012) Osteopathy and Swedenborg: The Influence of Emanuel Swedenborg on the Genesis and Development of Osteopathy, Specifically on Andrew Taylor Still and William Garner Sutherland. Publ. Swedenborg Scientific Association Press. Hardcover ISBN 13: 9780910557825

10 Ralph Waldo Trine was the author of many books, the most well known of which is probably I*n Tune with the Infinite: Fullness of Peace, Power, and Plenty* (1897). The New Thought Movement (along with much of the 19th century spiritualist movement) was the basis of the alternative spirituality of the late 20th century. Trine's books have been widely reprinted and are available online at http://newthoughtlibrary.com/trineRalphWaldo/bio_trine.htm

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11 Emmanuel Swedenborg (1688 – 1772) was one of the greatest polymaths in human history. Although best known for his spiritual books written in the second half of his life, he was probably the last person to master every known branch of science of his age. He was also immensely practical – being chief mining engineer to the King of Sweden at a time when Sweden was a world power and its wealth was based on its mining industry. Swedenborg used to investigate by meeting the foremost scientists of his age (he travelled widely and spoke several modern languages fluently, in addition to Latin, Greek and Hebrew), assimilating the most up-to-date knowledge. Having used his scientific skills to assimilate information he then applied a more intuitive method to determine what was the most likely truth. His treatise on the Brain, published in 1750 was state-of-the-art until the early 20th century.

12 Henry David Thoreau (1854) Walden. Widely reprinted. Works by Thoreau and Ralph Waldo Emerson can also be seen at http://newthoughtlibrary.com/ *"Live in each season as it passes; breathe the air, drink the drink, taste the fruit, and resign yourself to the influence of the earth."* — Henry David Thoreau, Walden

13 John Tyndall & Louis Pasteur (1878) Les Microbes organisés, leur rôle dans la Fermentation, la Putréfaction et la Contagion (*Microbes organized, their role in fermentation, putrefaction and the Contagion*).

14 Louis Pasteur Vs Antoine Béchamp and The Germ Theory of Disease Causation http://www.laleva.org/eng/2004/05/louis_pasteur_vs_antoine_bchamp_and_the_germ_theory_of_disease_causation_1.html

15 Ethel D. Hume (2011 reprint) Bechamp or Pasteur?: A Lost Chapter in the History of Biology Paperback, 352 pages. publ. CreateSpace Independent Publishing Platform ISBN-13: 978-1467900126

16 Pasteur's Recant : an essay by Susan Dorey. http://susandoreydesigns.com/insights/pasteur-recant.html

17 ... or to quote Star Wars "*there is a disturbance in the Force*"

18 Roger Abrantes (Posted on 13.01.17) How Wolves Change Rivers Ethology Institute, Cambridge. https://ethology.eu/how-wolves-change-rivers/ There has been some controversy around this issue, which often happens when science mixes with public opinion. So far as I can tell looking at real peer review published research, the original study still stands as being correct, see: Dobson AP (2014) Yellowstone Wolves and the Forces That Structure Natural Systems. PLoS Biol 12(12): e1002025. Available free online at https://doi.org/10.1371/journal.pbio.1002025

19 WHO International Classification of Diseases (ICD_11) : https://www.who.int/classifications/icd/en/

20 Jen Gunter (Aug. 1, 2018) Worshiping the False Idols of Wellness : Charcoal, "toxins" and other forms of nonsense are the backbone of the wellness-industrial complex. New york Times online. https://www.nytimes.com/2018/08/01/style/wellness-industrial-complex.html

21 J Scott Turner (2017) Purpose and Desire: What Makes Something Alive and Why Modern Darwinism Has Failed to Explain It. Hardcover, 352 pp. Publ. HarperOne ISBN-13: 978-0062651563

22 Or goodies and baddies, and you can always identify the bad guys because they wear black hats. But apparently, human help is at hand : "With some genetic engineering, bacteria can morph from bad to good" https://www.sciencenews.org/article/microbes-can-redeem-themselves-fight-disease

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23 Robert Scaer (2014) The Body Bears the Burden: Trauma, Dissociation, and Disease. Publ. Routledge; 3rd edition ISBN-13: 978-0415641524

24 J Scott Turner (2017) op. cit.

25 What the adverts don't say is that if the bacteria have a 1-hour lifecycle, you can kill 99% of them, but they will be back to their original numbers within 7 hours. Also, the ones killed will be the ones more susceptible to the antibacterial you are using, so repeated antibacterial applications, scrubbing the house 3 times a day to keep those bad bacteria at bay – will cease to be effective after a few weeks or months.

26 Bill Mollison & Reny Mia Slay (Illus. A. Jeeves) (1994) Introduction to Permaculture. Publ. agari Publications; 2nd Revised edition (4 Jan. 2013) Paperback 216 pp ISBN-13: 978-0908228089

27 Jim Robbins (13th April 2018) Trillions Upon Trillions of Viruses Fall From the Sky Each Day. New York Times online https://mobile.nytimes.com/2018/04/13/science/virosphere-evolution.html

28 Isabel Reche, Gaetano D'Orta, Natalie Mladenov, Danielle M. Winget, Curtis A. Suttle (2018) Deposition rates of viruses and bacteria above the atmospheric boundary layer. The ISME Journal (of Microbiological Ecology) 12, pp1154–1162 https://doi.org/10.1038/s41396-017-0042-4

29 A gut bacterium's guide to building a microbiome. Medicalxpress.com May 4, 2018 by Lori Dajose https://medicalxpress.com/news/2018-05-gut-bacterium-microbiome.html

30 Moises Velasquez-Manoff ()March 1, 2015) Among Trillions of Microbes in the Gut, a Few Are Special: Amid the trillions of microbes that live in the intestines, scientists have found a few species that seem to play a key role in keeping us healthy. Scientific American ¦ The Body https://www.scientificamerican.com/article/among-trillions-of-microbes-in-the-gut-a-few-are-special/

31 Meadow JF, Altrichter AE, Bateman AC, Stenson J, Brown G, Green JL, Bohannan BJM. (2015) Humans differ in their personal microbial cloud. PeerJ 3:e1258 https://doi.org/10.7717/peerj.1258

32 https://www.npr.org/sections/health-shots/2017/07/16/537075018/dirt-is-good-why-kids-need-exposure-to-germs

33 Francisco M. Codoñer, Ana Ramírez-Bosca, Eric Climent, Miguel Carrión-Gutierrez, Mariano Guerrero, Jose Manuel Pérez-Orquín, José Horga de la Parte, Salvador Genovés, Daniel Ramón, Vicente Navarro-López & Empar Chenoll (2018) Gut microbial composition in patients with psoriasis. Scientific Reports, 8, Article number: 3812 doi:10.1038/s41598-018-22125-y https://www.nature.com/articles/s41598-018-22125-y

34 The microbiome of a native plant is much more resilient than expected. Their diversity and adaptability protect plant bacterial communities against antimicrobial substances. Science Daily, April 17, 2018. **Summary**: The microbiome, which consists of all microorganisms that live on or in plants, animals and also humans, is important for the health and development of these organisms. Scientists investigated how a plant responds to manipulations of its microbial associations. The results indicate that the enormous bacterial diversity residing in natural soils may account for the stability of the plant-microbiome relationship. **From** : Arne Weinhold, Elham Karimi Dorcheh, Ran Li, Natarajan Rameshkumar, Ian T Baldwin. (2018) Antimicrobial peptide expression in a wild tobacco plant reveals the limits of host-microbe-manipulations in the field. eLife; 7 DOI: 10.7554/eLife.28715

https://www.sciencedaily.com/releases/2018/04/180417090017.htm

35 An Ancient Virus May Be Responsible for Human Consciousness. By Rafi Letzter, Livescience.com Staff Writer | February 2, 2018 12:18pm ET. https://www.livescience.com/61627-ancient-virus-brain.html

36 Sha Mi, Xinhua Lee, Xiang-ping Li, Geertruida M. Veldman, Heather Finnerty, Lisa Racie, Edward LaVallie, Xiang-Yang Tang, Philippe Edouard, Steve Howes, James C. Keith Jr & John M. McCoy (2000) Syncytin is a captive retroviral envelope protein involved in human placental morphogenesis. Nature volume 403, pages 785–789 (17 Feb) doi:10.1038/35001608 https://www.nature.com/articles/35001608

37 Harmit Singh Malik (2012) Retroviruses push the envelope for mammalian placentation. PNAS (Feb 14). 109 (7) 2184-2185; https://doi.org/10.1073/pnas.1121365109

38 Parrish NF & Tomonaga K (2016) Endogenized viral sequences in mammals. Current Opinion in Microbiology. 2016 Jun;31:176-183. doi: 10.1016/j.mib.2016.03.002. https://www.ncbi.nlm.nih.gov/pubmed/27128186

39 Friendly Viruses Protect Us Against Bacteria By Beth SkwareckiMay. Sciencemag.org 20, 2013 , 3:30 PM http://www.sciencemag.org/news/2013/05/friendly-viruses-protect-us-against-bacteria

40 Rudolf Ludwig Carl Virchow (1821-1902) was another contemporary of AT Still and Louis Pasteur. He is called the "father of modern pathology", and was active in the scientific fields of medicine, anthropology and biology. He was the first person to recognise that cancerous cells begin as normal cells, and that cancer is associated with long term inflammation.

41 Study shows how H. pylori causes white blood cells to morph. eurekalert.org: 9-Mar-2017. "*The lab experiments are among the first to show how mature white blood cells can change while still alive, in response to bacteria.*" https://www.eurekalert.org/pub_releases/2017-03/varc-ssh030917.php **From** : Laura C. Whitmore, Megan N. Weems and Lee-Ann H. Allen (2017) Helicobacter pylori Induces Nuclear Hypersegmentation and Subtype Differentiation of Human Neutrophils In Vitro. J Immunol March 1, 198 (5) 1793-1797; DOI: https://doi.org/10.4049/jimmunol.1601292

42 It has recently been found that both artificial sweeteners and Glyphosate residues in food poison the gut microbiome, and so potentially can cause illness. This seems to be particularly important for the health of the nervous system. It has been noted for some time that artificial sweeteners can significantly increase symptoms and deterioration in neurological disorders. Many MS sufferers have noticed a relationship between their diet, gut health and the progression (or control) of the disease – and particularly the health of the small intestine. And "Gulf War Syndrome" - a broad spread of neurological problems - appears to have been caused by consumption of artificially sweetened drinks. In a similar vein, it has been argued for some time by Glyphosate manufacturers that this chemical should not harm humans. Glyphosate interferes with the shikimic acid enzyme pathway – which is not found in human metabolism, but it is important to gut and soil microbes. Since all higher creatures including humans (and insects, such as bees) rely on a microbiome for their health, it is clear that although there may be no direct effect on human biochemistry – there is a potential effect on the whole-body ecology that is a vital part of organic health.

43 Pedro Moura-Alves et. al (2019) Host monitoring of quorum sensing during Pseudomonas aeruginosa infection. Science/AAAS Research Article 20 Dec. Vol. 366, Issue 6472, eaaw1629 DOI: 10.1126/science.aaw1629 https://arstechnica.com/science/2019/12/the-immune-system-listens-in-on-bacteria-signaling-to-each-other/

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44 It is already well recognised that opportunistic fungal infections tend to occur when the immune system is already weakened – such as Candida auris, a type of fungus that has been seen increasingly in secondary infections on hospitals around the world.

45 Bengt Lindström & Monica Eriksson (2006) Contextualizing salutogenesis and Antonovsky in public health development. Health Promotion International 21(3) doi:10.1093/heapro/dal016

46 Viktor E Frankl (2004) Man's Search For Meaning (original published 1946 in German) Publ. Rider ISBN-13: 978-1844132393 : also available online https://edisciplinas.usp.br/pluginfile.php/3403095/mod_resource/content/1/56ViktorFrankl_Mans%2520Search.pdf/

47 ...and also making the extraordinarily compassionate observation that both good and bad people were to be found in both the guards and the inmates

48 Ronald A. Nicholson, Jeffrey L. Birk & George A Bonanno (2020) Learning to make smart choices in the context of risk: The roles of internal affective feedback and life events. International Journal of Psychophysiology Dec 160 DOI: 10.1016/j.ijpsycho.2020.12.004

49 Monica Eriksson & Bengt Lindström (2005) Antonovsky's sense of coherence scale and the relation with health: a systematic review. J Epidemiol Community Health 2006;60:376–381. doi: 10.1136/jech.2005.041616

50 "It has been used in at least 33 languages in 32 countries with at least 15 different versions of the questionnaire on subjects from both Western cultures and countries like Thailand, China, Japan, and South Africa. The mean SOC seems to be independent of the cultural context. The instrument has been examined on healthy populations from children to older adults, in different patients groups and professionals, within many areas of practice like health services, social work, working environment, care of relatives, and in learning situations." (Eriksson & Lindström 2005, op cit, p. 378)

51 SOC seems to decrease the number of circulatory health problems in adults. People with a strong SOC had lower diastolic blood pressure, serum triglycerides, heart rate at rest, and higher oxygen uptake capacity. A low SOC was related to mental and circulatory health problems. In the Helsinki heart study the lowest incidence of coronary hearth disease was in the highest SOC quintile. (Eriksson & Lindström 2005, op cit, p. 378)

52 https://en.wikipedia.org/wiki/Salutogenesis

53 Theodore Roszak (2010): Towards an Eco-Psychology (excerpt) - Thinking Allowed DVD w/ Jeffrey Mishlove https://www.youtube.com/watch?v=83VHiA2HhkM

54 Theodore Roszak (1992) Voice of the Earth: An Exploration of Ecopsychology Publ. Phanes Press,U.S.; 2nd ed. edition (1 Jan. 2001) ISBN-13 : 978-1890482800

55 https://wildethics.org/essay/david-abram-interviewed-by-derrick-jensen/

56 Al-kuhl was also the name for antimony sulphide, one possible identity of the prima materia of the Alchemical magnum opus in which spirit and matter were purified and united.

57 From the Arabik al-Kimiya (chemistry), which may in turn originate from the ancient Egyptian word for black (kemi). This refers to the Nigrendo stage of the Alchemic process. This could also be translated as something like St John of the Cross's "dark

night of the soul" - but is is also a physico-chemical process that can take place in an alembic. The interrelation and synchronicity of physical events in the world and psychological processes was studied by Karl Jung, is one of the basic elements found in Shamanism, a practice that pre-dates Alchemy, and is the basis of Swedenborg's later works.

58 Philippus Aureolus Theophrastus Bombastus von Hohenheim (1493-1541)

59 David B Fuller (2012) Osteopathy and Swedenborg: The Influence of Emanuel Swedenborg on the Genesis and Development of Osteopathy, Specifically on Andrew Taylor Still and William Garner Sutherland. Publ Swedenborg Scientific Association Press. ISBN-13: 978-0910557825

60 And even in the case of surgery, it is the body that recovers from the surgery.

61 Girl with allergy dies after Heathrow Pret baguette. BBC News 23 September 2018. https://www.bbc.co.uk/news/uk-england-london-45617845

62 Caffarelli, C., Garrubba, M., Greco, C., Mastrorilli, C., & Povesi Dascola, C. (2016). Asthma and Food Allergy in Children: Is There a Connection or Interaction?. *Frontiers in pediatrics*, *4*, 34. doi:10.3389/fped.2016.00034 - and for a non-technical summary of childhood allergies see https://bettertennessee.com/health-brief-asthma-allergies/

63 For the entire Canadian mining industry, 2010 showed an average of 1.7 lost workday incidents per 200,000 workdays – impressive for an industry using big powerful machines in an environment that also brings its own accident risks.

64 In the UK we have the Health and Safety at Work Act – a piece of legislation that was brought in to ensure adequate compensation was paid for industrial injuries. Prior to this Act, there was no legally defined chain of responsibility, so many employers simply ran legal rings round any claimant until they ran out of money to continue their claim through the court system. The purpose of the Act was therefore to provide a legally binding and clearly identifiable chain of responsibility - that would facilitate legal proceedings. Unfortunately instead of being applied only to inherently dangerous occupations, this has inveigled its way into and been absorbed into every corner of UK culture. What is not commonly realised is that the purpose of the Act is not to make people safe, but to provide legal clarity – and so it is misapplied in many different situations – sometimes deliberately. A typical misuse some years ago was a spate of councils removing children's play equipment from parks because they posed a potential health and safety risk – for which the councils would be responsible. The whole principle of legal protection, however, misses the point that risk is normal – so therefore some level of accident is also normal, and we have evolved to grow up in risky environments. If too much risk is removed from young children, they can lose the capacity to properly assess personal risk as adults. The equation of benefit of an accident-free childhood vs a slightly less functional adult life is impossible to calculate. As we will discuss in Chapters 6 & 9, outside the extreme dangers of Victorian era industries, physical and material safety of the kind provided by a health and safety culture comes a very distant second to social safety when considering how resilience is nurtured in children.

65 Aspirin has been prescribed and recommended to older people for decades as a means to reduce risk of heart attacks. A long term study carried out in the USA and Australia showed that it has negligible effect on lifespan; and raises the number of major health incidents and mortalities by increasing internal bleeding (Aspirin is a blood thinner). https://lens.monash.edu/2018/09/16/1360202/an-aspirin-a-day-of-no-benefit-for-fit-and-healthy-elderly-study-finds

66 http://davidwoodgate.typepad.com/

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67 The 1854 Broad Street pump incident was an outbreak of cholera in the city of London, during which 616 people died. A local physician – Dr John Snow – recognised that all the people who were ill drank from the same water supply – a shallow hand pumped well. Up to this point, illness had been largely attributed to breathing in *miasmata*, or bad air.

68 Sender R, Fuchs S, Milo R (2016) Revised Estimates for the Number of Human and Bacteria Cells in the Body. PLoS Biol 14(8): e1002533. https://doi.org/10.1371/journal.pbio.1002533

69 Zou, S., Caler, L., Colombini-Hatch, S., Glynn, S., & Srinivas, P. (2016). Research on the human virome: where are we and what is next. Microbiome, 4(1), 32. doi:10.1186/s40168-016-0177-y

70 Virgin, H.W. (2014). The Virome in Mammalian Physiology and Disease. Cell, 157, pp142-150. doi: 10.1016/j.cell.2014.02.032

71 Baldridge, M.T. et al. (2015). Commensal microbes and interferon-λ determine persistence of enteric murine norovirus infection. Science, 347(6219), 266-269. doi: 10.1126/science.1258025

72 Profound Implications of the Virome for Human Health and Autoimmunity. Friday, September 8th 2017 at 10:30am by Ali Le Vere. http://www.greenmedinfo.com/blog/profound-implications-virome-human-health-and-autoimmunity

73 Dr. Jaap van der Wal (Apr 26, 2020) What The Embryo Has To Say About Togetherness. https://www.youtube.com/watch?v=IBMgXLVU1JQ&feature=youtu.be

74 Tom Myers (2013) Anatomy Trains: Myofascial Meridians for Manual and Movement Therapists, 3rd Edition. Publ, Churchill Livingstone. ISBN-13: 978-0702046544

75 The Whanganui river in New Zealand (including its catchment, the Te Urewera national park), and the Ganges and Yamuna Rivers in India were granted the same legal status as human beings in 2017.

76 Stephen Harrold Buhner (2004) The secret teachings of plants : The intelligence of the heart in the direct perception of nature. Publ. Bear & Co. ISBN-13: 978-1-59143-035-3

77 The subtlety of the non-conscious control of balance is well demonstrated by NASA engineer Destin Sandlin on his "Smarter Every Day" video #133 of the Backwards Brain Bicycle. https://www.youtube.com/watch?v=MFzDaBzBlL0

78 Elisabeth Brooke (2019) Traditional Western Herbal Medicine: As Above So Below. Publ. Aeon Books ISBN-13 9781911597209

79 https://underthebluedoor.org/2014/08/18/the-rwandan-prescription-for-depression-sun-drum-dance-community-we-had-a-lot-of-trouble-with-western-mental-health-workers-who-came-here-immediately-after-the-genocide-and-we-had-to-ask-some/

80 I am putting these in quotation marks because the reality of a living organism is that the organism IS the symbiosis, not some individual part of it. Our language separates human and the other parts of our symbiotic entity as if they are separ-able. Just as we say "I am going into nature" or "I am connected to nature", ignoring the fact that we are and always have been throughout our evolution an integral part of the ecosphere.

81 Rich Haridy (July 3rd, 2019) How antibiotics can make flu infections worse by wiping out important gut bacteria. Published online https://newatlas.com/antibiotic-kills-gut-bacteria-worse-viral-infection/60411/

82 Science Daily (July 4, 2019) Strain of common cold virus could revolutionize treatment of bladder cancer.

https://www.sciencedaily.com/releases/2019/07/190704191431.htm

83 Cindy Engel (2002) Wild Health: How animals keep themselves well and what we can learn from them. Publ. W&N. ISBN-13: 978-0297646846

84 Joel Shurkin (2014) News Feature: Animals that self-medicate. PNAS Dec 9 111 (49) 17339-17341; https://doi.org/10.1073/pnas.1419966111

85 Jacobus C. de Roode1, Thierry Lefèvre & Mark D. Hunter (2013) Self-Medication in Animals. Science 12 Apr 340(6129), pp150-151DOI: 10.1126/science.1235824. This paper is an interesting an duseful review. However, the authors tire themselves in knots by having to assume that the animals are intelligent enough to be able to knowingly self-medicate; whilst at the same not being intelligent because they are animals (and insects) – and therefore being incapable of intelligence.

86 It is recognised by chefs that grass-fed (i.e. freely grazing) animals tend to taste better. If one asks – "why does it taste better?", one answer may be that the herbs the animals eat somehow imbues their flesh with their aroma. I think we all recognise (beyond the obvious jokes) that it is not possible to put a sheep in a field full of mint or rosemary and have it hit the table ready-flavoured. I would suggest that part of the sense of taste (which is largely based on smell) is that we identify how healthy the animal was when it was alive – a reduced health will result in certain toxins or excess hormones of various kinds, or changes in the concentration of (e.g.) leucocytes. So if this is even slightly correct, part of the "better taste" of grass-fed animals is that we unconsciously recognise that they were healthy – as opposed to animals reared in a factory farm.

87 A.A.Macintosh, R.Pinhasi & J.T.Stock (2014) Lower limb skeletal biomechanics track long-term decline in mobility across ~6150 years of agriculture in Central Europe. Journal of Archaeological Science 52, Dec, pp376-390 https://doi.org/10.1016/j.jas.2014.09.001

88 http://www.hollieholden.me/

89 Yasuo Ito, Toshimitsu Shimizu, Tomomi Nakamura & Chie Takatama (2015) Effectiveness of tongue-tie division for speech disorder in children. Pediatrics International 57, pp222-226 doi:1111/ped.12474

90 49. Ursula K LeGuin (1998) LaoTzu : Tao Te Ching. A book about the Way and the power of the Way. Publ. Shambala. ISBN-13: 978-1-57062-395-0.

91 Ursula K LeGuin (1998) op. cit. This quotation points out that true balance is unaffected and natural; and as soon as it has to be enforced or becomes remarkable in any way, this is a sign that it has actually been lost.

92 This quote from the Gia-Fu feng and Jane English (1972) translation of the Tao Te Ching. Publ, Wildwood House. ISBN-10: 0704500078 In the beginning, there is Nothing – timeless, formless, nameless, non-being, indescribable, it is the precursor to everything. Then this Nothing gives birth to the Tao that contains form and Being. Non-being (the One) and Being are the archetypal Yin and Yang (the Two), and are themselves a unified complementary whole. These then in their movement relative to each other give rise to Chi – energy. Then we have the Three : Yin, Yang and Chi. And these are the basic ingredients of everything, and "the ten thousand things" arise spontaneously from their creative potential. http://www.libertariantaoist.com/?p=721 When thinking about the One, the Two and the Three, it is also necessary to recognise that whilst the original Nothing may be essentially Yin in nature, it is not the same as the Yin that creates Chi – being more of an ur-Yin. And the Yin and Yang

that create Chi in are turn not the same as the Yin and Yang that we experience in day-to-day life : they are more of an archetypal precursor to them. Putting this in as simple a way as possible : **NOTHING-YIN** ⇒ *YIN / YANG* ⇒ Yin / Yang / Chi. And Chi/"Energy" itself also steps down through several levels. In Qigong, three levels of Chi are formally recognised, each of which has different experiential properties (but all of them respond to where attention is placed) : **Shen Chi** is a very light (buoyant) lightning-fast, Light (luminous) energy that occupies cardinal directions. **(Chi) Chi** is a more dense and slower energy that is more (but not wholly) constrained to the physical body – and is the energy that moves through meridiens. This in itself has several different manifestations. And **Jing Chi** is a very dense, almost viscous or sluggish energy that underlies raw physical power, is wholly constrained to physical tissue.

93 Stanley Keleman (1985) Emotional Anatomy. Publ. Center Press, Berkeley. ISBN: 0934320101

94 http://www.ted.com/talks/daniel_wolpert_the_real_reason_for_brains.html

95 Gerald H Pollack (2001) "Cells Gels and the Engines of Life" ISBN-13: 0962689521

96 Another example of this applied by the pianist Lubomyr Melnyk (http://www.lubomyr.com/) in his "kung fu" piano technique (up to 19 notes per second!) can bee seen and heard on the BBC website : http://www.bbc.co.uk/news/entertainment-arts-16794606

97 OCJ. Lippold (1970) Oscillation in the stretch reflex arc and the origin of the rhythmical, 8-i2 c/s component of physiological tremor. J. Physiol. 206, pp359-382

98 OCJ Lippold (1971) Physiological tremor. Scientific American 224(3):65-73, PMID 5546818

99 "Alpha waves are neural oscillations in the frequency range of 8–12 Hz arising from synchronous and coherent (in phase/constructive) electrical activity of thalamic pacemaker cells in humans. They are also called Berger's wave in memory of the founder of EEG." quoted from http://en.wikipedia.org/wiki/Alpha_wave

100 Martin Lakie, Carlijn A. Vernooij, Timothy M. Osborne, & Raymond F. Reynolds (2012) The resonant component of human physiological hand tremor is altered by slow voluntary movements J Physiol May 15, 590(10) 2471-2483

101 Constantinos N. Christakos, Nikos A. Papadimitriou & Sophia Erimaki (2012) Parallel Neuronal Mechanisms Underlying Physiological Force Tremor in Steady Muscle Contractions of Humans. J Neurophysiol 95 pp53-66 doi: 10.1152/jn.00051.2005

102 Rob R Herbert (2012) Shaking when stirred: mechanisms of physiological tremor. J Physiol 590(Pt 11):2549 June 1st, PMID 22787166

103 Mark Plumb & Peter Bain (2006) Essential Tremor: The Facts. OUP, 176 pages ISBN 0199211272

104 http://www.sld.cu/galerias/pdf/sitios/rehabilitacion-fis/cold_stress_and_hypothermia.pdf

105 It should be noted that the range of frequency covers a scale approximately 0.3 to 30 Hz – so this is not a rigid system, though the peak at 10Hz is very strong and universal between human subjects and human muscles.

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