

Self as Object

Victoria N. Alexander

Dactyl Foundation

My aim here today is to try to more fully integrate the study of biosemiotics, emergence, purpose -- and to some degree cybernetics and intentionality.

A sign is interpreted
to stand for an object (selfhood)
not present.

This definition of sign is intended to link these areas of study. Some of us might have reservations with the word "interpreted" or with the "not present" clause. Probably few of you think of the object of the sign as selfhood as I do. Meaning is always self-referential.

A sign is interpreted
to stand for an object (selfhood)
not present.

* Object ≠ an actual particular thing

Instead of defining sign as "something that is interpreted to stand for some *thing* else," I prefer to make it clear that the object in a sign relation is not a particular physical thing but

A sign is interpreted
to stand for an object (selfhood)
not present.

- * Object \neq an actual particular thing
- * Object = General Type

A sign is interpreted
to stand for an object (selfhood)
not present.

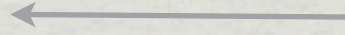
- * Object \neq an actual particular thing
- * Object = general type
- * Object = a type that sustains the interpreting entity.

*a type that sustains the interpreting
entity.*

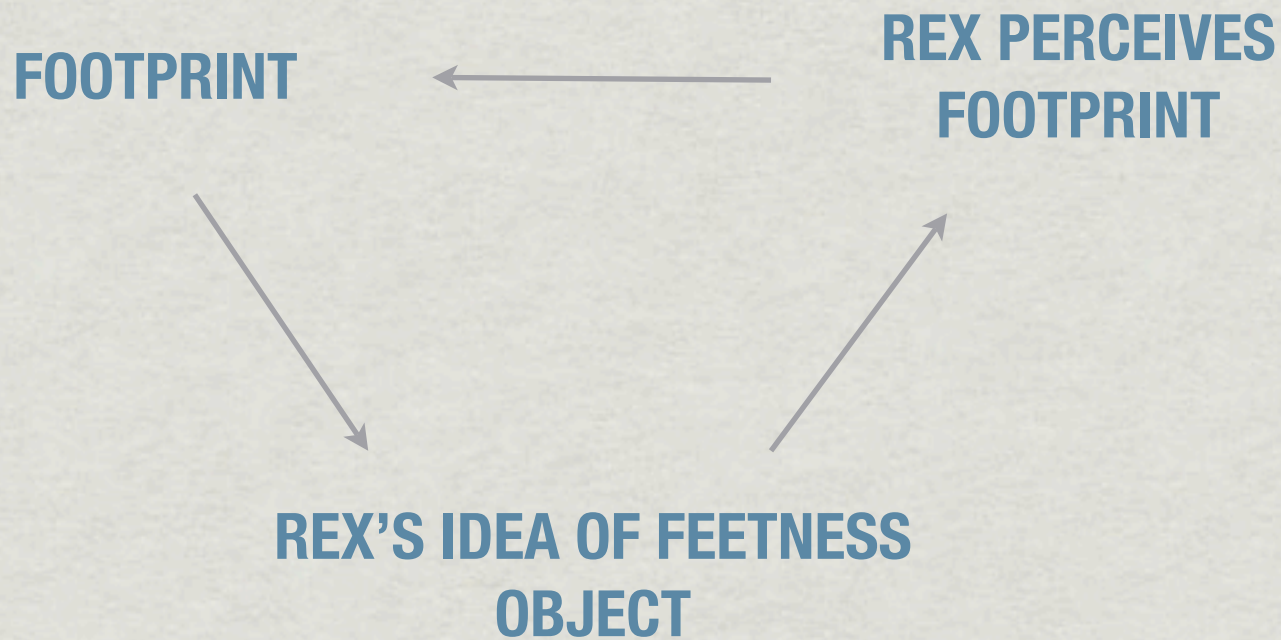
**RABBIT/ODORANT
REPRESENTATION**

**WOLF CHASES
INTERPRETATION**

**FOOD/SURVIVAL
OBJECT**



Let's apply this to an example: We might say a wolf detects an odorant that is the sign of a rabbit. But rabbits are only meaningful to wolves insofar as they are a means of survival, of self-maintenance. Thus the odorant is NOT the sign of a *particular* rabbit. The odorant is the sign of survival or maintenance of selfhood. The wolf's purposeful actions of pursuing catching and eating the rabbit result in the continuation of his metabolism, maintaining his tissue and keeping his vital organs operating. These predatory actions only maintain some aspects of his selfhood. Pursuing a mate would preserve other aspects. Performing various habitual or characteristic actions would preserve other aspects of his selfhood. If the object is a type, not a thing, then it is definitely not physically present.



I've added another two more examples after getting feedback at the conference: A person perceives a footprint on the beach and does not know who left it. The response calls up his/her concept of feet. The footprint is NOT an index of the beachstroller's particular foot, **to the person who sees it**. The object of the sign is always already part of the interpreter's repertoire of knowledge and, as such, the perception of any semiotic object reconfirms his/her ideas about the world, and his/her selfhood.

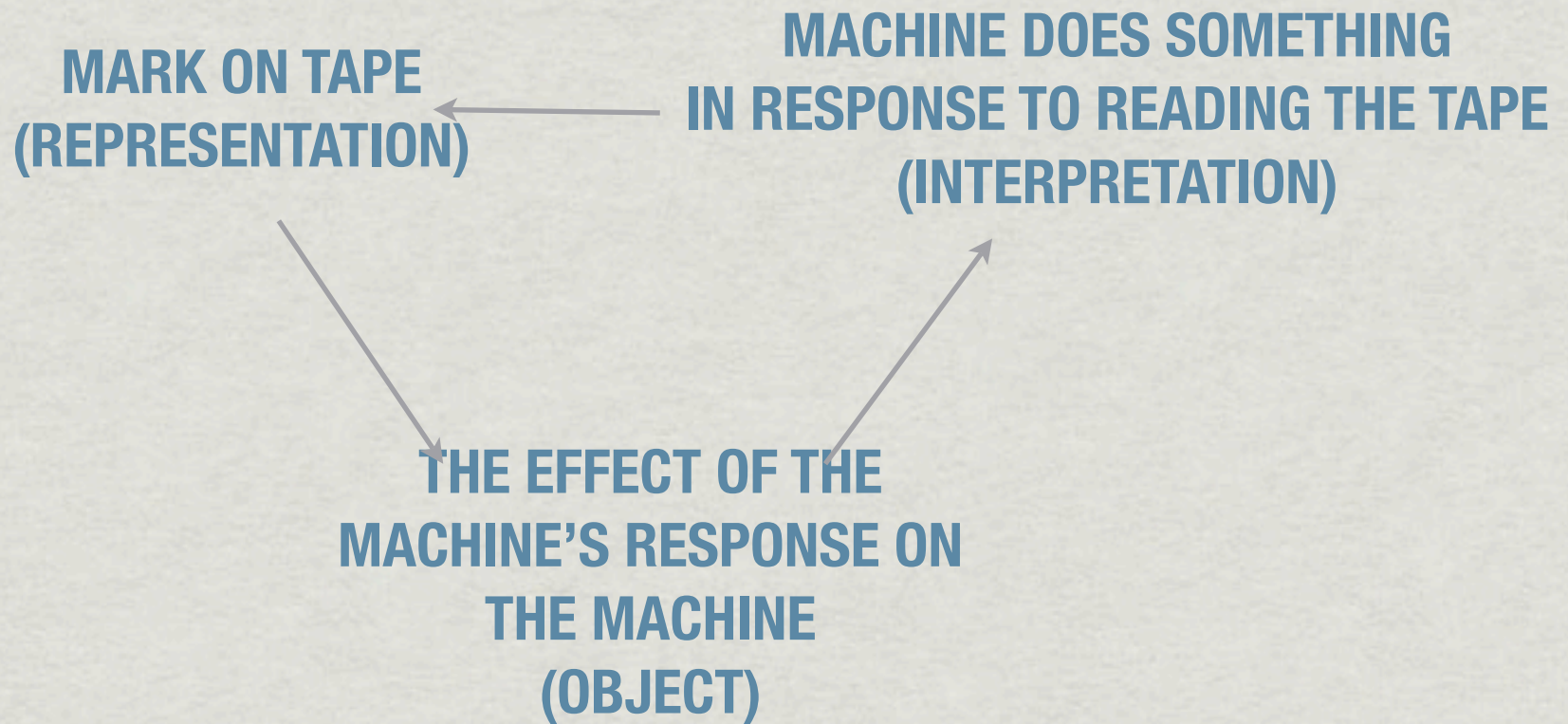
**MARK ON TAPE
(REPRESENTATION)**

**MACHINE READS
(INTERPRETATION)**



**MACHINE DOES SOMETHING
(OBJECT)**

Here's an example that I took from Gorlich, et al. "Cells as Semantic Systems." They write "in case of a Turing machine, the meaning of a sign on the tape can be defined in terms of the operations the machine performs after reading it" which might be diagrammed like this. I don't disagree with the ideas in the paper generally, but I would not diagram it quite like this. Here I think the interpretation (response) is in the object's position.



I would diagram it this way. The meaning of the marks on the tape can be defined in terms of the effects that the machine's response to the sign have **on the machine**. The object is the meaning of the response to the machine. Presumably, **that effect is the reason for the machine's existence and contributes in some way to its continued existence**. So the object for the machine is also self-preservation. However, in the case of machines, there is no biosemiosis. The machine is not self-creating or self-programing, although it is self-maintaining to some extent. An organic "machine" assembler would be biosemiotic. Diagramming the sign this way helps, I think, to unite those working in emergence studies, biosemiotics, theories of intentionality, theories of purpose, and etc.

A sign is interpreted
to stand for an object (selfhood)
not present.

- * the “not present” clause?
- * A semiotic object is not just absent;
- * it doesn’t exist in a particular state.
- * This is true of “emergent objects” and “intentional objects.”

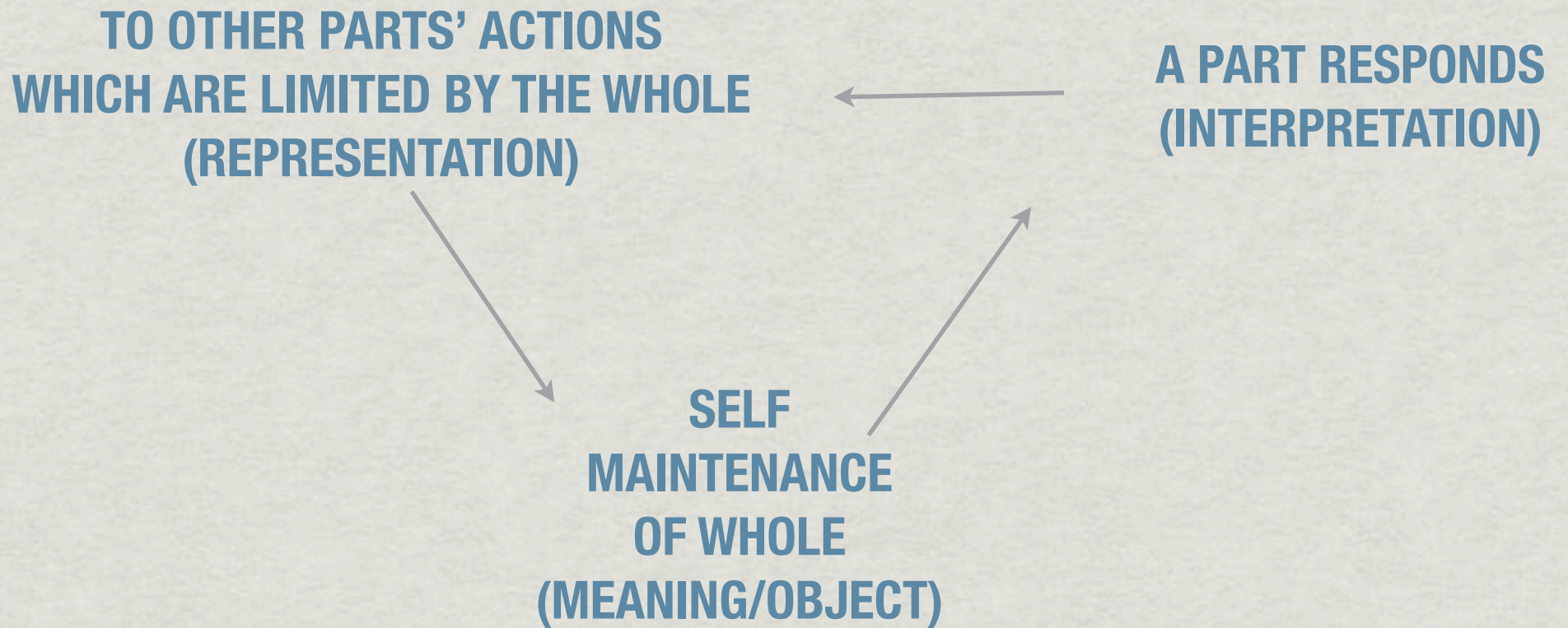
Back to my definition of sign. What about the "not present" clause? This is relevant to emergence and intentionality, as well as semiotics. The semiotic object, I argue, is not just absent. It is something that doesn't exist in a particular state. This is true of “emergent objects,” which are “wholes” and “intentional objects” which, according to philosophers, must be “potentially inexistent.”

An Emergent Object = Whole

- * is a self, i.e. a self-organizing entity
- * is *dynamically* stable so can never be fully present
- * is not a particular thing
- * the whole constrains its parts actions
- * thus, it is knowable by observing actions of parts
- * the parts' actions are self-referential or "about" the whole

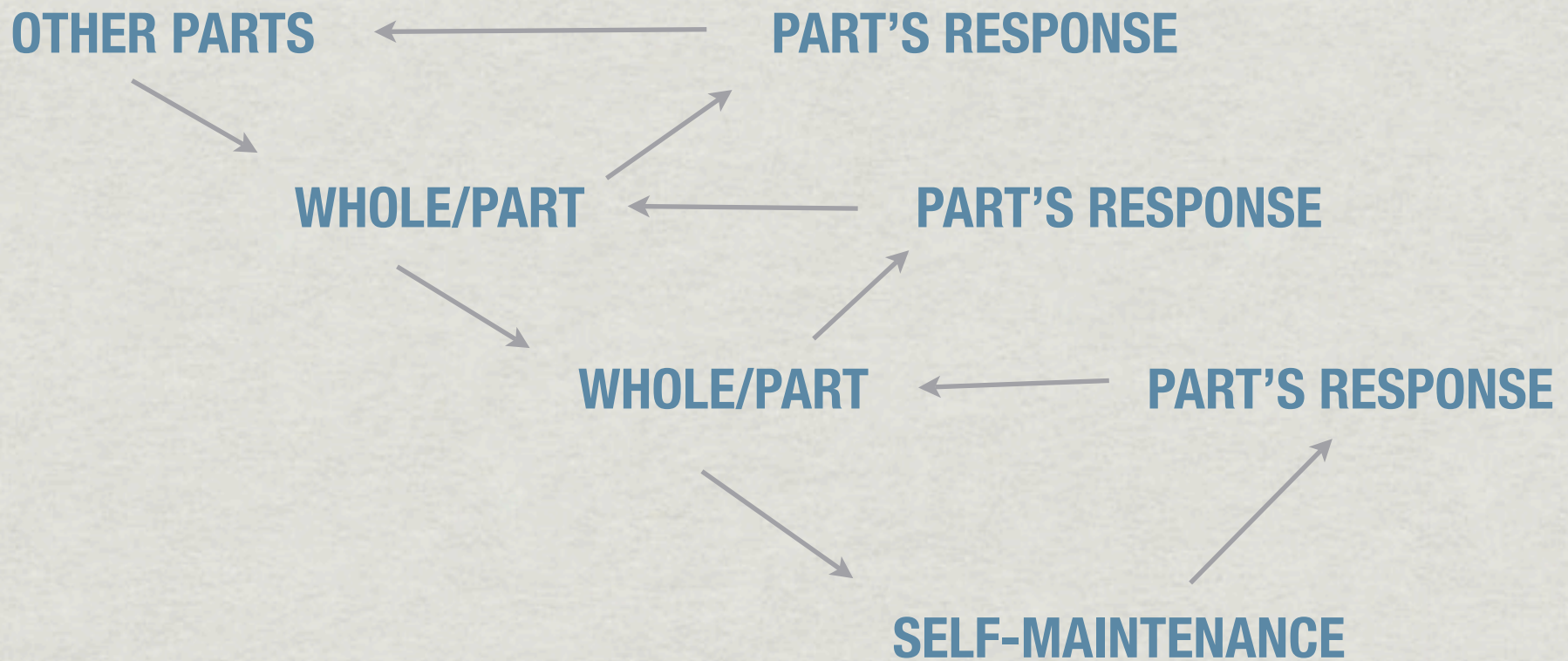
In the complexity sciences, an emergent object is a self, i.e. a self-organizing entity; it is *dynamically* stable –ever changing --so can never be fully present at any particular time: it is not a particular thing, but a "whole." The whole constrains its parts actions; thus, it can be known by observing actions of parts; the parts' actions are self-referential or "about" the whole. The existence of emergent objects—holistic effects—necessitates a biosemiotic theory that can explain how these objects come to have effects in the world, that is, through signs.

Emergent Object / Whole-Part



Here you can see the emergent object diagramed as a semiotic object. The parts' actions are signs of the constraining whole.

A part is interpreted
to stand for part of a whole, which is part of
of a whole, which is part...



Complex systems often include several interrelated systems, which might look something like this. Wholes function as parts of larger systems, which are parts of larger systems etc.

Purpose as Object

- * all purposeful actions are responses to signs of goals
- * a purpose is a type of effect for the sake of which responses occur
- * a purpose is always general, never particular
- * a purposeful actions always maintains the self, i.e. they are self-referential
- * goal objects, must be potentially inexistent

all purposeful actions are responses to signs of goals
a purpose is a type of effect for the sake of which responses occur
a purpose is always general, never particular , to quote Tom Short
a purposeful actions always maintains the self, i.e. they are self-referential
goals, or semiotic objects, must be potentially inexistent

Semiotic Purpose

**GLUCOSE GRADIENT
REPRESENTATION**

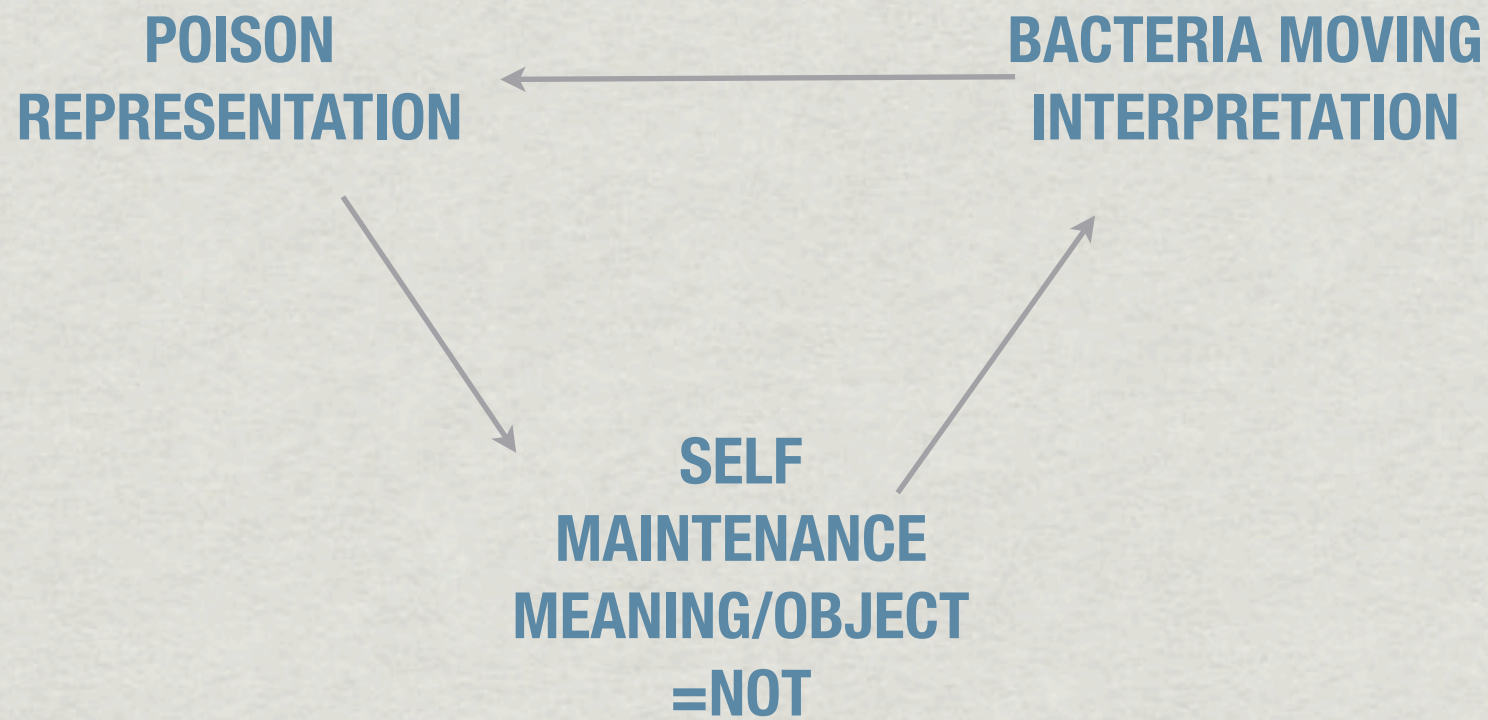
**BACTERIA MOVING
INTERPRETATION**

**SELF
MAINTENANCE
MEANING/OBJECT**



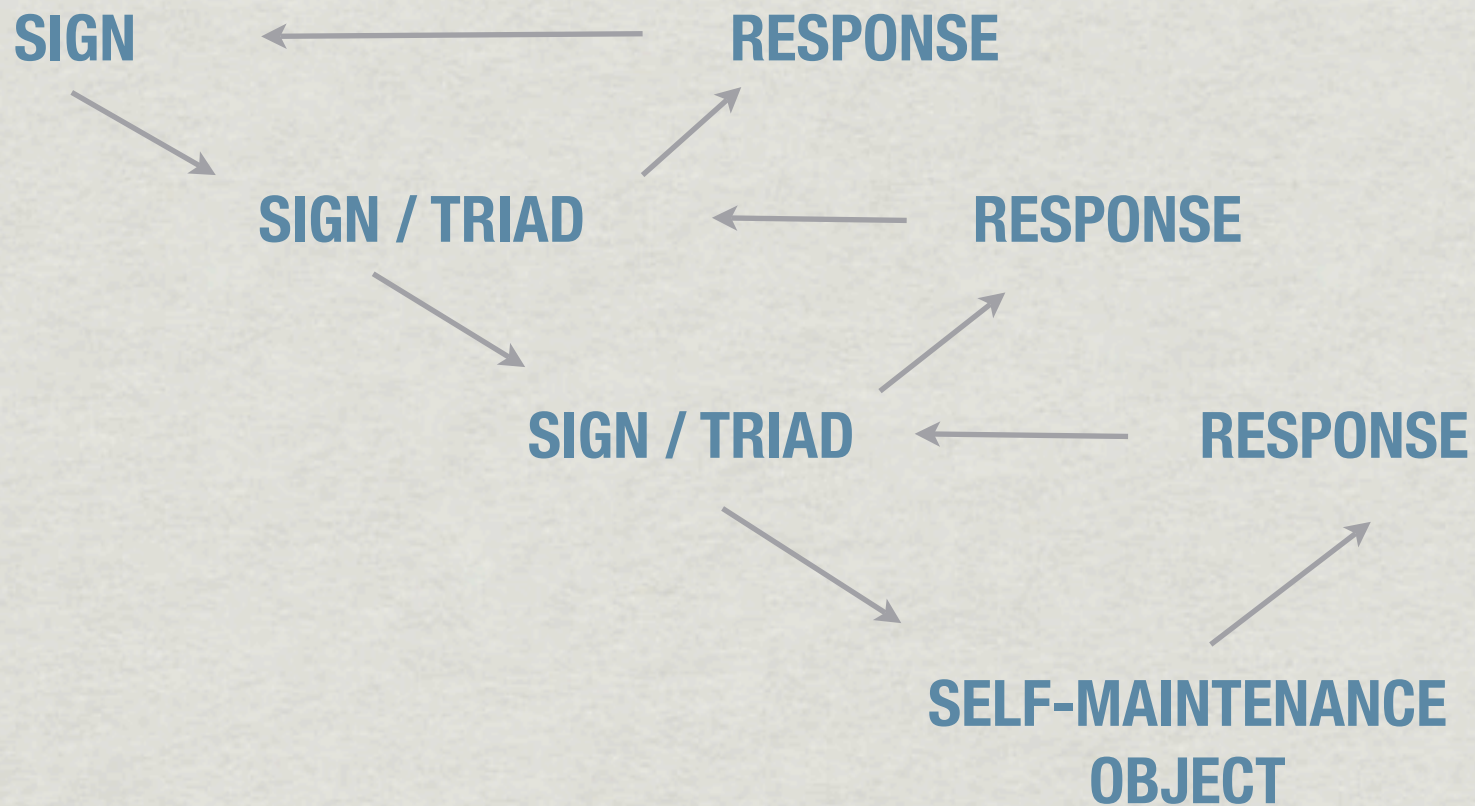
With Semiotic purpose the object is always self-maintenance. For example, If bacteria read a glucose gradient as an index pointing to more actual glucose as object, then materialists could say this is simple cause and effect. The bacteria react with a material substance in a way that is determined by the laws of chemistry and physics. As biosemioticians we want to say that, in addition to the material interaction, bacteria interact with a sign of an (emergent or possibly inexistent) object that cannot be fully physically present because it is a type of something and not some physical particular thing. Thus the bacteria can only respond to it through mediation. The glucose gradient is a sign of self-maintenance to the bacteria. The goal for the bacteria is to capture food for survival, which might be accomplished by moving toward lactose instead. The sign vehicle can vary, but the object remains the same.

Semiotic Purpose



OR suppose we invent pseudo-glucose, a poison, which kills bacteria when they move toward it. As Tom Short has argued, the potential to be mistaken about a sign makes actions purposeful. Entities or organism can only be mistaken if semiotic objects are not actual things but are self-referential meanings. In this case the object is not existent. But the interpretation still occurs.

A sign is interpreted
to stand for sign of a sign
of an object (selfhood) not present.



(“SIGN” = REPRESENTATION)

IF I'm right and semiotic object is always an abstract pattern of self to be maintained, then, Why do sign-objects sometimes seem like particular things? This is my guess. Sometimes we have complex situations, in which the sign-object is another sign-triad. Here a particular thing – the sign vehicles or representation, as part of the sign triad—is in the object's place (along with the other two parts of the sign). It's really just a cascade of interrelating sign triads

A sign is interpreted
to stand for sign of a sign
of an object (selfhood).

An agent does
 $A \rightarrow B \rightarrow C \rightarrow D$
D = (selfhood)

This sign of a sign of a sign situation can be understood as a purposeful action that involves a number of intermediate steps. An agent does A in order to do B in order to C in order to do D.

Object as Self

We can say that all interpretations maintain the self, because in some sense we only perceive or interpret what we already know. A cell receptor can only interact with a ligand with which it has some affinity or likeness. In order to have a general semiotics, we also have to say that all human semiotic actions are self-maintaining. But, of course, humans do more than act just to survive physically. They maintain and reconfirm ways of thinking, modes of being, assumptions.

Versions of Meno's Paradox

If we only perceive what we already know, how can we learn anything new?

If we only desire what we already are, how can we grow?

If all complex systems are deterministic, how can they generate novelty?

There is a version of Meno's paradox for purpose, semiotics, and emergence. How can we learn, grow or create anything new in this self-reference system I've described here. I realize that always maintaining oneself is just plain robotic, and so, we have to say that purposeful, semiotic and emergent activity must include creativity too, the ability to adapt to new situations such that the system is *better* able to maintain itself. This requires that the self *change*, but it can only change according to its own rules that define what it is. It can change only through misinterpretation of the non-self as self. So then the question is, How does this happen?

Jeffrey Goldstein on Emergence

- * Emergents exhibit behavior "which is not explicitly programmed in"
- * and "confers additional functionality on a system."
- * They "recombine, alter relations between wholes and parts,"
- * They "take advantage of randomness serendipitously,"
- * They "intensify under some kind of containment combination,"
- * "and include some element of [rule-bound] negation operations that open a space for radical novelty."
- * "Emergent phenomena are irreducible in the sense that there is nothing left to reduce them to."
- * "The former lower level components no longer exist as they did before but have a new existence bound up and entangled with the new emergent level."
- * "Emergence, Radical Novelty, and the Philosophy of Mathematics"

My next step will be to look at Jeff Goldstein's work on **novelty generation** in emergent systems, which I have found useful in understanding semiotic systems. He argues that definition of emergence includes behavior "which is not explicitly programmed in" e.g. instinctual, physically determined, and "confers additional functionality on a system." He claims that emergent systems "recombine, alter relations between wholes and parts, take advantage of randomness serendipitously, intensify under some kind of containment combination, and include some element of negation operations that open a space for radical novelty." He also notes that, "emergent phenomena are irreducible in the sense that there is *nothing* left to reduce them to. The former lower level components no longer exist as they did before but have a new existence bound up and entangled with the new emergent level." For us this means that the semiotic self changes each time it makes a new interpretation.

Goldstein, Jeffrey. "Emergence, Radical Novelty, and the Philosophy of Mathematics," *Nonlinear Dynamics in the Life and Social Sciences* edited by William H. Sulis, Irina Nikolaevna Trofimova IOS Press, 2001.

Georg Cantor

- * antidiagonalization
- * self-referential operation
- * negation
- * =radical novelty

Jeff has been developing a way to formalize these characteristics, which he calls a self-transcending constructional method. It is based partly on the "anti-diagonalization" method of mathematician Georg Cantor, which Jeff notes belongs to Rene Thom's "ugly mathematics" because it invokes undecidability, inconsistency, and non-computability. Thom believed that the future of mathematics lay in the area where the beautiful and the ugly meet. Perhaps the future of biosemiotics too. I won't attempt to try to explain Cantor's "diagonalization" here (please ask Jeff) but suffice it to say for now that you can think of it as a new set that is formed by going diagonally across an array of hierarchies. With the method, first a self-referential formula is used to generate an infinite set. Then another self-referential operation is performed on that set so that the outcome is always *not* in that original set. The upshot for emergence studies is: What goes into the system and is processed by the system can emerge as something radically new. As biosemioticians, we can say that: Entities learn from their environments through self-referential signs.

Formula for Self-Reference

- * John is reading *Moby Dick*.
- * John is reading about his understanding of *Moby Dick*.
- * The Self is reading **a sign of some aspect of** itself.
- * The Self is reading **about** itself.

To illustrate the concept to non-mathematicians, Jeff has come up with a formula for mimicking Cantor's method using verbal language instead of mathematics. He starts with this sentence, "John is reading Moby Dick" and then he performs these Cantor-like operations on it. But since I'm trying to marry semiosis with emergence I'm going to translate his sentence into my definition of sign, "John is reading about *his understanding* of Moby Dick" because every reading in some sense merely confirms the signs you already understand. This is to say 1. The Self is reading a sign of some aspect of itself. And this can be restated more simply as 1. The Self is reading about itself. Notice that I've added the word "about." because a self can't read itself fully. Adding "about" indicates that we are dealing with intentionality, which is a form of signification.

Everything that is read/interpreted must be done so in terms of what the reader already is. No new or additional functionality here in this self-referential recursion. We are adrift here amid post-structuralism, deconstruction, the pitfalls of Varela's autopoiesis. We need a process of rule-bound negation to get us out of this.

Mimicking Cantor

- * 1. The self is reading about itself.
- * 2. The self is reading about itself reading about itself.
[This is the diagonalization of 1.]
- * 3. The self is reading about the diagonalization of 2.

Let's go a step further. Following Jeff's anti-diagonalization after Cantor we get

2. The Self is reading about itself reading about itself. [This is the diagonalization of 1.]
3. The Self is reading about the diagonalization of 2.

Jeff notes that in this form, Sentence (3) asserts that the self is reading the diagonalization of (2), but the diagonalization of (2) is (3) itself. Therefore, sentence (3) asserts that the self is reading the very same sentence itself (3). Accordingly, sentence (3) is purely self-referential.

Jeff notes that this kind of self-reference is difficult to achieve. This is a bit like an Escher drawing. It feels like paradox. Notice that the phrase "the diagonalization of 2" is a symbol, for the sentence it represents. A symbol, which is a sign by convention, is further removed from the object than indices or icons are. *My guess is that* you can only get this kind of pure or paradoxical self-reference using symbols. I'm not sure: I have to think about that some more.

Okay, so far so good but we still need negation and novelty

Negation

- ✱ Terrence Deacon has noted that while the icon or index has a more or less direct connection to the object, the symbol negates that connection.

Terrence Deacon has noted that while the icon or index has a direct connection, the symbol negates that connection. Jeff says that emergence is like a bridge that disappears as you cross it.

Self-Reference & Negation in Biosemiotics

- * Hoffmeyer talks about “other-reference and self-reference” which “are inseparable aspects of the dynamics of the living.”
- * Membrane = other-reference
- * DNA, RNA = self-reference
- * Uexkull, *et al.*: “To identify the unknown means to recognize something familiar: nonself is a potential variant of self.”

*

(Biosemiotics 237)

There are lots of references to this self-reference and negation issue in biosemiotics. Jesper Hoffmeyer in particular has a lot to say. He talks about "*other-reference* and *self-reference*" which he says "are *inseparable* aspects of the dynamics of the living. He also quotes Uexküll, et al. "To identify the unknown means to recognize something familiar: nonself is a potential variant of self.

Hoffmeyer, Jesper. *Biosemiotics: An Examination into the Signs of Life and the Life of Signs* (University of Scranton Press - Approaches to Postmodernity, 2009)

Double Negative

- * Hoffmeyer's "Self as Iconic Absence." Only the T-cells that are *not* negative images (*not* like matching puzzle pieces) of the body's cell make it out of the thymus to then potentially act as negative images of non-self intruders.



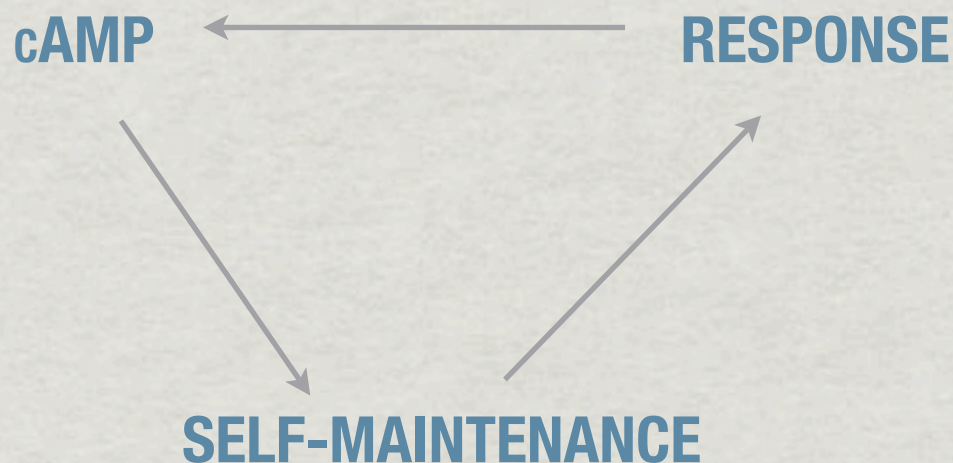
(Biosemiotics)

Double negative. Jesper's idea of "Self as Iconic Absence." Only the T-cells that are not negative images (not like puzzle pieces) of the body's cell receptors make it out of the thymus to then potentially act as negative images of nonself intruders to which they can bind.

cAMP

as misinterpreted sign

- * Bacteria produce an enzyme, as a response to cAMP, which is a (mis)interpreted sign of ATP, which is a sign of what it needs to maintain itself.



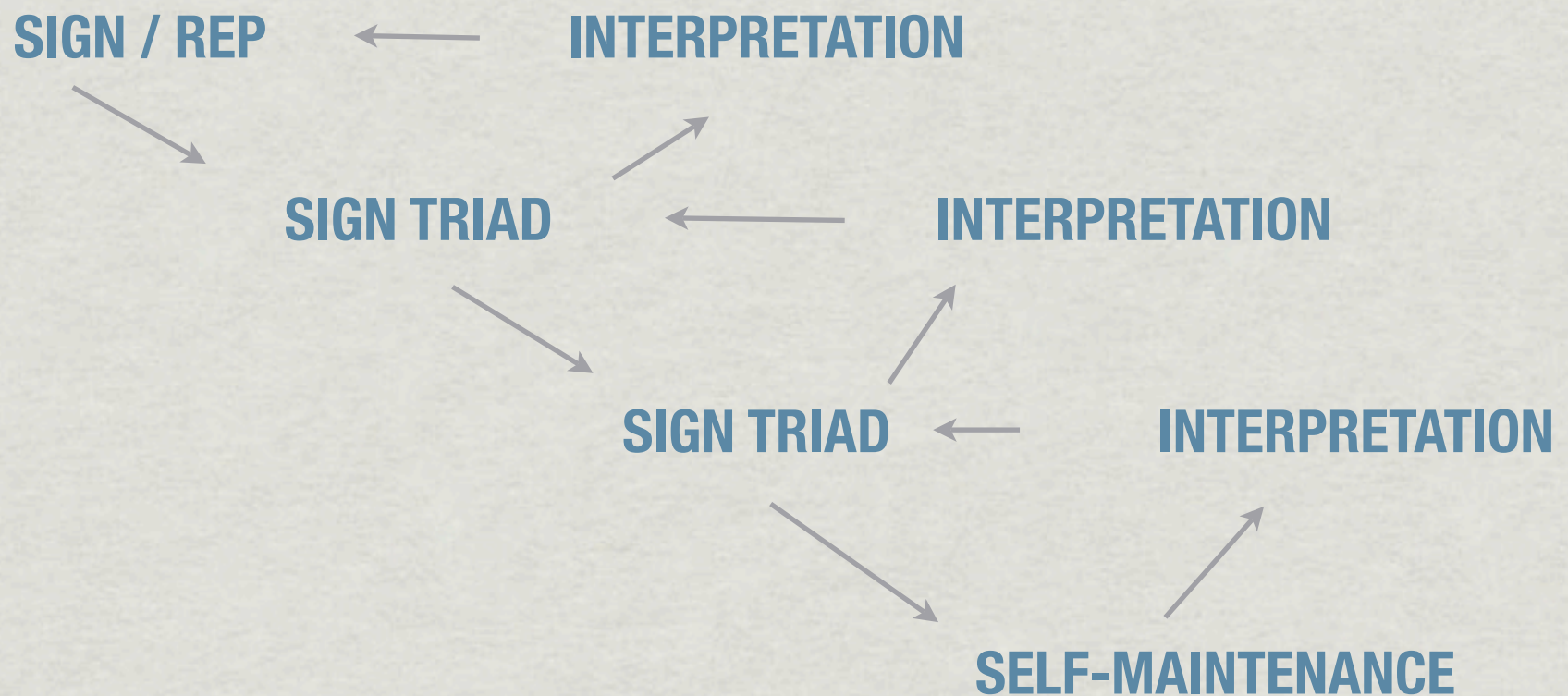
He also talks about how the concentration of cyclic AMP in bacteria functions as a stress signal indicating a lack of glucose which triggers the production of an enzyme that can break down other kinds of sugars, such as lactose. In this case, I would diagram it this way: the bacteria produce an enzyme as a **response** to cAMP, which is a **(mis)terinterpreted** sign of ATP, which is a sign of **what it needs to maintain itself**. As Jesper points out cAMP is an icon of ATP having similar shape, as both made of adenosine. This diagram is too simple for the process, which is more complicated and involves different levels of interaction.

A sign is interpreted
to stand for sign of a sign
of an Object (Selfhood) not present.



It might look like this, with something like anti-diagonalization going on as signs are misinterpreted across the hierarchical levels.

A sign is interpreted
to stand for sign of a sign
of an Object (Selfhood) not present.



Once the process is stabilized it's no longer a misinterpretation, but a correct interpretation.

Emergence, Semiosis, Purpose

- * A sign is interpreted to stand for an object (selfhood) not present.
- * Jeff Goldstein's anti-diagonalization after Cantor, an array of self-referential hierarchies and negation operation.
- * Negation occurs through misinterpretation, reading non-self as self.

In conclusion, I've offered some useful (I hope) generalizations to unite these areas of studies, which are all concerned with the behavior of irreducible, complex systems:
A sign is interpreted to stand for an object (selfhood) not present.
And to go further, Jeff Goldstein's anti-diagonalization after Cantor, an array of self-referential hierarchies and a negation operation.
Negation occurs through misinterpretation, reading non-self as self.