

Going back to Royaumont : what is a good naturalization ?

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Abstract

The Chomsky/Piaget debate is an iteration of a quarrel which fueled philosophical reflexion for centuries. There is no reason to believe, however, that this opposition cannot be overcome. The concept of “linguaging” set us on that track by avoiding both internalism and individualism which form the background of this historical debate. The naturalistic program is thus reconfigured. Whether we should accept this solution or not, there is indeed some actuality in this debate : if the solution is not satisfactory, then the debate shows an ambiguity we should not try to overcome ; if it is, we shall evaluate our progress in the way we link our knowledge of nature and language.

Keywords : Linguaging ; Internalism/externalism ; Innate/Acquired ; Rationalism/empirism ; Universals

Résumé

Le débat Chomsky/Piaget rejoue une querelle qui a constitué le moteur des réflexions philosophiques durant des siècles. Il n’y a pourtant pas de raison de croire que cette opposition est indépassable. Le concept de linguaging permet de sortir de l’internalisme et de l’individualisme qui constituent le fond de ce débat ancien. Il reformule ainsi le programme naturaliste que nous prétendons encore suivre. Que cette solution soit valide ou non, le débat n’est donc pas dépassé : si elle est insuffisante, il manifeste une ambiguïté indépassable ; si elle est satisfaisante, nous devons mesurer ce qu’elle apporte à notre manière de lier ce que nous savons de la nature et ce que nous savons du langage.

Mots-clés : Linguaging ; Internalisme/externalisme ; Inné/Acquis ; Rationalisme/Empirisme ; Universaux

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1. Introduction

The symbolic dimension of the encounter between Piaget and Chomsky at Royaumont often hides what is really intriguing about its content. We intend to show that it should not be read simply as the clash of two scientific paradigms specific to linguistics or theories of learning. As such, it is an outdated debate that belongs to historians. But as a philosophical quarrel, it is very much meaningful for present days, for it may help us to choose a path in the study of language learning and knowledge acquisition in general.

The existence of linguistic universals, the laws of language learning, the relationship between phylogenesis and ontogenesis, those are all questions of facts. But the opposition on these topics once the facts are established rest on underlying philosophical positions. These philosophical choices are made in accordance with theoretical costs and gains. There is no doubt that questions of facts shall and will be addressed by experimentation; but the reason for a particular question and the general significance of the strategies used to find its solution comes to light through philosophical study.

From that perspective, even if contemporary linguistics may be able to infirm or confirm Chomsky and Piaget's factual arguments, that is not what we are interested in. We shall rather study the significance of their positions in the history of theories about the relationships between meaning, the mind, and the world. The two opposing positions seem to reveal a dialectic dynamic, in which one can be tempted to see balance. It is actually a three-way feud that we must describe though: Chomsky's rationalism contradicts Piaget's constructivism, but both oppose Putnam's externalism, whose delayed participation is too often forgotten. By convoking this third opponent, we break the apparent dialectical balance so it does not work as a motor for progress anymore : we still have to find a way to create a link between what we know of nature and what we know of language . Most importantly, it appears that the opposition between rationalism and empiricism (or constructivism in that case) is not the same as the one between externalism and internalism. And it will appear that one cannot be both a naturalist and an internalist.

Philosophically, the main reason to be interested in this debate resides therefore in the fact that it is possible to call the very idea of an alternative into question. It seems possible to reformulate the way we spontaneously approach language as a natural phenomenon. If we question the idea of a dialectic repetition of the same philosophical opposition, it is then possible to find in the concept of *linguaging*, developed in the enaction theories and especially by Humberto Maturana, not only the start of a new trend in linguistics but also a new path for philosophers to follow, beyond the traditional dualisms. As an holistic description which pays attention equally to the facts and norms, the *linguaging* paradigm seems indeed to allow us to overcome the oppositions that structure ages-old debates such as subject/world, thought/action or ideas/things.

2. Everybody is a naturalist

At first, I shall establish the philosophical significance of the Chomsky/Piaget debate. The encounter at Royaumont is first and foremost a philosophical quarrel since the opposition of Piaget and Chomsky² rests not on facts or interpretations but on the philosophical consistency of their initial hypothesis. We can easily sum it up : can we legitimately talk about learning or can

² Despite the great evolution of Chomsky's thought during his very long career, his main postulates remain unchanged, as exposed in Chomsky (2005) : language is specific to humans, it is innate as a faculty, its most fundamental rules are part of our genetic inheritance and are therefore universals, there such a thing as a linguistic organ.

we legitimately devise the existence of innate necessary structures? This does not mean the solution to questions raised therein is not found in the field of science and that it is up to philosophy to decide on a response that the special sciences must then ratify. Rather, this conveys the absence of an agreement on how to interpret very general facts, yet this agreement is the condition of possibility of a scientific resolution to this dilemma.

Then, we have to make it clear that this particular question involve very general implications. As a matter of fact, it is fundamentally a discussion about the way we must understand and articulate the concepts of order and origin: from where does the order that I notice in the world, and that I express by means of language, come from me, from the world, or from language itself ? Piaget and Chomsky share at least one common view on those questions: they think that they can be given a scientific answer, since thought, knowledge and language belong to the biological realm. They are feats of living systems and must be studied as such. They both aim to naturalize what was considered until then as a philosophical inquiry and reduce the gap between the formal laws of reasoning and the factual laws of nature. This naturalistic program is still very much vivid. This quarrel can thus be seen as the root of the methodological ambiguity for a whole field of research.

Piaget and Chomsky agree on what should be done but not on how it should be done. This is absolutely not a new question and that is a very philosophical one. The disagreement lies in the conception of what a natural science is about: a universal order or a story about origins ? The problem this question stems from is : what does the name of a category refers to ? The classification is founded either on similarity, or on contiguity. This leads to the distinction between synchronic systems and diachronic systems. In the first case, categories are given and fixed, independent of the methods of classification: objectives, nay transcendent, even transcendental. Whether these things I mention resemble each other or not is not up to me; they resemble each other by virtue of the fact that they are the *specimen* of a model. It describes a fixed system, determined by the rules of classification. In the other instance, classification is an immanent activity with a story: the links and categories are real and refer to a physical interaction with the world. In my use of the world and of the objects that people it, I create groups. They are not imposed on me, nor do I invent them; they are natural links that are discovered. It is the reconstitution of a process, an evolution.

In the setting of the Royaumont argument Chomsky occupies the rationalist pole of the debate : as generative grammar aims to highlight invariable and common structures in all natural languages in order to reveal the link between the specific properties of our brains and the human specificity of articulate language. The same way genetics hope to link the general structure of our brains to the general structure of our DNA, Chomsky hope to link the universal grammar of actual languages to an innate system of structures genetically encoded in our brains. It is a reductionist claim. It does not mean, though, that grammatical rules are in fact an internalization of biological constraints, they are not selected, they are rules *sui generis* as they belong to the faculty of language *per se*.

Piaget occupies the opposite pole: genealogical and therefore dynamic. The Piaget perspective aims conversely to recreate the development of linguistic structures from operational frameworks, i.e. rudimentary forms of interaction with the world's objects. Furthermore, he claims that linguistic ontogenesis summarizes phylogenesis, which itself is the story of an adaptation, not just the fate of mutations. Piaget thus produces a model of the genesis of linguistic structures within the system of exchanges between a living, human subject and an environment. In short, each of these positions is a reflection of the other; they are opposite images. This reading of the discussion matches Chomsky's own interpretation of the importance

of his theory and possibly his opposition with Piaget as it is meant to follow the rationalist tradition and oppose the then dominant empiricism³ because of its inability to produce a proper scientific theory, i.e. discover universal and necessary linguistic laws.

The philosophical problem lies in the fact that the theoretical gains of one are the losses of the other and vice-versa. Chomsky manages to express the transcendence of linguistic structures, but his naturalism is problematic: one way or another these structures depend on biology and are the fruit of evolution, but we cannot say much more about it. Symmetrically, Piaget manages to consider the continuity between action and language, life and thought ; they all belong to the same mechanism of adaptation by assimilation/accommodation, but the concern and the difficulty of Piaget's approach is to go beyond the boundary between the fact and the norm in order to reach normative structures which would apply to the function of any intelligence. The question contemporary debate on the relation between a theory of human intelligence and natural science appears to be stalled over this alternative, to the point that one could think that a historical alternation on this matter is a law of human thought. But there is actually no reason not to try to clarify this debate in order to identify a possible exit.

3. Two ways but one direction

If we want our reflexion to outgrow this alternative we first have to understand it completely. Chomsky and Piaget both tried to adopt a scientific approach of language learning because they had the ambition to reduce the gap between sciences and humanities. Their disagreement reflects the many difficulties they encountered and the diverse solution they came up with. Those difficulties reveal the necessarily underlying commitments of any scientific endeavor. The question we can ask then is: is there a right way to be a naturalist or is it an intrinsically ambiguous task ? And isn't this ambiguity a fatal flaw that should make us choose another path ? Their language learning theories are indeed elaborated on the basis of a general epistemology and *in fine* a metaphysical position, according to the following progression:

1. the question of the existence of a knowledge before and outside language : do we have access to more than facts ?
2. the criticism of radical distinction between knowledge and action, between thought and interaction : should we search for universality and necessity in linguistic structures ?
3. the reconsideration of the existential disjunction between the subject and nature.

We shall try to explore the details of this, it will also be the occasion to shed a new light on the lesser known philosophical relevance of the piagetian system.

3.1 The question of the existence of an intellect before and outside language

For Piaget, it is a capital question. All of Piaget's psychological work rests on the idea that there is an intelligence before language, such that one can grasp the continuity between plans of action and abstractions and thus link the most complex intellectual constructions to the real by returning them to their physical origin.

We may think that this is precisely what Chomsky wishes to avoid by introducing the distinction between linguistic competence, i.e. language, and linguistic performance, i.e. speech. A historic and factual enquiry which does not by any means show limits, principles, basis: this is the state

³ Cf. Chomsky (1966).

in which he claims to have found linguistics, and it goes against his views on science, what he qualifies as his rationalism. In this respect, Chomsky answers Piaget with the response of any rationalist made of empiricism: *we must not stick to the facts because we can not-stick to the facts. Our capacity to know does not depend on the real; it is the inverse which is true*. Even if Piaget is not really an empiricist.

For Piaget, because the child can act before he can speak and because this interaction with the world is regulated and therefore gives way to thought, which is to say to the intellection of norms, the logical structure of thought and of knowledge is not given and universal; it is a construction. In this sense, we can consider that Piaget aims to explain epistemic norms. Genetic inquiry is his instrument but the Piagetian genesis of knowledge is a genesis without foundation. It is not a matter of reaching an absolutely principal and indubitable level from which we could deduce all others; it is a matter of explaining our way of understanding the world by relating it to the nature of our relationship to the world.

This perspective clashes with Chomsky's *nativism*, i.e. the belief that the child possess a linguistic knowledge that does not derive from linguistic exchanges or any kind of linguistic experience. Consequently, there must be a linguistic system implemented in every human brain that contain the essence of language, i.e. the original and basic set of rules that enables us to learn and understand every actual languages. It is therefore a universal – but also necessary and somehow transcendent as they are not invented in any way – grammar. Therefore we can have scientific access to universal laws of language, provided we do not try to understand why they are the way they are.

3.2 The criticism of radical distinction between thought and action

What enables the idea of a transcendence of cognitive and linguistic structures is the will to attain certainty, i.e universal and necessary laws but also the belief that thinking and acting are fundamentally two different things. If we subscribe to this idea, we acknowledge of course that there is technical and practical thinking, but we will consider that it belongs to an intermediate type of thinking. Indeed, we can shift away from the manipulation of objects to manipulate ideas; by doing so we are able to surpass the limits of animal life in order to achieve properly human thinking as we become capable of generality and able to refer to ourselves. Recursion, for Chomsky, is what single human language out. We believe in transcendent structures because of this conception of the true potential of intelligence and *vice versa*.

An alternative therefore appears with regard to the status of cognitive and linguistic structures: either they say something about the world or they say something about the human mind. In a way that at first seems somewhat paradoxical, if they say something about the world, it is relative; if they say something about man, they are universal and necessary. We have a tendency, like Chomsky, to value theories that can provide us with the universal and the necessary, which we identify as knowledge of the highest quality. To know is to access what does not change, what can be adequately expressed once for all. To Piaget this is a common mistake: Chomsky still conceive language as pre-Darwinian science conceived natural order: a fixed whole waiting for a description.

3.3 The existential disjunction between the subject and nature

The fundamental disagreement between Piaget and Chomsky is fueled by a different ideas of what it means for a human individual to be seen as a part of nature. They do not understand what naturalization implies the same way. The problem is to establish whether a thinking subject, a human subject, exists in a different way than that of the other natural things. Is there a leap that gives us access to something for which only logic can convey reason, a language of the mind

which would not belong to my body or my brain, even if its possibility is conditioned by it ? On the contrary, can we consider that everything which constitutes the behavior of man is integrated into a natural system ? We find ourselves facing a particular version of the problem of order : is order to be understood as a program or as a process of organization ?

At this point, it is clear that Piaget and Chomsky disagree on the way we can explain, referring only to natural causality, the fact that human individuals are rational subjects. But it is also clear that they both subscribe to the idea that we can deduce from a special kinds of behavior to the existence of a special set of rules. What they have to explain then is how individual subjects can reach a point where they transcend their particular experience and gain knowledge of universal rules. So they agree on the idea of a universal grammar and on the fact that, one way or another, those rules belongs to the mind.

More practically speaking, this point raises the question of the secondary importance of communication in the acquisition of language. To both of them, language seems to be a way of thinking, of describing relationships, of organizing ideas and the reality. Grammar comes first and communication is left aside. Hence we should focus on the brain as the material support of the universal rules or in the individual development as a way to apply the universal program. This is what we should really discuss when we confront Piaget and Chomsky, because it is the basic alternative of our contemporary naturalisms.

This was actually discussed in the Royaumont debate, in a rather discrete manner though. There are not only two positions which clash during the Royaumont colloquium, but actually three. So there might be a way to overcome the alternative. We must consider Hilary Putnam's position, which is radically distinct from the other two and dismisses them both for the same reason.

4. Language is not in the brain

Since Piaget refuses to attack Chomsky's intellectualism, rationalism and internalism⁴, the only meaningful opposition deals with the autonomy of grammar. On that point, Piaget and Chomsky are on the same team, and Hilary Putnam is their adversary. The problem lies in postulate, which finds its extreme version in nativism, that linguistic structures can be known independently from the semantic dimension of language.

Putnam starts by challenging Chomsky's idea that children are able to extrapolate the grammar of a language from the list of sentences which are accepted in their experience, because unacceptability and grammatical incorrectness are not the same thing. He then shows that grammar determines if a proposition can receive a truth value. Syntactic and semantic rules are parallel. Therefore, we shall not confuse the heuristics we use, which may have something to do with our brains, and the grammar of the language. A language is not only a program that we have to apply and that we can hope to describe without knowing why it is like it is, just like we do with natural laws ; it is something we do, therefore it is something we can understand because we know why we do it. Children do not try to master syntactic rules without reason. They do it because they need them to master the semantic dimension of the language, i.e. a way to communicate with others in order to satisfy practical goals. It is therefore not a matter of classification, between grammatical and not grammatical sentences, but an effort to participate to a linguistic exchange.

⁴ We call *internalism* the belief that norms and structures do not belong to the external world but to a necessary and universal order. We call *externalism* this position that consists of saying that references and ideas are neither in the mind nor in things, nor in the individual's interaction with things, but they are shared by a linguistic and cultural community.

Once we admit that fact, we are no longer victims of our linguistic solipsism and we can conceive that different intelligences can learn the same language. When they try to do the same thing we do, they have to apply the same rules we do. That does not mean they are like us. Their capacity to succeed may depend on the fact that we share some faculties, but we cannot go further. Putnam mention the example of Washoe the chimpanzee to illustrate that point and to show that this perspective may be better than Chomsky's one, particularly from a naturalistic point of view, as it is compatible with evolutionary biology.

Putnam position has to do be understood in regard of his internal realism⁵, i.e. the idea that categories depend on what and why we are categorizing. Internal realism is mostly a negative stance: it is an attempt to avoid using "God's point of view" like most philosophers do when they try to attain a transcendental order that would explain and guarantee the integral cognoscibility of the world around us. Putnam do not accept its cost: that the link between our subjective structures and the structure of the reality is a mystery (and precisely a mystery that God should know about).

The world has not always been in order, waiting for us to understand it, our categories find themselves referring to the world in virtue of a process, of an history we can tell. We can still rely on our concept of truth, provided that we understand it as a framework under which we can interact with the world. It implies, in our case, that the content of language is not absolutely second with respect to form. This is the main argument of Putnam : Piaget and Chomsky are both wrong from the start because nothing is possible in the field of language without the intent to mean something. The choice to ignore semantics indicates that both positions are philosophically misguided as we cannot mean something if we are not already in the world. Then the very structure cannot be independent from the experience of the world. That is why Putnam here claims that "the grammar of a language is a property of this very language, not a property of the *homo sapiens* brain⁶". It radically contradicts Chomsky's thesis, but it also applies to the watered-down constructivism Piaget displays in the debate, as he agrees on an innate nucleus and only state that the individual experience can be an occasional cause for the actualization of an already existing order.

Finally, by criticizing the "innateness hypothesis" in other works⁷, Putnam not only reject the internalist philosophical stance but also question the evidence that support it, namely the relevance of linguistic universals and the "ease" of children's language learning. According to Putnam, the facts it presents are trivial: the existence of linguistic universals only refers to similar large phrase structure portion in all grammars, which can be explained by the absolute simplicity of the composition algorithm, and the existence of proper names, which echoes the simple need to identify persons and objects. Besides, those facts do not necessitate the innateness hypothesis to be explained: it is sufficient to say that our intelligence, which acts under biological constraints such as memory, vocalization has produced throughout evolution and history the simpler way to answer universal needs. For is it very surprising that any intelligent life-form has an interest in physical objects and in one another and selects the simpler and more efficient way to do what it needs to do ? As for the ease of language learning, it simply isn't so : we underestimate the amount of direct teaching any child receive, which is far greater than what would be needed for an adult to access a much higher level of competence. Consequently, the innateness hypothesis is not an useful nor a well-established theory, it is rather philosophical choice, and according to Putnam, an arbitrarily extreme one.

The grammatical structure of languages is not a blunt fact we have to explain, it is the result of

5 Cf. Putnam (1990).

6 Centre de Royaumont pour une science de l'homme (1979).

7 Cf. Putnam (1985), the conference was actually given in 1967.

something we do with an intention: to understand in order to interact. As a result, if naturalizing implies to regard communication as secondary then it shall not be pursued. The counter-intuitive aspect of such a step is actually very surprising and can only be understood as the consequence of philosophical presuppositions. If he doesn't really propose an alternative, Putnam at least shows that one cannot coherently be both an internalist and a naturalist. The naturalization he rejects is the one that paradoxically negate the world in order to conquer a hypothetic necessity.

However, we have to notice that the Piaget/Chomsky/Putnam triad we have produced echoes the great problem of medieval philosophy : the dispute of the universals, without really renewing it. Putnam is the heir of nominalism as Chomsky is to realism and Piaget to conceptualism. If we were pessimistic, we would say that we have not moved an inch after nearly a millennium of reflection. However, in thought as in language, pure repetitions do not exist and any reformulation of a problem carries progress with it. It is not directly an ontological problem about the nature of the classes, the laws and the structures but a factual question and therefore this new repetition is singularly scientific : it takes the form of a "conflict of faculties" between an evolutionary anthropology, developmental psychology and structural linguistics. This shows the opposition in a new light : the issue is less to resolve by the reflection of conceptual contradictions than to articulate the activity of several disciplines. A solution to the problem is therefore possible.

5. Linguaging

The different stances opposing in the Royaumont debate differ on the question of the *explicans* of language learning, whether it is determined by some kind of program or by the exposition to the meaning that is already in the world. But it is very apparent that we face a circle : to grasp and formulate the world one must be able to recognize it, but conversely, to be able to project a structure on the world, reality itself must be cognizable, i.e. already ordered. As a consequence, internalism and externalism seem to be the two faces of the same coin.

Recently, linguistics has begun to shift away from this vicious circle by questioning the *explicandum* rather than the theories. As a matter of fact, all of them rests upon the assumption that there are linguistic universals which attest, depending of your philosophical preferences, of a built-in and already structured linguistic faculty (Chomsky's Internal Language (I-Language)), a necessary progress in ontogeny (Piaget's developmental scale) or an objective order reveal by our general intelligence (Putnam's externalism). We should also notice that these assumptions are rather question-begging as the *explicandum* is already an interpretation which function as a necessary condition for their main thesis. Linguistic typologists (Evans & Levinson, 2009) have recently provided empirical reasons for doubting the existence of universals on any level of linguistic organization, facts tends to show an irreducible diversity. What is left to explain is not a universal grammar but the process and the result of a "bio-cultural hybrid" tool for adaptation by variable co-evolutions. They reject the traditional presuppositions of linguistics but reiterate the call for a naturalization of linguistics.

As it turns out, the frame we need to produce in order to understand language as a part, and not a product, of a bio-cultural system of interaction already exists : the enactive paradigm and especially in the work of Humberto Maturana on the concept of *linguaging* seems to be perfectly appropriate as it answers to all the foregoing demands of contemporary linguistics. They chose to study language from the point of view of its essential function: communication. Language conveys the implementation of what Maturana calls a consensual domain. The concept of consensual domain refers to situations like this:

When two or more organisms interact recursively as structurally plastic systems, each becoming a medium for the realization of the autopoiesis of the other, the result is mutual ontogenic structural coupling. From the point of view of the observer, it is apparent that the operational effectiveness that the various modes of conduct of the structurally coupled organisms have for the realization of their autopoiesis under their reciprocal interactions is established during the history of their interactions and through their interactions. (Maturana, 1978: 47)

The main idea is that in order to maintain the dynamic stability that characterizes the existence of organisms, it is sometimes necessary for them to join forces. They thus produce consensual domains, meaning domains of interactions which are dynamic themselves. This is what we call a language: language designates a behavior in a consensual domain.

In *Tree of Knowledge*, Maturana and Varela (1987) already operated an *explicandum* shift from the traditional conception of language to “*linguallaxis*”: just like insects maintain social unity and adaptative efficiency through the use of a constant flow of chemicals, humans produce a linguistic domain consitued as a domain of ontogenic coordinations of actions”. Language is the tool by which human coordinate their adaptive behavior, it is a creative structural coupling, therefore it must not be seen as a way to transmit information, to formulate an implicit order or to translate thought. Maturana created the concept of *linguaging* in order to emphasize the fact that language is a communicative activity inside a consensual domain where living organisms coordinate their interactions, a linguistic domain. This activity is structurally determined by the biological constraints of the organisms and their environment but the regularities it generates obey to *sui generis* norms, produced in the course of the interaction, by way of recursive regulation. The perspective of *linguaging* is therefore a naturalization, as language is seen as a natural phenomenon, and a genuine one: nature is not here another name for a transcendental reason, a built-in program, or the cognizable order of the reality itself.

Linguaging is the activity which allows an organism to go beyond the *hic et nunc* of his perceptual account of the world. In order to do so, one needs language as a way to interact with the environment in absence of the environment. Linguaging is the activity of enlarging our consensual domain, our domain of interaction, beyond the physical immediacy. The recursivity of language offers to leaving organism a potential infinity as it can produce coordination of coordinations, descriptions of descriptions, and, by doing so, transforming these. The properties of linguistic entities are therefore not structural, though structurally determined, but emergent and not predictable. According to Kravchenko (2011), this implies a switch of interest from the denotative power of symbols to their connotative function :

The crucial difference between the traditional and biology of cognition views of language is that the latter, building on an approach that emphasizes interactional dynamics, assumes its connotational, rather than denotational, nature. The notion of the consensual domain, in which linguaging takes place, allows us to ascribe a function to language, namely: to modify an organism’s environment by modifying other organism’s behavior via consensual coordinations of coordinations of behavior.

This conceptual frame may be original but it is in some aspect clearer than the traditional one. It notably does not use the metaphor of the transmission of a message, an information using the linguistic entity as a vessel for meaning. Maturana and Varela reject indeed in the same book this description as faulty and caused by an observatory bias: “the phenomenon of communication depends on not what is transmitted, but on what happens to the person who receives it. And this is a very different matter from “transmitting information” (*Ibid.*, 196). The first consequence of this assertion is that one must be cautious when describing a situation in semantic terms. We

must not identify what we see in the situation and what is happening inside the interacting organisms. Meaning is not in the people, nor is it internalized, it occurs in the course and on the background of the history a linguistic coupling in a linguistic domain. The second consequence is that language is not a code or a program but a *praxis* : an activity which modify both the world and the one doing it. It is a way of handling situations by describing them or by adding to them some new relations of a new type in such a way that the more I say the more I have to say about. Language, then, is not a set of predetermined possible or acceptable sentences but a process of creating the means to communicate in order to answer adequately to perturbation in the environment.

This point of view enables us with a greater experimental receptivity as it does not focus exclusively on texts but pay an equal attention to all kinds of linguistic experiences. By doing so, it reveals the difference between theoretical language, as it is reformulated by traditional linguistics and actual language. This difference lies precisely in the fact that our linguistics exchange are under-determined by grammar as a grammar correct linguistic exchange is an exception in the world of real linguistic exchanges. It entails on the one hand that the linguistic theories do not describe the linguistic competence of the actual speaking individuals and on the other hand it rejects what language philosophers calls the *substantialist hypothesis* (see Auroux, 1998): the idea that grammar is not only the description but also the cause of our linguistic exchange. Grammar come after and is, therefore, a part of a linguistic domain, not its ground or its ideal form. The creative capacity of a language always exceeds its grammar (*ibid.*).

As a result, we can say that the enactive view of language is a more scientifically satisfying one. First, it relies heavily on experience: language is not limited to a formal definition but to all linguistic experiences, i.e. all the distinction individuals can make in a consensual domain. Regarding the question of the origin of language, it allows to consider many different synchronic sources progressively joining as coherent technical and symbolical system rather than a unique source, a first and fundamental linguistic fact we would be unable to verify. Similarly, the dynamical description of the emergence of convention in the consensual domain both regarding meaning and structure make the question of anteriority about the sign/meaning relation becomes irrelevant. As Bottineau (2008) notice, it is a reformulation of the model of communication as a circle rather than an arrow or more precisely “as a retroacting radial propagation that will constantly affect the consciences in presence and be re-profiled in real time according to transitory effects and actions: a binary structural loop in which two living bodies’ cognitive experiences are alternatively controlled and synchronized through somatic interference with the shared medium” that evacuate the concern of finding a starting point. One of the great merits of Maturana works is indeed that it doesn't pursue an impossible goal.

The scope is also the broadest possible, and that is what we can expect as the basis for a general theory. Consequently, the core concept of linguistics (word, sentence, language, grammar) become activities of living systems and therefore can be observed and can be empirically described just as biological processes can be. Finally, enactive linguistics are more self-aware than traditional models as it undertakes the circularity of its method and conceive the fact that linguistic theories are themselves enacted both by the linguist, who produce the model of the language he speaks, and by the speakers who uses the grammar as an external tool to regulate their exchanges.

Once linguists realize that they are themselves part of a linguistic domain and both interpreting and producing data, both describing and enriching the set of rules relative to this domain and possibly others they become aware of the fact that grammars are empirical entities, technical creations and historical facts and must be treated as such. It implies that languaging, as it describes using and creating and language at the same time, is neither an individual nor a universal phenomenon. The naturalization linguist are capable of has to make room for history

and culture as the only way for a human to ensure is survival as an organism rather it is the way for an individual to join a cultural collective, we cannot attain a reality more fundamental than that, we cannot short-cut culture and history. The automation of communication which our computer technology is on its way to achieve does not entails the automatism of the linguistic faculty (Auroux, 1988), once again one must not confuse what he understand and what is going on neither should we try to find a link between the individual and an already accessible universality. Most of our philosophical problems come from this temptation.

6. Conclusion

The model of *languageing*, by which Maturana designates the generation of a common language, offers us the possibility of a way out of the opposition which comes to light in the Royaumont dispute. It effectively enables considering together the singular contributions of each of the positions:

- There is a specifically linguistic capacity and this capacity designates the possibility to produce and apply syntactic and semantic rules.
- This linguistic capacity is not detachable from an adaptation of an organism to an environment. It is a form of action.
- This is a social activity which involves communication.

With this model we manage to operate the synthesis between internalism and externalism: the structures come from the exterior, from what is brought by each of the individuals that belongs to the consensual domain, and they belong to the history of this domain itself, where each interaction modifies the domain of the one that follows. The role of a theory, in this case, is to describe the different scales of these systems, which is to say, to produce a hierarchy of domains. Therefore the issue is no longer to understand the nature of ideas and then to establish the way we manage to know them, to master them, or to make use of them. It is a matter of understanding how regularities are set up:

[T]he regularities or rules that an observer can describe in the performance of any particular behavior, whether it is courtship, hunting, or speaking by the different organisms that enact it, do not reveal homomorphisms in the underlying physiologies. The regularities in the performance of the behavior pertain to the domain in which the behavior is described by the observer, not to the underlying physiology. Therefore, the describable regularities of the linguistic behavior of the members of a consensual domain do not necessarily reflect an identity of the underlying physiologies that generate the linguistic behavior of the different members. (Maturana, 1978 : 51)

Here Maturana carries out an important distinction between the conditions of behavior and the source of norms. There are biological conditions which make language possible, but they must not be confused with linguistic norms. Linguistic norms arise from communication itself. Up to a certain point, consensual domains are therefore analogous, since they are ruled by the same conditions: certain types of mechanisms must be available, as must a certain practical coupling, a certain context of action in order that the language arise (it is not independent of the emergence of a technical relationship to the world). This explains the generality of the linguistic occurrence. However, the norms applied belong to the interaction itself, so that we may consider their diversity – temporal at first, but also the diversity of the linguistic rules we observe on all scales of communication (diversity of languages, levels of discourse, individual interactions, etc.) – so that the only means of access to a language is to belong to the consensual domain in which it is established. Consequently, we may simultaneously consider unity and diversity, the necessity and the contingency of ideas and structures. It seems therefore that we are on the right track.

What can we take from all of this, relative to the development of a theory of learning ? First, we can take a certain number of specific remarks that lead us to a better definition of learning processes as well as a methodological lesson. Learning is at once an individual and a collective activity; at the same time, accession to a given, to a history, and our capacity for innovation and invention are at stake. An adequate definition of learning must take all of this into account. If it does not, it is condemned to repeat the paradoxes and the aporias of traditional epistemology. What must come first in a pedagogy is not the exploration of a given or the transmission of a group of concepts, but the implementation of a domain of interaction in which I have both the means and the interest to import and produce norms. If we apply this idea to language, this means that the learning of the language is not done through comprehension of a grammar or the memorization of a lexicon but by the implementation of an interface through which linguistic transfers can be operated.

But from this we can also take some leads on the importance and horizon of the naturalization of the theory of knowledge in general. Maturana's paradigm seems to comprise a new and fruitful context for such a project. For Maturana, as for Piaget, knowing is acting – it is transforming the world and transforming oneself. If knowing is adapting to the environment and to others, progressing, and producing norms, then a theory of consequent knowledge must above all be a theory of learning. But Maturana's reflection does not simply extend Piaget's: it does not repeat an opposition; it is a matter of a new, philosophically advantageous, and fruitful position which brings culture into a reflection otherwise limited to the articulation between psychology and biology.

The great originality of Maturana and Varela's stance is that it is philosophically unproblematic, meaning it does not try to solve philosophical puzzles but accepts them as part of the description of the world. That is why circularity is not hidden but overtly accepted as the fundamental form of understanding : understanding is not a finite process but a part of the relation of application and modification between the knowing subjects and the process he uses in his interaction with the environment. It allows them to also accept what Auroux calls "the irreducible facticity of the human language": as shown by Quine, there are now analytical laws nor are there determined translations. There is always already a linguistic fact, a choice, a practical commitment that produces a meaning or explains a structure. Languages are historical entities, and history is not already written.

Finally, the advantage this paradigm possess over every other rests on its acceptance of the reality of time. That is indeed the limit of all rationalism, it leads them to aporetic questioning by trying to ignore that everything exists in time and that time is not in our heads. We cannot attain a knowledge such as an absolute predictability is possible, not because we are limited, but because it implies that everything has already happened in a way, in a space accessible to our minds, and it is just not so.

At the end of this depiction of the recent progress of the philosophical reflexion about language, we can draw some conclusion about our initial question : what is a good naturalization ? What we have realized is that there is no shortcut. We simply cannot substitute nature to our old philosophical tools : we have to take nature for what it is an material, circular and temporal system, and it entails that we have to conceive ourselves as living and active organisms always interacting with an environment. Then we have to accept what classical rationalism has tried so hard to ignore for so long : there is just one world, the one we act in, and everything we are, have, think or do is part of it.

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