The organization of biosemiotics and some challenges for academic inquiry

Abstract:

What is the position of fields like biosemiotics and cybersemiotics in the organizational landscape of academia influenced by the major trends towards more entrepreneurial modes of organizing research? A description of what has been called ‘post-academic science’ is given, and the para-institutional nature of biosemiotics as an academic field is explored. Furthermore, the chapter addresses the place and character of biosemiotics in the academic landscape by using the typology of Richard Whitley and finds that even though biosemiotics may come out as a borderline case between a fragmented adhocracy and a polycentric oligarchy, there are some peculiarities for this young area of highly cross-disciplinary research when seen as a reputational work organization that makes it difficult to apply a typology for established and relatively well demarcated fields.

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The organization of biosemiotics and some challenges for academic inquiry

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"Despite the growing economic importance of scientific research, scientific knowledge is rapidly losing its status as the highest form of knowledge and a norm for knowledge in general. This is because knowledge today is produced so many other places and in other forms than those of the traditional research institutions. This means that the status of knowledge is increasingly transformed from being a public good to be a private commodity and resource. And that has put a pressure upon the public institutions of knowledge to adapt."¹

Introduction

This festschrift to my long-standing colleague Søren Brier, whose path of inquiry recurrently has been an inspiration to me, is a fine opportunity to reflect upon the general background and institutional context of the kind of research Søren Brier has contributed to develop over the past three decades. We have seen many transdisciplinary fields of research emerging by the end of the twentieth century, and it is no secret that Brier has been not only the major figure in founding cybersemiotics, but also very active in the appearance of biosemiotics, a field I have contributed to. Now what kind of sciences are biosemiotics and cybersemiotics? What is their intellectual organization? And in what kind of historical and economic context determine the development of such fields as areas of academic inquiry? In the following notes, I will comment

¹ Jens Erik Kristensen; see Lasse Lavrsen: “Den værste afgudsdyrkelse for indeværende” [interview with Jens Erik Kristensen], the Danish newspaper Information, August 28, 2004, p. 12.
upon biosemiotics and its place in the changing landscapes of science and scholarship, and on how to find ways to characterize these changes. The following will focus as much upon this social institutional environment and its impoverishment for particular types of research, as upon one particular instance, biosemiotics, a field that – seen in this general perspective – emerged as an endangered species from its very incipience.

A series of challenges faces the more traditional kinds of research at universities and the very academic culture that formed preconditions for the education, the interests and the curiosity of inquirers who, like Brier, never lost interest in ‘broad picture’ and shared the aspirations of science and philosophy to know the world at the deepest levels and in its most comprehensive variety. Although science and scholarship is still housed at universities, and pursued with an eye to its public, universalist purposes, there is no transhistorical necessity in having universities to host the sciences as an institutional arrangement. Knowledge is created many places, and historically, scientific inquiry did not start at the university. Furthermore, today more entrepreneurial forms of research organization are pushed forward. I will claim that the implication for academic science is that knowledge policy, and the dominant research political discourse, need to be supplemented by an explicit policy for academic science.

[p. 351:] Bio-semiotics and cyber-semiotics are examples of interdisciplinary fields exploring new connections between hitherto separate disciplines within academia, but as forms of interdisciplinary inquiry they are not directly part of the technosciences (research fields producing knowledge with the purpose that it can be used in developing new technology and themselves intrinsically dependent upon knowledge-intensive techniques of inquiry, e.g., nanoscience, biotechnology, ICT, neurosciences, etc.), rather, these to ‘hyphen-semiotic’ fields offer new interpretations and new broader theoretical perspectives upon some of the deeper puzzles, often of a philosophical nature that are not addressed by the standard scientific paradigms and techniques. This creates sometimes tensions among participant researchers entering into biosemiotics or
cybersemiotics, as they bring with them different metaphysical presuppositions, different norms of what counts as good science and scholarship, or how to understands basic notions like that of the sign relation, object, interpretation, etc. Furthermore, participants differ in their thresholds of tolerance for unsolved disputes or basic controversies over theoretical issues, and the often heard ideas of developing a common theoretical language seems to face the challenge of the theory-ladeness (or even some degree of ‘metaphysics-ladeness’) of fundamental terms in such a language. In their aims at theoretical coherence and ‘big’ comprehending forms of understanding, biosemiotics and cybersemiotics cannot fully accept a purely instrumentalist stance, so familiar in the technosciences, of combining different paradigmatic perspectives and techniques in a pragmatics of solving the solvable while abstaining from investigating their deeper theoretical tensions or seemingly irresolvable contradictions. In that minimal sense, those fields are indeed academic.

[p. 352: ]

**General trends – from science and scholarship to research**

Before discussing general trends from academic to post-academic and more entrepreneurial modes of research at universities, it is important to remember how different the individual academic fields are organized. The organizational sociologist Richard Whitley (2000 [1984]) characterized modern sciences as *reputational work organizations*. Reputation refers to an individual researcher’s status, prestige or scientific standing among a group of peers or colleagues within a field of research as being a the crucial dynamic factor for the social form that distinguishes academic science at a university from other forms of work organizations (and, one might add, is implied in the notion of academic freedom). Organizations are plural in form and differ in how they organize a field and how they achieve their degree of autonomy. All this depends upon the degrees of uncertainty regarding the kind of tasks the researchers are expected to contribute to solve, and the degree of mutual dependence upon other
contributors to the field, technically and functionally, e.g., how many colleagues in the field you depend upon for making a career, whether the internal coherence of a field is strong or weak, the degree of specialization, and generally how researchers achieve and fight for scientific recognition. However, disregarding the differences Whitney (1984) reported among research field organizations (and we will compare biosemiotics to his seven types below), the unifying point of departure for his typology was that of a scientific or scholarly field doing inquiry within a loosely or closely coupled collegial community of peers, who develop and enact some common standards for their work that govern what counts or do not count as research. As organizational theorist Whitley was initially interested in the micro-social science policy and its similarities and varieties across the academic landscape and the ways that disciplines institutionalize fields of research as units for education and employment of research staff. Especially for the well-established and highly connected fields with a high degree of scientific autonomy, it is the very participants of the field who decide (by processes like those of research collaboration, competition and peer review) the status, reputation and career possibilities of the field’s participants. For more loosely organized fields with a higher variation in theoretical frameworks and with target groups outside the field as potential audiences, access to control over resources for research and possibilities for career will depend on such more external factors. In this regard, Whitley’s theory on the micro-social forms of organization of research is open for extensions to investigate more macro-social and global tendencies (Whitley 2010). These global trends influencing university fields of inquiry – often with a unifying influence upon the diversity of modes of research (tending to lower ‘science diversity’) – are exemplified by national research policies, funding programs, the dominance of ‘strategic’ research councils, special types of university governance modelled over out-dated top-down hierarchic modes of business management, but also ‘New Public Management’, markets of employment for masters and doctoral candidates, etc.
Such a global trend is characterized by physicist and philosopher of science John Ziman as the transition from academic to post-academic science, and other scholars have theorized about this trend in related ways.² According to Ziman, academic science as an ideal type has some characteristic features: It gather its contributors in expert communities solely on the basis of their academic merits, that is, by having contributed to advance the understanding of a special topic. The scientific communities embody a scientific ethos, comprising virtues like universality, open and collective ownership of the knowledge generated and thus public available information on methods, empirical material and results, rational skepticism via the critical scrutiny by peers of what represent findings and interpretations of acceptable quality to be incorporated into the archives of science and scholarship, humility and acknowledgement of the fallibility of inquiry, an aiming at disinterestedness and objectivity, and a determination to make original research rather than to boil more soup on the same scholastic bones. Academic science is highly specialized, need economic and institutional protection, and is in principle pursued for its own sake, i.e., for the sake of human understanding. Its raison d’être is to investigate the reality by scientific means, disregarding special beneficial outcomes other than knowledge (but history has shown that non-epistemic benefits do indeed materialize), and disregarding any political agendas. Therefore, the epistemic relation between science and society is one-way: Even though the state as a protector pays, no state-directed or political inputs goes into the very scientific process. Knowledge flows only from science to society in the form of published results and highly educated graduates, as well as scientific advice and popular outreach.

² Ziman 2000. The distinction between academic and post-academic research in Ziman corresponds more or less to the distinction between mode 1 and mode 2 in Gibbons et al. (1994), see also Nowotny et al. (2001). For the critical literature on this and similar theoretical schematics (especially the notions about a ‘before’ and ‘after’ the opening of the university to the external world), see Weingart 1997, Elzinga 2004, Hessel & van Lente 2008, Tuunainen 2002. The notion of ‘academic science’ designating the special peer-controlled social form of organizing research is of course older, e.g., Barnes & Edge (1982) have a section on “The organization of academic science: communication and control” introducing a classical piece from Hagstrom 1965.
Ziman knows very well that this ‘Legend’ is an ideal type, or an official (and now threatened) ideology, and that a naturalist theory of science needs to account for much more complexity, controversy and ‘grey zones’ between science and society to give a more realistic picture. But his point is that the reality is moving, and today we move too far away from the ideal type on a number of dimensions, that is, towards post-academic science (Ziman 2000).

Before proceeding to characterize the later notion, the field of biosemiotics should be noted to be both originating within different areas of academic science (see Favareau 2010 for its history) and still to be thriving there as a special, yet ambitious and cross-disciplinary research agenda, gathering scientists from the biosciences as well as scholars from semiotics and linguistics and other disciplines. So biosemiotics, disregarding how to place it in a map of the overall research landscape, apparently lies closer to academic than post-academic forms of research. This is not to preclude it from also sharing some features of the post-academic trend.

Post-academic science according to Ziman represents a complex situation in which science becomes research (often related to industrial ‘research and development’), i.e., in practice and organizationally gets into close contact with other stakeholder interests, especially private business, and in part takes over norms from those spheres at the expense of strictly following academic norms. This is a silent and undramatic revolution, and touches on phenomena described by Ziman as 1. collectivization, 2. limits to growth, 3. exploiting knowledge, 4. science policy, 5. industrialization of science and 6. bureaucratization. This changing institutional setting for science will have a tendency also to change the very practice of science, as there are no hermetically sealed borders between epistemic norms, social norms and ethical values (cf. Douglas 2009).

1. Collectivization moves research from the individualistic culture of academic science towards more collective modes of action. Instrumental sophistication, increasing costs, and the Herculean nature of the tasks many research programmes are designed to tackle (complex problems of climate, health,
welfare, and environment) force the researchers to collaborate in larger multidisciplinary teams. Although bio- and cybersemiotics are often presented as multi- or transdisciplinary in essence, their mode of operation so far has only been through a single or a few researchers collaborating on an investigation.

2. Limits to growth also applies for science, and refers to the transition from exponential growth of the number of researchers employed in the 1960s to a more steady-state situation of today that is of course experienced as increased competition for scarce resources and cutbacks. This makes it a harder fight to invent new prestigious research institutions and disciplines (such as systems biology) depending upon high-tech infrastructure, while the costs of inventing biosemiotics with its more ‘theoretical’ modes of operation, have been fairly low.

3. Exploiting knowledge is the increasing demand for utility in knowledge production and constitutes a pressure (often framed as ‘strategic priorities’) upon the disinterested pursuit of basic science for its own sake. Post-academic production of knowledge emphasizes the contexts of application, and university scientists are forced into consultancy contracts and short-term projects in cooperation with industry, which results in severe constraints on academic freedom regarding choice of topics, of publication channels, and the free communication of results. In this regard biosemiotics has not been motivated by inventing practical applications, and it may even be seen as a counter-movement to that [p. 357:] extreme focus upon ‘relevance’ (seen as industrial utility) in technology-driven bioscience. 4. Science policy that way back in the 1960s primarily was of minor importance and merely figured as a question of estimating the total state fundings of research for the next year’s Appropriation Act, is today a highly disputed political issue, involving policies of innovation, business, strategies for advancement of special technologies, etc., in effect limiting the autonomy of academic communities by having more and more politically defined research programmes. Ultimately this has the effect of turning research groups into small business enterprises and substituting competition for money for the traditional competition for scientific esteem. Biosemiotics is
hardly marked by this macro-trend, unless one look into the grant proposals for new funding for biosemiotic research, but all such proposals will have their share of branding and PR. 5. *Industrialization* of science refers both to privatizing and norm confusion. Privatizing results from outsourcing governmental science (within environment, health, military, etc.) for private consultancy. In Denmark this started by merging big governmental departments for research with public state universities in 2007, and then loosening the ties between the governmental ministerial agencies and the merged research departments, putting the later under strong economic pressure. Norm confusion is seen when two incompatible system of norms collide, that is, the public one of academic freedom, openness and self-defined research agendas, and the more authoritarian system in industry where the boss decides, the firm own a research project and its results, and research is narrowly commissioned to solve particular practical problems. Here, research is forced into a culture foreign to academic science that in the end may threaten the objectivity and non-partisan attitude expected to be a defining feature of research made at a publicly funded university. Again, and unsurprisingly, biosemiotics is not very much industrialized in any of these senses, and the only industry that has shown genuine interest in the field so far is publishing houses, most notably Springer, launching a book series and a journal within the field (with Søren Brier as one of the more industrious contributors!). 6. The *bureaucratization* of science is seen, e.g., in the governance schemes inspired by New Public Management directing a larger amount of time spend by the researchers to measure and document every tiny aspect of their performance. It is also seen in the tendency of university income to flow into special administrative or regulative departments (for communication, Technology Transfer and patenting, Human Resources, and branding educational programmes) that take their toll on money for the core tasks of research and teaching. Bureaucratization end up in uniformity like having all fields, ‘wet’ as well as ‘dry,’ to live up to the same criteria of research excellence in order to apply the same indicators across all fields of science and
the humanities (like the ‘Norwegian’ research indicator, Schneider 2009; Auk & Emmeche 2010). As any other university field of research, biosemioticians are affected by NPM, and thus should also be aware of the ‘perverse effects’, to use an economic jargon, of having the number of publications in certain journals, rather than the inherent content quality and progress reported in articles and books, to be a major incentive to inquiry.

Many of the features described by Ziman as post-academic science have been caught by others as academic capitalism, designating the situation of governing universities as if they were private businesses, commercializing knowledge and higher education, coupling university management elites with big stakeholders in state and industry, and turning the researchers into state [p. 359: ] subsidized entrepreneurs with a market-like behaviour (Slaugther & Lesley 1997, Slaughter & Rhoades 2004, de Bary 2010). That the ‘high church’ values of academic culture like honesty, objectivity, impartiality, critical skepticism, and openness are threatened by the transition to post-academic science is sometimes discussed in the public when university scandals of scientific fraud or financial corruption is brought to the fore by the media.

The intellectual and social organization of biosemiotics.

Had one to imagine a continuous scale of research types, with the one end closest to the academic science and scholarship tradition and at the other end with types having all the characteristics of post-academic research, biosemiotics would be closest to the academic end of the scale, as indicated above, but such a scale of course is a simplistic abstraction and locating biosemiotics here says nothing about the specifics of its intellectual organization. For that purpose we will try to see if the seven types characterised by Whitley (2000 [1984]) can be of help, remembering that their typing into distinct categories may tempt us to essentialise them, while they should rather be seen as clusters in a multidimensional space of research fields. Being reputational work organizations,
there is in academic science in general a high dependence of the group of colleagues for reputations, and according to Whitley, the structure of allocating material rewards encourages many scientists to limit their originality to minor variations of procedure, topic or material so as to minimize the risk of rejection and conflicting with powerful colleagues (ibid., p. 28). But what about biosemiotics or cybersemiotics as purportedly new paradigms? Interestingly, Whitley at some point notes that [p. 360: ]

“scientists may, of course, adopt a more innovative strategy but even they will be constrained by the collegiate orthodoxy entrenched in journals, textbooks, and training programmes. Establishing new sub-fields will be easier than attempting radically to alter dominant perspectives, and so intellectual change in these fields is likely to take the form of differentiation and specialization rather than revolutionary overthrows of established doctrines.” (p.29).

This is indeed what seems to have happened to biosemiotics. Although there are indications that e.g. molecular and systems biology as well as evolutionary theory by the internal development of these fields become more semiotized or relationally oriented (see, e.g., Pigliucci & Müller 2010, Fernández 2010), it is harder (cf. Álvarez 2009) to see signs of full embracement of a genuine thoroughgoing semiotic approach to living systems in biology, outsides the confines of biosemiotics as that growing group of scholars and scientists already defining themselves as belonging to (at least to some extent, as professional identities can be plural) an international biosemiotic community.3

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3 Part of this may be due to the fact that in fancying a more visible merger of approaches, techniques, ideas and theories of biology and semiotics, biologists are by far the largest community in numbers of research workers, and interdisciplinarity in biology is most often partly driven by new instrumental lab techniques or new computationally heavy forms of data analysis, making biologists more prone to establish interdisciplinary research collaborations with medicine, chemistry, engineering, computer and nano science (Burggren et al 2010). Most semioticians will already perceive themselves as working within highly crossdisciplinary fields, such as cognitive science or media and communication studies, dealing with humans and human culture, and making direct cooperation with biologists less likely.
So what type of intellectual organization does that community embody? According to Whitley it should be on of these:

1. **Fragmented adhocracies** (their defining features are high strategic and high functional task uncertainty;⁴ low strategic and low functional dependence⁵) that produce diffuse, discursive knowledge of commonsense objects. Research here is rather personal, idiosyncratic, and only weekly coordinated across research sites. Fields are open to the ‘educated public’ and may include amateurs. Reputations are fluid, and standards open to many interpretations. Commonsense language dominates the communication. Examples (given by Whitley): management studies, British sociology, political studies, literary studies, and post-1960 US ecology.

2. **Polycentric oligarchies** (defining features are high strategic and high functional task uncertainty; high strategic dependence; low functional dependence) producing diffuse, locally coordinated knowledge. Here, the strategic dependence implies that scientists are more attentive to the views of a small group of leaders who control scarce resources. Competing ‘schools’ are based on

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⁴ Whitley’s (2000 [1984]) notion of task uncertainty refers to the commitment of research organizations to produce new knowledge (new and better intellectual artifacts) and be innovative. This is more difficult to plan than to plan the production of e.g., chairs. It has two dimensions: **Technical task uncertainty**, that refers to the degree of uniformity and stability of task outcomes: If high, then conflicting interpretations, and the use of procedures will be tacit, personal and fluid. If low, formal training programmes secures uniformity and reliability. The other dimension is **strategic task uncertainty**, that refers to the degree of stability and integration of research strategies and goals. This is concerning intellectual priorities, the significance of research topics and pay-off of different approaches, and the relevance of outcomes for achieving the collective goals of the field.

⁵ The degree of mutual dependence between scientists and the organization of scientific fields, according to Whitley (2000 [1984]), refers to the dependence upon colleagues to make contributions to collective goals and achieve reputations. This has also two aspects: **Functional dependence** is the degree to which one has to use specific results, ideas, procedures of fellow specialist in order to succeed (e.g., is there a need to co-ordinate tasks and demonstrate adherence to common competence standards?). **Strategic dependence** is the degree to which one has to persuade colleagues of the importance of your problem to obtain recognition, or the importance of your approach (thus it concerns the question of wheather there is a need to co-ordinate research strategies or to organize and prioritize common programmes).
intellectual leadership entrenched in employment organizations having control over journals. Here we have more theoretically oriented knowledge and one must demonstrate importance of a contribution to the school’s overall programme; yet knowledge is still diffuse (a highly tacit nature of research skills; and a lack of standard procedures). Whitley’s examples are: German psychology before 1933, British social anthropology, German philosophy, and continental European ecology.

3. **Partitioned bureaucracies** (defined by high technical and low strategic task uncertainty; high strategic dependence; low functional dependence) producing both analytical, specific knowledge, and ambiguous, empirical knowledge. They are highly rule governed and hierarchically organized fields, divided between the highly theoretical research and some sub-units fields for applications. Here, standardization of training programmes and skills in the central core enable an élite to control research strategies and problem selection, but lack of control over empirical phenomena threatens coherence and closure. Theoretical elaboration becomes more prestigious than empirical exploration, applications becomes peripheral. Whitley’s example is Anglo-Saxon economics. [p. 363: ]

4. **Professional adhocracies** (having low technical and high strategic task uncertainty; low strategic dependence; high functional dependence) producing empirical specific knowledge. They exhibit extensive specialization and standardization of tasks and skills but varied problems and goals, which are not ordered into a single hierarchy of significance. Such a field is highly segmented into various problem-areas; there is no need to integrate results. There are formal communication systems for results, but no overall integration of strategies. The organizational boundaries are not firm. There may be an abundance of resources from varied sources insuring that competition over priorities is not intense. The examples given by Whitley are bio-medical science, artificial intelligence, engineering, and pre-Darwinian 19th-century ornithology.
5. **Polycentric professions** (with low technical and high strategic task uncertainty; high strategic dependence; and high functional dependence) producing specific, theoretically coordinated knowledge. They combine segmentation of problem areas and a functional dependence between specialists with the formation of separate research schools centred on a small number of employment organizations and leaders. Theoretical coordination of results is more critical here. Results are comparable across schools and collective judgements about the significance of programmes can be made. The common background of work ensures that disputes are not so intense or unresolvable. Whitley’s examples are experimental physiology and continental mathematics.

6. **Technologically integrated bureaucracies** (having low technical and low strategic task uncertainty; low strategic dependence; and high functional dependence) producing empirical, specific knowledge. They organize research around separate problems that are coordinated by standardized rules and apparatus. Stable sub-fields function as semi-autonomous reputational organizations that share technology, significance criteria and background assumptions. Their mutual relation is not so important, and there is a high degree of specialization without coordination problems arising. The example is 20th century chemistry.

7. **Conceptually integrated bureaucracies** (with low technical and low strategic task uncertainty; high strategic dependence; and high functional dependence) producing specific, theoretically oriented knowledge. They are highly rule-governed and strongly bounded organizations, controlling and directing research through a very formal and standardized reporting system, and instantiate a hierarchical reputational structure. There is restricted autonomy of stable sub-fields with increased competition between them for centrality to the overall field. Importance of theoretical coordination is high. Exemplified by post-1945 physics.
Should we locate biosemiotics as belonging to one of these types, we should analyse the defining characteristics of degree of mutual dependence between researchers in making competent and significant contributions, and the degree of task uncertainty in producing and evaluating knowledge claims. Let us start with technical task uncertainty. If it was low, there would be a well-established set of research techniques which can be acquired by formal training programmes, the use of which is relatively straightforward and successes easy to determine, with replicable results and a high level of clarity about how to apply appropriate methods (e.g., semiotic approaches to analyse a system). In biosemiotics, however, there will often be common disputes over how to make sense of a system being analysed, which type of semiotic approach one should use and how to apply a semiotic model to a living system. This indicates a high technical task uncertainty in biosemiotics, and it is fairly evident that there is also a high strategic task uncertainty, i.e., uncertainty about intellectual priorities, preferred ways of tackling research topics, a high variety of problem types, etc. In biosemiotics as a whole, it is not quite clear which problems are most important among the high variety of research goals and problems. This is maybe unsurprising as the ambition of the field is to cover the whole of biology, as seen and analysed from the perspective of semiotics. In discussing task uncertainty, Whitley described the humanities as social sciences as example of fields with both high technical and strategic task uncertainty, while the biological sciences are characterised by a lower technical task uncertainty but a relatively high strategic task uncertainty (ibid., p. 127f). Biosemiotics is high in both aspects. Concerning the other dimensions, first, the mutual functional dependence between members of the biosemiotic research field, i.e., their need to co-ordinate task outcomes and demonstrate adherence to common competence standards, this seems to be fairly low: Contributions which do not fit into existing biosemiotic knowledge and do not rely on similar techniques or approaches as used by colleagues in the field are still likely to be published, as judged by the high variety of topics in the journal Biosemiotics and in various
anthologies (an exception here is submitted contributions that are deemed non-scientific by the community because of a high affinity to ideas like ‘intelligent design’, homeopathy and the like). As for the second aspect of mutual dependence, the degree of strategic dependence, i.e., the prevalence of some necessity for a contributor to co-ordinate research strategies or convince colleagues of the centrality of particular concerns to collective goals, [p. 366:] this may be slightly harder to access. Yet again, the field seems still quite open for newcomers bringing their own theoretical style, analytical techniques or metaphysical background assumptions into the field, pointing to a low degree of strategic dependence. However, even though the field is young, there have been some early attempts to establish introductory text collections (Barbieri 2007; Emmeche & Kull 2011), a ‘canon’ of biosemiotic ‘classical’ texts (e.g., the volume of Favareau 2010), or to formulate programmatic outlines for central research questions (Kull et al. 2008, 2009), so even though no consensus on such matters has been reached, the strategic dependence within biosemiotics may more precisely be evaluated as being medium. Perhaps this aspect is on its way from low to high, reflecting a consolidation of the field.

The result of this brief sketch of an analysis brings out biosemiotics as a border case between a fragmented adhocracy and a polycentric oligarchy. It does not completely fit Whitley’s description of either; unlike the fragmented adhocracy, commonsense language does not dominate and specialization does not tend to take place around everyday empirical objects (like ‘education’, or ‘marketing’) in part because both biology and semiotics have developed a substantive corpus of theoretical terminology that is drawn upon in biosemiotic studies; and unlike a polycentric oligarchy, it is often not necessary for biosemioticians to demonstrate the importance of their contribution to their school’s overall programme (rather than simply claiming it based on their investigation of

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6 The existence of border cases poses no problem as such to Whitley’s theoretical typology as it should be interpreted, as indicated above, as a description of some spots on a multidimensional and continuous landscape of forms of organization of fields of research.
empirical structures as it is the case within the adhocracy according to Whitley). However, as typical of the fragmented adhocracy, research is scattered and often idiosyncratic, and like the polycentric oligarchy, there seems to be several centres or slightly competing schools in biosemiotics (although the existence of them as separate ‘schools’ is contested), sometimes referred to as a Copenhagen-Tartu nexus (Jesper Hoffmeyer, Kalevi Kull, Søren Brier), a ‘biohermeneutic’ approach (Anton Marcos), and an ‘organic code’ approach (Marcello Barbieri) to mention just a few representatives (see Favareau 2010 for further comments and examples). The general problem, however, of applying Whitley’s theoretical typology to such a highly interdisciplinary endeavour as biosemiotics is that in the case of Whitley’s seven types of intellectual organizations, they all seem to presume that for some piece of science or scholarship, there exist just that single field of research within which individual researchers have to establish their career based upon reputations from colleagues within the same field (and eventually to some additional external audiences, as in the case of for instance a fragmented adhocracy), while in the case of a cross-disciplinary field such as biosemiotics, it attracts many scholars and scientists who already have been successful (more or less) in making an academic life within a single ‘mother discipline’. This may be a generational feature of many young emergent research areas inhabited by researchers with a variety of different backgrounds and competencies, until their eventual establishment of formal training programmes and departments as part of a process of institutionalization of the research field leading to a discipline – but this is yet something to be seen in the future regarding biosemiotics. [p. 368:]

This brings us to comment briefly upon some contextual factors – such as (a) reputational autonomy over the setting of a field; (b) concentration of control

7 Whitley (2000[1984]: 56f, 96, 225) distinguishes between a research field (and its general social organization of that unit of knowledge production and co-ordination as a work organization), and the discipline as a distinct historical form of such an organization combining training, skill certification, employment, and the pursuit of national and international reputations in universities.
over access to critical resources, and (c) audience structure – all according to Whitley (2000, chapter 6) influencing the organization of different types of research fields, here, a fragmented adhocracy or a polycentric oligarchy.

Ad (a): The field’s reputational autonomy over performance and significance standards (essential for any field to become established) are low for the fragmented adhocracy and medium for the polycentric oligarchy; while both have low autonomy regarding problem formulation and descriptive terms. For biosemiotics, the situation seems to be low autonomy regarding both standards of performance, significance and problem formulation, e.g., there are not yet any clear work methods unique to the field.

Ad (b): Concentration of control is horizontally high if a small number of central agencies allocate grants, positions and other resources, and low if local research sites or networks control the resources; furthermore it is vertically high when the leaders of an employment unit control appointments and promotions, grant allocation or submission of papers for publication, and vertically low if there is little local control over research strategies, facilities or procedures. A fragmented adhocracy has low control both horizontally and vertically; a polycentric oligarchy has medium horizontal control and high vertical control. Here, biosemiotics best fits the parameters for a fragmented adhocracy, with both low horizontal and vertical control. In fact, it is difficult to discern any control at all emanating from the field as such regarding resources. This may have something to do with the fact that many, if not most contributors have already established a significant part of their reputations within other fields, confer below.

Ad (c): Both a fragmented adhocracy and a polycentric oligarchy has a high audience variety, i.e., the researchers can address relatively many distinct groups, both inside and outside academia for reputational purposes. This is also the case for biosemiotics. However, regarding audience equivalence, i.e., the degree to which different audiences are equal in respect of the reputations they
control, this is high for a fragmented adhocracy while medium for a polycentric oligarchy. In the later case, the existence of a lay audience for the products of the field’s practitioners may carry relatively less weight in appointment and promotion decisions than for a fragmented adhocracy. Biosemiotics may well have a medium or even low audience equivalence.

There is little doubt that part of the peculiarity of biosemiotics as a field of research is that it seems to be permanently ‘parasitic’ on two other fields, viz. biology for empirical cases and semiotics for conceptual tools. Furthermore, one can observe a high variety of theoretical styles that its contributors bring in, coming from both the natural sciences (e.g., evolutionary and molecular biology, ecology, biochemistry, embryology, ethology, robotics, computer science) and the humanities (e.g., psychology, linguistics, semiotics, anthropology, philosophy), and thus with different emphases; on either somewhat rigid experimental approaches with the aim of generating new validated knowledge, settling questions and bringing controversies to a closure, or an emphasis on more loose interpretative styles of reasoning with [p. 370:] the aim of contributing to expand understanding by comprehensive theoretical narratives, or critically keep on questioning or contesting established knowledge. The later style is often seen by adherents of the former style as merely re-describing established knowledge or doing ‘theoretical mimicry’ with no scientific output, as expressed by skeptics like Kristian Bankow (Martinelli & Bankov 2008). So we may ask: Is biosemiotics really one single (though cross-disciplinary) field of research? Like Peircean semiotics itself, biosemiotics may be seen “as a possible interdisciplinary hub for many discourses, rather than being on the threshold of splitting into many ‘discipline-specific programs’” (Salthe 2010: 248).

**Conclusion**

In discussing the recent challenges to academic science by more ‘entrepreneurial’ forms of organizing research, called post-academic science by
John Ziman (and with several similar but not identical characterizations by others), we saw that biosemiotics was located closer to the academic end of the spectrum, even though its aspect of inter-, cross- or even transdisciplinarity is a feature it shares with the post-academic situation. This does not mean that biosemioticians are not at all affected by the recent macro-trends discussed, as these trends are so pervasive and confluent with the whole mode of organizing and governing publicly funded research in contemporary universities – such as the increasing demand to get external funding, increased focus on branding, outreach and non-academic audiences, pressure upon the communication system of science by the use of various research indicators in new public management, the higher amount of non-tenured research positions and the ensuing constraints upon academic freedom in short-termed research projects, and more separation between teaching and research. It becomes increasingly difficult within the spheres of the natural and medical sciences to raise funding for long-term ‘blue sky’ research that is not easily sold as new forms of nano-, bio- or information technology. I think the same applies, perhaps to a lesser degree, to cybersemiotics, as this field may easier fit into the ‘new humanities’ focus on media, communication, ICT, etc., but I will leave this question open for a later investigation.

Finally, I must mention that I admire my biologist colleague at the Copenhagen Business School for his stamina in having persisted – throughout his challenging voyage of inquiry between the Scylla of narrow-minded myopic scholasticism of some academic philosophy and the Charybdis of reducing research to the marketing of superficial schematic ideas – to pursue the same set of broad philosophical interests that makes it possible to see all his contributions within a comprehensive perspective, rooted in science, but also constantly acknowledging the limitations of science. I will let Søren Brier have the final word by citing one of my favourite quotations of him:

“There is, phenomenologically viewed, another side to our being and knowing than just science. The human condition can never be exhaustedly described
through science. Our becoming is ‘before’, ‘above’, and ‘beyond’ science in a
certain way and – in ‘the end’ – probably beyond words, based as they are in our
signification sphere’s continual historical drift through spacetime and feeling
matter.” (Brier 2001: 811).

[p. 372-375: ]

Acknowledgements

A part of this tribute to Søren Brier derives from the manuscript “Er videnspolitik godt for
Videnskaben?” for an anthology on knowledge policy (in Danish) edited by Jan Faye and David
Budtz Pedersen, to appear late in 2011. Thanks to Heine Andersen, Jan Faye, David Budtz
Pedersen and Jakob Givskud for critical comments. Special thanks to Heine who directed my
attention to the work of Whitley. I also thank Torkild Thellefsen, Bent Sørensen and Paul Cobley
for comments and for organising the Festschrift.

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