CULTURE IS NATURAL: INTRODUCING BIOSEMIOTICS

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Peter Harries-Jones
Dept. of Anthropology
York University, Ont.
peterhj@yorku.ca

In July 2010, *The New Scientist*, a generalist scientist magazine published in the U.K. sent us i.e. the people who attended our recent Biosemiotics annual meeting in Braga, Portugal , the following question. Why would a general science magazine like ours have an interest in your specialist subject, Biosemiotics? The New Scientist gave the attendees 300 words to reply. Mine was as follows below: but which I am going split into in two parts in order to talk about it:

Part A.

Currently, there is a dominant tendency in biology to treat information 'use' as if its patterns were comparable to geophysical processes; in other words, to employ an overall downwards reductionism to support a mechanistic explanation of communicative interaction. Geophysical processes do not use information; the distinguishing feature defining their border with living (biological) systems is the latter's use of information to maintain order and coherence. In the non- geophysical world, "use of" (i.e. response to) information covers a wide spectrum, from cells, to organization of context in the plant kingdom, to animal intelligence and to the interaction of biological systems with human cultural systems, prompting an investigation of fundamental attributes of use of information over the whole spectrum, together with characteristic variations.

I think this first part, call it Part A is fairly clear - information is an important topic and informational-type words are consistently used in biology - in genetics with reference to the genome in particular, but though scientists in these fields consistently use

informational words they still treat biological interactions as if they were talking of physico-mechanical bits and nothing more. Biosemiotics is attempting to wrest away, perhaps even to free both biology of its bad habits, especially especially of those who pusue neo-Darwin evolutionary studies - i.e. the one's who stick to a strict interpretation of natural selection as a universal materialistic law to account for change and adaptation over the millenia. Biology has studied how organisms and living communities are built, without paying attention to what they recognize (they can make distinctions), what signs they explore (because they communicate, make meanings and use signs), what they remember (because they have memory), what motivates them and why they choose as they choose.

We in Biosemiotics would claim that biology is in denial of the fact that both its descriptive and its explanatory terminology - terms such as such as "information", "messenger", "code", "signal", "cue", "communication," are used at all levels of biology. If it accepted this fact, biology would have to regard itself as a semiotic science. Many biologists might reply that they are merely using practical, metaphorical shorthand which might be dispensed with - tossed out of the window, if necessary. Biologists have had 50 years to do this, but instead, communicational terminology within it has increased by leaps and bounds. Rather than dispense with the terminology its salience is commonplace. A basic claim of biosemiotics is that the presence of such terms should be taken seriously, permitting a common framework and enabling semiotics and biology to distinguish between different types and levels of sign use. In fact Biosemiotics has proceeded that way, but discussion of these charts would take up too much time. The major point is that we claim that there is a semiosphere, which is as enveloping as "the biosphere" and which follows a semio-logic of communication which is different from the bio-logic imposed by biology's predominant legacy , that is the physics of biomass and energy, plus the mechanics of energetic order.

Part B:

There is a dominant tendency both in the philosophy of science and humanities to embed human language use as a template for understanding use of information in biological order. Hence, those strong links between intentionality and human language - specifically intentionality discovered through human reflective consciousness in human language - cannot be repeated in biological order. But, I argue, this is an upwards reductionism, Upwards reductionism is both anthropocentric and rationalistic, obscuring the possibility that both intentionality and meaning in the biological world arise from pragmatic matter-of-fact, or naturally necessary relations between information users and proximal environments.

It is the aim of Biosemiotics to show how semiosis (meaning) underpins coherence in all living systems. It proposes that information is a means of orientation to, and congruence with, all aspects of coherence in living systems, a coherence derived from informational responses - communication about - 'relations between'. It is not, repeat "is not" driven by the view that either meaning nor intentionality, "aboutness" to use the philosophical term, is somehow inseparable from the action of human consciousness and its inner representations. This mistaken view has been justly labelled 'meaning rationalism' and fosters a belief that the universal syntactics of human language is clearly distinctive from all other forms of communication exhibited by non-human life – that is non-human life has not grammaticality.

'Meaning rationalism' proposes that birds may sing, but they have no 'grammar' in their singing. Moreover, says the 'meaning rationalists,' they cannot learn how to give a performance in 'bird songs' through recursively practicing bird calls. We maintain pragmatics trumps syntax. Here we have a specific opposition to Biolinguistics and to

Noam Chomsky in particular. In fact, the research of one of our members, Almo Farina, shows that all bird singing is either individual or collective performance, depending on circumstance, yielding distinctive sound topes, and that these sound topes may, in some not-yet-established- way be related to ecosystem order.

Biosemiotics proposes that sign use (not language use) is fundamental to semiosis and that 'interpretation' is any activity undertaken by a biological agent engaged in a multilevel selective process. This is not be the same as language syntax in humans but is a multilevel characteristic of response which has its definite rules of expression. For example, birds recognize dialects in their singing, and the Queen's University Biological Station on the Rideau Canal in Ontario has done several studies of why Toronto birds are not welcome in Kingston, Ont. Why? because the singing dialects of Muddy York are different, and in relations between birds, the Toronto bird is a stranger to the Kingston sound. Or we may take another set of studies - this time done by one of our members - who has examined whale communication and has come to the conclusion that a study of the way they whales communicate with one another is sufficiently harmonic that it can be classified as a form of pop-songs. Most particularly one whale communicating with one another may adopt the harmonics of the other whale, and other whales will join in for a period of time until the novelty fades (Dario Martinelli).

In any event, both these examples of communication invoke "relations between" living creatures. We in Biosemiotics would hold that the notion of "relations between" is fundamental to our understanding of semiosis and sentience.

We can go further. Living organisms are able capable of rearranging not only their immediate surroundings between members of their own species, or interspecies relationships, they can rearrange their internal dynamics through response to information

i.e. any combination of odors, sound or visual cues they deem to be meaningful. At first this statement may sound suspicious, too like New Age stuff, or post-modern virtuality . But then begin to think of your own immune system and its response to influenza viruses. You may say - indeed your doctor has probably said that your immune system is a defense mechanism against bacteria and viruses - and encouraged you to get a preventative flu shot because. But “defense mechanism” is a poor metaphor. In the field of immunology researchers like (Irun Cohen), perceive the immune system as a communication system between “self” and “Other” which pertains in its relationships between between antibody and antigen. These examples of self- and -othering are more akin to a type of signification in a semiotic system than of a military offence lining up troops on a battlefield. In Biosemiotics we regard the “self-other” relationship as a basic characteristic of living systems which exists not only between living individuals, but internally as well, right down to the level of the cell.

The cell, you say! Well what about the gene, the genome and genetics? The media of the world and introductory textbooks of biology have insisted the gene is the basic unit of life, the template from which all of our individual human characteristics flow. I must presume that you have heard of the Human Genome Project which produced its results at the end of the millenium. The Human Genome Project put an end to that argument known as the Central Dogma in Biology in which there was a deterministic one way relationship between DNA in the genes >Messenger RNA > all proteins in the body. The Central Dogma proposed a ratio of one gene to one protein, yet it turns out through the Human Genome Project that our genetic complement of 25,000- 35,000 was almost the same as caterpillar size animals. So the Central Dogma of fifty years standing was falsified. Furthermore, it turns out that our coded DNA accounts for only two percent of the genome. And the 98 per cent left, the uncoded segment of the genome - formerly known as “junk DNA” - turns out to be an archive of our genetic history.

I will not go much further into that argument except to say that Biosemiotics has staked - on the basis of this evidence - the fairly dramatic claim that human beings, like all living organisms have a dual code, one code of which is the digital genomic code of which we are familiar and the other of which is an analogue code that binds us to our environment so that the living individual is both organism plus environment as a co-joined, co-evolutionary unit.

So far we have been speaking of the animal world, what about plants? And the answer here is that 'Yes,' plants too are consummate communicators. They have to be. They are sessile and therefore cannot move about like animals, which means that they have to be very creative with their chemical composition to become attuned to rapid adjustment in the environment to various tactics by insects, animals, funguses and pests that attempt to disrupt their lives. I, among other more professionally involved botanists have given and or published papers on "How does one talk of "context" in the plant kingdom?" i.e. Context chunking as a characteristic of organized informational response is widespread throughout the living world and in this case context chunking emerges through response to intermittent rhythmic sounds . Fifteen years ago I published the case of a South African quandary over conservation. In South Africa some entrepreneurs organized private game parks for profit, only to discover that for unknown reasons their kudu, hartebeest, gazelle and other deer-sized animals were dying for no known reason. Seemingly perfectly healthy animals were just dropping dead. Autopsies revealed that their livers were poisoned. It turned out, that all these animals fed off the branches of acacia trees, but all fed upon the branches of acacia trees at one level only. The trees were used to having their branches browsed by these animals over millenia , but they were not used to repeated browsing all the time. Private game parks provided a very small ranger area in which these animals could feed, and, as animals could not move on to another

place, there was no time for the tree to take the browsing in its stride .Under the movement- restricted small game park conditions, the animals were killing their lower branches. So they switched from being a food provider, to being a food poisoner. Moreover, they signaled a warning to other acacia trees around them that they were doing this, to prepare the others ahead of time to move their biochemistry from food provider to food poisoner.

In recent years botanists have put together a flood of papers about plant communication. In 2005, they even convened a conference in Florence , Italy to discuss communication as an outcome of plant neurology i.e. intimating that plant's may have an analogue to a central nervous system (Tremewas). Apparently, at any one given time, plants have to resolve 15 different types of information input, some information events which are not coincident with other information events. So they create contexts of response to respond to what otherwise would be a succession of response dilemmas.

Now we come to the title of my talk: "Culture is Natural" and it should be evident that Biosemiotics moves in an entirely different direction from sociobiology, which attempts to reduce culture to what it alleges to be a set of genetics mechanisms. Biosemiotics is an enlargement of the proposition that there is a Semiosphere congruent with a Biosphere and that the realm of communication in human culture is an extension of ubiquitous communication in the natural world. So, it is reasonable to ask how close Biosemiotics comes to the sort of writing about animal communication as envisaged in myths, legends and spirituality of indigenous peoples. In any categorization, these would be at the opposite end of any mechanistic interpretation of the relation between culture and nature. For this brief comparison, I have chosen one of the publications of Robert Bringhurst.

"Letters, like words, are things - but letters, like words, and like language itself, are also

metaphors, and metaphors, I think, stand in much the same relation to the mind as proteins and amino acids to the body. All the more reason to give them convincing and tangible forms, forms with which our bodies, minds, and memories can really interact (Bringhurst, *The Tree of Meaning: Language, Mind and Ecology,* 2006 p. 132].

In one sense Biosemiotics goes beyond Bringhurst. We say we are not dealing with tangible forms nor with language or nor with metaphors. We are dealing with a logic of signs that pertains to the logic of organismic response - which is part of real coordination and organization in life. The logic of semiotics is the logic of life as C. S. Peirce maintained. It is the biologists who ignore this logic and claim that "letters (genetic scripts), like words, and like language itself, are also metaphors," With genetic script we believe we are dealing with processes of representation. Genetic script has to be interpreted as part of a living process and which, like other processes of interpretation within the body (the immune system, etc.) registers a subjective response crucial to the morphogenesis of a phenotype (development of a baby). Standard biology denies subjectivity in such responses and speaks of the 'language of the genes' as a useful metaphor. Such metaphors can be instantly dismissed one the 'real' biochemical reactions are uncovered.

Now let us shift to the discussion of Part B. From a Biosemiotic point of view, I have picked out two disagreements with Bringhurst and one agreement with his line of argument..

Disagreement One

Given that we are dealing with the logic of 'real' semiotic interaction, that semiotic interaction brings along its own constraints of communication. For example, Bringhurst argues that it seems to him that "things have meaning before they are even seen or

touched by human beings and that humans can *participate,* as trees can, in the meaning-making process." Well we do participate, but not like trees. Does the rocky ledge on which the tree stands at the bend in the river at the point where the rocky ledge constrains the flow of water from a straight channel into a curve "participate" in the same sense as a human being building a canal on precisely the same spot. To say "yes" is to envelop a "**pansemiotics**." After some deliberation, Biosemiotics has decided that it does not agree with any pansemiotic position. Many in Biosemiotics follow the semiotic writing of C. S. Peirce, and Peirce himself took a pansemiotic view on occasion, so drawing a distinction here is quite important in that.

Disagreement Two

Bringhurst argues throughout his *Tree of Meaning* that connections in the "hard evidence" of bones, or "hard evidence" of the biochemistry of amino acids and proteins need to be projected into appropriate metaphors of connection in ecological understanding. Though we support the evidence of homology, we do not believe that the "hard evidence" of anatomy and the like is as fruitful an approach, as investigating connections in the field of meaning in an ecosystem. We believe that the whole field of connectivity is displayed in patterns of co-evolution, which in turn evolve around communicative interaction [p.208]. Our mereology i.e. parts and whole in ecology, follows from the constraints of communication, and lies in discerning these constraints in patterns of communication. We are not interested in the anatomy of formal components of living skeletons projected towards metaphorical assumptions about parts and wholes. Perhaps here we disagree with some of the metaphors of mythology and spirituality in the story telling of indigenous peoples. But communicative constraints are always formal patterns in patterns of communication: take for example the fact that non-human animals have no ability to describe their environmental circumstance because they have no ability to use language as humans do; nevertheless they can, through injunctive signs, order

complex interactions on or about their relations one with the other .

So we **agree**, profoundly with Bringhurst that :
“Meaning is not a thing; it is a relationship. It is, in other words, a difference - between or among things perceived, or between the perceived and the perceiver, or between the perceiver and his family, his community, his species or his world. Some people say that these are two or three quite different kinds of meaning: the objective, the subjective, and maybe something else. But meaning is a relationship, in every case a difference rather than a rupture or disjunction. To deny that a relationship exists is to deny that meaning is present. A break, of course can be meaningful - but then the meaning lies in the *relation* between the break and the thing broken.” (Bringhurst p. 202).

Bringhurst acknowledges that he draws this quote from the writing of Gregory Bateson. And the Biosemiotics series published by Springer.com has already published a volume entitled: *A Legacy for Living Systems: Gregory Bateson as Precursor to Biosemiotics*.

Thus, in summary (see below):

Part A.

There is a dominant tendency in biology to treat ‘information use’ as if its patterns are comparable to geophysical processes; in other words, to employ a *downwards reductionism* to support a mechanistic explanation of information. The distinguishing feature of geophysical processes, defining their border with living (biological) systems, lies in the latter’s use of information to maintain order and coherence. In the non- geophysical world, “use of” (i.e. response to) information covers a wide spectrum, from cells, to organization of context in the plant kingdom, to animal intelligence and to the interaction of biological systems with human cultural systems, prompting an investigation of fundamental attributes of use of information over the whole spectrum, together with characteristic variations.

Part B:

There is a dominant tendency both in the philosophy of science and humanities to embed *human language use as a template* for understanding information in biological order. This is an *upwards reductionism,* Upwards reductionism is anthropocentric, obscuring the possibility that both intentionality and meaning in the biological world arise from matter-of-fact, or naturally necessary relations between information users and proximal environments. It is the aim of Biosemiotics to show that information is a means of orientation to coherence in living systems, through communication about ‘relations between’ (own species, inter-species, animal-plant kingdoms). It is not, repeat “is not” driven by the view that all criteria of ‘meaningful’ activity has to be modeled on the activity of *human* consciousness. This mistaken view is sometimes called ‘meaning rationalism.’

Disagreement and Agreement with Bringhurst

Disagreement One

Bringhurst argues that it seems to him that “things have meaning before they are even seen or touched by human beings and that humans can *participate*, as trees can, in the meaning-making process.” To say “yes” to this is to support “**pansemiotics**.” After some deliberation, Biosemiotics has decided that it does not agree with any pansemiotic position, including that of C. S. Peirce.

Disagreement Two

Bringhurst argues the “hard evidence” of the biochemistry of amino acids and proteins needs to be projected into appropriate metaphors of connection in ecological understanding. But Biosemiotics understanding of mereology - interrelation of parts and whole in ecology- is displayed more in communicative patterns of co-evolution, than in the hard evidence of species homology.

We agree :

“Meaning is not a thing; it is a relationship. It is, in other words, a difference - between or among things perceived, or between the perceived and the perceiver, or between the perceiver and his family, his community, his species or his world. Some people say that these are two or three quite different kinds of meaning: the objective, the subjective, and maybe something else. But meaning is a relationship, in every case a difference rather than a rupture or disjunction..... A break, of course can be meaningful - but then the meaning lies in the *relation* between the break and the thing broken.”

(*Tree of Meaning*, p. 202 paraphrasing Gregory Bateson, 2000)