Cybernetics of Cybernetics

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Ladies and gentlemen—As you may remember, I opened my remarks at earlier conferences of our Society with theorems which, owing to the generosity of Stafford Beer, have been called "Heinz von Foerster's Theorem Number One and Number Two". This all is now history.[1][2] However, building on a tradition of two instances, you may rightly expect me to open my remarks today again with a theorem. Indeed I shall do so but it will not bear my name. It can be traced back to Humberto Maturana,[3] the Chilean neurophysiologist, who a few years ago, fascinated us with his presentation on "autopoiesis", the organization of living things.

Here is Maturana's proposition, which I shall now baptize "Humberto Maturana's Theorem Number One":

"Anything said is said by *an observer."*

Should you at first glance be unable to sense the profundity that hides behind the simplicity of this proposition let me remind you of West Churchman's admonition of this afternoon: "You will be surprised how much can be said by a tautology". This, of course, he said in utter defiance of the logician's claim that a tautology says nothing.

I would like to add to Maturana's Theorem a corollary which, in a modesty, I shall call "Heinz von Foerster's Corollary Number One":

"Anything said is said to *an observer."*

With these two propositions a nontrivial connection between three concepts has been established. First, that of an *observer* who is characterized by being able to make descriptions. This is because of Theorem 1. Of course what an observer says is a description. The second concept is that of *language*. Theorem 1 and Corollary 1 connect two observers through language. But, in turn, by this connection we have established the third concept I wish to consider this evening, namely that of *society*: the two observers constitute the elementary nucleus for a society. Let me repeat the three concepts that are in a triadic fashion connected to each other. They are: first, the observers; second, the language they use; and third, the society they form by the use of their language. This interrelationship can be compared, perhaps, with the interrelationship between the chicken, and the egg, and the rooster. You cannot say who was first and you cannot say who was last. You need all three in order to have all three. In order to appreciate what I am going to say it might be advantageous to keep this closed triadic relation in mind.

I have no doubts that you share with me the conviction that the central problems of today are societal. On the other hand, the gigantic problem-solving conceptual apparatus that evolved in our Western culture is counterproductive not only for solving but essentially for perceiving social problems. One root for our cognitive blind spot that disables us to perceive social problems is the traditional explanatory paradigm which rests on two operations: One is *causation*, the other one *deduction*. It is interesting to note that something that cannot be explained—that is, for which we cannot show a cause or for which we do not have a reason—we do not wish to see. In other words, something that cannot be explained cannot be seen. This is driven home again and again by Don Juan, a Yaqui Indian, Carlos Castaneda's mentor.[4]

It is quite clear that in his teaching efforts Don Juan wants to make a cognitive blind spot in Castaneda's vision to be filled with new perceptions; he wants to make him "see". This is doubly difficult, because of Castaneda's dismissal

of experiences as "illusions" for which he has no explanations on, the one hand, and because of a peculiar property of the logical structure of the phenomenon "blind spot" on the other hand; and this is that we do not perceive our blind spot by, for instance, seeing a black spot close to the center of our visual field: we do not see that we have a blind spot. In other words, we do not see that we do not see. This I will call a second order deficiency, and the only way to overcome such deficiencies is with therapies of second order.

The popularity of Carlos Castaneda's books suggest to me that his points are being understood: new paradigms emerge. I'm using the term "paradigm" in the sense of Thomas Kuhn[5] who wants to indicate with this term a culture specific, or language specific, stereotype or model for linking descriptions semantically. As you may remember, Thomas Kuhn argues that there is a major change in paradigms when the one in vogue begins to fail, shows inconsistencies or contradictions. I however argue that I can name at least two instances in which not the emergent defectiveness of the dominant paradigm but its very flawlessness is the cause for its rejection. One of these instances was Copernicus' novel vision of a heliocentric planetary system which he perceived at a time when the Ptolemaeic geocentric system was at its height as to accuracy of its predictions. The other instance, I submit, is being brought about today by some of us who cannot—by their life—pursue any longer the flawless, but sterile path that explores the properties seen to reside within objects, and turn around to explore their very properties seen now to reside within the observer of these objects. Consider, for instance, "obscenity". There is at aperiodic intervals a ritual performed by the supreme judges of this land in which they attempt to establish once and for all a list of all the properties that define an obscene object or act. Since obscenity is not a property residing within things (for if we show Mr. X a painting and he calls it obscene, we know a lot about Mr. X but very little about the painting), when our lawmakers will finally come up with their imaginary list we shall know a lot about them but their laws will be dangerous nonsense.

With this I come now to the other root for our cognitive blind spot and this is a peculiar delusion within our Western tradition, namely, "objectivity":

"The properties of the observer shall not enter the description of his observations."

But I ask, how would it be possible to make a description in the first place if not the observer were to have properties that allows for a description to be made? Hence, I submit in all modesty, the claim for objectivity is non sense! One might be tempted to negate "objectivity" and stipulate now "subjectivity". But, ladies and gentlemen, please remember that if a nonsensical proposition is negated, the result is again a nonsensical proposition. However, the nonsensicality of these propositions either in the affirmative or in their negation cannot be seen in the conceptual framework in which these propositions have been uttered. If this is the state of affairs, what can be done? We have to ask a new question:

"What are the properties of an observer?"

Let me at once draw your attention to the peculiar logic underlying this question. For whatever properties we may come up with it is we, you and I, who have to make this observation, that is, we have to observe our own observing, and ultimately account for our own accounting. Is this not opening the door for the logical mischief of propositions that refer to themselves ("I am a liar") that have been so successfully excluded by Russell's Theory of Types not to bother us ever again? Yes and No!

It is most gratifying for me to report to you that the essential conceptual pillars for a theory of the observer have been worked out. The one is a, calculus of infinite recursions;[6] the other one is a calculus of self-reference.[7] With these calculi we are now able to enter rigorously a conceptual framework which deals with *observing* and not only with the observed.

Earlier I proposed that a therapy of the second order has to be invented in order to deal with dysfunctions of the second order. I submit that the cybernetics of observed systems we may consider to be first-order cybernetics; while second-order cybernetics is the cybernetics of observing systems. This is in agreement with another formulation that has been given by Gordon Pask.[8] He, too, distinguishes two orders of analysis. The one in which the observer enters the system by stipulating the *system's* purpose. We may call this a "first-order stipulation". In a "second-order stipulation" the observer enters the system by stipulating *his own* purpose.

From this it appears to be clear that social cybernetics must be a second order cybernetics—a *cybernetics of cybernetics*—in order that the observer who enters the system shall be allowed to stipulate his own purpose: he is autonomous. If we fail to do so somebody else will determine a purpose for us. Moreover, if we fail to do so, we shall provide the excuses for those who want to transfer the responsibility for their own actions to somebody else: "I am not responsible for my actions; I just obey orders." Finally, if we fail to recognize autonomy of each, we may turn into a society that attempts to honor commitments and forgets about its responsibilities.

I am most grateful to the organizers and the speakers of this conference who permitted me to see cybernetics in the context of social responsibility. I move to give them a strong hand. Thank you very much.

Notes

[1]Beer, S., *Platform for Change*: 327, New York: Wiley, 1975.

[2]Weston, P.E. and von Foerster, H., "Artificial intelligence and machines that understand", in Eyring, H., Christensen, C. H., and Johnston, H. S. (Eds.), *Annual Review of Physical Chemistry*, 24: 358–378, Palo Alto: Annual Review Inc., 1973.

[3]Maturana, H., "Neurophysiology of cognition", in Garvin, R (Ed.), *Cognition, A Multiple View*: 3–23, New York: Spartan Books, 1970.

[4]Castaneda, C., *The Teachings of Don Juan: A Yaqui Way of Knowledge*, New York: Ballantine, 1969.
Castaneda, C., *A Separate Reality*, New York: Simon and Schuster, 1971.
Castaneda, C., *Journey to Ixtlan*, New York: Simon and Schuster, 1972.
Castaneda, C., *Tales of Power*, New York: Simon and Schuster, 1974.

[5]Kuhn, T., *The Structure of Scientific Revolution*, Chicago: University of Chicago Press, 1962.

[6]Note #2.

[7] Varela, E, "A calculus for self-reference", *International Journal of General Systems*, 2, No. 1: 1–25, 1975.

[8]Pask, G., "The meaning of cybernetics in the behavioral sciences (the cybernetics of behavior and cognition: extending the meaning of 'goal')" in Rose, J. (Ed.), *Progress in Cybernetics*, Vol. 1: 15–44, New York: Gordon and Breach, 1969.