FIRST- AND SECOND-ORDER CHANGE AS SYMMETRY AND SYMMETRY BREAKING IN FOLKLORE TEXT CONTENT EVOLUTION: FROM HERACLITUS TO LÉVI-STRAUSS

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Abstract: We distinguish between first- and second order change and identify the former with perpetual alternation on an existential plane, the second with moving out into existential space. The first type can be demonstrated by two antagonistic processes inherent in a Markov chain of two pairs of complementary values: the chain gradually alternates between the opposite terminal states and the pattern is symmetrical. Such an existential plane catches an essential feature of Heraclitus' philosophy, and can be illustrated by examples from classical Greek mythology. The same material also exemplifies Lévi-Strauss' formula of myth, symmetrical in its weak and asymmetrical in its canonical form. Since the weak form equals the orbit of a Klein group, we hypothesize that the canonical form, and thereby symmetry breaking, can be generated by element exchange between two respective Klein groups. The framework for such processes is text variation in folklore, described by ethnosemiotics.

1 INTRODUCTION

From physics to history, scholarly communication between different fields of science and the humanities would possibly benefit from a formal model of change, one which enables them to compare their respective disciplinary findings in evolution- and development-related research. Unfortunately, the availability of such a model has escaped the attention of the interested parties this far. Therefore the purpose of this short paper is to indicate those considerations which can contribute to its building.

In what follows, I will regard change as a process (flux) and conceive its dynamics as a sequence of stable states upon which some operator brings about modifications. I distinguish between two types of such processes, first- and second-order change, and argue that the first type manifests a symmetry the second type occasionally breaks, to create a next system of first-order change. With the variation of folklore texts as a universal phenomenon, I refer to Greek mythology for both types of changes.

2 FIRST- AND SECOND-ORDER CHANGE

My frame of thought is a distinction between enantiodromia and real change, much in the sense of Watzlawick et al., who identified first- and second-order change in human interactions (1974). Whereas it was Jung who proposed this term (1976: 375), the concept goes back to Heraclitus (Kirk,1954, Kahn 1983, Maly-Emad 1985). Enantiodromia means the progress of conflicting opposites toward each other, and refers to alternation between two polar opposites or two sets of them (cf. Fragment B 8: "Moving-against [is] a bringing together, and from out of separation [comes] the radiant joining"; in Maly-Emad 1986:17).

Enantiodromia properly accounts for any series of modifications which, departing from an initial state perceived as a set of signs, result in some other deviant set of values, described by sign agglomerations oppositely different from the original set. With time, however, just as the new values start becoming acceptable to the majority of the signifying population, a continuing but this time opposite convergence toward old values would begin, again testing the tolerance of the majority. This state of perpetual and complementary ambiguity, being torn apart by divergent torrents, is what people are exposed to most of the time, and what Heraclitus must have referred to as panta rhei as cited by Plato in Cratylus 402a (although this reference was pertinent to a state of All-One rather than ambiguity, to a principle unifying antagonistic forces rather than to the opposites themselves, see Beaufret 1987:72-77). Since this type of alternation takes always place on a certain existential plane, its nature is two-dimensional, inasmuch as it leads nowhere but back to the beginning (Fig. 1).

Real change, on the other hand, depends on finding a new frame of reference for a given situation outside of it (Watzlawick et al. 1974:20). It is intrusion into a new dimension: from the existential plane, it is moving out into existential space. Without mastering it, which is beyond individual or social control, it penetrates humans instead.

3 ENANTIODROMIA AND SYMMETRY

The pattern of two pairs of binary opposites – indicated by the colours black and white –, organized in an enantiodromic fashion, is mirror symmetric along the vertical axis and, due to complementary sign value arrangements, also on process level (Fig. 1). Phases of such processes can be described by Markov chains (Norris 1998), in which, in spite of convergence toward some goal state partly or totally opposing the initial state of the system, the probabilities of a next phase depend on that of the prior state in the chain only. Such processes seem to underlie at least parts of classical Greek mythology (Darányi 1995), with the implication that ambiguous interpretability of some sign combinations allows for symmetry breaking in a non-technical sense, leading to second-order change and reinstating enantiodromy on a next level.
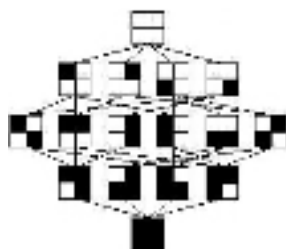

Figure 1: Enantiodromic process

Figure 2: Interaction between two Klein groups of myth variants

4 THE CANONICAL FORMULA OF MYTH AND SYMMETRY

My next example for symmetry and symmetry breaking is the canonical formula (CF) of myth, $f_x(a) : f_y(b) :: f_x(b) : f_a^{-1}(y)$ (Lévi-Strauss 1955). While Maranda (2001) and Darányi (2003) sum up state-of-the-art research on the CF, the explanation of this mathematical construct is conflict resolution or problem solving on narrative level: given two functions f_x and f_y and their two values (a) and (b), the initial standoff between $f_x(a)$ and $f_y(b)$ is mediated by fx swapping (a) for (b) plus the double inversion of the right hand side of the construct, first exchanging y and (a) as function and term values, then using the reciprocal value of (a) instead of (a).

As Scubla points out, in some anthropological cases such as exchange among wife-takers and wife-givers, from the mathematical point the result is a group of finite permutations, one which is isotropic, homogeneous and symmetric. "The same properties can be found in Klein's group or more precisely in the orbit of such a group, that is, in a quadruplet of the type (x, -x, 1/x, -1/x), which is obtained by crossing two binary oppositions and which therefore can only correspond to very weak versions of the canonical formula" (2001:

134-135). This is called so because it lacks the double inversion of the strong form and thereby its conflict resolution capacity as well. I have shown elsewhere (Darányi 2003: 61) that theoretically, two Klein groups, both corresponding to the weak form of the CF but with double inverted function and term values with respect to each other, could swap $f_y(a)$ and $f_a^{-1}(y)$ between themselves, an exchange resulting in two strong, i.e. symmetry breaking variants of the CF (Fig. 2). Future research will have to solve the automated identification of weak Klein groups in folklore text corpora.

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