

Neutrality as a Paradigm of Change

Comment on Walter Fontana “The Topology of the Possible”

Walter Fontana presents in his paper a convincing case for the relevance of neutrality as a paradigm of change for biological systems. Neutrality means a drift of a biological system through a succession of states which do not change the phenotype of the system and which are therefore neutral to natural selection. By such a succession of neutral states the system may accidentally come near to a position in which one further small incremental change in genotype implies the transfer of the system to another phenotype, a transfer which may be perceived to be an improbable one and which perhaps would not have happened in the absence of neutrality. Another twist one can give to the same argument will not look to a temporal succession of states but to the simultaneous occurrence of different genotypes in a population of units. All these different genotypes will produce the same phenotype and can therefore coexist in a neutral space. If a *need* for a different phenotype should arise there will always exist in such a population of genotypes some exemplars which by some few alterations can effect a transfer into the advantageous phenotype. In this way *neutrality* as a theoretical paradigm presents a good case for a continuous evolution going on in a population of genotypes being equivalent towards one another in a phenotypical sense. All of these genotypes stand for possible alterations. At the same time a concept of *discontinuity* can be formulated on this basis. Discontinuity then means all those variations and the phenotypes generated by them which are not represented in the population of genotypes by genotypes which would only need a few steps for changing into related genotypes which could then bring about the relevant phenotype. Continuous evolution looks *as if* natural selection as the evolutionary force could directly instruct the changes it *needs*. Discontinuities on the other hand mean that natural selection has to wait for a long time until very improbable variations accidentally arise which it then can favour.

Is this concept of *neutrality* a fruitful one in thinking in a more general sense about change in systems, especially change in social systems? First of all two important difficulties have to be mentioned. In social systems a precise analogue to the distinction of genotype and phenotype is not easily to be perceived. And there is in social systems no such thing as *development*, that is a class of mechanisms mediating between genotype and phenotype.

In the following I will look at three relevant distinctions of the social sciences to examine if their understanding can be improved upon in making use of neutrality as a theoretical paradigm. A first candidate is the distinction of *system* and *operation* (or *system* and *behaviour*) which in variant formulations will be found

in most present-day social theories. This distinction may be seen as a potential analogue to the distinction of genotype and phenotype but it is difficult to relate it to the argument of Walter Fontana. Operations are much more fluid and variable than the systems or structures they realize or implement, and therefore there is no such thing as an evolutionary drift of systems/structures through spaces being neutral in an operational or behavioural sense.

A second candidate which is probably more instructive is the distinction of structure and organization proposed by Maturana and Varela.¹ This distinction is again present in numerous conceptual variants. Structural changes in a social system do not change anything about organization (e.g. autopoiesis as an organizational feature). Therefore they are neutral to organization. But in a succession of structural changes it can happen at any time that a state is achieved in which a new structural pattern is no longer compatible with the organization of the system and this organization changes abruptly and discontinuously. A related kind of argument has been experimented with in the case of sociological differentiation theory which in authors such as Niklas Luhmann is based on the distinction of *structural differentiation* as ongoing process and *forms of differentiation* (such as: functional differentiation, stratification, segmentation) as discontinuous principles of ordering a multiplicity of differentiated systems.² Looking at a specific *form of differentiation* – for example at functional differentiation – one can easily observe ongoing processes of structural differentiation which are *neutral towards the principle of functional differentiation*. And then there exist limits to such a neutrality of ongoing structural differentiation towards functional differentiation. At these limits further structural differentiation will result in a new form of societal differentiation finally being established.

The present author has, in looking for the genesis of functional differentiation, collected evidence for a related argument. He tried to demonstrate that for the society of estates of late medieval and early modern Europe the addition of new corporations such as religious orders, trading companies, universities and cities to the world of hierarchical estates was in some respects a neutral addition as the corporations were invested with the outer signs of a stratified social order.³ They were characterized by status, dignity and honour as is pertinent in hierarchical society. But such a stratified social order enriched by ever new corporations which had to be distinguished in relation towards one another along functional lines, too, became unstable at some point, and then a new principle of social differentiation (a lateral, non-hierarchical, functional order) became *accessible* from within the society of estates. Of course, differences between the picture

¹ Humberto Maturana/Francisco J. Varela, *Autopoiesis and Cognition: The Realization of the Living*, Dordrecht and Boston: Reidel 1980.

² Niklas Luhmann, *Die Gesellschaft der Gesellschaft*, Frankfurt a.M.: Suhrkamp 1997, Vol. 2, Ch. 4.

³ Rudolf Stichweh, *Der frühmoderne Staat und die europäische Universität. Zur Interaktion von Politik und Erziehungssystem im Prozeß ihrer Ausdifferenzierung (16.-18. Jahrhundert)*, Frankfurt a.M.: Suhrkamp 1991, esp. Ch. II.

drawn in this argument and Fontana's considerations regarding neutral changes in genotype are easily to be identified. The changes mentioned in the argument about ongoing structural differentiation are not really neutral towards the principle of hierarchical differentiation which they later dissolve. It would be more adequate to say that they are characterized by a certain structural *bipolarity*. They have a neutral side (the status aspect of corporations) and on the other hand they exhibit the features of differentiation along functional lines which are incompatible with a hierarchical order. That is the parallel between this argument and Fontana's paradigm only consists in social systems succeeding for some time in *neutralizing* structural changes which from a later and retrospective point of view will be seen as signposts of a newly arising principle of social differentiation.

A third interesting and perhaps most apposite case we will briefly examine here is the social scientific distinction of *semantics* and *social structure*⁴ which is closely related to the distinction of *culture* and *social system*.⁵ Regarding both distinctions one can observe obvious parallels to Fontana's distinction of genotype and phenotype. Semantics as well as culture can drift through spaces of potential meaning without any changes in social structures and social systems immediately resulting from this drift. This means that in this case we can construct a more exact analogue to Fontana's argument. We may conceive semantic and cultural elements as a population of units which define a space of which it can be said that all the elements in this space are compatible with present social structures and social systems. But for each of these semantic and cultural elements it may be said that they occupy different positions in this contemporaneous space, positions which are characterized by differing contiguities to other potential elements which clearly are located outside of the space of compatible possibilities. For each of these semantic and cultural elements there exists at least one nearby possibility which is outside the space of those possibilities compatible with present-day social structures. From this consideration one can derive the picture of continuous evolution Fontana sketched in his analysis of a mechanism of biological evolution. If a *need* for structural change should arrive there is always a semantic/cultural element which is near to a variant from which the respective change in social structures can be established and legitimated. In a paper from 1990 David Sloan Wilson gave a populationist interpretation of historical semantics and he pointed to the polymorphisms in historical semantics which he illustrated by the historical semantics of *self* which freely

⁴ Cf. for the present usage of this distinction Niklas Luhmann, *Gesellschaftsstruktur und Semantik: Studien zur Wissenssoziologie der modernen Gesellschaft*, Vol. 1, Frankfurt a.M.: Suhrkamp 1980, Ch. 1; Urs Stäheli, *Die Nachträglichkeit der Semantik. Zum Verhältnis von Sozialstruktur und Semantik*, in: *Soziale Systeme* 4, 1998, 315-339; Rudolf Stichweh, *Semantik und Sozialstruktur: Zur Logik einer systemtheoretischen Unterscheidung*, in: *Soziale Systeme* 6, 2000, 237-250.

⁵ Talcott Parsons, *Culture and Social System Revisited*. Pp. 33-46 in: Louis Schneider/Charles M. Bonjean (eds.), *The Idea of Culture in the Social Sciences*, Cambridge: Cambridge U.P. 1973; Niklas Luhmann, *Kultur als historischer Begriff*, pp. 31-55 in: *Idem, Gesellschaftsstruktur und Semantik. Studien zur Wissenssoziologie der modernen Gesellschaft*, Vol. 4, Frankfurt a.M.: Suhrkamp 1995.

intermingles positive and negative evaluations as in *self-interest* vs. *selfish*.⁶ This illustrates the kind of ambivalence in historical semantics which for some time may neutralize social change and at the same time opens spaces of possibilities from which one may in short time change over into a world of different structures. And in building on this argument one may establish a concept of *discontinuity* which as it is the case in Fontana's paradigm means those possibilities which are separated by considerable distances from all the individual elements even in a very diverse semantics.

What I want to conclude from these brief remarks is that Walter Fontana has established neutrality as a suggestive paradigm of (evolutionary) change. This has to be further examined in interdisciplinary discourse. There are difficulties to be seen such as the obvious disanalogies to social systems regarding the distinction of genotype and phenotype and regarding the biological concept of development. But nonetheless *neutrality* may become a valuable entry in the vocabulary of terms of a theory of evolutionary change (of social systems). In a more complete discussion this concept will have to be related to well-established terms such as *latency* and to concepts such as *pre-adaptive advance* (or *exaptation*)⁷. This vocabulary is not well formulated yet. This makes it clear how considerable the distance is which separates us from a satisfying and complex theory of evolutionary social change.

⁶ David Sloan Wilson, *Species of Thought: A Comment on Evolutionary Epistemology*, *Biology and Philosophy* 5, 1990, 37-62.

⁷ Stephen J. Gould/Elisabeth S. Vrba, *Exaptation – A Missing Term in the Science of Form*, *Paleobiology* 8, 1982, 4-15.