On being out of control

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I

I will argue against control. Not all control, but against our assumption of the universal possibility and desirability of control.

A few years ago, the river channel of the Rhine was so full that large parts of Holland were in danger of imminent inundation. Many people had to evacuate as the waters rose to within a couple of centimetres of the top of the dykes.

This summer, large parts of central Europe were flooded. A vast area of China was as close to flooding as Holland was those few years earlier.

Thee are many reasons for these (near) inundations. The one which is of interest here is the canalisation of the rivers. Canalising rivers contains them and controls them. No longer are potentially desirable lands wasted as water meadows: because the path of thee water is controlled, they can be built on.

But water meadows serve a purpose. They are buffers. Where there are such meadows, the flooding is accommodated and the consequent destruction is minimal. The meadows act as buffers—and the lack of such buffers contributes greatly to the damage these floods may cause.

II

We like to control. That is what the canalising of the rivers is about: it makes them more controllable. It does away with what we have come to see as the waste of the buffer. We do the same with time buffers. “Just In Time” is similarly inspired, and works in the same way: remove a buffer by exercising finer and more precise control.

Yet control is, in principle, not often not possible. And it’s often not desirable: for more imaginative reasons as well as the catastrophic reasons associated with flooding.

III

Cybernetics is a subject that is deeply involved with control, as the subtitle (communication and control in the animal and the machine) of Norbert Wiener’s classic, eponymous book tells us.[1] The great English cybernetician, W. Ross Ashby, showed us a crucial aspect of control when he developed his Law of Requisite Variety.[2] Variety can be thought of as the number of states any system might actually take. Ashby’s Law tells us that, if we wish any one system to control another, the controlling system must have at least as many states as the controlled system might take. Otherwise it restricts, rather than controlling.

There are two ways of thinking about control. The cybernetician’s notion is summed up in the definition of Cybernetics as the science of effective management (a synonym for control) that Stafford Beer (who died earlier this year) gave us.[3] This concept suggests an equity and balance. Management is not about restriction but about the viability of the whole system, including (of course) the manager (controller). In this control, Ashby’s Law is followed.

But there is a second way of thinking that is uncybernetic, yet is often what we have in mind. This is control as restriction. It is what dictators do: restrict populations to a single instance

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and contain them within the wishes of the dictator (controller). This type of control does not follow Ashby's Law as Beer's statement does. In this case, the controlling system has far less variety than the controlled system and so many states the controlled system might take are denied by the limitations of the controlling system. As a consequence, Ashby's Law is, nevertheless, followed by restricting the number of states the controlled system can take to the variety of the controlling system. This is control as restriction: it is a power relationship.

This second situation is distressingly common. Consider the conventional school classroom, where, as Mike Robinson has observed:[4] the teacher controls the class by many means that reduce variety: uniform clothing, only one sex and one age group, separate desks all facing the same way, the denial of communication by or between students without the teacher's permission. Etc. We can understand what is happening when we think of the brainpower of the teacher compared to that of all the students put together. Assuming the raw brainpower of all to be of the same order, in a class with, say, 30 students, the potential brainpower of the students is not 30 times that of the teacher but a power of 30 greater. Thus, say we have a billion states of brainpower each (that's 10^9), the class has $(10^9)^{30}$, which is 10^{180} possible states! Of course, I'm only using these figures is to make a point. They aren't accurate in the sense that they can be proved. My intention in quoting them is to show orders of magnitude. What we see is that the possible total states of brainpower—the variety—of the students all together is vastly more than that of the teacher. No wonder (s)he needs to restrict them!

(And note how the layout of older classrooms, with the teacher on a platform, explicitly states this power relation which permits the teacher to enforce this restriction on his students.)

IV

That number indicating the brainpower of the students, 10^{180}, is an unimaginably large number. Nevertheless, we might be tempted to think that, we could create a computer with enough power to properly control a classroom of 30 students in accordance with Ashby's Law of Requisite Variety. But we would be mistaken. Hans Bremmerman[5] estimated how many states the earth could have accommodated if it had been an atomic computer hard at work all its life—a somewhat recondite calculation. (The figure is 10^{47} bits, but, again, this figure is not intended to be "accurate": it indicates the sort of size, a scale.) If you can work out some figure for the earth, you would expect to be able to work one out for the cosmos, at least as we understand from physicists now. A figure of 10^{120} has been calculated, and Ashby[6] used this to show that there are in principle non-computables, for the simple reason that there aren't enough particles on which to store the necessary information and there hasn't been enough time to do the calculations, either!

V

What does this tell us? It tells us that there are (very) many situations for which we cannot expect to have enough variety to control them in the manner of Stafford Beer's "effective management." It would seem, then, that the use of control restrictively (as dictators use it), is inevitable. And indeed, we are aware (for instance, the flooding examples that I started with) that our attempts to control are often inadequate. We usually excuse this as due to exceptional circumstances, or an inadequate description (one without enough variety).

VI

But I would like to suggest an alternative to always making excuses. We can ask ourselves what happens if, when there's a serious variety imbalance, we give up trying to control? If we

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don't try to force the system we had thought to control into having as little variety as we have?

Then we are left with a vastness of variety (and hence possibilities) that goes way beyond our limits.[7] We can be flooded, not by water inundating us, but by possibilities we had never dreamt of. Think of the value of opening up to employee suggestions, of how much we can learn from our students, of what the world offers us when we don't try to force it to fit the way we understand it: we can use the variety they have, which is so much more than we have, to increase our opportunities.

This is to say, we have found a source of creativity, of renewal. We find we can keep our eyes open and can see a universe of riches beyond our imagining, waiting for us to pick them. We have a source of novelty and of learning. And we remain in the realm of wonder that that other great Cybernetician, Heinz von Foerster, Viennese, who also died this year, so wanted us to enjoy.[8]

Introductory Abstract

Not to be in control can expand the options available to us, that is, allows us to be more creative. Yet our culture seems to value and promote control to the point where control can be extraordinarily destructive. In this article, I show that there are clear limits to what we can control, and great dangers when these limits are exceeded: that control is often misapplied so that it takes the form of restriction rather than effective management: and that there are advantages in reformulating how we understand the value of control to allow us often to benefit from being out of control.

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