

# A (Cybernetic) Musing: Invisibility and Silence

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## Cybernetics I

There is nothing new in wondering whatever happened to Cybernetics. Those who have read Flo Conway and Jim Siegelman's excellent biography (2004) of the *Dark Hero of the Information Age*, Norbert Wiener, published a bit over a year ago, will be aware of the strange way cybernetics took centre stage in 1948 and, by 1970, seemed to have died. I have on occasion recounted that a distinguished colleague of mine at University College London, remarked (on being told I was joining the staff in a minor role) that cybernetics was already dead in 1970, which makes me a necrophiliac. Conway and Siegelman's explanation is that Wiener, through the stance he took against big business and the military/national security in the USA, and his willingness to communicate with the USSR (his father, the professor of language Leo Wiener, was a Russian émigré), effectively made sure that cybernetics was seen by those in power in the USA as an alien (and almost treasonable) threat, and therefore it was starved of funds. This is all the more bizarre, since, as they also remind us, cybernetics was the USA's first home grown science. I have heard other explanations; Stuart Umpleby, for instance points to the Mansfield Amendment in 1970 which prevented the US military from funding any further speculative research.<sup>2</sup> From that date, only research with direct military application could be funded, and so the previous main source of funding for cybernetics dried up.

Yet cybernetics has not died. This journal, now in its 13th year, is proof of this. Rather, it has split into two streams: a stream that remains close to what Andrew Pickering, who is currently writing about the four early British cyberneticians W. Grey Walter, W. Ross Ashby, A. Gordon Pask and Stafford Beer, might call ontological cybernetics<sup>3</sup>—a cybernetics based in making actual machines, which he argues was particularly strong in the British foursome; and contrastingly, a more epistemologically inclined cybernetics that is based in the questioning which took form at exactly the moment that US military funding was drying up. This approach

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2. I quote: "Senate Majority Leader Mike Mansfield...proposed the Mansfield Amendment. This amendment to the Defense Procurement Authorization Act of 1970 required that the Department of Defense only support basic research 'with a direct and apparent relationship to a specific military function of operation'. ...When Heinz [von Foerster—RG] left the University of Illinois, BCL and its basic research in cybernetics came to an end. Although the Mansfield Amendment was later repealed, it had the unintended consequences of curtailing basic research in cybernetics in the U.S. and increasing funding for artificial intelligence and intelligence" (See Umpleby, 2003 quoting Hauben, 1999.)

3. The book is tentatively entitled: *Ontology in Action: Cybernetics in Britain, 1940-2000*.

applies cybernetics to itself to explore, recursively, what happens when cybernetics is examined in the manner in which it examines other subjects<sup>4</sup>—a cybernetic examination of cybernetics, nowadays generally known as second order cybernetics.

The first stream has, it seems to me, focussed on the technology of control and has, more or less, reunited with its cousin, control theory. When I look at a cybernetics department such as that at the University of Reading in the UK (where Kevin Warwick is professor), I see a department interested in control, automation, computing, and prosthetics and equipment for space research (arguably another sort of prosthetic). Only yesterday (February 8, 2006) the BBC referred to cybernetics as the technology of brain extension (i.e., in Warwick's manner). Warwick and his colleagues are not interested in cybernetics as philosophy, as a way of casting light on what it means to be human in a cybernetic world. In contrast, the moves that are usually associated with the name of Heinz von Foerster, but more accurately were carried out by a small circus of people with von Foerster as an informal ringmaster,<sup>5</sup> have taken the form of a cybernetics that is essentially rewriting how we understand the world, based on the understanding that our involvement with the world is, at every level and in every form, a cybernetic system. The qualities of the cybernetic systems we initially observed (and created) that are quintessentially cybernetic—the included observer, circularity/feedback, stability and goal, and so on—also govern the way we relate to these systems: In other words, cybernetic observing does not just exist in the system we observe, but in our observing of that system.

The first stream is found quite commonly throughout the world, although rarely under the name cybernetics. There are departments of universities and sections of companies worldwide that are busy building highly sophisticated control systems which achieve marvels and which are valued, in the main, because of the utility of what they do. (Utility is generally considered an obvious benefit.) They continue the revolution promised by early cybernetics, of better automation and more sensitive devices that function better—that is, systems with better implemented control. Thus, we have developed bionic legs on which you can sprint at Olympic speeds, safer and more economical aeroplanes, subtly and predictive adaptive control systems and so on. Following in the footsteps of the musician Peter Zinovief (the first British synthesiser manufacturer, who planned the insertion of a chip in his wrist that would allow him to better control sophisticated electronic music instruments), Warwick experiments on occasion with turning himself into a bionic man by chip supplementation. In fact, I find to my surprise that even after the demise in the 1970s of my alma mater, the Department of Cybernetics at Brunel University, there are two Departments of Cybernetics in the UK (the first is at Reading, the second is at Bradford)—both, unlike the Brunel Department, firmly in this first stream. This

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4. Circularity (and recursion) are at the heart of cybernetics, according to the other source of cybernetics, the Macy Conferences on circular causal and feedback mechanisms in biological and social systems. See the recently republished proceedings in an edition re-edited by Claus Pias (2003).

5. As well as von Foerster as ring master, I would include in the second order cybernetics circus Loeffgren, Günther, Pask and Scott, Maturana, Varela and Uribe, Umpleby, myself and, later, von Glasersfeld and Locker.

stream is often attached to engineering departments or business schools, rarely offering a full cybernetics programme in which a student can study the whole subject in a rounded way, but instead offering cybernetics as a set of approaches and techniques that may be of use to other, host subjects.

In this stream, I would also position those subjects that have absorbed cybernetic thinking and turned it to their own ends—often without any recognition that this is what they have done. Sometimes this has been achieved by a sleight of hand. When the trumpeted and overstated promise of early cybernetics began to fade, much cybernetic work was rebranded (the advertising term is so apposite) as bionics, in order to escape the shadow of these failing claims and retain funding possibilities. Perhaps the first of these rebrandings is Artificial Intelligence, which, also making excessive claims, had to be rebranded as Cognitive Science (in turn being rebranded, some would claim, as Artificial Life). A more recent arrival, complexity science, can also be seen as cybernetics under a new guise—though many critics would claim that it has taken techniques without understanding the wholeness of the field of cybernetics, the insights which generate the techniques and form their context, eventually undermining in the process the base of its origin in cybernetics, and as such essentially misses the point.

The second stream fares a little differently. It is the more explicitly philosophical stream that readers of this journal will be familiar with. I say more philosophical because it is concerned with an examination of the principles of cybernetics: Its explicit origin can be attributed to the idea (written in Margaret Mead's (1968) paper "The cybernetics of cybernetics") that cybernetics might, itself, be subject to a cybernetic analysis and critique. This means it must approach what Alfred Locker used to talk about with such conviction: presuppositions (1980). The inclusion of the observer in second order cybernetic systems is expressed in von Foerster's distinction (made in his 1975 course book *Cybernetics of Cybernetics*) between first order cybernetics as the cybernetics of observed systems, while second order cybernetics is the cybernetics of observing systems.

This stream is not (in my view) a stream in which application or use are given the normal and all too familiar precedence. It is a stream better thought of in terms of beauty, of making an understanding of the world in which we find ourselves that brings pleasure and delight and which resolves (some) problems we had, in some cases by recognising that they are insoluble. (One such is the undecidability of whether there is a mind independent reality or not. Von Foerster made a collection of such undecidables, which you can find on the Cybernetics Society's web site [<http://www.cybsoc.org/heinz.htm>].) As a philosophical position, second order cybernetics makes sense of certain conditions we could not previously make much sense of, and validates the approach of cybernetics (circular causality, in a nutshell) by applying it to itself, thus acting with a particular and acute rigour and consistency. It also gives us a way of considering what happens when the observer is not excluded: a situation understood as more and more common and relevant nowadays. While the observer's presence is currently certainly accepted in small scale physics, it is also explicitly

present in any field involving human action or which involves discourse and debate: in a word, interaction. (Hence my interest, explored in the penultimate issue of this journal, in what I have called *knowledge\_for*.)

This stream is, as far as I know, completely hidden in the university programmes I have referred to, not appearing as a stand alone course anywhere, being taught, instead, under various euphemistic names. The central problem it approaches has been seized as its own by post-modernism, which dominates in philosophy departments—to the extent that few have even heard of (second order) cybernetics. Nevertheless, it has been central in family therapy and some psychological approaches, particularly those that are dialogical in a Batesonian (or conversational in a Paskian) sense. It is present, as I have remarked in earlier columns, in and as design.

And yet... In spite of all, cybernetics seems to keep rearing its head. And, while it's not my intention here to argue whether cybernetics has been used or abused, I do want to consider this constant popping up in the face of its apparent demise. Did cybernetics really die, has it been disassembled and scavenged, or doesn't it, in spite of everything, survive somehow in a secretive life—and, given that, will it ever resurface? And, for that matter, am I liable to be called a necrophiliac?

In earlier papers I have argued using a metaphor, that we have treated cybernetics like a tool box full of tools, which we took to the building site and left, being surprised that when we didn't care for it the tools disappeared, even eventually the tool box! In this manner I believe we threw away our subject, which is why we have now to nurture and develop its integrity with such sensitivity. But von Foerster, for instance, argued that this process did not lead to loss, but to ubiquity. In his view (as we debated in many conversations), cybernetics had been suffused into everything and is everywhere.

So where do we find cybernetics now? Where, apart from the hidden university programmes I've pointed to can we find it, if anywhere at all? Where do we look for cybernetics?

Towards the end of last year, I was sent two books, both from the publishing house John Wiley and Sons. Neither of these books is ostensibly about cybernetics: both are based in design. The first to arrive was Leon van Schaik's *Mastering Architecture*. The second, David Grahame Shane's *Recombinant Urbanism*. Both are highly illustrated volumes by very distinguished practitioners of their trades, and both have been anticipated for many years.

And both are partial answers to my question about where to find cybernetics.

In case this seems an odd place to discuss books on design, I shall argue that these two are full of cybernetics. This is not perhaps so surprising: in the 1960s and early 1970s, architectural education reflected the preoccupation in the profession with cybernetics (systems)—not that that preoccupation was exclusive to architecture. In fact, even in the 1950s architecture concerned with the urban scale and industrial processes was dominated by a systems derived notion, *infrastructure*. At that time the notion of systems and the use of the word cybernetics was extensive, and some of the classic cybernetic texts were created within the context of design (for instance,

Christopher Alexander's *Notes on a Synthesis of Form*, 1964). What is surprising is the durability and all-pervasiveness of the notions of cybernetics and systems in these books: Both are redolent of these. For these two writers, educated in the UK, one now in Australia and the other in the USA, systems and cybernetics are indeed alive. And, although neither would claim to be cyberneticians, both are subject to what Gordon Pask (who both knew) told me as he scooped me up to be his doctoral student: "You may not think you know much about cybernetics, but you know far more than you realise."

## Review I

From the point of view of cybernetics (and systems), Shane's book is replete with familiar terms. From cybernetics itself we get, for instance, steady state, feedback, network. From other closely related areas we get rhizome, collage, recombinant. It is a book that is strongly founded in that optimistic time when cybernetics would solve everything and architects could do anything, the 1960's. The author is not flawed in holding onto this belief, but the influence of the age is not hidden. In this respect, *Recombinant Urbanism* can be understood as rooted in unreconstituted cybernetics.

For instance, there are fascinating accounts of the urbanistic and planning approaches of the Catalan Idefons Cerdá who already in the 1867 was describing the city as an immensely complex, yet trivial, machine which has found form in the wonderful city blocks of Barcelona. Not only did Cerdá treat the city as a machine, he also treated it as an ecological entity (an outcome of his approach to the city). Thus each block could take a number of forms dependant on the capacity of the block to sustain these forms, and the servicing of the blocks was ecologically sophisticated, with, for instance, waste being processed on site to provide gas for street lighting. Within an associated tradition, Shane's account of the radical work of Kevin Lynch in effectively founding the field of Urban Design is revealing. Not only did Lynch deal with the picturesque—the way the city can be understood as the unveiling of views and vistas—he also analysed the basic city form, the city as machine (which is where network and hierarchy, for instance, appear) and the city of faith, that is the city as cosmological mirror. These and other related understandings are developed through the work of Cedric Price and the Archigram group (both of whom worked with Gordon Pask), who lead the theoretical rethinking of, particularly, the permanent in the city at exactly the time Shane was a student. These examples indicate, I believe, the essentially cybernetic basis of the study.

Shane then moves to a change in understanding of the city, away from the theatrical to a view that is based in complexity and in recognising the significance of the experience of the individual: in other words, the city as an object subtended under the gaze of the plethora of individual views of a city's inhabitants. A concept not familiar in cybernetics but potentially of great value is introduced—collage. The term was first used by the Dadaist artist, Kurt Schwitters and refers to the making of a (new) whole by sticking together scraps from elsewhere. We can think of how we

understand the city as the making of a personal collage, just as we can see the city, in its development, its reflection of different cosmologies, as a historical collage. Shane explores collage through, first, the eyes of his teacher, Colin Rowe, and then expands it to various expansions of the meaning: bricolage, montage and assemblage, for instance. The suite of ideas deriving from collage gives a way of approaching the importance of the presence of the observer and thus to the removal of the master architect/planner (and plan) of the city, an act which approaches the heart of second order cybernetics. Rowe's original work is contemporaneous with the development of second order cybernetics. We might profit from a consideration of collage and its derivations as a systemic concept!

These expositions form a background study to the development of Shane's own synthesis based on the concepts enclave, armature and heterotopia—a concept he takes (and redefines) from Foucault, but which he already knew from Pask and the currency of cybernetics that flowed through the Architectural Association when he was a student there, influencing many people including me. Shane's elements, developed and refined over the last third of a century, are tools both for understanding the city through elements and for designing futures. In the latter part of his book, Shane explores how these devices can lead to the multiple function and fragmented interpretation that leads to the rich, even the media rich city of today and tomorrow. That is how, using these devices, to make environments that are multi-variant and non-monolithic: in a word, heterotopic. I will not attempt to summarise further, here: for reasons of space, but also because the best summary is Shane's own last chapter.

## Review II

Van Schaik's book is quite different in style and interest. While *Mastering Architecture: Becoming a Creative Innovator in Practice* is a book that also plays out a life-long preoccupation, this is much less of a book about the world out there. Shane's book is essentially realist in its outlook, allowing, as constructionists do, for the richness and incompleteness of the observer's view. Van Schaik's position is much closer to constructivism, although I don't think he, himself, feels comfortable when positioned there.

For van Schaik, the question is not so much a definition of the mastery of his title, as to how this mastery should be expressed and exploited. The purpose of attaining mastery (mastering) is not so much to confirm status and competence as to provide a foundation, even a springboard, for high quality innovative creativity. This central concern is expressed in zone (chapter) 4, "Encouraging Mastery and Innovation" which, in turn, springs from the heading, in the introduction, "Innovation—the Need to Transcend Mastery." That is not to say that there is not a wide-ranging discussion of what mastery is: the book is in fact organised around a division that represents an analysis of what constitutes mastery largely defined through conditions that, van Schaik argues, give rise to it. In fact, van Schaik sees "Mastery and Innovation" as two levels that may be thought of as complementary (*intertwined* is his word).

Van Schaik has explicitly, and for a long time, recognised the importance of cybernetics, specially second order cybernetics, in design and architecture. His book is also redolent with cybernetic language and concepts. Indeed, in his view, second order thinking (which he imports from cybernetics) is the essential reflective and evaluative mechanism or technique that can bring a deep—and masterly—understanding to their practice. The interest in practice as his primary arena for study in design and architecture distinguishes him from most workers in the field, including Grahame Shane, who can be seen (in this juxtaposition) as a theorist.

So how is this interest in a constructivist cybernetics expressed?

Aside from the arts, arguments about creativity, innovation and mastery have been connected to several approaches to management taught in MBA courses, and management is, of course, another word for cybernetic control. The use of these terms implicitly connects to cybernetics and to cybernetic epistemology (I think of, for instance, Gibbon et al's Mode 1 and Mode 2 knowledge, 1994)—and I have argued in this journal and elsewhere that innovation and creativity, at least, can be connected to (giving up) cybernetic control (Glanville 1998).

Van Schaik also points to work (e.g., by Randall Collins, 2000; and Howard Gardner, 1990) on conditions that encourage innovation and creativity, both in terms of contextual/environmental conditions; and in terms of the benefits of (small) group working. Interaction between a system and its context in order to improve the performance of the system, and the benefit of conversational working through the “loan” of ideas from other participants are both well known in cybernetics.

But from where I stand the really interesting point made by van Schaik in this book is the importance and value of reflection as a means of improving performance in practice. In this he follows a tradition that is thought of as starting with the research of Donald Schön. Schön's (1985) work is notable in that he was the first person from outside design to realise that there was something very special about how designers work, even if his work has since become somewhat formulaic. This, among other reasons, causes van Schaik to reject his term and to replace it with the notion of self-curation. The process of self-curation is one in which, van Schaik asserts, each of us can, through careful consideration, benefit creatively by and from mastering our own work; a process of amplification, positive feedback or bootstrapping which, in intent, is entirely second order. The outcome of van Schaik's careful analysis is to promote an involvement of the observer/actor (i.e., the architect/designer) in a feedback loop of circular causality that he shows is a powerful means of using mastery to innovate creatively—a demonstration, if ever one was needed, of the value of a second order cybernetic approach, and one that van Schaik takes very seriously, for the concluding chapter of his book is his reflection, entitled “Reflection.”

## **Cybernetics II**

Thus, these two books are, in effect, cybernetics books. Shane's is more an application of classical cybernetics/systems although this is not categorically so, while van

Schaik's is firmly grounded in second order cybernetics. Both are beautifully written and illustrated (though I have a slight problem with the tiny size of the majority of the illustrations in *Recombinant Urbanism* which are styled on thumbnails—unfortunately in print you can't click to open an enlargement). I imagine both contain a lot of interesting material for the non-specialist: they would certainly appear on my good read list for cyberneticians.<sup>6</sup>

But that's not the point I want to make, that these two books show both types of cybernetics have been alive and well and growing, even if we have perhaps not found this particularly visible under the name cybernetics in our universities. In the case of the work presented through these books, it has been nurtured by two non-cybernetician authors, perhaps managing better than those of us who might stand up to be counted as cyberneticians over the 35 years of what has often seemed to be near invisibility, near silence;<sup>7</sup> the years others have presented what cybernetics has created, sometimes with acknowledgement, sometimes as their own invention. As a further indication, in a forthcoming book, van Schaik comments on the vital importance of second order thinking in developing a confident and lively debate and a serious body of work—as it happens, in this case in architecture in Melbourne: but his point is general. In another of his books (van Schaik, 2002) he has even succinctly summarised for architects what cybernetics is and why it matters.

Shane and van Schaik are exemplars, amongst I am convinced many, who have been fighting the battle of developing cybernetics along with us, but on a different stage and, sometimes, without either us knowing them or them knowing us. They show me that, while we have pushed the envelope and hoped to develop more rigorous and radical theoretical understandings of what cybernetics might be, there is another body of people who are developing cybernetics in another way that is of great support and value to those of us who also value cybernetics.

Has this hidden work really been carried out in isolation by solitary cybernetic amateurs? The answer, in the case of these two authors at least, is no. Van Schaik, whose interest in mastery is deeply tied up with conditions that encourage and foster human creativity and for the amplification of creative abilities, quotes Randall Collins (2000), who examined the conditions in which creativity is commonly found. These included being on the edge, somehow peripheral: and working in threes. It happens that Shane and van Schaik are both members of a trio of old and close friends who started teaching as a triumvirate at the Architectural Association School in the early 1970s, on the urban design project that I attribute to Shane in the appendix. Each occupies a somewhat edgy position in their chosen city, and is perhaps something of an avatars to the other, a deeply hidden concept and persona in the mind of the other.

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6. Inevitably, there is some technical professional language and some assumed concepts that may not be familiar to those not in the fields, so a guide book may be helpful for some of the architectural language and references!

7. We might ask whether there is a particular relationship that would lead to these two books which appear at the same time from the same field, being cybernetic books. I believe, as I have written before, that there is a direct analogy between cybernetics and design: that they are variants that both deal with the central form of cybernetics, circularity. Design is cybernetics in action; cybernetics is design in theory. These books support this position, and I intend to return to the nature matter of their relationship in the future.

Last December, I was invited to attend two conferences. These conferences were concluding acts of two focus groups funded by government grant awarding bodies in the UK as a research experiment, based in design. In both, cybernetics was a commonly used word, even if what was referred to was early work, up to about 1970. In one, there was even a talk about the Law of Requisite Variety. In the other, a number of distinguished academics and artists discussed ALife, AI and suchlike—all mentioning cybernetics, giving it as a source and as a still valid approach. They were not taking cybernetics as a convenient tool box, a utility waiting to be scavenged. They were taking it seriously as a coherent approach, perhaps anticipating that it will be re-invented.

There is a resurgence waiting to be tapped. There is an openness if we wish to join in and make a dialogue.

As to who makes up “The Third Man” in the trio with Shane and van Schaik, I leave that to the reader’s imagination and private enquiry.

### **Appendix: biographical sketches**

Leon van Schaik was the head of the School of Architecture at the Royal Melbourne Institute of Technology University who was responsible for leading the turn round that made it perhaps the best architecture school in the southern hemisphere, truly a world ranking school. He continued to be dean of faculty, bringing designers, builders and social scientists together. He became Deputy Vice Chancellor before he chose to return to his first love, Architecture. He is a great innovator in architectural (and design) education, particularly known for his work in research where he has managed to create the one masters (and doctoral) programme in the world that is truly carried out through the medium of practice, which he has expanded into Asia, the United States and Europe. He has also played an enormous part in turning Melbourne into a world design city. His work was recognised by the Australian Government when he was made Officer of the Australian Order on Australia Day, January 26 2006.

Grahame Shane is one of the most distinguished living urban and urban design theorists. An early proponent of urban design, he set up the radical programme at the Architectural Association School in London that taught first year students from the urban scale downwards as opposed to the traditional bottom up approach in architectural education: a unique programme that invited beginners to have their first experiences of architectural design at the urban scale and in the urban context. He completed his Ph.D. with the enormously distinguished theorists Colin Rowe and Françoise Choay and has been based in New York City for the last 30 years, where he teaches at Columbia University and the Cooper Union (a remarkable school set up for resident New Yorkers regardless of wealth). He is in constant demand as a lecturer in and teacher and examiner of Urban Design.

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