

Chapter 51

Hunger Pang Chemistry

There is clearly more to life than classification, or, like the rocks, the British Museum's wonderful collection of butterflies would never have flown. In spite of the scientific world's best efforts we find ourselves right back where we started with cabbages and crystals, because there is something inside that renders an object alive, and no-one can tell us what it is. On the plus side, the reasoned logic of the dimensional structure gives us hope, because it releases us from the need to buy into the scientific zeitgeist in which the cabbage and the crystal, the butterfly and the rock are the same.

However it would be wrong to tar the whole scientific world with this crass and, in a sense, lazy form of materialism. Australian philosopher David Chalmers uses the phrase 'naturalistic dualism'^a to describe the phenomenon of subjective conscious experience as something which is in some way *produced* by the physical system of the brain, spinal cord, nervous system etc, yet paradoxically unable to be reduced to a physical state. Interestingly this has echoes of our old friend *Sphere* who, although in some way the product of 2D 'Circles', is paradoxically unable to be reduced to them. Whatever this tells us, it stands as evidence of the fact that the professionals no longer disregard consciousness with the brazen assurance of their 20th Century peers.



So where have we come to?

In the last chapter we saw how the taxonomic classifications are ambiguous because sharp divisions are not clearly evident in physical structure. If the dimensional structure consists in more than five dimensions it is therefore highly likely that they will transcend our taxonomic divisions, in which case an explanation would exist for why organisms that are so different in some ways can be so similar in others. However, discerning dimensional structure in the tree of life is not going to be easy, because at the level of a 5th Dimension we are still left with a conundrum:

- The parallels drawn between Rucker's cross-sectioning hypersphere and the lifetime of the universe imply that it is *life itself* that exists in a dimensional relationship to the 4D universe, whilst...
- The *central viewpoint triad* of Chapter 46 would suggest that the 5th Dimension comprises certain *cognitive aspects of the mind* (reasoning, creativity, memory etc.)

Are we therefore to conclude that all life is the same, possessing all the same stuff to varying degrees; that it is all just a matter of scale, and human consciousness is really no different to that of the trees? One might imagine that a materialistic approach would see no problem with this, but if this is the case, then why is there such resistance within science to the idea – what Stefano Mancuso of the University of Florence in Italy describes as “a kind of brain chauvinism”^b? Robert T Carroll, author of the popular *Skeptic's Dictionary*, tells us rather brusquely,

^a https://www.ted.com/talks/david_chalmers_how_do_you_explain_consciousness?language=en#t-3247 - Accessed 6th July 2016

^b New Scientist, *Roots of Consciousness*, Anil Ananthaswamy, 6th Dec 2014

'It would never occur to a plant or animal physiologist to test plants for consciousness or ESP because their knowledge would be sufficient to rule out the possibility of plants having feelings or perceptions on the order of human feeling or perception. In layman's terms, plants don't have brains or anything similar to brains.'^a

But it did occur to them, and it turns out that Carroll's conversion of his complex ideas into layman's terms may be incorrect^b. In a recent interview with Gareth Cook of *Scientific American*^c, Dr Daniel Chamovitz, director of the Manna Center for Plant Biosciences at Tel Aviv University and author of *What a Plant Knows*, points out that *'the entire plant is analogous to the brain'*. In the article he observes,

'A plant... can see, smell and feel. It can mount a defense when under siege, and warn its neighbors of trouble on the way. A plant can even be said to have a memory.'

Without venturing into the realms of telepathy or classical music, Chamovitz gives a solid scientific account of what has come to be known as 'plant perception', originally proposed by Anthony Trewavas at the University of Edinburgh, Scotland, and describing the astonishing array of physiology by which a plant relates to the world. Referring to the snake-like behaviour of the parasitic vine *Cuscuta*, which was revealed by time-lapse photography, Trewavas says,

"You'll stop doubting that plants aren't intelligent organisms, because they are behaving in ways that you expect animals to behave."^d

Everyone knows that plants respond to light; however it was Dr Chamovitz who discovered in the 1990s the unique group of genes responsible. To begin with he believed they were plant exclusive, however he later discovered that this same group of genes is also part of the human DNA, *'...important in animals for the timing of cell division, the axonal growth of neurons, and the proper functioning of the immune system.'*

He goes on to say,

'But you don't need neurons in order to have cell to cell communication and information storage and processing. Even in animals, not all information is processed or stored only in the brain. The brain is dominant in higher-order processing in more complex animals, but not in simple ones. Different parts of the plant communicate with each other, exchanging information on cellular, physiological and environmental states. For example root growth is dependent on a hormonal signal that's generated in the tips of shoots and transported to the growing roots, while shoot development is partially dependent on a signal that's generated in the roots. Leaves send signals to the tip of the shoot telling them to start making flowers. In this way,... the entire plant is analogous to the brain.'

Continuing,

'...While plants don't have neurons, they do have glutamate receptors [a neuroreceptor in the human brain necessary for memory formation and learning] and what's fascinating is that the same drugs that inhibit the human glutamate receptor also affect plants. From studying these proteins in plants, scientists have learned how glutamate receptors mediate communication from cell to cell. So maybe the question should be posed to a neurobiologist if there could be a botany of humans, minus the flowers!'^e

^a <http://www.skeptdic.com/plants.html> - Accessed 28th Jan 2017

^b Or perhaps, as in Monty Python's *Album of the Soundtrack of the Trailer of the Film of Monty Python and the Holy Grail*, *"...the brusque tone was intended for buyers of the cheaper version"*!

^c <http://www.scientificamerican.com/article/do-plants-think-daniel-chamovitz> - Accessed 28th Jan 2017

^d *New Scientist, Roots of Consciousness*, Anil Ananthaswamy, 6th Dec 2014

^e I hope Dr Chamovitz and *Scientific American* will forgive me this rather lengthy quote. I felt that to abridge it would be to devalue his thoroughness and falsely render his conclusions superficial.

No-one is suggesting here that plants have *'feelings or perceptions on the order of human feeling or perception'* (although there are those who do^a), but clearly there is far more to the humble plant than meets the human eye. Indeed, Dr Chamovitz' tongue-in-cheek suggestion of a botany of humans gives us a vision of the brain as some kind of highly specialised plant!

Smarty Plants

The *Oxford Dictionary* defines 'perception' as: *'The ability to see, hear, or become aware of something through the senses'*^b. Whilst Trewavas defines 'intelligence' as *'the ability to sense one's environment, to process and integrate such sensory perceptions, and decide on how to behave.'* Continuing, *"the great problem of plant behavior has always been that you can't see it going on."*^c However, in spite of this it would appear that animals have not cornered the franchise. In a study carried out by Dr Monica Gagliano from the University of Western Australia on the sensitive plant *Mimosa pudica* – an exotic herb native to Central and South America – experiments were designed in the same way as for an animal. The website *Sci-News.com* reported in January 2014 that,

'They trained Mimosa's short- and long-term memories under both high and low-light environments by repeatedly dropping water on them using a custom-designed apparatus. The scientists show how Mimosa plants stopped closing their leaves when they learnt that the repeated disturbance had no real damaging consequence. The plants were able to acquire the learnt behavior in a matter of seconds and as in animals, learning was faster in less favorable environment. Most remarkably, these plants were able to remember what had been learned for several weeks, even after environmental conditions had changed.'^d

So, getting back to our earlier conundrum (*might a 5th Dimension comprise life itself in its most basic form, or more sophisticated forms of cognition?*) it would appear that when we look closely at these more basic forms, we find evidence of cognition which includes learning and memory. It would therefore be reasonable to conclude from this that the interpretation of sensory perception in some form or another is available to enable all forms of life to make their way in the world, and any division between basic forms of life and those exhibiting more sophisticated forms of cognition is not simply a case of 'either or'.

So much of the history of science has been the overturning of our basic preconceptions which we inherit by simply accepting the world the way we find it. Anil Ananthaswamy writes in *New Scientist*,

'In the past decade, researchers have been making the case for taking plants more seriously... Charles Darwin would have approved. He was the first to seriously question Aristotelian ideas that plants don't have the stuff of life that animates us and other animals, simply because they don't move.'^e

As these studies suggest, the boundaries between plants and animals – or any taxonomically extreme groups – may not be as straightforward as they appear, casting an element of doubt on the traditional role of

^a Cleve Backster's now-legendary plant polygraph experiment of 1968 being the prime example, available online in PDF. Amusingly, the popular TV programme *Mythbusters'* blasé effort at busting the myth didn't go quite to plan! (Watch it on *YouTube*)

^b <http://www.oxforddictionaries.com/definition/english/perception> - Accessed 28th Jan 2017

^c *New Scientist*, *Roots of Consciousness*, Anil Ananthaswamy, 6th Dec 2014

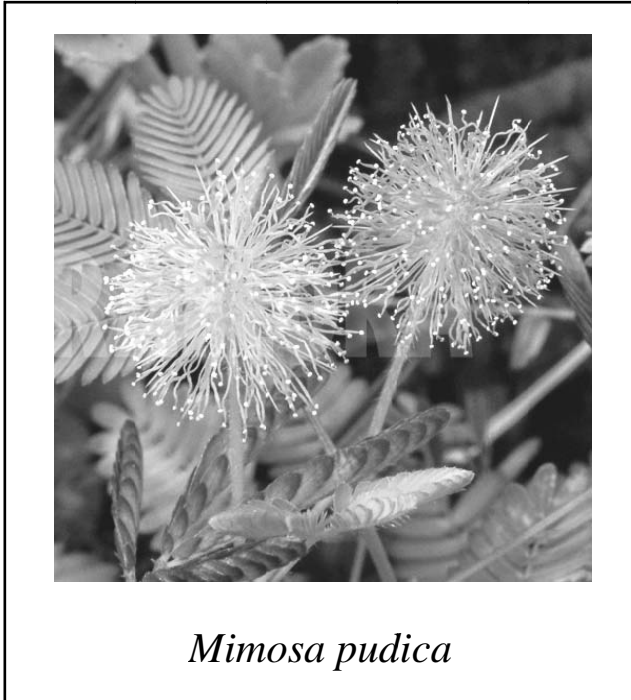
^d <http://www.sci-news.com/biology/science-mimosa-plants-memory-01695.html> - Accessed 28th Jan 2017

^e *New Scientist*, *Roots of Consciousness*, Anil Ananthaswamy, 6th Dec 2014

the nervous system, or our definition of 'brain'. Scientists are perhaps just starting to scratch the surface of a very exciting field – JRR Tolkein's ents may not be so fantastic after all!

Continuity

The report on *Mimosa pudica* concludes,



'The biologists concede that they do not yet understand the biological basis for this learning mechanism, nevertheless their set of experiments has major implications – not least, it radically changes the way we perceive plants and the boundaries between plants and animals, including our definition of learning as a property special to organisms with a nervous system.'^a

All this comes as something of a shock to our conventional view of learning and memory which has always been considered (assumed) to require the action of a brain or nervous system. However – with no recourse to the supernatural whatsoever – this situation lends itself to a logical interpretation in terms of the straightforward operation of the dimensional structure.

The central viewpoint triad – derived over Chapters 45-46 – suggests that life at even the most basic level must include some form of memory, with the *Mimosa pudica* lending support to this view. However, this need not be very sophisticated, perhaps imparting little more than a sense of continuity to the organism's physical processes because, without some form of 'time processing', nothing that any organism does has any context.

'Looking down' from a 5th Dimension in keeping with our Flatland-derived *Principle of Accessibility*^b, the mimosa plant *experiences* the sweep of time. It does not necessarily *feel* a certain way about it, and it would certainly not require to *contemplate* its little green belly button. In keeping with the geometry of the central viewpoint triad, all it need do is experience the span of its own 4D lifetime from a 5D position within the dimensional structure and respond according to the survival/reproductive value of each individual experience, whether that experience occurred in the now, the recent past, or even – perhaps in the case of a particularly adverse event – over a longer term. Dimensionally, it may be no more miraculous for an extremely simple organism's reaction to stimuli to be influenced by the past than by the present, because the dimensional paradigm intimates the possibility of a whole new way of looking at memory.

Enjoying the View

Because our notions of how memory works have tended to be 'storage-based', we assume the need for complex cognitive equipment on the part of any organism that might exhibit it (this is the source of our incredulity at the mimosa plant). Storage demands it, because it is believed to require neurons. This clearly rules out the simplest life forms, so when the mimosa flower puts up its little petal because it remembers something, it cannot help but freak us out! In reality all it is doing is agitating our preconceptions. This in

^a <http://www.sci-news.com/biology/science-mimosa-plants-memory-01695.html> - Accessed 28th Jan 2017

^b *The Principle of Accessibility*: Each dimension sees and may influence all those below.

turn opens the door to a polarisation of opinion with, on the one hand, those orthodox scientists (and Robert T Carroll) who deny everything, and on the other, laypersons who lean into the realms of telepathy and classical music, encouraged by scientists deemed to be ‘on the fringe’ such as author of *The Science Delusion*^a, Rupert Sheldrake.

But realistically, dimensional scanning of the organism’s thus-far stacked lifetime ought to demand very little cognitive prowess. Surveying the world from its 5D viewpoint in keeping with our *Flatland*-derived *Principle of Accessibility*^b, like looking down from a cliff, is surely the most natural thing in the world. Of course, processing that information may require a little energy, but that is available to even the simplest life-form. It’s not as though it intends to build a rocket or even bring down a buffalo; its life and times are a relatively low-key affair. With survival paramount, any sense of continuity or recall will be brought directly to bear on maintaining the state of its own well-being.

Survival

UK biologist Lewis Wolpert writes that,

‘Cells are the basis of all life... There is nothing living that is not made up of cells, even though their forms can vary from snails to elephants to roses.’

Listing many of their specific functions he tells us,

‘Yet, in spite of the apparent differences between, for example, a nerve cell and a skin cell, they work by the same basic principles.’^c

A living thing is a cellular machine. Like a house built of bricks, all life is built from cells – but there that analogy ends! Even at the most basic level, cells are mind-bogglingly complex, busy little bio-factories full of specialised workers, processes, machines, production lines, protocols, deadlines... the similarities are endless.

The organism subsists as an integrated whole and chugs along the conveyor belt of its own existence until it may chug no more, at which point the processes which defined it cease and all its component parts are returned for recycling to their appropriate slots on the periodic table. But it is far more than a machine, because these processes – the need to process nutrients, respond to environmental changes, repair itself, reproduce etc. – are tied to an inbuilt drive to self-preservation that seems integral to life at every level. Undeniably the organism ‘wants’ to live, and an aspect of this is embodied in its drive to reproduce.

But reproduction has to be instinctive, because it is survival-related in an indirect way, not necessarily benefiting the individual – often depleting resources and rendering the parent vulnerable and in some cases dead – but the species as a whole. It’s hard to imagine a bacterium engaging in such reasoning, and, let’s face it, even in humans the sex drive is not entirely left to our better judgment.

It is therefore reasonable to conclude that the instinct to survival and reproduction does not necessarily require ‘thought’, as we would understand it, but constitutes the fundamental imperative of life.

^a Rupert Sheldrake, *The Science Delusion*, Coronet 2013

^b *The Principle of Accessibility*: Each dimension sees and may influence all those below.

^c Lewis Wolpert, *How We Live and Why We Die: the Secret Lives of Cells*, Faber and Faber 2009, P2

Sensory Perception

Every living thing makes its way in the world by sensing it in some way. Interaction with surroundings and fellow organisms requires the deployment of *some* sort of sensory mechanism. Some animal senses are amazing and leave us enthralled – like the night vision of cats and owls, the sensing of vibrations through the ground by elephants, the underwater sense of smell of the shark or the migratory ‘radar’ of birds – but they all have this one thing in common: we compare them to ourselves, which is why we are impressed. *We* are the benchmark. Beat us and you are awesome, but woe betide you if – like the plants and all the micro-organisms – the things you do are too subtle, different, just too *slight* in relation to us.

The processing of sensory information is as diverse as life itself, taking some form within the experience of every living thing. From the least to the greatest, every organism requires to interpret its relationship to its environment and act accordingly. It possesses a tailored mechanism to enable it to do this, and whether we would describe this using basic words such as ‘innate’ or ‘instinctive’ or loaded words such as ‘conscious’ (or ‘ESP’!) is irrelevant, because at this, the lowest level of life on the dimensional structure, we are really only talking about the senses. Whether an ant or an amoeba heads out from A to B as an act of free will or simply chemical changes is not really the question – the same might be asked of humans – the issue is sensory perception, and, as we have seen, even plants appear to demonstrate this in some form.

The question might be asked, ‘*But isn’t this perception necessarily linked to some form of cognitive decision-making process?*’ At the lowest level I do not believe it need be. Life in the 5th Dimension is likely a pretty deterministic affair, with all the organism’s responses to its environment the result of involuntary physiology. Take the example of hunger pangs: we experience them as the result of low glucose in the blood several hours after eating. This is the product of involuntary body chemistry much as we might experience a sore head or the healing of a cut. We don’t make them happen and can’t simply will them to go away. They may act as signals to spur behaviours – e.g. phoning the doctor, or the takeaway – which involve a degree of cognitive input. However, in the 5th Dimension, the life cycle of the 5D organism may well be lived *entirely* on the level of ‘hunger pang chemistry’, with the sensing and sourcing of appropriate nutrition experienced purely as an extension of whatever acts as its digestive system.

Dimensionally speaking therefore, it is not whether an organism is an animal or a plant that separates them. Living things are ‘smart machines’, and it is their synergetic interaction with their environment which at the most basic level defines the difference between that which is animate and that which is not, with the twin instinctive imperatives of survival and reproduction lived out in the context of the sweep of time.

It would therefore be logical to conclude that, as embodied within cellular structure, *sensory perception coupled to involuntary physiological processes* may define the first level of life. I posit that this defines the 5th Dimension, existing within and as the dimensional foundation of *all* life.

Why Oh Why?

As to whether, for example, plants, algae or fungi, microscopic creatures such as dust mites, all the various zoo- and phytoplankton, or even insects, are limited *solely* to this first rung of life’s ladder, it is not for me to say. Specialists may one day be able to tell.

But we are probably the only creatures who are wondering.

All instances of life stand excluded from each other's 'inner' experience because the dimensional structure quits the 4D world at the 5D level, passing by means of the dimensional axis – described earlier – up through us all. And no matter how comprehensive and thorough our biology, we will always be restricted by our dimensional viewpoint – looking 'edge-on'^a along the 4th Dimension and up through all the rest.

Reflection... The world is filled with high quality scientific data on every subject which is available to all; my purpose here is not to trawl through the whole of biology and psychology presuming to rewrite the textbooks. I simply want to take you on a whistle-stop tour of the possibility that the dimensional principles expressed within *Flatland* might undergird not merely space and time, but the *whole* of reality.

If we are to accept that life itself is in some mysterious sense 5-Dimensional, then we must also ask the question whether the 5th Dimension may itself act as the boundary to a further, 6th Dimension. Or is 5 the edge? Can there be a final edge? This question is philosophical. However, *as far as possible*, we are here not in the business of speculation, but extrapolation; the principles either apply in a logical sense, or they don't. Let's look again at:

The Principle of Accessibility:

Each dimension sees and may influence all those below.

This *Flatland*-derived principle is bound up with the nature of information: in order to interpret information we have to view it from a 'higher' perspective. Without this, it may be there, but we can never know it. For example, if this page were written in cuneiform the chances are you would not be able to understand it, which would reduce your engagement with it to the level of the ink and shapes of which it is composed.

In the same way, we must consider whether we are able, not merely to act instinctively in response to sensory information as it relates to the world around us – as per the 5th Dimension – but to be *subjectively aware* of this process, able to 'read' our own thoughts and assess ways of interpreting them, because this would constitute an outworking of this dimensional principle. As humans, obviously we can.

Psychologists call this 'reflective practice', which is simply the act of thinking about the things we do, enabling us to learn from experience; or its more abstract form 'reflective thought' which, as the name suggests, involves the contemplation and development of our own thoughts and ways of thinking. But what of the (appropriately named?) 'higher animals'? To what extent do they share the basic physiology of the 'lower', or the cognitive sophistication of humanity?

I Grunt Therefore I Am

It is possible that Dimensionality may not add hugely to our insight into the animal kingdom, and, much to Stevie Wonder's chagrin it probably won't divulge the 'secret life of plants'. But what it does offer is a simple explanation for why we stand in shoulder-to-shoulder relation to all other living things across the

^a *The 'Edge-On' Principle:* Each dimension is viewed from within itself one dimension lower.

4th Dimension, yet cognitively isolated from one another. It all comes down to *Flatland* geometry and the position of our dimensional viewpoint.