On Signs and Texts: Cognitive Science
Faces Interpretation

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Are all sciences not cognitive?

— Daniele Gambarara

Two major problems, mainly investigated by language scientists, dominate the Western epistemological tradition. They correspond to a pair of underlying preconceptions about language – whether it is seen as a means of representation or as a means of communication. In short, the former posits meaning as a relationship between a subject and an object, and the latter as a relationship between subjects.

The dominant of these views, meaning the former, which follows a logical and grammatical tradition, stresses signs and syntax in its approach to language, relating them to the laws of reason. It is centred on cognition, and cognitivism represents its current state of development.

The second school of thought, belonging to a rhetorical and hermeneutical tradition, examines text and discourse in terms of their generative

and interpretative processes, and can be considered to focus on communication[2] through pragmatics, which borrows some topics from rhetoric, and offers a restrictive outline of communicative processes; this approach is largely based on the logical positivism of Morris and Carnap, a kindred spirit to the discipline. For the sake of concision, we will classify the former approach into a problematic of signs, and the latter into a problematic of texts.

Recognizing a distinction dating back at least as far as Dumarsais, let us adopt the convention that signification refers to a property of signs, and meaning to a property of texts. The transitional concept of context may help distinguish between the two problems. If we look further into the distinction between meaning and signification, a sign, at least when in isolation, does not have meaning, and a text does not have significance.[3] Significance results indeed from decontextualisation, a dispelling of context, as one may see in lexical semantics and terminology. In this respect signification is a stake of high relevance for ontological questioning, since traditionally Being has been characterised as identity with oneself. On the other hand, meaning implies maximum contextualisation, in language (context is all of the text) as well as through situational criteria (inclusive of the co-dependent variables of history and culture, beyond the sole here and now considered by pragmatics). Therefore, whereas signification is traditionally posited as a relationship, meaning can be represented as a process.

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2. Considering the failings of communication theories, we would rather adopt the term *transmission* (Rastier 1995b), insofar as cultural transmission, semiotic inheritance, can be included in it.

3. Three paradigms of *signification* centered on the sign, can be said to dominate the history of Western linguistic ideas: *reference, inference,* and *difference*. a) The paradigm of *reference,* in the Aristotelian tradition, defines signification as a mental representation, precisely a concept. It is variously continued today by vericonditional semantics and cognitive semantics. b) The paradigm of *inference*, in the rhetorical and Augustinian tradition, defines signification as an intentional action of the mind, connecting two signs or two objects. It is developed today by pragmatics. c) The paradigm of *difference*, of sophistic origin, and developed by the synonymists of the Enlightenment, then by the so-called structural semantics, defines signification as the result of a contrastive categorization.

The synthesis of which we have just offered the principle consists in determining inference and reference through difference, then to place these problems of signification under the authority of semantics, by assuming that the global (the text) plays a determining role over the local (signs).

By privileging the study of meaning, interpretative semantics (Rastier 1987) focuses on the text, rather than the sign, and defines meaning as interpretation. It is based on text disciplines (law, theology, literary criticism, among others) and can be ancillary to two kinds of theories: philosophical hermeneutics and philological hermeneutics. Since it aims to describe a great diversity of texts, it is naturally closer to the latter, because while the former seeks the *a priori* conditions of any interpretation, the latter seeks on the contrary to specify the incidence of social practices, and leads to a typology of texts.

If of course the study of signs and that of texts supplement one another, logico-grammatical problems and rhetorical-hermeneutic problems differ significantly. The first one enjoys widespread recognition and has strong unity, for until very recently grammar and logic developed in parallel and around the same categories (such as the very concepts of category, predicate, categoreme and syncategoreme, etc). The second one hardly has unity at all, and apparently rhetoric and hermeneutics till their own fields: the spoken and the written, enunciating and interpreting, Reform and Counter-Reform, persuasion and grace, Latinicity and Germanicity, etc.

It is impossible to trace here the history of those issues, but it is probable that the age-old vicinity of grammar and logic within the medieval trivium made much for their unity. The two fundamental disciplines followed one another among the first school courses, rhetoric being studied last, while hermeneutics was set aside for doctors.

Let us retain however that the two problems are particularly relevant for cognitive research, because language and thought have always been conceived in a related if not identical way. That seems to be constant, and enduring theories of an inner language attest to it: whether Platonic *dianoia* or *logos endiathétos* of the Stoics, Augustine's *verbum mentis*, William of Occam's *lingua mentalis*, up until Husserl's *endophasia* and Fodor's *mentalese*.[4]

The parallel between language and thought has not lost any topicality, if we are to believe Récanati: "For the last ten years or so, we have witnessed a massive turning of philosophy of language toward philosophy of the mind [...]. The idea that thought looks very much like a language has

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4. The thesis of a language specializing in thought and thought only results from a reworking of Aristotle's *Peri hermeneias* by late neo-Platonists (by Boethius in particular).

gained pride of place as a central topic in philosophy of the mind" (1991, p.137).

Whereas the rationality of thought (reason being the very form of the soul) has been admired since saint Thomas, the irregularity of natural languages has unwaveringly been deemed deplorable, so much so that some even doubt that they can adequately represent knowledge.[5] The unity between language and thought could be threatened by the discrepancy. As a consequence, one might say that, among our contemporaries, traditional logocentrism has grown into logicocentrism, insofar as the inner language has been suddenly regarded as a formal one. Thus the relationship between the language of thought and natural languages goes beyond sciences of the language and becomes a concern for the whole of cognitive sciences.

As far as the relationship between language and thought is concerned, the two problems require complementary strategies.

(i) The logico-grammatical questioning sets its agenda to folding the linguistic dimension back onto logic, either in a narrow way, through translations of linguistic fragments into formal language (as illustrated by Montague and Kamp, in particular, but already criticized by Quine); or in an "loose" way, with theories such as that of natural logic (Grize), argumentation in language (Anscombre and Ducrot), relevance (Sperber and Wilson). At the level of signs, the tendency is then to assimilate linguistic signs and logical symbols (for example, the pragmatics of connectors regards some grammemes as logical operators).

(ii) The rhetorical-hermeneutic questioning formulates no rationalist assumption on the nature of thought, and besides there is no consensus at all about the existence of a language of thought. At any rate, it results in distinguishing between logical and linguistic levels, while insisting on the inherent heterogeneity of the logic and linguistic dimensions, for logical languages were precisely instituted to redeem the alleged defects of languages and are put in any case to a great many other uses. This state of affairs resulted in drawing a fine line between the linguistic sign and the logical symbol, and correlatively between the hermeneutic modes those signs embody.

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5. The problems of representing knowledge primarily consist in providing a formalization or at least a logical formulation to segments of scientific or technical texts: it is in particular a question of dissipating ambiguities arising from linguistic expressions.

(Note: By underlining some limitations of logicism, we do not intend to throw away logic with the logicist bath water. One can consider it regrettable that in this field cognitive research has by and large kept a low profile, being mainly satisfied with first-order predicative logic supplemented by a smattering of modal operators, while at the same time research in logic was deploying an unprecedented variety of formalisms.)

I. Semiotics as a cognitive science

1. Semiotics and the division of human knowledge

The divisions among the forms of human knowledge introduce a disciplinary hierarchy which not only defines courses of study, but also raises epistemological and even gnoseological concern.

For the Ancients, at least from the second century onward, disciplines were ordered as follows: "Ethics ensures the initial purification of the heart; physics reveals that the world has a transcendent cause and thus invites to seek incorporeal realities; metaphysics or theology [...] ultimately brings the contemplation of God" (Hadot 1996, p.238). Among the Moderns, Locke seems to be the first to explicitly reshuffle this threefold separation, and that happens at the very moment when he names and defines semiotics. Distinguishing among the three kinds of Science where

> All that can fall within the compass of human understanding [...] may be divided properly into three sorts:
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> First, The knowledge of things as they are in their own proper beings, their constitutions, properties and operations [...] This, in a little more enlarged sense of the word, I call [Physics], or natural philosophy. [...] Secondly, [Practice], the skill of right applying our own powers and actions. The most considerable under this head is ethics. [...] The third branch may be called [Semeiotics], or the doctrine of signs [...], it is aptly enough termed also [Logic] (Locke 1993, p.414-415)

Comparing his to the ancient tripartition, one notes that Locke reverses the places of physics and ethics – thereby giving up the initiatory character of the course of study, which required to start out with the

moral education of beginners. He is an objectivist: things first – things as they can be known "in their own proper beings." Lastly, Locke replaces metaphysics with semiotics, an intent that can be attributed to his nominalism, and we can no longer be perplexed by the metaphysical leanings of many semioticians (for example, Peirce's semiotics is explicitly inseparable from his metaphysics).

This division of the sciences is by no means a historical oddity. As a case in point nowadays, it is clear that Popper's theory of the three worlds derives from it. If World 1 is the physical world, World 2, that of subjective thoughts, and World 3, in the image of Frege's third kingdom, that of idealities, Popper notably populates this last world with statements per se, then scientific theories, then books, newspapers and works of art, while justifiably ending up doubting whether one can ever give order to the "pot-pourri." Our objections (argued Rastier 1991) could be summarized as follows:

(i) World 3 is quite simply the semiotic world, which, because of a realistic illusion that undoubtedly owes to his baggage of logical positivism, Popper could not distinguish as such.

(ii) The defining feature of human cognition consists precisely in the mediating function of the semiotic level between the physical world (World 1) and the world of (re)presentations (World 2 according to Popper).

(iii) The worlds can be distinguished, but not be kept separate in the least: our knowledge of the physical world depends on the two other "worlds."

(iv) Let us underline that the question has moved from sciences on to the "layers of Being" and from epistemology on to gnoseology. However, it would be simplistic to base the distinctions between sciences on ontological distinctions. Indeed, any cognitive activity is a practice, one that brings into play several "levels of Being," all pertaining to the three worlds. In addition, the objective of the sciences is not simply to describe such or such a "world," but to describe and articulate the relationships between the various "layers of Being," by using various technical and semiotic artifacts.

It should be added that the division of knowledge into physics, ethics and semiotics, even as it is understood by Eco, remains tailored on a scholastic pattern. It does not take into account one major innovation – the progressive constitution of aesthetics from the Renaissance on to the Enlightenment, and the fact that it was integrated into philosophy by

Baumgartner, Wolff and Kant. Admittedly, some cognitive scientists (especially Petitot) resumed the Kantian program of transcendental aesthetics, as a theory of the a priori conditions of perception, but without posing the problem of judgements of taste. In fact, cognitive research is conspicuously devoid of aesthetic questions.

For traditional cognitivism in particular, things are simple: there is only one world, and one type of science only. It actually perpetuates logical positivism: through the thesis of a unity in science, the Vienna Circle had set out not only to eliminate metaphysics but also to equalize all sciences on the common methodological grounds of the physical sciences. The agenda to "naturalize" meaning, in which Sperber justifiably sees "the Holy Grail of cognitive philosophy" (see note 21), arose directly from there.

In this agenda, semiotics is only one aspect of the physical world. As for semiotics, as a discipline, it plays a very low key role, and debates have primarily circled around one of its sub-disciplines, linguistics – that is provided it is defined as the semiotics of languages, an apposite description in my view. In fact, the only semiotic theory followed by cognitivism, albeit in a non-critical way, is Morris and Carnap's semiotics, namely the division between syntax, semantics, and pragmatics.

It is not truly relevant here that this tripartition has been, for a half-century, the most obtrusive epistemological stumbling block in the development of language sciences. It is a highly functional proviso for cognitivism. Indeed, logical positivism carries a conatural contradiction between its empiricism and its logical grand scheme (objects of perception do not share in the qualities of ontological stability and identity to oneself of logical objects). Cognitivism allays the mismatch in a semantic way: the signification of signs is defined and guaranteed by atomic entities. Semantics, as it defines the pairing of word and object, solves the empirical difficulty, whereas syntax, as a rigorously regulated combinatory, confers logical validity on the predicative qualifications of objects.

However, cognitivism obviously does not share the anti-psychologism of logical positivism. It restores the possibility of subjecting representations to scientific description. Correlatively, it breaks free from a theory of direct denotation, a radical innovation brought by Carnap, which quite simply did away with the conceptual pole of signification, thereby defined as the direct linkage of a symbol (or signifier, in Saussurian terms) and a referent. The theory of necessary and sufficient conditions (NSC) in semantics bears witness to the reduction.

In retrospect, however much it vilified behaviourism, cognitivism appears to improve on it somewhat: it maintains the input/output model, which enables it to continue the data-processing metaphor, but it justifiably keeps the inspection of the "black box" as a possible option. However, the conceptual level re-instituted in the process is only given a single format, the propositional format (as propositional computation). The theory of direct denotation, in line with formal languages, is thus maintained and transposed, at the cost of some psychological involutedness, within the new framework of a computational psychology.

As such, the semiotic triangle from the Aristotelian tradition, whose canonical version had been offered by Ogden and Richards, is restored, with a major qualification: the symbol, by which the authors singled out the signifier, also turns out to be the semiotic format of the top pole of the triangle (that is, Thought).

That symbolization of thought seems closely related to the naturalization agenda, because thought is then emptied out of all content proper: its content is nothing but the worldly objects to which symbols refer. Formalism, as far as thought is concerned, is thus the "abettor" of mechanistic materialism insofar as the physical world and the referent are all one.

For the naturalization effort to succeed, it becomes instrumental that all signs may be simplified into mental symbols, by various kinds of transcoding.

2. The cognitive establishment of semiotics

The fundamentally semiotic streak in the cognitive venture should not come as a surprise. Ever since Locke defined it as a discipline[6] semiotics has always been cognitive. For Locke, semiotics is a species of the science whose defining characteristic is to study signs as instruments of knowledge: we would call it cognitive science today. He says of men: "The consideration, then, of ideas and words as the great instruments of

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6. Theories of signs are obviously not a new thing. *Tractati de signis* were numerous from the twelfth to the seventeenth century, which discussed the theory of the sacraments, in the same way Arnauld and Nicole's *Logique, ou l'art de penser* did in Port-Royal as late as 1662. But we owe to Locke the first reflexion on semiotics as a full-fledged discipline.

knowledge makes no despicable part of their contemplation who would take a view of human knowledge in the whole extent of it" (1690, p.415).

Consequently, the study of signs as instruments of knowledge will take two paths. Sometimes, as in modern cognitive sciences, one sees there (according to Jackendoff's expression) an open window onto cognition. In his answer to Locke, Leibniz states that "languages are the best mirror of the human mind" (1704, p.333). Sometimes, the languages reflect the spirit of the people: Leibniz, who sees them as "the oldest monuments of the people" (p.279) finds an ally in Condillac: "each language expresses the character of the people which speak it" (Essay on the Origin of Human knowledge, 1746, II, 1. Ed. G. Roy, Paris, 1947). The *Volksgeist* nationalist romanticism develops this thesis with dubious intents, but deserves at least to be recognized for breaking away from traditional universalism.

Whether cognition is social or not, the inalienable relationship between signs and knowledge is part of the rationalist doxology, just as it is part of the empiricist doxology. The latter takes into account the diversity among languages, whereas the former seeks the universals of language, the alphabet of the human mind. The project centred on the assumption of a universal characteristic derives from there: it is a matter for creating a perfect language in order to mend the defects of languages, and in one fell swoop to endow the human mind with the best knowledge tools. This passably optimistic endeavour had fortunate consequences, because it stands at the origin of the theory of formal languages, and as such provides a basis for the theory of grammars as well as for the theory of automata. They are the theoretical bases of data processing, and by extension of artificial intelligence, then the basis for the symbolic paradigm of cognitive research.

3. The Globalizing Agenda of Contemporary Semiotics

In order to better specify the relationship between semiotics and the cognitive sciences, let us expand on our contemporaries. Twenty years apart, in the Sixties for semiotics, in the Eighties for cognitive research, two transdisciplinary movements, one on the basis of the social sciences, the other one sprouting off engineering, set out to lay their claims on the issue of meaning. Their creative difficulties, their fertile incapacity to

achieve their ultimate goal could be parallelled today.[7] However the parallel symmetry will be broken here, by questioning on the one hand the semiotic deficiency of the cognitive sciences, and on the other hand the hermeneutic failings of semiotics.

As the generative capacity of these disciplines grew with their claim to describe possibilities, they veered away from attested facts, with increasingly reductive methodological attempts and the vindication of partial models. No doubt the descriptive weakness of contemporary semiotics and cognitivism originate from a common transcendentalism: they purported to annex meaning through regressive basicism, by defining the a priori conditions of its articulation, by the elementary structures or the syntactic rules of a language of thought. This establishment results in making meaning and the cognition of it rest on a lame ontology, in fact the spontaneist ontology of logical positivism, never questioned as such, because it is laid out as the condition of any claim to scientificity. To make for science, it is required to reduce the object of study to its elements, and recombine them. This provides a rationale for our critique, in particular, of the concept of sign (as an element) in semiotics, and of that of syntax (as a combination) in cognitive sciences.

4. Semiotics and logico-grammatical problems

Perhaps the ambitions of contemporary semiotics have been thwarted because it defined its object in too restrictive a manner. Indeed semiotics presents itself in the form of a science of signs, and many works of semiotics are devoted to a typology of signs (Eco 1992). In the Anglo-Saxon tradition, the Peircian definition of semiotics as a "doctrine of signs" (1956, p.98., following Locke, p.415) enjoys great authority, and Sebeok, who has spent thirty years tending to the global academic destiny of semiotics, stresses that the key concept of semiotics is still that of the

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7. In fact this periodisation merely points out climacteric media attention. Although they by and large ignored one another, the two currents borrowed from one another more than popular belief has it: in semantics, Schank's theory of primitives, and his theory of scripts, come from Greimas (who developed Pottier and Coseriu's theory of semes, in addition to Hjelmslev's theory of catalysis). Van Dijk and Kintsch's theory of text also reworks, impoverishing it in the process, Greimas's narrative theory.

sign. Pap recently summarized the alleged agreement among semioticians when he affirmed that "semiotics is the study of signs" (1990, p.1).

The case would be settled if the sign were not an artifact manufactured by semioticians. On the one hand, its identification is the result of interpretation, not its starting point. In addition, in general, the semiotic practices do not play upon signs in isolation, but upon complex formations, whose segmentation is always problematic, and sometimes impossible. The definition of semiotics as a science of signs therefore fits with the logical and grammatical tradition, in particular the one inaugurated at the opening of *Peri hermeneias*, which still looms over the discipline. As we know, it is universalist, static, realistic, and relies on an ontology of substances. It seems that the sign's loneliness is the down-side of the self-containedness of its concept, to which it is subordinated.

Admittedly, semiotic currents issuing from linguistics rather than from logic or grammar stress that semiotics targets sign systems. This is true, in the European tradition, of Saussure and Hjelmslev, of the Tartu School also (Ivanov, Lotman, Lekomcev in particular). However, the sign systems are usually understood as syntaxes: for example, Hjelmslev's theory extends the procedures of morphosyntaxic analysis to the whole of sign systems. However, even for languages, this syntactic patterning is not adequate, or marginally so. In the analysis of texts, all kinds of units are mentioned which do not break down into signs, such as topics or narratives functions. Signs are the least complex units, which does not necessarily entail that they are fundamental ones, in the sense that all the other units may not be reduced to signs without remainder. Were we to succeed in this reduction attempt, we would still have to acknowledge that no one has yet been able to provide a finite list of all the signs of a natural language.

Lastly, a language does not consist of one and only one system of signs, insofar as any text testifies to the interaction of several kinds of systems, in particular the impact of standards. This is why no grammar is able to generate a text. And without taking standards into account, the grammars that can generate sentences are unable to discard unspeakable sentences – and non-speakable ones because of the strictures of rationality.

II. Semiotics and the Symbolic Paradigm of Cognitivism

1. Signs in cognitive science

There are in fact two types of signs recognized by cognitivism: signals and symbols (in the logical definition of the term). The other types are studied only for their new translation into symbols, then, if necessary, into signals. Let us examine in this light the types of semantics and hermeneutics attached to the signal and the logical symbol.

1.1. Meaningless signals

Theories of the signal, flourishing under cybernetics, are related to the theory of information. It is advisable to distinguish the rampant use of the word signal, in expressions like signal-processing or speech signal, which then indicates physical flows likely to be interpreted as signifiers. This concept calls for a theory of interpretation, because nobody has yet offered a truly reliable method to distinguish the signal (meaningful part) from interference (the remainder in the physical flow). Let us add that the signal does not have syntax, because it is not discrete.

In another meaning of the word, signals are electromechanical bits. They are discrete, but do not have syntax. The concept of information expresses a statistical property of the signals, and has no relationship with the meaning that can be attributed to the message. The model of communication, which one finds in all linguistics and semiotics primers, is derived from telecommunication engineering. The transmitter and the receiver are, for example, a loudspeaker and a microphone. The message is not the text, but its expression, boiled down to its elements. Yet the Receiver fails to take the place of the interpreter, nor can decoding replace comprehension, because to hear is not to understand, except if we bypass interpretation. More generally, the extension of the communication diagram is proof of the hermeneutic shortcomings of the language and cognitive sciences.

In traditional cognitivism, the naturalization of meaning agenda is accompanied by the reduction of signs to signals, i.e. to low-level physical phenomena: bits in the compiler-model theories of cognition, spikes in neuronal theories.[8] This reduction of signs to their signifiers gives a sense of naturalization, but that is not meaning, an issue which is simply conjured away.

1.2. Symbols

The text you are reading is without doubt composed of small black images, your comprehension is certainly accompanied by neuronal discharges, but the mediation between these two material orders is still a highly problematic one. The symbolic paradigm of cognitive research, and in particular the language of thought theory, have both tried to solve the problem by using only the logical concept of interpretation, and by ignoring its hermeneutic dimension. The study of the concept of symbol will enable us to specify how cognitivism went about that task.

(i) The semiotics of logical positivism

As disciplines specializing in the processing of symbols, computer science and its applied branch, Artificial Intelligence, should belong to the semiotic domain. But semiotic reflection is only presented there in a quite impoverished form from the theoretical point of view, the logico-positivist semiotics derived from Carnap and Morris. As a logical attempt, it turns out to only recognize one type of signs, logical symbols, or at least its goal is to assimilate all signs to such symbols (Montague 1974). Although it is a mentalist one, the so-called symbolic paradigm of cognitive research is just that. Its reductionism originates from the tendencies of the Vienna Circle, which gave birth to that form of semiotics.[9]

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8. Even from the neurophysiological point of view, this is a reduction, because spikes are grouped into bursts.

9. It was a question of unifying all sciences on the single model of mathematical physics, according to what one called the unity of science hypothesis. Morris and Carnap delineated their program in the *Encyclopaedia of Unified Science* (1938). Unified Science translates the

In keeping with this reductive goal, Morris provided a purely physical definition of what a sign is: "A particular physical event" (1971, p.96). Therefore positivism already practises physical reduction in the very definition of the sign it provides. We are going to explain how that material object can also be at the same time a logical construct, so that the strictures of logical positivism are observed.

(ii) The sign according to Hilbert and the symbol

Obviousness is one of the positivists' criteria.[10] Hilbert's formal approach is a convincing case: "In mathematics [...] concrete signs themselves, whose form appears to us immediately and obviously, are the object of our examination" (1925, p.170-171. Ladrière 1957, p.3). Demonstrations then become "something concrete and locatable" (p.169). That would be possible if the signs had to be read only, but not to be interpreted.[11] Hilbert's sign is identical to itself in all occurrences, its varying signifiers are without relevance. Its occurrences refer to only one entity (identical to itself). It is autonomous, because neither its signifier nor its referent are defined in relation with the rest of the formal system. The symbol does not take any part in paradigmatic substitution, because it is not inter-defined with others: it is simply distinct from them.

Let us recall that in the formal paradigm, some symbols are devoid of signification. Russell, for example (1903, VI, ¶51), considers that logical

Einheitswissenschaft of the Circle of Vienna.

10. That is not a defining criterion, because the concept is used throughout various forms of non-critical intellectualism (see Thomas Aquinas's *simplex apprehensio*).

11. On the sign according to Hilbert, see Piotrowski (1994, p.58-59). Turing, in his foundational study when he expands on the immediate recognizability of symbols (1936, p.250), reaffirmed the fact that the symbol is self-evident because of *simplex apprehensio*. Admittedly, neither Hilbert nor Turing ever claimed that the definition of mathematical signs can be extended to the whole of signs. But Ladrière's general objection has remained unanswered: "the use of the formal method does not exempt mathematical thought to maintain contact with certain intuitions which precede formalization, and which formalization can merely help clarify" (1957, p.9). It will be the task of formal hermeneutics (Salanskis 1991).

words (connectors and quantifiers) are by themselves empty of significa-
tion, and that the others "have one by the simple virtue of being symbols
put for something other that themselves" (p.47). This is a well-known
distinction, one that dates back to Aristotle – who made a distinction be-
tween "articulations" in speech (*arthron*) and the noun and verb, whose
signification is warranted by ontology. It was built into grammar in the
Sixth century by Priscian, who distinguished the categorematic words
from the syncategorematic ones, and has lived on until our days along
with its grounding ontological postulates.

These heterogeneous semantic statuses do not affect computation
which, as a formal process, operates independently of significations. In
his Tractatus, Wittgenstein affirms in the same vein that if we are to avoid
the errors attached to polysemy, we require a language that comes fully
equipped with some sort of logical syntax (3.325, p.29); one condition,
however: "In logical syntax the meaning of a sign should never play a
role" (3.33, p.31).

(iii) The symbol and the linguistic sign

In principle, it is possible to manipulate logical symbols without tak-
ing their contents into account. From a Saussurian point of view – for
Saussure the two sides of the sign cannot be dissociated – they are not
signs, because their content is dissociated from their expression; and all
the more so because their content is not theirs proper (it can call on an-
other language or another plane of reality). Besides, Hjelmslev distin-
guishes between symbolic systems and semiotic systems (1971a, p.142).
Only the first systems are defined by a term-to-term relationship between
content and expression. More accurately, the symbolic systems are mono-
planar: they consist of a plane of expression, and their plane of content is
not configured by a system. As such, symbols are non-semiotic interpret-
able orders. Formal languages are not semiotics, and post-Russellian logi-
cists turn out to have been misguided in generalizing their properties
(1971a, p.142).

Let us briefly recall, even if it means returning to a semiotics of the
sign and factional issues for one moment, how linguistic signs differ from
symbols:

a) The signifiers of linguistic signs have a twofold articulation, symbols do not. First-level units (letters), as a matter of fact, are often used as logical symbols.[12]

b) Linguistic signs are neither constants nor variables.

c) Symbols are strictly counted as they are put in circulation. There are an indefinite number of signs in a natural language.[13]

d) Symbols strictly come up with their signification through syntactic rules, whereas linguistic signs do not abide by the compositionality principle. That is particularly clear at the level of text. In other words, the relationship between symbol and computation is the same as between the element and the whole; the relationship between the sign and the text is that of local to global.

e) Their meaning can vary indefinitely according to occurrence. The types of meaning, or signification, and even their syntactic rules, differ according to the social practices in which they are implemented. On the other hand, symbols keep the same reference, even if unknown, over the same computational process.

The signification of symbols is extrinsic to themselves. It is instituted from outside by their interpretation within another symbolic field or within an ontology of sorts. On the other hand, the meaning of signs is determined in a practice where they themselves play a part. And usage can reconfigure it indefinitely.

All things considered, whereas symbols have only one signification, but no meaning, because meaning is a contextual and textual phenomenon, signs do make sense, but their signification remains a problematic construct (as the debates surrounding polysemy prove it).

f) Symbols are not subjected to diachrony, neither within a same computational process (diachrony has nothing to do with the succession of an algorithm), nor from one process to the next. Unlike linguistic signs, they have no history but that of their original establishment.

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12. One can also use second-level units, such as words, and Lewis Carroll blithely does so in his *Game of Logic*. But then their use is actually autonymic.

13. Symbols in a language are initially stipulated in a list. The list of the words in a natural language is constantly overhauled, because it depends on variable standards which allow us to create interpretable neologisms at any time.

g) Linguistic signs are suitable for metalinguistic use, symbols are not.[14] In other words, natural languages might experience hermeneutic circularity, but not other languages.

h) Their hermeneutic modes differ, as much actually for the identification of their signifier as for the identification of their signified.

The parallel would be even more unbalanced if we compared not just signs and symbols, but texts and computation (although there are theories that aim at the "computation of meaning"). The cynosure of our discussion is interpretation. In the case of a general semiotics such as Hjelmslev's glossematics, "there is, for the computation of theory, no interpreted system, but only interpretable systems. There is therefore no difference, on this point, between pure algebra and the game of chess on the one side and, for instance, a natural language on the other hand" (1971a, p.141). Obliviously of the hermeneutic dimension, natural languages and other languages can well be put on a par. Rather, we would place them under the scrutiny of two different kinds of hermeneutics: a formal one for languages (Salanskis 1991), and a material one for natural languages (Szondi 1982. Rastier et al. 1994, and forthcoming).

The hermeneutic regime of the symbol is one of suspension: the suspension of interpretation is the means by which computation is allowed to unfold effectively. But this suspension occurs between two phases where interpretation is possible, if not prescribed. On the other hand, the hermeneutic regime of the linguistic sign is one of compulsive interpretation: it can only be identified and isolated through a combination of assumptions[15] which cannot be suspended, neither during semantic description nor while the sign is processed at the psychic level. Whereas, in computation, the interpretation of the symbol is temporarily excluded, the interpretation of the sign is always necessary.

Let us point out that the interpretive modes are not attached to signs as such, that a word may perfectly replace a symbol in computation, as a symbol a word in a text. Those modes are related to practices and traditions: mathematical hermeneutics is canonical, unlike linguistic herme-

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14. More precisely, a formal language cannot, without modification in its vocabulary or structure, be interpreted in terms of itself.

15. The arguments and examples are plentiful: the words *take a trick* will count for one sign when followed by *and win the game*, but for another two or three before *to a seedy hotel*.

neutics whose techniques vary according to genres and texts, even according to moments in the texts.

The difference between natural languages and other languages can therefore be described as follows. Natural languages have an open interpretive mode, not specified by a priori definable functions, but by types of usages specific to the historically and culturally located practices where those natural languages are in use. They are without functions, and this is why they can be adapted to an indefinite number of uses, of which the variety of textual genres is ample evidence.

On the other hand, languages have a preset interpretive mode at the time of their establishment – and this is the extent to which they can be called artificial.

The relationship between expression and content or, to simplify, between signified and signifier is what separates those two kinds of signs and the two hermeneutical regimes. For cognitivist semiotics, the two planes are separate, as are syntax and semantics (in the formal meaning of the term); or as the linguistic and conceptual planes are separate: signifieds, purely representational as they are said to be, do not belong on the same level of reality as signifiers, which are strictly material.

This dualism, however, seems to go against the grain of the monistic, materialistic claims of cognitivism. To solve this contradiction, the naturalization of meaning agenda submits that representations should be broken down into neuronal syntax, which amounts to pass symbols off as natural.

It will certainly be objected that cognitive semantics, with authors like Langacker,[16] broke away with the dualistic conception of the sign. Nothing is less sure. Indeed, the signified is continuously located in another order of reality as the signifier. It is simply that cognitive semantics divorced the theory of direct denotation, and watered it down without giving up the principle of compositionality. But when mentalism strikes back and it defines the space where states of affairs happen, it links back signifieds, become concepts once again, to cognitive fields with no defining principle, in a mental space which is a new version of transcendental space (Rastier 1993).

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16. Langacker is the only author in that current to mention Saussure: he borrows from the latter's iconic figuration of the signified.

All things considered, none of the great competing paradigms of cognitive research on signification acknowledges that the semiotic is a level which would allow to consider it as an area of objectivity that can be studied in itself. The semiotic unit as such is surreptitiously replaced with the percept on the one hand, with the concept on the other. Certainly, the percept/concept distance tends to be reduced, insofar as cognitive schemes have retained the outline of forms in space from their Kantian ancestors – while losing their mediating function, for want of pure concepts of understanding.

The objective common to all of the cognitive paradigms, which might lead one to say that they are pursuing the programme fulfilled by general grammars before the advent of comparative linguistics, consists in going upward from language to thought, and from the expression to the concept. Dummett summarized the attempt in the same way: "By examining the mechanisms of language, it is of course thought we are trying to analyze. Language in itself would hardly have any importance at all if it did not make it possible for us to access the workings of thought" (1994, p.2).

(iv) The function of symbols in the symbolic paradigm.

Their eponymous function allows to guess that symbols are entrusted with missions of paramount importance.

a) They are the means of any scientific description. According to Minsky and Papert:

> What do we mean by "description"? We do not mean to suggest that our descriptions must be made of strings of ordinary language words (although they might be). The simplest kind of description is a structure in which some features of a situation are represented by single (primitive) symbols [...] (1974, p.223).

This is the cognitivist road to perpetuate the thousand-year-old search for primitives. The underlying idea is that symbols are simpler and

more primitive than words, as we will see further in relation to the language of the thought.[17]

b) As we know, they are the basis for Artificial Intelligence. We have to credit Newell and Simon for formulating the *Strong Physical Symbol System Hypothesis*: a physical system that can handle symbols has the necessary and sufficient characteristics to produce or at least simulate intelligence.

This functionalist thesis rests in particular on a quite peculiar mode of relationship between types and occurrences. Symbols in their form, and as types, are computed, whereas in their material format, and as tokens, they are implemented. It is then enough to state that matter is related to spirit in the same way implementation relates to computation, and the problem of their articulation is apparently solved. However, the relationship between types and tokens is a crucial problem in semiotics and semantics: it governs for example the questions of polysemy and typicality, and more generally categorization. Characterizing this relationship, qualifying how tokens differ from types, is a major objective of interpretation. When one postulates that they do not differ, one implies that interpretation works on its own (Rastier 1995).

c) Symbols are the signs of the language of thought, independently of natural language. The cognitivists' originality is that they have maintained that this language is a symbolic one, in the image of formal languages, and that it plays for the mind the same role machine code plays for the computer. This speculative thesis is obviously a means by which dogmatic rationalism runs the cognitive science show. And as Reason is nothing but the secularized form of the Soul, animals are mysteriously deprived of mental language.

Only assertions and arguments of authority substantiate the idea that thought is a symbolic system: "mental representation [sic] are symbols: they have both formal and semantic properties" (Fodor 1981, p.26). Let us not expostulate on the atomization of mental life, since symbols are discrete entities, nor on the resilience of the representational paradigm (Rorty 1990). Mental contents are reduced to representations and beliefs, to which propositional cores and propositional attitudes respectively cor-

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17. Symbols then act as what the gentlemen of Port-Royal called words of ideas: they represent such simple ideas that they cannot be defined, and are used to define all the others. The elementary does not have to be interpreted as soon as it is decreed that elementariness provides meaning: it is a founding principle. Greimas's indefinables, and Fodor's primitives are actually the same notion.

respond. This distinction is actually based on the ontological opposition between categorematic and syncategorematic elements. Symbols have semantic properties, but do not have an interpreter to establish them (contra Edelman 1992); and the hermeneutic issue is once again side-stepped.

However the difficulty of the perceptive, and more generally biological, background of the symbolic level arises. If symbols ground cognition, what kind of metalanguage are they grounded on themselves? As a formal language cannot be its own metalanguage, as the ineluctability of the hermeneutic circle is rejected, and as the semiotic is not regarded as autonomous, the problem is addressed by a naive brand of nativism: we are born thus equipped.

Because of its sheer simplicity, the semiotics of the symbol is integrative. In short:

(i) if the symbol has no signified, or at least if its interpretation can be suspended, it does not have a signifier either. At least, according to Fodor and so many others, the symbol is amodal, and is as such independent of any perceptive modality.

(ii) It has no contextual variations.

(iii) It is not governed by a textuality of any sort, but by compositionality.

This simplicity makes it possible for it to be placed everywhere. The purely syntactic definition of the symbol does not prevent, quite the opposite, that traditional cognitivism turns it into a mediator between neuronal states and states of affairs: "mental symbols are neuronic configurations with physical, chemical and biological properties (studied by the neurosciences) as well as with formal or syntactic properties. In addition, being representational, symbols also have contents, and semantic or intentional properties: they represent aspects of the environment" (Andler *et al.* 1992, p.12).

One of the lesser accomplishments of symbols is to account for all of cognition — world, mind and brain. They indeed mediate between the environment and the neurons. One can however have doubts and be somewhat dissatisfied, in spite of the lofty intents in some sub-branches of the neurosciences, as to the assertion that mental symbols are neuronic configurations. It is worth wondering about the ideological function of neurons: is it not to anchor cognitivism in nature?

Cognitivism undoubtedly is the most evolved and systematic among the theories that originated from the logico-grammatical branch. As such, it is unlikely that another paradigm may compete with it on its own terrain (see below, V).

2. From perfection to absent interpretation

The normative character of hard-boiled cognitivism is expressed in the fact that it claims and maintains without empirical backing, much as beliefs are held, and we should ponder on the origins of such a methodology. It is well known that the wish for universality is a constant feature of Western metaphysics: it went hand in hand with the political and ideological conquest of the world. In linguistics, it results in the programs of universal grammars. Chomsky estimates that his universal grammar is one of the "hypothetical components of our genetic inheritance" (1984, p.21).

The Leibnizian enterprise to seek out a universal characteristic, resumed by Frege's *Begriffsschrift*, was to produce a universal and perfect ideography, free from all the irregularities of natural languages. The cognivist feat will have been to fit this perfect language into the very operation of the human brain, as the means of all possible cognition.

Here is not the place to make fun of such a serious subject: Hebrew was long held to be the perfect language, the language spoken by Adam and Eve. The calculation of first-level predicates, boosted by modal operators,[18] or propositional calculation, was thought, up to very recently, to provide a format to mental representations as well as to the language of thought. After several failed attempts at establishing the perfect language, are we not ready now to discover it within our genetic inheritance?

The refusal of hermeneutics has undoubtedly led the symbolic paradigm to elect the format of a semiotics characterized by interpretational suspension. It certainly had the merit of underscoring the role of semiotics in human cognition, but its computationalism has pigeonholed it

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18. This computation articulates the logical patterning of the semantic interpretation of sentences in the Chomskyan theory of the Eighties; or then again the predicative format which, according to van Dijk and Kintsch, would have made it possible to encode the signification of all sentences in all texts.

into a single formal version. That resulted in the absolute primacy of syntax over semantics, that only symbols could convincingly implement:

> the brain is first and foremost a syntactic machine, which can advantageously be regarded as emulating a semantic machine, but one where significations themselves never have precedence, never dominate and have no influence, ever so little, over the raw mechanical or syntactic flow of local causality in the nervous system (Dennett 1992, p.31).

Besides, certain authors, such as Stich, explicitly refuse to provide a semantic interpretation to their theory.

That did not prevent, quite to the contrary, rather hubristic ambitions, even totalitarian ones, which show through in claims such as the one made by Johnson-Laird: "language and society ultimately depend on the mental ability to compute recursively defined linguistic structures" (1983, p.450). As cognitivism links its naturalization of meaning agenda and its stated purpose of eschewing the hermeneutic circle,[19] it has located the origin of meaning in a syntactic machinery, thereby suppressing the problem of interpretation.

III. Semiotics and interpretation

After the image of linguistic theories, among which some are universal theories of language, in line with traditional philosophy, and others are

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19. Dan Sperber wrote, under the title of *The Knowing of Knowing* ("Connaître l'acte de connaître"): "There is no thought without signification. Is this to say that signification should also receive a Darwinistic explanation? Can signification "be naturalized"? Here is undoubtedly the Grail of cognitive philosophy. If we manage one day to explain the signification of a speech or the contents of a thought without bringing back them to other significations, to other contents, if, in other words, we are able to leave the "hermeneutic circle," then, indeed, there will be a cognitive revolution. The gap between the natural science and the social sciences will have been filled" (1993, p.32). According to us, the gap only appears to be one to uncritical objectivists, whose turn of mind is a late revival of last-century scientism. It will be bridged once the hermeneutic dimension of "natural" sciences is established, as authors like J. Stewart are trying to do in biology or G. Cohen-Tannoudji in physics (Rastier *et al.*, forthcoming).

general theories of the languages (as in comparative linguistics), two kinds of semiotics can be identified: universal semiotics and federative semiotics (Rastier 1993). Universal semiotics are quick to develop into a science of the sciences, or to give the label of signs to everything (see Peirce).

However, no concept makes it possible to summarize the whole of the semiotic level, quite simply because its inside is where conceptualizations thrive: Meaning, as soon as it becomes hypostasy, is no longer within reach, because it falls within the realm of transcendental thought, and not within the scope of the sciences. It appears necessary to take a step back, in scepticism or as a tactical manœuvre, and to keep the door open for some philosophy of Meaning to visit, before the semantics of natural languages, along with the semantics that study other sign systems, can be developed further. In short, three roads can be taken.

1. The unifying strategy

It summarizes the semiotic level with only one type of signs, and the semantics associated to it. The prevalent strategy in classical cognitivism is a case in point. As the arbitrary and uncritical reduction to one type of signs is the means through which unification is achieved, this strategy can be considered to be dogmatic.

2. The "Ecumenical" Strategy

It creates several general categories of the sign and interpretation, under which it summarizes all the kinds of signs and interpretations. It was illustrated by Eco, and Enjalbert (1996). We will give a broad outline before specifying our point of view.

2.1. The general category of the sign

Eco's great treatise (1975) borrows from "medieval" thought a general definition of the sign: *aliquid stat pro aliquo*.[20] This definition appears unusable to us. On the one hand, it is static (as the stat indicates, resumed in Ogden and Richards' stands for) whereas, according to us, the sign results from the process of interpretation, for its signifier is not offered up to *simplex apprehensio*, but is identified within a practical process, and its signified is not intrinsic: in short, a sign can be identified only as a station on an interpretive path.

Moreover, the interpreter is a great absentee in this definition of the sign.[21] Then again, it neglects the fact that the two "objects," *aliquid* and *aliquo*, are not at all unspecified. This school definition, which none of the great medieval semioticians adopts, smooths over the differences between relata (that can be two things, two signs, or a sign and a thing, a sensory or intelligible element). The only binary sign recognized by the Ancients was the semeion, an inferential sign defined as such by the rhetoric theory of forensic evidence. The canonical example is: If she is lactating, she gave birth. This type of sign forms the basis for the theory of natural signs in Augustine's thought.

The consequences of this generalization are tremendous. Thus Eco manages to fuse under the Aristotelian model of signification (or semiotic triangle) all the major Western models of the sign (1973). The move is not immune to simplification: for example, that leads Eco to equate Saussure's concept and his signified, whereas Saussure's stroke of genius was precisely to make a distinction between them. Eco also juxtaposes

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20. Jakobson, in his inaugural conference of the Second International Congress of Semiotics, included the formula *aliquid stat pro aliquo* as a general description of the various types of signs. It can be found almost anywhere, as in Lalande's dictionary (1968, p.991), or Abbagnano's (1971, p.777).

21. Whereas it is present in Peirce, according to whom a sign "is something which stands to somebody for something in some respect or capacity" (*Collected Papers*, 2.228).

the Saussurian signified and Peirce's interpreter (whereas these two no-
tions have no common ground), etc.[22]

Lastly, this definition does not distinguish strictly between the three
basic relationships (inference, difference, reference) and remains stuck
with the single model of the semiotic triangle, which is certainly amenable
for logical positivism (we stressed that the syntax / semantic / pragmatic
division originated from it in Rastier 1990), but not very compatible with
the semantics of natural languages, and at any rate not with the problems
of the text, because it defines semiosis in relationship to the sign in isola-
tion.

2.2. The General Category of Interpretation

The difficulties it raises are no smaller than the ones raised by the
general category of the sign. I will not expand here upon the interpreta-
tion conceptualized by the philosophical hermeneutics of Heideggerian
descent (because it merges altogether with human life) and will focus on
the semiotic problem itself.

Enjalbert resumes the general category of the sign to offer a model of
interpretation reminiscent of the rewriting of *aliquid* into *aliquo*. The input
(or source) as well as the output (or target) could consist in objects, per-
cepts, in signs, or concepts.

If we adopt a Sign / Sign model, it is still necessary to distinguish be-
tween the rewriting of signs within the same system and their
transcoding. This distinction appears significant to us: the elementary in-
terpretive processes for which we previously offered a typology (1987)
were relevant to various sememic re-writings (in different texts in the

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22. One extra difficulty is this: the referent (the Scholastics's res) is assimilated with the
stoical *tynchanon*; however the Stoics had a propositional theory of signification, and the
referent is a state of affairs or more precisely an action (the traditional example is *Dion runs*),
not an object (contra Eco 1973, p.36). If Eco chooses to downplay these difficulties, or to
mention them on the *paraliptic* mode, it is because he intends to unite the models of the sign
around the semiotic triangle. His argumentation turns to the flimsy and the whimsy: "As
we can see, on the basis of common sense – isn't it the most fairly distributed of worldly
goods? – there is agreement as to how to call this tripartition, but not on the names to be
given to each of the three poles thereof" (p.39).

same language or in different languages). But those processes cannot be directly transposed to higher levels of description, to units such as the rhetorical-prosodic period or the chapter, for example. And this Text / Text model is quite different from a transcoding model.[23]

In addition, as far as the issue of the text is concerned, any rewriting of any sort is a recontextualization, and cannot be described without describing also the parameters of situation and context switching processes. Thus, sign A in context 1 is rewritten as sign B in context 2. Nevertheless, the context is all of the text: in its turn, text A in situation 1 is rewritten as text B in situation 2. The contextual and situational variations obviously require that interpretation be situated in cultural history.

A related hermeneutic standard is attached to each sign system or language, and this hermeneutic standard is a defining one. This is why a text cannot be interpreted through computation, quite simply because a natural language is not defined by the same hermeneutic standard as a language is. One can certainly, conventionally and at the cost of tremendous looseness, encode linguistic signs with symbols and grammatical rules with syntactic rules (in the logical acceptation of the term). But on the one hand such coding is not interpretation, and on the other hand it cannot be interpreted (in the logical acceptation of the term). Worse still, it does not make computation (in the logical acceptation of the term) possible. Throughout the whole history of the formal semantics of "natural" languages, despite exhilarating and worthy endeavours, nobody has ever managed to bring forward any such computation, notably because compositionality is foreign to the hermeneutic standards of natural languages.

It follows that the interpretation of a computational process does not have anything in common with the interpretation of a text.[24] And for example, the fact that an interpreter of Prolog can be written in Prolog does not mean that this language is equipped with hermeneutic circularity. On

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23. In addition to the fact that natural languages are not codes, transcoding is not sufficient to define interpretation, or more precisely, it circumscribes the question of interpretation to syntactic interpretation: for example, compilation is a form of transcoding, but not a semantic interpretation.

24. The various acceptations of to interpret are often mixed together: depending on theories it is a question of highlighting, of expanding, of reviewing, of specifying or affixing value, of rewriting, of transcoding, of building representations, or even of compiling (as in the compiler-model theories of cognition).

the other hand, in the case of a text, intralinguistic commentary remains a possibility, just like translation, to some extent.

More generally, the various sign systems have their own interpretive modes, and as meaning is the product of interpretation, they also have different semantics. This last remark follows the way opened up by Lessing, whose *Laocoon* estimated that painting and poetry could not be translated into one another. This position has hardly been followed, because of its dire consequences: it questions the existence of an amodal conceptual-semantic level, such as traditional rationalism conceived it, and upon which cognitivism still capitalizes.

In short, even if a general category of interpretation made possible that we set up a globalizing semiotics which still would have some descriptive value, it is important to come up with a typology of standards, modes and interpretive regimes pertaining to each semiotic system: indeed, those determine the modalities of perception, recognition and comprehension for the signs in the system. This enterprise implies that we enunciate the specific constraints of the expression-substance (rendered discrete or not, linear or not, for example), and the standards of interpretation attached to each generic semiotic performance.

If the question was never asked within the framework of cognitive research, it is undoubtedly because the unification under the "formal" paradigm of the sign and interpretation permitted the persistent homology of naturalness and artificiality – see the agenda that guides the technical branch of Artificial Intelligence. But this program supposes an unprecedented technical misprision by recognizing to artifacts the same type of objectivity as that of "natural objects."[25] The failures of cognitivism are undoubtedly due to the fact that they failed to ponder long enough on the instrumental role techniques play (in particular in writings and natural languages) in the process of knowledge. As such, it seems that the scientific, not to say philosophical, ambitions of Artificial Intelligence made it less of a priority for it to define itself well as a semiotic technology.

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25. What is there to gain for example in calling vocal commands a man-machine dialogue, except that the understanding of dialogues can be put on the back burner? One eminent specialist in the field noted recently, with all due seriousness, that the turn-taking from keyboard to screen does not raise any particular problem.

3. The Critical Strategy

Rather, it sets out to treat sign systems and interpretive regimes sever- ally, by relating them back to the various practices in which they are put to use. With a grounding in anthropology, but deliberately relativistic, it leads to a semiotics of cultures, whose epistemological core is historical and comparative linguistics. It refuses to accept that a single model of the sign and, further, a single model of interpretation are satisfactory tools to work with. Indeed, if we are to take the interpretation of texts into con- sideration the following questions have to be asked:

3.1. The identification of the sign depends on the interpretation which is brought to bear on the text. Admittedly, under the formal stan- dard, the suspension of interpretation presupposes that it is possible to work from the signifiers up (while regarding their signifieds as nonde- script). On the other hand, as far as linguistic signs are concerned, signifi- ers are not always taken for granted, and unknown words lend themselves to being interpreted. Even known signifiers are reconstituted – a convinc- ing example can be found in the linguistic concept of null signifiers. Its identification may depend on unforeseeable syntactic and semantic condi- tions. Even eyeball movements, although widely held to be automatic and unconscious, vary with interpretive regimes: when the meaning is obvi- ous, the eye focuses in the middle of the word, but focuses at the begin- ning of words when their meaning seems dubious (Lavigne-Tomps 1996). As far as signifieds are concerned, moreover, even though signifi- cation may well be known, it is not always the case for meaning (folly is euphoric in Chamfort's writings, for instance). In short, the sign as a unit made up of a signifier and of one or several co-actualized signifieds re- sults from interpretive processing.

3.2. It follows that in a given text the same sign can or must be dealt according to:

— various degrees of systematicity: natural language, standards (genre, for example), style;

— various connections with other points within the same text (meta- phors spanning long distances), or with other texts (allusions);

— various interpretive codes (multilingual puns, interpretation of first-level units, letters or phonemes, according to interpretive techniques, like *gematria* or *notarikon*, which bestow symbolic value on them). To this extent, any text can be said to be polysemiotic.[26]

3.3. Interpretation cannot be given a single model, because it is the work of situated subjects (Rialle 1996), and because – despite Grice, or Sperber and Wilson – the interpretive situation cannot be qualified in transcendental terms (Rastier, forthcoming).

IV. The issue of the text and of semiotic performances

Even if it is agreed that texts are the empirical objects and at the same time the objects of knowledge of linguistics, to what extent are textual issues relevant to the whole of semiotics, and not only to linguistics as defined as a semiotics of all natural languages.

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26. Remark : This leads us to amend the concept of linguistic sign inherited from Saussure's standard theory, and in particular on the point of semiosis, as the fundamental relationship which links the two sides of the sign. On the one hand, semiosis must be related to the two planes of content and expression evidenced by the text, and other semiotic performances. Semiosis can no longer be defined as a relationship between the signifier and the signified of the sign. In addition, it cannot be defined by a logical rapport that can be formulated in simple terms, such as inference in the intentionalist tradition, or reciprocal presupposition in the structuralist tradition. Lastly, the signifier is not the starting point of interpretation, because it has to be recognized for what it is. In other words, the constitutive relationships of meaning hop from one signified to the next, as well as from the signified to the signifier. We therefore define semiosis on the basis of the network of relationships among signifieds within the text – while considering signifiers as interpretants which make some of those relationships possible to build. We see relationships such as those as directed pathways. One could undoubtedly distinguish among as many kinds of semiosis as there are kinds of elementary pathways.

Lastly, semiosis can be pinned down only as the result of interpretation, not as its departure. The identification of signifiers seems to be one of the points where the interpretive path can be taken, but some expectations and assumptions come first. Those are stipulated by the textual-generic corresponding contract relative to the practice in progress: therefore one could also define semiosis as a point of return.

The text is merely a kind of semiotic performance.[27] In the next section, we specify what the primacy of text and semiotic performances owes to the primacy of practice in knowledge.

1. The semantic approaches to texts

Linguistic theories fall into five categories.[28]

a) Theories resulting from formal semantics, among which Kamp's is the best known. Their technical complexity is remarkable. On the other hand, they do not lend themselves to a comparative description of texts. For example, the concept of genre could not be reformulated within this framework. Descriptions, in fact, do not extend beyond units larger than the paragraph.

b) Pragmatic-enunciative theories resulting from discourse analysis. They have attempted to identify enunciative marks, such as pointers, to classify speech acts, to study the argumentative structures of texts, when it can be done. Those theories lend themselves to the analysis of micro-sociological interactions, in particular to the study of conversations. They are related to certain oral genres, but are not pliable enough to be the basis for a typology of texts, especially because they assert a transcendental definition of communication (Grice refers to Kantism; Sperber and Wilson petition the a priori principle of communicative relevance).

These the first two types of theories are compatible with one another, at least because pragmatics and formal semantics are germane within logical positivism.

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27. We would like to highlight some of the semes in the word: "expertise," "completion," "public nature," and thereby designate the semiotic level of a social practice. Performances are accomplished, because they correspond to practical sessions (e.g. a sermon, a thesis assessment), whereas practices (like religious or academic liturgies) have unspecified durations. Nonetheless, by virtue of this completedness, semiotic performances do not become objects we can interpret in their own terms, without resorting to the conditions of their production and interpretation.

28. In this section I am using elements from Rastier 1996b.

c) The semantic theories resulting from the Saussurian current (Coseriu, the first Greimas). Their favourite haunting grounds are lexical semantics, isotopy theory and the analysis of narrative. Within this general framework, the program of interpretive semantics aims at integrating the three planes of linguistic description (word, sentence, text) as different stages of complexity, but nonetheless describing them in terms of the same basic concepts, that of "seme"[29] among them.

d) The material hermeneutics sketched by Schleiermacher in his time, whose program was resumed by authors such as Szondi or Bollack: it is an ambitious form of philological hermeneutics that has remained incomplete.

e) The "rhetorical" theories resulting from the study of specialized languages (Swales, Bhatia). Most of them are tied to the anthropological tradition (Firth, then Halliday), they describe in detail the diversity of texts in terms of socialized practices, and have accumulated invaluable observations on the language of the law.

A convergence of the last three types of research is still possible. That coming together supposes, on the one hand, a shared rejection of objectivism and immanentism, and correlatively moving from logico-grammatical questions on to rhetoric-hermeneutic questions. It does not matter whether research becomes more or less scientistic or scientific, according to preference: as it is taking textual complexity into account, it is already showing higher descriptive capacity, which in the mid-term will allow us to side with effectiveness.

There is still a state of the art to be made, a synthesis to be sought. At the same time, it is necessary to confront, evaluate, and combine the various analytical methods used to describe scientific and technical texts, and literary or mythical texts. A textual typology must be built in terms of concepts borrowed from semantics (since textual structures are primarily semantic). The linguistic description of scientific and technical genres has

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29. The reason why it is also qualified as *differential* and *unified*, which characterize its method. *Interpretive* refers to its epistemological prospect.

not yet been systematically attempted, at least not in France, unlike in Denmark or Germany (*Fachtextlinguistik*) for instance.[30]

2. Rebuilding Semiotics on Semantic Foundations

In all likelihood, contemporary semiotics derives its hermeneutic deficiencies from the language sciences, which privilege the sign (where reference is located) and propositions (where truth is located), and show reluctance in fact to treat texts. Benveniste was aware enough to phrase the problem: "semantics is 'meaning', insofar as it results from the way signs are linked together, how appropriate they are to such and such a situation and how compatible they are with one another. That's an absolutely unforeseeable vulgar fact. It's an opening to the world. Whereas semiotics is meaning closed back on itself and to some extent self-contained" (1974, p.21). The proposition is the boundary between the two disciplines, or at least it is the border between their respective objects. However pervasive it may be, this separation merely expresses a state of affairs: logico-grammatical problems aim for signs and their syntactic combination, which does not span beyond the proposition. On the other hand, rhetoric-hermeneutic problems aim for the text and all its levels, down to that of the word. The meaning of a word constantly depends on the text that includes it (this is truistic for the semantics of literary texts, for example).

The paradigm of sign, which falls to the lot of logic and the philosophy of language to study because of its content, and to the grammatical tradition, which culminates in contemporary morpho-syntactic research, because of its expression, is an attribute of semiotics, whereas semantics is justifiably associated with the paradigm of text.

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30. In France, researchers still have to do without a sufficiently diverse digitized corpus of reference. Admittedly, the Frantext base of the National Institute for the French Language fortunately collects literary texts as well as technical and scientific ones (in an insufficient but growing number). It is the only one, in the French field, to allow a uniform access to these texts, so they can be contrasted. But the Frantext corpus has not been systematically exploited in its generic variety (which does not account for the lexicographical studies in progress). Novels and short-story collections, for instance, are indexed together. A new classification is a good idea. In a thematic study of feelings, we have thus been able to verify that feelings in the novel are different from feelings in the essay.

While taking care not to generalize from the perspective of linguistics, it should be recognized that texts are among the most complex semiotic performances, and are exemplary for this reason. In addition, texts (oral and written ones) are plurisemiotic constructs that implement, besides natural languages, genres and styles, graphic and typographical systems (a punctuation mark does not function the way a morpheme does), prosodic, gestural (some sort of kinesics is always associated with oral performances). All these aspects are neglected by semiotics, and also by the linguistic schools that work on morphosyntax alone.

Finally and above all, the semantic relationships established or recognized between the various parts of a text, as an interpretive process, are of such complexity and variety that they cannot be boiled down to logical compositionality, but more often than not, on top of everything else, they involve interpretants lifted from other semiotic systems than natural languages.

And yet, neither contemporary semiotics nor cognitive research has brought forward a theory of text compatible with rhetoric-hermeneutic problems.

(i) Certainly, the descriptive practices of contemporary semioticians often go beyond the logico-grammatical theories they advocate. They created the semiotics of discourse, developed narratology to exceed the confined framework of linguistics.[31] And yet their theories are still premised on signification (which pertains to the sign), not on meaning (which pertains to the text). Hjelmslev, when he chose commutation as the test to identify linguistic units at all levels, unified the definition of content on the paradigm of sign – signification or denotation being defined as the relationship between a unit on the plane of content and the corresponding unit on the plane of expression. Greimas's theory, more complex on this point, distinguishes signification and meaning, but makes the one proceed of the other. Specifically, Greimas's generative trajectory, through a series of conversions, attempts to derive textual meaning from the elementary structure of signification, emblematically summarized with

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31. Generative discourse analysis and narratology, drafted recently in opposition to linguistic theories exclusively reduced to morphosyntax, are the best known semiotic theories and regard the linguistic level as a surface variable (Greimas). As the field of linguistic studies expands, the principle of autonomous discursive semiotics becomes increasingly difficult to defend.

a weak Boolean square called "semiotic square" – which still testifies to the logical origin of the concept of signification.[32]

Semantics and semiotics have entertained dubious relationships.[33] But it matters more here that semiotics (insofar as it is limited to signs) has produced theories of signification only, whereas semantics (when it treats texts, that is) is bound to produce theories of meaning.

(ii) In the field of cognitive research, the most prominent theories of text remain attached to the logico-grammatical branch in two principal fashions.

— Textuality is summarized as sentence-level phenomena which extend on to neighbouring sentences (agreement in tense, anaphora), which are as many local isotopies. Albeit interesting, the research on macro-syntax and paragraph- or period-level semantics remains within the limits of text and textuality.

— Another approach is given as a reply: that of reducing the text to a set of propositions. Its principle is well known, and Van Dijk gave a noteworthy illustration of it: after the sentences have been coded into propositions, the propositions considered to be secondary are removed, so that one proposition, called macroproposition, is kept, which supposedly represents the text.[34]

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32. The generative trajectory produces textual meaning, which belongs to "surface" linguistic structures, by starting out from the elementary structure of signification, set up into a constitutional model of all semiotics, by definition the "deepest" model one can imagine. As for myself, I merely consider this elementary structure (presented in Greimas and Rastier 1968) as one of the attested structures among basic lexical classes.

33. For example, Hjelmslev's semiotics (1957) came before Greimas's structural semantics. But Greimas's semiotics, presented in *On Meaning* in 1970, originates from his *Structural Semantics* (1966).

34. In the early Sixties, Nicolas Ruwet showed the way and offered the macroproposition "I love you" as a summary for a sonnet by Louise Labé (1964). The characterizing value of this kind of description seems low, because thousands of other sonnets written at the time would of course have produced the same result.

2. Problems of the Text and the ALP Breakthrough

The situation is changing, however, and as it is often the case more quickly in practice than in theory. Let us consider for one moment what happened with automated language processing (ALP). Far from being an unspecified province of linguistics or data processing, ALP, along with the Chomskyian current, has provided some of the major conceptions behind cognitivism.

In retrospect, in computational linguistics, data processing seems to have fallen victim to the charge of computationalism, while linguistics was confronted with the dire limitations of the logico-grammatical paradigm – such limitations are quite obvious, though, as soon as we agree that a text is not merely a series of sentences. Logico-grammatical theories have made the construction of morphosyntactic analyzers, and of formal proposition representation, such as by conceptual graphs, possible. In spite of their practical merits, they are on the wane, at least as global explanatory and descriptive theories.

The evolution of ALP and the rise of the new corpus linguistics since the beginning of this decade are on the verge of providing a new empirical basis to rhetorical-hermeneutic problems.[35] It is no longer a question of knowing if this or that universal grammar may be run on a handful of sentences, or how to represent, by computerized means, Kamp's hobbyhorse donkey-sentences. Moreover, social needs have evolved: whereas problems such as man-machine (or Person-System) communication become increasingly obsolete, corpora are now accessible that dwarf those available only ten years ago, and there is a trend toward new applications: the semantic access to textual banks, the assisted typology of texts (illustrated for example by the works of D. Biber), the creation of sub-corpora with enhanced relevance, text-to-text queries without the help of a thesaurus, automatizing the targeted broadcasting of documents. If the objective of automatizing comprehension no longer has any serious advocate, that of assisting reading and interpretation can be brought forward.

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35. See in particular *TAL,* N°1-2 (1995, a special issue directed by Benoît Habert). This evolution is not a linear one at all, and Benoît Habert is right to point out that arborescent corpora are named tree-banks (as if a text could be reduced to a series of sentences).

And for example, in the field of assisted topical analysis, the time-honoured hermeneutical technique of parallel passages can be seen to resurface.

Not only did the propositional paradigm show its inadequacy to large corpora, because it is impossible to automatize propositional chopping, and it is ludicrous to do it "by hand" as is done within the framework of Discourse Representation Theory, but also the research mandates have been revolutionized. Whereas the objective of knowledge representation required the collection of a maximum of "information" in a formalist net, the new analytical objectives tend toward selecting minimal amounts: the output from an analyzer can be a single pair of relevant semantic features according to the application's objectives (Cavazza 1996).

The evolution towards computational corpus linguistics is accompanied by the rise of philology, which has remained up to now next to irrelevant to computational linguistics. Since one describes and deals with texts (and not with examples), a deontology is essential. It is initially a question of respecting the proper conditions for collecting, establishing, and transcribing. Then, it is time to encode the articulations in the texts. If it continues and specifies the guidelines of the Standard Generalized Markup Language (SGML) and HTML, the *Text Encoding Initiative* (TEI), co-sponsored in 1987 by the Association for Computers and the Humanities, sets from this viewpoint a particular epistemologically relevant precedent. In addition to the fact that it points to the recognition of the problem of textuality by all the involved communities of ALP (literary scholars, linguists, computer scientists), the TEI now requires a renewed reflection on the criteria behind typologies.

Lastly, the textual dimension is completely taken into account by systems of philological inspiration when it comes to the computer-assisted reading and analysis of texts (like Jean-Guy Meunier's LATAO).

3. Epistemological Consequences of the Paradigm of Text and Semiotic Performance

The logico-grammatical and rhetorical-hermeneutic paradigms differ in their epistemological objectives. The first branch is trying to explain what the language means, and why. In particular how the concept targets the referent. It has an explanatory goal: the laws of thought explain those

of the language, after the analysis of language has made it possible to pin down the laws of thought. The second branch, insofar as it can be loosely characterized, raises a question of conditions rather, not of causes: the social and historical context makes the understanding of a text possible, where grammar only allows it to be deciphered. These conditions permit the appreciation of "how" the text operates: through its organization, determined by its situation and the tradition where it belongs. The problems of reference and truth come second, after those of referential impression and the techniques of realism.

The logico-grammatical paradigm return performance to competence. In the other branch, performance must be studied for its own sake. However, the cognitive puck in the face-off of competence and performance could be advantageously replaced, just as it could be in the semiotic face-off of system and process. Indeed, in addition to their rules, complex semiotic systems also have standards of use. The variation of these standards, such as the standards of genre, forces us to return the various kinds of performances to various systems and degrees of systematicity.

The sign, where reference can be located, and the proposition, subjected to judgments of truth, are isolated in a representational relationship to things and states of affairs, and/or to concepts or mental propositions: this static, achronic, representational relationship is eminently the one held by the theoretic conception of knowledge. On the other hand, texts and semiotic performances take place within practices. They are products of activities and fall into the category of artifacts: they result from linguistic techniques that each society codifies in genres; moreover, some of them assume technical functions.

Insofar as texts are the empirical objects of linguistics,[36] it cannot idly watch the speculative face-off between two abstractions, language and thought. It is highly advisable to study texts within the practices where they are produced and interpreted, because those practices configure textual standards. However, every practice is an interaction between the physical world, the semiotic world, and the representational world (Rastier 1996a), and texts bear evidence of the practices to which they belong (scientific texts are no exception).

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36. Words and isolated sentences are descriptive artifacts which result from conventions of segmentation and decontextualization.

By saying this, we are deviating from the theoretic conception of knowledge. The sacral origin of the concept of *theoria*, the contemplation of the divine, is notorious. For Aristotle (in particular in his Nicomachean Ethics) and the tradition he initiated, the *bios theoretikos* or contemplative life is the condition of knowledge.[37] Practice, for the free man, is reduced to ethics. Technique and the whole of productive activities were valued dysphorically by societal standards — a traditional feature of Indo-European societies — and they still are.[38] Therefore the Sophists (as today the people of communication) were vilified precisely for their technical approach of language, on the basis of social needs, without setting great store by "true knowledge."

In keeping with the normative tradition prevalent in the theoretic conception of knowledge, the linguistic theories put forward by cognitive research never take factual practices into account: they merely apprehend linguistic phenomena as manifestations of thought processes, and the bones of contention relate only to the nature of thought and its processes. The research programs on situated cognition which were first proposed, it should be noted, by anthropologists like Suchman, hold promise in this light.

However natural languages themselves, if we are willing to restore them to their cultural and historical dimensions, are configured by the practices in which they take part. Such is the case for writing, the body of descriptive and normative activities which Auroux calls grammatisation, which obviously had consequences on the natural languages. Changes can happen very quickly (one might think, for example, of the evolution of the Russian language over this century).

To put things in a nutshell, textual problems could contribute to make the theoretic conception of language and cognition evolve towards a praxeology. That would justify our definition: to know is to learn within social practices.[39] At any rate, the semantics of interpretation requires a

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37. The *liberal arts,* as they will be called, the historical centre of the sciences, are leisurely activities reserved to free men. They stand in opposition to the mechanical arts, which were to provide the core historical concept of techniques, reserved to slaves and foreigners.

38. Edgar Faure, a Minister of Education under De Gaulle, was prone to underlining that technical education was wanting in *soul.*

39. *Social* does not necessarily mean collective, but codified and socially sanctioned.

theory of action, because it presupposes temporalisation, intentionality, anticipations, and feedback loops.

Challenging the theoretical representational conception of interpretation, to instate in its stead a praxeological conception which links it back to its socio-historical conditions, we have previously suggested the following strategy (1996a):

(i) A characterization of human languages, in contrast with animal communication systems, through the possibility of going beyond the here and now of communication, and, in short, of speaking about what is not there __ evidenced by the shifts in personal deixis (e.g. first, second, third person), temporal deixis (present, near future and past, distant future and past), spacial deixis (here, there, elsewhere), modal deixis (certain, probable, possible or unreal).

(ii) A definition, with those distinctions as a starting point, of three semiotic zones (called anthropic): the identity zone (which coincides with the enunciator or the interpreter, whether individual or collective), the proximal zone (the zone of the otherness), the distal zone (the zone of the law, whether scientific, institutional, or religious).[40]

(iii) The acceptance that the relationship between any two zones is conventionally mediated by the third, that texts and semiotic performances bring those zones into play, and that the interpretation of texts can be defined as following pathways between those zones.

(iv) The comparison of the identified structure of the semiotic world with the configuration of the (re)presentational world and with the physical world.

Our philosophical traditions fall short, however, when we conceptualize the semiotic world. Indeed, the First Philosophy has always been divided between ontology and the theory of knowledge. Acknowledging our somewhat Laodicean attitude toward ontology which prompted us not to follow its lead, we believe that the fixed face-off of Thought and Reality has to be replaced by a reflection on the semiotic level, because it does not lend itself to be summarily dismissed in the terms provided by the one or the other. As a baffling compound of the sensible and the in-

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40. The relationship with the Other and with the Law are conspicuously absent from traditional cognitivism, because they do not lend themselves to being explained away in narrowly physical terms.

telligible, the semiotic level, with its phylogenetic and ontogenetic exten-sions, appears as the most salient characteristic of the human world. The resolute uncoupling of semiotics and semantics from ontology — actually they also should be uncoupled from the theory of knowledge — then seems a condition to fulfill before they can achieve their emancipation from metaphysics, were it a physicalist one, and we can finally envisage meaning as a cultural dimension.

To describe linguistic meaning, semantics has to lose its moorings in a transcendental tradition which is constantly on the lookout for universals and founding principles, and to steer free from cognitive dualism at the same time. Such is the means by which meaning can be recognized as a cultural production by subjects within their insertion in their surround-ings (1996a). It varies with the practices and situations, and as such always calls for reinterpretation.

V. Epilogue

Having followed our discussion this far, our reader will perhaps be surprised that we have not yet produced a "new paradigm," and we have to explain the breach of academic étiquette.

In the second section of this study, we tried to characterize the semiotics of logico-grammatical approaches. It became remarkably devel-oped under the impetus of logical positivism, then with its late extension, in the functionalist paradigm of cognitive research which Fodor and Pylyshyn justifiably see as traditional. However, I will deliberately not capitalize on it to try and weaken the functionalist paradigm, nor will I plead in favour of a competing model. Here are the reasons for my cau-tious forbearance:

a) On the one hand, the traditional model of cognition came under sharp criticism over the last ten years (Rastier 1991), and has now lost most of its supporters, except in certain pockets of the philosophy of the mind. It is fading away in a kind of indifference, as if conformism had changed sides. Inveighing against it now would amount to a late jump on the critical bandwagon.

b) Should an alternative be found at all costs? Cognitive research seems on its way to paying a dear price for relying on Kuhn's epistemol-

ogy. The most ambiguous concept of "paradigm" is used in all quarters with some critical recklessness, whereas it undoubtedly transposes academic competition, lobbies, skirmishes and banners, on to the theoretical plane. We were recently graced with the spectacle of Quixotic tilting on windmills, some grand standing where alternative paradigms were pitted one against the other: thus, the publication of Parallel Distributed Processing (1986) threw down the gauntlet with bravado and a fair amount of noise. In fact, the connectionists differed rather by their methods than by their objectives, and were no less functionalist, in their own way, than the adversaries they intended to floor.

However the question that arises is whether a global alternative to functionalism is possible (Rastier 1996). It seems unlikely that cognitive research will be able to shape it, for functionalism has so intimately determined transdisciplinary relationships within it.

Should we not seize the day, rather than despair, if ever we can make do without all-encompassing theories? Without a paradigm, or at least without reassuring conformism, anyone tends to look for a way to turn. But is it necessary to look for a way to turn? When he advocates *vipasana* meditation, Francisco Varela is eager to anchor cognitive sciences in Buddhist wisdom. We might as well go all the way: cognitive sciences are already somewhat participating in Plotinian wisdom, at least through Leibniz, who invented the binary number system and promoted the modern theoretical rapprochement that governed the first brand of cybernetics: it would be no lesser oddity to return to it.

c) In fact, some fifteen years ago already, Fodor crudely provided the first acknowledgment that functionalism, in its computationalist version he was defending, was sheer nonsense, but he nevertheless drew argument to perennialize it, since no theory could claim to replace it. Without expostulating on such militant resignation, let us note that the argument holds for a fact that the place of functionalism is delimited once and for all. What if functionalism were too powerful a theory, one impossible to disprove, and for this very reason a nonscientific one? Like all other metaphysical positions, it cannot be attacked, and any other position with the same ambition would be no less metaphysical.

d) The only option left is to do without functionalism, even if it means giving it up forever, without falling into the trap laid by Fodor. In fact, the various currents of thought that have developed over the last ten years, such as enaction, artificial life, constructivism, naturalized phenomenology, material hermeneutics, are all the more interesting as they do not

package themselves as global theories, and maintain strong links with disciplinary sectors: enaction with biology, artificial life with data-processing, constructivism with psychology, naturalized phenomenology with philosophy, material hermeneutics with the language sciences.

e) In fact, when we took from Schleiermacher the project of a material hermeneutics, such as it was implemented by Szondi, we sought to give an epistemological basis to linguistic semantics, independently of the existing theories of reference and representation (Rastier et al. 1994, chapter 2). We offered to extend those problems to the whole of the semiotic sphere. This matter has notably been reworked by Bachimont, in the field of Artificial Intelligence and data-processing (1996). But much is left to be done before those problems turn into a paradigm, in the overstated sense of a global alternative to functionalism. Such a change may not be something to wish for.

f) Indeed, cognitive research is undisputedly entering a new interdisciplinary phase, no longer a fusional one, but more of a federative one. Computational functionalism unified the cognitive disciplines through a commonality of working postulates: the uniformity of the symbolic system, the ubiquitousness of the propositional format, a computational theory of processes. Correlatively, cognitive scientists deliberately used the same concepts and the same means of representation: semantic networks, sequential modules, etc. This kind of unity is a late and probably final implementation of the program of a unified science delineated by logical positivism.

By contrast, the affinities between alternative problems which develop in the various disciplines do not warrant saying that the borders between disciplines have actually been cancelled. If, in its own way, the stance adopted by material hermeneutics makes a renewal of semiotics possible, while semiotics is still very much premised on logical positivism, it will at least provide further inquiry into the distinctions that separate natural languages from languages, and from other sign systems. This paves the way for the semiotic mediation between the "physical" and the "representational" to be specified in a more efficient way. Lastly, by posing the problem of the phylogenesis of cultures, it will become possible to connect the sciences that study culture to the forms of intelligibility resulting from the life sciences.

Appendix

Let us exclude medical semiology or semeiology, a discipline of Hippocratic tradition which is limited to the study of clinical symptoms. The general science of signs was named semiotics by Locke, and this name was taken again by Peirce (1839-1914), then by Morris and Carnap. As for him, Ferdinand de Saussure (1847-1913) named the discipline semiology, and was followed in this practice by Hjelmslev (who employs semiotic to point to sign systems). This use lasted until the Sixties – Barthes named his *Elements of semiology* in 1964. When it was founded in 1969, the International Association for Semiotic Studies sided with the Anglo-Saxon use, which has become accepted practice among academic milieus, but not in communication circles.

And yet the terminological variations betray epistemological differences. The main one touches on the founding discipline of the science of the signs: for the Peircean tradition, it is philosophical logic; for the Saussurean tradition, linguistics. The former targets formal languages in particular (see Montague's Formal Philosophy, which continues Carnap's project in its own way) and seeks in their theory the fundamental categories with which to study natural languages (such as the semantic / pragmatic / syntax tripartition that Chomsky borrows from Morris and Carnap's semiotics). In this branch, semiotics focuses on the typology of signs and on a formal definition of their relationships.

On the contrary, the latter branch takes language as a starting point: thus Louis Hjelmslev's Prolegomena to a Theory of Language (1943) present a general semiotics which was to make the description of all sign systems possible. This kind of semiotics retains from Saussure the principle of non-realism, so that the problem of reference is not posed in its traditional terms any more, as well as a form of holism so that the system is considered to exist before its elements, and relationships before their terms.

Nowadays, four unequally represented conceptions of semiotics are prevalent, and correspond to as many extensions of its object.

1) The first conception restricts the field of investigation to nonlinguistic systems of signs, such as road signals, coats of arms, or uniforms. It was illustrated by functionalist linguists like Mounin and Prieto.[41]

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41. Mounin (Introduction à la sémiologie [1970], Semiotic Praxis [1985]) and Prieto (Pertinence et pratique: essai de sémiologie [1975]) call their semiotics sémiologie in French [Translator's note].

2) The second conception defines language as the body of common principles existing in the natural languages and nonlinguistic systems of signs (Hjelmslev, Greimas). It therefore seeks fundamental semiotic relationships and structures (such as the semiotic square in Greimas's idea, which is the a priori form of any signification).

3) By extending the concept of semiotics beyond the systems of intentional signs, it is possible to define semiotics as the study of the way the world, inclusive of signs, makes sense. Thus, following Augustine's tradition of the theory of natural signs, semiotics can study indexes: a cloud means rain in a different way than the word rain, but (according to Eco for example) semiotics can tell how those ways of meaning cohere, the sign being then defined very generally as a thing put for another. This conception of semiotics often opens on to a phenomenology (such as Peirce's phaneroscopy).

4) Finally, certain authors extend semiotics beyond the human world, by leaving a rightful place to animal semiotics (or zoosemiotics, according to Sebeok). Bridging the social sciences and the nature and life sciences, they exploit concepts such as genetic code, in order to promote a kind of pansemiotic view which is a renewed form of the philosophy of nature.

There are as many corresponding epistemological types as there are conceptions. The first one has turned semiotics into a descriptive discipline that uses comparative methods; semiotics then remains a social science among other ones. The second one is more ambitious and assigns to semiotics the mission "of serving as the standard for all the social sciences" (Hjelmslev). The third one is actually a philosophy of signification. The last one tends to erase the distinctions among the sciences, as well as between the sciences and philosophy.

Those divergences on how to conceive general semiotics did not prevent, quite to the contrary, the multiplication of specific semiotics. The semiotics of discourse, which in the Seventies intended to mitigate the absence of developed text linguistics, bifurcated into sub-disciplines according to the types of discourse studied (legal, political, religious, etc). Other semiotics can be characterized according to the sensory area adopted by expressive modes (visual, auditory semiotics etc). Others again specialize according to cultural practices (semiotics of dance, of the cinema, of advertising, culinary semiotics, etc). Others finally focus on

particular systems (gestural semiotic) or on arbitrarily defined sectors of reality (semiotics of narrative, psychosemiotics, etc).

The relationship between specialized semiotics and academic disciplines is worth specifying: does the semiotics of music recoup musicology, pictorial semiotics iconology? In addition, as far as general semiotics is concerned, two institutional roads can be taken: the federal way would link various semiotics and set up an interdisciplinary field; the united way would regard particular semiotics as sub-disciplines of a same science. Only the second way has been explored until now. The great expectations of the semiotic endeavour are undoubtedly related to its philosophical origins. But there has been a low academic pay off in terms of institutional establishment: semiotics truly has not yet constituted itself as an autonomous discipline.

Whether anthropological or ethnological, the shape assumed by a semiotics of cultures — provided that, taking Lotman's lead, cultures are defined as semiotically plural systems — remains to be seen, according to the direction it will take.

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