THE ‘NEW’ WAVE IN SYSTEMS THINKING

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“The whole is greater than the sum of its parts”. If you argue for the truth of this proposition you will be classed as a holist/organist. If you go further and insist that scientific explanations must be found then you are in the business of systems thinking.

That seems quite simple and straightforward. Of course, it is not. It is not at all like one of those mythical scientific disciplines that rise from some brilliant insights and grow on their own researches. System thinking has set itself to do for our understanding of individual humans and human organizations what Darwin did for living species in the last century. It has to grow in the middle of an intellectual and social battlefield. In its development systems thinking has been twisted this way and that way as its developers sought an accommodation with this or that of the hostile influences.

Finding the central core of meaning in systems thinking in this twisted history is not easy but I think the opening paragraph is close to mark. It then just depends on what you think is a ‘scientific’ explanation.

The extent to which systems thinking is sensitive to its social context is well illustrated by its recent history. Systems thinking was very much in vogue in the sixties (Emery, 1969). In the early seventies there was a distinct cooling of interest as people realized the extent to which systems theory and underlain the US conduct of the Vietnam conflict. It was also being seized on as a tool for bureaucrats faced with complex civil projects. The profound differences between ‘systems theory’ and systems thinking had not yet sunken in. By the end of the seventies there was still little public interest, despite major advances in theory and evidence of extended application (Emery, 1981). I cannot point to any major advances in the eighties and systems thinking appears to have become a so-called ‘Californian phenomena’ i.e. free ranging speculation. Now it seems that systems thinking is coming back into fashion. It is difficult to point to any particular breakthrough in theory or application. In fact the present upsurge in systems theorizing seems to be a backwards move in thinking about systems. One is left with the feeling that something more elemental is involved. Before jumping onto this new wave we had best check whether we are not just jumping onto a merry-go-around. That means going back to fundamentals. If we are clear about what is unique to systems thinking we may better judge whether we are jumping onto a new advancing wave or just jumping onto a merry-go-round.

In one way or another systems thinking has always been involved in the notion that 'the whole is more than the sum of its parts'. We need not concern ourselves here with whether this holds for physical and chemical wholes. Our concern is whether it holds for living wholes and in particular for human beings and their organizations. To the layman it seems perfectly obvious that living wholes, whether bugs, fishes or humans, are more than the sum of their parts; if only because they are living beings, not inanimate objects. However, to the persons who have devoted their lives to scientific pursuits this is dangerously misleading proposition. It is a proposition often advanced by ecologists and conservationists and one that the door to unscientific, even religious thinking. In defence of their skepticism scientists point first to the practical success of science in explaining so many so-called holistic phenomena in terms of the lawful interaction of their parts. Second they point to the effective reduction of so much of chemistry to physics and so much of biology and physiology to chemistry. There is a powerful historical dimension to this skepticism.

In the Middle Ages such a notion would have directed us to the conflict between realism (the reality of universal such a God and his angels) and the nominalist position that reality can only be granted to observable particulars. Since the 17th century the notion has come to represent the questioning of science. By the 19th century science had proven that it could isolate, analyze and then synthesize organic matter such as urea. Darwin then, threw this spanner into the works. The potential power of science was very exciting for some, and very threatening for others.

The notion that 'the whole is greater than the sum of its parts' was very much part of the social attempts to keep science in its place. It was intended to convey that there were some matters that science could never explain e.g. purposes, consciousness, character, conscience, and free-will. Further out were the concepts central to the religious beliefs and faith in ruling values and authorities. Scientists have always tended to seek the security, protection and, not least, the status, of university acceptance. The price of acceptance has always been the denial of any challenge to the role of the 'humanities'. Increasingly they have been called on to mask what price they paid behind a screen of mathematical abstraction. One after the other we have seen the physical sciences, the biological sciences and the social sciences thread this path. Since World War II we have seen Operations Research thread this same path and, I think, we now see systems thinking knocking at the doors of academia.

Systems thinking is obviously exposed to many external influences. And I have not even mentioned the fads and fashions of managerial consultancy. I think that all that we can do in this space to indicate the core meaning is to list the major steps that have been taken in systems thinking. This provides us with a check list. If someone claims to be advancing systems theory and has not encompassed these steps then we have reason to question why.

The six steps are, as I see it, the following.

The first step is to realize that we do not understand a system until we understand the system principle. Without this we do not have a concept of the system as a unitas multiple but simply we have an aggregate of propertied things and their interactions. We may impose our ideas of conceptual or statistical ordering but unless a system principle is demonstrated to exist we locked into the notion that the system can be explained in terms of the sum of its parts. The notion of a system principle is very neatly summed up in Peter Drucker's first question, "What business are you in?" Why not two, or three, or more system principles? If there is more than one system the component parts will be pulled in different and conflicting directions and we will soon find ourselves having to identify the overlapping or invading systems corresponding to each system principle. If in an organization, we demonstrate that more than one principle is active then we need to reorganize so that the separate systems can relate to each other as independent systems. By identifying system principle we can identify and confront questions about incompleteness and overloading.

The second step was to realize that parts are not directly related by reason of their own inherent properties. They are only indirectly related to each other via their direct relation to the system principle. The discussion of systems as objects requires a different language and a different logic. Our languages and traditional "Aristotelean" logic presumes that our world is composed of things, their properties and their interactions. A simplifying assumption that we hardly ever notice is that any given moment these things are static. Zeno pointed out at the time that this assumption implied a world of no change. A world within which things would inevitably stay in their given place, not only slaves and their masters, men and women but also if Achilles started off behind the tortoise forever remain behind the tortoise; if the arrow was distant from its target it would remain forever separated from that target. Zeno and his paradoxes was such a nuisance that he was put to death by torture. Scientific American continues to publish disproofs of his paradoxes as children continue to chant 'ring-a-ring of roses'. Increasingly science had to state its findings and hypotheses in mathematical forms that escape the limitations of traditional language and logic. A simple illustration is in the way that science has had to change the way we describe metals.

Third, was the recognition that a statement of system principle in terms of goals or mission was only a short-hand for describing special forms of interdependence between the system and its environment. Thus L11, L12, L21 & L22. –non linear math necessary – Lewin's failure – dc's – graph theory.

Fourth, co-evolution and the scaling of both the L11 and the L22. – E paper and OPS.

Fifth, unification of the scales – ideals and L11 etc.

Sixth, Future? Consciousness – PD and SC – democratization.