Chapter II

THE STAKES FOR LINGUISTICS

*Languages are not the work
of a reason present to itself.*
Turgot

1. WHICH LINGUISTICS FOR COGNITIVE RESEARCH ?

Our first task will be to specify what branches of linguistics are interested in cognitive research and which of these find themselves at ease with the problematics of cognition; furthermore we will examine what implicit conception of language prevails in these studies and also what epistemological status they presuppose for linguistics. These questions are of course are vast enough to constitute the subject of an entire book and so we will content ourselves with indicating a few directions for research.

1. Linguistics can be divided into three sectors: descriptive, comparative and historical, and these fields are sollicited very unevenly by cognitive research.

(i) Historical linguistics is quite simply absent. In our view this absence has neither been recognized nor justified.

(ii) Comparative linguistics is represented, in its simplest contrastive form, by research in automatic translation and specifically by research that has not made use of interlanguages. Up until now this research has been restricted to a very small number of languages, perhaps a dozen. And except for Japanese, all of them are Indo-European.

(iii) Descriptive (synchronic) linguistics has been sollicited by other branches of AI : by speech analysis and synthesis and by work on man-machine dialogue. Here again the number of languages studied remains small, minutely so in relation to the thousands of languages that will likely never become the object of computer applications. The neurosciences, and to a lesser extent cognitive psychology, sometimes refer to certain elements of descriptive linguistics but usually in order to illustrate theses about a particular language and not about language (*la langue*) in general[1]. In effect what these disciplines seek to clarify are the universal aspects of the mental and cerebral processing of language.

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[1] See for instance the use made of Russian examples in Luria, 1982.

In short, whereas the diversity of languages constitutes the principal focus of both synchronic and diachronic linguistics, in cognitive research this double diversity is accorded only minimal importance. Finally, the third major factor of linguistic diversity, namely the dialectal[2] variations inherent in every language, is never considered. As a result, cognitive research is concerned with only a small number of languages, studied synchronically and as the product of standard, that is, ideal speakers[3]. What type of linguistic theory can consequently adapt itself to these restrictions? As we shall see they can only be accomodated by universal grammars.

We first need to differentiate between the disciplines which interact with linguistics. Psychology and the neurosciences have not been over zealous (nor need they be) with respect to their appeal to linguistic theories. On the other hand, linguists have only to take account of the results of this research in order to help guide their own hypotheses and to corroborate their conclusions. In this respect psycholinguistics is especially helpful since it has very often developed experiments in order to confirm or refute particular linguistic theories.

By contrast, since AI is a technology, it tends to formulate its requirements in more strict conformity with its objectives. The computer scientist, confronted with the necessity of making specific choices, will find himself for example obliged to pose the linguist specific questions, often too specific--such as "What is the place of the adjective in French?"--and consequently receive only the most diffuse (and embarassed) answers. The computer scientist turns naturally towards those linguistic theories that appear to be the most easily amenable to computer implementation. For example, theories that conceive of linguistic rules in the same way as the rules of formal languages will be privileged to the detriment of those which conceive of linguistic rules in the normative sense of being influenced by a variety of cultural factors.

Whatever the case, linguistic theories emerge from these applications transformed, often simplified and sometimes in better shape, since it is not unusual for these applications to elicit unforseen and undetected problems. Very often linguistic analyses are only a beginning point. Computer scientists thus create what we could call a "local" linguistics, which linguists consequently find to have some heuristic value. Of course the practical choices of the computer scientist cannot be judged in the same light as the linguist's theoretical choices (cf. *infra*, section II, introduction).

2. The question that we set out to investigate, "Which linguistics for cognitive research ?" thus poses itself in different ways, not only as far as linguistic theories are concerned but also in relation to their fields of application in AI. We will begin with these fields of application; their cognitive implications are very diverse.

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[2] Oral dialogue systems destined for the consumer market should take these variations into account. The diversity factor interests first and foremost automatic speech analysis.

[3] Cf. Chomsky on the famous "ideal speaker-listener, belonging to a completly homogeneous linguistic community" (*Aspects of a Theory of Syntax*, Cambridge (Mass.), MIT Press, 1965, p. 12).

(i) Speech analysis[4] is concerned with the problem of automatic perception. This is the reason why connectionist methods, which are inspired by the neurosciences, are beginning to make important advances in this domain and this progress will surely have an influence on traditional methods of analysis. Yet at present there has been no system developed capable of treating the interaction with other linguistic levels[5], and this is doubtless why this field of application still occupies a secondary place in the debates on cognition.

(ii) As for automatic translation, it is oddly absent from the scene[6]. We know however that automatic translation played a very important role in the history of AI (cf. Wilks, 1987). Perhaps one could invoke as a reason the general malaise created by the ALPAC report and the rather persistent prejudices that it fostered. But more fundamentally, could the diversity of languages really create such a discomfiture ? The cognitive aspects dealt with in automatic translation however have important implications, at least in the case of systems that involve the construction of an interlanguage independently of source and target languages[7]. This interlanguage figures in systems as different as those of Wilks, of Schank (MARGIE) or of Bonnie Dorr (UNITRAN, 1987). In the case of the first two systems, the interlanguage is constituted by universal concepts; in the third case, by principles of universal grammar.

(iii) By contrast, the field of man-machine dialogue has retained a lot of attention. It poses the problem of non-linguistic context, and in particular, the situation of communication--and with it a number of questions: how can one represent this situation ?, how can one account for the representation that speakers form of one another ? How does one go about describing the intentions and strategies of communication ? The man-machine dialogue opens in theory indefinite (if not infinite) possibilities for simulating human intelligence, as the Turing test suggests (cf. *infra*, chap. VI).

In practice if not in theory each field involved with the automatic processing of language deals with very different aspects and problems of cognition. This example shows that the question "Which linguistics for cognitive research ? " should receive different answers according to the field of application under consideration.

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[4] And of written forms as well, especially handwritting, which presents similar difficulties.

[5] And in particular the problem of the retroaction of the semantic over the phonetic, a phenemenon that manifests itself in lapses and related speech errors.

[6] An example: Gardner (1985) does not say a single word about it in his four hundred page *History of the Cognitive Revolution* .

[7] Is it known that is was Colmerauer who first created PROLOG for the needs of automatic translation (the TAUM system developed in Montreal) ?

2. Orthodox cognitivism and universal grammars

Viggo: *Last night I had a dream : it appeared to me clear as day that the grammar of a single language is inconceivable without taking into consideration the grammar of every single language. I am therefore resigned to occupy myself with the latter first* .

Absalon: *A* grammatica universalis, *is that what you really mean ? May the good Lord and Doctor Subtle be with you !*

Jacob Mey, *Dialogus de ente linguistico uno, vero, bono*

1. We should first explain what type of linguistics orthodox cognitivism is associated with. There currently exist many types of universal grammar, some more élaborate than others : the Universal Grammar of Chomsky, Shaumjan's Universal Applicative Grammar, and Montague's Universal Grammar (which remains an unfinished project[8]). We can designate these grammars as *formal* since each attempts to formalize linguistics by the use of logico-algebraic theory; I leave open the question of whether they were able to produce formal calculations (in the technical sense of the term). Only the first two have been clearly involved with cognitive research : Chomsky's from the outset and Shaumjan's beginning a few years ago with the work of Desclés in France.

The notion of a formal universal grammar requires some explanation. These grammars do not come under the heading of general linguistics which compares languages in order to uncover (predictive) laws. The power of logico-algebraic formalisms permits them to engender all the possible sentences in a given language, even the grammars possible for each language as well as grammars of possible languages.

These theories thus find themselves obliged to *reduce* their power and scope if they hope to achieve any descriptive value. After twenty five years of effort Chomsky conceded that "the current theories of transformational generative grammar are so restrictive that they permit only a finite number of grammars in principle, apart from the lexicon" (1981, p. 233)[9] whereas the first theories of

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[8] Many other theories, even only partially elaborated ones, aim more or less clearly for universality, for example Fillmore's theory of cases or Schank's theory of conceptual dependencies, etc. I will limit my discussion to theories whose ambitions are decidedly formal and which explicitly claim universality.

[9] As though one could possibly put together a grammar (and even a syntax!) without taking the lexicon into account. For Shaumjan, the problem of restriction presents itself only after the construction of the genotype system (formal representation of language) after which it becomes

generative grammar permitted a wide range of possible grammars in the interest of attaining descriptive adequacy"" (*ibid.*).

Once one has established that a universal grammar produces only a finite number of particular grammars, it remains to be demonstrated that these grammars are adequate for each of the languages to be described and *only* for these languages. Silence reigns on this point since one cannot reconcile the *absolute a priori* of mathematical logic, which has produced formal languages to which a descriptive role has been assigned, with the *relative a priori* inherent in the hypothetico-deductive approach (that is to say, an approach preceded by inductive knowledge that provides general hypotheses).

It is uncertain whether universal grammars can limit themselves to natural languages without developing into a semiotic that naturally exceeds linguistics[10]. At least Montague discerned no essential difference between natural languages and formal languages, and to that extent his theory is valid for both (and he treats natural languages *as* formal languages--cf. "English as a formal language" in 1974)[11]. As for Desclés he is seeking to discover (among other things) "the properties common to both natural and formal languages" (1987, p. 23 ; see also Shaumjan, *Semiotics of language*, 1987).

What does the cognitive character of universal grammars consist of ? Only Chomsky has answered the question clearly : "the theory of u.g. is not the study of the general properties of language, but rather u.g. is a postulated component of genetic endowment [...] Once this change of focus is adopted, this part of linguistics becomes part of psychology, and ultimately biology" (1981, p. 233). In short, his universal grammar is of a cognitive nature because it makes up part of the "biological equipment" of human beings. And in this claim resides a good and not the least bit onerous guaranty of its universality. Not to be outdone however, Shaumjan has affirmed that it is *his* universal grammar that finds itself inscribed in our genetic heritage[12].

2 Whether implicitly or not, formalist universal grammars appeal to two postulates that aim to ensure the universality of languages as well as limit the cultural variations that can affect this uniformity and thus possibly point to the inadequacy of an invariable representation.

(i) First is the postulate of the self-identity of a language: only a unique and homogeneous language can be represented by a calculation, thus demonstrating that the language is unique and homogeneous. This postulate denies or ignores the existence of diastratic variations, not only between the different "levels of language"

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necessary to isolate, from among the infinite number of well formed expressions, those which can effectively be realized in sentences of a given language.

[10] Beginning in 1943, Hjemslev extended his theory of language to systems of signs other than languages (without however discontinuing the use of the expression *language theory* ; see the principles of what is termed the *universal component* of this theory in *Nouveaux essais*, Paris, P.U.F., 1985).

[11] Elsewhere Montague takes up the fundamental tripartion of Morris's semiotic which evidently does not take languages to be its specific object.

[12] *Grammatici certant*, agreed. But it's the first time in history that grammarians have had the audacity to dispute amongst themselves over our genes.

but also with regard to the enormous difference that exists between the oral and the written[13]. One thus produces the grammar of a standardized written language. Diatopic variations are also ignored : dialects, regional or local speech[14] completely escape the grammar in question. This postulate also enables one to forget about diachronic variations : the absolutely synchronic character of the description is a necessity from the formalist point of view since formal grammars, like all formal languages, do not (and in fact cannot) have a diachronic dimension. In practice, the rare diachronic models developed within the framework of formal grammars have not produced convincing results.

Even if we accept that universal grammars are restricted to the synchronic description of languages the postulate of self-identity would remain no less erroneous. A language does not consist of only a single system. In every utterance, and *a fortiori* in every text, there are always many systems of social norms at work. The functional system of language is one instance . But there are many more : generic norms for example[15]. The prescriptive force of these systems is variable since they evolve according to different temporalities. The mission of linguistics is to describe the interaction between all these systems and not merely to restrict itself to one of them. In short, the heterogeneity of language obliges that its grammar be heterogeneous as well.

(ii) The second postulate, which advocates the *autonomy* of natural languages, in effect entails their desocialization. Desclés formulates the idea as follows : "We said that a natural language is an *autonomous* system of representations. This implies that *a language, insofar as it is a symbolic system, can be separated from its socio-cultural and anthropological environment* " (1980, p. 82). A simple example suffices to illustrate the point. Take two phrases such as "Peter is being nursed at the hospital" and "Peter is nursing himself at home". An applicative grammar like Shaujman's could specify the difference in voice between the two examples : the first case is of the order of "means" while the second is of the "reflexive" order. But in order to recognize this difference one necessarily has to know that generally speaking in a hospital one is cared for and that at home one most often cares for oneself. Whatever the semantic description of "home" or "hospital" may be, it is in no way independent of the socio-cultural context.

In order to circumvent this difficulty one could stiffen the opposition between the *grammatical* and the *lexical*. In this way the core of linguistics would be found in the description of the grammatical categories of languages[16] and this description would thus partake of an *intrinsic* semantics (independent of specific domains of utilization) whereas the lexicon would call for an *extrinsic* semantics (dependent on

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[13] Oral texts frustrate attempts at description that use traditional methods of analysis.

[14] Universal grammars refuse to constitute corpora. If not they would find themselves obliged to call the postulate of the self-identity of language into question. They thus content themselves with examples that in fact substitute for an empirical object and that belong entirely to the theory that fabricated them. If not, why would linguists accuse each other of having *stolen* an example ?

[15] No text is without a genre. For example, we all possess several types of conversational competence.

[16] In relation to this proposition see Desclés, 1987, pp. 28-29 ; Shaumjan, 1987. It is a simplification to oppose grammemes and lexemes because they constitute closed and open lists respectively : lexemes constitute an open list of closed classes.

contexts of use). However the opposition between the *grammatical* and the *lexical* should be made relative and even reduced since in effect there is a continuum extending from so-called lexical morphemes to so-called grammatical morphemes. From a diachronic perspective the latter are the result of a process of integration of lexical morphemes. These entities are themselves established doxa since language in its globality is a socio-cultural phenomenon and grammar does not escape this fact.

> *Note :* In its very formulation, the current opposition *grammatical/lexical* (instead of *syntactical /lexical*) expels the lexicon outside of grammar. Being difficult to formalize, the lexical field is neglected by universal grammars; they prefer instead to consider lexical content as a variable to be interpreted only when need be--although in fact lexical content plays an important part in determining the syntactic valencies of lexemes. The relative "rehabilitation" of the lexicon in post-Chomskian grammars (notably in Bresnan's *Lexical-functional Grammar* and in Gazdar's *Generalized Phrase-structure Grammar*) has been accompanied rather remarkably by a waning interest in the project of a Universal Grammar.

The postulates of self-identity and autonomy both contribute to desocializing languages and they are put into practice by means of a number of *a priori* methodological choices: for instance by a refusal to establish definite corpora or by a refusal to take real situations of communication into account[17]. These postulates consequently have a considerable impact on the epistemological status of cognitive research in general : linguistics is the only discipline among those involved in cognitive research that belongs to the social sciences.

An epistemological choice can be discerned in the case of universal grammars : either its formalization requires that it move towards a mathematical logic, as Montague contended (who explicitly made linguistics a branch of mathematics) or, as Chomsky hopes, universal grammar "becomes a part of psychology, and ultimately biology" (1981, p. 233)[18]. In both cases linguistics finds itself estranged from the other social sciences in order to be introduced deceptively to the ranks of the "hard" sciences.

It is by recognizing that linguistics is a social science that cognitive research in general will be able to apprehend and study the social dimension of human cognition. After all, is not one of cognitive research's missions to study the interaction between the biological and the social ?

3. Let us now take account of an objection that has arisen from a point of view that is widespread in the disciplines studying cognition as well as in the social sciences. According to a "progressivist" theory of the *three epistemological stages*,

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[17] The willing delegation of powers accorded to pragmatics resolves nothing, as with all abdications. It relieves linguistics from the problem of usage to the benefit of an American style microsociology (cf. the Chicago school, Goffman) which naturally hasn'nt the slightest regard for the specificities of language.

[18] And of course biology ends up by *reducing* psychology. This is why, rather than speaking of *language learning* (classic question of genetic psychology), Chomsky prefers to speak of the *growth of grammar* (*op. cit.,* p. 16) since a U.G. comes down to the "innate properties of the species" (*ibid,*) ; for a discussion see chap. IX). Despite the criticisms that Shaumjan has leveled against Chomsky on this matter, he considers that the Universal Applicative Grammar contains "an hypothesis about the structure and the functioning" of a "special mechanism stored in speakers' brains" (1987, p. 279).

each scientific discipline must pass from a *descriptive* to a *predictive* stage (where it is able to formulate laws) in order to find its culmination in a *formal* stage[19]. One might for instance hope that since linguistics, descriptive in practice for a long time, has succeeded in formulating laws then the time has come to elevate it to the more dignified rank of a formal discipline. This hope however misconstrues the type of scientificity characteristic of linguistics. A historical note should allow us to clarify this point. When in the latter half of the thirteenth century the Modistae sought to establish a science of grammar--whereas it had been traditionally considered an art[20]--they from the outset constructed universal grammars. Moreover, they founded these grammars on (naturally universal) principles and not on the basis of empirical knowledge[21]. Apart from this, the languages studied (or at least cited as examples) were predominantly the Latin, and occasionally, on the initiative of a truly avant-garde author by the name of Roger Bacon, other learned languages such as Greek and Hebrew. Speculative grammar does not take the diversity of languages as its object or in any event this diversity represents its least essential, we might say *accidental*, aspect. Although an adversary of the Modistae, Bacon affirmed that "In regards its *substance*, grammar is unique and identical in all languages, though it varies *accidentally* ." (*Grammatica graeca*, ed. Charles, 1902, p. 278)[22].

   Logic was naturally taken to be the foundation of universality, in conformity with the Aristotelian thesis that all men shared the same conceptual assets and according to the principle that understood logic to be the science of the relations

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[19] As with all theories that postulate different "stages" this one projects onto history a distinctly teleological metaphysics (because it foresees its end). One is thus obliged to force reality somewhat in order to apply it. The often cited example of physics is hardly convincing: does the fact that a mathematical physics has been established imply that physics has become a formal discipline ? And what if the interest of mathematical physics resided more with its semantics than with its syntax ?

   To return to the social sciences, the theory of the three stages has racked more than a few minds, like a bad conscience, and has given rise to a number of faulty formalizations passed off as excellent projects in computerization. But what would for example a predictive history look like, or later a formal history ? This theory is part and parcel of the great epistemological myth of our time : Michel Serres gave it the name *the North-West passage*, inspired from Melville. This passage, as everyone knows, separates the Old World from the New World and, by metaphorical extension, the social sciences from the "exact" sciences. Some excellent minds have undertaken the odyssey : the hope being not only to sensibilize the exact sciences (which would be the reponsibility of the social sciences), but in return to formalize the social sciences themselves.

[20] Although Aristotle affirmed that it was a science (*Topics*, VI, 5), the prevailing opinion held that it was not. Not only did Aristotle contradict himself (*Nicomachian ethics*, VI, 3), but the name given to the grammar of Dionysius Thrax, *technê grammatikê,* is indicative enough of the thinking of the Ancients.

[21] Dionysius Thrax argued that grammar constituted empirical knowledge (*empeiria*). On the other hand, Thomas d'Erfurt, at the ouset of his famous treatise *De modis significandi sive grammatica speculativa*, recalled that every science derives from knowledge based on principles (*ex cognitione principiorum*). And according to the *Quaestiones Alberti de modis significandi*, "that grammar be considered a science supposes: (i) that it derives from universal principles ; (ii) that it be the same for every language ; (iii) that it be theoretical (that is to say that it not be defined by any practical objective). From (i) and (ii) follows (iv): "grammar is a demonstrative discipline" (Auroux, 1989, p. 207). Science (the concept of which was rediscovered at the beginning of the thirteenth century in Aristotle's *Posterior Analytics* and by way of their Arabic commentators) was then defined as a body of necessary knowledge demonstrated deductively.

[22] Consider Desclé's recent praise of Shaumjan's *Universal grammar* : describe the *characteristics of language* while taking the *accidental traits* of particular languages into account (1988, p. 24).

between concepts. It has often been said that *the* science of language (*scientia sermocinalis*) elaborated a semantically based grammar; this is almost admissible, as long as we specify that the semantics in question is necessarily conceptual, detached from particular languages, and founded on a metaphysics.

The problematic developed by the Modistae along with the conception of scientificity associated with it persisted in the general grammars up until the beginning of the nineteenth century. Only general grammar merits the title of science whereas particular grammars are classed among the arts[23]. And although the grammarians of the second half of the eighteenth century were for the most part empiricists, grammar as they conceived of it did not however develop into an empirical discipline : it remained impelled by a dogmatic rationalism[24].

It is precisely in contesting this problematic that historical and comparative grammar were able to establish themselves as a new discipline, linguistics, in the first half of the nineteenth century. This new discipline put forth an entirely different conception of scientificity. The Aristotelian maxim which holds that the only science that exits is a science of the general is no longer interpreted from the perspective of universality, or at least, as Auroux remarks, universality is seen to reside in the method adopted and no longer necessarily with the object. This alteration leads to the assumption that general regularities can be promoted to the title of "laws".

If the science of languages no longer has to occupy itself with the dilemma of the *universal* and the *singular*, it can apply itself to thinking about the distinction between the general and the particular. In this way, language-specific linguistics become possible and can acquire a scientific status once reserved for universal linguistics.

Better still, linguistics has a typological mission that requires it to recognize that some facts and laws are neither general nor particular. Logic--at least classical logic--can no longer serve as the organon required to found a grammar since it recognizes only two forms of quantification: the universal and the existential. Linguistic knowledge belies any appeal to the true or the false, all or nothing. Its knowledge rests within the order of the plausible[25]. The science of language ceases to be deductive, in the sense of refusing apriorism. It consequently invokes an empirical rationalism (see Auroux, 1989), that is, a form of rationalism that can be termed *a posteriori*.

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[23] See the article "grammar" in Diderot's *Encyclopedia* : "General Grammar [...] is the science of the immutable and general principles of written or spoken discourse in every language. A particular grammar is the art of applying to these immutable and general principles of spoken or written discourse the arbitrary and typical institutions of a particular language*" .* Destutt de Tracy asserted that a "language-specific Grammar is an art" by recalling that "no art can be founded on absolutely certain principles" (*Eléments d'Idéologie*, II, p. 12-13).

[24] Grammar is no longer founded on the theory of the different modes of the signifier, but on the theory of ideas (see Tracy, *Eléments d'Idéologie*, II, p.1 : "grammar [. . .] is the continuation of the science of ideas" ; and especially the article "grammarian" that Dumarsais wrote for the *Encyclopedia*).

[25] This is why the concept of rule, in its Chomskian acceptation derived from formal languages, is inadequate for describing linguistic regularities.

4. Epistemological ruptures are neither sudden nor irreversible and the contemporary projects in the area of universal grammars have quite naturally drawn upon a tradition that began with the Modistae.

Peirce, in formulating his project of a *pure grammar* that to our knowledge is the first formal universal grammar since it is purely syntactic in the logical sense of the term, explicitly refers to the *grammatica speculativa* of Duns Scotus (cf. *Collected Papers*, 2.229). As for Chomsky, he devoted a study to Cartesian linguistics in which he draws on a rationalist tradition linked to the general Grammar of Port-Royal. That this work is both academically and scientifically[26] unstable is of little importance to us here. Chomsky could just have easily have called on the Modistae (cf. Salus, *The Modistae as Proto-generativists*, 1971). What is essential in our view is that he remains rooted in a dogmatic rationalism. At present the criticisms leveled against orthodox cognitivism are directed against rationalism in general, as though there existed no other forms of rationalism than the Chomskian and Fodorian conception of rationality; and as though the only alternative was Heideggerian phenomenology (see Winograd and Flores, 1986).

Contemporary universal grammars differ of course from their predecessors :

(i) Those of Chomsky and Shaumjan are based on the explicit thesis of a biological faculty for language, and not on reason[27].

(ii) They can also rely on the support of a theory of formal languages and avail themselves of more refined logics (predicate calculations in Chomsky, lambda-calculus and intensional logic in Montague, and combinatorial logic in Shaumjan's case).

(iii) They can display, thanks to computer simulation, a new--and largely illusory--relation to empirical facts.

Despite all this, the dogmatic conception of rationality remains and it is aggravated by the demand for formalization especially as expressed by the theory of the three stages.

5. Should we then consider linguistics and the other social sciences as theorized empirical bodies of knowledge ? Such an interpretation would not be degrading provided that we accurately recognize their particular type of scientificity, and concurrently, the relative kind of truth that they can aspire to.

It is important that formalist prejudices not be allowed to prevent cognitive research from being able to accomodate and take account of the relations between the natural sciences, the life sciences and the social sciences, as well as the type of scientificity specific to each.

Let us be more specific. Beyond the divisions, more academic than scientific, established between the sciences of mathematics, physics, of life, and of society, the debates within cognitive research illustrate conflicts between three fundamental

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[26] See Aarsleff, 1970 ; Joly, 1977. This grammar is the fountainhead for the general grammars that abounded for almost two centuries. Strictly speaking, the term *general* is an inadequate label since these grammars are in effect universal; consider the sub-title of John Harris's *Hermes* (*Philosophical Inquiry concerning Language and Universal Grammar*), or the preface to Beauzée's *Grammaire générale* in which he presents his project as a work "on universal grammar" (p. xvii).

[27] It is in this sense that the thesis opposes itself to Cartesian rationalism (see Auroux, 1989, p. 207).

theoretical types that we could name, following J. Ladrière's terminology, *formal* (i.e., mathematics), *empirico-formal* (i.e., biology, physics) or *hermeneutic* (i.e., history and, at least in our view, linguistics). It seems to us that to each of these three theoretical types correspond three privileged methodological procedures : the deductive, hypothetico-deductive and abductive respectively.

Beginning with the development of cybernetics, the first two types of theory held sway in the field of cognitive research. The collaboration between those two emblematic figures who were McCulloch (a neurologist) and Pitts (a mathematician) illustrate this initial collusion. A predominantly formal approach guided the growth of AI--an approach in fact more logical than mathematical.

The decline in the field of cognitive research today not of logic but of "logicism", and the repudiation of its most visible and sycophantic exponents, has naturally been followed by an expansion of the neurosciences that connectionism reflects in its own way.

The collusion and the rivalry between the first two theoretical approaches (evidenced today by the debate between cognitivism and connectionism) leaves open the question of the third type of theory. And here two choices seem to impose themselves: either cognitive research keeps out of the social sciences' way, unable to articulate anything new about languages, and one must reconsider the enigmatic presence of linguistics among them; or, as I believe, cognitive research should reach out to the social sciences by recognizing on the one hand the social dimension not only of knowledge but of cognition as well; cognitive research should also be prepared to admit a rational hermeneutics and an abductive methodology by other means than the study of plausible reasoning or by references to *Sein und Zeit* .

3. Directions for research

Let us leave the questions of principle where they stand. They should permit us to return to our initial question : *Which linguistics for cognitive research ?*

1. If the orthodox cognitivists chose language as their battle ground it is because they judged it dangerous for their adversaries. In effect, up until now connectionism has not been associated with a linguistics that could be presented as a global alternative to universal grammars. Connectionist systems designed for the automatic language processing simply draw from the common fund of linguistic concepts currently used in cognitive research in general. They maintain the classical distinctions concerning the stratifications between different linguistic levels, even when they are trying to describe their interactions (cf. Waltz and Pollack, 1985).

If connectionist systems still have nothing to bring to the understanding of languages as symbolic systems it is partly because they are deliberately conceived as being situated "beneath" them. It is in this sense that Smolensky has defined a *subsymbolic* "paradigm" which belongs to what is called the *microstructure of cognition.* Subsymbolic units are as much phonological features as semantic ones (*micro-features,* cf. Hinton, 1981; Waltz and Pollack, 1985); they are always considered in their context. From a linguist's point of view these features pertain to phonology on the one hand and to microsemantics on the other. These features

first comme into play in the *perception* of linguistic signs--a fundamental domain that formal linguistics has not been able to treat[28].

Does this mean that one has to choose between a "symbolic" and a "subsymbolic" linguistics ? Such a perspective would entail shifting into the linguistic sphere the often distorted debate around which the different cognitive paradigms are confronted. The level of the sign occupies only one of many levels of linguistic description and a linguistics worthy of its name must take both the symbolic and the subsymbolic dimensions into account.

2. One can see emerging today, especially in semantics, a rather refreshing variety of theories that are contesting the formalist approach in linguistics in the aim of a better understanding of cognition. In particular one could mention Langacker (1986), Lakoff (1987), and Talmy (1988).

These interesting developments however should not lead one to forget about the headway made long ago by theories developed within the European structural linguistic tradition and which have been unjustly marginalized. In the field of cognitive research the least unknown of them is surely Halliday's functional linguistics. Largely inspired by Firth, Halliday's linguistics takes the social character of communication fully into consideration[29]. It can be credited in part for the technical success of Winograd's SHRDLU system and also offers good possibilities for advancement in the area of automatic text generation and interpretation (see Sabah, 1988, 1, chap. IV). The same could be said of S. Dik's functional linguistics.

It is to European structural linguistics from Troubetzkoy to Hjelmslev that credit is due for the elaboration of the concepts of phonological and semantic features[30]--well before the subsymbolic "paradigm" made its appearance. The European tradition developed in close company with psychology, from van Ginneken to Bühler, and particularly with *Gestalttheorie*. Indeed, the historical foundation of cognitive research resides precisely in this alliance, fostered in the first third of the twentieth century. Yet this fact is often neglected, doubtless because computer science had not yet made its appearance. In this respect, once again, the epistemology of cognitive research shows itself inseparable from its history, and this link will no doubt be important for the future of the discipline.

4. Crossroads

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[28] Just as they do not recognize internal diachrony, nor even dialogic or diastratic variations, formal grammars do not possess a perceptive dimension in the sense that their theories attribute no pertinence to the problem of perception. If we conceive of language according to the image projected of them by formal grammars we are led quite naturally to neglect this dimension, and the problems associated with the identification of signs are reduced to simple questions about ambiguity.

[29] And thus it avoids the postulates of the self-identity and autonomy of language.

[30] As well, it could be shown how many of the principal concepts elaborated in AI for the representation of knowledge such as *frames*, *scripts* and other MOPS (Memory Organization Packets) rearticulate concepts developed within this tradition (such as structures, motifs, narrative functions in Propp's sense.

A machine invents a universal language.
Given that nobody can understand it,
everybody adopts it.
Elias Canetti

Let us now take a look at the consequences of the preceding discussion from three different angles : linguistic theory and its object, the social demands to which this theory must respond, and the resulting organization of research.

1. Once constituted, the object of a science is already a theoretical formation and not an empirical reality. Scientific activity deforms it and reforms it over time, thus modifying our perception and understanding of its nature. But for the social sciences in particular this object evolves according to other objective factors and sooner or later this evolution is reflected on the theoretical level. The mutation of linguistics is consequently accompanied by a mutation of its object. At the beginning of this century linguistics embraced three diversities:

(i) The synchronic diversity of languages that beginning with the Rennaissance became more widely recognized as a result of the progression of imperialism[31], colonialism and evangelization[32]. Comparative linguistics, in either its typological or contrastive form, takes this diversity as its object.

(ii) The diachronic diversity of languages, with their filiations, permanencies and evolutions, represents the foundation of the monumental edifice that is historical linguistics. The formation of the large European nation states in the last century, Germany in particular, is for many of decisive importance and interest for the history of languages : at stake was a desire to give legitimacy to European nations that would justify itself in part by the history of their respective languages[33].

(iii) The internal diversity of languages, as seen through their regional, dialectal even local variations; this diversity has been stressed with the development of dialectology, Creole studies, linguistics atlases, etc.

Despite this, these three forms of diversity are today becoming diluted or are being depreciated. Let us recall a few regretable facts :

(i) The number of living languages[34] is decreasing inexorably, by reason of the extinction of the populations that speak them, by their acculturation, their

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[31] This word is not to be understood in the Leninist sense. We could recall for example that Katherine of Russia had ordered P.S. Pallas to compile an inventory of all the languages of the Empire and to undertake their description (it was Leibniz who first counseled Peter the Great in this enterprise).

[32] Occidental Christian religions are the only revealed religions that systematically translate their sacred texts. The debt linguists owe to missionaries will never be acquitted. See for example the six volumes of the *Catalogo de las lenguas de las naciones conocidas* (Madrid, 1800-1805) in which Father Hervàs presents the *Our Father* in over three hundred languages.

[33] For example, is the richness of Czech linguistics in the first half of the twentieth century not still linked as well, in some way, to the intensity of the national question ?

[34] Without going back to linguistic Darwinism (which erroneously compared languages to biological species), we can take the term "living" literally: as cultural formations, languages are also biological productions. They thus exhibit all the diversity and superfluity of a living being. Their number is decreasing at the same time as the number of living species decreases. But such thing as a linguistic ecology is still not a reality.

learning and assimilation of a dominant language. A few dozen of the most widely spoken languages are finding more and more new speakers; the least spoken languages are losing them. And the disappearance of these monuments of human history is met with indifference. For example, of the twelve to fifteen hundred African languages only a hundred have been described or preserved in the form of basic documents (a grammar, a dictionnary, a collection of texts). Of the two hundred and fifty Tibetan-birmese languages fewer than a dozen have been the object of the same basic description[35].

(ii) The internal diversity of languages is being attenuated; they are becoming constricted into uniformity by the imposition of the media and of written norms. The centralized character of the modern state evidently favors this evolution.

(iii) Lastly, interest in the history of languages has significantly diminished. This is no doubt linked to the general waning of historicism, and to the ideological withdrawal from the humanist cultural model, which found a good deal of charm in tradition. Another reason can be located in the current renewal of unversalism reflected today by a variety of cognitive linguistics; yet, if universalism has a history, the universal does not.

2. By way of an apparent paradox, a restriction in the object is followed by the universalization of the theoretical model notably in the case of universal grammars. Considered in relation to general and comparative linguistics, these grammars are marked by a threefold rupture that its originators quite willingly stress. We have already seen that this breach concerns, (i) methodology, with the use of logic as organon, (ii) the epistemological status of linguistics, considered as a branch of linguistics or as destined to become absorbed into psychology, then into biology, (iii) gnoseology : the dogmatism[36] of universal grammars, constituted deductively and aiming for axiomatization--without the regulatory possibility of being able to refute ideas by direct experience, a support theories in physics have--is opposed to the empirical rationalism of general linguistics, which sought to discover regularities and even laws on the basis of proven facts.

The current universalism in linguistics is not confined to universal grammars. Semantics is evidently one of its privileged interests since in our tradition linguistic meaning has almost always been equated with the logical concept (for philosophical and theological reasons that have still not been extenuated). Hence one encounters a multiplicity of theories dealing with semantic *universals* (noemes, archetypes, primitives). A particularly revealing case in point is Anna Wierzbicka who in 1972 professed the existence of 13 primitives, a number that in 1980 found itseld elevated to 15[37]. The "cognitive atoms" in question explicitly recall Leibniz's "alphabet of human thoughts" (see Wierzbicka, 1989, pp. 106-107).

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[35] Thanks to Luc Bouquiaux and Martine Mazaudon for these estimates.

[36] We believe that empiricism is opposed to dogmatism and not to rationalism. Dogmatic theories--such as Kantian transcendental idealism--certainly claimed to be rationalist. But we wish to oppose an empirical rationalism to their dogmatic conception of rationalism.

[37] One may wish to compare these numbers to the hundred or so primitives uncovered by Masterman, or to Zholkovsky's 23, the twenty listed by Greimas, the 11 then 14 of Schank, or to the prudent thousand established by Waltz and Pollack.

In short, the formal universality of grammars as well as the substantiated universality of primitives rest on the universality of the human mind and, in more modern terms, of the brain--and it matters little here whether or not this organ is invested with the capacity for language. The progressive integration of linguistics into cognitive research is evidently linked to the renewal of universalist theories in linguistics; it is also linked to a more restricted conception of what constitutes the linguistic object. As the history of linguistic ideas attests, universalist theories reduce the triple diversity of *languages* (*les langues*) to inessential phenomena in relation to what are considered the essential characteristics of "*language* " (*le langage*).

Finally, the restriction of the object is accompanied by a change in the *epistemological status* of linguistics. From its position as a social science it moves into the purview of the nature sciences or of mathematics (which for the occasion are regrettably deprived of all reference to the continuous, to space, the infinite or even to very large numbers). The reduction of the object allows in effect an underestimation of its regularities.

3. Linguistic theories indirectly reflect a social demand or at least they have to adapt themselves to this demand. This question scarcely appears in the writings of linguists, even if it is not absent from their preoccupations: in general, they prefer to remain on the theoretical level. Nonetheless the problem needs to be clearly addressed.

At present, the demands made of linguistics concern two broad areas : language teaching, which progresses with wider access to teaching programs and with international exchanges; and linguistic engineering, which defines the products of artificial intelligence. Only the second is of direct interest to cognitive research and we will limit ourselves to it.

The first observation reinforces what we have just said about the restriction of the object : linguistic research for artificial intelligence is interested in only a miniscule number of living languages, *about 1%*, and most of them are Indo-European[38]. And of course only the standardized versions of these languages are examined and from a strictly synchronic point of view. These restrictions and limitations are due to economic factors, namely the fact that only the most developed countries can afford to create and sustain a language industry[39].

Another aspect of the problem has to do with the fact that it is no longer feasible to analyze social demands from within an exclusively national framework. For example, Japan's unprecedented financial contribution for automatic translation was made in the hopes of lessening its linguistic isolation from the other industrialized countries.

In general, computational linguistics is a factor, albeit still a modest one, in the economic political and cultural competition among major industrilized nations. For example, we know that cognitive research owes a great deal to the United States; the Sloan Foundation and the National Science Foundation contributed a great deal over the course of the past decades to their development and promotion.

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[38] And, of course, not a single of the dead languages.

[39] The word *industry*, used frequently in this connection by the higher-ups of the trade, has to be taken in its widest sense: linguistic engineering belongs in fact to the service sector of the economy.

But isn't this debt reciprocal given the fact that the global expansion of cognitive research has been accompanied by a diffusion of theories, ways of thinking, terminologies (even programs and related materials) of typically North American origin ? In any case economic political and cultural imperialism has always shown a predilection for universalist theories since they tend to annul cultural differences and constitute the supreme form of ethnocentrism.

The social mastery of language is undergoing a new phase. The invention of writing was soon followed by the appearance of the first language-related occupations (i.e., scribes). With the invention of the printing press these occupations attained a developed commercial stage. And with the computer age they moved into an industrial phase.

Social demands thus assume new dimensions with time and lead to the creation of new scientific problems. For example, linguistics had never before tackled the problem of text generation except in a very partial and speculative way[40]. Speech synthesis in particular had been studied very little, especially in relation to its prosodic aspects; today in fact there is a great deal of money and investment tied up in this area[41].

These new problems, or at least new in the way they are presented, have a definite heuristic value. They incite one to be sceptical about a number of common, generally accepted descriptions: for example, with respect to automatic speech analysis classical phonology serves only to classify theoretical problems but hardly serves to resolve them.

If a new social demand is able to lead indirectly to a reelaboration of theories that were intended to answer other needs, then by extension it also leads to deepen knowledge of an object whose apprehension had been circumscribed by these otherwise restricted interests. Lastly, new demands can lead to a modification in the internal theoretical equilibrium of linguistics; this is true in cases where research efforts are concentrated entirely on certain areas.

4. To the extent that this evolution is sensitive and receptive, the current sociology of linguistic research manages to render it more docile to social demands. In saying this I am not siding with American epistemological sociologism which would explain scientific revolutions by battles between competing lobbies of researchers and university administrators in general. I wish only to underline certain changes. In the nineteenth century, general linguistics developed within the framework of the university, unique purveyor and guardian of research programs, and with limited means pursued an immense and disinterested enterprise. Today research into language is carried out not only in (public) research laboratories but also by private enterprises. The collectivity of linguists has thus seen itself at once divided and diversified. The diversification of linguists as a group and of research institutions indeed foreshadows a splintering of the discipline.

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[40] The problem of generation was treated theoretically in the general grammars of the seventeenth and eighteenth centuries as the passage from logical judgment to the phrase. Technically, it was traditionally a problem treated by Rhetoric right up until its demise.

[41] Certainly aesthetic factors (which linguistics has delegated to other disciplines) will be an increasingly important consideration for the designers of computational linguistic products intended for the consumer market. This is the aim of *agreeable interfaces*.

Rather than speak of *linguistics*, we prefer to speak of the *sciences of language.* This hospitable plural form is not only a symptom of a certain neglect : linguistics is the only scientific discipline to take *languages* (*les langues*) as its specific object, whereas many disciplines, from philosophy to sociology, deal occasionally with *language* (*le langage*). This plurality renounces the idea of unity.

This unity could surely be broken by some kind of division at the institutional level, one that would reflect a deeper epistemological division. General linguistics, along with its object (languages), would pair up with philology in some glorious conservatory of the social sciences. Universal linguistics, developed within computational linguistics, has already joined artificial intelligence and cognitive psychology among the technologies and sciences of cognition and communication. And what would prevent linguistics from finding itself eventually integrated into the life sciences (aided by the famous "organ of language"; cf. *infra*, chap. IX)--as is the case in France with cognitive psychology ?

The three branches of the collectivity of linguists differ somewhat from each other, but all three engage in what we could call *contract hunting* ; all the institutions encourage the practice and demand *results*. And because of the great material and financial stakes involved, the only research privileged is the research that promises to lead most quickly to profitable and productive ends or at least research that seems to offer possibilities for application in the medium term.

This last point indicates that linguistic theories are being regulated in a new way : practical efficacy often wins out over theoretical concerns. Technology — long considered as a kind of servant-turned-master — along with the traditional relations between science and technology find themselves reversed. In this sense, linguistic theories become instruments, one set of tools among others. Of course the justification for a given theory remains in its application, as the English say, "the proof is in the pudding". And yet the fact remains that the link between linguistic theories and their applications is still as tenuous as it is in the natural sciences.

The pragmatist's criterion "well, it works[42]" certainly allows one to decide between rival theories, even to choose between scientific chapels and academic lobbies. This criterion however remains at the service of prevailing social demands, and of the *state of the art* in computer technology. We saw not long ago how the ideological versatility of certain decision making bodies was willing to sacrifice whole research endeavors on the basis of misunderstood scientific reports (i.e., the cessation of research into automatic translation following the ALPAC report or the discrediting of connectionism by the work of Minsky and Papert on perceptrons). The very idea of long term fundamental research thus finds itself re-evaluated.

Granted, practical exigencies demand choices. But the competition between theories is unequal for reasons that have more to do with the academic mores of cognitive research. Theories of North American origin are greeted more kindly as though out of principle. Those not formulated in English scarcely have any chance of getting attention; likewise, of course, for theories that depart from the accepted viewpoints or that do not reiterate the usual references. In the end, since North

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[42] This expression sanctions the successful implementation and operation of a computer device. The first computers, descendants of PASCAL computing devices, displayed their results by way of rotating meters not unlike the display wheels that one finds on slot machines.

American academic mores privilege knowing how to sell oneself, media aggressivity very often takes precedence.

But, more profoundly, the preeminence of theory over practice may not only have been inverted. There is doubtless a technologization of theories under way. In the first case, the founding discipline of cognitive research was Artificial Intelligence. And AI, whatever one may contend to the contrary, is undeniably a technology. Even the scientific status of computer science has to be questioned : it is the science of the processing of information we are told. But it is doubtful that *information* possesses the type of objectivity necessary in order to found a science[43]. As for the processing, it is more of the order of a technological objective. One would then have to accept Winograd's definition: "the design of computational systems also has a theoretical side, which is often called *cognitive science* " (1983, p. 2). Accordingly, cognitive science would not be a science since it has no *object* . It is thus to be looked on simply as an assembly of disciplines grouped around common technological objectives. And AI remains at the centre of cognitive research, including for the connectionist paradigm : in effect it represents the common ground where the other disciplines gather to collaborate. An ambiguity remains however since the ultimate objectives of AI are of the order of a science (or even of philosophy). But in the best of cases AI manages only to *simulate* a science since it disposes of none of the means of regulation propre to the sciences (especially because simulation is not as valid as experimentation).

One has to acknowledge the 'mythical' objective of AI (and following it of cognitive research) : to divest philosophy of the problem of knowledge and then institute it as an object of scientific enquiry; and as for its practical objective : it is to create technological products.

This mythical objective is surely stimulating, as much for researchers as for those who fund them, and it is quite apt to console practical failures. But a certain scientific code of ethics obliges us to restrict ourselves to *practical* objectives and to characterize the type of interdisciplinarity that these objectives require in order to be realized.

We have dismissed the hypothesis that cognition is a scientific object, and consequently there can be no question of an interdisciplinarity capable of leading to a theoretical fusion. There exists a third type of interdisciplinarity, if we concede as well that cognition is not a domain of objectivity that other disciplines can occuppy conjointly, even partially, in such a way as to enable theoretical exchanges[44]. This third type involves technical collaboration. This type is difficult to characterize since, in our philosophic tradition, *tekhnê* has been unjustly marginalized and devaluated--and this is precisely why technologies like AI wish to pass themselves off as sciences. Since there does not exist anything that we could call a "technical epistemology", we might simply sketch a few features of a technical interdisciplinarity :

(i) It would not modify the object of the sciences in interaction.

(ii) Correlatively, it would have no incidence on the types of theoretical regulation of these sciences.

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[43] The same goes for *object* or *form* in general.

[44] As is the case for example with language, that linguistics, psychology, sociology and neurology each study in their own way.

(iii) On the other hand, it would permit, indeed require, drastic simplifications in the theoretical material used, that is to say, practical pertinence would prevail over theoretical pertinence and all simplifications would be legitimate provided that they served the projected aim. For example, one could use very detailed analyses in order to design automatic processing systems operating by key words. This wouldn't take anything away from linguistics--on the contrary.

(iv) Any technical problems encountered could be taken as the symptom of theoretical difficulties and would consequently have a heuristic value.

(v) Finally, collaboration between researchers from different disciplines should permit them to better apprehend the specificities of their respective disciplines and perhaps to modify them (by borrowing, by imitations, emulations, etc.). The impact that this sociological factor can have on the theoretical level is undeniable.

The image of cognitive research that emerges from this certainly appears to be minimalist. So be it, but some effort in the direction of elucidating what is at stake was necessary, and in the end the interests of cognitive research are better served by challenging its pretensions to scientificity than by simply repeating on its behalf the usual grandiloquent twaddle. Finally, and without any paradox whatsoever, acknowleging the purely technical nature of cognitive research permits us to recognize the specificity of those scientific disciplines that find themselves engaged in it, from mathematics to linguistics, and without reducing these disciplines to the impoverished forms that they take on as a result of their collaboration.

5. With respect to the three domains under discussion (linguistic theories and the objects they produce, social demands, and the sociology of research) we have limited ourselves to indicating what appear to be the most important trends, even if these are in some cases only tendencies in research and not widespread practices.

As for linguists, they are effectively limited to the first domain. There should be no question of them of shying away from or contesting the evolution of their discipline but rather of encouraging it by seeking an equilibrium and unity that in the end, of course, will never be achieved. This goal requires that one recognize the *cumulative* character of linguistic knowledge, and that one be less content with preserving it than with reformulating, reevaluating and applying it to other needs.

Yet, the *table rase* theory stills seems to be in fashion[45]. That its presumptuousness and/or ignorance belittles scientific ethics is of little importance

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[45] See for example Bellier, 1989, p. 23 : "The change of perspectives that involves a shift in the object of linguistics from languages to grammars (that is to say a body of universal principles, characterizing the faculty of language, the parameters of which have been established for specific values) entails that the "constructions" of traditional grammar cease to have a theoretical reality. They are rather considered as "taxinomic epiphenomena" (Chomsky, 1988) [...] ". This proposal contains what seems to us a very revealing contradiction. On the one hand, we know that the theory of grammars comes under, along with the theory of automata, the theory of formal languages. On the other hand, in order to apply to languages a theory that derives from a discipline other than linguistics, it was necessary to take up again (and in a decidedly non critical way) the traditional categories of non-formal grammars and specifically the inventory of the parts of speech of which Dionysius Thrax had already presented a complete picture, synthezing as he did centuries of

here. The problem confronting us is that of the *translatio studii* [46]. In particular, further research in cognitive psychology must be willing to avail itself of knowledge acquired in other sectors of linguistics.

There is a kind of resolute ignorance that seems well enough suited for making (re)discoveries at the lowest possible price. After having become internationally famous for being the most recent discoverer of cases, Fillmore ingenuously confessed in 1975 that he had just discovered the *ergative* ! Encouraged by this progress, he began in 1978 to reformulate the theory of semantic fields under the name of *scenes and frames semantics* (for an analysis see Post, 1988). Rather than condemn so-called structural linguistics as invalid, would it not have been simpler just to *read* Hjemslev's *The category of cases* (who managed to surpass his predecessors precisely because he took their theories into account) or Porzig's *Die Wunder der Sprache* ? Perhaps this is asking too much since the thread of history had already been cut, firstly in the minds of the followers of the "new paradigm" and soon after by the linguistic community as a whole.

There has been somewhat of a boom over the last fifteen years in research on the history and epistemology of linguistics. Some have interpreted this as a sign of crisis. But aside from the fact that crises are a normal and necessary thing in the history of any science, these studies give us an occasion to reflect on the current situation with some lucidity, and in the end enable us to measure what we will no doubt lose and possibly gain.

If the recognized division between universal linguistics (which takes language [*le langage*] as its object) and general linguistics (which takes languages [*les langues*], as its object) were to consummate itself as well on the academic level, then the linguistics of languages, excluded in fact from the field of cognitive research in general, might find its place within another scientific grouping proper to the social sciences, perhaps in a general semiotic of cultures. And indeed it would be an eminently suitable place for it; in effect, the comparative method elaborated by linguistics is at the source of scientific revolutions in mythology and the history of religions (Dumézil) as well as in social anthropology (Lévi-Strauss).

Before this possibility can be realized a new social demand will have to manifest its presence; and of course the social sciences will have to affirm their own specificity too. Such an interdisciplinary project could have been put into place in the sixties under the overly hospitable label of "structuralism". But linguistics at the time was already divided; and the reigning academic marxism doubtless inhibited the social sciences from formulating a coherent project; and since then, semiotics has been trying to return to philosophy, from which it originated.

It is possible that these hurdles, especially the second, could be overcome at least in the middle term. A semiotic of cultures would be in a position to bestow to linguistics, and especially to semantics, the eminent place that it deserves. What should be aimed at is not a unification of the life sciences with the social sciences

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discoveries. In actual practice, one can only put previous theories to rest by denying one has ever inherited them. Chomsky himself admitted it indirectly when he acknowledged, in an instance of modesty, that linguistics had not yet discovered its Galileo.

[46] In linguistics, our century has witnessed the *translatio imperii* of Germany to the United States. As for the *translatio studii,* it remains to be realized.

but rather the establishment of a dialogue between them partly on the basis of a shared understanding of cultural phenomena in cognition. The Sapir-Whorf hypothesis is at the centre of this debate. Studies of semantic perception have been trying to relativize this hyopthesis, by refuting and confirming it at the same time. If it is possible to continue in this direction, the confrontation between universalism and culturalism would move from the platform of opinions in order to rise and form an audacious synthesis.