

Black Boxes

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In a recent issue of this journal (Glanville, 2007), I introduced and explored the notion of the Black Box. Invented as a *gedankenexperiment* (thought experiment) by James Clerk Maxwell, and cited by Norbert Wiener as providing an approach that engineers found useful when faced with the unknown, it was really put on the cybernetic map by W. Ross Ashby, and it was mainly Ashby's interpretation, often both surprising and surprisingly modern, that I investigated in that column.²

Over the past more than 30 years, I, also, have worked with the notion of the Black Box, contemplating the presuppositions and assumptions involved in the use of the concept, and developing what I hope is a richer understanding and interpretation of what its value might be. What appealed to me most in Ashby's work was his assertion that perhaps everything could be looked at as a Black Box—how do we learn to use that unfamiliar doorhandle? I have now come to realise that, strangely, the work I have done developing this concept does not appear in any concentrated and focussed form, but as observations and asides in other papers, for instance my recent column “Five Friends” (Glanville, 2008). There are some focal papers, but they are relatively few and generally from early in my investigations. Since these investigations lead to some somewhat surprising understandings (I also have been surprised, and my opinion has changed: for instance, in respect of whitening the Black Box), I decided to compose them together here, as a counterpart to the earlier paper in which I discussed Ashby's work.

Putting the Black Box in Place: Its Status

The Black Box, in the sense that Maxwell introduces it, is a *gedenkedexperiment*—along the lines of his other famous *gedankenexperiment* known as Maxwell's Demon—rather than a lump of physically present material, square or square-ish in shape and black in colour. The blackness of Maxwell's box is taken (as an allegory) to indicate that we can see nothing: it is dark. By extension, the blackness is taken to indicate that we do not know what is inside the box and cannot see what (if anything) is within. The boxiness of his box is taken to indicate that we assume there is some mechanism inside the box, even if we cannot see it.

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1. Ranulph Glanville, CybernEthics Research, Southsea. Email: ranulph@glanville.co.uk
 2. Dr. Mick Ashby, Ashby's grandson and a prime mover behind putting the Ashby journals on the web, pointed out to me, in respect of the earlier paper (29 December 2008, private correspondence), that Ashby, in his journals, examined the relationship of the observer and the Black Box in 1954 (<http://www.rossashby.info/journal/page/4840.html>), and the way the Black Box affects the observer in 1953 (<http://www.rossashby.info/journal/page/4480.html>). These examinations look suspiciously close to second order cybernetics, in their concerns.

In contrast, the Black Box is taken quite literally as a physical object in later use (specifically in engineering). Engineers, faced with (sealed) objects which they believe have mechanisms leading to certain behaviours, build descriptions that explain a postulated connection between an input to and output from the box by means of a mechanism (often expressed as an equation). One dangerous example is an object that might be a bomb. When the engineers are confident of the correctness of their explanation, they consider the box *whitened*.³ Sometimes they will then open the (physical) box to confirm that it actually contains the mechanism they have deduced, possibly destroying it in the process. Of course, often they cannot open the box. And those of us who prefer Maxwell's gedankenexperiment box do not accept that that box is openable (or that it can be whitened), anyhow.

Later still (1956), an Australian engineer, David Warren, created the Black Box with which we are probably most familiar. This device (a.k.a. the flight data recorder) records the behaviour of aeroplanes (initially), helping us understand what has happened when there is a malfunction. It was developed following the crashes of the Comet jetliner in the early 1950s. This Black Box is normally painted orange!

I distinguish these latter two versions of the Black Box as weak versions of Maxwell's gedankenexperiment Black Box. It is Maxwell's Black Box that is the central concern of this column, rather than the later and weaker engineering upstarts. It is important to the development of this paper that we remember our Black Box is not a physical object, but a concept (a phantasm) we use in order to develop what Bateson calls *an explanatory principle*, which we evoke when we are faced with an uncertain confusion. It has no substance, and so can neither be opened, nor does it have an inside. Its function is to allow the creation of an explanation of some observed behaviour and any object/mechanism that seems to generate this about which we are uncertain. It is the invention of the observer.

Finally, there is the so-called Black Box Theatre: a minimalist room which can be configured in many ways according to different dramatic needs, and which is generally painted black. For all its charm, this is not the sort of Black Box we are considering.

The Causal Relation Between the Input and the Output

We may ask how we might use such an ephemeral concept as Maxwell's Black Box?

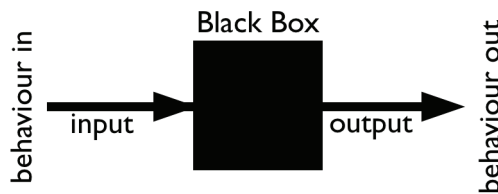
Let me explain it thus. Imagine you see something going on, you don't know what, but there seems to be some action which you might be able to call behaviour. It's unclear, it's a mess, but you're curious.⁴ To investigate this, you impose a Black Box on the mess (as an ordering concept). The advantage is that the Black Box allows you to structure what you see going on, which you convert into an input to the Black Box,

3. Wikipedia (http://en.wikipedia.org/wiki/Black_box, retrieved 6 March 2009) gives the author of this approach as Wilhelm Cauer (1941), although, apparently, he did not use the term *Black Box*.

4. Or you might be looking at something that you have no familiarity with, and be wondering what it does, which is to say, how it behaves

and its believed-to-be-consequent output (i.e., into behaviours). So the unclear chaotic mess is (re-)constructed as behaviours associated with an input-output machine, where the machine is the Black Box (the home of the mechanism): and therefore we don't know how it is made up. By manipulating the inputs and recording the outputs, it is possible to look for and test a pattern that links them (Bateson's explanatory principle). Note that we've no idea what the Black Box is actually doing. (Well, it's not doing anything because it's just a phantasm and it has no interior, and because we have provided the structure that converts what we saw going on into a structured link—now assumed to be the mechanism that is presumed to be inside the Black Box, but we'll ignore this for the moment.)

Figure 1:



The Black Box is inserted to create input and output through which we construct the change of behaviour in to behaviour out.

Thus, the installation of (the concept of) a Black Box allows us to create input and output together with their associated behaviours, and the consequent construction from our observations of a pattern that connects gives us an explanatory principle. In an early paper (Glanville, 1982), I characterised the Black Box that generates the explanatory principle thus:

- a. being believed to be distinct,
- b. having observable (and relatable) inputs and outputs,
- c. being black (that is, opaque to the observer).

The Black Box may be thought of as an embodiment of George Spencer Brown's (1969) distinction, or, perhaps, as a machine for distinguishing (input from output, and hence value from value). In this interpretation, the Black Box is both the mark of the distinction and the mechanism which generates the observed change between in and output (that is, between the value on each side of the mark of distinction).⁵ Thus, the Black Box maps onto Spencer Brown's command:

Draw a distinction = insert a Black Box

5. I doubt Spencer Brown would like this metaphorical elaboration, for it gives mechanism and dynamic to his logic.

(the Black Box is analagous to the mark of the distinction, performing much the same function of creating value.)

Because we take the pattern we create to account for our observations as general, we treat the mechanism in the Black Box as cause. (When we do this, and continue to believe in the viability of the causal mechanism postulated, we have Foerster's (1993) so-called *trivial machine*.)

But note, all this takes place in the observer (or as Ashby called him, the investigator), who is an active participant in forming and operating the Black Box. It is the observer who introduces the phantasm that is the Black Box, who creates the input and output, who modifies the input in the light of the output, who constructs the pattern that connects and hence the explanatory principle (and who tests it), in interaction with the Black Box.

History and Repetition

The Black Box is, I believe, an outstanding investigative device for the type of study that may generate scientific knowledge. In order to find a pattern, the output of the Black Box is recycled to become the input, so that regularities may appear. These regularities include repetition of behaviours: through investigation, we come to expect the same input (value) to generate the same output (value); and we expect a related input (value) to generate a related output (value).

But we can never be certain of this regularity, because the Black Box is a device we use to form a mess into an order. It helps us construct pattern by creating inputs and outputs taken to be connected through the Black Box by means of a gedankenexperiment which operates through the conceit of a virtual machine – a mental conceit, used by the observer. Its value lies in the *blackness* which permits us to postulate mechanism in a phantasm. It is this blackness that permits us to create our explanatory principles. Remove the blackness, and it is no longer fit for purpose.

Thus, we do not know, through using the Black Box, what is actually happening. We have, instead, a way of generating what we determine is a pattern, a (radical) constructivist machine! We cannot properly talk about a cause, but, rather, an explanation. We have a determinable history, but we do not have a determinable future (this is, or course, an example of Hume's problem of induction). If we believe repeating the input will produce repetition in the output, we can indeed act as if we know what will happen, but this is a belief, and it exists *as if*. In effect, the Black Box confirms Wittgenstein's historical assertion to the effect that, because something has always happened, we have no guarantee it always will.

This process of testing and re-testing is the process of refutation that Popper (1963) taught us was at the centre of science. Every input to a Black Box can be thought of such that it becomes a test of the pattern we have constructed (our explanation). It can confirm this pattern as still valid, or it can give us a resultant output that does not fit. When we make a pattern that persists, we may like to refer to the Black Box as whitened (as a trivial machine), but this is a deceit: The Box is not

whitened, the deduced explanation is simply found to be valid (still). Furthermore, the explanation remains unattached to an actual mechanism because there is no mechanism (or, to be more precise, if there is a mechanism, we cannot know it).

It is precisely the blackness of the (purported) Black Box that gives it its power.

The Contribution of the Observer/Investigator: A Participant

Perhaps one of the most interesting aspects of the Black Box is the role of what is usually called the observer.

One overriding aim of the scientist is to remove himself (as observer) from his work. The intention is to remove individual variations (subjectivity), and to link cause and effect as simply, uniquely and directly as possible. He is the observer of what happens, taking no active role, detached and without influence on the events that unfold. The Black Box looks, at first sight, like a device which allows the sort of cool, remote observation we have learnt to accept as scientific observation. What could be more scientific, more objective, than looking at an input/output device, into which you can't see, and simply observing, and then deducing the pattern that connects between, these inputs and outputs? Wasn't this the basis on which behaviourists attempted to make a scientific psychology?⁶

Yet appearance is, as so often, deceptive. The observer (Ashby's investigator) not only provides and places this phantasm, the Black Box, within the system being observed, but also determines what are inputs and outputs, invents the patterns (the observer cannot see inside the Black Box but constructs explanations that both account for past, observed behaviours and predicts new ones), and manipulates inputs and outputs to expand the range of observations (thus testing the range of value of the patterns that the observer has invented, and also increasing the range by means of predictions based on these patterns). The criterion for the testing we do is, however, viability, rather than truth.

And, since the Black Box is an invention of the observer, the observer's gedankenexperiment, the observer has an essential responsibility for the whole set up: the Black Box is a product of the observer's imagining. It can never be independent of the observer's actions. It exists through and because of his thoughts.

Thus, in every respect the observer has a central role in the deployment of the Black Box which, without the observer, is not even a concept, let alone meaningful or usable. The observer is, at very least, a partner in the activities that he observes. If the scientific observer attempts to be an observer of what goes on, a reporter whose presence barely touches what is reported, the Black Box observer, an observer in the behaviours and actions—in making what is observed.⁷ The observations made using a Black Box are not of behaviours of the Black Box alone, but are of behaviours shared between the Black Box and the observer. The Black Box, by itself, does nothing. I, the observer, place it where it is, and I behave with it in determining and valuing inputs

6. See, for instance, Friedenbergr and Silverman, 2006.

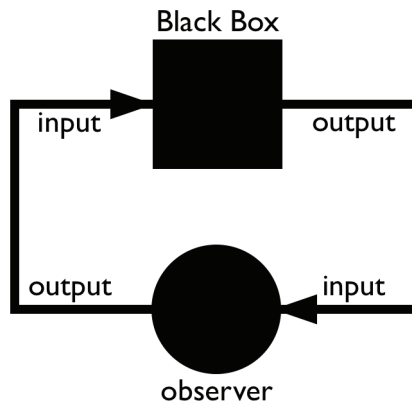
and outputs. The patterns I create, the (as I called them in my early papers) functional descriptions that I, the observer, develop of and in co-operation with the Black Box, are shared between us, and find their location not in the Black Box (or in me) but in the space between, where their co-operation can take place. The point is one of location: Where do we find these behaviours? And the answer is in the spaces between Black Box and observer.

We cannot know, any more than Heisenberg's observer can know, how much of what we observe and account for comes from within us, and how much from without, because there is no absolute and examinable separation. We find ourselves in the radical constructivist position. That is a position that does not deny the existence of a mind independent reality (out there), but it does not affirm it, either. It accepts it is in the realm of the unknowable, and leaves it there. As Heinz von Foerster (1995) tells us: "only *those* questions that are in principle undecidable *we* can decide," which I take to mean that when faced with an undecidable proposition, such as that there is a mind independent reality, there is no (in principle) argument that will properly decide this for us and so the decision as to whether to accept the proposition or not is ours to make (and to remake), freely: indeed, it is only these questions that we are free to chose our answers to. What Foerster does not mention is a third position I hold to be especially valuable—the position of not deciding, perhaps not even being interested in the decision, but of maintaining undecidability. If it is up to us to decide on which side of the fence to be, we also need the people who build and maintain the fence for us to be on one side of, and those who remain stubbornly undecided, remaining on this fence itself.

What we can, however, assert is that the system is not the Black Box, but the Black Box and the observer. Thus I have recently found (as pointed out in my previous paper) I am arguing much as Ashby did, if a little more extensively.

7. It may be helpful to make a comment, here, on the use of the word observer. The participant observer is no novelty. Recent science has clearly been infiltrated: the observer in both Einstein's relativity theory and Heisenberg's uncertainty principle is a participant, influencing the outcome of what is held to be going on. In social sciences, the observer effect has been known for at least 150 years. It is not strange to think of the observer as a participant, although there are those who believe that the meaning of the word observer is fixed in a non-participatory world, and that it should not be used. For some, this is a matter of great concern. For me, it is not: the (social) meaning of words changes as we use them, and our thinking changes, in part as a result. I do not find myself suffering from the difficulties that those who object to the use of the word observer suffer from, and so I continue to use the word I grew up with, but have learnt to understand differently. I interpret it as a measure of changes in my thinking.

Figure 2:



The Black Box and the observer linked in a circularity: showing the role of the observer in inserting the Black Box and determining inputs and the relationship between input and output (the pattern, or functional description). The Black Box and observer, together make a (new) whole.

So what of the relationship between the Black Box and the observer?

About twenty years ago, I introduced what I call *the law⁸ of mutual reciprocity*. This grows out of considering what happens on each side of a Spencer Brown distinction, and I argue that, where there is a distinction, and we attribute qualities to one side of the distinction, there must be a possibility the same qualities might be attributed to the other side of the distinction, although there is no need or necessary reason for this possibility to be taken up. That law, in turn, derived from my earlier work on Black Boxes, where I described the observer as Black to the Black Box, a point originating in Ashby's suggestion—and my belief—that everything may be thought of as a Black Box. By that I do not mean that the Black Box must be animate or conscious (or not). Rather that, just as the behaviour of the Black Box that the observer responds to is in principle unpredictable (and may be deeply surprising),⁹ so the behaviour of the observer towards the Black Box is also in principle unpredictable (and may be deeply surprising). What can happen in one part (on one side of the distinction) may (but need not) happen in the other. Applying this law, we accept that the Black Box, while we may use it for prediction (and indeed may and do test the validity of our, observer's, invented patterns of behaviour), is essentially unpredictable.

8. or Principle

9. One obvious example of this is how we consider each other. We have no idea what's going on in the head of another we are in conversation with, but we do take indicators and responses and make patterns of how others will behave; and from this we develop those predictions that we sometimes refer to when we talk of knowing how someone will behave. I would also argue that I have no idea what's going on in my head.

A profound ignorance

This leads me to assert that what we know through the Black Box is based on a profound ignorance.

Why? Because the Black Box and the observer are unpredictable to each other. But also because the Black Box is black: it is, by definition, a phantasm and it's unopenable. However, using the law of mutual reciprocity, so am I, the observer, to the Black Box (insofar as we can understand such a statement).

To western ears, this finding may be shocking. It may even move us towards the mystical. It disposes of the attempt to find the ultimate basic units, for instance the supposed particles of matter that our physicists seem to search after: Such particles (if they exist) will be found outside the realm of our epistemological conventions and positions (Glanville, 1980b). The history of *hunt the fundamental particle* might suggest this to us. What we assert is, rather, that behind our inventions there is nothing, a void, which I call a profound ignorance. We do not even build on sand, but on an emptiness, a lack. In building from this un-foundation, we create our patterns and by doing so, knowledge (or, as I prefer to call it, knowing). This knowing is not founded in fact, but in construction. We can, as good constructivists, test it for viability—the Black Box encourages us to. We cannot test it for truth, but it does seem to satisfy the requirement of Occam's razor.

There is, in this sense, no whitening of the Black Box: we never see inside it because it is a phantasm that we, jinni-like, conjure up and place, and because it is defined as black. All that we see is the outcome of our interaction with it. The profound ignorance from which we grow our knowing is guaranteed by the blackness of the Black Box, and it expresses this blackness. We may claim that there must be something in the Box that participates in generating the behaviours observed, but this remains a claim, contradicted by the definition of the Box as black.

There are benefits.¹⁰ In the first instance, every piece of learning we do, and every bit of knowing we learn, is ours. We are free to understand, and we understand as only we understand. We are also responsible: There is no one to blame. This does not mean we cannot learn from others: But that learning and the consequent knowing is, in each particular case, ours, not theirs. These benefits are some of those that I have argued are the implicit ethics of second order cybernetics, and are one reason for welcoming it (see Glanville, 2004). I could argue many of the others but will leave this to other authors, or to other occasions.

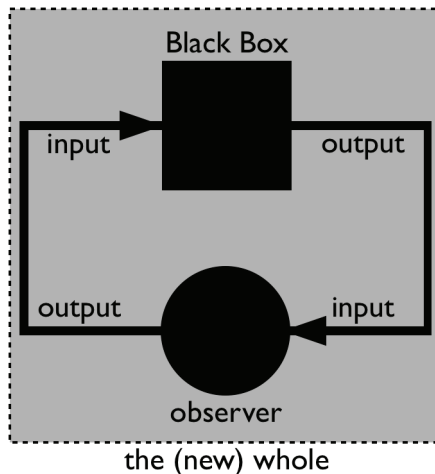
I hope it is also clear that the integration of the observer and the Black Box is an embodiment of the basic premise of second order cybernetics, that it is the cybernetics of observing systems (Foerster et al., 1974), cybernetics when the observer is in the system under consideration (Glanville, 1995). In the case of the Black Box, we insist on the blackness, and hence that we do not enter into the Box, but build a functional description that comes out of our observing. Given the uniqueness of each observer, it

10. I use the word benefit with some concern. I regard the qualities of the Black Box's blackness, here described, as inherently beneficial.

follows that the observations of one observer are not the observations of another. This implies the need to construct a system supporting the notion we each understand differently, yet permitting us to believe these understandings are of the same thing. This is a prime requirement for second order cybernetics to be viable as reflecting the experience we seem to share. (As far as I know, there is only one attempt at this, the Theory of Objects I developed in my PhD Thesis, Glanville 1975.)

Finally, integration of the observer in the loop gives a stronger sense of whole. A whole, seen in the light of this exploration of the Black Box, contains the observer. Talking about it must include the observer talking about it. This confirms a more wholistic approach to the whole (and leads to a potential problem of recursion, which I discuss, and, I believe, resolve in the section after next).

Figure 3:



The Black Box and observer understood as a (new) whole. This whole is also black to an outside observer of it (not shown). This blackness is depicted in this figure as grey (see figure 6).

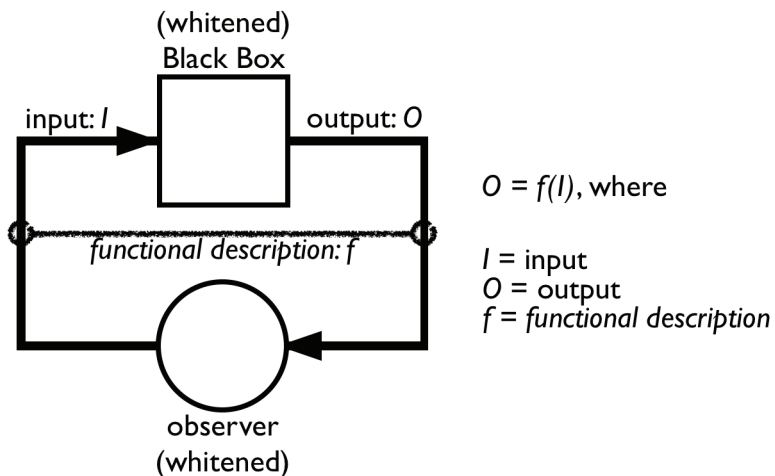
But There is Whiteness, of a Sort....

Yet, we act as if there is a whiteness, of a sort. In ordinary use, we do refer to a whitening of the Black Box, in spite of the arguments I give, above—as well as those arguments I quoted from Ashby in my earlier column. What can this “sham” whiteness be and how can it come about?

The notion of whitening a Black Box is intended to contrast to its initial blackness. As we observe, and interact with, the Black Box, the functional description that we develop as containing and expressing the pattern that the observer invents to capture and account for regularities in the combined behaviour often needs less and less modification to account for this behaviour. As this functional description becomes what appears to be more and more reliable, and to be able to predict the future with

more and more likelihood that the prediction will be (found to be) correct, we may be inclined to take its increasing viability as more than that. When we are so confident that the viability of the functional description has become a (very near) certainty (a truth), we may call the Black Box white, and refer to a process of whitening the Black Box. But while this may be satisfying to the observer, there is a distortion in it. The functional description may become more viable, but that never makes it true. The apparent whiteness is a deceit. It is, however, a deceit we find so useful that we practise it every day, for we do live as though we know what happens in a Black Box, and we do learn to trust our functional descriptions. Under these circumstances we may, and often do, treat the viable pragmatically as true, black as white.

Figure 4:



The Black Box (and the observer), whitened to the other. As the functional description is developed by the observer, and remains viable, so the observer comes to act as though what is in the Black Box is known (although it cannot be).

Transcendence

Let us now consider the relationship between the Black Box and its observer, working together.

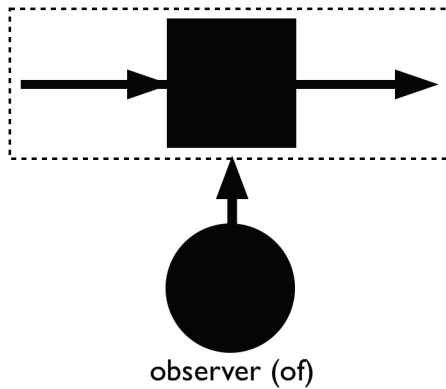
Recollect the Black Box and the observer are linked in a circularity, the functional description that the observer creates deriving from their interaction. It is not an account of the behaviour of the Black Box but of the Black Box interacting with the observer as a (new) whole. The Black Box and the observer are coupled, and the observer is in the system; that is, the (new) whole.

This is probably not how we thought about the Black Box before we began to consider how we use it.

While we now understand that the observer of the Black Box is within a system constituted of both Black Box and that observer, we, nevertheless, have been

observing this (new) whole from outside: There is a second, previously unacknowledged observer (you and/or I) observing this system and reporting back on it. Yet, to this observer, what is going on in this newly constructed whole is, itself, a Black Box, for it contains an unopenable Black Box, and this blackness remains, unchanged, in the new box. It is, thus, transferrable. Put another way, the blackness that appears white to the observer in the system remains black when observed by the observer of this same system. As the observer of, I may (or may not, as I prefer to argue¹¹) be able to observe the observer in (the loop) and know what is going on in that observer, but I certainly have no superior access to the Black Box and cannot open it.

Figure 5:

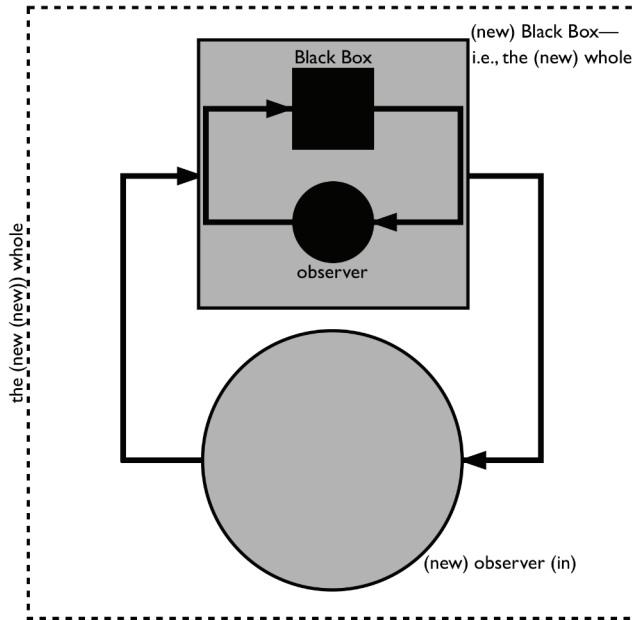


The (pseudo-objective) observer of the Black Box: showing a misunderstanding of the observer's role and involvement as detached and, hence, quasi-objective.

Thus, I have created a recursion. The Black Box and its associated observer in (the original motivator of the insertion for the Black Box), themselves form a(nother) Black Box to their observer of. This observer of becomes an observer in this recursion, becoming an observer in a circularity (and a (newer) whole) with the super-ordinate Black Box that contains the original Black Box and its observer in. For it is the working in conjunction of the Black Box and the observer that makes the observer an observer in rather than an observer of. And, at the same time, the observer addressing the super-ordinate Black Box is an observer of that super-super-ordinate Black Box, about to become an observer in an even newer super-ordinate Black Box, in a potentially eternal recursion: an infinite egress.

11. Ashby makes this point, as I indicated in my earlier paper. The reader will notice the operation of the law of mutual reciprocity introduced earlier in this paper.

Figure 6:



The (new) whole that is the Black Box and its observer, observed by a similarly connected observer, forming another (new) whole and the beginnings of a recursion.

The grey colouring should be read as black. Grey is used only so that the Black Box and observer nested inside the larger Black Box (the Black Box here coloured grey) are visible.

When this (grey) Black Box is treated as white by the observer (when the functional description has a history of reliable viability) the sense of the assertion that “Inside every white box there are two black boxes trying to get out” (Glanville, 1982) can be seen.

I ask myself the following question. What would happen if the observer in all cases were the same? In other words, If the observer can transcend the boundaries of the super-ordinate Black Box that constitutes him and the Black Box of his immediate concern, the Black Box with which he is an observer in the circularity?¹²

I find responses that give rise to two ways in which I can consider the Black Box I have inserted to help me find an explanatory principle for the mess I first saw, and wanted to give order, form and understanding to.

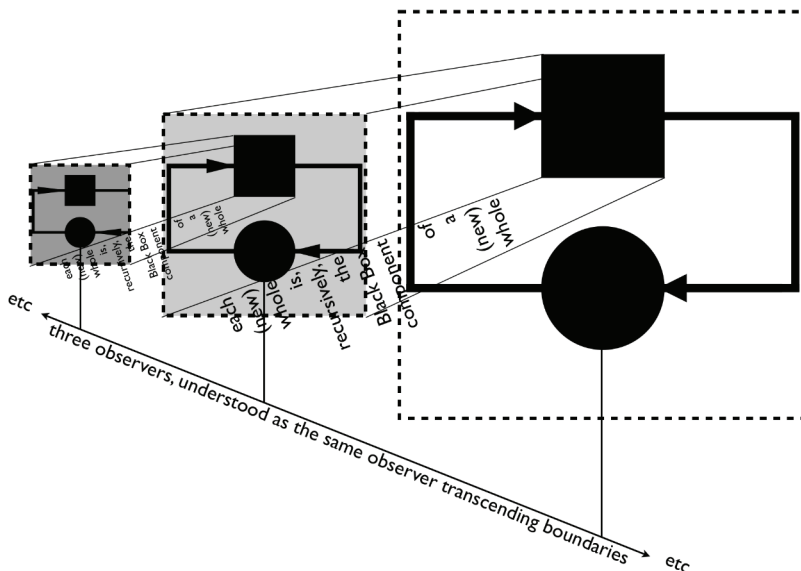
The first is through the initial arrangement I made, where I introduce the Black Box and find myself an observer in a new system or whole consisting of me and the Black Box arranged as a circularity, and a whole. Here, as we have discovered, I can observe behaviours and build a functional description for any pattern I may construct relating these behaviours together. Such a functional description has no truth

12. This is not an extra-ordinary assertion. It is, I believe, common experience that we can be both part of a system and observe it from outside. We may need to switch roles, but sometimes we seem to be both at the same time, whether through switching between the roles so fast, or taking both roles simultaneously.

associated with it: it is, rather, viable while it works. It is a functional description that describes the sense I make of the behaviour deriving from and existing in the interaction between myself and the Black Box. It can be interpreted as a form of testing. It relates closely to the position taken by Popper in *Conjectures and Refutations*.

The second is through transcending the boundaries, where I, as observer, create a recursion in which I am both the observer in the circularity with the Black Box, and an observer of that whole/system, itself understood as a Black Box. Here, the behaviours I consider are those that include me, so they are the behaviours of the whole/system, observed. This is a way of accounting for my involvement in the observing, without having to stand outside. The recursion can lead to an emerging fixed value (the so-called eigen value, of which Foerster wrote, and which Lou Kauffman so elegantly expounds in his column in this journal). It also allows us to take experience, in which the observer is always present, and convert it into (what appears to be) a constant: to create a (pseudo) objectivity from experience in the manner in which Piaget (1955) discusses object constancy (or the conservation of objects), converting experience into what we think of as an object that exists independent of us.

Figure 7:



Three Black Box/observer systems ((new) wholes), part of a potentially infinite series, with each system nesting in the Black Box component of another system comprised of the same units in the same relationship (Black Box and observer): the systems are self-similar.

If the observer in all (three) cases is the same, the observer transcends the boundaries. This may lead to an emerging fixed value, called an eigen value.

I believe it possible that this act of transcendence may be at the heart of human consciousness.

There is an interesting possibility that may now be considered. It concerns my proposal that the observer transcend the boundary. I would like to propose this as an essential human ability, which depends on and creates the ability to both observe and to observe our observing, an awareness which would seem to be an activity at the heart of what we call consciousness (Glanville, 1980a). By proposing this as an essential human ability, I do not wish to exclude other animals, nor anything else we may choose to consider as intelligent: But I do want to suggest this ability is a sign of intelligence and of consciousness, and we humans like to imagine these qualities are our qualities.

Inside Every White Box...

In this column, I have allowed myself what might look like a certain use of double standards. I have both insisted the Black Box is unopenable and, in principle and by definition, black; and accepted that the Black Box may be thought of as whitened.

The difference between the two lies in where we focus our intention, in how pragmatic we are. Rather than double standards, it derives from a shift in intention and purpose. In the first (black) case, we consider the Black Box as introduced by the observer in order to allow us to deal with messiness. In the second (white) we consider how we treat the Black Box, the comfort we gain from it. Because there is a tendency to consider that we can whiten a Black Box, and that doing so opens it, I tend to concentrate on the blackness of the Box, and on the profound ignorance on which we base our judgements of its behaviour with us and the knowledge (knowing) we thus construct.

Nevertheless, the conceit of whitening the blackness is valuable. It allows us to treat of a world of objects, and provides something of a technology that moves us from understanding to acting, from knowledge of to knowledge for.¹³ However, given the recursive construction I have just presented, we should remember that inside every White Box there are two Black Boxes trying to get out.¹⁴

The Black Box is an invention. We can't open it because it's not there. It's a device, a trick, a deceit, a phantasm. In its absence, we can't open it also because it is black by definition, unopenable by dictat. So we build knowledge (knowing) through considering our interaction with it, our behaviour together. But this knowing is always based on a profound ignorance. This is the most amazing ability of all: that we can make and know a world based on nothing.

We can't see inside the Black Box because there is no inside.

13. It is, in this fundamental sense, basic to my recent work in which I have tried to bring cybernetics and design together, in part by indicating different forms of knowing that I have named: knowledge of (what is)—Ko; knowledge for (making the new)—Kf; and transfer knowledge—Kt—the knowledge of technologists that may convert Ko into Kf (see, e.g., Glanville 2005).

14. The two Black Boxes are the Black Box named as a Black Box (to the observer), and the observer, which has been argued to be a Black Box to the nominated Black Box. Of course, the Black Boxiness comes about not through what these may be, but through our attempts to shape and make sense of our experience. They are “not really there,” as Captain Beefheart says.

We can't see the Black Box because there is no Black Box.

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