
Christopher Rose
light
and materiality
a handbook

Light and Materiality, a handbook

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Thanks

To friends and colleagues at Rhode Island School of Design and the University of Brighton, England. Also at Haystack Mountain School of Craft in Maine, Fourth Door Review UK, and SRISHTI college of Art Design and Technology, Bangalore.

My thanks and appreciation to Sara Raffo, who designed the book, and whose insights into, and collaboration with the concept development, has brought the project to life.

For my family; Christine,
Katherine, Jonathen.

Light shone directly into our eyes means nothing, yet the same energy deflected to us via everything else that is ‘out there’ will carry the meanings of that ‘everything’ for us and to ourselves.

This book is a meditation on that impossible paradox, and I hope may help you, the reader, pause for moments of connection with light itself.

How this book came about.

I have been noticing things about light since using a camera seriously the first time when I was 14, halfway up a tree trying to film a blackbird. It was dusk; I could see the bird in my eye but not in the camera. Since that time, as a designer, I have considered light in relation to light and dark, to colour, drawing, images and meaning. Also, both in more individual realms of interpretation and in working with collaborations between specialist disciplines, I’ve thought about materials of construction, the material world, and the senses through which we appear to connect with that world and how knowledge is built and shared.

This is the past 40 years of ‘how it came about’. However the occasion of the 2010 Feltman lecture at Cooper Union, New York, titled ‘Light is Calling’ provided the catalyst for this particular collection of ideas and images. There I had 20 minutes to speak publicly about light and this book is based on the sequence that I assembled for that event. It went on to become one of the departure points for a seminar class at Rhode Island School of Design in 2011 titled ‘Light and Materiality’ for the Departments of Glass and Industrial Design. For these windows of opportunity through which new experiences occurred and which produced their own ripple effects, my thanks are due to David Gersten of the Cooper Union, and Rachel Berwick of RISD.


THIS


NIST


NOT

about

explaining
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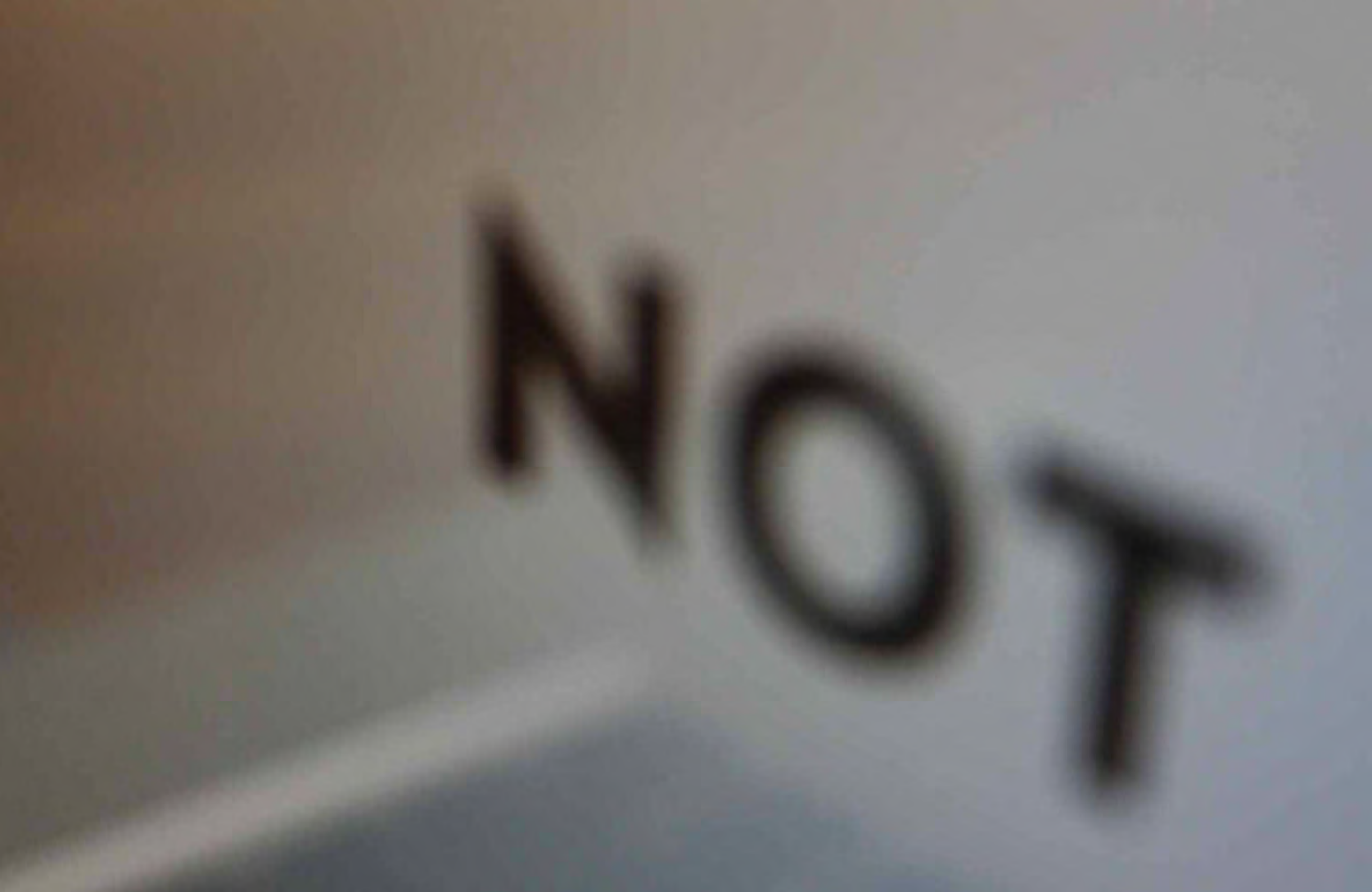

Not

self-explanatory.

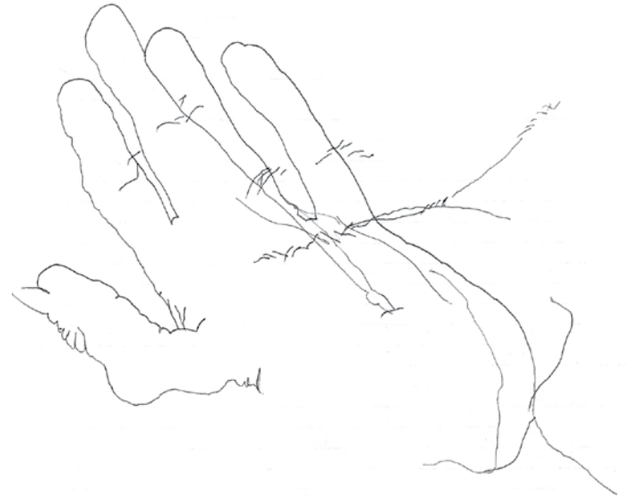
It's very funny to me, because having thought about it for years, however obvious some of these ideas may appear, it's interesting that every time one tries to explain it, it's slightly different.

These are attempts to actually understand things, not pretending to understand things.

touch
vision & perception

This can be demonstrated if you get someone up in front of an audience; you sit the person down and ask them to pretend they are blind and close their eyes. The audience can see an object you are holding as you stand some distance away from the 'blind' person. You tell them that you are bringing something towards them. It's obvious in that little setup that they don't know what it is yet, and then you get them to hold out their hand and you move toward them and eventually put the object into their hand so people can see that they've 'connected' with it. Then you ask them to open their eyes and look at it and ask them what it is and they'll say "apple" or "brick" or whatever it is. Then you repeat the whole thing this time with their eyes open so they can see you coming. And then it appears obvious; you say "what is this?" and you are standing over there this time and they say "well it's a brick" and they're curious — 'what's all this about?'.

It can be pointed out that for a blind person the only way a blind person encounters something within their present moment is when it collides with them. So the fact that they can now see over a distance, reminds us that vision carries experience 'out there'. One way of thinking about that is that vision extends the sense of touch in time and space. You demonstrate it first and then you can explain it afterwards. This is an effective way of giving people a sense of what embodied cognition is all about. It illustrates the connecting of time and space through the sense of touch, and that your visual sense can only really work after you've encountered something in some way. There's another story you can tell about a person who was blind from birth who knows what a cup or drinking glass is by handling it. If you show them a drinking cup inside a glass cabinet when they have recovered their vision, they will have no idea what it is until they have picked it up. But once they have associated the visual experience with the tactile experience then they know what it is using their vision alone. So in this sense vision is dependent on touch.



I'll just show you another little demo about embodied cognition.

Hold your hand out flat.

Now, try just holding your hand level.

I'm going to place a weight into it.

Don't tense up.

Just hold your hand level, with the weight in it.

I have now taken the weight off.

And, did you see what happened to your hand?

It went upwards.

Again — I've put the weight into your hand.

OK.

Now you take it off with your other hand.

It doesn't go up does it?

No.

Why is that?

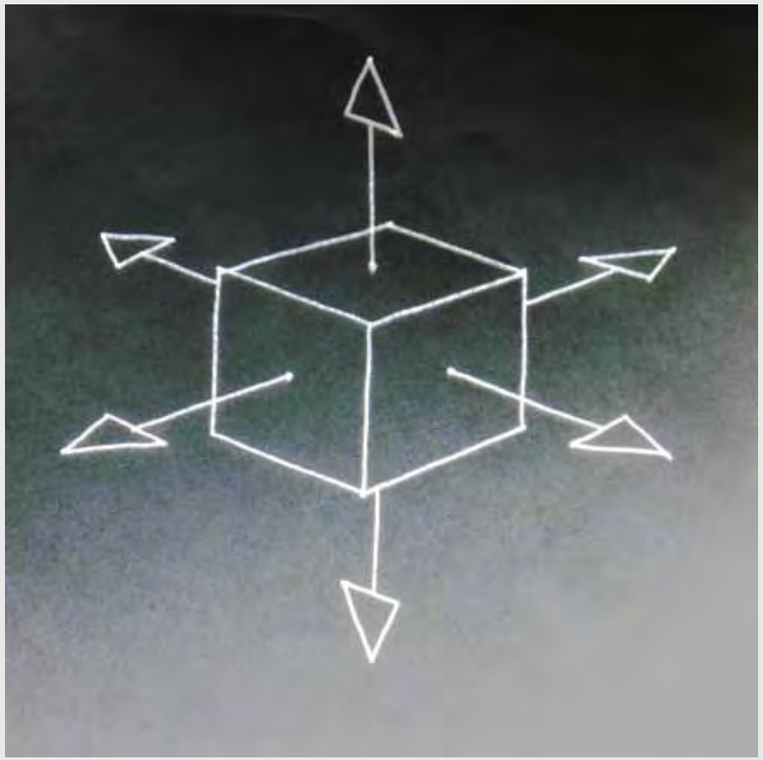
Because your right hand knew what your left hand was about to do?

So it anticipated it and counteracted the motion in perfect sync.

A kind of empathy between your hands and arms. So your brain knew what was going to happen.

It had experienced the actual weight so it was able to compensate.

If the waiter is walking past and you lift the wine off his tray he cannot help but throw it in the air, unless he sees you do this.



balance

Human perceptual cognition can be thought of as existing in 3 vectors and this is imaged here by the 3-vector cube. There are in fact 6 directions coming out of this because there are 3 vectors and each of these has 2 directions along that vector. This is why a three dimensional conceptual model is sufficient for modelling human vision. (A four dimensional conceptual model is needed for a bee). This basic conceptual model underpins much of our reasoning, our cognitive processes and orientation in space. It can be seen in the architecture of the inner ear for example. However, such a conceptual model is not a representation of what is out there in the world so much as the selected modalities through which our senses interact with the world. This is why the colours we perceive are not 'out there'. Bee vision has a greater number of modalities than does human vision and this 3 vector diagram is useful in understanding the human way of perceiving things. Especially since it also indicates the notion of balance; a sense that we tend to take for granted and which we are only conscious of when it goes wrong.

Without starting from a condition of balance it is impossible to make anything happen.

It is impossible to have any movement that is controllable or comprehensible if we do not start from a condition of balance. The body's systems strive every split second to achieve this balance; bio-chemical, physical, tactical; in terms of behavioural kinetics a 'sense of oneself'. There are many different varieties from nano- micro- macro scales of the sense of balance.

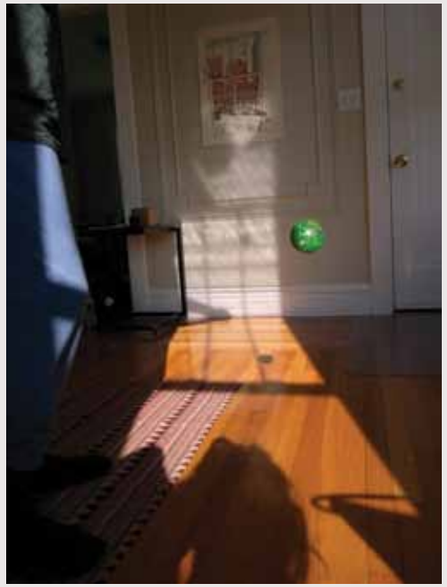
We have two eyes. Why two? In thinking about possible reasons an interesting comparison can be made between traditions of so-called ‘folk knowledge’ and contemporary ‘explanations’ as to the functions of two eyes working together. The reason this approach is helpful in critiquing ‘explanations’ of phenomena, is that the coexistence of alternative views of the same thing provides a potential outcome space for ideas of greater complexity than either position alone. In the context of cognitive processes, two eyes provide ‘perspective’. Angles of convergence give us a sense of depth and location of things in space. It contributes towards three dimensional or depth perception, but is not the only factor that contributes to depth perception. Loss of saturation in colour, certain objects that are identified as being of coherent form and occluding other objects in the visual scene (which means they are standing in front of them or rather they are between us and something else); these are other depth queues. The perspective concept is only part of the explanation for understanding spatial depth.

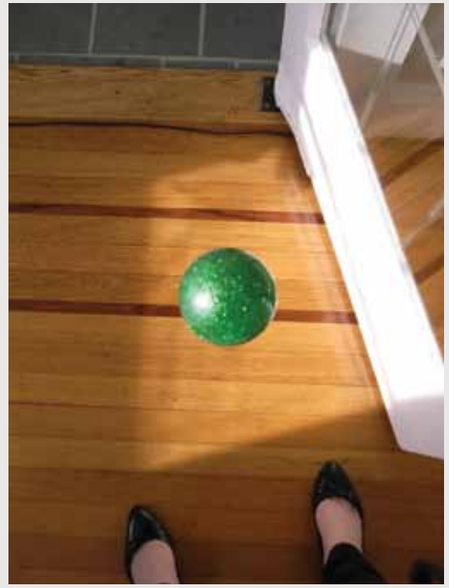
However, in comparison, one ancient (i.e., pre-scientific) Hindu conception about the reason for having two eyes is simply that we have one eye to see the totality of creation, and the other to see all the individual creatures and the effects they have upon each other, within that environment. This turns out to be not so far from the idea of ‘right and left brain’ specialization. In other words, one is sequential and linear as a means of responding, and one is holistic or integrative and consequently independent of time relationships. These two vectors working together provide insight. So various ideas flow from that; one of them being that we cannot have any particular perception of time without there being some kind of background tapestry against which we measure the specific. We have to have both specific linear time, and non-specific ambiguity of time, in order to be able to construct narratives and have a ‘sense’ of time. Stories are time-based in their telling, and events are placed within that time. Another way of putting this is that without an ambiguous sense of time there cannot be a relative or a measured sense of time and we would be unable to recognize patterns of events, which means we would be unable to learn. If there was only one mode of processing you would not be able to actually have any experience and it is the navigation between and among those two conditions that generates experience and narrative.

distance

You don't get spherical objects just hanging in the air. So you know that it is doing something. And what helps us understand where it is, is noticing the shadow. So now you know where the sun is, you can see the relative size of the shadow and the object. You can see that there's perspective information in the floor, which gives us this notion of a plane surface. Notice that 'surface' is a concept, not a thing. So you start putting all these things together and you can see the ball in space. This is really about the process of animating something in the imagination in order to understand it. Then if we look at this next picture, it's the same subject matter; the ball is a lot bigger but we know it's the same ball. So we don't see it as a different bigger ball, we see it as a different space, a different place in that environment, rather than seeing it as a bigger object.

And also there's a sort of implication of person in the scene, the question of relationship of the person who might be throwing it or catching it. So you start setting up a set of relationships to things and movements and we get a narrative. Now if you would start off with that image it would be very hard to understand what you were looking at; but the fact that we've got this previous involvement, in other words we have historical information, the brain uses that to simply understand what that is. You see a lot of relationships, potential and actual, in the visual image. So you're using time based information about the history of something to understand what it is in the moment.





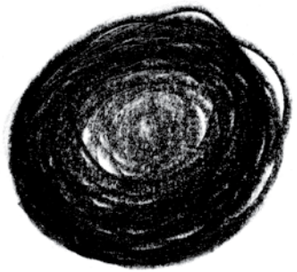
outside
self
& motion

The circle is one of the early gestural things that emerge from expressionistic drawing. Circle marks and circle drawings occur throughout human history. Children doing this become very intrigued.

It's a kind of eureka moment.

It's a line, but because they've joined up, it's now got an inside and an outside.

It's a very fundamental cognitive step. One line but with two properties, or in other words two outcome spaces. When you start drawing circles, there's an inner world and an outer world. So people love circles. And also it's a whole thing. It speaks of completeness but it's something that you did. So it's simultaneously a whole thing but it's also something you have to make. The first thing a living cell has to do in order to grow is to distinguish between what's inside it and what's outside it. Then you can have process.



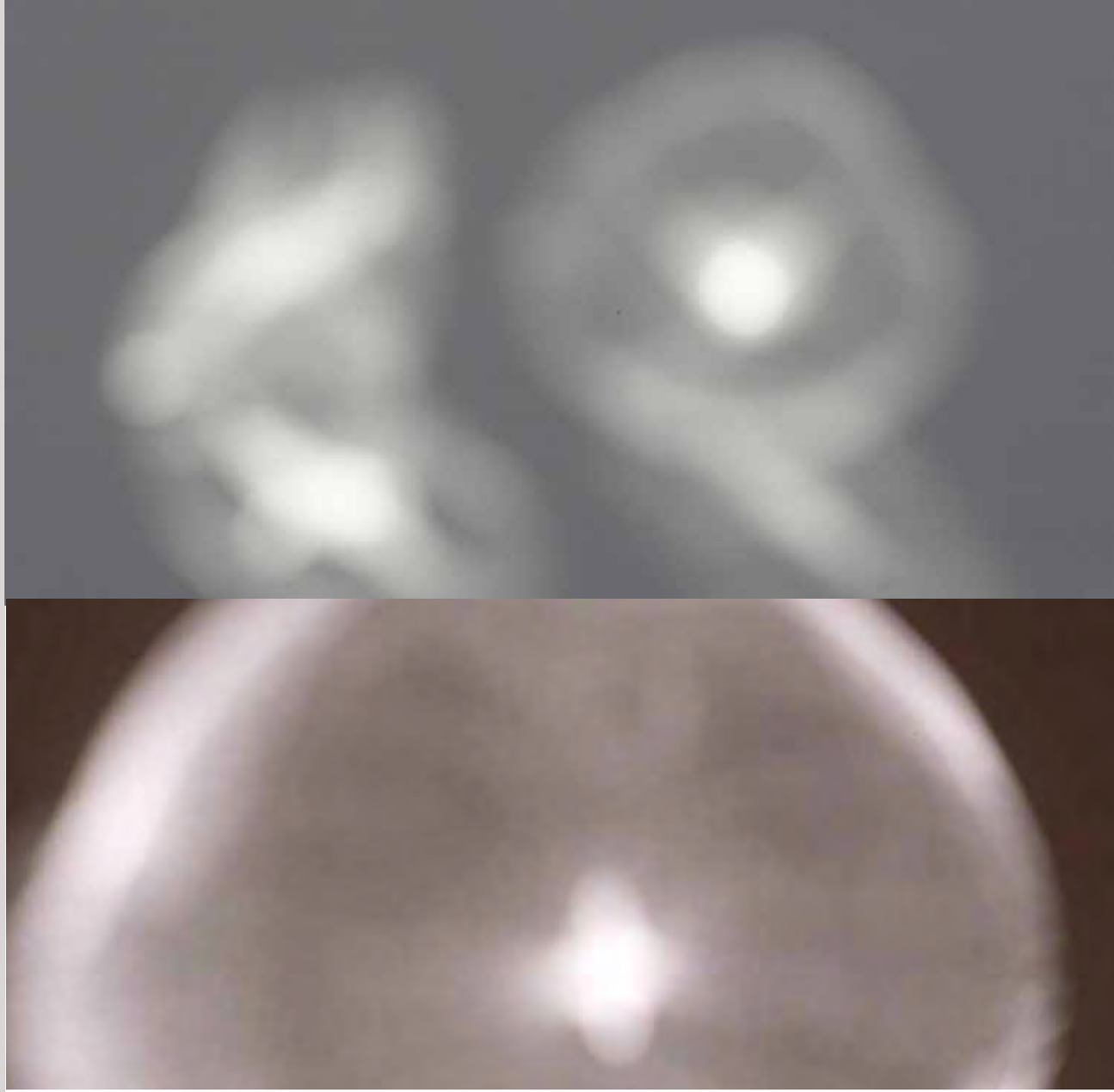
Boy and red balloon in a Parisian street market. From the film by Albert Lamorisse. Pascal is looking at a painting of the girl in a framed mirror. The frame is a loop, the girl is holding a hoop, and the hoop is reminiscent of the balloon, the balloon is accompanying the boy. The balloon has the freedom of the air by its nature.

What connects all these nested realities is light.

The balloon is buoyant in the air and is an analogy of freedom as it is escaping the grasp of anybody but the boy. This particular boy has the balloon in his grasp and the balloon appears also to be deciding to accompany the boy. The balloon has paused and what it notices in the street market amongst all the clutter and detritus is itself in the mirror. Now the balloon is reflecting on its own surface, and it is reflecting a kind of cityscape and the balloon is also seeing itself reflected in the mirror. All possibilities referenced in that moment. It is quite remarkable and looks as though the mirror is a transparent window with the background building and shop fronts, which are themselves glazed, continuing to run through the mirror surface but this is an illusion created by the point of view. You cannot tell whether the mirror in the view (which is actually a framed piece of furniture) is a window through which we look through to the background. The perceptual depth is not the same as the physical depth. The balloon takes us through post-war Paris in a manner that reveals the socially constructed limitations to freedom.

nothing

Bright illusions occur on the sides of a boat moored in choppy water in bright sunlight. Distinctively patterned shapes of light created by glazed components in a building reflect on buildings opposite. The forms created are actually cross-sections through a virtual three-dimensional light object. The phenomena is one version of ‘natural focusing’. This happens at tiny scales of magnitude too and efforts to understand this phenomenon continue to inform theoretical ideas of light. The light itself can create virtual objects in the air; an occurrence we are unaware of unless there is something interposed there to reveal the cross-section through it. You cannot see the whole thing this way, but the forms produced can be modelled mathematically. These forms have structural distinctions, somewhat analogous to distinct musical sounds. One of them, instead of being called C sharp, is called the ‘Parabolical Umbilical Catastrophe’. We use the term ‘pattern’ to cover many such occurrences.



and
something

Birds fly through the medium of air,

a medium infused by light.

For them, the medium also consists of light itself.

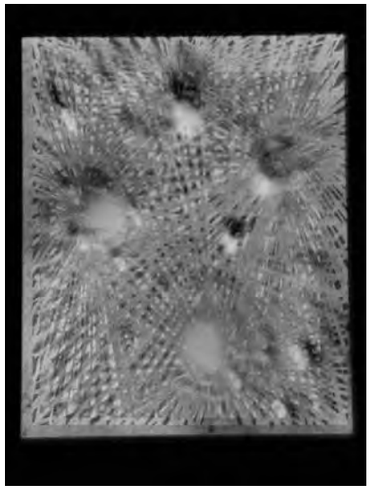
Certain birds have separate focal points in the eye that means they can understand the direction of polarization within the medium of light. This is a type of vision that is not associated with looking at objects or things, but looking to the behavior of the medium itself in which they are immersed in flight; hence their behaviour in the air is influenced by all that is in it.

everything

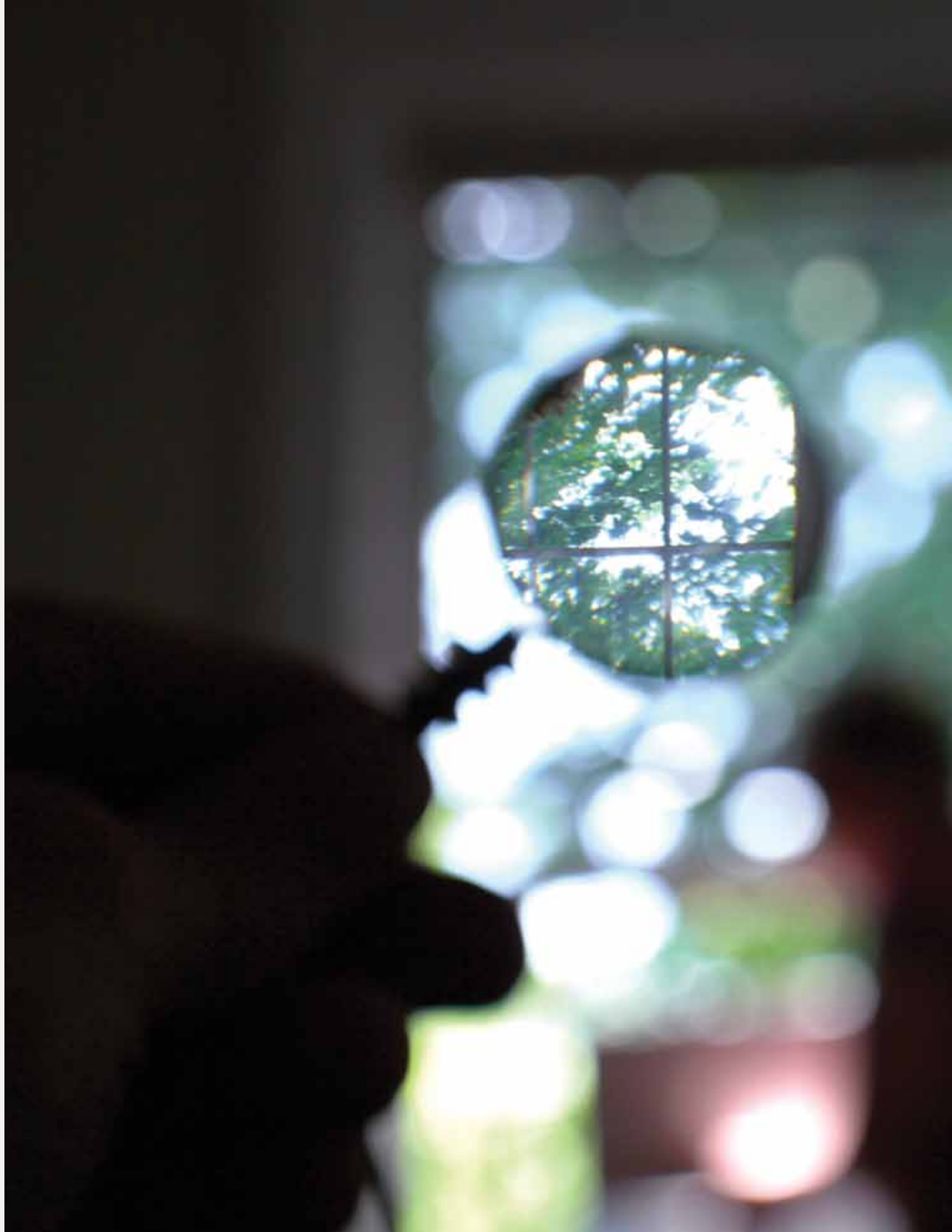
Light is an energy source that makes life possible. It's an energy that makes living things able to assemble material matter. The magnolia tree is like a cascade of energy coming from the sky and we can tell that different flowers are at different conditions of opening and closing, or beginning and ending, so it is full of potential. Thinking about colour, these are white—what does it mean for them to be white in a colorful domain. It's full of potential.

To me it is an extraordinary thought that wherever you go, wherever you travel, if you hold your binoculars up and look at the stars you get the same thing; 'Orion', 'Seven Sisters' etc. I was thinking of this when making an illustration of the Southern Cross for a magazine article about something specific to South America. There is this implication that every point in space is connected to every other point in space with light. And yet if you intersect that matrix in the right way you can create an image.

When you look out into the night sky, you see all these myriad stars. You know if you look at the stars with a telescope you see certain constellations of stars and then you can travel thirty miles or a hundred miles and see the same stars in more or less the same patterns if you look through a telescope at the image. Or anywhere in between. And the implication with this is that there's information coming from those little points of light that fills every other point in space. So depending on where you are, you can engage with that information anywhere. So the idea is this kind of network of light, that travels in all directions, all the time; the fabric of existence. Every point in space contains information of every other point in space.



Blurred images of light are held unresolved in space — they are virtually meaningless to us. A lens interposes itself in the light, creating an image by interfacing with that potential energy in a very particular way.



What does that image say to you, when you look at that image?

Because of the way he's pointing, it feels like he's capturing light in the atmosphere and he's sending it to you from far away.

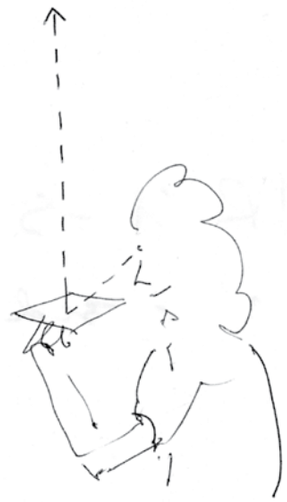
Another view is that the same light there is the same light here.

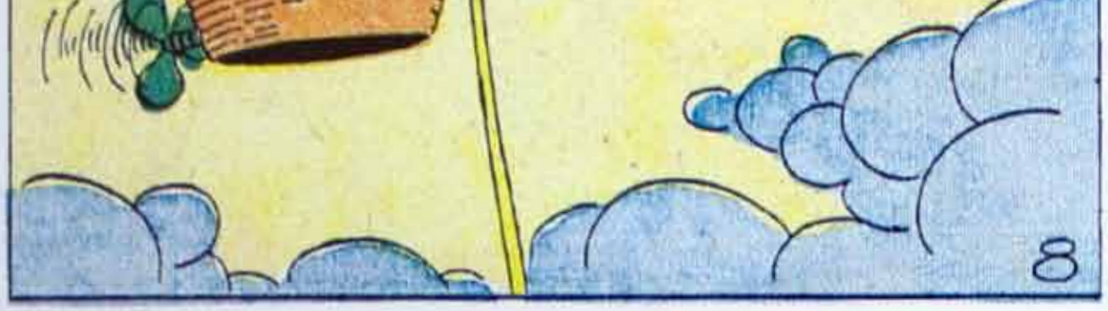
We are joined in light.

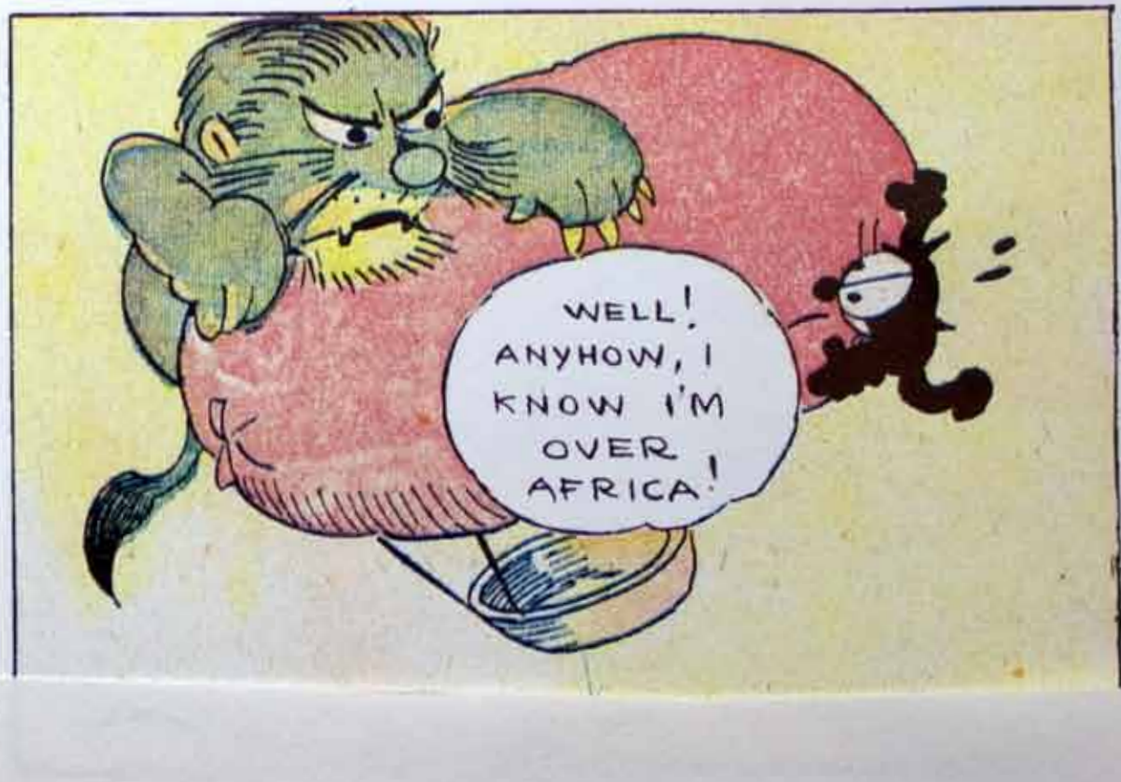
Well, that's all that's necessary.

looking
walking
among the trees

How do we encourage people to look up? How does habitual behaviour cut us off from what is out there? This shot is taken from a project in woodlands with children, to walk them along the horizontal path but to bring the presence of the tree canopy in the sky into the consciousness of the child. The human consciousness is understandably orientated around the horizontal plane, but if one is trying to understand or study something that exists in a different dimensional zone then we need to have some sort of behaviour that brings that into consciousness. Normal ambulation is familiar and restful. The girl is walking holding a mirror at 45 degrees so the tree canopy, the vertical view is fed to you while in normal forward ambulation. This suggests normal motion but is connected to visual content that we usually miss, hence it's a 'rich' experience. Deliberately looking 'up' can alter thinking patterns. We are reminded about the 'arc of the sky'. Straining to look up is however abnormal and may make us fall over, so this exercise is an effective 'prism' of embodied cognition and sidesteps habitual blocks.



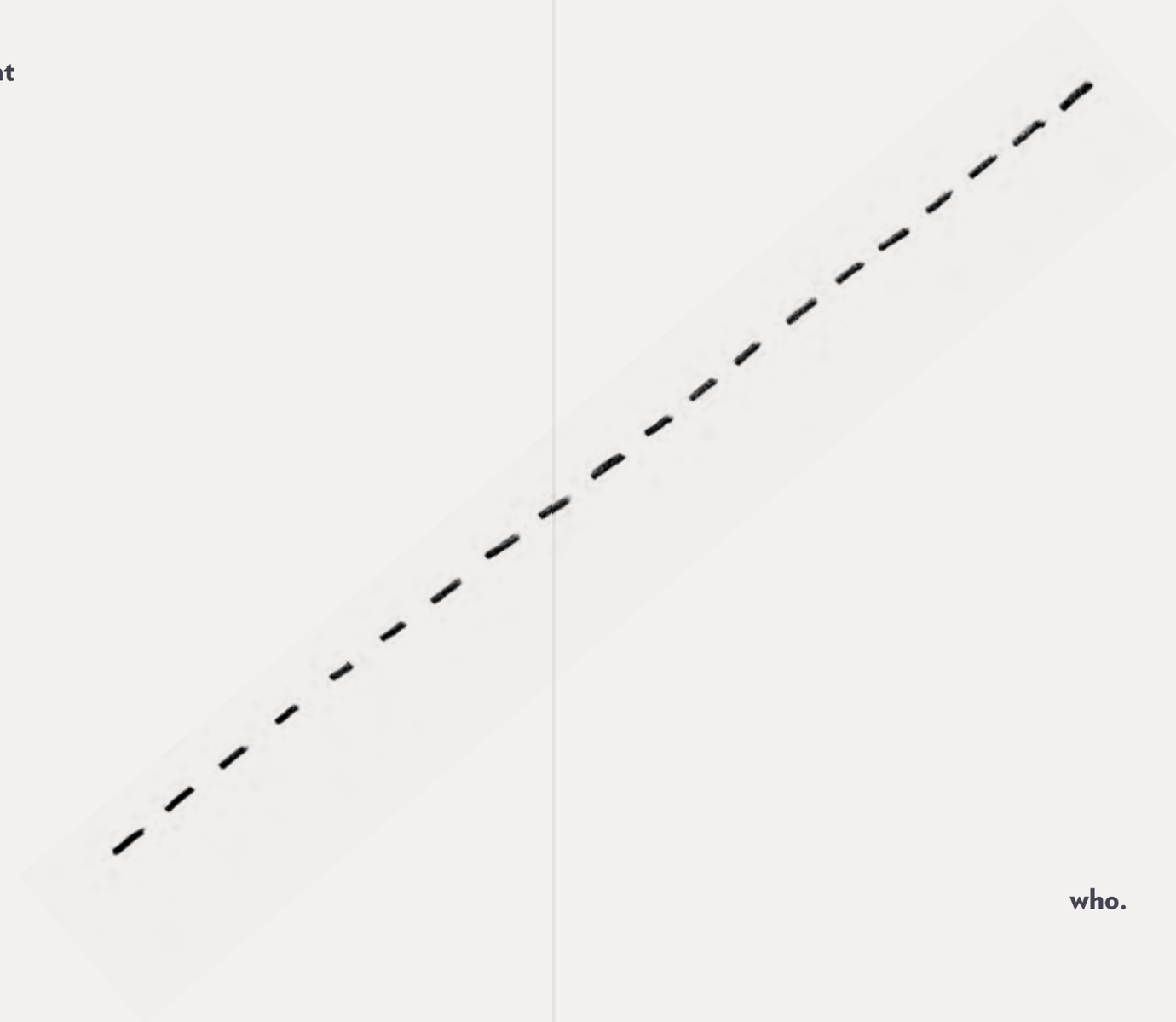




pause for thought

Felix the Cat was very surrealistic. There were all sorts of absolutely extraordinary ideas in it. He is usually trying to construct a means of escape.

This is about who is looking at



who.

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PAT SULLIVAN

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He's got this question mark over his line of sight. Felix is a cat, and this is a cat, but it's not a cat he's ever seen before. It's the first time he's come across a lion. Felix escaped from England and he didn't know that the balloon had taken him over Africa and in his sleep the balloon touched down to the ground and he woke up again. And now he's got the lion. So, he sort of recognizes it, but not quite.

It relates back to the Aristotelian concept that seeing was a deliberative act and some ray of intelligence was transmitted out of the eyes and struck the subject. In recent times this idea was dismissed because we now know of course that it's the light that that enters the eye. The question of how this relates to visual experience however is much less straightforward.

According to cognitive research now, this 'line of sight' concept turns out to be an idea with validity; that our visual experience is co-constructed between the energies of anticipation, analysis, understanding, memory and history being associated together with whatever sensory stimulus is coming in. Those factors together create the totality of visual experience as distinct from visual stimulus. Visual experience is something our faculties work at generating. It's the work of consciousness. It's not like a spoonful of medicine transmitted into us from the outside to the inside.

Returning to the Hindu construction of why we have two eyes, and the fact that our visual experience is largely constructed by what we bring to it from our history and our ideas about context, it's not such a crazy idea. We need the capacity to notice the behaviour of the context before we can populate it with meaning. The meaning belongs to us, not to 'what's out there'.

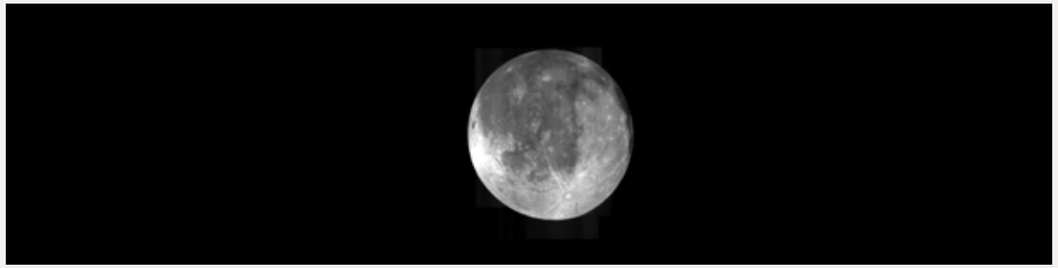
what is out there?

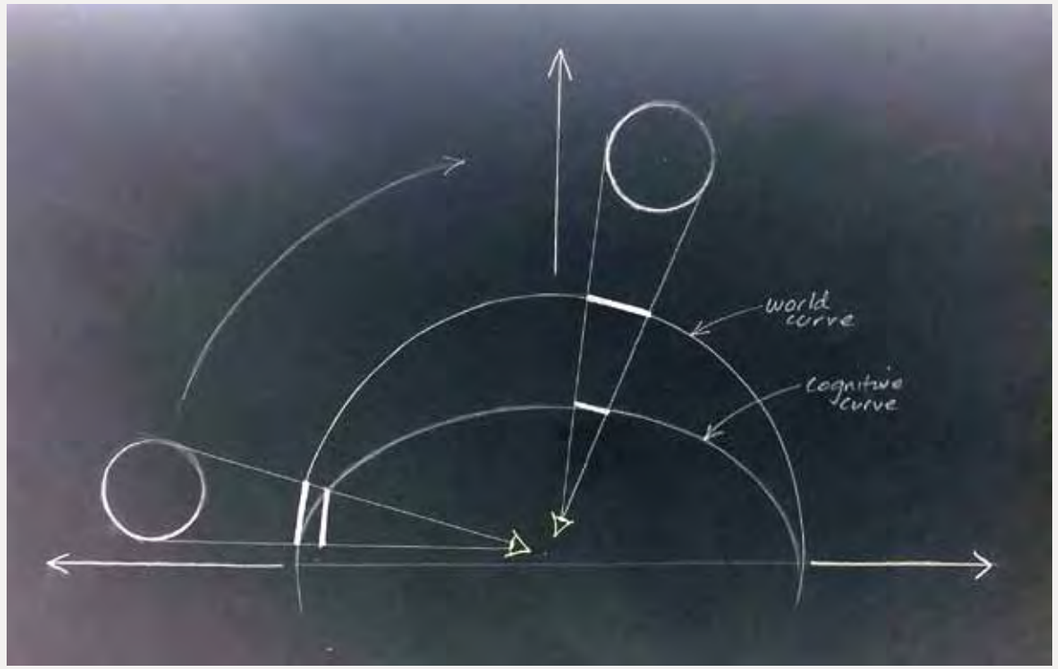
We tend to think that our cognitive space pretty much coincides with what is 'out there'. In fact we can only know what is out there by travelling through it, colliding with things and attempting to connect up the sensory experiences we have at all the surfaces of the body, then making up stories about it. An amusing example of this is when we hear someone say "Have you noticed the moon is really big tonight?"

Although the moon does indeed appear to be bigger or smaller at different times, in fact the angular displacement in the visual field of the moon's disc as it orbits the earth varies much less than we think it does. The illusion occurs because of a significant discrepancy between cognitive space and space as it is distributed in the solar system. We each have significantly less vested experience in the vertical (Zenith) direction than we can accumulate by living in and interacting with objects in any of the horizontal directions.

This means that for us, (and not for birds) the horizontal directions contain a significantly larger density of mapping and history for any potential physical experience than does the vertical dimension, straight up in the air where the balloon goes. In this vector few of us have any embodied experience, and so cognitively it is reduced (de-emphasised) in significance. This differential in spatial engagement translates into a virtual cognitive 'sphere' (represented in the diagram as a cross section) in which the vertical axis is considerably compressed compared to the horizontal axes, resulting in a disc form of elliptical section. If you then compare the transit of the moon's disc around this elliptical shape you will see that we read it differently according to altitude rather than according to its physical size with which we can have no direct connection, and so cannot know; we only have a cognitively modeled connection. This is so much easier to draw than to describe.

It also means that what we touch is known to us more completely, and in fact known to us as a precondition of seeing. In this way, touch confirms vision. Vision without touch can be anything from speculative, to ambiguous, to illusory. This is the value of what we call 'hands-on'. Conversely, vision can be thought of as extending the sense of touch in both time and space, extending the domain of our imagination and experience way beyond the boundary of the body.





It's an interesting question:

What is it in you that reaches out to something?

what

do you see in something?

In this gallery installation people are drawn to give closer attention to what's happening in the ice and talking to each other about it as part of a personal cognitive matrix being extended from the individual; their faculties are 'reaching out'.

within
the arc of the sky

This provides the basic orientation of up above and down below, or, the arc of illumination and the depths of the darkness below. Visual or light based orientation systems are found in most living things relating to daylight.

In the starkest terms, this is a dome of illumination, and then the darkness of the unknown below, or the pit. It works as a metaphysical term as well as in the context of biology. From the neurological energy going from the eyes, around 85% goes towards the visual cortex and about 15% not to the cortex but to the spinal column, and it's here that the 'above and below' issue becomes connected to a general haptic balance. In other words, it's a deep evolutionary instinct only partially associated with what we call vision. It's literally the distillation of up above and down below, and is a function that works with metabolism. Metaphors such as reaching for truth, expanding our awareness, refer to growth, moving toward the arc of the sky; the outside of the circle.

We scan the horizon, aware of anything encroaching our space. We can do that while relying upon a sense of balance. Without a sense of balance we cannot do anything at all, and retreat inwards.

We can think of three basic ways of looking; there is looking at specific individual things in our close and immediate reach, looking at the horizon, which is as far away as as you can actually look (i.e., looking away from everything in your vicinity), and there is a neutral field which is neither and which exists between these states; the Buddhist gaze, and the general domain of the entirety of creation. This one tends to be ignored. The near, the mid and the far distance; the field of connectivity between outer and inner life.

thinking
space

Some of the objects are above the surface and some are below—how do we know that? What is the surface? The plane of glass is providing an intersection in the domain of light, so this creates images that can be thought of as existing as a potential, and where we simply put this imaginary plane surface to interrupt them. Part of the imagery is of the outside world, there are bits of trees, parts of a building, but these are only visible because of the glass surface. If this surface wasn't there none of this information would be accessible to us. It can be thought that the potential of that information is in that space if we do something to intersect it and bring it to awareness. So the image is a combination of things that really are in that space, things that are in that space by virtue of their potential in the domain of light, and things that are there by virtue of our ability to perceive. Different kinds of surface; reflective, non-reflective, semi transparent, transparent, opaque. Multiple takes on the physical world, are all within that one image. Water and light together epitomize this kind of potential and there is a lot of both in us.

Can it be the sun descending O'er the level plain of water? Or the Red Swan floating, flying, Wounded by the magic arrow, Staining all the waves with crimson, With the crimson of its life-blood, Filling all the air with splendor, Filling all the air with plumage? Yes; it is the sun descending, inking down into the water; All the sky is stained with purple, All the water flushed with crimson! No; it is the Red Swan floating, Diving down beneath the water; To the sky its wings are lifted, With its blood the waves are reddened! Over it the Star of Evening Melts and trembles through the purple, Hangs suspended in the twilight, Walks in silence through the heavens. *Hiawatha's Departure Extract from "Hiawatha" by Henry Wadsworth Longfellow*

Illustrations and photographs

Cover, pp 7, 8, 10, 11, 13, 14, 15. *Sara Raffo*

19 Blind Contour drawings of the hand. *Christopher Rose*

20–21 Photographs. *Sara Raffo*

22 Balance. 3-vector cube drawing, pencil, ink. *Christopher Rose*

25 Two eyes. Drawings and photography. *Christopher Rose*

27 Photographs. *Katherine Rose*

29 Inside/outside pencil drawings. *Christopher Rose*

30–31, 33 Stills from 'The Red Balloon" Albert Lamorrise, 1956.

35 Natural focussing patterns from glass windows partially focussing the sun on an opposite wall. Drawing and photographs. *Christopher Rose*

37 And something. Photograph. *Christopher Rose*

39 Magnolia tree in spring, Providence Rhode Island, 2009. Photograph. *Christopher Rose*

40–41 Illustrations of the constellation of the Southern Cross, for Fourth Door Review UK. Pencil, charcoal. *Christopher Rose*

43 Photo of handheld lens. *Christopher Rose*

44 Photography. *Jonathen Rose*

47 Walking among trees. Photography and drawing. *Christopher Rose*

48–49, 52–54 Felix cartoon, Pat Sullivan, 1927.

57 What is out there? Moon transit diagram, pencil. *Christopher Rose* Moon photo. *NASA*

58–63 What do you see in something? Photograph. *Christopher Rose*

65–67 The Arc of the Sky. Horseneck Beach, Massachusetts, 2007. Photograph. *Christopher Rose*

69 Thinking space. Photo of model boat, stones, shells, glass, fossilised wood, 2007. *Christopher Rose*

End page illustration, oil pastel. *Christopher Rose*