Time as Linguistic Systems: E-series Time for Bio-synchronicity

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The aim of our paper is to explain that: (1) time is linguistic systems, and (2) living organisms adopt a time code called E-series time (Nomura & Matsuno 2016). Illustrations are drawn from: (a) cellular circadian clocks in duckweeds, (b) Kai protein oscillators of cyanobacteria, and (c) "chemical affordance" internally observed in the citric acid cycle (Gibson1979, Matsuno 2013).

A living organism sways the time of its own world; that is, without living organisms there can be no time (Uexkull & Kriszat 1934, p. 13). The physical time with use of a clock seems only one kind of time. Biological time is not clock's time applied to the world of physics.

What makes the Uexkullian argument valid? Time is always based on some kind of punctuation, which functions as a boundary maker (Bateson 1972). Otherwise, the passing of time would not be grasped in relation to one's space. Or, any kind of clock can be said to consist of closed loops of signifier and signified, which is indexical pointing of the other and being pointed by the other.

The time classifications by McTaggart (1927) are here adopted as linguistic categories, turning the inquiry from ontology to epistemology. Time is not considered a single physical entity but plural semiotic expressions each having own style of punctuation. Time having tense (the past, preset and future) is the A-series; time without tense but having earlier-later relations is the B-series; time having neither tense nor earlier-later relations is the C-series.

Nevertheless, the biological mode of time making via interaction and synchronization mediated by the action of signs does not fall into the above categories. We propose E-series time to cover a mode of punctuation that is negotiated interactively with use of a functional loop of sign activities.

In the language of semiotics, each sign vehicle receives a sign from the vehicle situated in the immediate upstream (one preceding), interprets the

received sign and then send off a transformed sign to another vehicle in the immediate downstream (one succeeding). The consequential clock consisting of the loop of the sequence of the transformed signs comes to implement the time making in the E-series.

In the language of communication, on the other hand, two or more agencies are locally synchronized as "the second-person negotiator." As if a dancer pair getting in step with each other, biological formations or metabolism are also in step to the surrounding environment, continuously adjusting the timing of punctuation through mutual indexical exchanges. Such local time making is in the E-series.

Synchronicity at a close look shows incessant mutual adjustments of trial-and-error, which is comparable to Learning I, while the formation of a functional loop -- a step higher in logical type -- then corresponds to Learning II, where minute differences are sensed and extinguished by negative feedback to stay in parameter (Bateson 1972).

We then discuss: <1> retrocausality (backward causation) of the running of feedback loop in relation to the biological identity, and <2> chemical affordance permitting the environment to act as an agency.

References

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