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Living without pictorial geometry

Fixation and saccadic eye movements take place within a field structure generated and controlled by the biological system. Both 'generation' and 'control' would appear to be dependent upon self-organising criticality (SOC) articulating the interface between how the data presents and the path along which the biological system has evolved in order to exploit this and so establish its ecological niche. These factors build to facilitate core capabilities determining the human umwelt.

Our perceptual processing system doesn't map the environment through a series of pictures to provision spatial awareness or orientation. The only factors providing a coherent thread to visual experience are the processes governing fixation and saccadic eye movement made within a perceptually generated field structure. We see the world in relation to ourselves. To my mind, these processes are ultimately expressions of the same system, products of SOC revealing that dynamical systems run both the universe and hence perceptual awareness. It is through these processes that we develop our ability to navigate the external world. This identifies that perceptual orientation is not commensurate with the type of modelling that drives our current virtual reality and image making technologies.

It's impossible to over emphasise the significance of the self-generating field in the formation of perceptual awareness and hence experiential reality. It must hold the key to the issues of implicit spatial awareness but also to perceptual stability. It is in terms of the phenomenal that we contextualise our environment and its *within* this field structure that explicit processes set-about the contemplation of objective form, attend to tasks, modulate and alternate information to exploit binocular disparity. The field's structure and mechanisms underpin multi-sense integration. Without it we wouldn't function.

Awareness bears the characteristics of a dynamical system so we would understand this perceptually generated field in terms of SOC, a state 'booted' and awaiting the arrival of data from the environment to realise. The data appearing in terms of fleeting comparative values sifted from the incoming sensory systems. The perceptual system becoming capable of realising important aspects of the environment by exploiting the physics involved in the delivery of the relevant data: by exploiting our relationship with light. The study of vision *as vision* reveals that this relationship is not comprehensively reflected in our current technologies or the records they produce. Activity at retina would appear to exploit aspects of mesoscopic physics that we have still to fully comprehend.

Manifesting implicit spatial values embedded within the light array within phenomenal field would be reliant on a constant flow of input and movement with respect to the environment. If movement were to cease, the spatial values currently presenting could not be 'captured', or 'frozen in time' as a freeze-frame and continue to be meaningful to the organism. If the dynamic system ceases to



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be dynamic (flow and movement) the values couldn't manifest and holistic understanding would be lost. This particular form of 'spatial' meaning would fail to transpose. An emerging value has meaning only in relation to a dynamic change of state both locally and in terms of the whole population. These 'values' may not belong to our number system in that they may not be fully discrete?

In experiential terms, when the dynamic of movement ceases, contextual vision, (peripheral vision), doesn't go black. The saliency of the phenomenon is just depleted, deprived of the implicit spatial texture provisioning implicit proximity cues. So the primary loss will be in terms of contextual (peripheral) spatial acuity, this being one of the systems related to orientation. An alternative methodology or strategy to movement to reinstate implicit spatial values in a static scene would be to reboot the system. Blinking is known to reboot the visual system so the mechanism will also fleetingly rekindle the spatial values without the requirement for movement.

An external environmental factor leading to system failure in the production of implicit spatial awareness is likely to be low or scotopic luminance levels. In these scenarios the spatial texture will become too sparse to propagate effectively. This condition is likely to coincide with the transition in rod function through the mesoscopic phase (between photopic and scotopic).¹ While these 'values' will not be related to the measurement of light intensity, high or photopic environmental luminance levels will be required to distil or segment enough data to support the propagation of implicit spatial values.

Our current technology is entirely devoid of the field structure and the spatial values so it presents stimuli for the visual system that will cause it to operate atypically. Current visual media looks flat, un-real yet counter intuitively it's referred to as 'realism'. So-called 'realism' is characterised by paintings of everyday life executed in a photographic like render. This photorealism is then described as 'naturalistic'! Reality; that, which we actually experience, is neatly 'covered off'! We are in denial of implicit spatial awareness and the data structures involved.

Implicit spatial awareness would appear to function on the assessment of local variations across the entirety of phenomenal field. This implies processes operating at a high operational speed, which is not usually associated with SOC. This constraint with respect to the lag time to perception might be overcome by the biological system having evolved the ability to generate a self-supporting system in the form of its perceptual structure to interface with sensory driven neural avalanches? i.e evolution has developed a solution to fast track the process?

¹ Vision-Space: Retinal Receptor Functions <http://youtu.be/XzA7zirZK7s>
Vision-Space: Retinal Receptor Functions 2 <http://youtu.be/-vDAn2a1Se8>



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For evidence of this type of activity manifesting we would need to consider that mesoscopic physics is taking place at the retina seeding the two visual pathways with distinct data-potentials. One based on intensity and the other coherence or phase. We would also need to acknowledge the mesoscopic interface between the brain dynamics generating perceptual structure (macro) and the dynamic streaming of noisy data potentials from our sense organs (micro) toward it.²

The generated field structure provisions perceptual capabilities that our conceptual theories currently prohibit, namely implicit spatial awareness. The particular characteristics within the changing flow patterns or textures across the entire spatial field (x,y & z) implicitly reveal who is doing the moving, the observer's eyes, head, body with respect to the environment or, an object (not necessarily perceived as such) moving through contextual field, i.e. movement with respect to the observer. If all the required factors were in play perceived movement in the implicit system would not be not relative.³ Implicit spatial awareness presents a form of body-centric or embodied awareness. Awareness at this level being holistic, accomplished through comparative values filtering through populations of neurons.

"If I think everything is lost"
- Cezanne:

So these implicit spatial values are not related to the detection and subsequent determination of individualised or decontextualized specifics *about* the environment. They are subconscious or prior-to the development of conscious awareness. They are *of* the environment.

It follows that, a still life set-up and the resulting painting executed by an artist referencing the disorder field is actually atypical. If the observer and still life setup were actually still, then the field would not be fed by the relevant implicit spatial information to form the values being depicted. The implicit spatial system would fall-over if both the artist and the subject were perfectly still. Movement on behalf of the observer being required even if it's subsequently or conveniently airbrushed in the language used to describe the activity. The same is obviously true for experimental setups or stimuli used to test/investigate vision. If the testing environment is still or compiled from 'stills' we can expect an atypical perceptual response leaning heavily on ventral processing and so by implication, atypical or one-sided neural processing with the dorsal stream making a diminished response. Straight away we would have to reconsider conclusions drawn from experimentation using fMRI brain scans with subjects exposed to media derived from current technology, even if moving pictures as the media doesn't contain the relevant implicit data.

² Vision-Space: Awareness is developed and governed by Dynamical Systems

<http://youtu.be/xCFo7S-y0UE>

Vision-Space: Awareness is a dance mediated and augmented by 'mind' within a multidimensional space <https://youtu.be/-DCx5kLS2MQ>

³ Vision-Space: The painter, reality and the real – Part 2 <https://youtu.be/hbFtIIHQ9Y>

So the realisation is that the still life painting is not an attempt to 'freeze frame' reality, its not related to the 'taking of a picture' using an instrument such as the camera. It records an engagement made with the real by a biological system over time.

Pictures and Images

By direct mark making, artists open up certain aspects of visual perception. In some respects, in intuitive record from life study, there are no base assumptions. If you make a mark, then another, then another you are not taking a picture, you are recording facets of visual perception. Recording 'how' as well as 'what' we see.....



Pictures and Images

..... One mark may correspond to one projection of conscious vision then previously suppressed information may be responsible for the next. If you learn to organise these projections, understand their characteristics, how the mind tends to use them and the intent that drives, them, you are working 'inside visual perception.'



Fig 2. Seated man 1949 Giacometti, Oil on canvas, Tate Gallery, London

Fig 1. Self portrait, John Jupe - Seated Man, 1949 Giacometti, Tate Gallery

The requirement for movement in various forms in visual perception is probably why the eyes keep active making imperceptible mini-saccades even when we consider that we are fixated on one spot in a real setting. By these reflex movements the visual system will be trying to maintain flow and hence implicit contextual spatial awareness. Without implicit spatial awareness and proximity cues we would be prone in our ecological niche!

We rely on proximity cues for orientation and to keep us alert and so safe. It follows that when immersed in Virtual Reality (VR) setups that lack any reference to implicit data, the implicit system will be largely at rest – there will be little if anything for it to bite on. While this system may engage or monitor the

activity being presented, it will not find anything of significance to report. It will not sense 'encroachment' or be able to compute 'proximity'. The embodied self becomes compromised. We must then anticipate implications for repeated long periods of immersion in VR systems, such as neural redundancy and the formation of atypical perceptual structures. Deprivation could lead to permanent damage and mental impairment as the brain starts to consider the implicit system redundant or obsolete and the pathways breakdown.

Forming Fixation:

Contextual implicit vision also supplies the spatial data around which to coordinate ballistic eye movement prior-to a change in fixation. The lens changes shape to satisfy the focal length requirement for the next fixation in advance of the associated eye movement. How does it get the data to perform this preparatory work? Early stage spatial awareness with respect to proximity is likely to develop at the superior colliculus and thalamic regions of the brain indicating that the implicit field structure also actually plays a logistical function with respect to explicit visual interrogation. To an extent the dorsal and ventral systems support one another's activities but it's the dorsal stream that forms the foundations. It is down to the function of 'mind' to mediate and control proceedings from both takes-on-the real.

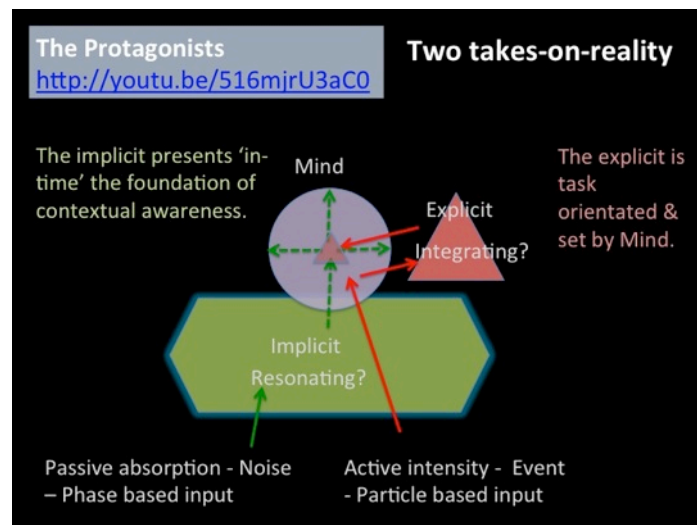


Fig 2. Vision-Space: The protagonists <http://youtu.be/516mjrU3aC0>

Fixate (verb):

1. focus on something
2. obsess somebody
3. form a fixation
4. become or make fixed

What's 'brought together and made fixed,' are the two data potentials, the two takes-on-the real. Fixation is required as part of the generation of the reality we engender. Fixation requires activity on behalf of sentient being on multiple levels and as such sensory fixation is a primary indicator of subjective *presence* and this is a requirement *for* and not *of*, perceptual processing.

Saccadic eye movements have been studied in some depth. The scientific study area is still something that I remain only partially familiar and there's a reason for that. It's very easy to be lead by what one reads! It's important to remain open-minded (without preconception) to explore what can be determined on an experiential basis. How do these complex processes complete effortlessly amid apparent visual stability at speed on a moment-to-moment basis?



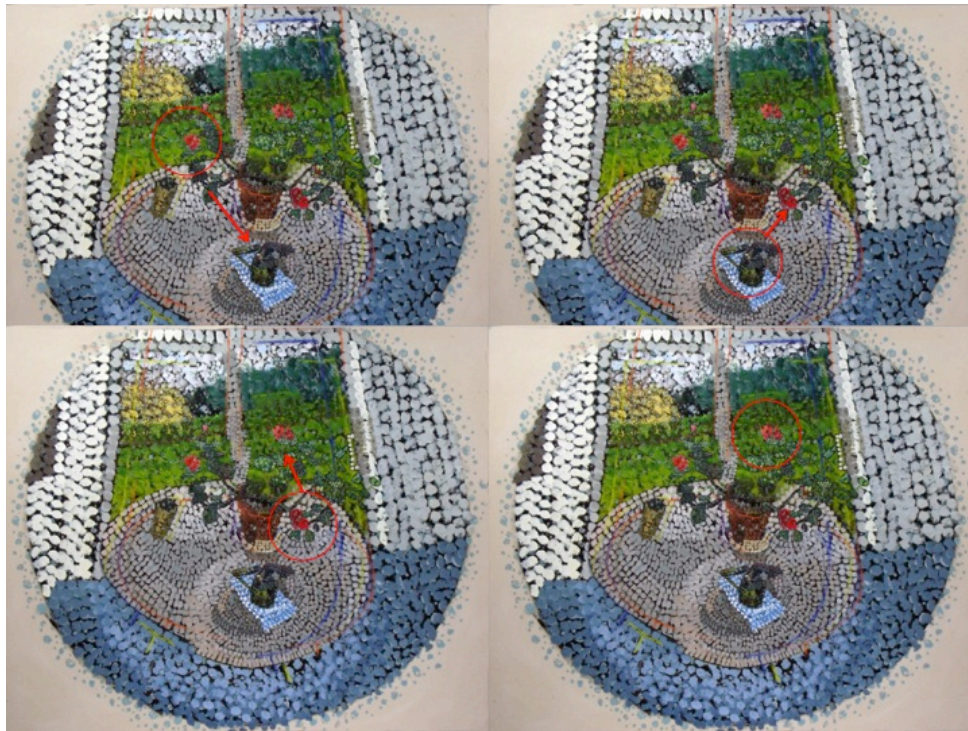


Fig 3. Four fixations and three saccades, John Jupe 2015

The hard problem

But first I feel the need to distinguish between the task outlined above and the assumptions upon which much traditional vision science still operates. It too considers the uniformity, stability and bit rate of the phenomenon fascinating and unresolved but also largely unapproachable. The unapproachability is linked to the so-called hard problem, how sensations acquire characteristics, and I would maintain that this 'impasse' derives from the adoption of an inappropriate ontology, at least with respect to implicit processing and its take-on-the real. 'The hard problem' results from an issue in approach adopted by science and philosophy, which is not inherent in the situation under investigation. It's not hard to paint; it's hard to understand what's going on while engaged! What occurs is actually almost effortless. I think this is linked to the sensation of driving a car on a long familiar journey – on arrival we have next to no recollection of all that occurred. We will have thought *about* a good deal else and can remember that! The implicit system can operate independently, take control of what's required to keep us operationally safe reporting to conscious awareness when required or issues requiring that form of attention arise. Is this evidence of the 'old brain' in action *and* in bodily control?

There isn't a 'picture' on the retina to be segmented, processed and projected so the neural processes are actually engaged in activities and process that don't support the formation of what's envisaged by the preconception. Neither is there a piece of paper or screen in the brain to which all these changes in composition occur through time. There's just the perceiver's perceptual structure, manifested in the form of a field structure within which values fleetingly appear. The



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apparent 'inattention' to change in terms of composition and even objective content about the world outside is not a matter of so-called change blindness. We don't perceive in terms of changes to pictorial content!

Psychophysical experimentation must be alert to the limitations of current 2D media with respect to its ability to elicit typical responses in subjects. Indeed experimentation often clearly establishes this with the results being misinterpreted?

<https://www.youtube.com/watch?v=vJG698U2Mvo>

The system is primarily designed to register change but changes to the values that form the basis of implicit spatial awareness not the recognition of explicit content. If we didn't perform these tasks the chances are that we would not be around long enough to recognise forms and conceptualise *about* the world. We would have been taken by surprise and eaten! Implicit spatial awareness and its processing via self-organising criticality is what keeps our cognitive systems buoyant and operational. These cognitive states of awareness occur in bifurcations from the implicit state of awareness.

These particular perceptual processes and functions aren't engaged in the 'build' processes currently envisaged as forming the basis of visual awareness. The sentient being waits upon what is being diagnosed from the sense organs but realises these in terms of itself embedded within the environment not as a recording device. Of course we can use our perceptual system to coordinate with respect to the environment but it doesn't model it or map it in order to comprehend what's going on. To the implicit system there isn't a hard problem as posed, to solve. The hard problem arises due to the concept of and use of the 3rd party ontology adopted by science to consider and probe situations. The disciplines set up a false set of preconditions or hurdles that culminate in the requirement to pose the hard problem. The take-on-the real that does perhaps conform to a 3rd party ontology is that undertaken explicitly through the build processes associated with the ventral stream and central vision. Despite plenty of inter-reliance, there's ultimately little in the way of temporal hard wiring between the two takes-on-the real, they develop as independent functions requiring 'mind' to juggle and juxtapose selecting the best data to support its intent in the world.

The prevailing 3rd party ontology ensures that we are currently looking to only establish what receptors and neuronal processes are thought to be 'detecting' and 'building towards', where the primary function of many may be to passive 'transmit' a data potential towards a resident self-organised system to unfold? Chaos isn't dealt with at the retina – it penetrates and permeates. The implicit system has a voice of its own but its contribution is usually governed by 'mind' unless action is required immediately where upon it is capable of making an 'executive' decision that our conscious self describes as a reflex action, i.e, it wasn't consulted.

The associated implicit reflex processing up to the point where mind would become involved being closer to 'filtering or sifting' than to the notion of



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‘segmentation and detection’. So in our new implicit processing paradigm, an incoming noisy data potential is subconsciously and passively filtered to establish when called upon, spatial values that then populate the pre-existing perceptual structure without consideration. In this instance there isn’t a ‘from’ to transpose ‘to’. Sensations don’t acquire characteristics. Characteristics (belonging to the sentient being) become sensitised. Perceptual structure being an extension of the dynamical processes required of us by light impacting on neural tissue over billions of years throughout our evolution – we are born with the facility. It is as an embryo that spontaneous firing in the form of retinal waves can be observed firing up this criticality well before any environmental light impacts. We are prepared, primed and waiting upon as well as waiting for.

“Being-in-the-world has always expressed itself, and as Being alongside entities encountered within-the-world, it constantly expresses itself in addressing itself to the very object of its concern and discussing it. The concern of circumspective common sense is grounded in temporality—indeed in the mode of a making-present which retains and awaits.”

— Martin Heidegger, Being and Time

The notional 3rd party ontology asserts itself as a consequence of us ‘subjectively feeling’ that we exist in order to observe and manipulate the world. It’s a secondary and considered position, associated with the contemplation of form emerging from and within the implicit.

“Cogito ergo sum”

- Descartes, The Discourse on Method & Meditations on First Philosophy

The perceptual system was set up to affect just that sensation of ‘I am’ and it works! We are even confident enough of the sensation to incorrectly impart or project this ‘feeling’ upon our instrumentation. We created it after all so its function must be analogous to perception and record reality? The 3rd party ontology is however, thankfully ultimately illusory. The assumption is a by-product of a well functioning perceptual system, a hybrid artefact to be associated with the complexity involved in the dynamics of neural self-organisation. We believe our own hype, if you like! The mental dynamics associated with conscious awareness are not stand-alone, they are an elaborate response to the onset of light and actually work against the realisation that we are embedded in the universe. Notional 3rd party observation is the achievement of subjective awareness, however its deployment and the subsequent trajectory ultimately return us to the realisation that it’s all founded upon supposition. There isn’t a ‘level of consciousness’ there is the illusion of it. We need to address the innate implicit subjectivity of reality and not hide away or detach ourselves from it. You may think that I labour these points but the truth is I need to do so in order to keep myself alert to the conceit and the consequences.

Right and left Hemisphere characterisations

Left hemisphere: dependent on denotative language and abstraction, yields clarity and power to manipulate things that are known, fixed, static, isolated, decontextualised, explicit, disembodied, general in nature, but ultimately lifeless.

The right hemisphere: yields a world of individual, changing, evolving, interconnected, implicit, incarnate, living beings within the context of the lived world, but in the nature of things never fully graspable, always imperfectly known.

Iain McGilchrist (Master and his Emissary)

Fig 4. The Master and His Emissary, Iain McGilchrist

The prevailing 3rd party approach ensures that artificial stimuli currently being presented to a subject's visual system are either devoid of pre-formed implicit spatial values to be read by the subject or, devoid of the data potential required to engage with the neural processes we have evolved to propagate them. VS technology currently provides stimuli with the former (preformed implicit values) that at least register the field structure for us to read (explicitly), examine and respond to. Looking at a VS painting or VS media can only be setting up a vibrating resonance with late stage visual processing surpassing the level of engagement offered by a photographic record. However, VS media will not be firing up the early stage implicit processing system to generate experiential reality, the job has been done for us in the stimuli to acknowledge. However, VS stimuli play intelligently and knowingly with the later stage visual system in ways that output from our current instrumentation cannot. This means that a subject's response to non-Vision-Space stimuli will be atypical even in the later stages of the visual process. We have to ask what will the results and statistics gathered from hundreds of years of experimentation using pictorial media actually mean? This is not a trivial point. There is no such thing as virtual reality. We can aim to simulate visual awareness but this is entirely distinct from forming perceptual reality that requires the full complexities of the environment into which we are embedded.

I am not saying that what transpires by adopting the 3rd party ontology can't be useful in terms of technology, results and dependent theory or relevant in some way to the formation of experiential reality, far from it. It's just that independently, without the contribution from the implicit, it has an inbuilt ceiling that we are now pressing hard upon. We need to re-evaluate at a fundamental level in order to move on. Indeed, we can't move on substantively without doing so.

"Everywhere we remain unfree and chained to technology, whether we passionately affirm or deny it. But we are delivered over to it in the worst possible way when we regard it as something

neutral; for this conception of it, to which today we particularly pay homage, makes us utterly blind to the essence of technology.”

— Martin Heidegger

Making fixations and saccades: Vision-Space



Fig 5. Candelabra, John Jupe

I think one of the primary preoccupations of the arts is to get beneath the life lived through concepts made *about* the world to the processes that effortlessly contextualises the world for us and us within it. These processes are *of* the world. What I hope Vision-Space will encourage is to open the door to science to follow and make an invaluable contribution to proceedings taking place in the basement! It is not enough to use a Van Gogh to illustrate the front cover of a vision science book but fail to mention it between the covers. We all understand that the painting is not decoration. The Turner, The Van Gogh, The Cezanne, the Degas, The Bonnard, The Picasso, The Bacon don't contribute or impact to mainstream vision science and that should be intriguing if not alarming to those engaged in the disciplines involved because this amounts to more-than an oversight, doesn't it? There is a reason for the 'no comment', a reason why it's all out of reach. The visual art doesn't reinforce the vision science. What is much of vision science actually studying?

Without funds to pursue these issues through the development of the Vision-Space software architecture, painting at least allows me the opportunity to continue to confront some of the related issues. Saccadic eye movement for example can be explored at the experiential level but the results in terms of paintings are going to be something of a mess! So much adjustment occurs within the phenomenon from one moment to the next even when studying a still life that I can't hope to render it all faithfully within a single static image. For many scientists, I guess this painting is going to be dismissed as something of a 'dog's dinner' with compromise and unresolvable clashes being order of the day. This painting isn't going to 'work' in that respect! But that's actually the point and this situation need not leave us with a negative. It will perhaps serve to illustrate just how compromised we are by our current stimuli developed from the prevailing 3rd party ontology and its instrumentation? We need perceptually structured technology producing Vision-Space stimuli in order to explore the perceptual system in this fashion. We need to understand the process, data-sets

and structures involved to understand what's actually involved in an act of observation.

To an artist this sort of examination of the phenomenon where we expose ourselves to the reality of phenomenological experience first-hand, is routine. The outcomes in the form of artwork also generating an interface with viewers as they engage with the complexities and evaluate the degree to which the artist's insights resonate with their subjective awareness. There is some magic left in this exercise if you care to take the time. Generating paintings and exhibiting them this is a form of unstructured psychophysics of course. The trick is to extract something meaningful to the proof environment and so make the connection between disciplines. I have been told by leading vision scientists whom I greatly respect, that I am wasting my time in this endeavour and I probably am...but what else is there to do given the implications?

1. Having explored perceptual condensation across phenomenal field⁴ we can understand that any change in fixation is going to be associated with updates to the degree of condensation attributable to all objects appearing within it. The same is true for the disorder values.⁵ Each fixation would usher in up-dates in terms of implicit values across phenomenal field together with the degree of condensation appreciable to objects forming the scene, so I will select just a few salient points in the real setting to act as fixations. Overlay and unresolvable juxtaposition need to be articulated and not artificially resolved to satisfy notional uniformity. I will revisit each fixation area to draw over the under painting, marking these adjustments in contextual vision using different colours. So this colouration will obviously not denote perceived colour relating to the environmental set-up. In this respect I guess that painting will become to some extent, a diagram.



Fig 6. Coloured overlay lines

⁴ Vision-Space: Land and seascape 2, St Ives, Cornwall <http://youtu.be/AquQiqjyt7k>
 Vision-Space: Charting condensation across phenomenal field <http://youtu.be/QgnJ3R3pdoA>
⁵ Vision-Space: Land and seascape, Camusterrach, West coast of Scotland
<http://youtu.be/zr38-ibFwcU>

2. As each fixation establishes a new locus for the field so all the values in the field will adjust. Around each fixation I have made local spatial references. These show up in the rendering of the table-top for example. The 'collisions' between the mismatched spatial renderings are rather nice I think? Reminds me of the patterning appearing in Paris' cobbled streets, which I happen to like!



Fig 7. Cobbled Streets in Paris

3. You will also encounter mismatches relating to aperture adaptations as the eye adapts to different lighting levels in each of the fixation positions but that's simple to account for in terms of fundamental optics. In general terms the values beyond the range of each of the designated fixation areas belong to the 1st fixation.



Fig 8. Changes in aperture

4. I am also choosing not to register the binocular stereo alternation zones situated outside central vision. This is just to remove one layer of complexity in the hope that doing so will add to the clarity of the points under specific investigation.

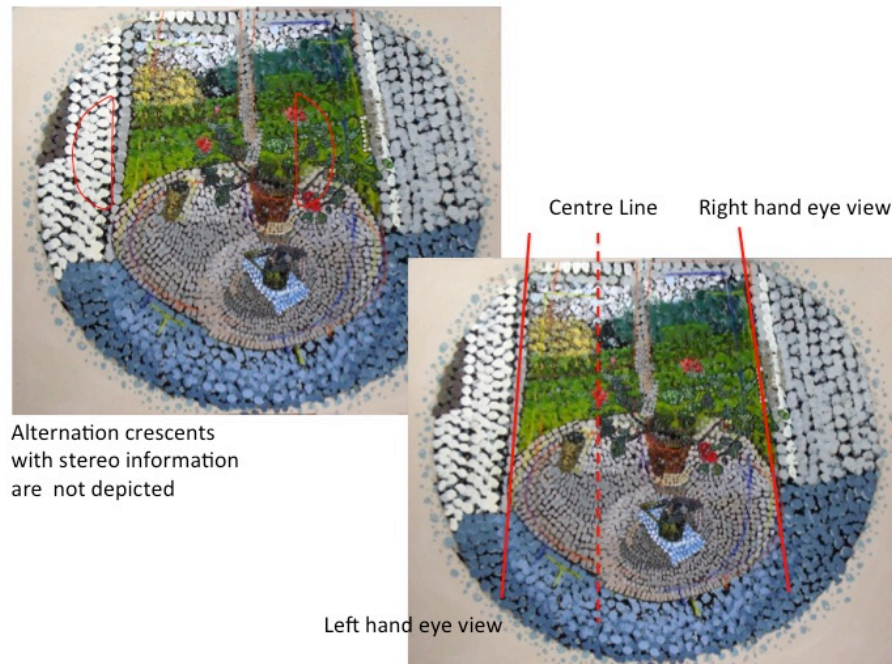


Fig 9. Binocular stereo registration

5. I am however retaining the left and right eye demarcation along the centre line of each fixation so central perspective convention is compromised.

With all these constraints in mind we can start to look at what occurs between one fixation and the next? To start with VS identifies that two independent systems are required for mind to formulate visual awareness and these must be aligned. This alignment *forms* fixation. Surely this is why we use the word to describe the activity? We don't just 'focus' upon something out there in the world, we coordinate data structures and their forms of attention around a locus that relates all the different factors. By doing so we can 'appreciate' and 'evaluate' the scene in a meaningful way. Imagine the struggles that would ensue if this function were atypical and failed to 'set' properly. If we are careful and learn how to look at this confluence we can start to appreciate the ecology of the systems involved. The two takes-on-the-real are juxtaposed (as opposed to integrated) to generate the potential for synergistic advantage to emerge.

Implicit

Explicit

An attractor operational within a field structure, Dynamical system, Contextual spatial awareness, Proximity cues, Spatial awareness	Optical focus, Akin to the fundamental of optics. Investigative awareness, What is in the world, Objective form
Implicit spatial awareness associated with the passive propagation of noise through the retinocollicular & thalamic pathway to cortex. Dorsal	Detailed contemplation of form associated with neural spiking involving the detection of light intensity fed through the retinogenicular pathway to cortex. Ventral

Spatial attention, Multisensory inputs, Distance to target. Sensitivity to movement through pattern change. Forms contextual (peripheral) vision. Instinctive response so semi-detached from mind. Formulated 'in time'. Vague with respect detail. Attention is holistic in nature.	Attention to detail with respect to performance or intent in the world. Motion is tracked with multiple fixations. Macular vision. Contemplation of objective form. Tracking movement through fixation changes. Considered response so strong association with mind. High definition, Formulated 'through time'. Attention is focused.
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Fig 10. Table

Blur/Disorder

If perceptual structure operated as a series of photographic stills, ballistic eye movement would be accompanied with horrific and disorientating motion blur. We can appreciate that as we look at media shot by video camera that's been pivoted. Obviously this doesn't happen on an experiential basis. We are hardly aware of any blur in the periphery as comparable movements take place. In its place we encounter remarkable perceptual stability. The world doesn't move when our head moves, instead we correctly sense our movement within it. There are a number of physical factors contributing to this but there is also a fundamental, elemental aspect.

Blur

- "Blur" is technically a convolution with a non-negative, localised kernel (like defocussing a camera or projector). In the limit of infinite blur you end up with the average over the image, a uniform field.

Jan Koenderink



Disorder

- "Disorder" implies spatial shuffling. It destroys spatial resolution but leaves the histogram invariant. In the limit of infinite disorder you obtain a texture with the same histogram as the image

Jan Koenderink



Fig 10. A definition of blur and disorder

As I have indicated in previous presentations the data-structure 'blur' is foreign to the phenomenon of vision, a better description is 'disorder' and I thank Prof Jan Koenderink and Dr Andria Van Doorn for their work on this. I consider that this disorder manifests within an egocentric radial structure from the loci aligned to optical focus forming fixation. Proximity cues fleetingly populating this perceptual structure in very small independent discrete areas so the realisation of values doesn't smear across some notional pan-exposure delineated frame of reference. Auditory input is also likely to be realised in these terms.



Fig 11. Disorder patterning in the Vision postproduction tool and the size of brush-mark strategy adopted in the painting

The rendering systems of implicit and explicit takes-on-the real may seem compatible adjacent to fixation. Indeed it's difficult to appreciate the differences even when they are rendered out for us in the Vision-Space postproduction tool. However, when we address the depicted implicit system with the explicit system further away from the designated fixation the situation becomes quite alien even abstract. However, we can still understand or appreciate the system of spatial

texture, it's somehow familiar to us while at the same time unnatural or even disconcerting as we look directly upon it. This is to be expected given the cross wiring involved, the explicit system is observing the mechanics of the implicit system, its rival, a product of another ecology and its processing system.

The issues relating to perceptual stability with respect to motion actually need to be viewed in reverse, from the precept. If we didn't generate the field structure with its attractor we wouldn't actually stand any chance of accomplishing perceptual stability and we certainly couldn't mask all the variations referred to within a notional 'build process' from optical input alone. To understand how perceptual stability is accomplished we have to *start* with what we think constitutes the basis of the systems involved in perceptual structure and then investigate through that or in terms of it, working *outwards* toward the membrane with the external world.

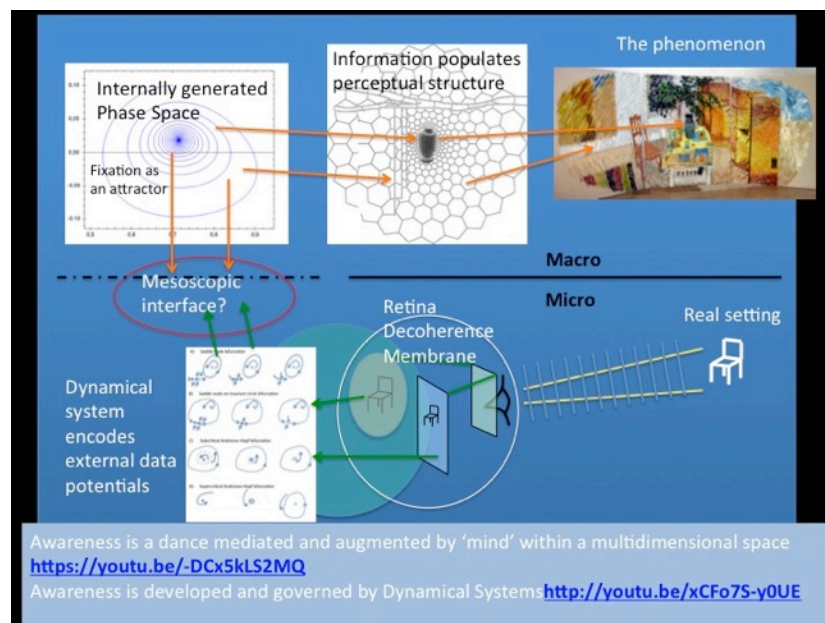


Fig 12. Vision-Space presentations looking at possible links with dynamical systems

We would then hope to encounter the scenario where micro spatial values present within the macro generated system, a scenario analogous with the *mesoscopic interface?* Moving further towards the retina we should hope to encounter the mechanics or wiring associated in both the active segmentation and passive filtering of the data potentials derived from the light array.

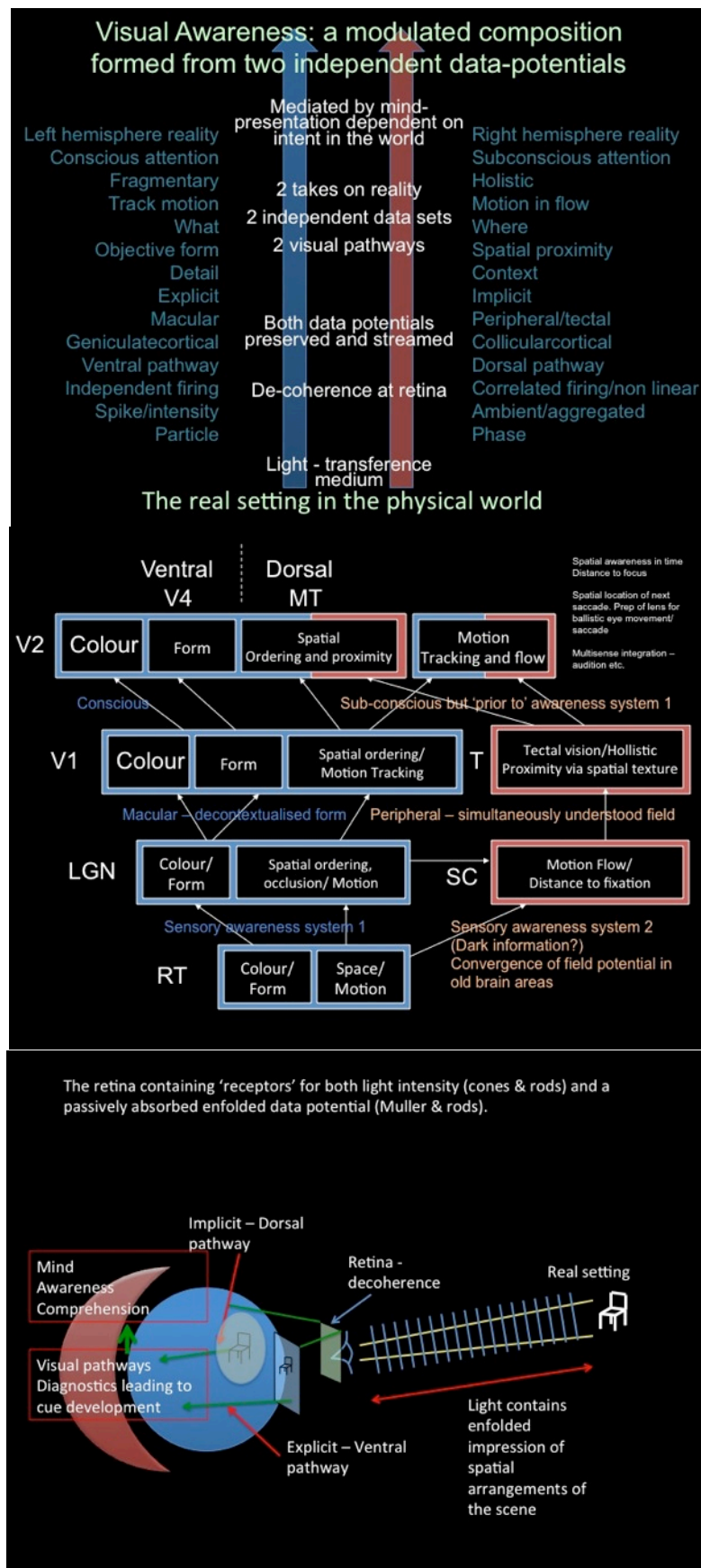


Fig 13. Possible trace for explicit and implicit processing pathways?

Spatial values

The size of brush mark increases across the planes and curves presented by objects with respect to their distance from the designated fixation points.



Fig 14. The height of the fixation above the table and the size of brush-mark increasing across it

The brush marks are also orientated away from the designated fixation points to provide an indication of the radial structure of the field.



Fig 15. Radial distribution from the fixation point

Each mark holds a dual spatial reference and hence a valid spatial coordinate when seen in relation to others forming the field. Saliency within the implicit data potential is understood perceptually on an holistic basis but as we examine it here set down in the painting we are using our explicit analysis system operational in central vision.



Fig 16. Details of flower heads and leaves

The spatial values appear to form in groups or clusters but does that appreciation of their structure in those terms come from us attending to the depiction and illustrated values using our explicit processing system? Clusters are understood to relate to one another, perhaps indicating a surface with directional slant appreciable through small incremental changes in the spatial texture. However, is this relational evaluation relevant to how they unfolded and impact in perceptual terms? Are we 'reading' individual and then grouped values from the record without proper consideration for what they mean in-terms of implicit awareness? I think sequential appreciation of grouping, layering and hierarchy may be alien to the way the system impacts as holistic implicit awareness. They have something to do with how it's constituted however. We should be sensitive this consideration when matching implicit awareness to the function of neuronal receptive fields, the way they overlap and correlate population firing.

We should also carefully consider the nature of the stimuli required to make this aspect of the visual system fire correctly! Not much point in showing or feeding a subject moving image footage unless we are testing the visual system for its appreciation of 2D media! The implicit system, delivering implicit spatial awareness from the environment is not going to respond typically to what's

represented on a 2D screen captured by a camera! Virtual reality (VR) is a miss-concept. Current VR presents a pictorial reality and even Vision-Space will be a simulation *of* perceived reality. It will not replace our relationship with the real. Reality occurs to us.

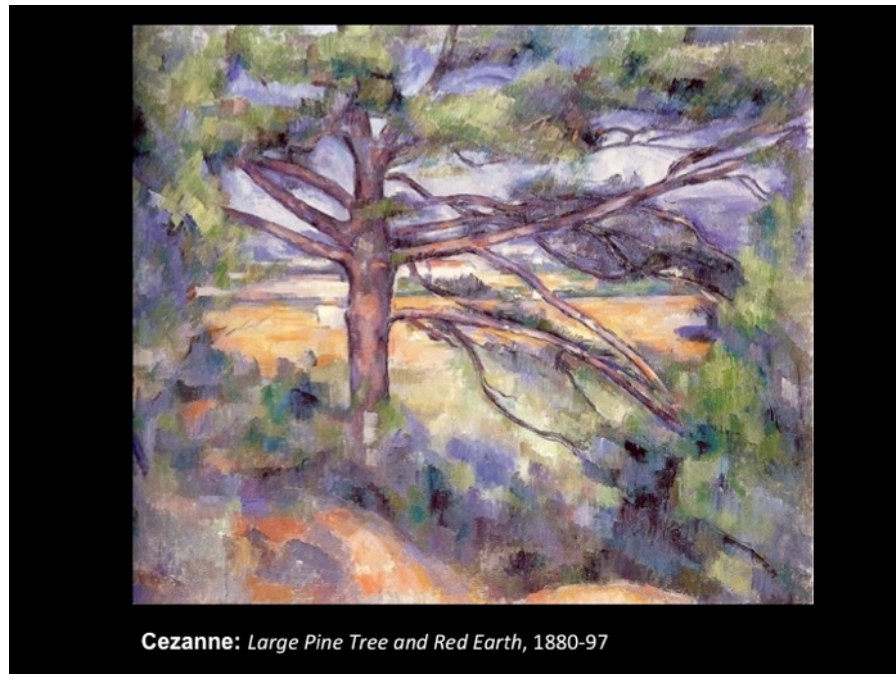


Fig 17. The large Pine Tree and Red Earth, Cézanne

3D/ExpD (experiential dimension)

I am not painting leaves and neither is Cézanne! We are realising (or feeling for!) spatial values. Spatial awareness appears to involve the formation of sets and groupings without recourse to measurement or conceptual understanding relating to line, edge or form. The system simply unfolds and presents. This is why we find it hard to express what's going on in contextual/peripheral vision or even to consciously attend to it. What goes on there is alien to the system we are trying to address it with.

In vision science there is good deal of evaluation of the role that 'occlusion' plays as a potent 'depth' indicator but I think this plays out in the ventral visual 'build scenario' associated with central vision; pictorial space considered in frames etc. For occlusion to be a factor in depth perception we have to first establish notional edges, boundaries and lines if not objects, so occlusion cue development would be reliant on conceptual analysis *from* conceptual analysis. We are looking for something different here, something inherent in the raw data unfolding on a pre-conceptual basis provisioning implicit 'proximity cues'.

If we hypothesize that an attractor is required to unfold implicit spatial values from a noisy if not apparently chaotic data potential then the neurones responsible for streaming this data potential to the point of collapse are not involved in the 'detection' of sets, groups and spatial orderings. They would be involved in something very different. Something closer to their 'generation'.



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It is as though the neurons are familiarising themselves with the content embedded within the noise so that once called upon they can proffer up what's required in terms that are meaningful to the intent of the caller! The values are held in suspension until the decision to declare the deck is made. It shows a tailor made full-house every time, with specific values appearing in the field holding meaning with respect to the setting of the locus.

Of course we don't consciously appreciate in explicit terms the resulting 3D mosaics used in the painting to articulate the spatial values, this is just a course indicative depiction strategy I have developed, but it is possible to discern or infer that a system like this must be 'in play' and that a strategy for depiction is required if we are intent on modelling the acuity of visual awareness. The painted 3D mosaic is actually very anodyne the actual visual data is noisier so my paintings don't have quite the same 'feel' as contextual vision. The Vision-Space 3D disorder algorithm is subtler and can be tuned to be quite unobtrusive and so more 'naturalistic' (See Fig 11). While the system provides a relatively weak spatial impact in reproduction, we are highly tuned to its grain and reliant on its function.

Fixation

The field's attractor forming part of the fixation process is by analogy a bit like pulling iron fillings with a magnet under a piece of paper? They arrange around the attractor in the 2D plane but also extend in space or bristle outwards in depth. The 2D plane of paper in this analogy acts like the plane of the table-top depicted in the painting. Where an object appears on the table-top it proffers an articulation of the 'z' depth indicator and extension in space. (see Fig. 14)

Fixations are made in terms of subjective perceptual structure, i.e., within Vision-Space and not in terms of the geometry of optical projection, the rectilinear propagation of light rays or central perspective and how they relate to the real setting. So a record made of the experiential space including multiple fixations doesn't 'add-up' in terms of mapped environmental space. The saccades do not amount to some navigation of a picture or even to the selected positions existing in the real setting. Spatial awareness is dependent on the navigation of the embodied, condensed experiential space of the phenomenon.

The various branches/stalks of the plant belonging to the 3 individual fixations made on the flower heads would converge at the pot. However, they do not arrive in the same place in the overlaid experiential records. In fact the pot has to be referenced in four positions, one for each fixation (See Fig 3). The same is true for all the contextual settings that surround the various fixations (see Fig 6).

It's not that we somehow manage to perceptually *mask* multiple changes in terms of pictorial content. There is actually only *one* constant, the field structure and we address the world in terms of the way it up-dates. We don't mask anything, we use all the differentials to enhance the phenomenon and so the



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saliency of the presentation and this assists with our comprehension of the scene. Why don't we notice all the updating taking place as we make fixations? Because we don't make any pictorial records to track them! There are no frames. The *only* consistent spatial referencing system we experience is that of perceptual structure, the condensed field of Vision-Space. We don't 'map' the environment we experience the environment in terms of the subjective space we generate. The formation of some conceptual understanding 'of a change' would come far too late and prove counter productive anyway.

The saccade

When we make a new fixation what happens? What is the status of awareness during a saccade? What happens to the implicit and explicit takes-on-the real?

To understand this process I think its necessary to acknowledge the protagonists (Fig 2). Mind in control of the attractor together with implicit and explicit takes-on-the real.

Does the magnet or attractor governing the implicit field get removed to be subsequently re-applied in a new position or does it slide to the new location? It may be capable of both but I think in normal circumstances it slides but at speed. The attractor shoots or flips from one place to another within *its field*. The attractor does not move through *environmental space*. It moves through condensed perceptual space. This movement within the field may not be directly connected to the processes governing the physical movement of the eyes? Perhaps the attractor draws the eyes?

The explicit take-on-the real that forms from the eye movement operates differently. It jerks from position to position along a subordinate trajectory towards the new position. Lagging behind it is then locates on the attractor's new resting position. It's the jerky eye movements that an eye tracker registers. The small lag time would possibly allow time for messages to be sent with respect to the setting the focal length of the lens. All of this suggests that it's the implicit field attractor that actually typically controls the saccade? After all VS identifies that explicit modulations manifest within the implicit field. We should also note that implicit spatial awareness is in temporal advance of the more conscious explicit form of awareness. The indicators are that implicit awareness evolved before explicit awareness.

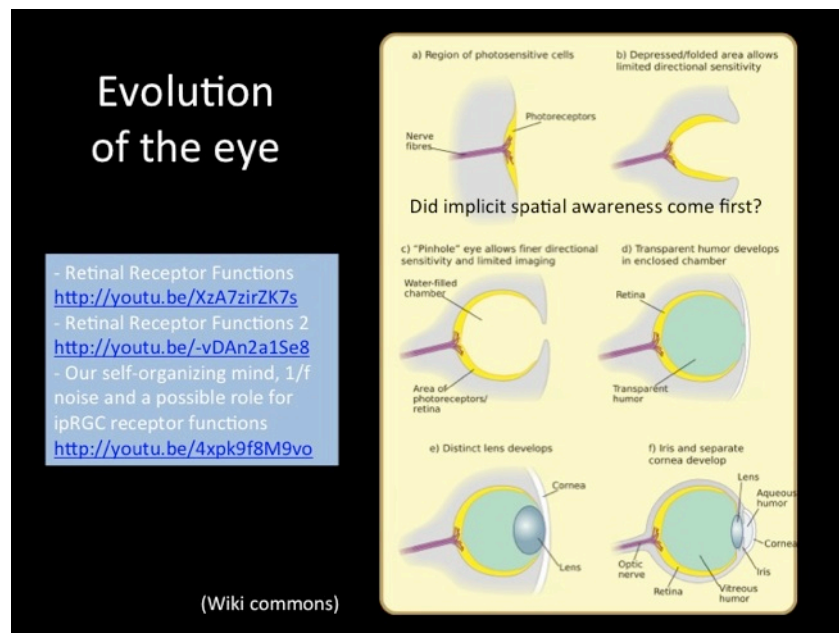


Fig 18. Evolution of the eye

As we move outwards towards the periphery of phenomenal field we can determine condensation. Perceptual space is compacted at the extremities of contextual (peripheral) vision. So moving to a new fixation located in contextual vision means moving the attractor through a space that's expanding with the movement. As the saccadic eye movement progresses this condensation must unfold or extrapolate. This realisation must challenge the notion of us developing 'maps' of the environment to store in memory to assist with orientation? The real space as designated by the rectilinear propagation of light, doesn't map onto perceptual space.

The sensation gained within a saccade should be of the existing fixation moving away from the new location as the saccade takes place. However this actually can't be the case at all! The previous fixation must ultimately be just trading positions with the new as opposed to moving away from it. The *process* of moving in condensed space proffers the *sensation of* expansion. As soon as the new fixation has been made the sensation abates. They are 'trading places'. Try it. Vision-Space is obvious!

There are four fixations in the painting (Fig 3) and enough supporting implicit information associated with each to assess the spatial impression for each position. The flowerpot may be the locus for all the various flower stems in the real world but with respect to perceptual space and the chosen fixations it doesn't anchor anything. The anchor is the perceptual field and fixations are a navigation of perceptual space and not real space. The poor pot becomes a floating entity, supplying contextual spatial data in support of.... but it was never fixated upon.

The painting is then essentially an experiment to determine the extent to which this sort of complex composite stimuli can resonate with our perceptual system.

Is it 'meaningful' to set a static stimulus reflecting the dynamics of vision? To what degree do we become aware of and accommodate the 'unnatural' interfaces between the conflicting field structures? To what degree can we 'pick' the fixation's relevant contextual information from the others while still feeling in-touch with the overall space?

So the saccade does not take place in a pictorial geometry related central perspective or optical projection. Fixation points are related in terms of perceptual structure, the perceptually generated field underpinning experiential awareness with saccadic eye movements being the methodology developed to navigate between them.

The Measurement Problem: A limited concept with respect to 'measurement' is the 'problem'?

While we are recording some of the up-dates and overlaying them in the painting so we can 'detect' the changes, we don't do this in vision! Is it meaningful to think of experiential reality in this fashion, as a series of still records on a canvas or coming out of a video camera? Mind doesn't engage in processes aimed at verifying its positional integrity in terms of the world. It establishes what's going on within its perceptual structure. Presentation of where things are go on continuously, there isn't a history of images stacked up somewhere for the comparison to take place. There is no memory of some previous frame before the one occurring now. There is no notion or concept of either 'record' or 'measurement' or 'frames' or 'frames-per second' or even 'inertial frames' for that matter! In implicit terms we can't stand outside of the events we are experiencing.

We only become aware of all the up-dates in terms of how data presents as we engage with the record making process (drawing and painting) in an attempt to pin something down with respect to what's occurring to us or as we look at a compiled image containing them. This order of record making is the power inherent in intuitive art.



Fig 19. Flashes of perceptual structure inc. Cezanne's Blue Vase

A re-presentation, even if it's a good record of an experiential encounter, takes us out of and away from the experiential encounter in order that we may look upon what's being depicted. But in the case of the painting what is being depicted also contains references to the processes involved in the development of experiential reality. This is absent in the camera record. Intuitive records have embedded within them constraints imposed by the perceptual system involved in the processes of making the record. The record contains aspects of the individual that executed them and hence what's actually involved in an act of observation.

Pictures and Images

Abridged quote

Picture being: "a real representation, an ordered record, such as a video-signal, a photograph, an activity pattern in a neural structure. The order of the picture is purely conventional and exists only with respect to an external agent."

Images: "always contain **more than** pictures because the whole structure of the receiver (a lifetime's experience) is summed up in them."

Jan Koenderink



Van Gogh Self Portrait 1889

Fig 20. Pictures and images inc. Van Gogh self portrait

Sensory immersion in current VR systems may induce the conscious belief within us that there is a virtual reality laid out before us especially if all input from the actual environment has been removed ensuring that we can't make reference to normal experiential reality, but immersion in VR which is reliant on re-presentation from optical/picture format so deprived of implicit spatial data will not fire the brain up in the same way as an actual encounter with the environment it seeks to replace. Indeed, over immersion in these simulations is unlikely to be benign with respect to the maintenance of neural circuitry and mental health.

Vision-Space suggests that experiential visual reality at terrestrial scales is developed from a duality of data potentials brought to us by light, i.e. it's a managed construct from both implicit and explicit takes-on-the real. The proposition is that we are currently tracing the heavens with reference to just one of the data potentials required to locate ourselves in relation to the world. We are explicitly tracing trajectories without accounting for the continually varying conditions affecting light's trajectory from points in space to us here on earth. We are assuming that light is true to us, that it provides explicitly veridical data without a requirement for additional assessment or evaluation even though we understand that gravitational effects from both matter and dark matter can



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deflect it's path. We assume that recording movements over cosmic distances can be comprehensively measured from light intensity alone. This additional data would not change the scheduled meeting up between a probe sent from earth and distant object, but it could effect how with think about space, gravity, curved space-time, black holes and the big bang?

Are some of the major 'forces' and 'masses' out there just required because it's necessary to balance-the-books formed from data pertinent to an explicit take on reality and accounting for situations reported to us by our instrumentation? Are we dedicating ourselves to the further development of a model that must accommodate the assumption that 3rd party observation is valid without additional data? By peering through our instrumentation, do we perceive the reality of space in a meaningful way?

Wiki: Definition of an ellipse:

In mathematics, an ellipse is a curve on a plane that surrounds two focal points such that the sum of the distances to the two focal points is constant for every point on the curve. As such, it is a generalization of a circle, which is a special type of an ellipse that has both focal points at the same location.

An ellipse is also a circle seen existing in the perceptually condensed geometry of phenomenal field where a single fixation or focus is made away from the centre line of the circle. i.e., is it case of double focal points or dual data potentials? Is there a different way of thinking about it?

Are we plotting trajectories that are commensurate with the full faculty of visual perception or merely what our instrumentation has been designed to detect? Have we successfully and without consequence removed ourselves from the observational process and record taking or are we still very much bound up in them by way of default, through a misunderstanding? Do we understand what's actually involved in the making of an observation and are we deploying it?

In Vision-Space, reality and with that location becomes a matter of judgment for the sentient being to realise, not measure. Location is a subjective construct and it has to be. Our current instrumentation is not designed to make these judgments or even to perform one of the necessary data-realisation procedures.

Only by studying vision *as vision* will we understand or keep connected to what's actually involved in an act of observation.

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2015-11-18

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V i d e o P r e s e n t a t i o n L i n k s

Vision Space technology:

Vision Space presentation 1: The structure of monocular vision

<http://youtu.be/AO71a8LzZSg>

Vision Space Presentation 2: The incorporation of binocular stereo information

<http://youtu.be/xLY60lm86Mk>

Vision-Space: Process of information exchange within phenomenal field

<http://youtu.be/8hmgutPGJmQ>

Technology evaluation:

Vision-Space: Monocular test, car demo **http://youtu.be/uRR_Quu6WYA**

Vision Space: Embodiment demo **<http://youtu.be/sWZr5q1BtQ4>**

Vision-Space: Butterfly demo **<http://youtu.be/Cc00Neu2i2Y>**

Philosophy:

Vision-Space: Overview **<http://youtu.be/UpMFfbEKEx0>**

Vision-Space and the experiential ontology **http://youtu.be/WJVC48a__50**

Vision-Space: The protagonists **<http://youtu.be/516mjrU3aC0>**

Vision-Space: Addressing a blank piece of paper

<http://youtu.be/x9niE3EKsx0>

Visual art:

Vision-Space: The paintings and their story **http://youtu.be/_Tj-r1XtWto**

Manifesting dark light and setting out a Vision-Space painting

<http://youtu.be/RJj7OdCzifM>

Setting out a Vision-Space painting: An up-

date **<http://youtu.be/HcmGkn5LMk4>**

Vision-Space: Visual cues appearing within the radial structure of phenomenal

field **<http://youtu.be/kYqsdTgI-i4>**

Vision-Space: A still life painting together with mirror, mirrored

<http://youtu.be/F4J579YCW-8>

Vision-Space: Exploring Implicit Spatial Awareness

<http://youtu.be/WMh9j60ERxU>

Vision-Space: Self-reference Pt 1, within spatial texture

<http://youtu.be/xUGOD1g3dtI>

Vision-Space: Self-reference Pt 2, contributions from memory



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<http://youtu.be/hDDoRGHaOwE>

Vision-Space: Self-reference Pt 3, exploring the extents of phenomenal field

<http://youtu.be/SarFf6FA8Eg>

Vision-Space: Self Reference Pt 4, painting phenomenal field, accessing the umwelt?

<http://youtu.be/g8rOhQhcl0A>

Vision-Space: Stressing presentation within phenomenal field

http://youtu.be/q_to0w3CX7c

Vision-Space: Land and seascape, Camusterrach, West coast of Scotland

<http://youtu.be/zr38-ibFwcU>

Vision-Space: Land and seascape 2, St Ives, Cornwall

<http://youtu.be/AquQiqjyt7k>

Vision-Space: Charting condensation across phenomenal field

<http://youtu.be/QgnJ3R3pdoA>

Vision-Space: Awareness is a dance mediated and augmented by 'mind' within a multidimensional space **<https://youtu.be/-DCx5kLS2MQ>**

Vision-Space: The painter, reality and the real

<https://youtu.be/gzzBYOs6mc8>

Vision-Space: The painter, reality and the real – Part 2

<https://youtu.be/hbFtIIHOQ9Y>

Vision-Space: Follow-up: The painter, reality and the real

<https://youtu.be/JMGhI7hfDhE>

Physical theory:

Vision-Space: Having the courage of your perceptions - A physical theory

<http://youtu.be/NWdK8ZzuHgU>

Vision Space and dark matter **<http://youtu.be/MGZFpKDMOak>**

Vision-Space: The scientific approach to understanding the nature of reality is incomplete

http://youtu.be/BLFK8rd_QkQ

Vision-Space: Real-setting, decoherence, visual processing, awareness

<http://youtu.be/TzbyydODC1E>

Vision sciences:

Vision-Space: Retinal processing and the research proposition

http://youtu.be/1ZMUPT6Oz_s

Primary spatial awareness direct from the light array?

<http://youtu.be/8wUT0HGNSww>

Vision-Space: Face recognition **<http://youtu.be/e01yFVIDOBw>**

Vision Space: Mechanobiology of brain function **<http://youtu.be/WIHbUGeg5UY>**



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Vision-Space: Health implications of non-perceptually structured content and screen technology <http://youtu.be/6gizIuLL9mg>

Vision-Space: Typical and atypical perceptual structures
Potential links to ASD and stroke related conditions
<http://youtu.be/Pss3UOoiuyQ>

Vision-Space: Some deficiencies of pictorial space with respect to the structure of phenomenal field <http://youtu.be/i2a5IVz6DBE>

Vision-Space: Retinal Receptor Functions <http://youtu.be/XzA7zirZK7s>

Vision-Space: Retinal Receptor Functions 2 <http://youtu.be/-vDAn2a1Se8>

Vision-Space: Our self-organizing mind, 1/f noise and a possible role for ipRGC receptor functions <http://youtu.be/4xpk9f8M9vo>

Vision-Space: What's in an artificial stimulus? <http://youtu.be/9ryFnuFCGys>

Vision-Space: Awareness is developed and governed by Dynamical Systems
<http://youtu.be/xCFo7S-y0UE>

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