

Chapter 3.1

Boundaries and the Proxemic Field

Boundaries · Proxemics · Semiotics · Healthy Proxemic Zones · Experiential Aspects · Aerials · The expansive self · Possible mechanisms of proxemic space · Health warning for therapists · The Lateral Line and other Sensors · Polarised charge shells and Chi · Embryological gestural fields · The heart's electromagnetic pulse · Solitons · The Tai Chi circle · The psychology of boundaries

*When despair grows in me
and I wake in the middle of the night at the least sound
in fear of what my life and my children's lives may be,
I go and lie down where the wood drake
rests in his beauty on the water, and the great heron feeds.
I come into the peace of wild things
who do not tax their lives with forethought
of grief. I come into the presence of still water.
And I feel above me the day-blind stars
waiting for their light. For a time
I rest in the grace of the world, and am free.*

- Wendell Berry

Boundaries

The only thing that will bring happiness is affection and warm heartedness. This really brings inner strength and self-confidence, reduces fear, develops trust, and trust brings friendship. We are social animals, and cooperation is necessary for our survival, but cooperation is entirely based on trust. When there is trust, people are brought together—whole nations are brought together.

- Dalai Lama

The need to maintain a boundary carries something of a contradiction that goes to the heart of organic life. It is only by enforced separation that something new emerges. And at the same time nothing can ever truly be considered to be separate from the ebb and flow of all life's varied expressions. So healthy natural boundaries are not really impenetrable like castle walls - but always have some degree of adjustable permeability. It is the openings – the doors and windows – that make give utility to the enclosed space of a room. A cell's outer wall used to be thought of as being wholly enclosing with a few specialised “gates” (channel proteins) to allow food in and waste out. But in reality, very few cells (if any) have a fully enclosing shell of polysaccharides. Instead, large sections of cell walls are comprised of folded proteins that can open and close as needed. For as we have already seen, the cell is not a globe of fluid that needs to be contained (so that it will not leak); but rather, is a nest of closely packed and mobile organelles within a gel-like mass of structured seawater, and all organelle activity requires physical movement. In human terms, the very physical representation of boundary is the skin : a three-layered membrane packed with nerve endings and hair follicles that sense the external world, that allow gases to diffuse, that contain a garden of *Staphylococcus epidermidis*¹ as a first immunological line of defence, that help regulate internal temperature, and so on.

There is a tendency to think of the human body as being pristine, and only human cells being tolerated by the immune system. However, this is simply not true. For instance, the skin produces antibiotic substances that can kill e-coli in a few minutes, and the production of these compounds is reliant on a colony of subcutaneous bacteria – i.e. non-human cells that live *inside the skin* in colonies almost like small gardens. So boundaries in living systems are rarely (if ever) absolute. If any human body should be pristine, it is an embryo and gestating foetus / pre-term baby. But it seems that even this immaculate environment not only has a microbiome but also requires one², with the mother's microbiome being shared pre-term and being important for the baby's post-natal health. This doesn't only have implications for the baby, but also for how we view the microbiome itself ... Because in order that the mother's microbiome ends up in the baby (and also in the placenta), there must be a continuity of microbial presence throughout the abdominal cavity in normal health^{3,4}. As Claude Bernard and Antoine Béchamp and AT Still pointed out, it is the “terrain” – the ecosystem - that determines health or illness. Health is not a biologically pristine colony of human cells, but rather, health is a

dynamically balanced and actively responsive ecosystem in which organisation information flows from the container – the “human” - to the contained – the microbiome – preserving order. All of this should on reflection, be obvious, because an absolute boundary is antagonistic. Natural boundaries are always permeable to some degree, and it is only human ones that have the *appearance* of impermeability. However, even a locked and bolted castle gate must at some point be opened to allow passage of goods and people in order to have utility as a gate (otherwise we might as well just brick it up).

The boundary is probably the most fundamental gesture of a living organism, and is organised in three directions. On the one hand it regulates what may transfer both from the outside to the inside, and inside to outside. It is the skin, the immune system, the sense of Self/Other. It also contains, holds, protects, supports by embracing and enfolding. The polarised gesture of

pushing out / meeting vs. drawing in / embracing

is the first of the pulsatile motions that is expressed by healthy life. So whilst boundaries are a necessary distinction between inside and outside, the inside and outside still have to meet, and the boundary is perhaps best thought of as more of a control valve to regulate that two-way exchange, and a physical or sometimes more symbolic location where that exchange, and its transactions, may take place. Which defines the third function of a boundary – as a medium of communication. The action of tensegrity⁵ as a means of communication has been extensively researched by Donald Ingber, and mechanical force is means of communication continuous across all scales of the body, from molecules and organelles (though charge polarity tends to dominate at this scale) through cells, organs, and up to the whole body and through into the more social scale of human touch. So it should perhaps (!) come as no surprise at all that cell nuclei organise their DNA as closely in contact with the nucleus wall^{6,7,8} as possible; and that macro-level changes in mechanical force (such as use of muscles for whole-body movement) have a direct effect on gene expression in the nucleus. A clear case of boundaries being used as a means to communicate. The packing of DNA in the cell nucleus is also affected strongly by hydration, since at this scale most (if not all) water is bound in gels^{9,10}.

The importance of the boundary as a biological function has long been recognised. Traditional Chinese medicine recognises the presence of a “Heart” meridian and a “Heart Protector” meridian, the latter’s job being to regulate the heart’s openness so that whatever it receives is bearable. And the same five-element conceptualisation of living processes assigns the condensing, contractile yet malleable quality of “Metal” to the places where we most strongly interface with the external world – the skin, the Lungs and the Large Intestine (end of the digestive system).

Perhaps the ultimate embodiment of a boundary is the development of the blastocyst during the first few days of the growth of a fertilised egg. An egg does not leave the ovary

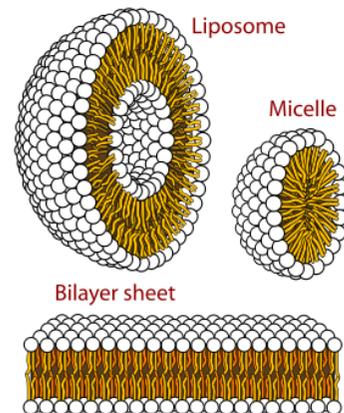
on its own. Rather, it is surrounded by several hundred nurse cells (that stay with the egg until it no longer has need of their protective company) inside a loosely bound halo of saccharides and proteins – the zona pellucida. Although in most cases only one sperm enters the egg, many hundreds of sperm congregate round the egg, join in with the nurse cells, and start to rotate the egg so that it has safe and easy passage down the fallopian tube and into the womb¹¹. The single egg splits, divides, and becomes many. These undifferentiated cells divide, rotate, reorganise - to form a hollow sphere, which will eventually become the placenta; and for a few short days that placental sphere is the bulk of material life formed by the act of fertilisation. Inside it, protected and contained, is a small smudge of half a dozen cells that eventually will grow to be a human being. The placenta continues to nurture its fledgling child for nine months, during which the growing embryo forms its own double-layered outer boundary of cells. The placenta's role evolves from that of an enclosing protective boundary to that of a go-between, a mediator between the embryo and the mother's body and blood. At the point of birth, about nine months after conception, the placenta's life is over, and a new life is ready to emerge from its lovingly bounded container into the larger world. Rather like the dragonfly, we have already passed through several phases of metamorphosis even before birth, each stage protected inside its own many-layered boundary that is necessarily both permeable and highly selective.

Layers and boundaries inside and around the human body vary from the purely physical – such as a cell membrane and interstitial compartments, the skin – through to personal body space, clothes, living space (the walls and door of a room or house, and its garden and fences), the wider social network and the geographic environment of landscape, and the territorial space that many creatures in the natural world define for their own food-security. One aim of architecture is to design space that provides the correct balance between containment and spaciousness, between protection and open movement that allows communication. Differently designed enclosed spaces provide different qualities of environment suited to different kinds of activity; and the physical dimensions and qualities of those constructed spaces generate very specific mindsets. It is not unusual for junior schools or meetings in tropical countries to be held under a tree, or in a building that has walls with openings but no glass or doors. So boundaries that provide social and functional cohesion do not have to be the kind of sealed enclosure that might be more expected and familiar in colder climates. The outer bounds may be more gestural than substantial; and that kind of gesture is so normal to all living things that we implicitly understand its meaning. A flower bed at the edge of a lawn is symbolically equivalent to a steel wire fence if it is recognised and respected – so the physical solidity and appearance of boundaries lies on a spectrum between gestural flowers through to the kind of high wall and razor wire that might surround a prison or demarcate a border between two countries. Hard boundaries are usually designed as overt signals, in

addition to generating a functional and very physical separation. South African architecture from the period of Apartheid had even hospitals built with forbidding monolithic concrete walls on the external aspect of their ground floors – very much like the vertical and featureless walls of a castle. But even castles need openings and a door of sorts for entrance and exit. A village green is protected by the surrounding houses. Just as a forest clearing is protected by the enclosing trees - and a copse of trees is bounded by the surrounding fields! Which gives a feel for the malleable nature of boundaries and the transferrable inside-ness and outside-ness of nature. The British Library has similar walls on three sides, but its entrance courtyard is not unlike a fallopian tube, welcoming readers into the vast womb-like atrium, within which they may select their place of implantation in the various reading rooms. The territory of a bear is defined not by walls, but by its scent and claw marks. The territory of a tree is maintained by its canopy, by its roots – which for an ancient¹² forebear may spread out almost half a mile - and by the often invisible mist of pollen and aromatics that fill the surrounding air.

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https://en.wikipedia.org/wiki/File:Phospholipids_aqueous_solution_structures.svg

A boundary is a division between two functional units, and of necessity creates a sense of self and other, and an inherent **relationship** between whatever is inside and whatever may be outside, focussed within the thickness of that interface zone/ boundary layer. It engenders distinctiveness and discrimination. The inside of each boundary has its own functional homeostasis and normal range of activity – and this will change dependent on the external environment and whatever is there to be in relationship with. So not only do natural boundaries divide, they also connect, because some information is always transferred at least one way, leading to the emergence of a responsive relationship through the presence of the boundary. This is one of the fundamental paradoxes of life – in that separation creates the potential for communication and relationship, and therefore leads to complexity. The richest environments on Earth are transition zones such as the tidal margin. If none of Nature were separate, all would be a formless blob of green slime. Human Proxemic body-space, although invisible and very non-physical creates the potential for complex social interaction.



*The world that created and surrounds us, dwells within us.
 - Julie Morley^{13,14}*

The imposition of boundaries and edges has an importance that far exceeds any consideration of safety and normal ways of viewing territory. When considering nature as a whole, including the human body and human mind - unlimited communication is rarely a good thing. McGilchrist¹⁵ points out that the brain is most functional when there is a

restriction in communication between the two halves (i.e. the different bilateral structures), and that bilateral structure is so important that it has been conserved for hundreds of millions of years. It is a similar reduction in communication and creation of an internal functional (or even physical) boundary that allows cells to differentiate and form complex organisms. Similarly, it is a reduction in communication between evolving populations of living organisms that allows them to develop and then diverge in their own particular way; or for two human populations to diverge and develop different cultures, language, music, customs or even different habitually acceptable proxemic distances. This is almost pure Darwin, and although the theory is almost universally known, the wider implications regarding the *necessity* of separation on an (e.g.) organic, cellular or neurological level are rarely considered.

Each living organism builds its own world, its own reality (Umwelt). This world includes the body and surrounding objects which an organism uses in its activities. Advanced organisms can produce signs that correspond to elements of their Umwelt. Each human being has its thesaurus by which he can describe his Umwelt. A language is a result of agreement among communicating individuals on how to use specific signs.

– Alexei Sharov¹⁶

For humans, the separation of identity between individuals makes us different from bees and ants, allowing a proliferation of different kinds of identity, personality, ways of seeing the world, ideas, religions, clothing, customs, music, relationship. In some cultures this identity is less individual and more contained within a particular family. Identity (a perception of self that defines one's own world, or *Umwelt*) held by a group rather than an individual is actually found throughout human societies, and throughout the biological world. It is the basis of symbiosis and ecosystems. So the principle of boundaries allowing just the right amount of communication and just the right amount of separation is one of the pivotal foundations of everyday experience; its precise point of balance shifting according to needs and circumstance. Evolution through genetic variation is similarly a matter of partial communication of information. If communication is insufficiently clear, then the creature will cease to exist, because there will never be enough new creatures to generate a new species. But if it is too precise, then there is no variation (and so it will also cease to exist, because it will not adapt).

But being separate in our own particular perceived reality (or *Umwelt*) does not mean that we cannot travel into and experientially explore other *Umwelts*. After all, this has been the role of the shaman in every hunter-gatherer culture that ever existed. There are several kinds of body-awareness processes that are designed to create a direct experiential awareness of various functions and organic parts of the body. John Upledger developed one version of Craniosacral Therapy in this direction in his Body Talk / Cell Talk¹⁷ technique. Bonnie Bainbridge-Cohen described these processes in Body-Mind Centering¹⁸. All of these methods one way or another tap into the experiential and

participatory mode of experiencing of Goethe described by Henri Bortoft¹⁹ and applied by Anna Breytenbach²⁰.

I had some interesting experiences of biological boundaries during workshops with Linda Hartley^{21,22}. In one particular exercise involving about 50 people we each took on the role of a specific organelle of a cell, and (an interesting coincidence, considering my specific interests) I was one of about 30 people who were told to form the inner and outer lipids of the cell wall. The cell membrane is made of a sheet of two layers (“a bilipid layer”) of molecules, the head end of which is positively charged. The two positive charges repel each other, resulting in the tails pointing at each other and the heads facing outwards; and this positive charge has further important effects on the structure of water external to and within the cell membrane²³. The totally unexpected experience playing the part of the external lipid layer was that my awareness was directed inwards towards the cell via the lipid “legs”, and the inner layer’s awareness was directed outwards from the cell in the same manner into the surrounding fluid. There was also an inexplicable joy and excitement in performing this task. Whilst I can’t possibly prove that this experience was that of an actual lipid molecule, it is one of many such experiences I have had that carried an unmistakable authenticity that left a lasting effect – as if I had been allowed to touch something profound and sacred. The experience also was curiously evocative of the arrangement of cells in the retina, where the cell that detects light is located on the inside surface rather than the outwards-facing surface.

Personal body space is particularly interesting in that it has no specific physical presence, but almost everybody is aware of and respects the boundary that it implies and imposes. Should anyone enter the body space of another person, both of them will – given sufficient somatic awareness – notice shifts in their own bodies, in tissue, muscle, viscera and in changes in mental-emotional state. The variations in these invisible boundaries are so nuanced and contextual and can shift so quickly - that it is sometimes difficult to precisely define the ways in which two people have interacted. Each person has an almost unique way of defining their own boundaries and signalling that boundary to others in intimate, private, social and public settings²⁴.

Every person's map of the world is as unique as their thumbprint. There are no two people alike. No two people who understand the same sentence the same way... So in dealing with people, you try not to fit them to your concept of what they should be.
- Milton H. Erickson

If a boundary is broken/ infringed, then there is an automatic defence response. With the skin, we would expect a defensive armoured tensing of superficial muscles as a threat of penetration is detected, with some flinching or even major movement initiated at the spinal reflexes. This is followed by pain – because the physical tissues of the boundary/skin have been damaged; and an appropriate immune response (the immune

system is our body's active sense of identity, self and other) should that penetration happen or be threatened. Therefore, the production of cortisol under stress directs the immune system towards dealing with possible infected bites and wounds, and away from the usual infections that might come through food or water or air. The more subtle non-physical boundaries – i.e. those associated with body space – might not suffer physical damage, but also evoke emotional pain and physiological alarm-defence reactions when they are breached unexpectedly, aggressively, or without permission.

But if you watch closely, you will see what you have never seen before, namely that things live their life, and that they live off you: the rivers bear your life to the valley, one stone falls upon another with your force, plants and animals also grow through you and they are the cause of your death. A leaf dancing in the wind dances with you; the irrational animal guesses your thought and represents you. The whole earth sucks its life from you and everything reflects you again.

Nothing happens in which you are not entangled in a secret manner; for everything has ordered itself around you and plays your innermost. Nothing in you is hidden to things, no matter how remote, how precious, how secret it is. It inheres in things.

Your dog robs you of your father, who passed away long ago, and looks at you as he did. The cow in the meadow has intuited your mother, and charms you with total calm and security. The stars whisper your deepest mysteries to you, and the soft valleys of the earth rescue you in a motherly womb.

~Carl Jung; Red Book. He who sleeps in the grave of the millennia²⁵

Outside-Inside

As has been previously mentioned, one of the biggest shifts in evolution was flip that occurred when our nervous system expressed externally, and digestive system internally – the opposite to the arrangement in organisms such as starfish and sea urchins. Thus, the skin - the largest area of epidermis – is derived from the ectoderm (the external layer of the embryonic plate) as is the central nervous system (CNS). The CNS happens to be internal instead of superficial because it has been infolded (invaginated) rather like you would put your hand in a sock and turn it inside out. Which is interesting, because one of the main functions of the external layer of the body is to provide some protection from the outside world – to provide an interface, a barrier, that allows in what we want and repulses whatever we do not want. So one can look at the CNS and consider that one of its main functions is to mediate between the internal and external worlds, to intelligently filter what is good from what is not – i.e. to be the mediator and controller of an active boundary. This external function is particularly relevant to the sympathetic nervous system, whose task is mainly to manage and facilitate the expenditure of energy so that we can interact with the external environment – but also to the motor system (muscles) and the external (“five”) senses, etc.

The immune system also has the task of separating out what we want from what we do not. This is not such a straightforward issue as identifying human vs non-human DNA, because our existence depends on the whole internal ecosystem – human DNA, mitochondria, microbiome²⁶, virome²⁷, mycobiome²⁸, and so on – the entire ecological balance of life contained by our skin that contributes to homeostasis. This balance is a fundamentally ecological one (see Cani 2018)²⁹.

The immune system's function as an interface (including its interface with the *internal* ecological environment) is not totally dissimilar from that of the CNS ... in that it has to intelligently identify what is "good" from what is not – including the destruction and re-absorption human cells and DNA that have mutated and become dangerous to the whole organism – and respond accordingly. The immune system therefore has to identify a "what?" and a "where?" and a meaning with some level of nuance (just as the CNS is involved in this process with regard to the *external* environment) . Its task to identify what is beneficial vs what is disruptive to homeostasis and internal health is not clear cut. Like the CNS, this requires a "sensory" component with some kind of gestalt-like memory as a short-cut to meaning and as a way of facilitating and speeding response to situations (bacteria, viruses) that have proven disruptive in the past. On reflection, we can also say the converse – that the functions of the CNS are not at all dissimilar to those of the immune system, and so we should not be surprised that CNS immune cells outnumber CNS neurons by about 10:1, and that CNS immune cells (glia) are now being found (when we actually look at them properly) to contribute to CNS functionality – even to cognitive processing (Einstein's brain was mainly unique in its richness of glia).

When it comes to the immune system, it is usually thought of as a internal system of defence, but actually its main activity is on the boundary/interface with the external world – a guardian that prevents most intruders from entering at the skin, in the digestive tract, in the lungs, and in fact anywhere else that interfaces with the outside. The other face of the embryological plate is the endoderm – the cells that will line the digestive tract – another "external" surface. The body is in fact full of "endothelial" interface tissues that provide a guarded transition and allow the immune system to compartmentalise any infection³⁰. One could think of the capillary beds – which distribute oxygen and nutrients – also as places like the skin where the internal world of the extracellular body cavities meets the relatively external world of the blood stream. These interfaces, whether it is the skin protecting the outside of the body or the endothelium protecting the inside, have their own complement of organisms and organelles that intercept and prevent most of the potential transfer of pathogens. The skin relies heavily on a garden of subcutaneous bacteria in its role as first line of defence. The capillary beds are intimately connected to the lymphatic system and support a presence of blood cells specifically adapted to immune functions. It is not that transfer of food, information, even organisms, is prevented by these interfaces, but that this transfer is policed and regulated, rather like a

well-run customs post at a national border. This policing function is somewhat different for women than men – affecting the blood-brain barrier³¹ (particularly in the way it is modulated during pregnancy³²) and probably also affecting all other endothelial barriers.

Inside-Outside?

There is a universal gesture of enclosure - that plays out very visibly at a cellular level - that says something important about the role of boundaries in various stages and scales of life, from ecosystems to the formation of the placenta and the investing of organs³³ and other structures in the growing embryo, to the encapsulation of infections³⁴. Cells started off as very primitive forms, probably organising themselves around (and inside) membranous lipid structures³⁵. Maybe not so much as a means of protection, but (also) due to the fact that the structure of the membrane, just like structured water, provides a mechanically stable substrate that encourages further structured relationships to arise, and provides a ready-made means of selective filtering.

The basic gesture, seen in recent research into the transition from Archaea to Eukaryotic life³⁶ is one of :

- Increasing surface complexity
- Formation of exploratory tactile “organs” out of this expanded surface.
- The enclosure of an external body

And from here we can proceed to simple digestion-absorption or to something more creative and dynamic – a mutual, possibly symbiotic interrelationship between the absorber and the absorbed. The tactile protrusions may have some intelligence of their own (such as the arms of a mother encircling her child) but that intelligence is almost secondary to the process of enclosure/encapsulation. At a more fundamental level, it is the presence of “other” that creates an internal response resulting in an increase in complexity of the way we/the cell relates to the external environment. At a cellular level this probably has much to do with electrostatic fields – ionic charge shells in the intervening fluid that in turn generate shifts in internal charge in each organism. Even more fundamentally one can say that a radial force generates a circumferential response. The archetypal nature of this response can be most easily seen in large scale conflict – we talk about “keeping our enemies close”, and armies can be seen manoeuvring to outflank each other. But it can also be seen in any kind of relationship. The presence of “other” when recognised creates a change in internal organisation. There is a dance of radial relationship, the I-Other polarity, which then changes to a more encompassing “I-Thou-We” relationship in which the whole inter-relational complex reorganises its total relationship to everything else.

Proxemics

The “space” of normal interaction between living creatures is formally described by the study of Proxemics – a small but significant branch of the science of Semiotics^{37,38}. Semiotics is overtly a study of communication, but it approaches the subject from a subjective experiential point of view, which is sensible, because interpersonal communication is highly subjective, as is perceived meaning. Factors that modulate Proxemic space and the entire human sense of boundary, boundedness, safety and containment include :

- Space itself (or distances of comfort and discomfort),
- The various obstacles, boundaries and other impediments to movement, contact and clear sensing within that space, including chairs, tables, clothing, jewellery, weapons, etc.
- Smell – pheromones, testosterone (and other chemicals that might chemically signal aggression or fertility or fear, etc.) , the external fug of the body microbiome, perfume, etc.
- Physical (relative) orientation of body and gaze (eyes),
- Physical elevation (higher is effectively more dominant),
- Qualitative aspects of eye contact/avoidance
- The use of other aspects of body language within that space
- Movement (vs. stasis), capacity to move easily, and the availability of escape routes
- The amount of perceived inner resilience and energy available to defend personal boundary (if necessary), and the amount of external support available
- The surrounding environment (including the presence or absence of other people), and the various ways that this environment supports or challenges
- Predictability of the environment, and particularly of people. This includes
- Conformity of external behaviour to social expectations and to assumed and archetypal roles.
- Social expectation and norms as to personal boundary and space.

Note that there is a seamless interplay between function and form – so the means to claim or enforce body space are also recognisable signals. As a very extreme example, the Cold War was played out using nuclear weapons as signals of territorial inviolability, without (fortunately) the need to invoke their function. Body space and its associated

body language is a universally recognised form of communication between two or more people, even if that is not consciously recognised. Or to be even more general, between organisms, if nothing else because your pet dog can read human proxemic space and body language better than most humans³⁹. We not only project our own willingness to socialise in different ways, but also receive information about how people around us are in that regard by observing their use of space. The nuances are so subtle and full of meaning that an entire conversation can be had by simply changing orientation a few degrees or position by a few centimetres relative to someone else, or by subtly tightening or contracting a series of muscles.

Body space can be projected or defended or retracted, each of these having many different possible meanings. I can move my hand forward curiously, aggressively, violently, firmly, tentatively, with trepidation, as a form of greeting, seeking contact, intending to grasp, repelling/pushing away, or in many other different modes and possibilities. The degree of engagement with Proxemic space conveys the degree of willingness to socialise, and how closely that might take place, and on what terms. As such, the two-way communication of Proxemic space is, along with all other aspects of body language – intimately tied into the sensory system, the motor system, and the (Ventral) Vagal nervous system – and therefore also to cardiac activity, homeostasis, and survival-alarm states such as fight-flight or freeze.

Although there is variation between individuals as to exactly what distances feel safe (and similarly there is variation between different cultures), the basic principles of Proxemics are very simple and universal. **A comfortable proxemic distance is – at least during the initial stages of contact - an expression of two potentially contradictory survival needs.** On the one hand, humans are social animals. We desire physical and emotional contact and support; and so want people to come closer so that we can experience that support and connection. On the other hand, as an individual differentiated organism we want to be safe, and a greater separation provides a buffer space of safety. Needing more body space to feel safe is not so different from a desire for more territory, although the former is driven directly by fear-survival and the latter is driven by aggression-survival (which is an external projection of fear-survival). Both of these territorial expansions effectively cause an expansion of personal space into the zone usually considered to be social space (and maybe even beyond). It is interesting that the polarity between socialisation and safety is not dissimilar from the Buddhist polarity of craving and aversion - one of the fundamental causes of Dukkha (existential pain). And the entire craving-aversion, support-safety, towards-away from, close-distance polarity is yet another expression of the fundamentally pulsatile nature of organic life described by Stanley Keleman. But this should not be viewed purely through the lens of danger/fear. Expansion of personal body space can also take place in a way that does not require that space to feel safe – but rather the extra space brings an increased sense of comfort and internal expansiveness. In in this context

it can express (rather than explore) personal empowerment and feelings of safety. As mentioned earlier, architecture can contribute significantly to very positive feelings of expansion.

Once an initial connection has been made in a way that is experienced as safe, then there is the space for more nuanced, creative and less survival-driven forms of connection to evolve. Putting this in terms of the Autonomic system (Chapter 7), the Ventral Vagal socialisation branch of the nervous system can only express itself fully once the situation has been found to be “safe-enough”. If that *safe-enough* has not been given sufficient information, time and physical space to be properly established, the resultant interactions are themselves never safe enough and never fully socialised. This simple principle of mammalian socialisation can be perhaps most easily understood by considering how a nervous dog is best approached. Body posture (not too upright or threatening, slightly self-immobilising), facial expression (friendly), and approach distance have all to be judged with some delicacy. Then there is a pause, and then the back of the hand can be offered for the dog to smell – no too quickly, not too close. It takes an exploratory sniff. If everything is in order, it will be less certain about danger and a series of offerings and negotiated shifts in distance will eventually lead to a relationship being set up, and the dog no longer barks, and next time greets you with a wag of the tail. Humans also need to go through a similar ritual, but this ritual has been curtailed in Western technological cultures, largely out of necessity in cities with high population densities and insufficient physical space to fully negotiate the biological dance of safe connection. As a consequence, all animals become stressed if they are excessively crowded together. Even fish in shoals and birds in flocks have an ideal range of proxemic distance between individuals, which only shrinks for any substantial length of time when there is an external threat. Hence the very dynamic and springy quality of movement expressed by a murmuration of starlings.

There are distinct Proxemic zones that arise as a result of our specific relationship to others. According to MacLean's Triune Brain model, the reptilian hindbrain is responsible for managing territory; so although Proxemic zones are integrated into socialisation responses, they are also tied into much more primitive and reactive hindbrain defence-attack-survival responses arising in the Reticular Alarm System. For instance, “manspreading” (sitting solidly upright with legs wide apart) is a form of territorial dominance. Therefore, an alternative to thinking in terms of zones is to simply state that if we feel safe, our need for separation decreases, and people may come closer without triggering a reactive defence alarm. And if we feel threatened, our territorial defence alarms are more reactive. The size of the zones is related to arm length (which may be modified by weapons – sword and staff forms in martial arts are very interesting in the way that Proxemic space becomes modified), visual field of view, auditory sensitivity, physical (muscular) reaction time and potential speed of movement, and the immediate

sense of safety/danger. Although it is further modulated by social convention, the absolute degree of variation between different human cultures is not particularly large.

Proxemic spaces are adaptive in that they are usually capable of being overridden for functional purposes – medical help, physical assistance, intervention by authority figures, etc. So there is an alteration of the alarm response if there is a good cause for allowing unfamiliar people into the personal or intimate zones. This is very poorly defined in the literature, probably because – beyond an experiential account, it is very difficult to pin down how the specifics of how personal space adapts and changes. And of course, the need for personal spaces is usually at least partially overridden when we stand and sit in crowded public spaces like elevators or buses/trains and waiting rooms. Here is some clue to the workings of these overrides, in eye contact. For a distant culture such as the UK, eye contact in forced close quarters is usually not socially acceptable, and so many people on the London Underground can be observed to be looking fixedly at the floor. The degree of eye contact and the orientation of the body and head relative to another person not only signals something to them, but also signals something to our RAS/hindbrain⁴⁰.

These temporary expedient adaptations that allow strangers to come unusually close are almost always contingent – i.e. they are not whole-body socialisations, but are external gestures, that are accompanied by internal tension. A careful, slow and somatically-aware exploration of proxemic zones reveals that true intimacy is not granted on an ad-hoc basis. There is almost always some internal holding-in or holding back or resistance. No matter how subtle these may be, they are intrinsic to adaptive expedient ceding of personal space. Bad experiences when body space has been ceded can create particularly strong learned aversive behaviour patterns – because territory is so strongly tied into hindbrain function and survival. I was particularly moved recently by an observation my partner recently made in her work. She used to teach movement and exercise to disabled people, and she had seen one particularly institutionalised young woman attempting to draw all of her extremities into her clothes when she was obviously not being given enough space. Of course, clothes, rooms, houses, professional labels - are all another form of skin. Withdrawing the hands into the sleeves, with other parallel gestures, is a clear sign that there is nowhere else to retreat to. In terms of the physical body, there is one further recourse for retreat, and that is to abandon the skin and extremities and retreat to the core muscles and tissues immediately anterior to the spine. This retreat of body space under extremis requires that the outer body is abandoned, and is one practical example of dissociation used as a means to survive.

When I first started to look at this topic (around 2003) there was surprisingly little information available about Proxemic space in either books or scientific journals. The best summary I originally found was in a manual used to train film directors; and one reason modern films look so realistic when compared to 1950's films is that modern

directing takes account of Proxemic space, eye contact and other subtle tells that are embedded in normal social interaction... for example, there are some very nuanced and accurate examples of trauma-driven socialisation and use of body space in the film *Crash* (2004)⁴¹. The situation has improved significantly in the past few years. Sorokowska et. al. (2017)⁴² have published an international comparison of Proxemic body space for Intimate, Personal and Social interpersonal distances. This is an interesting study from several points of view. Some countries (e.g. Bulgaria, Peru, Malaysia) have a relatively small standard deviation of around 20% in body space requirements, suggesting a relatively uniform social culture. Others – Canada, Uganda and many Islamic countries such as Saudi Arabia – had very high standard deviations in response (50% or more), which may reflect several ethnic subgroups, or perhaps social bravado. Or even religious bravado. One passage in the Koran talks of being willing to be close enough to smell the breath of your neighbour, which may be taken literally and so confuse the normal biologically-based rules of Proxemics. Social distance – the body space required when talking with a stranger – averaged out more or less the same in all regions of the world, between 100 and 120 cm. Romania and Hungary were the most noticeable exceptions, needing about 130cm social space. Peru is the most comfortable of all countries with proximity (80cm Social, 63cm Personal, 44cm Intimate) as well as being one of the least variable.

On the whole, Personal distance is remarkably consistent, being 60-80cm in most of the “developed” world world, and being slightly higher (70-105cm) in much of Africa and Asia. These small variations can create amusing or annoying social situations (depending on your point of view) as people with smaller personal body space requirements chase people with bigger body space needs round the room⁴³. Personal space reduces in big cities (with many western countries with big urban populations having social space reduced to less than 100cm) because people are used to being crammed together; and tends to be bigger in rural areas, where there is more physical space in the lived environment. So whilst many people in developed countries have a relatively small body space, Japanese people living in cities have particularly small body space requirements. The fact that space requirements are rooted in biology means that these adaptations due to urban overcrowding come at a cost, and too little space – no matter how well people adapt – usually results in higher biological / physiological stress due to activation of the hindbrain’s desire for safe territory.

What is particularly notable is the high variation (standard deviation) in these Proxemic zones, with many countries showing a standard deviation of around 40%. It may be that this variation simply reflects cultural heterogeneity in a modern multicultural world. However, that would require major variations in Proxemic space between cultural types – which there are, but much less so than the variations within individual countries. So the inference is that these variations reflect the degree to which Proxemic space is

manipulated in social settings, and to which it is affected by trauma, hyperarousal, psychosis, narcissism, insecurity, sociopathy, bullying, class and/or racial hierarchy and the many other distortions that affect human interaction.

It is interesting that animals do not use body space in quite the same way. Animal proxemic space is far less nuanced, and is generally defensive (at a distance determined by the size of the animal and the particular kind of threat, and its need for territory to maintain enough access to food) - or is virtually non-existent. One animal species is usually very tolerant of other species – especially if they do not compete for the same food and are not potential predators. To the point that it seems like animals in general – including humans – perceive other species as being non-invasive, and the way that their presence is tolerated suggests that it may even be reassuring. Prey animals can even be tolerant of predators that are not actively hunting, so during droughts it is not unusual to find predator and prey drinking close together at the same waterhole. The blackbird in my garden and the squirrel in the oak tree ignore each other, but chatter angrily at me when I walk toward the garden seat, and will fight off other blackbirds or squirrels that attempt to steal their personal worms and acorns. So dogs and cats and ants can freely enter and leave human body space because we do not perceive them to be threats or competitors. With each other that first approach is not necessarily so easy, and is affected by their intrinsic sociability and personal sense of safety and control. Some cats can be very insecure and insular, and will usually hiss and spit and chase off any other intruder. Other cats watch with total unconcern as a cat from another house (or maybe a thrush) enters the cat flap, eats their food, and leaves again.

Dogs are generally more social, and so will usually default to making friends. After the first delicate ritual of approach with legs stiff, teeth bared and hackles raised, dogs move into each others space with comfort. They do not have such a strong sense of identity that requires a graded approach and classification of people into degrees of trustworthiness, though again, some animals clearly do express different degrees of trust for different strangers. It seems therefore that proxemic space is strongly tied into ego-identity – in addition to more fundamental issues related to survival such as physical safety and food security and the many other factors listed above. It also seems that humans recognise other humans to be not only sources of social support, but also to be a potential existential threat. Which also raises questions as to how healthy and “natural” normal human socialisation is – i.e. to what degree Western cultural norms of socialisation body language are contrary to more hard wired biological imperatives that are retained in the sub-cortical body-mind? Contrast the way that human-to-human proxemic space can be critical, with with the way that human-to-animal and animal-to-human and animal-to-animal proxemic space doesn’t usually seem to matter at all. I suspect that one reason for this very human need for space is that we regularly override biological need for the kind of ritual performed by dogs, and replace it with Proxemic

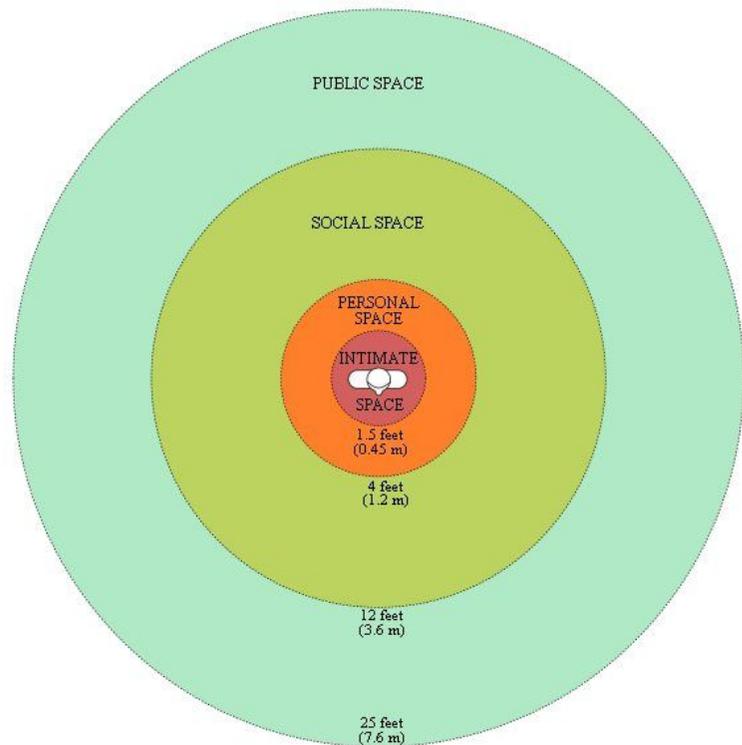
distances and “rules of engagement” based on socialised convention. With these overrides driven by the cortex and midbrain, the biological (hindbrain) territorial functions often remain unsatisfied that the interaction really is safe.

Image (Right) from https://commons.wikimedia.org/wiki/File:Personal_Space.svg

Semiotics

The basis of semiotics (the study of communication) is the idea that every communication has three aspects⁴⁴ :

1. the **Object** – or thing being communicated (e.g. a fire or an order for a cup of tea in a cafe)
2. the **Sign Vehicle** – or means of communication (e.g. smoke, or spoken language)
3. the **Interpretant** – or means by which the communicated message is translated into an idea by the receiver of the communication. The idea of Meaning has been discussed in Chapter 5, pointing out that *Recognition* is a fundamental aspect of any sense of Meaning. It is only by recognition of the sign vehicle that the Object can be identified.



Proxemic body zones

(from wikipedia under the GNU and Creative Commons licences)

Proxemics usually communicates a tension between the degree to which people desire social proximity and the degree to which they do not want it because they do not feel safe. In Semiotic terms, this is the *Object*. The interpersonal distance (along with associated body language) is the *Sign Vehicle*. And whether or not this message is received or not, and how it is received and responded to is wholly dependent on the other person – whose conscious and unconscious response forms the *Interpretant*. Viewing Proxemic space in this way clarifies its role in communication, and shows that the actual message communicated may not be the same as the Object, or it may be ignored. Thus, social communication is almost wholly subjective – a fact that we

probably know by experience, but this recognition of subjectivity also places human interaction well outside the domain of scientific methods based on Objectivity. It is therefore appropriate to investigate human communication (including Proxemic zones) subjectively and experientially – a fact recognised by one of the founders of modern psychology, William James (1842 – 1910).

If we divert for a short while, the *Interpretant* is determined by the relational state of the observer. If survival is the primary orientation, the observer is always interested in personal *usefulness*, and they will tend to filter out most other “irrelevant” information. Therefore, a human, an ant, a cow and a nesting bird will understand the meaning of a piece of grass in very different ways. They must all have the capacity of recognition, but the meaning inherent in that recognition will vary. It is only when one transcends survival (if only for a few brief moments) that utility has a chance of being replaced by something broader, and what is being observed can be perceived differently.

Jakob von Uexküll (1864-1944) spent his whole life investigating semiotics, and discovered that the Sign Vehicles used by particular animals (including humans) are always integrated. All of the means of communication that we employ – language, facial expression, body language, proxemic space, eye contact, smell (including fecal smells deriving from the microbiome), DNA (as a communication to our descendants), (etc?) - are used *and recognised* as an integrated whole that Uexküll called the ***Umwelt*** – the personal world that forms the locus of perception (and meaning). This whole is not constrained to the superficial signal, but is also hardwired into musculoskeletal structure, neurological connectivity, biochemistry, immune function, etc; and is – provided that the organism itself is functioning as a single unit - a whole-organism expression. External expression causes internal response. Internal response causes external expression. All of the senses, body structure, physiology, and perceptions of meaning are an integrated whole *Umwelt* – a personally experienced and lived-in (i.e. embodied) universe.

*However, the sky is a product of the eye... Eyeless living beings know neither sky nor sun.
- Jakob von Uexküll*

The internal representation of sky and sun would be different (alien) rather than non-existent. An eyeless creature living in a deep cavern would be aware of up-ness and down-ness, and the fact that up-ness is always more spacious and airy than down-ness, that water is also controlled by down-ness. And might be aware of diurnal changes in temperature of water flowing through the cave. We are surrounded by information.

Healthy Proxemic Zones

Lets take a closer look at the four Proxemic zones (distances typical for most countries):

The **intimate zone** (0 – 0.5m), about the distance that two people would be separated if they were holding hands in an intimate way. It is reserved for people who we implicitly trust in every way; in that we want them to be close and do not consider them to be a source of danger. In this intimate zone, we no longer have good quality peripheral vision that might warn of sudden movements. The experience of someone we trust implicitly coming into intimate Proxemic space is a warm glow or relaxation. The Autonomic state we fall into is the heart-centred balanced zone where all branches of the ANS are equally available. It is likely that one period of human evolution required that we socialise to survive by sharing body heat (rather like penguins), and physical contact is particularly important for human survival.

This zone is also available to professionals (doctor, hairdresser, because we trust them and they have a good reason to enter this body space ... and to pets.

The **personal zone** (0.45 – 1.2m) is reserved for friends, for people we can trust enough, but with whom we are not intimate, and for conversations with intimate friends. It is about the distance that would be covered by two people shaking hands with outstretched arms. In this zone we are able to decide whether we wish for intimacy or not, and have peripheral vision access to the other person's full body language. Full intimacy is a state of substantial biological and emotional vulnerability, and most people do not take enough care in checking for either themselves or others as to how acceptable that vulnerability might be; resulting in very awkward and stiff A-frame hugs. There is a big difference between what might feel comfortable vs social expectation, that begins right at birth with too many people wanting to “hold the baby” because they want to feel good themselves – rather than because this is good for the baby. This hijacking of intimacy in early life, caused by adults wanting approval and affirmation from children creates a loss of safety that alters the proxemic responses in the intimate and personal zones in later life. Meaning that strongly supported uncompromised boundaries at an early age result in very healthy, strong, clear, and adaptive boundaries later in life.

The way that the personal zone works in practice is that as our familiarity with a person decreases or as the specific relationship being played out becomes more formal, we feel more comfortable with more space. So the personal space required for talking with a friend is less than that required when asking a stranger for help or when engaged in a more professional relationship, or for someone we are unsure of.

Social space (1.2 – 3.5m) and **public space** (3.5 - 8m) are really about feeling sufficiently in control of the immediate environment, including the control of preliminary movements that might end up entering personal space. Personal space provides only peripheral visual

awareness of the lower body of someone approaching, whereas social and public space allow a far more conscious visual appraisal of the full head-to-toe body language, along with allowing sufficient time to react to approaching danger. It could be that these wider proxemic zones are almost entirely based on a very physical combination of the optical properties of the human eye, normal reaction time (0.2 sec) vs speed of movement, and arm reach.

Just as in the closer Proxemic zones, they are also about support. Having friends and other people expressing supportive body language within the social space zone creates an enhanced feeling of safety.

Public space is about the distance we feel safest from others when walking down the street. Social space defines the distance that strangers might comfortably arrange themselves at a party to talk, provided there is enough space to do so. All zones have a maximum, beyond which communication does not really work – the person feels distant and disconnected. It is an interesting exercise noticing at what distance communication feels to be losing qualitative contact. One can move forwards a few centimetres, and suddenly the person feels to be more present – and moving back an equally small distance and they have been “lost”.

These zones are particularly sensitive to variations in eye contact. It is a biological fact that we use the same type of body language for both threat and socialisation, but the meaning is modulated by facial expression and eye contact. Childhood learning of adaptive socialisation requires that the dangerous connections are played out in safe ways – which is particularly visible in childhood games such as “tag”. Full eye contact may occur in a predator-prey or a fighting contact, but is also a sign of trust (i.e. trust that this is not a fight or a predator-prey relationship).

Proximity is an important part of body language, and we lean forward to signal interest in what someone has to say, and lean backwards in disinterest. We also lean forwards if we are feeling a good trustworthy connection, and lean backwards if we are uncertain. Recalling the PolyVagal section (Chapter 7.1) sitting back in a chair is a self-immobilising submissive resistance, and one spectrum of proxemic behaviour is an axis of certainty/uncertainty vs confidence/submission. Expectations of one kind of body language can be confounded if the primary communication coming back in the other direction is not related to the same (semiotic) Object. e.g. one person is using body language to signal a desire for social communication and another person is using body language to signal personal discomfort.

There are also territorial factors to Proxemics⁴⁵ that modulate the need to enforce normal proxemic distance. **Primary territory** is a place that we are familiar with, and have some habitual degree of control over – such as our home, or the room or desk or chair that we work from. **Secondary territory** is familiar or safe enough neutral ground, such as a

restaurant or pub or friends house. It may also include public spaces such as parks, provided that they are safe enough. **Interaction territory** is a temporary personal to intimate space which it is assumed offers sufficient privacy for a conversation. All of these definitions are subject to a lot of contextual float.

Experiential Aspects

Every living being is an engine connected to the mechanism of the universe. Although living is only affected by its direct environment, its sphere of influence extends to infinity.

Nikola Tesla

When further exploring Proxemic zones from a somatic participatory viewpoint, there seem to be several phenomena taking place simultaneously / in parallel that are quite difficult to disentangle. The descriptions below relate to the physical space surrounding the body, but in implying a presence and function outside the body, I suspect that I am also describing fields that also extend through the body. There are many different descriptions of “Aura” in energy workbooks, such as Barbara Brennan’s Hands of Light⁴⁶. However, I have approached this subject with very a different question in mind to the usual way of thinking about off-body phenomena. Most (if not all) books describing fields around the body describe the topic from a spiritual - energetic point of view, such as the wonderful illustrations by Alex Grey⁴⁷, which are drawn from direct vision of the imaginal realm (as opposed to imagination in its more usual meaning).

The principal difficulty with spiritual non-physical phenomena is that they can literally be subtle and intangible; and only a few people are able to experience them with clarity and lack of ambiguity. I believe that almost everyone potentially has the capacity to be aware of them to some degree or other, but that is different from perceiving them clearly – which is really only possible through an inner visual sense. I started my journey into bodywork, rather like John Upledger⁴⁸, by being apprenticed for a short while to a spiritual healer. My experience is that – experience is everything. One cannot work effectively with something – particularly non-physical phenomena - that has been learned second-hand; and there are very good reasons why science restricts itself to physically measurable phenomena. Any attempt to apply theory to the treatment of other people without direct experiential knowledge of what is being manipulated is fraught with so many pitfalls and dangers that I would always caution against it. Just because fields are not physical objects does not mean that they are innocuous, for there are many good reasons to believe that the physical world is formed from essentially intangible forces, and is secondary to those forces. Even considering living organisms from the point of view of physics – the specific forms and relationships that arise form chaos, complexity and

emergence are dependent on the subtlest of forces and unimaginably small variations and perturbations. In the invisible landscape of fields and forces around the human body there are maybe a couple of dozen overlapping and interacting systems that cannot really be described adequately in any written manual. Alex Grey's illustrations give some sense of the awe-ful complexity, but still do not include everything that is "out there".

One particularly useful experiential insight I have had in practising both CST and Qigong for some 25 years - is that both the physical body and this invisible off-body world are like halls of mirrors. If one contacts the human biofield with any preconceived idea of what is there, or expectation of what might (or might not) be felt, or what might or might not happen - then it will accommodate that preconceived expectation and reflect it back. That reflection may or may not be useful, but the more rigid the expectation, the more likely the "answer" is to be useless, since it conforms to that expectation - and therefore provides no information of any value. This is a form of confirmation bias. However, it is also due to the fact that mental fields (i.e. fields of consciousness) strongly affect off-body fields, possibly because off-body field phenomena are themselves fields of consciousness or are strongly coupled to consciousness. So the very specific details of the question being asked are reflected in the answer given. In short, perception is modified strongly by expectation, and the more subtle the phenomenon being observed the less available are tangible clues that can provide some form of reality check.

All I'm saying is simply this: that all mankind is tied together; all life is interrelated, and we are all caught in an inescapable network of mutuality, tied in a single garment of destiny. Whatever affects one directly, affects all indirectly. For some strange reason I can never be what I ought to be until you are what you ought to be. And you can never be what you ought to be until I am what I ought to be - this is the interrelated structure of reality.
- Martin Luther King, Jr.

The specific question I asked was not so much spiritual or energetic, but was focussed on finding the boundary that would trigger either a hyperaroused or dissociative somatised response if it was invaded. And my intention all along has not been to explore "energetic" layers, but to explore anything relevant to the biological and Autonomic aspects of human experience. The "answers" to that question are clear enough, and have provided a lot of food for thought around the subject of consciousness : for my experience is that these fields are very much related to consciousness - indeed, I have come to think of them as being fields of consciousness.

The method applied to sense this activity round the body is one of *reflective embodied participatory observation*. i.e. one does not try to feel "out there". Instead, the idea is to trust that internal somatic processes and sensations that arise from them are a good representation of the qualitative external phenomena. In effect, I am employing counter-transference as an investigative tool, along with detailed body reading. This only really works in very simple situations where (just like normal scientific experiments) so far as

possible just one variable at a time is changed, and the result is observed; and the changes are mapped against a well explored and familiar personal ground state of being. It is only by knowing oneself in intimate detail that internal changes can be attributed with any clarity to changes in the external world. In truth, the more that Goethe's participatory method of scientific observation is applied, the more it reveals that there is no absolute separation of inside and outside, and that there is no true absolute objectivity. If one allows for a participatory holistic universe to exist, it reveals itself time and time again in experiences that are difficult to explain to anyone who is not observing in this way, yet far more difficult to (personally) deny.

There now follows a qualitative description of two qualitative layers that exist around the human body, that have consistent behaviour; and that affect and are affected by the activity and balance of the Autonomic Nervous System. I have called them, for now, the "A-Field" (A is for Aerials) and the "P-Field" (P is for Personal Proxemic space).

Aerials

He watched sleepily the flakes, silver and dark, falling obliquely against the lamplight. The time had come for him to set out on his journey westward. Yes, the newspapers were right: snow was general all over Ireland. It was falling on every part of the dark central plain, on the treeless hills, falling softly upon the Bog of Allen and, farther westward, softly falling into the dark mutinous Shannon waves. It was falling, too, upon every part of the lonely churchyard on the hill where Michael Furey lay buried. It lay thickly drifted on the crooked crosses and headstones, on the spears of the little gate, on the barren thorns. His soul swooned slowly as he heard the snow falling faintly through the universe and faintly falling, like the descent of their last end, upon all the living and the dead.

—James Joyce (*The Dead*)⁴⁹

Firstly there is definitely an "aerials out" layer of presence. Lets call this the "**A-Field**". This can be experienced by deliberately switching to (i.e. intending to sense) an unforced awareness of spaciousness. There are several distinct properties to this layer :

- When forced (even slightly), it appears to fade out into the distance⁵⁰.
- It has a slightly "underwater" quality that suggests that it is connected to (or related to) the sense of hearing.
- It has a kind of "aerials out" effect, which also makes me think that it is one of the more subtle "extrasensory" senses that we have culturally forgotten about.
- It's quite difficult to deliberately focus in on this sense without expending a lot of energy and entering a slightly hyperaroused state; and I would say that it is quite strongly linked to the hindbrain's sensitivity to territory being invaded. Someone who is experiencing even mild hyperacusis is *also* (in addition to their normal

hearing) focussing quite strongly on the A-Field.

- When not used in a forceful or hyperaroused way, the A-Field is a subtle continuous field that extends everywhere. It can only be experienced in this way by bringing the focus of awareness back to the body and allowing an awareness of spaciousness to be a natural part of that somatic, embodied state of being. Using this de-focussed, relaxed, indirect and slightly “out of the corner of the eye” form of sensory awareness is a skill that can be practiced.

The expansive self

*Life is 10% what happens to you and 90% how you react to it.
- Charles R. Swindoll*

The A-Field is distinct from, but easily coupled into a second layer that can be experienced quite physically; which I will call the “**P-Field**” that governs and responds to interactions between two people. Clearly, there are many different possible contingent circumstances when one person approaches another, each of which will evoke a different response; so the following descriptions are very simplified and restricted in scope. Although it is possible to suppose that this field is actually “only” Proxemic space determined by normal senses such as vision, the phenomenology is only fully described if it is assumed that this is a real “Field” - i.e. “something” exists that fills and defines this physical space outside the body, that is beyond a simple mental construct. Its properties are :

- a) When strong, its presence can be quite physical, to the point that anyone walking into it with any significant level of awareness will feel like they are pushing against denser or slightly more pressurised air.
- b) It is a polar field that simultaneously pushes *outwards* to define territory, and simultaneously consolidates *inwards* in a way that induces a more consolidated sense of embodiment[§].
- c) It occupies the volume described above as Personal Proxemic space, but is

§ *At this juncture I have to clarify that the system I am describing is based largely on my personal experiential explorations, and on my particular way of conceptualising, and on applying Occam's Razor in an attempt to keep things simple. I know that there are many different energetic fields that extend outside and interlace through the physical body. But if I were to declare “oh! That's the etheric!” (or whatever) without really knowing that for a fact, I think that would potentially confuse both of us. I suspect that I am describing half a dozen or more parallel effects that work in a coupled manner sometimes and decouple at other times. It may also be that what I perceive as a polarity is actually two or more very distinct fields that are not in a directly coupled and fundamental polar relationship. The aim of this description is to provide a tentative (and at the same time, practically useful) mapping of the phenomena - rather than to be in any way definitive. If you wish to map out my descriptions into your own system then please feel free to do so. And also, maybe ask yourself whether you are doing that because you actually know this “map” by experience, or whether it's somebody else's idea that you have accepted unquestioningly.*

adaptive to factors such as available space (e.g. in a small room) : see list on page 9.

- d) It follows the rules of Personal Proxemic space :
- i. The P-Field expands with strength of ego (charisma), or with confident aggression – both of these being related to claiming body space as territory. Someone might “feel” big, even if they are physically quite small. Under these conditions, P can form a very distinct external boundary – a second skin.
 - ii. It may be that P-Fields interact between each other (and that may be way that Social Space is defined by non-overlapping P-Fields. However, the behaviour of our personal P-Field skin and the way we experience it is not *directly* related to another persons P-Field, but rather, is sensitive to their location of their *physical body*.
 - a) If someone walks into this edge, the internal experience of “pressure” on both people increases; in which case the person being approached experiences an energised expansive somatic shift that can be approximately described as anger or empowerment and (at this minimal level of invasion) comes with a mild increase in sensory arousal.
 - b) If either person is uncertain as to their capacity to withstand the P-Field of the other person, then they would experience somatic anxiety – a feeling of butterflies in the stomach, or nervousness being two typical forms of reaction. Translated into more common experience, that would be one person is uncertain of their ability to defend themselves should conflict arise. This may be a conscious uncertainty, but is also often playing out unconsciously. Of course, anxiety and excitement are two sides of the same somatic coin, having almost exactly the same somatic-mental-emotional qualities; with the exception that excitement is rousing and expansive, whereas anxiety is fearful and tends towards contraction. So when a weaker person is approached by a stronger person who is friendly (e.g. a child approached by a parent), the child experiences excitement – which can rapidly turn into anxiety if the adult happens to be a stranger who does not pause at the correct distance and wait for permission signalled by the correct “it’s OK for you to come closer” body language.

It is tradition in many cultures to demand that a member of Royalty is approached with head bowed, and that people maintain a certain distance ... which custom is probably based on the behaviour of the P-Field. It could be

that historically, Kings had great charisma, to the point that somebody's natural reaction would be to automatically pause and drop eye contact as they approached. As the power of Royal presence diminished, the response became a custom – a polite facsimile of the real thing. I always enjoy walking round the Egyptian room of the British Museum, because the various Royal statues (along with a few specific pieces from the Greek and Roman collections) create a very physical impression of the kind of charismatic power I am describing. Walking into and consciously noticing their “presence” creates a similar response in my own body, as my P-Field rises to meet it. An energised and activated P-Field energises and activates the muscles and fascia, and creates something of a “Shen” response (see below).

When two people with relatively equal and strong P-Fields approach each other in a friendly manner, the combined relational field tends to engage the heart.

- iii. The outer edge of the P-Field is almost like a second skin, and any unwanted incursion that penetrates into this body space is experienced as being particularly invasive. Unlike the skin it has a certain amount of “give” and elastic resilience, and can compress and deform. I have come across a few people who are familiar with manipulating “energy” who can temporarily distort their P-Field and shrink it or enlarge it at will. But it takes a lot of wilful energy to sustain such a change. These manipulations are very temporary changes that come to an end as soon as the wilful intention is relaxed – and the P-Field then simply springs back to its original size. However, familiarity with this kind of wilful manipulation of energy comes at the price that it may become difficult to be aware of the “true” resting state of the body's P-Field – so all relationships would become slightly artificial and wilfully controlled. Given two people interacting, and no conscious interference, no change in their mental-emotional relationship and no disrupting body language - the size of the P-Field (i.e. the physical point in space at which both systems interact) is stable to within a couple of centimetres.
- iv. The P-Field “skin” may be quite thin - sometimes just a centimetre or two. This skin is something of a holographic event-horizon. There is a lot of information exchanged and available to consciousness as counter-transference when a P-Field interacts with another persons body.
- v. The P-Field expands when under consciously *or biologically* perceived threat into the next Proxemic level. So the personal field (usually no greater than 1.2m in radius) expands about half way out into what is usually thought of as the Social field – i.e. typically to about a 2 or 3 metre radius. In this

circumstance, if the P-Field is strong it may still have a well defined outer boundary – i.e. it invokes an easily perceived expansion of internal energy when minimally pushed/invaded by a few centimetres). If it is not so strong it may be very diffuse and almost imperceptible, depending on the capacity of the person to defend themselves and their body-territory. And these weaker P-Fields tend to collapse far more easily. It takes energy to achieve and maintain this kind of (non-consciously driven) expansion, which is – rather like hyperarousal – only intended biologically to be sustained for relatively short periods of time.

- vi. Under pressure by being entered into, the P-Field strengthens and becomes even more repulsive (i.e. there is an increase in perceived physical pressure). It is often quite sensitive, in that once found, a radial approach of less than a centimetre, or an excess of eye contact, or a withdrawal of eye contact, or a slight change in relative body orientation - can cause it to react.
- vii. If its capacity to repel is exceeded, the P-Field “collapses”. In collapsing it separates into two polar responses :
 - a) The expansive pole rapidly expands even further; and to anyone who has been pushing against it, the experience is that it disappears. In reality, what has happened is that the field has expanded and they are no longer aware of it because they are inside it (and no longer in contact with the holographic outer shell). Once expanded, the P-Field is more or less useless as a form of repulsion, because whatever physical force it can exert is spread over a far bigger volume and surface area. And once expanded it effectively creates far more vulnerability in any social situation, because people will automatically enter it – partly because their somatic (experiential) sense of personal space is smaller than this expanded boundary, partly because they cannot easily feel that it is much bigger and that this person “needs more space”, but mainly through social conventions around normal body space and how close one must be to have a conversation. This reactive expansion is a form of dissociation. The A-field always strengthens and moves out to fill this expanded P-field space, thus consuming even more energy.
 - b) There is also a contractile pole that retreats into the person’s body. I assume that this internal pole starts off as a layer extending roughly to the level of skin⁵¹. The contraction is also a form of dissociation, as the P-Field abandons the periphery (skin and limb extremities). If this contraction is chronic it may over the long term cause numbness/loss of superficial sensation (depersonalisation) and physical pathologies such as

peripheral neuropathies and circulation problems. In extremis, this contraction can retreat as far as the pre-spinal fascia – the deepest and therefore “safest” part of the body; and this specific response seems to be a common cause of migraine.

- viii. A chronically collapsed (i.e. externally hyper-expanded, internally contracted) P-Field often results in difficulty socialising and forming relationships. Anyone coming close creates a sense of insecurity and anxiety – because the biological defensive P-Field boundary has been breached. So the tendency is to push people away. If they come even closer, at some point the P-Field collapses further; and the result is a relational black hole, in which the second person is pulled in (or falls in) to a vacuum – so then too much happens far too quickly.

Since collapsed P-Fields tend to be associated with overwhelm trauma, the result of this kind of collapse is overwhelm.

Chronic absence of the layer of consciousness associated with the internal P-field (i.e. it is no longer present in external body tissue) can result in a wide range of somatic, medical, neurological and sensory pathologies. Here we are probably looking at many different phenomena that cannot easily be unpicked. However, the common theme is that a layer of consciousness is no longer meshed into the body tissues and into the peripheral nerves in the usual way – leading to increasingly physical problems (somatisations).

There is a further rather interesting way in which the P-Field manifests, which is related to the craving-aversion axis. I have already described the way that its expansive aspect can be experienced as literally pushing on the front of the body like compressed or dense air. This is a “stay out of my territory” response. If somebody’s P-Field is expressing a craving for human contact (instead of aversion), the experience for someone entering it is one of being *pushed from behind*. If the P-Field collapses, due to overwhelm, then the experience can feel like being *pulled from the front* – as if onto a vacuum. The P-Field is very forgiving, in that if it does collapse, all one has to do to reinstate it is to find its outer position and stay on that edge instead of barging inside it, and it will re-form, which is one of the several factors that make me think it far more influenced by processes in the hindbrain than by the storytelling cortex. This strategy (of resetting distance) works in a large treatment room, but the distances involved (about 1.8 – 3.5 metres) mean that it would appear really strange in a public space. I have come to the conclusion that most people are so used to their P-Field boundary (i.e. their personal space) being invaded that although they might be conscious that something is happening they don’t like, the incursion is generally “tolerated”.

Having worked with these Fields for over 10 years now, I can quite confidently say that

- (a) The above map works maybe 95% of the time for mainly white middle class people of age 20ish to 80 who live in England (!)
- (b) There is a lot of personal variation, and every time I have thought I have a complete map, someone walks in through the door whose P-Field behaves differently.

So, the above is a summary of the experiential aspects of personal body space. I suspect that, on reflection, a lot of the qualitative description will be familiar to many people. I will discuss how this information can be used in treatment strategies in later chapters.

Useful resources on Proxemics include :

- Language of the Body (website in Italian) : <http://www.linguaggiodelcorpo.it/>
- An archived chapter of an original book on Semiotics (later editions had this chapter removed) : <http://www.afirstlook.com/docs/proxemic.pdf>
- Proxemics Research by William Ickinger <http://sharktowntown.com/proxemics/intro.html>
- West Side Toastmasters : [Personal space ownership](#)

Possible physical mechanisms of proxemic space

Ever since the Cognitive Revolution, Sapiens have thus been living in a dual reality. On the one hand, the objective reality of rivers, trees and lions; and on the other hand, the imagined reality of gods, nations and corporations. As time went by, the imagined reality became ever more powerful, so that today the very survival of rivers, trees and lions depends on the grace of imagined entities such as the United States and Google.

— from "Sapiens: A Brief History of Humankind" Yuval Noah Harari

This section is very speculative.

So far as practical everyday use of these fields, the mechanism is largely irrelevant. We experience and respond as a whole integrated organism. That organism does not need to know how it does what it does – it just does it with a consciousness and an adaptive intelligence which is nevertheless highly reactive - unless the cognitive mind is well interlaced and integrated into those deeper somatic levels. Knowing a mechanism might give additional insights into behaviour. But picking the wrong mechanism and thinking it is the correct one leads to all kinds of unfortunate secondary errors⁵² as cognitively-directed behaviour becomes decoupled from instinctive behaviour and “knowing”. My general observation is that attempts to match quantifiable physical processes with subtle sensory phenomena are not usually very successful; for it’s all conjecture with very little evidence other than a set of rather subtle and ephemeral experiential phenomena (and maybe best defined by the image on the right). One must always be aware that many biofields and physiological states are multi-layered and have many different driving forces, so what may appear to be a single phenomenon (and indeed, is a single phenomenon across a narrow physiological band) may decouple and turn out to be two or three parallel and distinct processes in other situations. The entire body is highly contingent, and does not lend itself readily to definitive measurement or categorisation.

I have included this section partly because Western cultures have become mechanism-oriented when looking for explanations. But also, exploring these various options provides some further insight into phenomena and mechanisms that (even if they are not directly related to Proxemic space) are important for understanding dissociation. There are several different yet overlapping, parallel or optional phenomena that can possibly “explain” or at least account for some of the particular (and peculiar) behaviour of the P-Field described above :

1. Consciousness
2. The heart's electromagnetic pulse
3. Lateral Line (?) sensors
4. Embryological fields
5. Chi
6. A Soliton
7. Polarised charge shells

There are many other possibilities, such as the Etheric, Astral, Mental and Causal bodies of western mysticism. None of the above seems to be able to account for all of the phenomena of the P-Field (although "Chi" is a good contender) suggesting that the P-field is probably not just driven by a single mechanism. To recap, the particular properties of P-Fields that are quite physical and can be experienced relatively easily include :

- Although the outer boundary may be very diffuse, it is able to coalesce (condense?) to a shell only a few centimetres thick.
- This shell is tangible, and contact with it creates a reaction in the person who it is emanating from, to the point that they often have a noticeable visceral response, such as tightening of the abdominal muscles or the stomach/solar plexus, or butterflies, or even migraine.
- Depending on the density/degree of condensed-ness of the outer (repulsive) shell, the person approaching may feel physical pressure on their skin – usually the upper body, but sometimes down in the legs. This pressure increases with further proximal motion, and starts to be felt internally (somatically) as an internal pressure, almost like being inflated with a slight increase in heat and vibration.
- The effect is definitely greater with eyes open initially, and so some of this is an effect coming from the more obvious visual sensory system – which could be an argument for this just being a psychological mirage. However, once one is tuned into the P-Field and aware of its presence (i.e. know "where" and "how" to find that particular sense), eyes open or closed makes no difference.
- Following on from the above point, it is responsive to mental attention. Being aware of its presence and location (i.e. placing a de-focussed conscious awareness on the outer edge of the active personal proxemic space, or whatever else is also going on in the P-Field) affects it, and can create physiological, biomechanical and mental-emotional shifts in the person whose field is being so observed.
- When standing on the Edge of the P-field, counter-transference effects are

particularly strong, and once inside it counter-transference can reduce to zero – particularly if the P-field has collapsed on approach.

- If dissociative overwhelm is triggered, the P-Field develops a vacuum-like quality that sucks people into it, towards the person's body. This suction can be quite strong and is also experienced on the front of the body as a pull.
- Last, but not least, and definitely the strangest from my own point of view – a strong need for physical contact and support creates a push from behind – propelling people forwards.

Health warning for therapists. I should also say at this point (and will raise this further in later chapters) that once the P-Field has been engaged, following these pushes and pulls that ask for (demand) greater proximity is usually a bad move therapeutically. Most times, the primary need is safety and distance, in which case following these pulls and pushes inwards always results in dissociative collapse. Clearly if this dissociative response is extreme, then the somatisation can also be quite extreme; and in her chart of Autonomic zones in trauma⁵³ Babette Rothschild suggests that paramedics may need to be called. I have never experienced this level of autonomic/Vagal collapse, possibly because I always have approached Proxemic zones with caution, but mainly because Babette treats cases of extreme traumatisation.

Most people are not so strongly dissociative; and in most cases the person is usually very mildly aware (or not even aware at all) of the dissociation - simply because dissociation is such a familiar state, that to enter it has become part of their normal experience of being alive. What any therapist should be aware of far more acutely is that the **counter-transference** that arises with the *suction* and *pushing-towards* fields creates a very real danger of falling into Rescuer (and then Victim-Persecutor) mode, and can also create a feeling of personal or even sexual attraction. This attraction is even more potent if there are unresolved embryological fields (see below) – due to their dream-like and oxytocin-laden nature. Remaining observant of these as qualitative gestures and presences will help the patient; whereas thinking they are your own feelings (and therefore falling into them in a swoon of attraction) has the potential to do a lot of damage. In particular, one should always be consciously aware of the potential for counter-transference; and so be able to use it productively instead of being taken over by its unconscious whisperings.

There are a lot of cases of therapists and other health professionals getting into physical and/or emotional relationships with their clients/patients. The forces described above provide a good explanation as to why this can affect even the most experienced therapist. If there is awareness of the ways the P-field acts, these mistakes are far less likely to arise. Suction often arises when the boundaries have already been breached in the past, or at the very least it demonstrates that the patient has just entered a physiological state of overwhelm.. Therefore, an experience of this suction should also be a warning that this is the material presenting itself for treatment.

There are a few other more ephemeral qualitative phenomena that I will mention in relevant topics.

Some people feel the rain, others just get wet
~ Bob Marley

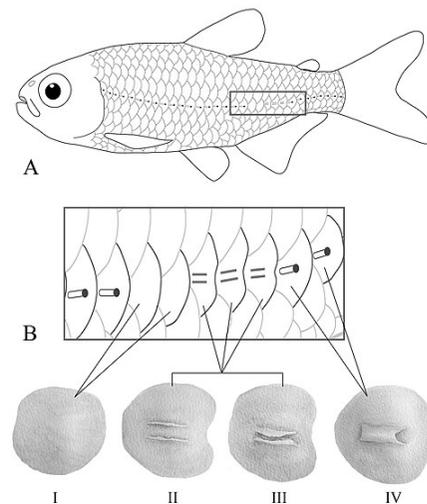
The Lateral Line and other Sensors

Figure (Right):

[https://commons.wikimedia.org/wiki/File:Moenkhausia_cambacica_\(lateral_line_detail\).jpg](https://commons.wikimedia.org/wiki/File:Moenkhausia_cambacica_(lateral_line_detail).jpg)

Most vertebrates have evolved from a bony fish that lived about 500 million years ago, which like most modern fish had sensory organs along its lateral line, but specifically possessed electroreception⁵⁴ – the ability to detect changes in electrical current and resistance in the water surrounding its body. The Lateral Line (LL) sensors most often found are pressure sensors⁵⁵, the topmost of which has become the organ of hearing in land animals. Human anatomy still retains the same lateral line⁵⁶, where the lateral cutaneous nerves exit the rib cage and then divide into anterior and posterior branches. This division between anterior and posterior is often visible as a change in skin texture. Many modern fish also possess an electroreceptive sense⁵⁷ (whose sensors also lie along the lateral line), including sharks, sturgeons, paddlefish, lungfish and lampreys⁵⁸. It is not known for sure how much this sense was conserved or whether it was simply reinvented several times⁵⁹, in the same way that eyes have evolved several times. A few aquatic limbed animals are also known to possess this sense, including axolotls, salamanders and the platypus. Electroreception is simply more effective and useful in water than on land – and particularly in saline water⁶⁰ – because air is such a strong insulator. However, it is known that we hear low frequency and more explosive sounds through the skin⁶¹ as well as through the main organ of hearing – the ear. This appears to take place through mechanoreceptors in the skin, and particularly hair follicles.

We are all to some extent synaesthetic, in that direction is always processed visually (even if direction is detected via hearing or touch); and the sense of hearing is strongly related to the sense of touch⁶². Which should not be surprising, considering that sounds are rhythmic variations in air pressure, and the skin can detect changes in pressure.



Polarised charge shells and Chi

So far this doesn't really go anywhere in terms of possibly explaining external fields to the body that can be physically experienced. However, I'd like to invoke a couple of phenomena that have not been physically measured on humans, but which are physically plausible. The first is polarised electrical shells. These have been demonstrated and given a strong theoretical foundation by Gerald Pollack⁶³, and in cold plasma physics⁶⁴ (though this latter effect is usually researched in the context of large scale atmospheric and planetary phenomena). The human body is electrically charged, and one physical aspect of "Chi" phenomena may be that Chi equates to a buildup of electrical potential in the body, resulting in more tangible external polarised fields. External Chi is recognised in Qigong practice to be unstable in wind, which could also point towards this electrical charged shell effect. I don't gamble, but I would bet that the human body is electrosensitive to some degree, whether that is through the lateral line, or through hair follicles, or some other mechanism – and an electrical zone and sense would match the more physical properties of the A-Field ("Aerial" field) quite well, as well as the slightly repulsive and pressure effects typical of the P-Field.

A second possible physical explanation is that the body produces low frequency sound waves, possibly from resonance in the vascular system. We would then be aware of this effect occurring *in another person* via mechanotransducers on the skin detecting subsonic pressure changes. It has been known for some times that the Aorta resonates in a frequency range of 3 to 6 cycles per second⁶⁵, and the nature of low frequency sounds is that they do not easily attenuate, and transmit easily through fluid. Once that pulsation reaches the skin it would also continue into the zone around the body. If there is such a low frequency sound wave entering our immediate local space, it would not be unreasonable to further assume that this has been made use of biologically, and that it can be detected by the sensory system. The properties of such a (stationary) sound wave would not be dissimilar to the P-Field, particularly if we had evolved some way to focus that sound for the purposes of defining personal space. Such a sound wave would also be very similar to Chi phenomena (see below), and if it were focussed into a standing wave, would be very compatible with the Soliton (also see below).

Embryological gestural fields

Here we enter even more deeply a territory that will make complete sense to anyone who has experiential familiarity with it, but that might sound like complete gobbledegook to anyone who does not have that direct experiential familiarity. In the early stages of gestation, before differentiation occurs, we exist as a globe of fluid. In fact there is so much fluid compared to the normal arrangement - in which cells are usually busy and packed full of organelles jostling together like commuters on a rush hour tube train. The egg might be busy turning itself into two cells, each of which then turn themselves into two ... etc, but inside it is fundamentally still. The stillness arises partly from the bloated fluidity that it started as, along with a saturation of oxytocin that induces a blissful and contented state of being. The stillness is broken for a brief period as the two newly separated cells complete a 90-degree rotation relative to each other, and then it all starts again. As the Blastocyst takes shape, after initially looking like a ball of frogspawn it begins to form a spherical shell around a central fluid space; on the edge of which is a tiny smudge of a dozen or so cells - that will eventually differentiate into a human being. The greatest part of the embryo at this stage is the outer shell of the Blastocyst, which will soon, after the egg implants, become the placenta.

The egg is conscious right from the very start. Or to be more precise, the egg has been conscious *at least* from the very first time a single cell came into existence some four billion years ago. Conception gives it a new beginning - an opportunity to express its potentiality, and this is its focus right up to the point of dissolution, when it returns its component atoms and fluids to the cycle of Life. The earliest times of this new beginning are delicate, and the egg-human can suffer overwhelm in many different ways (see later Chapters). Each time it is overwhelmed, a dissociation occurs, and a part of the gestural form of the egg-embryo gets stuck in that time frame, whilst the rest of it is carried onwards by the strength of the flow of Life, for the most part physically unaffected. So these memories of egg/blastocyst/embryo gesture and form are stuck in a time warp, and unless they are re-integrated into the greater organism, continue to exist in that state of suspended animation throughout life. The earlier (egg-blastocyst) gestures, forms and states of being simple and quite powerful, and can dominate the adult proxemic field.

Like all trauma patterns, they need to be activated to come to the fore, but the easier the pattern is to activate, the more frequently it shows itself, and these early patterns tend to be very reactive. So a person who has a egg-blastocyst dissociative pattern overlaid onto their normal "now" state of being will (when it activates) tend to have quite a large (from 2 up to 3 or 4 metres radius) and undifferentiated proxemic space. Inside this space might feel very nice for people coming in - as there might be traces of the oxytocin-laden deeply peaceful fluid environment that the egg swims in. The experience contacting an egg-blastocyst retained gesture can be one of entering an infinite spherical ocean. But for

the person themselves, personal boundaries might also tend to be quite floaty, it might be quite difficult to feel sufficiently bounded, held and supported, and quite often there are nameless fears or complex undifferentiated and therefore difficult to manage emotions – because in this pre-verbal state there are no storylines, only gestures and forms and somatic/biochemical memories.

So this particular pattern does not explain normal P-Field phenomena, but it does overlay it and significantly change it – and significantly change the persons experience of (lack of) boundaries. There are many other nuances and variations, some of which will be looked at in a later Chapter.

The heart's electromagnetic pulse

Every time the heart beats, the sinoatrial node transmits an electrical pulse through the heart and into the rest of the body. Measured using a standard ECG (Electrocardiogram), this pulse is about 100,000 times stronger than electrical activity in the brain (measured by an EEG or Electroencephalogram). At the same time, an *electromagnetic* pulse is emitted that may be measured using scientific instruments up to a few metres from the body. Just like radio waves (which it is related to), this pulse doesn't need a conductor to carry it, and travels in every direction; not only spreading out all around the body, but it also passing *through* every tissue and fluid in the body. Its signal strength is about 5000 times greater than similar electromagnetic activity arising in the brain, so the heart beat dominates the electrical and electromagnetic environments of the body.

Although we tend to think of the brain controlling the body, what actually happens is that the electrical and electromagnetic pulses coming from the heart entrain and synchronise the electrical activity of the brain. The pattern of the heartbeat is therefore important because it entrains all rhythmic neurological activity. This pattern has several components.

1. The heart is composed of a spiral winding of seven muscles that fire and contract independently, so there is a pattern of activity with frequency peaks (see typical power spectrum for the heart, opposite) around 3 - 12 Hz, with almost all output occurring below 30Hz. Of particular importance is a frequency band around 10Hz, which seems to coordinate both neural activity and many physiological processes including muscle tremor – which in turn controls memory and socialisation. This 10Hz physiological frequency band is probably ties into the Schumann frequencies (primary bands are 7.83, 14.1 and 20.3 Hz) – the resonant frequency of the earth's atmosphere within the ozone layer and magnetosphere. All organic life on Earth has evolved within the Earths electrical environment. So some biological processes use earth cavity resonant frequencies as a clock, and others avoid that frequency range because they need to have freedom to shift.

So (e.g.) there are waves of activity passing through the cortex at around 5-10Hz, but activity in the midbrain and hindbrain is coordinated at much higher frequencies.

2. Then there is the heart beat itself at around 1Hz
3. And the heart rhythm is not fixed like a metronome, but rather, organises itself into a semi-chaotic beat-variability over a sequence of heart beats. This is called “Heart Rate Variability”, and has been the topic of much research, particularly by Rollin McCraty at the HeartMath Institute.

Solitons

Figure (Right):

https://commons.wikimedia.org/wiki/File:Shiva_as_the_Lord_of_Dance_LACMA_edit.jpg

There is also a direct archetypal connection between Proxemic zones and boundaries and the embryological shells that we inhabit in our metamorphosis from egg to human. In particular, the placenta is a fundamental archetypal presence. Shiva's Dance of Creation is one possible visual representation of the space formed by the embryonic placenta. It is a peculiar fact hardly mentioned in any description of human gestation – that the placenta is a part of the embryo itself. In fact, for some weeks, the placenta is the largest part of the embryo, and initially forms a protective enclosure around the small smear of cells that will eventually become human.

Moving the arms and hands to acknowledge and connect with the space immediately round the body is a very powerful gesture that can also connect us up to early issues with boundary and the relationship between self and other. This movement is used not only in body psychotherapy, but is also integral to many different Qigong practices - such as calming and collecting of the Chi back to the navel (umbilicus), and the cultivation of Shen (spirit).



The Soliton (see image of the Anu, above) has already been covered in the chapter on Consciousness. In esoteric anatomy^{66,67,68} the soliton/Babbit's Atom is the physical forms taken by the Air and Water elements. Air is the elemental energy that is associated with the parasympathetic system and the “mind”, and which organises itself around the axis of the notochord.

Water is the medium of life energy and the source of physical form. Since the human biofield is a standing wave consisting of many different parallel processes (electrical charge, electromagnetic effects, consciousness, the fug of



the extra-corporeal microbiome, subsonic sounds from the vascular system, subaudible sounds from cellular activity, etc), there are many ways in which it can have a potentially sensible physical presence. More on Solitons can be found in Chapter 8.2.

The Tai Chi circle

The Tai Chi circle relates potential internal power to the space we can control with that power. Starting from the Tan Tien (the core of the abdomen, just below the level of the navel), movement and power radiate out into the limbs. The legs connect with the ground, the arms extend out to envelop the space we can command. This creates and/or follows a very real and tangible bubble/sphere. If the hands remain within this sphere, the body stance is strong and the arms are able to transmit power from the legs. If we extend ourselves even a fraction of a millimetre beyond this Tai Chi circle, the arms reach beyond the ability of the Tan Tien and the legs to fully control them, and we can be overpowered and overbalanced. The strength of the circle breaks and all that is left are the major muscle groups. I first came across this principle at a demonstration by Chen Xiao Wang about 15 years ago. He spent the first hour of the demonstration talking about money. How if we have a small amount of money, we can only do small things. How we can conserve and use the small amount of money we have to make more money. How if we spend more money than we have, then often that leads to trouble of one kind or another. The principle of the Tai Chi circle is universal, and although you could say that he was just talking about money as an analogy, in fact it is not an analogy – it is part of the Tai Chi circle of anybody's physical resources.

The bubble/sphere which comprises the Tai Chi Circle is tangible – it is a form of Chi that acts like a field that runs through the body (partly in acupuncture meridians, but also elsewhere) and that surrounds the body. It is a sphere that is alive, that can move, be more intense or less, expand and contract. It can divide into a greater sphere and a lesser one, and when the lesser one is contained in the hands and rolled, it energises and the greater sphere also energises at the same time. It is as if we could make a little model of ourselves and dress it in armour, and feed it and send it to exercise classes, and the big body that is our “normal” body would receive all the benefits we plied on the smaller one. Writing this, I am maybe feeling less dismissive of action man toys!

The Chinese Daoists recognise three main levels of Chi. The first - Jing Chi – is related to physical energy, armouring, the fluid pressure in the lymphatic system, the strength of the bones and resilience of tendons. It is largely internal, though it may extend a small distance beyond the skin. The second type is usually just called Chi. Internally it follows the mind and the blood, and has a relationship to lymph in that opening the armpits and groin (sites of major lymph nodes) improves the flow of Chi. Externally it is like a slightly

more viscous slightly denser bubble through which the limbs move. The mind moves the Chi. The Chi, centred in the Tan Tien (belly), responds and moves round and through the body. The body moves with the Chi. The body moves through the Chi, the Chi responds and the sense/mind respond. Its movements are spherical, spiral, fluid, dynamic, continuous, moving in, then out, high then low. This cycle of subtle cause-effect and intention-response can be initiated and then simply followed, or it can be wilfully pushed here and there, or there can be a studied and intelligent two-way cooperation, the mind following intelligence of the chi, and at the same time providing guidance according to the rules that the Chi lives within. Physical or emotional constriction cause joints to compress and muscles to be denser, and these restrict the movement of Chi, causing temporary pain as the Chi works to free itself. As this benign process unfolds, given the correct mental attention, the insubstantial but still relatively tangible Chi will evolve into the intangible Shen. The third type of Chi – Shen Chi (or just Shen) is also called “Spirit”. It is the space that the higher identity resides within. It is the meeting space of the light and Chi. It moves and concentrates in the three Cartesian planes. To be inside it, one only needs to intend to be aware of the lightness and spaciousness of being rather than any sense of physicality or resistance or containment. One cannot sense it, but one can sense how being in contact with it affects the body and mind – a peculiar distinction – and makes them feel free and light, buoyant, quick, effortless, clean and playful. The Shen is not only the ocean of the Spirit – it is also somehow continuous with universal, heavenly Chi – the intelligent matrix of everything that is.

The natural order of things is that the lower energies evolve into a higher state once they have fully worked themselves out and purified. And the higher levels naturally sustain and inform the lower energy levels. The upward evolutionary movement is often interrupted simply by a lack of patience and the unpleasantness of some of the sensations that result when Chi is clearing blockages in its flow. The downward movement of information and resource is often interrupted and blocked simply by a lack of understanding that there is a choice to focus on the higher level. The less physically sensible energies are simply not valued enough – so they never have an opportunity to be cultivated to their potential.

Polarised charge shells & cold plasma (again)

I have left this until last for several reasons. First, it is the closest match to the experiential phenomenology of the proxemic P-Field described above. But secondly it requires that much of accepted physics is discarded and replaced by a much simpler model based on the universality of electrical polarity. Charge shell phenomena were discussed by Richard Feinman, and more recently by Gerald Pollack in his book⁶⁹ “The 4th Phase of Water”. They apply to air at room temperature as much as to liquid ions and (in their usual research topic) hot plasmas. To give an example of the power of electrical charge, the

force exerted by 10% of the charge in our bodies at one metre distance (if they were to separate) is about equivalent to the weight of planet Earth⁷⁰. Of course, the force keeping the charge mixed is also equivalent to the weight of the planet Earth at one metre, and since the charges are a lot closer, it's far far higher. So in general for a living organism, charges tend to remain globally mixed, and internally structured into local charge polarities (or in the case of vesicles, cell walls and similar, very small shell polarities). EZ/structured water is just one example of this organisation through charge-polarity. It is interesting to consider the internal electromagnetic potential energy each of us is walking around with. This has been organised and structured as part of our growth into a living organism, and is a powerful example of the way that Life reverses the supposedly all-consuming 2nd Law of Thermodynamics.

Feinman was particularly curious (well – he was actually curious about everything) in how the apparent simplicity of polarised charge can create more complex phenomena. On a very basic level, like charges (+/+ or -/-) repel each other, and unlike charges (+/-) attract. However, that effect locally has more distant consequences. An accumulation of positive charge in one place will tend to attract a more negative charge towards it, which then attracts its own positive charge... So then we have two positive charges attracting each other (but only so far) by virtue of the negatively-charged zone they accumulate in the space between themselves. As Feinman pointed out, "Like likes like!" And this cascade of polarised attract/repel results in organised structures, whose effects can assume larger and larger accumulated patterns of charge until the whole creates (e.g.) such a large and powerful phenomena as a tornado storm cell. Coming back to the body (humans, but actually, any living organism), the internal body organises according to its need to mobilise and support the muscles and external skin in its response to the external environment. So – given the vast mechanical repellent (or attractive) force that is associated with quite small charge polarities, it is not inconceivable that a relatively small internal reorganisation of polarity inside the body can cause a small but tangible resistance at a distance of some feet.

Another interesting thing is asking how that might scale-up to a martial arts practitioner being able to direct a force over some distance capable of knocking someone over? I've experienced small versions of these fields when in the presence of four advanced Chinese practitioners (two Qigong Masters and two Taiji Masters), and was convinced at the times of all the experience that they were rather holding back on what they were really capable of. It's pleasing to have identified a simple physical mechanism that might account for this; and at the same time the information has brought me not one jot closer to having that capacity!

The psychology of boundaries

Humans are probably quite unique in that in addition to the usual invisible territorial or proxemic outer boundary, we also have an invisible Psychic (psychological) space. Psychic space is a malleable combination of Proxemic space, physical body, territory, biological integrity, biological and family/group/clan identity, and ego-identity – acknowledging that there is a considerable degree of overlap between these different realms. Although particularly oriented towards other human beings, it also applies to any predator seen or unseen that might be lurking in the darkness. Feelings of containment and bounded-ness are intimately woven into the sense of safety (and danger), socialisation and other aspects of the Autonomic Nervous System (Chapter 7). *Biological integrity* includes factors such as toxicity, invasive microbes, noise and in fact anything that compromises the capacity to maintain homeostatic balance. Clearly these more biological/physiological factors would not normally create a sense of being invaded. However, they occupy some of the same response mechanisms that deal with territorial invasion; and if there is pressure from these more physical and environmental elements, it is far harder to maintain the psychological boundary when under pressure. If the integrity of psychic space is not maintained and respected, this is interpreted *on an organic level* as if the physical body itself had been invaded and its existence had been placed under mortal threat, *regardless of the specific form of invasion*.

It seems that Trauma and a host of possibly trauma-related somatised illnesses found in humans such as Parkinson's or Addison's Disease, etc. are almost never seen in other creatures. This may simply be that socialised human society can tolerate physical incapacity because there are many less physical ways that an individual contributes to a society; but these illnesses in an animal would radically reduce its capacity to survive. However, the animal kingdom is not wholly red in tooth and claw. Pack-predators such as wolves or lions, and herd animals such as elephants - will support older and physically injured animals so long as they are able to do so. This kind of altruistic behaviour has even been found to have existed in sabretooth tiger packs, as can be seen through bones that bear the scars of injuries that obviously caused much pain and at the same time must have been in that condition for many years. Although big cats are not well known for being traumatised, they and many other large animals do suffer from trauma when they have been caged (immobilised/trapped) and maltreated (by humans). Since trauma (i.e. an emergency survival response that continues well past the point at which the real threat has disappeared) is almost exclusively found in humans and animals affected by humans, one has to ask what it is about human behaviour towards themselves and other animals that causes this to take place. The answer must be at least partly in the internal relationship that humans have with themselves, because trauma affects humans even if another human has not directly been involved. The issue of psychic space and

boundaries is a large component of this malformed and/or easily distorted internal relationship.

*I also knew that prey animals in the wild, though routinely threatened, are rarely traumatized. Rather, they seem to have a built-in ability to literally shake off the effects of life-threatening encounters, and go on with their lives as if nothing unusual had happened.
Peter Levine, Healing Trauma, page 25⁷¹*

Boundary is a very good example of the way in which physical, physiological, immunological and social factors interact with mental-emotional state and perception of meaning. For this reason, it is remarkably difficult to come up with a simple definition of boundary and invasion of boundary – because there are so many ways that a feeling of boundaries being invaded or overridden or abused or compromised can come about. The range of events and situations that can result in a feeling of having ones boundaries overridden and trampled varies between individuals, but tends to possess some common core elements. Because bounded-ness is a relational phenomenon – one cannot have any boundaries overridden if there is nothing happening relationally – there are contributing factors from both the invader and the invaded person. As has been described in the discussion on Proxemic fields, the person being invaded is more likely to feel invaded if they are not feeling resilient enough or supported enough on any other level. For example, feeling unsupported socially means that we have to defend our boundaries on our own – and so for most people that would result in a feeling of insecurity and inability to defend. And most people would be familiar with the way that a small illness such as a runny nose or headache can reduce social resiliency and result in a feeling of needing space/boundaries to be more respected. The incursion by another person is more likely to feel that an invasion has occurred if :

- there is a physical invasion of territory – whether that is personally defined wider territory (such as a taxi driver who suddenly finds that another taxi company has started working in his area), or of proxemic space (local territory) or of the body itself.
- there is a degree of forcefulness or aggression in the invasion – be that physical force, or emotional force, or the force of authority
- there is a perceived inability to defend the personal boundary – which may be due to insufficient strength/resources, social expectations and protocol (normal or manipulated), etc.

The language available to describe boundedness is quite limited, and this lack of vocabulary is contradictory to the way in which many people have quite intimate clarity as to where their boundaries are and when they have been pushed. “*Boundary*” and “*Space*” (or *personal space*) are really the two main words used to describe the experience of this extraordinarily complex and nuanced phenomenon. Bounded-ness

implies safe containment, so feeling “*contained*” or “**Held**” is another way this is expressed. People who do not have a clear sense of boundary are often aware of an ambivalence and discomfort when their boundaries have been invaded, even though they might not consciously understand what is causing that unease. And people who have been normalised to having their boundaries invaded might even feel uneasy if their boundary is *not* invaded... “Keeping your friends close and your enemies closer” means that if boundaries will inevitably be overridden, the situation can feel more in control if the boundary is ceded deliberately. In fact, the whole point of Psychic boundaries is that they are part of a complex suite of information and circumstance that determines whether we feel *sufficiently in control* of the situation – meaning that we are feeling *sufficiently safe*. Since control and safety are rarely absolute, this boils down to feeling “**In-control-enough**” and therefore “**Safe-enough**”. Unpredictability is particularly threatening to boundaries, because safety through time requires some sense of recognisable pattern – rhythm, consistency. We feel in control when we know what is happening. Much of perceptual and sensory awareness is based on prediction and forward modelling of the world; which in one of its simplest forms might be the ability to catch a ball – or for a bat to catch an insect in flight. The coordination skills required include prediction of the likely future. But actually the bulk of our conscious sense of the environment is based on an assumption that most of the world carries on much the same as when we last checked it.

The fact that boundaries are usually thought of as being psychological indicates that their integrity is very much related to sustaining the integrity of the ego-identity. And the biggest threats to ego-identity come as a result of a poorly formed ego, and threats to it from the usual places we would look for support and confirmation. Thus, Adverse Childhood Experiences (ACES) are one of the main causes of distortion or depletion of the boundary that contains the ego-identity. This will be discussed in more detail in the chapters on Trauma and Dissociation, but in essence the ego-identity and its boundedness are most vulnerable in the roughly seven first years of development plus the period of gestation. And this vulnerability is particularly strong at earlier ages (i.e. gestation) and at critical events in development (e.g. conception, implantation and birth).

However, as a result of the way that identity, movement (the musculoskeletal system and its innervation), physiology, meaning-recognition and the sensory system (particularly sensory integration) co-evolve as the body grows itself, the body (or body-mind) is also a seat of identity. So insults to the physical/physiological body and the physical sense of identity – the immune system and homeostasis - are also effectively insults to the core identity, and therefore insults to and strains on its container – the identity-boundary. As the body-mind and psychic identities are strained, so that strain also affects the sense of containment, presence, boundedness, and safety. Any perceived danger or lack of safety (the two are not necessarily the same) is also a boundary issue. As are all situations concerned with relationship, particularly including relationships where there is a power

inequality or which invoke shame. Overwhelm of any kind is a boundary issue – either directly (the overwhelm involves invasion of boundary), or as a consequence of the loss of capacity to maintain the integrity of personal boundary. In fact, by virtue of its presence at cognitive, emotional, relational and deeply biological levels, Proxemic space - along with the boundedness and relational field that it expresses - is a key element in the integration of the human body-mind.

Along with well formed (and not so well formed boundaries) come the basic attachment styles originally identified by Mary Ainsworth⁷² and John Bowlby. Attachment is a state in which our sense of self includes another to the extent that the self is both incomplete and unsustainable without that other. It is the natural child-parent relationship. Clearly we start life in a very physical and biological form of that relational attachment – through the umbilical attachment via the mediation of the placenta. Even at the very beginning the more physical attributes of containment, fluid, oxygen, protein etc are not the only input received and understood by the growing child. The beat of the mother's heart creates a pressure-volume resonance in the amniotic fluid - that concentrates blood cells into a central location, grows the heart, and causes circulation to occur before the heart's electrical engine fires up. And the heartbeat and its specific harmonics and patterns of variability along with the biochemical signature of the blood reflect the mother's mental-emotional state, which also reflect the safety, containment and nourishment available in *her* environment. Sounds penetrate the womb from outside, as do patterns of physical movement. The embryo and foetus is an intelligent but forcedly passive observer of the life the parent it is living and growing inside. Passive here means that it has an extremely limited opportunity for self-actuation, and the true nature of the growing child is acceptance – and its response is love.

After birth, this containment should gradually be withdrawn, and the degree of attachment-security experienced previously - from the point of conception or even earlier - determines how resiliently the growing child (and adult) faces, overcomes and assimilates later challenges. Along the way it is important that the growing child experiences a consistent-enough, loving-enough, nurturing-enough, and supportive-enough (and therefore safe-enough) interaction with its parents. This experience of being held and contained results in a feeling that the world is a safe-enough place, regardless of what might happen in it. Another way to put this is that the Meaning we attribute to every experience in life tends to be driven by the resources and sense of support-containment we experienced in and bring forwards from past experiences. So Health (in the sense described in the first section of this Chapter) is very much founded on early experiences of containment and support – i.e. of attachment. Whilst Ainsworth and Bowlby's attachment styles did not originally refer to pre-birth experiences, there is increasing recognition that the pre-birth period is critical. For instance, Michel Odent⁷³ (in a book written 20 years ago) described how children whose father left the relationship

during late pregnancy or in the first few months after birth are far more likely to express addictive or antisocial behaviours later in life.

Of the four basic attachment styles, **secure attachment** (a result of all the “enoughs” listed above being in place) was only exhibited by just over half of adults in a 2009 study. This group finds it far easier enter and maintain secure loving relationships and be part of strong social networks, are more resilient and less likely to become traumatised, are creative, tend to learn more easily, can express clear social boundaries and also tend to be physically healthier.

Children who did not receive enough somatic signals (contact, body language, facial expression, and other practical expressions) that their parents cared for them – and so felt that they were on their own in the world – tend to over-focus on their own needs and ignore the needs of others, and therefore exhibit **insecure-avoidant** behaviour. This group consisted of just under ¼ of the adult population surveyed. The resultant behaviour tends to be self-reliance (which may have been one factor that helped the DIY industry to flourish in the last few decades of the 20th century), suffer from anxiety and a fear of failure, but hide it and/or don't communicate it to people who might be able to help. They have to create their own secure boundaries. This is difficult with no feeling of support, so they tend to become isolated, and need to feel in control⁷⁴.

Children whose parents were inconsistent in their response tend to exhibit **insecure-ambivalent** behaviour, tend to have low self esteem and a fear of rejection. They are often clingy and attention-seeking, find concentration difficult, observe people closely (so they can predict their behaviour). They have a poor grasp of cause and effect - so may repeat destructive behaviour or may accept what should be unacceptable behaviour in other people, and therefore have a poor sense of their own boundaries and the boundaries of others. This group amounts to about one fifth of the UK population.

Untreated, these two insecure attachment styles reduce mental-emotional resilience in later life, resulting in an increased likelihood of sustaining the kind of overwhelm that results in Trauma. So rates of PTSD are particularly high in these groups; and since these two groups represent almost half of the population, rates of measurable PTSD in the UK are therefore also high – between 10% and 20% of the population exhibits measurable levels of PTSD/Trauma. Overwhelm and resultant trauma also cause a reduction in physiological resiliency and adaptability that is in effect a loss of intrinsic Health (physical resilience), leading to a higher likelihood of physical illness.

Disorganised-controlling behaviour is found in about 1% of the population, and is the result of direct physical and/or mental-emotional abuse or neglect or abandonment during early childhood. These children never felt safe and even learned that the “responsible” adults around them were not protective, but rather were potential sources of danger. This group is also most likely to suffer from Dissociative Identity Disorder – the

highest level of traumatic adaptation – described in more detail in later chapters. The adaptations to behaviour that these children were forced to adopt in order to survive are not healthy social or socialising behaviours, and they can often display the kind of unpredictability that – as parents – would produce insecure-ambivalent children. A similar and perhaps even deeper effect can occur where chemical or emotional/mental toxicity is surrounding an embryo. Even more than a child in a dysfunctional household (some children have actually just decided to leave) an embryo/foetus cannot escape except at the time of birth, and cannot refuse the blood entering its umbilicus because that blood also carries oxygen and food. If your source of safety is also a source of threat, how does your whole being adapt to this desperate ambivalence?

Which brings us to the fact that many disorganised and insecure socialisation behaviours and their corresponding physiological shifts (and their corresponding chronic physical illnesses) tend to be generational. Over the course of the 20th century, Europe suffered two world wars, compounded by the 1918 flu epidemic (that killed as many people as the first world war), by two major periods of social instability and threat (the 1920's depression, the Cold War of the 1950's to 1970's with its threat of nuclear annihilation). Some people born roughly the turn of the century experienced all of this in their lifetimes, and we are their descendants. So although generational trauma has probably been with humans from the very beginning of civilisation, the past three or four generations have been particularly affected by the kind of events that increase the incidence of generational trauma. Therefore, modern western society is not a particularly good example or measure of Health from any point of view. With about half the population suffering from insecure and disorganised behaviour, relationships within the "average" family the wider social context are not expressing mental-emotional Health, boundaries and associated behaviours. "Normal" as in commonly observed behaviour is not normal at all. And the physiological knock-on effects mean that physical "health" of the average person (if such a being exists) is also badly affected, and similarly, "normal" (and average) is not a good measure of Health.

Integration – the Left hand of Boundaries

Ecological thinking ... requires a kind of vision across boundaries. The epidermis of the skin is ecologically like a pond surface or a forest soil, not a shell so much as a delicate interpenetration. It reveals the self enobled and extended ... as a part of the landscape and the ecosystem, because the beauty and complexity of nature are continuous with ourselves ... we must affirm that the world is a being, a part of our own body.^{75, 76, 77}

If boundaries create and maintain richness, diversity and integrity, these qualities are only of use if there is connection and interaction. A house is only useful while it has doors and windows. But more than that, we have grown up in a home and family that may have been “nuclear”, but which actually is innately and inextricably embedded into the human and natural world. It is true that most people no longer know the life cycle of the food they eat – but nevertheless, they eat it. So are willingly or not, we are participants in the chain of life of cattle, pigs and other domesticated animals, wheat, tomatoes and other farmed plants, and fish in the ocean, and many other life forms besides. And so are in turn also dependent on the life forms that they depend on – and so on, and so on. This chain of dependency is not infinite, because we live in a finite world, and sooner or later, like the Earth’s movement in its orbit, it turns a full circle.

Our cultural focus falls heavily on separation and identity, and so has adopted the narcissistic psychology of Freud in which love is a limited resource that must be divided between different demands. We love ourselves or we love others, and it would seem that there must be some decision as to how much we love ourselves (so we can have what we want) vs how much we love others (so we can give them what they want)⁷⁸. The forest does not obey these fearful equations of false scarcity. The soil willingly gives what it has and willingly takes what it is offered. Each what we might call “component” (for looking at it with divisive eyes, the world is made of parts that are juxtaposed and added together) has grown in the embrace of all others just as surely as the human embryo is in the embrace of the placenta. In an ecosystem, “boundary” does not mean *separateness* any less or more than it means *togetherness*. And if we had not artificially separated out our lives, we would be able to more easily see that the mother carrying the placenta and embryo is inextricably woven into the fabric of the whole world, and can never really be alone. It is true that we can be disconnected, but only through the artifice of perception and physical and philosophical (spiritual, if you will) disconnection; which may in turn be compounded by subsequent secondary disconnections of carelessness, ambivalence and apathy.

The whole point of boundaries – as envisaged psychologically and socially – is to maintain a safety through separateness. But as I pointed out previously (Proxemics), each boundary carries the tension between needing safety through distance and needing connection through contact and merging. All of this is based ultimately on a pathological relationship to a life where danger is always immanent. The illusion of separateness – that

the human being stops at its skin, and that the internal human is a pristine Pasteurian entity that stands alone warding off all invaders seen and unseen, foreign and domestic – means that the fullness of the ecosystem from which we emerged is no longer at our disposal. So, it is true, resources are limited. Love is limited, because we have limited it. There are so many societal confusions that they cannot (and should not) be listed. But perhaps the biggest is the confusion of taking everything personally. A bacterium or a frog can get away with this taking-personally, because the story that they tell themselves in the moment cannot be turned into a mythic saga with a life of its own. So yes, threat is personal, mating and having offspring and finding food and having enough territory to ensure a supply of food is very personal. But they have not separated themselves in their imagination from everything else. Although their skin is a kind of boundary that creates a mythic frog-world, that frog-universe interpenetrates and is e-mergent from everything else. One can perhaps glimpse this less constructed environment by thinking of the salmon, whose body fluids are so like the sea it swims in - that it is hard to tell whether the salmon sea swims through the sea, or the sea swims through the salmon.

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- 2 D'Argenio V. (2018) The Prenatal Microbiome: A New Player for Human Health. *High-Throughput*. 7(4):38. <https://doi.org/10.3390/ht7040038>
- 3 The currently accepted theory (2021) is that gut microbiota enter the amniotic fluid via the vagina. See Chuong E. B. (2018). The placenta goes viral: Retroviruses control gene expression in pregnancy. *PLoS biology*, 16(10), e3000028. <https://doi.org/10.1371/journal.pbio.3000028>. However, that begs a few questions about pathways. It *may be* that the bacteria enter at conception, and that the fertilised egg already contains its own bacterial colony – which would allow for IVF being possible, and this *may be* one reason that the embryonic plate divides into layers and curls around the germ bacterial colony.
- 4 Therefore (if the microbiome enters post-conception), the idea of a “leaky gut” being pathological is wrong in an absolute terms – what is happening is that there is an excessively leaky gut, or an out-of control abdominal microbiome.
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- 6 Weizmann Institute of Science (2021) Novel imaging method reveals a surprising arrangement of DNA in the cell's nucleus. *phys.org | Biology | Cell & Microbiology* <https://phys.org/news/2021-09-imaging-method-reveals-dna-cell.html>
- 7 Daria Amiad-Pavlov, Dana Lorber, Gaurav Bajpai, Adriana Reuveny, Francesco Roncato, Ronen Alon, Samuel Safran & Talila Volk (2021) Live imaging of chromatin distribution reveals novel principles of nuclear architecture and chromatin compartmentalization. *Science Advances | research | cell biology* • 2 Jun • Vol 7, Issue 23 • DOI: 10.1126/sciadv.abf6251
- 8 Gaurav Bajpai, Daria Amiad Pavlov, Dana Lorber, Talila Volk & Samuel Safran (2021) Mesoscale phase separation of chromatin in the nucleus. *eLife* 2021;10:e63976 doi: 10.7554/eLife.63976
- 9 Gerald Pollack (2001) *Cells, Gels & the Engines of Life: A New Unifying Approach to Cell Function*. Publ. Ebner and Sons Publishers ISBN-13: 978-0962689529
- 10 Hilmar Strickfaden et al, Condensed Chromatin Behaves like a Solid on the Mesoscale In Vitro and in Living Cells, *Cell* (2020). DOI: 10.1016/j.cell.2020.11.027 (remarkable that 20 years after Pollack's research this is “new” – giving an indication of how long a change in paradigm takes to move into mainstream science)
- 11 Nothing is known about the eventual fate of the genetic material in these extra-ovular companions; but since the genetic material of her children is often found in chimaeral cells in a mothers body, I would not be surprised if companion sperm were also somehow assimilated into the mother or the foetus, or both.
- 12 Woodland Trust ancient tree inventory for the UK : <https://ati.woodlandtrust.org.uk/> see also Wikipedia: List of oldest trees [in the world] https://en.wikipedia.org/wiki/List_of_oldest_trees
- 13 Julie J. Morley (2019) *Future Sacred: The Connected Creativity of Nature*. Publ. Park Street Press ISBN-13: 978-1620557686
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- 16 Alexei Sharov : What is Biosemiotics? <http://alexei.nfshost.com/biosem/geninfo.html>
- 17 John E. Upledger (2010) *Cell Talk: Transmitting Mind into DNA*. Publ. North Atlantic Books, 544pp ISBN-13: 978-1556439131
- 18 Bonnie Bainbridge Cohen (2014) *Sensing: The Experiential Anatomy of Body-Mind Centering*. Publ. Contact Editions ISBN-13: 978-0937645147
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- 20 Animal communicator : a documentary film about Anna Breytenbach <https://www.youtube.com/watch?v=T2vhV63lx2k>
- 21 <http://www.lindahartley.co.uk/>
- 22 Linda Hartley (1994) *Wisdom Of The Body Moving*. Publ. North Atlantic Books ISBN-13: 978-1556431746
- 23 Gerald Pollack (2013) *Fourth Phase of Water: Beyond Solid, Liquid & Vapor*. Publ. Ebner & Sons 357pp ISBN-13: 978-0962689543
- 24 For a single cell, there is a limit to the number of possible responses to changes in the internal and external environment. These are summarised by changes to the biochemical signalling molecules and to the gross balance of major ions, and to the properties of the boundary/membrane. This total chemical/ electrical/ tensegrity response to the sum of internal and external states is encoded by the organism's physiology – the organism becomes this response, and its homeostatic balance shifts to this response state. As human organisms, it might be surprising to learn that we have very few options for social response in addition to those of a single cell. Cells self-propel, move towards, react, recoil, flee, explore; and signal to each other by means of infrared/biophotons and variations in the composition of their outer boundary. Emotions are simply our way of describing and sensing in a slightly broader and more nuanced way the single-cellular changes in neurotransmitter and peptide balance, membrane potentials (electrical/osmotic/ionic). Body language – which is a largely non-conscious expression of relational state – both communicates and feeds back into our emotional awareness via muscles, bones and connective tissue, just as the cell membrane tension and arrangement of actin fibres and microtubules expresses and feeds back into the consciousness of a single cell. Each emotion has a particular function in terms of our physiological response. Anger is an externally directed surge of energy, associated with preparation for fight (by increased tension of structures around the mouth, hands, arms, shoulders, belly and legs/feet), and is associated with Sympathetic arousal of the ANS. Sadness is an internally directed retreat from the external environment, with a corresponding swing of the ANS towards the Parasympathetic, and it is an interesting question as to what extent single cells also experience primitive responses that might be equated to human emotion.
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- 34 *See histology sections in ...* Gil, O., Díaz, I., Vilaplana, C., Tapia, G., Díaz, J., Fort, M., Cáceres, N., Pinto, S., Caylà, J., Corner, L., Domingo, M., & Cardona, P. J. (2010). Granuloma encapsulation is a key factor for containing tuberculosis infection in minipigs. *PloS one*, 5(4), e10030. <https://doi.org/10.1371/journal.pone.0010030>
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<https://doi.org/10.3390/life7010005>
- 36 Amber Dance (19 May 2021) The mysterious microbes that gave rise to complex life: As scientists learn more about enigmatic archaea, they're finding clues about the evolution of the complex cells that make up people, plants and more. *Nature | News Feature* <https://www.nature.com/articles/d41586-021-01316-0>
- 37 Semiotics is the study of communication of meaning through any medium. This may be through language, metaphor, symbolism, analogy, indication, movement, or many other possible modes.
- 38 <http://alexi.nfshost.com/#theorbiol>
- 39 <http://www.bbc.co.uk/newsbeat/article/37712162/an-autistic-boy-who-cant-be-touched-has-connected-with-a-service-dog>
- 40 One way of thinking about this would be to say that the RAS also might work through an equivalent of the pre-motor cortex, so there is no need to act out a specific response – there is some level of ability to (semi-)consciously self-regulate even low level physiological responses relevant to the external environment.
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- 50 But when it just “is” (not easy to achieve), can extend almost indefinitely, much in the way that James Joyce’s awareness of snow seems to effortlessly embrace all of Ireland, this being made possible through the presence of snow.
- 51 In which case it may (or may not) be that the contractile layer is sometimes called the “Ethereic” in energy jargon.
- 52 An example, John Upledger developed the “Pressurestat Model” in the 1970’s in good faith, as a way of explaining the craniosacral rhythm (otherwise known in Osteopathic circles as the CRI or cranial rhythmic impulse) that he was working with. See John E. & Vredevoogd, Jon D. (1983) *Craniosacral Therapy*. ASIN: B00M0LAA2U. The development of MRI over the next 25 years was just one way in which medical science moved on and provided evidence that contradicted the Pressurestat Model, but some of the techniques that were devised based on that model, and ways of thinking of the movement of the cranial bones that arose as a consequence of that model – are still in some modern textbooks and training courses.
- 53 Babette Rothschild (2017) *Autonomic Nervous System Table: Laminated Card*. Publ. W. W. Norton & Company ISBN-13: 978-0393712803
- 54 Alasdair Wilkins (10/12/11) The ancestor of almost all vertebrates could sense electricity. Gizmodo. <https://io9.gizmodo.com/the-ancestor-of-almost-all-vertebrates-could-sense-elec-5849169> or see the original article : Melinda S. Modrell, William E. Bemis, R. Glenn Northcutt, Marcus C. Davis & Clare V.H. Baker (2011) Electrosensory ampullary organs are derived from lateral line placodes in bony fishes. *Nature Communications* volume 2, Article number: 496 <https://www.nature.com/articles/ncomms1502>
- 55 John Janssen (2004) *Lateral Line Sensory Ecology*. in G. Von Der Emde et al. (eds.), *The Senses of Fish*. Narosa Publishing House. Chapter 11, pp231-264 ISBN-13: 9789400710603
- 56 <https://phys.org/news/2011-10-vertebrates-humans-descended-ancestor.html> A study in the Oct. 11 issue of *Nature Communications* that caps more than 25 years of work finds that the vast majority of vertebrates – some 30,000 species of land animals (including humans) and a roughly equal number of ray-finned fishes – descended from a common ancestor that had a

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well-developed electroreceptive system. The researchers also found that the electrosensory organs develop immediately adjacent to the lateral line, providing compelling evidence "that these two sensory systems share a common evolutionary heritage," said Bemis.

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