INTRODUCTION

For me, as Director of the University of the West of England's Centre for Moving Image Research, the understanding of the modern mind and one of its principle expressions, 'the city', coalesced when the imaginations of Marshall McLuhan and Rayner Banham merged together to inform the contemporary psyche on what had happened to the world approximately 140 years after the introduction of electricity. Between the 1830s and the 1970s, homo sapiens-sapiens' conceptual tectonic plates were shifting, everything was moving, altering, paradigm lurching.

To create a narrative to understand this level of change, in this chapter I shall spend some time developing the relationship between the act of creating metaphors and the relationship they have with the 'reality' they represent – because I believe that it's in this liminal boundary between the real and the virtual that we will find our current understanding of the world. Quantum physicists do not see particles, they see the traces that particles leave behind – in this way we might picture what the digital is, through the analogue acculturated trained eye. As we have moved between the analogue, through to the early years of the digital and now find ourselves at the gateway to the meso-digital, not everything is clear, nor defined, so we have to look to late analogue practices to next create narratives that reveal some kind of truth of the situation we are in. The trouble we are going to have is that metaphor – and language itself – is a product of the latter end of the stone age and we may find that it's frontal lobe analytic modality is not fit for purpose as we enter what I shall refer to and explain at a later point as 'a velocitised state'. I use this kind of language because it's a development of the common parlance of the cognitive neuroscientific realm which has been so proficient in publicizing itself such that many arts and humanities researchers feel they need engage with this discipline. I shall demonstrate that within this ideology it has been argued that we transcend frontal lobe behaviour rather than laboriously produce semantic ideas through the frontal lobes – and that in fact we should *entrain* with meaning, rather than analyze it, via what will be described as *velocitized behaviour*. Throughout the chapter I shall try to invoke metaphors which create an impression of the experience of velocitisation, which itself is both a sum of and a description of a barely recognized faculty that we've had since coming down from the trees some two million years ago.

So, with regard the flux of factors which came together over time to create the churn from which our digital age evolved, we have to count as important the historically recent and continual developments in science and technology, not the least of which, communication via telegraph, telephone, radio, or television would describe our own ontological state for us. Primarily the ability to externalize material acts at the 'click of a switch', to essentially bring 'light' into the world, came with electricity. But coming forwards 100 or so years, if we are to listen to Marshall McLuhan, then the introduction of the media of electrical mass communication subtly massage the meaning of that communication such that the information transferred says far too much about the medium itself – and little about what is originally being communicated. Now, with the internet, or more specifically 'the rendering into a digital representation', the transformation of everything into *bits* to make it manipulable, actually turns information *into the medium*.

Quantum physicists posit that it is probable that information *is* the true stuff of the universe. Arguably therefore, within this narrative, the foundation of *matter* is actually '*meaning'*.

So as the electrical age developed toward some maturity, when Rayner Banham examined the LA cityscape using the idea of the moving-gaze rather than the static-gaze as a way to *read* LA, in 'Los Angeles: the Architecture of Four Ecologies', what he identified as 'not fit for purpose' was simply that prior modes of 'reading' the city derived from static historical imperatives. These testified to the regard with which societies held themselves through their architectural works, which had stood grandly and proudly as monuments to the taming of the physical environment and these too required us to stand in awe in front of the stone building which dwarfed us. In so doing we would learn the message they contained: that they were paid for by money that had been drawn towards the city and the building itself, by colonial or mercantile imperatives - including the thing that should never have been celebrated: the exporting and monetizing of human traffic. Banham (and McLuhan) realised that that older modality could no longer be used to read the human mythos (in Banham's worldview, exemplified by Los Angeles) and should never be again. For McLuhan the answer lay within the means of expression – it would no longer be possible to relay the message *once the medium was recognized* – that effectively meaning and medium are contemporaneous, interwoven and self-correlating. What was wonderful about this level of interpretation was that it was just that: a linguistically based elucidation of a non-linguistic experience that itself was to constitute the experience of the very early traces of the digital.

The subject of Banham's attention, Los Angeles was and is axiomatic of later sprung-up cities where their functionality of increased speeds of experience dominate their foot-paced living experience. To read this new kind of city, Banham suggested a simple change in the way we look: we must regard the environment within which we exist from a moving viewpoint, so that osmotic modes of alignment of self to the destiny of a society, may not occur from a static position. Eventually, static osmosis would wither as we placed our attention into moving forms – or velocitised forms of viewing. Banham realized that Los Angeles did not have the dominant vertical monumental forms that Madrid or Paris might have, architecture that rendered a person small in its presence, but it did have a horizontality that no prior city could match – but only if you moved fast enough through that environment could you then release the encoded power and impact of that landscape's horizontal meaning.

As you move and try to watch the moving landscape, your eyes saccade, that is, instead of sweeping across vistas, they stagger staccato-like in short bursts trying to fix the moving image into a series of instances. The word 'saccade' comes from the French and translates into English as 'a violent pull'. Your consciousness is pulled and then filtered through a rapid movement of the eye between fixation points that you then experience as a smooth transition. Like a goldfish through water we pass through an invisible medium – yet it is our sensory functions that make this invisibility apparently coherent, built as it is for transportation at a maximum of 23.5 miles per hour – our flat-out running speed (an interesting figure in relation to 24 frames per second). If the medium is the message, then we are both medium and message.

This way of conceptualizing the world is now concerned with our eye/brain/mind/gaze and so runs in parallel with new research in the production, display and consumption of moving images. These expanding parameters (HFR - higher frame rates, HR - higher resolution, and HDR - higher dynamic range) unencumber the production and display of images from the two-dimensional limitations of photochemical film and propel image creation into three and four-dimensional forms which now enable manipulation of space as well as time.

In 1936 Walter Benjamin said:

> The camera introduces us to unconscious optics as does
> psychoanalysis to unconscious impulses [1]

If this was thought to be true in the analogue age, in the digital age we might ask: What do new forms of capture and display reveal about our unconscious state?

As architectural practices develop to encompass new forms of display – for instance where the building itself is a display so that it's 'image-skin' may regularly change – then the city, which is itself a recent development within the human narrative, may in fact have to assume faster-than-foot-pace-conceptualization. Moore's Law applied to the developing process of electronic or digital image capture creates as profound a change as Lumiere's invention of slow-motion to those that first saw it. Increased capture quality and speed, handling and display of data, and the dissipation of bottlenecks in data flow, open new possibilities for how and why images are captured and displayed.

However, there is an underlying conviction in this research that something will be revealed about how these accelerations perturbate or excite the human perceptual system. Traditional forms of exhibition are already accommodating these developments with 4k projector systems, delivery of higher resolution television via terrestrial digital and higher resolution narrowcasting via the internet. Business as usual for the human project: but what might this mean for architectural image making where often it us in movement around a fixed 'display'?

MOVING IMAGE CAPTURE AND DISPLAY

We've now entered an era of electronic capture in preference to photo-chemical capture and one of the paradoxes of Digital Cinematography is that in some senses it has greater similarities to photo-chemical film than digital video or televisual forms.

> The historically determined optical pathway of digital cinematographic
> cameras is 35mm or above, its images are reconstructed from a
> progressively based, lossless data flow, with one full frame of information
> at a time. It holds the image in a latent state until it is rendered (or
> 'developed'), but unlike film, its materialisation is non-destructive of its
> prior material state. However unlike film, its inception as an image
> capture mechanism is no longer its sole intent as a medium. [2]

The last point is perhaps the most important: with the use of two triangulated camera's sensors we can map 3D space in real Time. With the use of four or more imaging units within a white-light interferometer, we can map micro-space at unlimited definitions and so procure its details as data into computer space for deeper manipulation. Mapping space will allow us to create defined regions of our reality with greater and greater resolutions. If we can accurately map 3D space then we can create events with gesticulation or voice and therefore trigger events and other locations could then be mapped so that events could be created *there*.

CURRENT RESEARCH

In collaboration with University of Bristol and BBC Research and Development, my current research strategy now centers on *our* physiological specificity. In November 2012 we completed the first HDR/HFR test shoot (50 frames per second and 200 fps), the results of which were published in a paper at International Broadcasting Convention in September 2013.
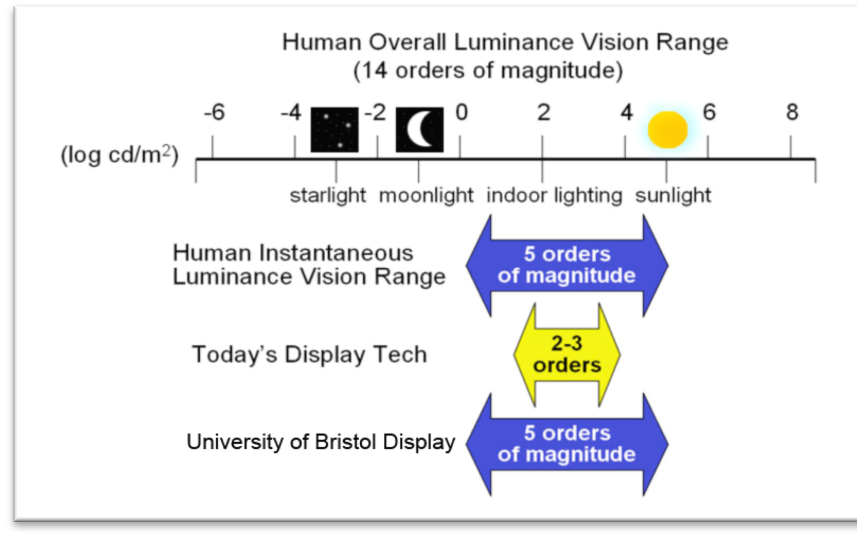

Figure 1: Human Overall Luminance Range (Flaxton)

If you look at this diagram (Figure 1) it shows that the human eye/brain pathway uses 5 of a 14 order of magnitude scale, sliding this instantaneous facility up and down the scale to deal with starlight at one end and desert sun at the other. Most contemporary displays currently show between 2 – 3 orders of this scale, but we now have a prototype which displays 5 orders and coincident with this, the BBC in turn have created a 200 frame per second projection system.

By combining variants of frame rate, resolution and dynamic range, we should be able to effectively produce 'the perfect picture'. By calibrating these different parameters to produce a combination that best resonates with our eye/brain pathway the proposition is that if we can manipulate *all* the factors of the construction of the digital image then conscious immersion may follow. [3]

COGNITIVE NEUROSCIENTIFIC WORLDVIEW

But at this point in time, questions of 'what next on the horizon' do the subject an injustice. Cognitive Neuro-scientists argue that mammals and possibly all animate creatures, have within their minds a precise internal map of their immediate environment; that each creature maneuvers within their world by first imaginatively representing their intentions in that world as a rehearsal for action.

Emeritus Professor Merlin Donald, Queen's University, Ontario, wrote 'Origins of the Modern Mind' [4] in which he argues that being in the world is an *aspect of mind* and that human communication developed through three scaffolded phases, built one upon another:

Because evolution is conservative, the modern mind retains all previous stages within its complex structure. [5]

Donald argues that the *mimetic*, the first stage of development, came at a time when, say, an ape sees a group of other apes in the distance and comes down from her perch in the trees to show her fellow apes what she's experienced.

The Mimetic Domain comprises gesturing, pantomime, dance, visual analogy, and ritual, which evolved early and formed an archaic layer of culture; based mostly on action-metaphor. Mimesis allowed for the spread of tool-making technology and fire-tending, through imitation and ritual. [6]

In telling her tale, she and her watchers physically developed a sympathetic mirror-neuron system so that we primates can empathize with each other's experience. These mimetic tales were told sometimes running flat out at 23.5 miles per hour to stimulate neuron pathways as to how to corner quarry.

Then, as recently as 150,000 years ago Homo Sapiens-Sapiens developed larynxes suitable to accurately render and replicate sounds that became more specific than pantomime in conveying details of the world. In uttering controlled sounds (prosody), our ape changed the physical construction of her own brain and skull. This is Professor Donald's second stage:

Mythic culture is based upon spoken language, and especially on the natural social product of language: Storytelling. Mythic Culture, retains a subsidiary mimetic dimension, manifested in ritual costume and gesture, which is then epitomized in various forms of art. [7]

The third stage, the Theoretic, began 10,000 years ago when the hunter/gatherer settled down to farm. The mythic period had become so sophisticated that descriptions of the world were taken up by specialized members of the tribe, (i.e. Shamans), who were the beginnings of the bureaucracy of a priestly class.

It started very slowly with the emergence of sophisticated writing technologies and scientific instruments, and then, after a long gestation period, became dominant in Western Society after the enlightenment. [8]

Theoretic Culture is symbol based, logical, bureaucratic, and heavily dependent on external memory devices, such as writing, codices, mathematical notations, books - and computers. Some neuroscientists call these sites Exograms and recognize them as having a similar importance to their sites of internal memory, Engrams. They then argue that as theoretic culture developed, internal memory becomes less important as we externalize the persona of our inner-selves and remake the world in our own image. Donald continues by saying that theoretic culture and language is still a minority culture that is:

disproportionately influential because of its place in the *distributed* cognitive systems that determine such things as our collective representation of the past and our tribal and class identities. [9]

The argument continues that because we have digested the lessons of the theoretic through the Victorian cataloguing and indexing period, we can now assimilate the practice of innovation itself, as it rewires brain pathways, a process which then leads us to experience a sense of comfortableness with very high speeds of change. A hint of Gnosticism now begins to creep into the cognitive neuro-scientific argument: When the fundamentally conservative tendencies of evolution, *metacognitively* speaking, can be seen as inhibiting the progress of the species, then the paradigm change comes.

Velocitisation, my appropriated term for the 4th stage of change is a means by which we reach back into the picture that mammals have created in their heads *and change it*. In this stage we are outwardly manifesting the most important Exogram of all: *Data*. In this process one thing is clear at least in terms of the Neuroscientific narrative, this grand human project to become at one with reality reconnects us with our environment in a surprising way. Here Banham's proposition of developing our response to the city at speed, via the process of the saccade, and interpreted in cognitive neuroscientific language:

> This process has undoubtedly accelerated the long-standing symbiosis of the brain with the external symbolic world it has created, and put pressure on the young to assimilate more and more technologies. There is no longer any doubt that this symbiosis of brain with communications technology has a massive impact on cortical epigenesis and, with the rise of mass literacy, that this effect is present in a very large percentage of the human population. The driver of this increasingly rapid rate of change, human culture, can be regarded as a gigantic search engine that seeks out and selects the kinds of brains and minds it needs at a given historical moment. [10]

There are echoes of both Darwinist and Gnostic sentiments in the above. The Darwinist can be seen in the use of the concept of natural 'search-engine' selection, yet this is balanced by the Gnostic belief that reality can be changed through faith – that mountains can and will be moved by the interior spirit of human sentience. The corollary statement in terms of 'new digital theory' would be that with the digital, the transformation of everything into *bits* to make it manipulable, actually turns information into the medium *as we apprehend that activity*. Whether in the act of creation of digital artefacts, writing or receiving emails, watching digital displays, playing with social media, or designing buildings or environments via computers, we then become the substance of the process itself:

> Whether viewed in terms of the functional Architecture of the brain, or the larger cognitive capacities of the human species, the trend toward externalizing memory and restructuring the larger social-cognitive system has generated a radical change in the intellectual powers collectively at the disposal of humankind. [11]

The original proposition that all sentient creatures create a version of reality in their own mind is now changed by the externalization of our world picture so that both now become commensurate with eachother.

WAVES OF TECHNOLOGY

To go one stage further in considering what the future might hold with regard this narrative and its relationship to the idea of the city as a nexus for accelerated human development I'd like to propose to

the reader that the advent of a technology – whether the invention of a wheel or its extension the locomotive, or a silicon chip, or a suspension bridge, or the idea that a hominid should stand upright, can be thought of as arising within an overall system. Also: not only is this behaviour part of being human, but that it is what any sentient creature that has transcended its form can and will do – which is to manipulate its environment. In so doing that creature not only changes its form but its technological imperatives - and then a behaviour that once begun of biological imperatives, was functionally developed and then driven by external feedback such that these will imperatively reflect back into its physical development. This is epigenetic development (that is, arising from other than gene expression). So the technology that the creature develops comes as a response to the manipulation of the environment that in turn manipulates the manipulator at higher and higher levels of adaptation.

But thinking this through farther, not only does technology come in waves, but that these waves – after many millennia - are so ubiquitous, consistent and resonant, that deeper and deeper wave function develops so that as with a musical composition - be it humanly orchestrated, or acknowledged as occurring (as with John Cages 4 minutes 33 seconds) harmonics develop in both the production of technological waves and also in the act of paying attention to the phenomenon.

Going back to my earlier proposition that "I shall try to invoke metaphors which create an impression of the experience of velocitisation" on the radio recently, a planetary scientist spoke about flying an instrument through a water plume on Europa - the far-flung moon of Jupiter. This was, he said, to take samples of 'sufficient resolution and dynamic range'. I caught my breath at hearing this phrase because this terminology is familiar to me but its use was unfamiliar. I use this terminology to describe the expanding parameters of the moving image as resolution, dynamic range and frame rate. Here however with a planetary scientists use, the idea of taking measurements of 'sufficient resolution and dynamic range' is itself a game changer. This usage means that the metaphoric language of the digital has seeped through into scientific parlance.

The issue I'm raising here is whether or not words - the semantic paradigm - can usefully relay what we're now experiencing as happening on a sensory and velocitised level. Each innovative phase, be it an optical reality invoked in the middle ages where glass technology developed and advanced our view of the world and the stars, or a mechanistic reality relating to Newton's clockwork universe in the Principia onwards, until McLuhan's understanding in the late analogue, that somehow the medium itself is the thing that is being said, that somehow, as Shakespeare knew four hundred years before, that we are the stuff as dreams are made of – we too are the message, and the massage, and the triage in our current 'digital' age, in an age which recognizes the epigenetic redirection of neural pathways to shape both our reality and our physiology.

RESOLUTION AND DYNAMIC RANGE

It is my contention that our inventiveness and material innovations, though as constant as the need to survive, also come in peaks and troughs – our technological imperative reveals itself in waves of innovation. We are waves of innovation and we are particles of innovation – I'm simply invoking the wave/particle duality to bring up the possibility that we together are also involved in the behaviour we observe outside of ourselves. It would seem that the two imperatives compete, to survive and also to innovate or dream, and are so are often in conflict because the need to survive becomes the need to survive well. We can obviously survive well, and survive well enough for many so that we now *consume*

innovation. Consumption of innovation is now a part of the development of the self such that who I am and who you are is integrally related to the perceived use of technology by one's own avatar – ones representation not only to others, but to oneself.

If you follow Larry Siedentop in his construction of the development of the individual in 'Inventing the Individual' [12], the argument leads you back to a definition of the pre-city state individual who tended the fire and paid homage to their ancestors, forward through the nature of the individual during the period of city state allegiances, where the priestly role encompassed many families in combined loyalty to eachother (the dynastic priest) – forward to the development of monasteries in near modern times, through kingdoms and wars and nation state configurations – through to the enlightenment and now modernist and post-modernist formulations of the Western liberal self. As you come to this moment, this history says to each of us: If the rights of the individual are in contention with the rights of the whole, then that self that seems so solid, can be seen to be transient and its definition constantly changing. It also says, architecture and it's agglomeration – the city – grew and changed to reflect our internal and external narratives and that naturally, as soon a s a city grew larger that a persons ability to run flat out and collapse in exhaustion, the city itself had to be reimagined. Benjamin and Calvi, Mieville and Dyer, Borges and Asimov have done their bit to encourage us to imagine and reimagine and imagine once again – each time shedding the skins of the prior imaginings – now we have to maintain this behaviour in a state of trust that what we imagine shall become real. Real in the same sense as Los Angeles is real.

As I explained earlier, in my own study area of capture and display of moving images, how we capture and how we display, and how we see what that process is, are so intimately connected such that the resonation back and forth in the lab where we construct this new technology affects what we do and who we are at the same time. We invent something then look in awe at eachother, at the fact that as we are inventing the form we start to see something we'd never seen before. We are either *learning* to see something we'd not seen before or we are changing both the technology and ourselves at the same time so that we are actually seeing differently.

As this is happening our conviction is growing that we are about to experience a step-change in the peak of technological inventiveness. In every research lab I've been into for the last 20 years I've witnessed activity that tells me that the human project is furiously working on the area of synthesizing the behaviour of the human senses to materialise those senses such that we can then manipulate our own reality in a variety of ways - and of course those senses combined with the common sense, the mind – all of those contribute to the idea of a sensorium experiencing a 'reality'.

THE SENSORIUM

I use the word velocitisation to convey that the developing rapidity of technological change requires a higher-level epigenetically encoded *agility* than the frontal lobe analysis can provide to cope with the increased waves of technological change.

You're on the freeway and comfortable with 85 miles per hour. You come to the off ramp and you need change down to 30 miles per hour. That takes adjustment – just as much as if you enter the off-ramp from the urban road system and get into a high speed flow of traffic. This behaviour is frontal lobe based which relies on input of data supplied by the senses in the normal neuron flow of information

developed over 2 million years to get from branch swinging, through running at 23 miles per hour then that system having to adapt to the speed of a modern automobile. Test pilots have learned to utilize 'calmness' at high velocities to increase their adaptation to rapidity. We, the public, now have to learn the same thing.

You're coming into a bend, some people brake. The advanced driver increases speed and therefore grip to accelerate though the curve. Same with the pilot – hurtle down vertically, hold your nerve, then accelerate to the ground to curve out and rise. With the driver at small multiples of running speed, braking enables frontal lobes *to feel* in control. With the increasing speeds of the data freeway, we need agile and adaptive methods to first engage with the onramp before sensing the rapidity of response required to engage - and then repeated behaviour will epigenetically modify your physicality to give you a post-frontal lobe comprehension of the world. No need to engage with 'try-this-and-if-it-fails-repeat-with-minor-changes' behaviour.

So what you might muse upon now – within the theoretic age, with a theoretic mind, is that we are within the beginnings of a new 'Prosody'. It's a step change on from the linguistic which still uses the linguistic base we are familiar with in much the same way that prosody used the mimetic base and the mythic overlay to sing-song it's way to staccato word units. Now we may utilize in that same scaffolded way the sing-song behaviours of velocitisation where we transcend the linguistic oriented frontal lobes of the 'theoretic' – humming to eachother our prosodic agreement to begin to formulate a 'language' that can articulate and convey the new staccato comprehension required by post-velocitisation.

CONCLUSION

Merlin Donald has created the groundwork for the proposition of velocitised ideas within the theoretic domain – so the *reality* of what Donald described and its representation – these words in text and how life is lived within the velocitised period – will be two different things.

The city is both a set of exograms and a cognitive distributive nexus, developed within the theoretic period and so much of its arrival and design has been evolved through a theoretic understanding detailed through text and drawing and finally replicated in brick, mortar, steel and glass. The hominid that ran flat out was probably as immersed in the attentive detail of the physicality of running as we are at velocitised speeds through traffic – and for that matter data traffic - and that physical effort has now migrated to the seated form, with minimum physicality but just as much attentive energy, to the velocitised driver. When the passive self-driving car arrives, then things will once more change – we are after all within a scaffolded evolution.

Banham's reading of Los Angeles was of course theoretic, but importantly he and especially McLuhan were progenitors of a velocitised reading of the environment, where accelerating ideas within Euclidian space activate an ability to read the world as if it itself were formulated from data – because if we are to believe todays neuroscientists we are at the end of the human project to export memory into exograms as we and the world are becoming one. But being at the end of something may mean we are at the beginning of another.

Recently simple material forms like algae and lichen have been harnessed to produce electricity – and importantly *computation*. So it is small stretch of the imagination to see the world and its biological

materials as giving us energy and exogramatic functionality to do what we do now in a destructive manner, some time later in a self-sustaining and non-destructive behavior. The information economy is a wrong-headed description of how data is flowing – data in itself strains to be free. It is only late capitalist behaviour that resists not only the complete automation of work to free homo sapiens for much more 'valuable' behaviour – but also its own eventual and complete decline. The system of money is frontally lobe based. The recent invention of virtual money is simply a stepping stone over into a world without an 'economy', which is of course where we began. It was a useful tool but not really relevant any more as it promotes distortions such as extreme poverty and the idea of the criminal that is super rich – but that somehow that is ok. Clearly we will not tolerate this prior narrative to persist when we have such an attractive outcome in front of us. It is only a step further to follow McLuhan into seeing the world as the medium, the data encoder itself as we interweave with data, the material and consciousness, in a self-fulfilling interaction.

I argued earlier that for McLuhan it would no longer be possible to relay that message *once the medium was recognized* – that effectively meaning and medium are contemporaneous and interwoven. But *the digital* goes beyond theoretic insights and any attempt at remediation of it via theoretical constructs which are inherently resisted because *language* does not account for the *affects* of velocitisation. What we can add in words, at the beginning of a new paradigm, with a form of *pre-mediation,* is that the idea of measurement is a hangover from a previous time – it is a conceptual and also a theoretical mistake to believe that we need to catalogue and index existence to *know* it. We need to get smarter and accept that conceptualizing reality via representations of reality are not reality itself – and in fact we do have a function that enables us to entrain with what is around us - we simply need to become acclimatized to the subtle velocitised sense that we already are in possession of. To convert that into a metaphor that should work with McLuhan in mind, we need to be able to sense and understand the water we are swimming in and this can only be done by understanding what we actually are – and we need to start work on understanding our current ontology, now.

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