

A Cybernetic Musing: Five Friends

Ranulph Glanville¹

Preamble

This column is based on a paper presented at the last “Problems of...” conference organised by Gerard de Zeeuw and myself in the week after Easter, 2001, which formed part of de Zeeuw’s University of Amsterdam Professorial retirement celebrations.²

Introduction

There are many devices, concepts and such-like that help us think. In my enjoyment of thinking about thinking, I have become particularly aware of the existence of five of these, for I have found I like to go on thinking expeditions with them: they are my “friends.” I have mentioned all five in previous columns – but some only in passing. Here, I shall introduce each, and then use them in exploring the idea of intelligence, chosen as an archetypal concept for thinking.

These five are not the only concepts I value in such a way, but they are amongst those I value most.

First Friend: *A description of a thing is not that thing (the description is not the thing described).*

This is the basic premise of representation (as stated so clearly by de Saussure, 1966³). Its origin is in the practice of thinking and of communicating, and I suppose it is as old as they are: for (apart from some sort of direct ephemeral union that may or

1. CybernEthics Research, Southsea, UK

2. The conferences, initiated by de Zeeuw in 1979, formed a particularly delightful series and ran over 22 years and 12 meetings. They attracted a loyal following because of how they were organised and the style of de Zeeuw’s direction, leading to an academic exchange of the highest quality, and a lot of enjoyment, too. Some distinguishing elements were: a full and generous social programme; no parallel sessions; presentation at the conference as refereeing process (final papers were written after the conference); and a theme set by de Zeeuw using a particularly challenging and open form of articulation. The theme for this conference was “Problems of Individual Emergence.” For various reasons, publication of the proceedings was much delayed. My paper “A t’Tribute” was omitted due to some misunderstanding (but has since been published in an annex (Glanville, 2007b)). The delay allowed me to develop my thinking, but I still consider the original to contain several important concepts, especially when gathered together. So, after the original delayed publication, I have reworked it, modifying it to take into account some more recent thinking (in particular, the connected notions of sharing and betweenness). I am grateful to the editors Gerard de Zeeuw, Martha Vahl, and Ed Mennuti of the conference proceedings for their permission to republish this renamed, much amended, but still recognisable paper.

3. Ferdinand de Saussure (1857 to 1913) published little. The reference is to an assembly from notes taken during a series of lectures in the 1890’s (Saussure, 1966).

may not exist) we know of no thinking or communicating without some form of representation—where the term is used in the most general, liberal sense.⁴

For representation, Saussure required a structure of two elements. One is the represented, the other the representing. These are not inherently connected, being brought together for a moment by the agent making the representation. There is no inherent, logical, symbolic, semiological or other a priori relationship between the two. The agent receiving the representation understands the concurrence and the “two in the one” – the two separate elements brought together in the act of representation (one is normally explicit, the other implicit). Sophisticated accounts of representation and description, depending on complex social constructions, must be founded on this Saussurian act. I can conceive no simpler way representation could be, unless an ephemeral, direct union – which may be communication but probably isn’t representation and is certainly beyond this discussion.

In this account, meaning is not transferred. An arbitrary bringing together of two unrelated elements is treated as a representation, allowing both *speaker* and *listener* to create and again represent their own meanings, which they have (individually) constructed. The mechanism that allows this to function as a means of communication was elaborated in Gordon Pask’s conversation theory (e.g., Pask, 1975). Conversation (a form, an iterative, circular interaction) is the archetypically cybernetic act.

At the centre of my interest are these two Saussurian requirements: the separation of the represented from the representing; and the lack of inherent connection between them. For Saussure, they are arbitrarily brought together in the instant. Thus, while in the act of representation the two may appear as one, they must always remain different (Glanville, 1980). Bateson (who talked of *explanatory principles*) reminds us (1972) of Korzybski’s proclamation “the map is not the territory,” which pithily makes the point. Since, in Saussure’s account the representing is not the represented, something found in the one may not be assumed to be in the other. Thus, the describing (i.e., the representing) is not the described (i.e., the represented). These two aspects establish my first friend: A description of the thing is not that thing.

Representation is a muddled field. Much of it concerns interpretations, “official” meanings and so forth. Often it ventures into the highly symbolic, and personal opinion seems asserted, all too frequently, as universal truth. Absolute value is claimed for the manipulative and the personal. This aspect of representation neither interests nor communicates to me. My interest is how representation might occur, the structures and conditions that would allow and sustain it. Such an interest is typical of a cybernetician.

4. At least three notable cyberneticians, Lars Loefgren, Humberto Maturana and Klaus Krippendorff, have taken the position that we exist in language, and hold that consideration of language is crucial to understanding and developing cybernetics. I find this difficult to accept as such an absolute view. In my experience there are moments that are completely extra-linguistic. Of course, these cannot be told: Our insistence on telling leads to us considering only that about which we can tell. These extra-linguistic moments can be shared and are thus communicable—but not in a “linguistic” manner.

Second Friend: *Circularity*

Circularity (of form) – leading by iterative recursion to a spiral progression in which we circle, ending above where we started – is cybernetics’ central theme (Glanville 2002b). Cybernetics is concerned with “circular causal and feedback mechanisms” (see the Macy Conferences⁵). Wiener’s (1948) formulation in his eponymous book, writes of communication and control, giving the essential example of the feedback loop (the prototype for control in a world where error is inescapable—but we can act to alleviate its effect). Conversation is circular.

The argument that circularity is more fundamental in cybernetics than the more conventionally fundamental linearity, depends on Occam’s Razor (*Pluralitas non est ponenda sine necessitate* – entities should not be multiplied unnecessarily). Occam’s Razor is an efficiency decision maker, telling us we should chose the description giving more for less. It is a device that makes intuitive sense, but is very difficult to implement without ambiguity: what exactly do we mean by the intuitively clear terms *more* and *less*?

Under Occam’s Razor, we assert circularity is more general than linearity, because linearity can be understood as a special instance of circularity, with feedback so weak it may be ignored. This argument can be related to early cybernetic arguments about the absolute roles of controller and controlled. It seems these roles are determined energetically: The (traditional) controller uses little energy to affect the behaviour of the controlled, which expends much energy (to affect, in turn, the behaviour of the controller). Accepting that cybernetics is concerned with the form of systems (rather than their physics), the energy argument disappears. When linearity is considered as circularity where *feedback* is ignorably insignificant, we no longer assume those absolute roles (controller and controlled), along with other familiar concepts, such as coded (as opposed to conversational) communication and linear causality, and so forth.

Generalisation to the circular characterises cybernetic systems and the cybernetic way of understanding the world, where interaction, conversation and other similar actualisations of circularity provide both material for study, and cybernetic models through which to carry out that study. Understanding circularity-as-form must include the observer (as an actor in the system), and admitting that which is examined as examinable: confirming a separation between form and content that allows us to, for instance, discuss experience-in-general as form, while insisting that each particular experience is unique, its meaning belonging to each occasion-and-(actor-)observer.

The cybernetics of such explicitly circular systems was called *second-order cybernetics* (see e.g., Glanville, 2002b): a distinction important when we first realised circularity was crucially central to cybernetics. Second-order cybernetics particularly

5. The Josiah Macy Foundation supported ten conferences from 1946 to 1953, chaired by Warren McCulloch, on “Circular Causal and Feedback Mechanisms in Biological and Social Systems.” Much of the thinking that established cybernetics was developed here: Wiener was a participant. Wiener’s MIT dinners and a prior Macy Conference (1942) developed a basis for an transdisciplinary meta-subject, which Wiener named “cybernetics”.

insisted on the involved observer making (and accepting responsibility for) his/her observations: a circular process where each observation changes both observer and observed, leading inexorably to new observations!

The observer observes; what is observed changes; a new observation is made. Observation is circular, and circularity is the necessary form for interaction (a key notion in de Zeeuw's approach, see Glanville, 2002a.)

Third Friend: *The Turing Test*

The Turing Test is a conceptual tool, like Occam's Razor. Both are hard to pin down precisely, yet share an intuitive obviousness. The test was introduced by Alan Turing (1950) in the article "Computing Machinery and Intelligence." Its original formulation is frequently considered over-complicated and it is often presented in a simpler form, as here.

To transcend questions originating in Lady Lovelace's assessment of Babbage's engines, dating from the 1830s, concerning whether Artificial Intelligence might, in theory, be possible, Turing proposed changing from a test based in definitions of intelligence to one based on recognising intelligence in operation.

The paraphernalia of the Turing Test is a communication link that can be used with equal facility by both human and computer. Our task (as the human involved) is to judge whether an interactive behaviour with some respondent is intelligent (within a particular context). We (humans) are in a separate space from the respondent (either human or machine), connected only by the link. By definition, we cannot know which our respondent is, but, by interacting with it we may guess (see the next, Black Box, section). Judging it intelligent depends only on us recognising the quality intelligence in the interaction: whether human or machine is of no significance. If we determine the behaviour is intelligent, finding our partner in interaction is a machine should make no difference to our judgement.⁶

Behind the Turing Test is the remarkable assumption mentioned above. Turing does not assume intelligence is a property, but a quality attributed by an observer (you or I) to the behaviour we observe of some entity (object) we are in interaction with: thence, a quality attributed to an object by an observer, consequent upon their interaction. It is recognised rather than measured, not belonging to the "intelligent" object, but is rather a gift from the observer to that object, resulting from the interaction. Thus, questions about whether the object can be intelligent or not become irrelevant: intelligence is not seen as being in the object, but in behaviours in interaction, an attributive gift from an observer (Glanville, 2001a).

Turing's Test implies one further assertion: We should trust experience. We should question what theory tells us, if it counteracts "pure" experience. This does not

6. The Turing Test can be used, in generalised form, to determine the existence of any quality in any interaction: It can remove problems of prejudice including those based on race, colour, religion, gender and sexual orientation, although logic does not, of course, preclude emotional responses. Nor can the excuse of trickery on the part of our partner be sustained: for we observers judge that we recognise a particular quality.

dismiss theory, but demands a relationship between theory and experience in which experience is given proper authority. Experience is all we have.

The outcomes of Turing's Test are owned by and the responsibility of the observer(s) in interaction with their partner other(s).

Fourth Friend: *The Black Box*

The concept of the Black Box was introduced into cybernetics primarily by W. Ross Ashby (1956). Attributing the notion to James Clerk Maxwell,⁷ he suggested everything might be considered a Black Box. The Black Box allows us to remain profoundly ignorant, yet to act: While we do not know, we can, nevertheless, build descriptions (acquire knowings) allowing us to act, as if we knew. I have elaborated Ashby's position in this journal recently (Glanville, 2007a), where I summarise how the (Ashby) Black Box works thus:

An observer notices a change. To account for this (s)he installs a device where (s)he observed the change. The device is a Black Box, which has an outside and is assumed to have an inside, which, however, cannot be examined. The purpose in installing this device is to postulate a mechanism accounting for (generating) the change (in the observer's realm of observations). No matter that we believe we understand what's going on inside, the device cannot be opened: it remains black.⁸

The observer develops and tests suppositions about the Black Box's mechanism by interacting with it (providing inputs and observing outputs). When, through this interaction, the observer has constructed a mechanism accounting for the observed changes, we often say the observer has whitened the box. This whitening takes place, however, between observer and Black Box, existing in the description built of the proposed mechanism: it is not in the Black Box, which we cannot (by definition) look into. Indeed, the Black Box is a fiction inserted to allow the construction of a description giving us a mechanism. We observe and extend the change and construct the account, through interaction with what is, in effect, a fantasy.⁹

But Ashby also suggested the Black Box might be considered universal. I believe this is a prescient understanding: The Black Box is the best available description of how we confront the world. However, accepting this entails we remain fundamentally ignorant of any posited, external, mind-independent reality—or even whether there could be such a thing. We cannot know. With the Black Box, we do not need to. Thus, the Black Box can be understood as the root device of what is now called *radical constructivism*.¹⁰ These extensions of how we understand the Black Box are mine (Glanville, 1979, 1982). They tell us that the outcomes of installing and observing a Black Box are owned by, and the responsibility of, the observer.

7. It has always been difficult to trace this attribution. I tried for years before Dr Albert Mueller (at the University of Vienna) informed me the source is Maxwell's (1881) "Theory of Heat."

8. Remember, we invented and placed the device.

9. This is no longer quite Ashby's account, for he appears to consider the Box may be whitened, without being clear how.

10. Although it is possible to cite a key Glasersfeld paper, the publication of a collection edited by Marie Larochelle gives a much wider source, and is a delight. See Glasersfeld (2007).

The Black Box is the epitome of Bateson's *explanatory principle*. It shows us clearly why no scientific theory can be held to be absolutely true: for, no matter how well the description we develop with a Black Box stands up, we do not see inside and so the Box can never be whitened.¹¹

The Black Box isn't really there,¹² and it has no connection with what, if anything, happens in whatever mind independent reality there may or may not be.

Fifth Friend: *The Principle (Law) of Mutual Reciprocity*

The Principle (or Law) of Mutual Reciprocity states that, if through drawing a distinction we are willing to give a certain quality to that we distinguish on one side of the distinction, we must also permit the possibility of the same quality being given to that which we distinguish on the other side of this distinction:¹³ If I distinguish myself from you and I consider I am intelligent, I must consider that you (which I distinguish from I) might also be intelligent.

The principle does not require the quality be claimed for both sides of the distinction, only that it might be: The principle concerns possibility and potential, not actualisation. This relates to the act of valuing: If we are to value something, we must accept the value might be zero. A quality may appear on either side, but, its value being zero, it may appear absent. However, the potential remains.

This Principle derives from the condition of drawing a *first* distinction. I have argued (Glanville, 1990b), that, distinguishing ourselves, we must also distinguish an other: There is no distinction in a world of one, so there is no point if I distinguish myself, but distinguish no other from which I am distinct (what does it mean, to be distinct, when I am alone?). This is the source of the principle: On either side of the distinction is an assumed potential sameness: In the first distinction, we may call this a sense of self. As a consequence of (the reason for) distinction drawing, it is present not only in the first distinction, but in all distinctions. It is general.

This principle explains how qualities such as intelligence may be understood to belong to both participants in an interaction; shared, in the between. Unfolding, I can say that, recognising intelligence in you I confirm it in me; and that you, acting in the intelligence I recognise in you, confirm my intelligence. This suggests that generosity of approach is important. We should look to find and affirm qualities both in another and in ourselves. We seek to welcome these qualities, rather than deny them.

In this journal, I have argued that favouring such positive qualities is a major benefit of second order cybernetics (Glanville, 2004). We can develop a richer account of being human than the impoverishing approach so familiar in the materialist,

11. It can be seen as providing a mechanism (metaphor) supporting Piaget's views of how children build their pictures of their worlds.

12. I cannot resist a reference to the great Captain Beefheart, aphorism author, painter and rock star, who said: "I'm not really here. I just stick around for my friends." A true Black Box!

13. I am using the notion of distinction introduced by George Spencer Brown in his *Laws of Form* (1969), in the extension I argue in Glanville (1990b), where I insisted a distinction consists of 3 distinguished elements. I first introduced the principle in Glanville (1990a), written a couple of years before my 1990b paper.

utilitarian interpretations, which assert our essential selfishness, suggesting the model for human behaviour is mean and grabbing. In contrast, I revel in our generosity (Glanville, 2001c).

Thinking with My Friends

Why have I referred to these thinking devices as friends? Because, as with my human friends, I like to be with them. I enjoy their company. I like doing things with them, especially when I am surprised in our interaction and can consequently increase the range of my ideas. I will demonstrate this by thinking with them about the already mentioned subject, intelligence.

*Locating Intelligence*¹⁴

How do we come to consider intelligence? Traditionally, we have thought of intelligence as a property of the individual in whom we have recognised it. However, our experience of intelligence is, I believe, through interaction. We assume the other may be intelligent,¹⁵ and confirm it by interacting with the other's behaviour, recognising the presence of intelligence in the behaviour of the interaction.

Consider further! Intelligence is a quality we recognise in others as we account for their behaviour. This behaviour is formed in interaction. So intelligence is recognised as arising between us (as shared) in this interaction, not in one participant or the other, no matter that we may express it by a statement such as "You are clearly intelligent." We give it because we recognise (and can recognise) it in our shared behaviour, in our interaction, and it is through this that we can come to consider ourselves intelligent. Thus the attribution to another is a sort of mirroring activity.

The intelligence we recognise is not recognised in individuals but it in behavioural interaction. Although we maintain intelligence is caused by individuals in the interaction, this intelligence is not observed in them, but in the interaction that is their shared behaviour. I believe this is how we meet intelligence, in everyday life. Attributes do not emerge. We recognise them. Their commonality is not as properties of objects, but as attributions to (and from) interactions in the mind of the attributor. (I will, however, accept that we may consider the self-attribution of a quality as treatable as a property.)

14. De Zeeuw's text for the conference "Problems of Individual Emergence" included intelligence as a key example. Signalling intelligence out as a key example also makes it more than an example, perhaps an exemplification.

15. We have traditionally associated intelligence with human beings: hence we question the possibility of intelligence in machines, the original reason for the invention of the Turing Test, on which this thinking is based. We do not question intelligence in humans!

My Friends and Intelligence

Finally, I will examine the contributions to this understanding of intelligence of my five friends (in reverse order). In this manner, I will show their power as thinking companions.

My description of the way we experience behaviours we come to call intelligent exemplifies the Principle of Mutual Reciprocity in action. The intelligence I recognise in the other is the intelligence I recognise, existing in shared behaviour, arising in interaction (as I observe it). I think of this as occupying a space between (hence the importance of the in-between in the interface, discussed in Glanville, 1997). I recognise intelligence as a quality I construct from observed behaviours in a shared interaction. It is both mutual and reciprocal: What I have you have. I know I have it, because I give it to you and you give it to me: We are co-partners. This is Friend Five.

Yet I have made no assertion about properties I take to belong to my co-participant(s) in the interaction. I know nothing of you – my other – except what I observe in interaction with what I call your behaviours, where I recognise intelligence. Note that I did all this. I have treated my other as a Black Box. In the sense in which I have qualified the term, I know, and can know, nothing of what happens in this other. I can observe behaviour in interaction with me (which is how I come to believe (s)he is present in our world). From this, I can build a description allowing me to attribute the quality intelligence to the interaction and to each participant. Thus, we attribute (if we do) the quality to the other, without having to know what happens inside the insideless and fabulous Black Box (and, hence, not knowing any properties). This is Friend Four.

The means, by which we do this, is the Turing Test, which can be seen as the Black Box, made operational. The Turing Test allows us to attribute the quality of intelligence regardless of the nature of the object to which we attribute it (it allows us to step outside our prejudices)! The Turing Test achieves this because its operational premise is, in effect, the Black Box. We never know what is inside the Black Box. We observe behaviour, interact with that, and build descriptions that seem to account for the behaviours. We express the building of the description, in this case, in giving the quality of intelligence, thus performing the Turing Test. This is Friend Three.

The way, we build descriptions that work, is through interaction: that is, productive circularity in shared behaviour. The processes mentioned above are circular in form: I do something, and you do something else (which I take to be in response). As I begin to build my description (and, I suppose—by the Principle of Mutual Reciprocity—you do too) I extend the value of my description by adjusting (controlling) the input in order to test how the description continues to work. Such testing lies at the base of most accounts of science.

Circularity is further involved because it creates a form for interaction, passing both the interaction itself and the quality under consideration (i.e., intelligence) between the participants. This is Friend Two.

Finally, intelligence is recognised in the behaviours exhibited in interaction. It exists in a description of these behaviours. Firstly, in the description by which we

attach the label *intelligent* to this behaviour. Secondly, and as importantly, in the recognition that the behaviour expresses (describes) the object. Intelligence is seen not in the object to which we will attribute it (if this object is a Black Box, we cannot see in it), but in a description of the object's behaviour-in-interaction. The attribution of the quality (i.e., intelligence) is not in the object but is in the description (of the behaviour). Since the quality is not in the object, it cannot be (inherently) a property of the object. This is Friend One.

Conclusions

It is, perhaps, clear that my Friends are inter-connected: They work together as a team, and they imply each other. They are related in other ways, too. For instance, the Black Box, Turing's Test, and the difference between the description and what is described are all related to a notion of ignorance, a much underrated condition. I believe, if we have anything at all, what we have is experience: If we seek reality, that is where our realities can lie. I believe this way of thinking is powerful and general. Many qualities other than intelligence are well treated in this manner. Perhaps all qualities are.

Of course, this sounds like a creed. It is. The premise it is developed from is no less a belief than any other premise. And the argument leads to positions firmly founded in belief.

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