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A Cybernetic Musing: All the 8's

Ranulph Glanville[1]

Introduction

In recent years, I have found an unexpected revival of interest in cybernetics amongst artists and designers. However, the cybernetics they are aware of seems to be the pre-1968 variety brought to public attention in the Cybernetic Serendipity Exhibition. I have been wondering how to capitalise on this interest, to bring an updated cybernetics to artists and designers. One move to this end was compiling and editing a double issue of Kybernetes on "Cybernetics and Design" (Glanville, 2007b).

Meanwhile, preparing for the 50th anniversary of the founding (in 1958) of the Biological Computer Laboratory at the May conference of the American Society for Cybernetics,[2] I came to realise the importance of the 9th year of each decade in the story of cybernetics.

We can form the history of cybernetics around years ending in 8—until cybernetics more or less disappeared from popular awareness. The history is, of course, familiar, but the familiar is re-formed by re-centring its focus.

More importantly, we can propose a way forward for cybernetics in 2008: develop our association with artists and designers, in such a manner that we can introduce our more recent, and relevant, insights. The serendipitous launch in Vienna in November 2007 of the Gordon Pask archive provides further impetus. Pask's work, rarely touched on in this journal, is the subject of considerable scrutiny in art and design, in part because of his own performance and output as an artist. Thus, even though history contains no predictive causal mechanisms, we may take a lesson from history in order to move forward.

I hope you will find this background helpful in reading the rest of the column.

1968

My background is in the arts, although I studied sciences as a schoolboy. At University, I studied architecture but spent most of my time composing—electronic and instrumental, notated, taped and improvised music. I founded an early live electronic performance group, and promoted concerts.

I came across cybernetics (in the form of Gordon Pask) when designing an automated supermarket (what we now understand as internet shopping): an epiphany. Pask was a polymath. As well as cybernetics, he had a more than passing interest in the arts. As a wedding present, he bought his wife a theatre.

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1. CybernEthics Research, Southsea, UK, email ranulph@glanville.co.uk
2. To be held in Urbana, Illinois, 11 to 14 May: see http://www.asc-cybernetics.org/news.htm

At that time, Pask (1967) was preoccupied with a revolutionary art work, *Colloquy of Mobiles*. This followed other, earlier machines, particularly MusiColour. Colloquy[3] was shown at an epoch marking exhibition, Jasia Reichardt's "Cybernetic Serendipity," at London's Institute of Contemporary Arts (ICA), from August 2 to October 20, 1968. It was a collection of mobiles sending light signals to each other, which turned to capture and engage these signals in a dance. The audience could walk between the different mobiles, modifying the behaviour, joining the dance. The result was a performance that derived from the machinery's interaction with the environment, specifically with the ambulant viewers. The interaction belonged to all participants, human and mechanical. This understanding of interaction goes back, as do so many current cybernetic concepts, to Pask's very early work.

Cybernetic Serendipity was the ICA's most visited exhibition, its opening extended because of public demand. It was totemic. It remains in the consciousness, and can be said to mark a moment in which cybernetic ideas, computation and the arts came together seriously. A new art medium and area of cybernetic action was affirmed, its significance confirmed by the founding in 1969, of the Computer Arts Society.

1948

As noted, early cybernetics can be articulated by decade. I believe recognition of the significance of events clustered around "8 years" offers insights for 2008.

In 1948, Norbert Wiener published *Cybernetics*. With it, he founded a new subject described by the subtitle *Control and Communication in the Animal and the Machine*.[4] Appreciation of the (modern) history of cybernetics has become clearer recently, in part because of two books, Steve Joshua Heims's (1991) *The Cybernetics Group: Constructing a Social Science for Post-War America*, and Flo Conway and Jim Siegelman's (2005) *Dark Hero of the Information Age*. There were two separate, yet linked, streams. The first involves the dinner parties Wiener held during the 1940s with distinguished, mainly physical scientists, particularly the Mexican neurophysiologist, Arturo Rosenblueth. These dinners were built on the growing conviction that there were common structures behind apparently distinct fields—if we could but find them—and a language in which to discuss them. The most obvious is feedback. The first expression of these insights was, I believe, Rosenblueth, Bigelow and Wiener's 1943 paper, "Behavior, Purpose and Teleology," which lead to Wiener's book, where he named the field. As he said:

Until recently, there was no existing word for this complex of ideas and…I felt constrained to invent one....

Slightly earlier, another group (from social and biological sciences) formed, including Warren McCulloch, Margaret Mead, Gregory Bateson, as well as Wiener and others. This group, supported by the Josiah Macy Junior Foundation in New York,

3. See http://www.medienkunstnetz.de/works/colloquy-of-mobiles/ and http://www.lumen.nu/rekveld/wp/?p=624
4. notice that this subtitle claims neither to be a definition, nor that cybernetics is a science.

first meet in 1942. It continued after the Second World War, describing its concern as "circular causal and feedback mechanisms." In 1948, McCulloch brought in Heinz von Foerster, visiting the USA to promote his quantum mechanical theory of memory. Margaret Mead insisted he become secretary of the group and editor of the Proceedings in order to improve his "execrable English" (his words). It was Foerster who united the two groups, proposing the Macy group adopt the name Cybernetics.

Heims' book refocussed us on the Macy meetings as equi-significant in forming cybernetics. Republication of the proceedings, edited by Claus Pias (2003), confirms their importance. I argue several of this group understood cybernetics in a manner later identified as second-order cybernetics.

1958

Fifty years ago, after a historic meeting at Dartmouth University in 1956,[5] Foerster took time to study neurosciences, and founded the Biological Computer Laboratory at the University of Illinois, Champaign/Urbana. Although cybernetics was fashionable, there were few university departments and most were driven by the mechanical aspect of Wiener's description: The biological (animal) was under-represented. Foerster was interested in new possibilities, including the development of non-standard computer architectures.

One of Foerster's greatest abilities was as a ring master (typically modest, he claimed this as his main ability). Foerster built a faculty of researchers, teachers, students and visitors whose work was critical to the development of cybernetics.[6] Where most research groups accepted the (hidden) epistemological assumptions of early cybernetics, Foerster's group questioned them. The BCL explored cybernetics as offering its own, unique epistemological approach. This enquiry eventually found form in the demands of Margaret Mead's 1968 paper "Cybernetics of Cybernetics" and subsequent publication of the course book (also *Cybernetics of Cybernetics*) Foerster and his students assembled in 1974 consisting in the main of selected cybernetic texts subjected to cybernetic analyses. These are generally taken to be origins of second order cybernetics. Autopoiesis may also be said to have an origin in work done at the BCL (see below).

The BCL was formally dissolved in 1975 (although many associated with it continued working, and Foerster maintained a shadow BCL in his Californian home), but the recent work by Albert and Karl Mueller (2007), based in the Foerster Archive, suggests that there is *An Unfinished Revolution*. The Muellers, instrumental in installing the archive in Vienna, have forced a revival of interest in the BCL and what its legacy might be. Its 50th anniversary is being celebrated in a joint event shared

5. Umpleby (2003) tells us that this was the meeting where the (cybernetic) engineers and epistemologists began to part company, perhaps necessitating the founding of the BCL leading eventually to the formulation of the cybernetics of cybernetics as the embodiment of cybernetic epistemology.
6. These included Alex Andrews, Ross Ashby, Stafford Beer, Roger Conant, Gotthard Guenther, Alfred Inselberg, Lars Loefgren, Robert Martin, Humberto Maturana, Gordon Pask, Paul Schroeder, Stuart Umpleby, Francisco Varela and Paul Weston.

between the conferences of the American Society for Cybernetics and the Department of Electrical Engineering at the University of Illinois, Urbana/Champaign (the BCL's academic host). It is appropriate the ASC is involved, since Foerster was also responsible for its founding, and it has provided a home for second order cybernetics since earliest days. This is now extended through the link with this journal, explicitly promoting second order cybernetics, which Foerster saw as an important element in the life of the ASC and, hence, cybernetics in general.

1968

I started with 1968. Mead's paper was published in 1968. Cybernetic Serendipity was on shown in 1968. The year of student revolt, Kent State and Vietnam (and flower power) was also an important year for cybernetics. But while a peak moment, it was also the beginning of the trough we are still in. Stuart Umpleby (2003) points out the effect of the Mansfield Agreement, passed by Congress in 1968, denying US military funding to speculative areas, at just that moment cybernetics was about to become its most speculative.[7] This was a terrible blow to cybernetics, from which it has not recovered.

It is also the year of publication of Loefgren's "An Axiomatic Explanation of Complete Self-Reproduction," which Pask cited as the origin of second-order cybernetics. This process was, effectively, completed by 1978, by when the basic understandings and concepts had been clarified.

It may be that there is no longer any need to distinguish orders of cybernetics. But the revolution lead and orchestrated by Foerster was critical helping us understand inconsistencies in how we were talking about our circular systems, and the subconscious precedence given to the mechanical over the animal. Foerster's (second-order) cybernetics reverses the preferred metaphor to the animal metaphor for the mechanical, without which autopoiesis might not have been thinkable. In conversation, Dirk Baecker (who studied philosophy in Paris) remarked that deconstruction and post modernism deal with many of the same questions and come to similar conclusions as second-order cybernetics does, but whereas the former lead to the despair of structureless nihilism, second-order cybernetics leaves us with a structure and a way forward. I have recently understood how this works in the case of the Black Box, and will cover this in another column.

There may be much to be explored in the influence cybernetics has had on continental philosophers and philosophy.

1978

1978 is marked by the conference "Applied General Systems Research, Recent Development and Trends" (Klir, 1978) which George Klir organised with the support

7. The Mansfield agreement is one major factor in the demise of Cybernetics, but is not, I believe, solely responsible.

of NATO, to my knowledge the last time that cybernetics/systems research received serious funding for a meeting. In our story, the conference is of interest as the first large-scale public parading of work on and in autopoiesis.[8]

1978 also marks a new, associated approach, for around this time Glasersfeld began publishing in earnest on radical constructivism,[9] which many believe is closely related to second-order cybernetics. Radical constructivism may have stolen some of the thunder of cybernetics in spite of Glasersfeld referring to himself as a cybernetician and embedding his work in the cybernetic tradition. Nevertheless, the fields have remained closely allied.[10]

1988, 1998

After this, nothing. I know of nothing to place under the year headings 1988 or 1998. The decline of cybernetics, and public interest in and valuing of its offerings, is virtually non-existent and we cyberneticians learn to take a small place in an apparently insignificant corner of what should be history—insignificant to almost everyone but us. This can be indicated through a distinguished professor's comment on hearing I was to become a colleague, remarking that cybernetics had died in 1970: In his eyes, therefore, you and I, cyberneticians, are necrophiliacs.[11]

2008

This interpretion would be wholly depressing, were there not something of the moment to add. I am no numerologist, but slicing the stream of experience can help us see changes and developments. If, in 2008, we see new life in cybernetics we might have reason for optimism. If not, perhaps 30 years is enough to qualify for declaration of The Official Death of Cybernetics!

I said at the outset that I have noticed a resurgence of interest in cybernetics among artists and designers. I believe we can build a valuable association with these fields. I do not mean this should exclude other areas of interest: just that there is interesting potential here.

2008 is the 60th anniversary of Wiener's book; the 50th of Foerster's founding of the BCL; and also the 40th anniversary of the Cybernetic Serendipity Exhibition. I believe we should celebrate all three: but at this moment of celebration we should look for renewal particularly in the arts and design. I shall turn to this now.

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8. It lead to the publication of Zeleny's (1981) miscellany, *Autopoiesis: A Theory of Living Organization*.
9. My first record of Glasersfeld mentioning Radical Constructivism is "Piaget and the Radical Constructivist Epistemology" (Glasersfeld, 1974).
10. For a review of Glasersfeld's work see the festschrift for his 90th birthday (Glanville & Riegler, 2007).
11. The landscape is not completely empty. For instance, our editor reminds me that this journal was founded.

Why?

From the above, we can see, historically, a mutuality between the practices of cybernetics and art/design. The policy of our editor to include art alongside papers, bears witness to this, and readers may remember the column (Glanville, 2006) in which I talk of (unwitting) cybernetic developments by non-cyberneticians—specifically, two architectural theorists.

Why should there be a link between cybernetics and art/design? Is there any structural reason?

In order not to over-extend this column, I will only point to the evidence (rather than expounding and arguing). There are at least two ways in which cybernetic understandings give insight into aspects of art and design.

Firstly, there is the concern with circularity. At the centre of the act of designing is, I argue, a circular process of conversation held with oneself, alternating the acts of mark-making and mark-viewing. This moving between roles involves switching what we might think of as personae, or as Pask calls them, p-individuals (Glanville, 2007a). Switching between personae gives rise to novelty, just like the exchange with another in regular conversation. Conversation is, thus, right at the centre of the creative process and is intensely cybernetic: As a version of a Paskian conversational structure it's necessarily circular. Thus, design may be seen as cybernetic practice while cybernetics can, reciprocally, be seen as design theory.[12]

Secondly, there is variety, which I have previously explored in these columns (e.g., Glanville, 1998). In effect, the ability of any one system to control any other is determined by Ashby's law of requisite variety, requiring that the variety of states in the system that will control must equal or exceed that in the system to be controlled. The variety of a system made up of several people interacting vastly exceeds that in one person. Similarly, the variety in one person is vastly less than that in the world (using realist notions as a shorthand). Thus, we live an inherently unmanageable life. This may not be bad: it means there is always the potential of states as yet unimagined, if we cease restricting the world to what we already know. Openness can lead to the new, perhaps the main thing artists and designers believe they do.

There is a different synchronicity. Although Gordon Pask practised mainly as a cybernetician, his persona and practice as an artist was equally important to him. His art work is being re-evaluated and recognised, no doubt one source of artists' and designers' current interest in cybernetics. These studies are supported and facilitated by the same Muellers who revived interest in Foerster's "unfinished revolution," following the installation of Pask's archive alongside Foerster's in Vienna University's Institute for Contemporary History.[13] Pask's archive was formally opened in November 2007, just in time for 2008, our festive year!

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12. The paper mentioned appears in a double issue of Kybernetes (devoted to Cybernetics and Design) which I edited. The size and variety of the issue shows that there is something timely to examine.
13. The archive referred to passed through his family to the University. There is a second archive recognised by Pask, his American archive, maintained by Paul Pangaro, which includes some hardware.

Several initiatives are being developed (many with the ASC) to celebrate Cybernetic Serendipity: not just to look backwards, but rather to provide a springboard from which to launch second order cybernetic questions: not what can the arts and design learn from cybernetics, for instance, but how can they support each other. Can the approach of practitioners in each teach practitioners in the other? As these initiatives develop, I will attempt to bring news of them to this journal.

I hope re-acquaintance with Pask's work in art and design will open a new future for cybernetics in general and Pask's reputation in particular. We saw a beginning in the "Maverick Machines" Exhibition Richard Brown curated in Edinburgh last summer.[14] This is developed in the exhibition I have curated with Brown and Stephen Gage, "Pask Present," that was on show at the Gallerie Färbergasse, Vienna, in parallel with the 19th European Meeting on Cybernetics and Systems Research, between Tuesday 25 March and Friday 4 April, accompanied by lectures by Gage and myself. No doubt we will build a web site.[15]

This is the first event I can report.

Action

I propose that if we look at the history of modern cybernetics, slicing each decade at its 9th year, we find key events each decade from 1948 until 1978, after which there is nothing. I suggest that 2008 is a good year for a cybernetic celebration, and we should particularly celebrate Cybernetic Serendipity because of the positive and active interest in cybernetics amongst artists and designers. I have suggested analogies between cybernetics and art/design, and indicated the central position of Gordon Pask. Yet this interest in cybernetics is founded in the cybernetics of 1968, and has scarcely moved on. For instance, the explorations of Edward Ihnatowicz's sculptures "SAM" (shown at Cybernetic Serendipity) and son-of-SAM, "Senster"[16] show that he saw cybernetics as closely allied to computing, providing a modelling technology allowing a particular artistic aim to be realised; indeed, a lot of art interest in Pask is based in his early experiments with chemical computers. Those I meet at art and design conferences and workshops talk of cybernetics as it was in 1968, with no awareness that it has moved on, that what they are talking about is not current. There is a mission: to bring a more up-to-date understanding to those already interested.

The Chinese traditionally view the number 8 as bringing great fortune. Let's hope that the 8 in 2008 will bring that to cybernetics.

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14. See http://maverickmachines.com/WordPress/
15. Since this was written, a web site has been created. Please visit www.paskpresent.com
16. See http://www.senster.com/ihnatowicz/index.htm

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