

A (Cybernetic) Musing: Constructing My Cybernetic World.

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Introduction

I am going to use the occasion of the arrival of the (proper-ish) new millennium to write about aspects of my own work. I hope this won't seem very self-centred or indulgent. The idea came to me at Christmas: like many, I send relatives and friends a 'Year Report'. This year I decided, also, to attempt to explain what I've been working at in cybernetics for the last 30 years, or maybe my whole life.² I know that what I wrote (and present here in reworked form) is under-argued and it might be relatively easy to pick holes in it. I hope you'll not want to do that: this is an attempt to set a personal second order cybernetic scene which was originally intended for the completely uninformed, rather than a technical piece. On friend commented (about the Christmas version) that not only was it about a constructed world, but it actually constructed that world as well.

What I believe ties together this work is the belief that each of us experiences and understands the world we find ourselves in in our own way: that is to say, each of us is both distinct and different (I am not arguing here about the nature of these worlds). And the attempt is to find the conditions under which we might begin to explain how we could understand the world. It is not philosophy, science or psychology: rather I think what I've been doing is attempting to lay the ground so the philosophers, scientists and psychologists can do their work. I am thinking about thinking: that is, reflecting.

I am explaining experience, and the experience you have is not mine, nor even of that which I believe I experience; but is of my account and my explanation. My explanation is where I am now. I cannot regress to that state where I was what we as informed adults call new-born, when I was, perhaps, a tabula rasa. I cannot go behind the concepts I've formed, or the fact that I form them, or the fact that knowing this, I am where I am now, who I am now. The explanations that I make change me. What they are based in is my past, so they are cumulative. No wonder that psychotherapy requires such constant practise, unless one is blessed by that

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[2] What I wrote was also occasioned by the publication of the posthumous autobiography of my uncle, Frank Tindall (*Memoirs and Confessions of a County Planning Officer*, Pantile Press, Ford, Midlothian). I discovered just how much he had done, and how little of it I had realised. I was appalled at my ignorance. So I decided to account for myself.

total reformat-in-one that Saul seems to have undergone on the road to Damascus. I cannot go behind where I am now to where I might have been, without being here, where I am now, to go behind. Even the notion of behind is formed in this way. This is the recursion of life.

To some, I may seem anti-science: I'm not! What I am anti is the misrepresentation of the status of what science can bring us in the way of what we know. Thus, for instance, I dislike the confusion of the description with the thing described, and the (mechanism of the) explanation with the mechanism of that thing.

In a recent piece published on the web, Ernst von Glasersfeld reminds us:

Constructivism is an epistemological model and can no more be empirically refuted than Leibniz's Monadology, Nicholas of Cusa's theory of 'docta ignorantia', or any other theory of knowing. They are conceptual networks built on assumptions which one may or may not like; they have no truth value; what matters is their internal coherence and whether we find them useful.

That he is talking about constructivism rather than second order cybernetics (is there a difference?) is not, of course, the point. What matters is that it is understood that I am not trying to do science, or anything like that: I am trying to set up a system within which we can have such as science.

To start with

I believe in the individual, and in the distinction between each of us: I am convinced that each of us is different, and this difference is important. We cannot demonstrate we are or think the same: even attempting this requires we assume we are different, in order to be able to find this sameness. I have noticed that we tend, in finding similarities, to forget the differences: the majority of discussions of our experience are focused towards a knowledge based on what we hold in common, ignoring difference. In contrast, I am less interested in what we have in common than what we have that supports and keeps us different. I hold this difference to be self-evident. My question is how can we account for a world which each of us sees differently, and which, as a result, we cannot be sure is the same world?

As my response to this I built a framework in which I designed a structure to support difference based in observation (a general term meaning more than visual looking!). The theory is built around what I call 'Objects', which are taken to be 'self-observing'. I know this sounds odd: if it worries you, see the footnote.³ Objects are taken to have two roles: self-observing and self-observed. But each Object is just one Object, so these roles are seen as switching, which they do by generating time (they are oscillators). When the Object is self-observed, a slot is

[3] How do we know something is observable? When it is observed. What does it need, that something may be observed? An observer. What is the minimum configuration for such observing? When the observing is of the self: the observed is the observer. This organisation makes for autonomy and organisational closure.

left open for observing which other Objects may look into (providing they are in their self-observed role, and so are free to observe): an Object can observe another Object by occupying that Object's 'observing' slot while it is empty, which it is when the (self) Object is not in the (self) observing role, but in the observed role. Each Object generates its own time, which means their times appear different to each other, and also that one Object might observe several different, other Objects simultaneously, allowing observations of different Objects to relate several Objects together through (the synchronising times of) our observations of such Objects. Which is the motivation for this work: I wanted to set up a structure allowing that each of us see differently yet believe we see the same. I don't believe anyone else has put it this way: usually differences are to be explained away, not celebrated! (I'm sorry this account is a little dense and garbled.)

What I'm making is an explanation. It is not what is (which I claim we can never know — we can't even know if there is anything separate and independent from our observations (if there is anything to be explained) so if we can know, we can't know that we know!). A serious defect of science as currently, generally recounted occurs because we fail to distinguish between explanation and mechanism. Science is presented in such a manner that explanations are said to be what (actually) happens. This elementary error is made by even the eminent, and by many who should know better, and that is what I am anti!⁴

The explanation I constructed, in my Theory of Objects (my first PhD), does all sorts of unexpected things. For instance, explanations of how we develop qualities such as memory and consciousness; the way that arguments don't seem to reveal (lasting) fundamentals; and how we represent and communicate — without which there would be no point in this thesis for, even if we did all see differently (and, therefore, as different), without communication we'd never know it.

Why did I do this? I was accused, at the time, of treating humans as machines. But that's not it — in fact, quite the opposite. I was trying to create an account that leaves us liberated (and I believe I succeeded): the prerequisite of my thesis is that we understand differently. We each see the world in our own way(s). We are free to see as we see. Our mission is to be where we are. Therefore, we are responsible for what we see, and what we do based on this: what we learn and all our actions. This contrasts greatly with other views, where we are slaves to mechanism and without responsibility. It is this view of what humans are, of freedom and the liberal libertarian that has always been my belief.

What I like most about the theory is its terse elegance and power. When I look at it nowadays, I am overwhelmed by it. I like, also, that it does more than satisfy the prerequisites I'd set, and that the structure it makes shows how it is possible to consider a world in which we all see differently, and the consequences of this. In contrast, post-modernism only demands we accept that we do all see differently

[4] I am aware that, for some theorists, specially mathematicians, there is a notion that (for instance) the world IS mathematics: mathematics is both explanation and mechanism because the two either map perfectly onto each other or are one. This is a very cybernetic idea, and one that post-Goedel mathematics would seem to preclude. I think maths and cybernetics are both a bit confused here!

(that any way of looking is as good as any other), and then despairs of finding communication and structure.

Delineating what we might see differently

Since I start from an interest in a structure allowing us all to observe differently while we believe we observe the same thing, I must be interested in how we might describe how we might delineate or identify (so we have an observed). This is important because we do believe we distinguish one thing from another (and that we can talk about this to each other). It is this act which allows us to treat the world as populated with observable Objects: it allows us to believe there are Objects to observe.⁵ It is how we either put or observe the lines/boundaries/edges round things. Such lines, so elegantly discussed by the artist Paul Klee (a drawing is ‘taking a line for a walk’), have been a lifelong obsession of mine.

There is a key conceptual text which cyberneticians like me refer to: George Spencer Brown’s ‘Laws of Form’, which starts from the primitive act of drawing a distinction. Louis Kauffman’s delightful column often touches on this, and there was a wonderfully helpful tutorial in vol 6 no 4. I hope to return to this on a later occasion.⁶ Lines don’t only distinguish an inside from an outside, they also have qualities of their own.

We demarcate where we think ‘things’ begin and end by drawing a distinction — by making a line. I’m talking metaphorically: we don’t usually pick up a pencil, and ‘things’ may be very loose, woolly and invisible — they are Objects: making the line may actually create these things (as I, amongst many others, would argue). The line forms an inside (where the ‘thing’ is) and an outside (where the ‘thing’ isn’t but some other ‘thing’ is). But we have also created the line, and the line is also a ‘thing’, so there’s a question of how the line is distinguished from what’s inside it. To me this suggests that either we must go on distinguishing and re-distinguishing the ‘thing’ (i.e., we keep on seeing it as the same, or we have an ‘edge’ of great richness: this we find in, for instance, highly articulated walls in architecture); or the line is what’s distinguished (so there’s no inside or outside, just the line — pictorially, a Moebius strip rather than a circle). Surprisingly, this understanding seems to match very closely the way that the Mayans thought of their architecture, where they talked of the space of/in the wall. (I discuss this, and the work I did on how we perceive architectural space, in my second PhD.)

[5] Elsewhere, I’ve argued how we can take observations and turn them into credible ‘real-world objects’: I’ll not do that here (though I do precis the argument later in this article), even though it is very important, for it explains how, within the way of thinking I’m putting forward, we can have a common, negotiated ‘reality of experience’, and hence the science and technology we all so depend on and enjoy. I write about it in ‘An Observing Science’.

[6] I had a (student) piece published the year before ‘Laws of Form’, in which I distinguish the Yorkshire town Kirbymoorside through drawing several boundaries (distinctions) as lines drawn on maps, overlapping and containing the little market town.

I could go on. For instance, we talk of things being stable (including bodies, concepts, relationships) often meaning that they continue to be, but there are two types of stability: static (unchanging, how we often seem to ourselves) and dynamic (changing, how we often seem to others). Stability is determined in relation to something else (a goal, which has also to be stable, although I won't pursue that here). When something seems to be dynamically stable we can consider this goal as being outside the stable thing. Yet for the thing to continue to be, there must be a goal inside, and (unless we are also within) we can't do more than surmise there is such a goal. Second order cybernetics is full of circles like this, and of logical conundrums which are best dealt with, I find, by not being insistent on the priority of one outcome or the other; or by not trying to find a solution at all but just being in (actually, inside!) the argument.

There is another aspect to my interest in lines. Say a line I draw does distinguish (for instance) me from what is not me (that is, I distinguish myself, which would make me an Object). What on earth (!) would be the point of doing this if I didn't distinguish myself from something else? What conceivable point is there in having an I if there is no you or it against which to appreciate my I-ness, to enjoy my self? I maintain there is no point. In other words, the purpose of distinguishing myself is not just to assert there is an I, but to distinguish myself from you or it. When I draw a line, I can think of it as making what comes to be each side of it by the act of drawing it, and each one of the three elements I now have (distinguishing line, inside and outside) in a way distinguishes the other two. This is the purpose of (the first) distinction.

There is, I believe, a corollary to this move, to distinguish myself from you. If I am prepared to assume for myself certain qualities, I must allow that these qualities might also be in or of you (or it). And the qualities I see in you must be conceivable for me. Notice I do not say these qualities are present: only that I should leave space in my thinking so they might be — they are potential. I have introduced this concept in previous columns, and call it the 'Principle of Mutual Reciprocity'. It is important because it gives me an ethical obligation beyond simply accepting responsibility, and it means that, in making myself, I already make (and must respect) you and make you different, while still being able to share qualities. Which means that conversation is possible — the basis of decent behaviour.

So nowadays I don't even think there is a 'thing' for us to see differently. I believe we construct a world through a strange sort of interaction: to say there is an I is to say there is a you, and therefore I always construct not the 'thing', but observations that are realisations of interactions, and which, through a process of iteration, I reify into things (which can give us a reality of reference such as is so powerfully used in science). But that's another matter! Whether or not there are things independent of me I can, of course, never know: I should neither assume there are, nor assume there aren't.

I wrote above about inside and outside, and how important they are. We are different: I can never have your understanding, nor you mine (though I can have

my understanding of your understanding, which is precisely not your understanding). In a conversation, each of us can be our self, but we also enter into another entity — the conversation we are sharing in creating. Each of us brings our differences — our uniqueness — to this. While outside you, I can be inside the conversation with you. In a conversation, unless one forces his/her view on the other(s), there is bound to be novelty. The conversation will move in its own way, according to what we come to describe, after the event, as its momentum and logic. Conversations lead to novelty and surprise for each participant (though the surprises may be very different). What interaction gives us is novelty — in the sense (at least) of something that was not of me becoming available to me; and often in a much grander sense.

There are different ways of considering the world depending on whether we place ourselves inside or outside (though we are always inside the system of circularity involved in observing). When I am outside the system I can talk of it as having a vast complexity of possibilities ('variety'): the combinatorics of possibilities, if we don't restrict what we can do, is beyond the computable even if the whole cosmological universe is assumed to be a sub-atomic scale computer operating at the fastest of speeds for its whole life-span, as I have reported before in this column. This tells us that the universe we live in is essentially unmanageable and leaves us different options. One is to close down (which is what dictators do): remove the possibilities and the freedoms we have which generate complexity. Another is to accept unmanageability as wonderful: which gives us endless novelty, a richness beyond our wildest imaginings, magic; and demands from us trust, open-mindedness and generosity, the sorts of qualities I assume we would like to claim for ourselves. I love an understanding that promises me novelty and I try to make sure I set up situations so this is encouraged. Even more, I love an understanding that tells me the qualities I most need are the ones I most admire, as opposed to one that tells me that the 'natural' qualities are also the meanest. Don't you?

How could WE know this?

I have slipped between the pronouns I and we in this account, without answering the question of how, if the world is full of I's, there might be a we.

The first part of an answer concerns our ability to observe. Since we can observe Objects (that's the purpose they were set up for), we can observe Objects no matter whether those Objects are what we might now call fellow human beings, quarks or galaxies, love and fear, the totally imaginary or, even possibly, academic papers. It makes no matter what sort of observable we are dealing with when we want to talk of what constitutes observables (the notion of what sort of observable is a later development). So, first, we both observe and have observables, which is, mainly, what I've been writing about. When we can observe Objects, and make observations more than once, we can determine that the observations are the same (are of the same thing). Thus, we can construct an identity for objects of/as if in

the real world, as we do (theory sustains experience). We construct an identity between observations which we understand as some thing, an Object.

Being able to put Objects together in this manner gives us the basis for observing relationships between these things. That is to say, if we can find identity (and, by implication, non-identity), we already have a basic relational framework. I will not, here, show how to extend this to a full blown relational logic: it's complicated, and I believe that I have done enough to show the possibility, hoping you will chose to believe me.

The second part concerns the 'what sort of' question. This requires not only that we can observe Objects (or draw distinctions), but that we can find certain qualities in those Objects that we believe they hold in common. This is not so different from the making of identity between observations of an Object, thus making it an object (of the traditional sort), a thing, a concept, a whatever. It is possible to understand this as finding qualities in things, qualities they might share: which assumes the sort of relational logic just mentioned. These qualities allow us to find similarity in quite distinct things, a similarity that supports their difference and separateness.

We create identities between things that are separate and which it is our intention to keep quite distinct, and we often call this representation. A picture (of a thing), no matter how 'picture perfect', is not that thing. Nor is a word the object to which it is attached, or that it indicates. In representation, we keep the difference between the two clear, otherwise it would not work. This is the reason fundamentals can never be described. To say two things are the same is, equally, to say they are different (otherwise they are not two). To name something as fundamental is to say that not only is there something the name and the object hold in common (indivisibility) but that there is something they do not hold in common. Oh dear! Naming a fundamental stops it being fundamental by conceptually splitting it into the part that is the same as the description and the part that is different. However, representation becomes possible, with which comes not only identification, but also the possibility of communicating.

As of now, these connections are made by you or by me: that is, by just one of us. To communicate (or to believe we communicate) we need more than that: I must believe you have made a connection like I have. This is where Gordon Pask's theoretical conversations enter.

Conversation allows us to create agreement, and hence social phenomena, such as everyday language. Language, in this sense, is a collection of agreements: one of the reasons it is so hard for most adults to learn a new language is that they have to accept the rules of a club of users, when they have already learnt to behave, see and describe the world according to the rules of another club. We can (and do) create languages, but there is no reason to presume languages should be precise, contain meanings, or have precedence: language depends on a series of agreements, known to be agreements. We derive language from negotiation. Conversation is not a linguistic device: language is a conversational device.

It is in this process of negotiation that we may communicate, find similarities, and believe there are agreements. Through negotiation we may arrive at social phenomena. Because these language and other phenomena of social agreement derive from negotiations carried out before we were involved, where our only negotiatory power is to accept what's on offer, there must be differences and difficulties.

And design?⁷

Ross Ashby borrowed a fabulous concept from the physicist James Clerk Maxwell — the Black Box. Ashby even suggested everything might be considered a Black Box. I concur, except I'd say *should* instead of *might*. We live in essential ignorance (a good thing, as indicated) and make explanations from/of observations and experiences, which we then test in a circular action: observe, explain, try out, observe, explain etc. In my mind, the Black Box is a philosophical device which sets up and supports a set of positions intimately connected with difference and ignorance.

For some, especially those who want to know what's inside the Black Box, the notion of ignorance is painful. For others, the Black Box is deeply determining (through psychological conditioning). I don't share these views. For me, when I observe a Black Box, I build an explanation of/through my interaction with it. This explanation is (of) what happens between the Black Box and me. But my explanation of what happens is not an actual mechanism: my essential ignorance remains. I don't have to know what happens in the Black Box (what, if anything, makes the behaviour I experience) — in fact I can't, for that's why I invented and placed it. All I can do is make an explanation of the Black Box through my interaction with it, which I believe accounts for its behaviour in this interaction. (Actually, since I only come to posit a Black Box because of an observed change in behaviour, the only evidence of the Black Box is the changing behaviour I observe through interacting: it may not be there at all. Familiar sounding?)

I believe circular behaviour (interaction) with an unknowable is a good description of what designers do (as opposed to what at least some theorists believe they should do!). This approach allows me to understand design, giving it its due place as a serious activity.⁸ Designers go through an iterative and circular process, a sort of conversation with themselves using pencil and paper, ending up with something (a design) which is a token of the circular action. The design can be seen as an embodiment of the process and outcome of a conversation. So the Black Box becomes (ex)PLAN(ation).

[7] This section responds to the way I have earned my daily bread over the last 30 years: teaching art, design and architecture. I find an enormous similarity between (second order cybernetics) and design: design is a form of action that is, in my view, deeply cybernetic. In this belief I am not alone. Gordon Pask held firmly to it, and, amongst his dozen successful doctoral students at Brunel University, two thirds (by my estimate) had previously studied architecture.

[8] For a long time, designers thought they were inferior scientists.

Designers will recognise this circularity, although not everything in design is circular. There are problems — specified beforehand — to be solved. But the creation of the previously unknown, which is at the heart of design, is reflected in the explanation I give of the Black Box.

This interactive process with the unknowable leads to further interesting understandings. For instance, we can learn about intelligence without having recourse to such nonsenses as (standard) Intelligence Tests. Intelligence is appreciated through interaction with others. It is in the interaction, not in the performance of isolated tasks, that we find intelligence. Equally, we can discover important features of the interface (person to person, person to machine, whatever): this needs space for interaction to occur in — the space between the unknowable and the person who wants to explain it. Current computer interfaces are mere action/reaction devices, which I believe is one reason computers seem so dumb and so deeply infuriating!

Since we behave in this manner with each other, we not only use the Black Box model (possibly unwittingly): we are also all designers, for the making of understandings in this way is what designers do. In my (second order cybernetic) view, humans design their understandings and their knowledge into whatever form it takes in our conception. Design is a basic human activity. And design is second order cybernetics in action: it is, if you like, the application of second order cybernetics, making it useful. Thus, the strong connection I see between cybernetics and design.

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[9] A CV including a list of my publications with links of several of them may be found, courtesy of Alex Riegler, at <http://www.univie.ac.at/constructivism/people/glanville/cv.html>

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