Control, imagination and addiction:

some cybernetics of how we limit and transcend ourselves.

Cybernetic characters

Ross Ashby, *centenary 2003*

Graham Barnes, *alive*

Gregory Bateson, *centenary 2004*

Stafford Beer, *died 2002*

Joseph Beuys, *died 1998?*

Heinz von Foerster, *died 2002*

Humberto Maturana, *alive*

Gordon Pask, *died 1996*

Mike Robinson, *alive*

Stuart Umpleby, *alive*

Francisco Varela, *died 2000?*

Norbert Wiener, *died 1967?*

Cybernetics

or control and communication in the animal and the machine (Norbert Wiener, 1948)

the science of effective management (Stafford Beer);
the science of the defensible metaphor (Gordon Pask); etc.

Two ways we use the word “control”

control as regulation (stability, counteracting perturbations): Maturana skiing.

control as restriction (imposed, removing choices): fascism—“Hitler control”

Variety

due to W. Ross Ashby: Introduction to Cybernetics (1956)

a measure of the number of states a system may occupy: this depends on how the observer describes the system.

this measure is often thought of as being similar to Shannon and Weaver's (1948) "information."

Ashby, "Introduction to Cybernetics" 7/7:
The word variety, in relation to a set of distinguishable elements, will be used to mean either (i) the number of distinct elements or (ii) the logarithm to the base 2 of the number, the context indicating the sense used.

Determining variety

Traffic lights

Thermostat

Tic tac toe

The observer

Law of Requisite Variety
(Ashby)

(1) the amount of appropriate selection that can be performed is limited by the amount of information available. (2) for appropriate regulation the variety in the regulator must be equal to or greater than the variety in the system being regulated. Or, the greater the variety within a system, the greater its ability to reduce variety in its environment through regulation. Only variety (in the regulator) can destroy variety (in the system being regulated). The law was formulated by Ross Ashby. (Umpleby, quoted on the Principia Cybernetica web site)

Ashby, "Introduction to Cybernetics" 11/7:
Only variety can destroy variety

For effective (regulatory) control, a control system needs to have at least as many states as the controlled system has. Otherwise, any control will be restrictive.

Second order cybernetics and variety

Second order cybernetics emphasises circularity in causality: which element is controller and which controlled is a matter of choice or convention, for each element controls the behaviour of the other. Under these circumstances, the variety of each element in a control loop must be exactly the same, if it is to satisfy the Law of Requisite Variety.

Second order cybernetics is to first order as Einstein's mechanics is to Newton's.

Bremermann's constant (or limit)

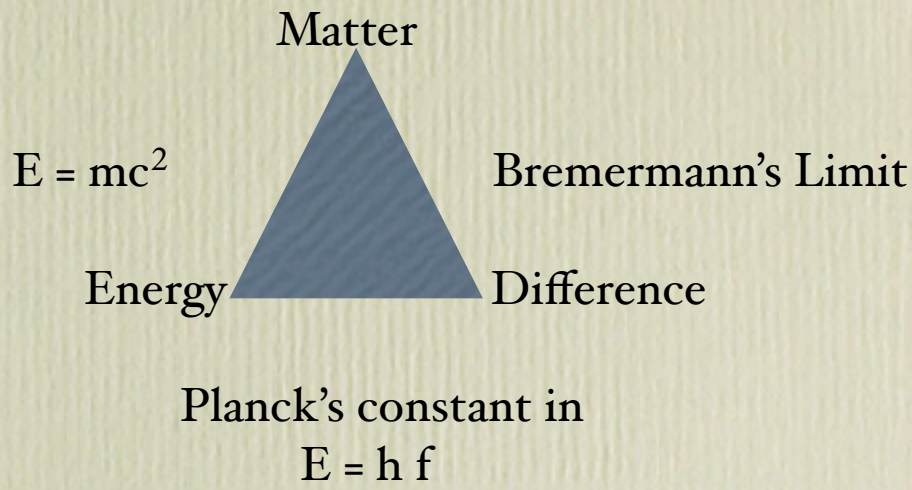
via Ashby 1964:
...Bremermann has shown that, even if we take single atomic states as markers (i.e., "digits") for computation, the known physical laws make it impossible for any computer made of matter to process more than about 10^{47} bits per gram per second.

via Beer via Ashby 1964:
Let such a computer be as big as the earth and go on for all geological time, it is physically incapable of processing more than 10^{73} bits.

via Ashby 1964:
Everything material stops at 10^{100}.

Umpleby's triangle

Stuart Umpleby (2004) suggests that Bremermann's Limit completes the triangle relating Matter, Energy and Difference (his generalisation of Information, following Bateson), which he takes to be the prime elements of our (current) physical world.



Robinson's Classroom Control (1979)

In a classroom of 30 students, each assumed to be merely a 100 state system (having a variety of 100 states), the total variety of the students is 10^{60} states. To effectively control (regulate) this requires a near earth-mass (10^{73} state) computer!

What is the teacher to do?

Alexander's choice of materials

The architect and mathematician Christopher Alexander is reported to have calculated that the number of theoretical combinations of atoms to make molecular compounds is in the region of 10^{20} compounds. That makes the choice of chemical compounds used in this room as building materials "transcomputable."

When faced with the transcomputable...

We can try to redefine our understanding so that it has less variety.

But what if that is not possible?

When we talk, we simply utter into a void; but when we listen, we join with the sounds we hear.
"The Lost Art of Listening," M. Nichols (1995)

Beuys' primary requirement for true communication was the existence of a reciprocal relationship between individuals. 'For communication it's necessary that there be someone who listens...There's no sense in a transmitter if there's noone who receives.'
Panel entitled "Communication" at the Joseph Beuys Exhibition, Royal Kilmainham Hospital, Dublin, read on June 2nd 1999.

A Zen master had an important visitor who came to learn about Zen. Rather than listening, the visitor kept on talking about his own ideas. The master served tea. He poured tea into his visitor's cup until it was full, then he kept on pouring.
The visitor could not restrain himself. 'Stop it! It's full! You can't get any more in!'
'That's right.' replied the master, stopping. 'And just like this cup, you are full of your own ideas. How can you hope to understand Zen unless you offer me your cup empty?'
Traditional Zen Story.

According to our analysis, this metaphor [of communication down a tube, RG] is basically false. It presupposes a unity that is not determined structurally, where interactions are instructive, as though what happens to a system in an interaction is determined by the perturbing agent and not by its structural dynamics. It is evident, however, even in daily life, that such is not the case with communication: each person says what he says, or hears according to his own structural determination; saying does not ensure listening. From the perspective of an observer, there is always ambiguity in a communicative interaction. The phenomenon of communication depends not on what is transmitted, but on what happens to the person who receives it. And this is a very different matter from 'transmitting information.'
"The Tree of Knowledge" Humberto Maturana and Francisco Varela (1992).

Pask's conversations

I do not transmit a meaning to you. I state what I understand, in your presence.

You, hearing what I say, make your own meaning from it.

You restate what you understand, so I can hear it.

I, hearing what you say, make my own meaning from it, which I compare to what I first meant.

If the two meanings I have made are not adequately similar, I try to restate my understanding to reduce the error.

Cybernetic devices which are beyond our control

Non-trivial machine (von Foerster, 1971)

Black Box (Glanville 1982)

Being out of control

Medicine is preoccupied with control of disease.

Addiction

A disease associated with control (amongst other things, for instance moral degeneration, spiritual poverty, physical deterioration, mental delusion).

The substance (or action) of choice is open, the effect and the mechanism are essentially the same.

Alcoholism will be used to represent all forms of addiction.

The misinformed view

Weak-minded

Lacking determination

Lacking self-control

Undisciplined

The more you try
the harder it gets
the more you fail
the more you try.

The harder you
try the more you
fail.

Such courage,
such will,
such strength of
character

The logic of addiction

1. If I am addicted to a substance or action, I cannot control my use of that substance (by definition).
2. Therefore, to get better (conquor my addiction), I must learn to—and practise—control.
3. The way to know I can now control my use of my addictive substance is to test it by trying to use it in a controlled way.
4. But if I am an addict, I cannot control my addiction: therefore I fail the test.
5. Back to step 2.

(Notice Bateson's alcoholic double bind!)

Anonymous Alcoholic in Töölö church, Helsinki, Finland.

When faced with the uncontrollable (unmanageable)...

Is there any course left open to us?

First two steps of AA 12 step programme

ONE
We admitted we were powerless over alcohol—that our lives had become unmanageable

TWO
Came to believe that a Power greater than ourselves could restore us to sanity.

The Big Book of Alcoholics Anonymous

- Bateson and alcoholism, pride and cybernetic epistemology.

Stop playing games

Eric Berne and the alcoholic game: transference.

Graham Barnes and the Psychopathology of Psychotherapy (2002): the damage of enforced and untested control.

Compare to the classroom.

The classroom and addiction

In the classroom and in addiction, restrictive control (rather than regulatory control) is used in order to reduce variety.

The difference is, that in the classroom, the control is applied to the world of The Child; whereas in addiction, the addict reduces his/her own sensory alertness. In the first, the classroom, the world is reduced; whereas in addiction, alertness to the world's richness is reduced.

Two types of control

Regulatory control cannot occur when there is not enough variety in the controlling system. Under these conditions, control can only take place, according to the Law of Requisite Variety, if the variety of the controlled is reduced to that of the controlling system. This is restrictive control.

Moral

Don’t always control: let go!

(The value of the unmanageable.)

Lesson

Sometimes, control
is not possible

Cybernetics needs to
recognise this limit.

We need a
cybernetics which is
not about control.

The Brave Pretence

I have taken more from
alcohol than alcohol has
taken from me.

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