The IASS Roundtable on Biosemiotics: A Discussion with Some Founders of the Field

Participants:

Claus Emmeche (*University of Copenhagen, Denmark*),
Jesper Hoffmeyer (*University of Copenhagen, Denmark*),
Kalevi Kull (*University of Tartu, Estonia*),
Anton Markoš (*Charles University, Prague*),
Frederik Stjernfelt (*University of Copenhagen, Denmark*)

Moderator:

Donald Favareau (*National University of Singapore, Singapore*)

On June 11–14, 2007, the International Association for Semiotic Studies convened its Ninth Annual World Congress at the University of Helsinki, Finland. In keeping with the conference theme of Communication: Understanding and Misunderstanding, a roundtable panel discussion entitled "Understanding and Misunderstanding the Interdiscipline of Biosemiotics" was presented. Therein five of the founders of the contemporary project of biosemiotics attempted to explicate for those in attendance not only what the "biosemiotic project of scientifically examining natural sign relations" entails — but also to clarify the many misconceptions about biosemiotics that they so often find themselves having to explain both to other biologists, as well as to other semioticians. What follows is a transcript of that discussion.

DF: Let me begin by explaining the purposes of this roundtable. It is now almost twenty-three years since Tom Sebeok made his proposal for the development of a semiotics — and for a view of the life sciences — whose goal would be to transcend the explanatory limitations of both naïve realism and

ISSN 0277-7126

naïve idealism, so as to let us better examine and understand what we see happening in, and *as*, living organisms.[1]

Most of the guests in our roundtable today trace their participation in Sebeok's project of biosemiotics back to its earliest days in the late 1980s and have remained active in that project ever since. Our goal here today, in keeping with our conference theme, is to see if we can clear up a few "understandings and misunderstanding" about Biosemiotics for the people who are with us here with us today — and also to get a kind of historical snapshot or record of where the project of Biosemiotics happens to be at this point in time.

So rather than giving a long introduction to all these people, I'm going to ask them to say a few words about themselves. Starting from the far left, we have Jesper Hoffmeyer from the University of Copenhagen (JH); Frederik Stjernfelt, also from the University of Copenhagen (FS); Kalevi Kull, Tartu University of Estonia (KK); Claus Emmeche, Niels Bohr Institute of Copenhagen (CE); and Anton Markoš, Charles University in Prague (AM). I'm Don Favareau, from the National University of Singapore (DF).

All right, then, let's start like this: No one here was trained as a 'biosemiotician'. So: Prior to your involvement with this project, what were you doing? How did you come around to doing biosemiotics and what is your purpose in doing it now?

JH: Well, I'm a biochemist by training, and I'm still a part of the Molecular Biology Department in the University of Copenhagen. But at a stage very early on in my career, I wondered why it was that my colleagues would go around saying such stupid things as "people are nothing but their genes" and all this kind of thing.

And yet, when I was young, I, too, was once a believer in this way of seeing natural science. And at that early time in my intellectual development, I wasn't opposed to the view that, in the end, human beings were nothing but calcium ions and things like that. But the more that I began examining the matter, the more I discovered that this cannot, in fact, be true. And so I started trying to think more deeply about such matters, just at around the time that my fellow scientists — and people in general — started talking about a new "Information Age" that we were entering.

And at that time, one of the things that became most clear to me was that, in the discourse of Biology, there is now a deeply incoherent notion

1. Myrdene Anderson, John Deely, Martin Krampen, Joseph Ransdell, Thomas A. Sebeok, and Thure von Uexküll, "A Semiotic Perspective on the Sciences: Steps Toward a New Paradigm", *Semiotica* 52.1–2 (1984), 7–47.

of *information* being used all the time. For although one cannot do biology without using this word, nobody really knows or attempts to explicitly define what exactly the term *information* means. Therefore, as a biologist, it appeared to me that a very deeply informed concept of 'information' would become central to the study of life processes. And, indeed, the *word* "information" at any rate, did become very central to Biology, in those years. But, as I say, the necessary explanatory concepts behind the promiscuous kind of 'placeholder' use of this word were lacking. So Claus and I started wondering what exactly *information* means in living systems, and well, maybe Claus would like to say a word or two about this here, as we collaborated together a lot in the early days of biosemiotics.

CE: Well, yes, I too started out as a biologist, doing my PhD work with Jesper as my supervisor and this was a project to articulate what biological information really is — because biologists, of course, are talking in "informational" terms all the time — though, as Jesper mentioned, without providing any really solid definition of just what "information" means in a biological context. So ours was an attempt to do theoretical biology on a more reflective basis. And in this project, we came across the work of Sebeok and others who had speculated profoundly upon the interface between Biology and Semiotics. So we thought that we'd, too, do well to learn some Peirce and to learn something about semiotics. So that was how I transformed from a theoretical biologist into a quasi-, if not yet full-blown, biosemiotician.

JH: So I think it's important for you to understand and to see that the reason why Claus and I went into this and tried to get at the semiotics of life was that we needed it for Biology. I never was very interested in Philosophy, or Semiotics for that matter, but I had to do these things in order to understand Biology. So I don't come here today in order to understand Philosophy or Semiotics. I'm here because this is the only way for me to reframe Biology so as to make it understandable.

DF: What aspects of Biology couldn't you understand by using the explanatory tools that Biology already has?

JH: I would say that it's the 'cumulate'. For the way that biological molecules are organized, the way the cells are patterned, the way that everything is working together in the body is — as I see it now — determined by a semiotic kind of logic. And this logic simply cannot be derived from physicalist-reductionist science as it's presently practiced. You must add to that science an

investigation into the kinds of semiotic organizing principles that allow the body and the cells — as well as biological eco-systems, for that matter — to actually do their work.

Francis Crick, for example, when he defined the Central Dogma insisted that: "Information is something which goes always from the DNA to the RNA to the proteins. And never the other way." But what is this "something" that Crick is calling *information?* We know that it is not the individual DNA nucleotides themselves, for these give rise only to the aptly-named transcription and translation products which are not themselves those nucleotides, nor copies of them. Under Crick's formulation, then, this "something" that is genetic *information* seems extremely like a "cause" in the sense of Aristotelian efficient causation. But if you have discovered such a "cause" why then talk about "information?" And eventually I came to realize that there is, indeed, a fundamental reason why it only makes sense to think about such phenomena as "information" in the semiotic sense and not as "cause" in the materially efficient sense — though, obviously, material causation and semiotic causation are always found together and stand in critically important relations to one another in any living system.

DF: All right, well, I'm sure that we'll hear more on this, but just to complete the Copenhagen part of the story — Frederik, you did not come from a biology background in the same way that Claus and Jesper did. What is your interest in this project of biosemiotics?

FS: Well, my story is a sort of mirror version of the one that Jesper and Claus just gave. I recall in one of our first conferences, Tom Sebeok came up to me and asked: "Are you a bio-semiotician or are you a normal semiotician?" I thought a bit and answered, "I am a normal semiotician." So I think I'm not quite a biosemiotician to the same extent as Claus and Jesper. But in some way I turned out to be a sort of 'fellow traveler' of these two and some others.

And this was for the reason that my background is in Comparative Literature — and in fact, I still have a position in that department at the University of Copenhagen. And my motivation was, again, a sort of mirror inspiration of the kind that we just heard about from Claus and Jesper, regarding their frustrations at how things were being thought about in Biology at that time. Because I was similarly becoming desperate at the emptiness and evasiveness of so-called post-structuralism, deconstruction, radical social constructivism, and all this rubbish — to put it briefly — that was going on in my own area at that time.

And I wanted to move in a direction of a more realist semiotics — one where one could claim more than just to say that "there is nothing outside the text" or that every signifier begets another signifier, and so on and so on, *ad nauseum*. And this was why I've turned to bio-semiotics, and that is how and why I became a sort of a biosemiotic fellow traveler.

DF: Good. I hope that you will all try to help us to address the question of the difference between mainstream science and biosemiotic science, and mainstream semiotics and biosemiotic semiotics as we continue ... but let's turn now to Kalevi Kull. Rather than coming from a background of Comparative Literature or Molecular Biology, you started your career as a Botanist, is that correct?

KK: A Botanist and a Biologist, yes. But I see myself as a very slow person, so that is why I had to begin my investigations very early. So even back when I was in pro-gymnasium, I found myself beginning to ask questions about the nature of this endeavor called 'the science of Biology' and by corresponding with my friend Sergey Chebanov (a biologist who later became a biosemiotician), I gained much knowledge and insight from him.

Later on in my career, feeling myself very much to be a naturalist and a field biologist too, and well-embedded already the society of professional biologists, I came to understand that the nature of life — as well as the investigation into the nature of life — is something that needs very much kindness and care. And this led me to search out those sub-societies of scientists in Biology who would approach both living and the investigation of the living in this way. And so of course I found these people here!

Still, this search took a pretty long time. Because it was exactly 30 years ago, in 1977, when we organized in Puhtu, Estonia — the place where Jakob von Uexküll wrote his *Bedeutungslehre* [*Theory of Meaning*] — our Spring School conference "Towards a Theory of Organism" dedicated to Jakob von Uexküll, and this included a paper sent especially to that symposium by Robert Rosen. One year later, in 1978, we organized with some Russian friends a conference entitled "Biology and Linguistics" in Tartu. After that, however, it still took 15 more years to get other people see the light that Thomas Sebeok and Jesper Hoffmeyer were already seeing at this time.[2]

DF: Anton Markoš, you are both a philosopher and a biologist, is that correct?

---

2. Kalevi Kull, "Biosemiotics in the Twentieth Century: A View from Biology", *Semiotica* 127.1–4 (1999), 385–414.

AM: Well, I am sitting in the department of Philosophy and History of Sciences in the faculty of Sciences at Charles University in Prague. So as you can imagine, the floor is sometimes quite hot for us there ... but we like it!

And yes, by training I am a biologist — and when someone chooses to study Biology, it means that one is eventually going to have to confront the question how living forms came into existence. But today, when you take a course on evolution, and you want to know how bodily forms came into existence, you learn in that course that the *definition* of 'evolution' is "change in the frequency of alleles in a population over time." And with this, one suddenly learns that Biology has become very 'scholastic' in its arena of inquiry and in its definitions. Because with such 'virtual' definitions, you can do a very disembodied kind of population science, you can do statistical analysis and calculus — but you find out that, all of a sudden, you no longer can account in a scientific way for actual living bodies and their actual living experience. Therefore, despite any reasonable scientific inquirer's demands of *habeas corpus ad subjiciendum*, one soon finds out that there is no longer any room for this *full* sense of "body" in, of all places, Biology!

Realizing this, I then moved over towards the philosophers. But to my astonishment, I found out that the situation is much the same there! So everything — all the sciences and the humanities — have become unworkably scholastic, allowing no space for the actual workings of life. Because if life means bodily existence, and if bodily existence entails and is made possible by biological reproduction; then it follows that this reproduction cannot be mere "copying" of genetic alleles because in the bodily world, one thing cannot "copy" any other thing. At best, the living body can only 're-produce' forms to the extent that one can that make structures that are similar to pre-existing ones, but not the same. Yet in order to make 'similar' structures, the body must somehow recognize 'likeness' — otherwise it cannot determine in what sense any two things are similar. And in order to recognize likeness, it needs "experience."

So if you take all this: likeness, experience, maybe memory, and body; you'll find there is no room for *all* of it in either of the two realms — Philosophy and Science — that are connected in our department — though without doubt, all of this is deeply connected in *life*. Realizing this, I started looking around to see what community, if any, could offer some help about these issues. Well, I found these people, and, so far, I think that the [Peircean] concept of 'abduction' has turned out to be the most helpful idea that I have found during my searches.

DF: Thanks, everyone, for those brief self-introductions. Now just to stay at a very basic level here — please, be clear to us: Why do we need a study of 'semiotics' undertaken from *within* Biology? Or to ask the question a little differently: What is it exactly that you are trying to "add" to our understanding of the biological world?

FS: For an answer to this, I would go back to Jesper and Claus' now old, but still path-breaking 1991 paper[3] where they laid out a very basic argument which is still for me *the basic argument* for the coming into existence of biosemiotics. Namely the fact that if you take any textbook in Biology — and you can make a test of this for yourself — anywhere from Bio-Chemistry and Molecular Biology and all the way up to Ecology and Ethology; all the branches of Biology. If you take an ordinary textbook, and pick some arbitrary page, you'll find semiotic terminology. You'll find biologists talking about *signs* and *codes* and *communication* and *information* — and the strange thing about it is that these concepts in ordinary textbooks do not appear as technical concepts. They appear as straight-off, common sense concepts.

And in many cases, if you go up to the person that wrote that textbook and ask him: "What do you mean by 'code' and 'communication' and all this business about intercellular 'messaging' and so on?" Then he will answer, "Well that's just a sort of metaphor. Just a sort of image. If I tried, I could explain the same thing without any semiotic terminology." And then the obvious counter-question to that is: "Then why don't you do it?"

It is obvious, then, that Biology is unable to get rid of these concepts — and so the next step that biosemiotics proposes is to say: "But then why not try to use those concepts in a more coherent, more scientific way where you technically define them? So we can agree upon what we mean when we say 'code', 'symbol', 'communication' etc. etc." So that these terms stop being vague, commonsense notions and are qualified as real technical terms of science. That is still for me the most basic argument for why we need a biosemiotics: because the ubiquity of semiotic processes are already described in every Biology textbook — but only in an severely undeveloped, at best possibly embryonic, conceptual form.

DF: It seems to me what you're saying is that we've already cashed out the scientist's view of 'message' or 'communication' — and that this keeps coming back down to merely the quantified descriptions of the chemical substrate whereby that message is realized. But you want to talk about the message

3. Jesper Hoffmeyer and Claus Emmeche, "Code-duality and the Semiotics of Nature", in *On Semiotic Modeling*, ed. Myrdene Anderson and Floyd Merrell (Berlin: Mouton de Gruyter, 1991), 117–166.

qua message, right? The sign *as a sign*, and not just as its material substrate, is that correct?

FS: Yes.

DF: Well how would one go about trying to do this? There must be many ways that one could attempt to undertake this kind of investigation, I would imagine. Are there some approaches that you have decided are more useful than others here?

JH: Well, as I mentioned earlier, the whole notion of 'information' has proven to be incoherent in the study of biology, if you attempt to treat information as a kind of 'entity' or 'cause' — as most biologists unreflexively still tend to do. And yet as soon as one applies *a triadic conception of the sign* to those cases where one talks about 'information', it quite quickly becomes clear that this kind of an understanding does, in fact, help us to better understand exactly what it is that we are trying to explain about the processural reality of biological 'information' to an organism.

And in this way, one can escape the reductionism that is implicit in the debased notion of 'information' that is currently being used in Biology. Because thinking of information as if it was a 'cause' will inexorably guide you into a reductionist view. And the way to escape this kind of explanatory dead-end is to expand one's conception so to see that 'information' is only *information* in the sense that it is something that has to be interpreted.

Understanding this, if one then asks: "What is the unit that interprets?" the answer is that, at the most *fundamental* level, such bodily interpretation must take place at the interface of all biological sign processing that is the living cell. This kind of bodily — and not yet mental — interpretation takes place simultaneously on many different levels also, however: these levels include, of course, the entire body system proper, but also at the level of the sub-systems, such as the nervous and the immune systems, as well as at the level of the sensory apparatuses, such as the surfaces of the eye or skin. And as a result, you have interpretants feeding into interpretants upon interpretants in one long chain — or web. And this is what 'knowing' ultimately is. So in this way, the formerly mysterious notion of biological 'information' then finally does begin to make sense when you start looking at it from a biosemiotic, rather than a materialistic or a psychological, perspective.

DF: And you are saying that if mainstream biology adopts this perspective, it would have a fuller understanding of the sign-processing phenomena that it has heretofore been looking at. I guess the obvious question to ask then, is: Would science then have to throw out all of the findings about the material substrates of these interactions that it's already achieved?

JH: Not at all. I mean, all of us here, as scientists, are very grateful for the hundreds of years of experimentation into the physics and the chemistry of life, and for all the things that doing science this way has allowed us to find out. But *just* the physics and the chemistry *alone* doesn't fit together in a way that can fully explain *biological* life. And to do this, one has to reframe what's known about physics in light of what's known about life. That's what biosemiotics is: a re-framing of the kinds of things that a responsible Biology is going to have to look at in order to scientifically explain the processes unique to *living* systems.

DF: And how successful has this project been? To get scientists to see things this way?

CE: I find two main reactions that one often gets from scientists. One reaction has already been phrased here as a question, and that is: "Why must we redescribe what we already know from standard science?" And I think one answer to that is that standard Molecular Biology and Cell Biology and certainly Genetics, have been quite reductionist in their approach. But even in those fields today, there is now quite a bit of recognition now that such reductionist approaches are not really working, and that what they need are more synthetic and holistic models. There is, therefore, on the one hand, an acknowledged need in science to responsibly join together all of their disparate data within a wider explanatory perspective. Biosemiotics is also a kind of 'widening', then, of science, so as to accommodate a greater dialogue between its fields. And in a complimentary fashion, it is also always helpful intellectually to provide several distinct theoretical models in the attempt to explain the same set of basic factual findings — 'your data', if you like. Because such distinct models can provide really new perspectives, and therefore new theoretical understanding, about what it is that you are seeing.

For example, at the annual Gatherings in Biosemiotics conference that we had in Groningen just last week, there were several papers that gave very good explanations from a semiotic perspective on things that you couldn't really get the same understanding of if you just stayed within the mechanistic paradigm of, say, Molecular Biology. And you also see in the fields of Biosemiotics a diversity of interests: some people are doing work on cellular signaling and genetics, others are interested in animal behavior, others in the organization

of human sign use, and others are interested in its more broader perspectives — its metaphysical and philosophical implications.

And in this sense, I think that Biosemiotics is very much like Cognitive Science. There, too, you have an interdisciplinary field, and you see a lot of philosophers interested in metaphysical issues — but you also see practicing scientists who are much more narrowly dedicated to solving particular scientific issues. So Biosemiotics and Cognitive Science have some similarities in this respect. They're both cross-disciplinary. They're both dealing with cognitive informational processes. But I would say that the 'information' metaphor in cognitive science is more mechanistic and less thought-out than the 'sign action' concept in biosemiotics.

DF: I suppose that a scientist coming to biosemiotics for the first time would ask: Why is there all this emphasis in Biosemiotics on *umwelt*, and on subjective experience? Isn't this exactly what science wants to get away from — subjective explanations of all sorts? So what is the purpose of talking about the animal's subjective experience? What's scientific about that? Or is this just a kind of story-telling?

KK: There was a very nice conversation published between Howard Pattee and Robert Rosen — and I would include both of them into Biosemiotics, I think they are both biosemiotic thinkers — and they were asked: "What is exactly the aim of biologists in Biology as they see it?" And Rosen gave a very clear answer: "What is important in biology is not how *we* see the systems which are interacting, but *how they see each other*".[4]

DF: And this includes the animals.

KK: Yes, the animals, and all the other organisms. Now, this is an almost impossible task for a purely physicalist science, I would say, to show and to discover how the organisms see the world; what is there in their *umwelten*. This demand requires of us to carefully develop a new set of methods, and a new set of conceptual apparatuses, in order to somehow to grasp all this.

JH: And so, of course, one can either choose to continue to dance around all this, or to finally try to come to terms with this head on. Now, if we don't think, as some philosophers do, that our own lived subjectivity or subject-hood or

4. Robert Rosen, Howard Pattee, and R. L. Somorjai, "A Symposium in Theoretical Biology", in *A Question of Physics: Conversations in Physics and Biology*, ed. Paul Buckley and F. David Peat (Toronto: University of Toronto Press, 1979), 84–123.

first-person experience — the feeling of an 'I' — if we don't want to just write that off as an illusion, if we think that this *experience*, at any rate, is 'real' — then we must explain within the context of natural evolution just how such a thing did, in fact, come about. And while I suppose that it is still conceivable that the information theoretic or the computational approach may someday tell us something about how already living agents operate so as to build their intelligence, I don't think that's the hard problem. The hard problem is the evolution of the experiential world itself — agency, if you like, and intentionality.[5]

Now evolutionary theory in Biology must explain how it is that we are not miracles, that we did not come down from heaven, but that we are somehow born out of nature. Thus, we must provide an explanation *from within evolution* that accounts for the experience of intentionality and subjectivity in living creatures. We can't go on just denying that it exists, because it's such a large part of our own life — and, in fact, the life of every animal. It will do no good to write off this fact of biology as an 'illusion'. So for that reason, I believe that we have to go back and see if we can we make a biological, and evolutionary explanation for how subject-ness, or agency and intentionality, has came about.

DF: And what is the role of 'semiosis' in this new evolutionary explanation?

JH: A fundamental one. Because semiosis is the relation, in action, of a sign and its object through the formation of an interpretant. This, of course, is a kind of semiotic causation, and thus a kind of causation. But it's a level of causation that does not reduce to simple efficient causation.

DF: So in an evolutionary context, 'semiosis' would establish the relation between an organism, its experience of the world, and the world itself, yes?

JH: Precisely. Because those relations are exactly the ones what we are looking at — or should be looking at — when we are attempting to understand organisms' natural "evolution."

FS: And in this context, I think that the strength of the sign concept is that it comes without any precondition of human-style 'consciousness'. Therefore we are able to bracket that issue and to focus instead upon the very structure of the sign relations that organisms actually use. But doing so also points out to

5. Cf. Jesper Hoffmeyer and Kalevi Kull, "Baldwin and Biosemiotics: What Intelligence is For", in *Evolution and Learning: The Baldwin Effect Reconsidered*, ed. Bruce Weber and David Depew (Cambridge: MIT Press, 2003), 253–272.

us to a very important caution that I think most of us realize that Biosemiotics must take. Most of us agree that it's an important task to try to construct an understanding of evolution which makes it understandable how we ourselves, *with* our human-style 'consciousness', are also products of this process.

And to do this entails that we should be very cautious *not* to take the concepts that we use to conceptualize the evolutionarily latest and most complicated product of such semiotic processes — which is human culture — and uncritically project such concepts downwards. So when we employ all the many different types of sign concepts that we have in semiotics, we must always be very careful to distinguish *which* of these sign concepts are appropriate to the precise *level* of investigation that we are presently undertaking — and we must do this so that we do not commit the grave mistakes of *vitalism* or *anthropomorphism*.

DF: Yet it is exactly the charges of 'vitalism' and 'anthropomorphism' that are often made against Biosemiotics by those who may be hearing about it for the first time, but who are themselves insufficiently familiar with the actual literature, yes?

AM: Yes! And to expand a bit upon Jesper's statement that when you open any biological textbook you'll find it said in the first chapter that "a living body *is composed of* ... these and those chemicals ... and thus it is composed of cells ... it is composed of organs ..." in the same way that a building *is [passively] composed of* bricks. And yet we all know unmistakably that, much unlike a building, and unlike any non-living system, a living body actively composes itself. It *is* that which it composes, and is so continuously, for as long as it is alive. So "a living body is composed of ..." is a strangely kind of 'creationalized' statement, though almost nobody realizes it. It is not a reversion to *vitalism*, I would say, to quote French philosopher Raymond Ruyer's obsevation: "Gentlemen, we have never been dead!" The point is, rather, that in living creatures, there has been a continuity in life-sustaining processes from the very beginning — a continuity unbroken now for four billion years. And it is in *these* creatures alone that we see *experience, memory, forgetting* — and in different lineages, different *images of how the world is*. Those are some very highly-qualified semiotics, I would say.

DF: So you're saying that at the heart of these things that are "organisms" today — and at the heart of human, and maybe even all animal experience and knowing — there lie simpler, prior relations that are necessary to organize the phenomena of life, yes?

AM: Yes. We criticize reductionism, but it's not only reductionism. With genome projects, there are no reductions — one has a whole genome's vocabulary, and one can use that. And just by comparing genomes, one can make enormous systematics. But what is it for? For forensic medicine, for forensic evolution, and for making evolutionary trees. But it will not explain why I look like myself and not like you. And why neither of us look like a horse. So if we don't accept this, and we don't want to say: "Well, our Biology is good enough as it is", we have to stand up against that kind of thinking, small as we are. So I see us as advertisers of a new Biology — but there are still one million Old biologists standing against us! This opposition is crazy, of course, because Biology as it is is a already a very good science, and I say that as a biologist. But I think that two views of the same topic of 'life' are better than one, as Bateson said. So why not develop a complimentary view, wherein the goal is not to explain life as passively "composed of" but to explain instead how life actively "composes itself" — as shown by the phenomenon of evolution.

DF: Would semiotics explain that? Would biosemiotics explain that?

AM: *Biohermeneutics* would, I would say: for this is the bodily reading of the information written in our genomes, according to the experience of the evolutionary lineage that led to human beings.

DF: So reading, interpretation, sign processes are critical to the organization of biology. And everyone here agrees with that.

AM: Yes. And these topics have not covered by standard biologists. So the question then becomes: Are we going to change the paradigm of mainstream biology or will we make another competing realm?

DF: That's a good question. Are you going to make a competing realm, or what do you see happening?

CE: Well, to address this question, let's consider a very common metaphor that often comes up when we discuss "What is the place biosemiotics in science?" and this is the metaphor of 'national territories'. Very often, we tend to see each of the sciences and each of the scholarly investigations as somehow dividing the world up into separate territories, each with their special governments, boundaries, citizens and laws. But maybe instead we should begin to think upon this investigative activity as more like a network, than as a series of disconnected and competing states. And I think that biosemiotics can help

establishing better network connections between the so-called hard sciences and the humanities by not accepting this 'national territory' metaphor of research. And in that sense, biosemiotics may be a central node, or at least one among several important nodes, in this whole hub of investigative activities.

JH: Yes, and I see this very much as connected to a general trend in advanced science nowadays that goes beyond the deterministic thinking which characterized so much of the old science, where even quantum mechanics is essentially classical in this sense. But the new emphasis on self-organization, system dynamics, non-linear systems, chaos theory, and so forth — all of this points towards another kind of understanding, the understanding of emergence and emergent systems. Biosemiotics also is a way of figuring out how emergence occurs in the life sphere. Because organic 'emergence' seems to be very much a thing that we have to take to seriously now. So I am thinking that in one way, biosemiotics is already quite advanced science.

DF: Agreed. But so far what everyone has been talking about today has been concerning a paradigm shift — or at least, the attempt to establish a different perspective — in how we think about and do Biology. But now what about the other side of the biosemiotic project? What, if any, impact or challenges does Biosemiotics pose to how one thinks about or does Semiotic inquiry? What, if anything, does a biosemiotic perspective add to a non-biosemiotic perspective on say, culture and the humanities? Any thoughts on that?

FS: As I've mentioned earlier, one of my reasons for affiliating myself with this field was a disappointment with certain trends in general Semiotics. Before Biosemiotics, before the whole Peircean Renaissance in semiotics during the last ten years or so, I think it's safe to say that the main current in Semiotics was structuralism. Now, many good studies were made there, but there were some basic flaws in the assumptions of structuralist semiotics. They very often tended to claim that semiotics was a uniquely human endeavor; that it could not be applied outside of our species; and that, moreover, it tended to claim that these human signs were in all cases completely arbitrary. And this led into all kinds of relativism and skepticism and all sorts of blind alleys that you'll find if you go back to the literature of twenty years back.

This is why I think that Biosemiotics in some sense is a two-edged tool: It may help us to deepen our understanding of Biology on the one side, but it may also help us improve our conceptual foundations for a general Semiotics on the other side. And to re-establish Semiotics in a more satisfyingly realist manner than the general semiotics that went before it.

KK: I have to say, in addition, that there has recently been done some very interesting work in Biosemiotics that may prove impactful to more general and theoretical semiotics. Because up till now, most semiotic study has been limiting itself to dealing with human culture. But now we are witnessing an '*ecological turn*', so to speak, taking place across many fields in the humanities. And because of this, the studies of cultural semiotics will need somehow to integrate the study of 'natural' semiotics in their research, without reducing that semiotics to mechanics. Biosemiotics, of course, is the logical place to begin such an integration ... as we've been doing it all along!

DF: An objection that is often made against Biosemiotics is that talk about 'human knowing' of the kind that might be studied in general semiotics and talk about 'non-human knowing' of the kind that might be studied in biosemiotics are insufficiently recognized to be talk about two distinct things. So the question I have for all of you is: Are they, in fact, two distinct things? And if so, is there a principled distinction in Biosemiotics that distinguishes human knowing from non-human knowing?

FS: Of course, being a Peircean, I would claim there's a continuum between them. But to claim that there's a continuum between any two things is not the same as to claim that they are equivalent. Because a continuum may take different trajectories and courses, and I think that everyone here agrees that the continuous evolution from higher primates into our species is one of the trajectories in evolution that is particularly steep. In that phase, due to the kinds of sign processing between individuals that became available, the evolution from primate to human acquired a very particular speed — and it is this speed that might make it appear that what we are looking at is two distinct worlds. But as far as the whole discussion about what the exact new sign-types appearing during that phase were — the question of the origin of so-called *anthroposemiosis*, or our contemporary style of human knowing — my personal guess is that the sign skill that we mastered, but that even our higher primate relatives did not, is what Peirce calls 'hypostatic abstraction'. That's my theory, anyway — but I could talk about that for hours, so I'd better stop now.

JH: To address the same point, only using a technological metaphor: When the Industrial Age arrived, we didn't stop producing new grains. We still had to produce agricultural products. And when the so-called Information Age came in, we still needed to rely on mechanical energy for most of our production processes. And in a similar manner: When human consciousness started

arising in the world, it's not that we stopped being animals. But certain of our ways of doing things became superseded by other means. In my own work, I refer to this concept as a process of 'semiotic scaffolding'. And we can see this taking place even on the most fundamental levels of the organism, as it is way of a building structure in the organism by semiotic means which allow it to remain stable within its environment. And in fact, one can think of much of physiology as the semiotics scaffolding of body parts in relation to use in the world. And one can see the DNA and the genes provide the semiotic — which is to say the sign-based — scaffolding of certain developmental pathway in ontogeny.

And in the same way, human culture, too, provides us with new species-specific semiotic scaffolding mechanisms. For culture itself is just an enormous, more productive way of scaffolding things. But I am quite sure that semiotically, we are still very much bodily scaffolded at the same time that we are culturally scaffolded. It is, of course, true that human understanding is considerably different and so much more semiotically complex than that of other animals. But nevertheless, the more animal kinds of understanding still seems to be very much alive in our bodies — and therefore still very much a part of human experience and understanding. And I would suggest that in the human sciences, one should be aware that one kind of understanding doesn't exclude the other. And I think that it would be a very interesting project — not just for biosemiotics, but for the humanities — to see how these scaffolded semiotic processes work together to make us the kinds of beings that we are.

AM: I'm not so sure how many people are going to embrace that project however. If you look at the last two hundred years of the history of Biology, you can always find minor groups of dissidents claiming that "There is something more to life than is being accounted for in the standard science." You find this especially in the major works of literature. But who alone succeeded in actually establishing this case? Only one single person succeeded. It was Darwin. Darwin brought 'story' back into Biology, and into the sciences. And it took a hundred and fifty years to push story back *out* of Darwinian evolution make neo-Darwinism! Well, we've found the 'story' in life again. But since we see that in two hundred years, only one single person was successful in synthesizing history and working science, well ... we must be careful in our optimism!

KK: Yes, but 'having semiotic eyes' allows us to read more books than do the neo-Darwinians! And it also gives us a good basis to see what is most reasonable from the other side. So we can see how narrow the view would be if our

understanding of evolution was only that of gradualism. For we can see *why it must be so* that there are novelties, there are emergences, there are qualitative changes, there is punctualism — all which is so important to include in any honest explanation of evolutionary processes. And it is, in fact, *all* of this — evolution's qualitative and quantitative aspects both — that Biosemiotics insists we must study and attempt to scientifically explain.

AM: Of course, I agree. My point was only that most modern scientists are in many unseen ways 'scientific creationists' — and not only because it took a hundred and fifty years for science to properly acknowledge evolution. But because, in fact, there are only two histories, or 'stories' that have been allowed into science. One is the Big Bang, where the whole story is effectively condensed into the first one-tenth to the minus forty-two seconds of the universe — after which you then just have normal functioning, the mechanical, clockwork functioning of the universe. So that story already finished long ago. But the second story — that of biological evolution — is still going on. Yet you cannot just push biological evolution to the very beginning of the universe. It started at some definite point in time, from no one knows what. This is a problem which is posed before science all the time. And, of course, it is a challenge for us too.

DF: I see that we are coming towards the end of our session. Before we go, though, let's take some questions from the audience for our panel.

AUD 1: A very concrete question. What are the possibilities for Biosemiotics to become a practical, empirical research program? Is this allowed? Are concrete case studies needed?

KK: My view is that it should be done. Such studies can be very rich. But what is still needed is a well-formulated semiotic methodology for biological empirical research — because such qualitative methods of study are not at all well developed anywhere in Biology itself at this time.

JH: I think my general answer to this question is that what Biosemiotics can do, for now at least, is to direct the curiosity of scientists into still relatively unexplored areas, so that the kind of experiments that one does would be different. But I don't think, as such, Biosemiotics is primarily a methodology for doing experiments.

DF: Well, isn't it the case that if a biosemiotician runs an experiment, say, on a brain event, he's going to get the same results that a neurobiologist would, simply

because the underlying biology is, of course, the same? Is it that only the two interpretations what the resulting data represent may be what's different?

KK: No. Asking different questions may result in different findings.

JH: And of course the aim would be that under the new system, you would have the conceptual means to see a logic in its working — and this might direct your investigations in another direction.

AUD 2: What about feedback? In a biosemiotic context, can, say, Wiener's concepts of 'feedback' help build up the conceptual framework of biosemiotics today?

KK: Yes, but it may not be as useful if one uses Wiener's mechanical model. But if you take von Uexküll's functional cycle, this is also a feedback model more closely designed from the observation of the organism's physiology, this is one of the basic models that we have used.[6]

AUD 3: From what I have been hearing from some recent approaches to biosemiotic theory, I am quite skeptical that we can overcome our anthropocentric access to experience in order to overcome our culturally-shaped prejudices …

FS: OK, and that's a culturally-shaped culturally-shaped prejudice that you are uttering — so now where are we?

AUD 3: True — my idea is that there is only the possibility of changing one set of cultural prejudices for another one. But the idea of *Umwelt* requires you be able to get into the animal's mind and I cannot see how you believe that you can transcend your own biologically determined *umwelt* to do that. For even this making of a theory of Biosemiotics is a very high level, culturally determined human activity. It requires a very long time of human schooling within purely cultural instructions in order to even be doing what you are doing now — that is, to express a highly abstract ideas. So, while from that level of ethics and everyday care, we can very well overcome our anthropocentrism at the level of our contact with animals — people have done this, and have shown that this can be done. But this making of theory — this is

6. Norbert Weiner, *Cybernetics: Or the Control and Communication in the Animal and the Machine* (Cambridge, MA: MIT Press, 1948); Jakob von Uexküll, "A Stroll Through the Worlds of Animals and Men: A Picture Book of Invisible Worlds", *Semiotica* 89.4 (1934/1992), 319–391.

a problem: How can we make general conceptual tools which are not a fruit of the cultural inheritance we all share?

DF: I don't think that Biosemiotics is trying to occupy some impossibly non-perspectival conceptual space beyond whatever we can achieve with a self-conscious understanding of our own anthroposemiosis. The project, I think, is not so much of trying to somehow *experience* the mind of the animal and then to write up a veridical report on that — rather, it is to try to investigate those self-world sign relationships that the animal sets up for itself that give rise to a network of actionable meanings in animal life. This network you could refer to as its 'mindedness' if you prefer — but its investigation is asking a somewhat different question, and is amenable to different paths of inquiry, I think, other than trying to tell ourselves that we must be able to *have* the same experience that the animal — or even another person — is having before we can reasonably make any claims about it. That's just the kind of Cartesian dualism that we're trying to overcome.

FS: I would also just say there is no general answer to your last question. I mean the skepticism you are expressing might be well-placed in specific cases where you are going into specific interpretations of specific organisms. If you can point out anthropocentrisms there, I think you should do that. But I don't think there's any general *answer* to 'skepticism' as a way of thinking.

AUD 4: Given my experience at the rest of this conference so far, I see that it is a problem inside the larger arena of Semiotics, in that owing to the exclusive focus on human culture, other biological entities are *de facto* exempted from semiotic investigation. Perhaps Biosemiotics is to be excepted here — yet I still see the potential for a problem here, too. For in doing biosemiotics, you are still using a 'standard semiotic theory" — that of, for example, Peirce. But there are some terms that are critical to those theories, such as Peirce's notion of an 'interpreting mind' And, of course, when you study a biological entity on the level of itself, the question remains: where is this mind? So it's a two-sided question. First, how will you circumvent the difficulties with already established semiotic terminology? And is Biosemiotics liable to take semiotic theory further beyond just applying Peirce in biology?

CE: When I first tried to apply Peirce, I found many different interpretations of his work that were essentially misinterpretations of Peirce — and having this idea that 'the mind' is the name of some kind of mysterious *entity* that somehow imputes meaning upon the sign is a very common Cartesian

misinterpretation of Peirce. Peirce, from what I tell, would reject this kind of reified, non-processural view of 'mind.' So this makes relevant the whole question of the supposed 'locus' of meaning: Is meaning the kind of thing that is physically 'located' at a certain place? Is it — as people often say — *in* the mind? Or is it possible that talking about '*the mind*' is really not the right way to phrase the whole question of meaning? From going deeply into questions like these, I think that we can learn a lot. So I think it's very much an on-going process of really understanding the best possible manner to interpret these questions of sign action — and by using Peirecean terminology, we can hopefully non-naively ask such questions as: What is the interpretant in process *x*? How many different *kinds* of interpretant signs do we have at our perceptual disposal? Or for use in our conceptual understanding? and things like that.

FS: There were two parts of your question. First, I think, that even if we are basically Enlightenment optimists, I am not convinced that we have yet made the huge kind of progress that we want to in Biosemiotics. Up till now, for example, I don't think we have developed all the sufficient terminological units that we need in order to fruitfully talk. On one issue, however, I think we have been a success — and this is the one that you refer to in your first question. I think that in the general Semiotic community, Biosemiotics is much more accepted now than it was ten years ago. Ten years ago, all the old French structuralists were fighting to keep it out and I think that they have given up that fight now. So I think that within that small field, that's a partial success at least. And I do agree with Claus that if you take Peirce's concept of 'mind' it has almost nothing to do with the common sense, ordinary, every-day-language notion of 'mind'. It's a much broader term and he underlines on many occasions that it does not imply that there needs to be any consciousness present, much less human linguistic activity. He merely defines 'mind' as a certain sort of systematic processing of signs.

DF: I see that we only have a few minutes left, so before we leave, I want to ask the panel: Regarding the state of Sebeok's 'biosemiotic project" today, in 2007: How do you think it's going? Is it progressing? I know that it has often been said by biosemioticians that they are still doing the 'backwoodman's work', as did Peirce, clearing the grounds of outdated ideas and marking the paths for others who will follow them. If that's so, where do you find yourselves today — still chipping away? Making inroads? Or do you see the project failing? What is your take on the state of the art in biosemiotics today?

CE: Well, in principle, I'm an optimist, and I do see a lot of progress ... but, of course, that depends upon how you measure "progress." I think that progress cannot best be measured by some of the ridiculous measures one sometimes see in standard science, such as 'citation indices', or 'the expansion of the number of workers in the field' and so on. I'm more concerned about progress regarding those big issues that you posed, such as the distinctions between human and non-human knowledge. Though I'm not sure that even Biosemiotics *in itself* really can answer those big questions at this point. These questions may simply be too big for such a little bunch of workers.

JH: Like Claus, I'm not sure how one would go about trying to chart Biosemiotics' 'progress', but what I am sure of is that somehow we are partners in lots of different approaches that are going on in science and in semiotics in these years, and that we are trying, in our own way, to make a new kind of framing of things. And for a long time I had the feeling that these ideas seemed to have fallen on barren earth somehow. I really have had that experience. But recently it seems that a lot of scientists are finally coming around and questioning the things that we have been questioning all this time. In fact, I was just in Boston two weeks ago at a high profile meeting with scientists like Stuart Kauffmann and Gregory Chaitin and several others, and I finally had the feeling there of Biosemiotics being received. They really grasped it. This message was received. And I think that a lot of people are now thinking and working this way. So maybe Biosemiotics as such will not build up into its own kind of separate field, but instead its ideas will profuse into scientific thinking. And I think that eventually, maybe, we here will be forgotten — but maybe we will have made a little bit of a contribution to science as a whole.

KK: Yes. And, in any case, the concept of 'progress' as having 'high value' belongs to the modernist period of science — and this is something that we have now left behind. Life leaves signs. But life also, and exclusively, *lives* in signs. Therefore, let us too, live in signs, instead of just leaving them — because what has real value is to be, and to have had been, alive.

DF: Well, that's as 'biosemiotic' a note as any to end on, I suppose. Thank you all for being with us here today.