Daniele Barbieri

Is Genetic Epistemology of Any Interest for Semiotics?

At the beginning there was cybernetics, Gregory Bateson, and Jean Piaget. Then Ilya Prigogine, and new biology came; and eventually theories of complexity got to appear on the stage.

The role and importance of cybernetics and of Gregory Bateson for the arising of the new paradigm has already been stressed by several authors in a number of papers and books. Not the same happened instead with Jean Piaget, whose constructivism is a key word for the new school. The book *La danza che crea* by Mauro Ceruti (Milano, Feltrinelli 1989) has been written to explore Piaget's thought about constructivism, and especially about his genetic epistemology. The sub-title of the book is in fact "Evolution and Cognition in Genetic Epistemology".

The first fact Ceruti stresses in his book is that genetic epistemology is a particular kind of experimental epistemology, and its central problem is natural history of knowledge. Therefore, genetic epistemology is quite different from neo-positivistic and analytic epistemologies: the insight is that epistemology is not a sort of a-priori foundative set of normative rules, but its task is rather to use and support investigations giving us useful data and models for an inquiry about the natural history of cognitive processes.

The relation between epistemology and science is not anymore one of dependence, one where the former provides rules and norms (methods) for the latter, but a kind of circular relation, where the normative aspect is still important but relies on the discoveries of empirical inquires. Like in cybernetics, the position of the observer is not anymore that of God: the observer is thrown into the situation he is observing, and his methods themselves depend on the interrelation between him and his environment.

A lot of different (but related) themes are developed in the book, and this report cannot account for everything. The first part of the book gives an overview on the approaches to biology, chemistry, antropology, etc. going in the same epistemological direction as Piaget. Ceruti outlines problems about biological self-organization, and ideas by von Foerster, Ashby and Atlan, problems

about logical self-organization and the double bind theory by Bateson, as also his concept of learning to learn... Different perspectives around the same constructivist approach.

But the most part of the book is of course about Piaget's epistemology, and his theory of stages of knowledge plays a particular role in it. In the perspective of a genetic epistemology, the central problem is that of structural stability, and the problem of the genesis of structures. A particular attention should be paid to the complex chapter about the role of logic, fact and norms, where Piaget's position on the interplay of psychology, epistemology and logic is widely explored. Genetic epistemology is neither a psychologism nor a logicism: logic is not conceived by Piaget as a formal science, but as formalizing the deductive operations. It is not possible to separate this logic from its own construction and from its own history: and this position is precisely opposed to Frege's position reporting the context of logico-mathematical discovery to a context of purely formal justification, seen as eternally invariant.

In the last chapter a reductionist paradigm is confronted with a constructivist one: the problem of the role of the observer is here in the focus. Reality is seen as constructed by the observer by means of his experience: objects are seen as stable symbols of behavior. Action and experience are bound in a recursive circularity having as result the stability of reality. Objects are not given, don't exist as such in reality: they are symbols, stable symbols of behavior. As it was for Poincaré, there is no understanding of reality without movement, without action and interaction with it.

I think that in these just mentioned ideas we could find the first reason of interest for semiotics towards genetic epistemology. In 1868 C.S.Peirce published his *Some Consequences of Four Incapacities*, the most important of his essays about semiotics. In the last pages of the paper we can find something rather similar to the position of Piaget (and of von Foerster) reported in the book of Ceruti. Peirce says that the complete content of mind is nothing but a sign, or, better, signs: the objects themselves, therefore, can exist only as signs. People, and philosophers too, tend to forget an important feature of Peirce's thought, his idealism. It is an objective idealism, having far hegelian origin. Nevertheless it is important to stress that for Peirce himself reality is not but a system of habits, that is, of recurring behaviors; not a system of objects, therefore, but a system of relations. Signs are constitutive of reality itself.

The mind, according to Peirce, is not but a sign because it grows on, by means of, and with signs. Only signs can be in a mind; and it is the system of signs that determines the way a mind will be. But the system of signs is language as much as it is the environment where a mind grows.

Pragmatism means stressing the importance of practice and behavior for a mind: according to Peirce what a mind can do is trying to form habits, recurring behaviors, being signs themselves, but also the only possible final interpreter of a sign.

In other words, a process of interpretation can stop only with a habit, a disposition to a practice; there are no signs without practice, and therefore there is no reality either. This is quite a near result to the position of Piaget and von Foerster. Semiotics since then has not been anymore so idealistic as its founder, but the pragmatic assumption is still strong.

This leads to a second reason of interest of semiotics towards genetic epistemology, and against some gender of cognitivism, based on the notion of representation and on some kind of cartesian rationalism. Genetic epistemology and pragmatism share an anti-cartesian perspective: no abstract (philosophical) foundation is possible. Stressing practice means stressing the impossibility of an external point of view.

In the last chapter of the book, Ceruti quotes Francisco Varela about the different answers that classical cognitivism and constructivism would give to the same questions. The questions are:

1- What is cognition?

2- How does it work?

3- How can we know when a cognitive system is working correctly?

The probable answers of classical cognitivism would be:

1- It is information processing: symbols manipulation ruled by rules.

2- It works by means of a device able to support and manipulate discrete physical elements: the symbols. The system interacts only with the form of symbols (their physical attributes), and not with their meaning.

3- When symbols adequately represent some aspects of the real world, and information processing leads to a "good" solution of the problem that has been posed to the system.

On the other side, the answers of genetic epistemology would be:

1- It is effective action: the history of a structural combination that "puts forwards" a world.

2- It works by means of a network of intertwined plastic elements lying below a continuous history.

3- When it becomes part of a world of meanings in development (as it happens with the young specimen of every species), or when it forms a new one (as it happens in the history of evolution).

Of course the convergence of genetic epistemology and pragmatism is not at all casual. In a sense, genetic epistemology is a late fruit on the tree of pragmatism. But what is important for us is that semiotics itself (an other fruit on the same tree) share this convergence. In some way, the convergence of genetic epistemology and pragmatism is a strict analogous of the convergence of structuralist semiology with peircean semiotics.

It is so time, I think, that semiotics declares its distance from classical cognitivism. Neither of the two branches of semiotics ("peircean origin" semiotics, and "structuralist origin" semiotics) can share most of cognitivist philosophical premises. Representation is a dangerous word for both approaches, and system a fascinating one.

Recent (rather heretical) developments of cognitivism had as a result a new deal in researches about cognition and its simulation in computers. Connectionism is such a different thing from classical Artificial Intelligence, and such a similar thing to old cybernetic researches. A lot of constructivist themes have entered in the connectionist way of thinking; but (at least) one of them has a particular relevance for us. A connectionist network can, if programmed to do it, learn about the world: but the rules having effect in it are just rules of learning, and no rule is given about what is going to be learned. The process of actual learning is accomplished by mere presentation of examples, and feed-back reactions of the outside world to network's reactions. At the end of the process, the network is able to discriminate among the different objects it has been presented with; but inside the network there is no representation at all of any object. All what the network has is a system of differences and relations. Any new object presented to the network would be classified as one of the old ones, as long as possible.

The network has constructed its world; and the result of the process of construction depends both on the structure of the network and on the structure of the perceived world. The outside world has been known only as a system of differences and relations, i.e. as a system of meanings. No object is in the network's "mind", only signs of other signs, and eventually of actions.

I think that, in terms of Peirce's pragmatism, the gap between analytic, cartesian epistemology and genetic epistemology, is a gap between an attempt to explain knowledge in terms of Secondness and an attempt to explain knowledge in terms of Thirdness. The main notion of classical epistemology is "consequence" (or "cause"), a dyadic notion: if we say that "A is a consequence of B", only two entities are involved, A and B. The main notion of genetic epistemology is "meaning" (or "interpretation"), a triadic notion: we cannot say only that "A means B", we need a C such that "A means B to C".

We need not have a conscience to have triadicity; a system like a connectionist network is enough for it. Every system able to learn (in the lowest sense of learning) can be considered in terms of thirdness. This is of course absolutely anti-reductionist and anti-physicalist; and it is truly constructivist.

We need not have a conscience to have triadicity; every time we have life we have knowledge and development, and therefore we meet phenomena we can deal of as triadic. Speaking of knowledge, even at the lowest sense, is speaking of thirdness, of interpretation.

Genetic epistemology gives us some hints about a basic problem of threshold for semiotics. Going down in onto- and phylo-genesis, where is the borderline between semiotics and biology, provided that such a borderline exists?

Ceruti's book gives rise to two different answers. First, the semiotic function, from the ontogenetic point of view, arises in Piaget's second stage of the development of cognition in the child, the stage of concrete operations and of representations. Before that, in the first stage there are no semiotic operations proper, no representations, there is not yet conscience. According to this position, the threshold of semiotics is the threshold of representation, and as the second stage is characterized by language, there would be no semiotic function before of language (even if not only language would be object of semiotics).

But a second answer is implicit in constructivism and genetic epistemology. If we look at the development of stages not only as ontogenesis but also as phylogenesis, in a perspective where no existing language can be learned, as no language still exists, and we reflect about the origin of language, whatever it could be, in any case it will be necessary presuppose some kind of semiotic function even before of language. Actually, it is not necessary to have representation to have meaning, as we have seen in the example on connectionist network: all what we need is (some kind of proto-)self-organization.

Traditional epistemology was dyadic because of the exclusion of the observer from the process itself of cognition. Genetic epistemology reintroduces the observer in the process: in doing so, however, it states that every process is a process for somebody (or for some"thing"). Thirdness means meaning. The underlying proposal of genetic epistemology is to look at the phenomena of the world as phenomena of meaning. But, if so, where is then the threshold of semiotics? It looks like nowhere, since every phenomenon can be seen as phenomenon exactly because it is a sign, because it is meaningful.

I am not talking now about semiotics as a research method, but as a philosophical position. In this sense semiotics and genetic epistemology are so near that could be largely overlapped.

As a research method, maybe the field of semiotics has really the threshold of Piaget's second stage. It is possible that no effective methodology is available to study from a semiotic point of view the early ages of meaning; and it is possible that nothing interesting results from investigating those areas fro a semiotic point of view. Semiotics deals with texts, and no texts are produced by a micro-organism, by an animal or by a baby. But - I am really tempted to believe - it is also possible that some opportunity of that kind can exist.

What is really important for semiotics as a method at the present moment is that inside new biology, cybernetic, genetic epistemology, constructivism, and "complexity sciences" in general, a lot of instruments have been developed in order to deal with the problems of meaning at the lowest levels of knowledge.

Semiotics had always problems whenever its analysis tried to face non-linguistic contexts. Dependence on language has always been a problem: if we believe that the threshold of semiotics, also from a philosophical point of view, coincides with the second stage of cognition, the dependence of language is then an obvious consequence. But if we think of meaning as a general phenomenon, always present where life is present, then semiotics cannot avoid to confront this challenge.