

GENETIC EPISTEMOLOGY AND NATURALIZED EPISTEMOLOGY

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When I started studying philosophy at the *lycée*, the very first book that I read happened to be Piaget's *Sagesse et illusions de la philosophie*. I hated it. It explained that philosophy can, to some extent, keep its traditional role of searching for wisdom in the practical domain, but that it is no better than poetry when it tries to say things about the nature of the world, and even when it sets to itself the role of giving a critical examination of the scope of our knowledge of it. Only from within scientific inquiry, Piaget argued, could one give such an account, and the philosopher had to become a scientist himself to be able to say interesting things about theoretical matters. I disagreed, because I thought that confining philosophy to the quest of wisdom was, in spite of the apparent nobleness of this grand aim, a way of leaving it with a *peau de chagrin* and of dismissing it altogether. It took me more than twenty years to realize that Piaget was right. But I have come to reach more or less the formal operational stage in philosophy— or at least I hope— and it's too late for me to come back to the sensorimotor stage in this discipline, so that I could start again on the right foot to have a chance of becoming a little scientist. I agree now with Piaget, but still not completely. The purpose of this paper is to explain why Piaget was *almost* right.

About a century ago, logicians such as Frege and philosophers such as Husserl have established what we may call the official doctrine of philosophers about the relation of their discipline to psychology. They have argued that psychology, as an empirical science, has nothing to do whatsoever in any genuine account of knowledge, for knowledge deals with *objective truths* and not with *subjective psychological processes* or states, with the *reasons or justifications* of our beliefs and judgments and not with their *causes*, with the *normative* properties of knowledge and not with the *natural* properties of our mental equipment. This set of confusions— of the objective with the subjective, of reasons with causes, of the normative with the natural and the descriptive, and of the *a priori* with the empirical — has been labelled *psychologism*, and considered as the original sin of

any sort of naturalistic analysis of knowledge. Psychologism in the domain of knowledge involves, according to the official doctrine, a fallacy which is no less pervasive than the naturalistic fallacy in the domain of ethics, of trying to derive “ought” from “is”, or of trying to draw, as Kant said, morality from life, moral norms from empirical facts.

The revolt against psychology and psychologism has been one dominant slogan of many schools of philosophy during the first part of this century. Two major schools of philosophical thought, phenomenology and analytic philosophy, have, in spite of all their disagreements, agreed on at least this: when one deals with knowledge, one should altogether banish what Husserl called the “natural attitude” of starting with empirical facts of the natural world. The logical positivists made a sharp distinction between the “context of discovery” of scientific hypotheses, by which we inquire in their psychological, historical or social origins and their “context of justification”, which deals with the conditions of their logical validity. They have also made a sharp distinction between analytic statements, true in virtue of their meaning, and synthetic statements, true in virtue of empirically verifiable facts, and considered that philosophy had to do only with *a priori* or “conceptual” matters, concerning the meaning of our statements, and not with any sort of empirical inquiry, in particular in psychology.

The psychologists themselves have, in a sense, agreed with these official doctrines of the philosophers. In their desire to secure the status of psychology as an empirical science, they have insisted that they were dealing only with the natural, factual, or causal side of knowledge, not with its normative, *a priori*, or rational side, which they considered as irrelevant for their investigations. Indeed at the very time when psychologists were leaving the philosophy departments and were creating their own university departments, the philosophers were slamming the door upon them¹.

Today the situation is, in many respects, not very different, but in other, important respects, it has changed. A number of philosophers have challenged the analytic/ synthetic distinction, and denied that there is any strong dividing line between purely conceptual matters and empirical matters. They have, to a large extent, moved away from the “linguistic turn” characteristic of the analytic school in philosophy. A number of philosophers of science have challenged the distinction between the context of discovery and the logic of justification. And, last but not least, the so-called “cognitive revolution” has reached the shores of the philosophical island, and a number of its inhabitants are today much more doubtful that they can inquire about knowledge without looking at what cognitive scientists have to say about it. This has led some to think that, in many ways, we have returned more or less to the situation which was prevalent before Frege and Husserl’s rejection of psychologism, when naturalism was prevailing in the theory of knowledge, when Mill, Mach, Haeckel, or Baldwin were its leading stars. We are no more evolutionists in the sense of Spencer, nor associationists in the sense of

¹ The phrase is borrowed to Elliott sober (1978)

Mill, but we can afford to be sophisticated neo-darwinians and computational cognitivists. Today's slogan is that epistemology, the theory of knowledge, must be, after Quine's phrase, "naturalized". On one reading of this slogan, it means exactly what Piaget himself was recommending: the theory of knowledge must become the psychology, or the biology of knowledge, or at least must be continuous with them, even if the ways of naturalisation are often not the same as Piaget's.

The question that I want to ask here is this: can a naturalized epistemology really account not only for knowledge in general, but also for our *concept* of knowledge, as it is usually conceived by philosophers when they inquire, in an *a priori* and conceptual manner, about the features of this concept and build theories about it? By changing the *doctrine*, are not the proponents of naturalisation simply changing the *subject*, that is talking about something else? In particular, when they propose that we could consider knowledge as something equivalent to the natural processes and states of "cognition", which would be causal and lawful, are they not simply ignoring the very *normativity* of the usual concept of knowledge, and thus are they not simply reverting to the psychologist's naturalistic fallacy? In other word, can naturalized epistemology be really *epistemology* at all?

In the first part of this paper, I try to show how we can escape this dilemma, and keep the naturalism while still accounting for the normative features of knowledge. This implies that one tries to understand better the nature of the desired form of naturalism, by distinguishing it from its reductivists versions (the "nothing but" syndrome), as well as understanding better the normativity in question. In the second part of the paper, I try to explain why it seems to me that Piaget was aware of these difficulties, and proposed in fact something like the non reductivist version of naturalised epistemology that we are looking for. But I say only "something like", because he does not seem to me to escape completely from these difficulties. This is why I think that, in a more specific sense, he was only *almost* right.

I

Let us start with a truism. The theory of knowledge deals with knowledge. So we better had to know what we are talking about. Let me first recall you what are the main features of this concept, by providing what the philosophers are generally supposed to be good at, that is giving a sort of *a priori* conceptual analysis or definition of it. This seems to beg the question against a naturalised epistemologist, for he precisely challenges the presupposition that we can give such an *a priori* philosophical or conceptual analysis, which would rely on our pretheoretical intuitions about it. But we have to start somewhere, and we could not even explain knowledge in terms of natural psychological or biological processes if we could not say what it is that we are explaining.

The traditional analysis of the concept of knowledge can be found in Plato's *Theetetus* , and, in its general form it is still the one that you can find in the contemporary philosophical literature, especially within the analytic tradition. It goes like this:

(K) X knows that p if and only if

- (a) X believes that p
- (b) p is true
- (c) X is justified in believing that p .

This is just Plato's definition that "knowledge (*epistémē*) is true (or correct) belief or opinion (*doxa*) together with reason or justification (*orthos logos*). The definition is vague unless we are more precise about what each term means. First knowledge, on this definition, is *knowledge that*, or propositional knowledge; it is, in the contemporary philosopher's idiom, an intentional state, or a propositional attitude. This implies that it is not *knowledge how*, or implicit or tacit knowledge, that we are dealing with. This is related to another feature of the definition: in order for knowledge to be knowledge, one must have *belief*. Belief could be also understood as a dispositional state, of an implicit kind. But it is understood here as an explicit one, or at least as an implicit one which would involve some relation to a proposition or an intentional content. Hence the phrase used: "belief that p ", where " p " is a proposition. This seems to rule out perception, and to concentrate upon *judgment*, as a state which can be articulated linguistically, at least potentially. But in fact it rules out perceptions only in so far as these are not conceived as propositional states. This account for condition (a). Condition (b) has to be added, because it goes with the notion of knowledge that the beliefs on which it is based are *true*. This is just a matter of definition: somebody who would have a false belief p could not be said to *know* that p (i.e. "I know that p but p is false" is an absurdity). Another condition has to be added, for, as Plato showed, somebody could have true beliefs, but arrive at them through some sort of chance or luck, and so not have *knowledge* of p . Therefore (a) and (b) are only necessary for knowledge, but not sufficient. Hence condition (c): for true belief to be knowledge, the subject must in some way be *justified* in believing truly that p , to be in some sort of specific relation to p . If we abstract from the fact that we have not yet defined what a true belief is, and not defined truth itself, the tricky element is to define what *justification* means. This means, in ordinary terms, that the subject must have a *reason* to believe that p truly, but what is the nature of the appropriate relation of being a reason with respect to what it is a reason for? Here philosophers tell us different stories. Some say that for a true belief to be justified, it must be in some sense *founded* or *based* on other basic or primary beliefs, or be itself such a belief. Others say that it must *cohere*, or be in some logical or other sense, consistent with other beliefs which sustain it. Others that the beliefs must be obtainable by a *reliable* method of investigation. The theory of knowledge begins, for philosophers, when we try to spell out the meaning of this relation of justification. And there are strong divergences in the answers, which all constitute philosophical theories of knowledge.

As one can see, Plato's definition, as stated here, is far from complete; it contains many gaps, and it fails to give necessary and sufficient conditions for knowledge. Indeed some philosophers think that no such necessary and sufficient conditions can be given, and that we must rest content with this approximate definition, for knowledge is not a natural kind, which could be defined in, say the way we define water as being H₂O. But be it as it may, this is enough for my purposes. When philosophers say that the concept of knowledge is a *normative* concept, they mean in general three things. First they mean that the features and conditions of knowledge (a)-(c) are more or less definitional of it: something would not be knowledge if it did not contain these elements. "Normative" here refers to the conceptual, *a priori* features in question, considered to be attached to it as a matter of *conceptual necessity*. Second the concept of knowledge is normative in a more specific sense, which comes with condition (c). In order for a true belief to be knowledge, we must in some sense *evaluate* it, to confer upon it the property of being *correct* and incorrect, in whatever sense in which we could cash out this notion. We ordinarily suppose that this implies that there is some *rational* evaluation, but even a "mad" evaluative property could fit this bill. For instance we could say that a true belief is knowledge only if it is *kascher* or written somewhere in the Bible or the Coran. This would be, I assume, crazy (although I do not want to offend anybody of religious persuasion), but it would still retain the normative-evaluative element I am referring to. This also indicates that we can say that the philosopher's concept of knowledge is normative in a third sense: it is normative in the sense that there are different ways of understanding and spelling out the nature of the justification relation. In other terms the normativity comes here at a meta-level, the level at which we can evaluate the nature of the evaluative justificatory relation itself, and disagree, rightly or wrongly, with the other accounts, and try to defend our own account of it. "Normative" means here that there is room for an appraisal, critical or not, of the normative properties of knowledge themselves.

I have located the normative properties of the concept of knowledge in the justification relation alluded to in condition (c). But in fact the evaluative element enters also the sub-parts of the definition. It seems to belong to the concept of belief itself that a belief can be correct or incorrect, and it seems also to belong to the concept of truth itself that truth is a normative property. Truth is a property of our beliefs that it *worth* having, at which our beliefs *aim*.. It's not, on this view, simply a factual matter that our beliefs are true: they better have to be so, and not false, if they are to perform their role as building blocks of knowledge. This point, that truth is a normative and evaluative concept, is contested. But it is also one of the senses in which knowledge as true justified belief is said to contain a normative dimension.

The naturalists, and especially the psychologists who are naturalists— as I assume that most scientific psychologists are— may react at this point by claiming that the philosopher's definition of knowledge begs the question against them. First, as I have already said, it assumes that a "pure" or "a priori" definition of

knowledge can be given from our intuitions, and independently of any empirical investigation. Second, the definition seems to exclude certain apparently natural senses of the notion of knowledge which are precisely investigated by psychologists: knowings-how, skills, implicit knowledge, or perceptual non-propositional knowledge, if such there be. And third, it assumes that the so-called normative elements in the definition are somehow irreducible and not susceptible of a further analysis, which could reduce it in factual or descriptive terms. In particular, are not evaluations, or judgments of value, or the idea that our beliefs can be true and rational, or justified, susceptible of being analysed as the outcome of certain psychological processes of a complex, but perfectly ascertainable, factual nature?

The philosopher here has a standard reply, which is in a sense the same as the argument from the naturalistic or psychologistic fallacy: we cannot derive the normative from the factual, for the derivation would be circular. It would presuppose, in the naturalistic *definiens* or *explanans*, the very normative properties of knowledge which are contained in the *definiendum* or *explanandum*. The point can be illustrated with the notion of knowledge itself, as I already mentioned above. Suppose, for instance, that we say that something is knowledge if it is the regular outcome of certain cognitive processes and representations, which intervene between the stimuli of an organism from its environment and its behaviour or its actions, and that we call these processes and representations, whatever they are, “cognitions”. But these “cognitions” would constitute knowledge only if they could, in some sense, instantiate the normative properties of our ordinary notion of knowledge itself, as they are codified by our conceptual analysis. For otherwise it would always be open to an objector to such an analysis that its proponent has only dealt with *apart*, even if it’s an important part, of what *we* call knowledge, and hence that the analysis is at best incomplete, or at worst circular. It would be incomplete, because the element of justification would be missing: a subject could have such cognitive states without ever knowing that he has them, and without being in any sense able to evaluate them. It would be circular, the objection goes, because we have simply assumed that the so-called cognitive states already constitute knowledge. The point can also be illustrated, most familiarly, with other normative concepts, such as, prominently logical concepts. Suppose that we want to account for our concept of, say, logical negation and logical inconsistency between proposition through an analysis of some psychological states of our judging (consciously or not) that two propositions, or schemes, or images, or whatever, are in some sense *incompatible* and, to use Mill’s or Bain’s phrase, “destructive of one another”. This would not, however, amount to a real analysis of the intended concept of negation or inconsistency, because the very notion of “incompatible state” or representation already mentions the notion of negation or of contradiction between propositions. One can find, in Frege or Husserl’s polemics against psychologists, numerous examples of this kind of circularity argument. The fact that they addressed the associationist psychology of their time does not seem to affect the fact that a

number of more refined and very different kinds of psychological explanations are guilty of the same vicious circularity. The well known point, argued at length by Frege and Husserl, is that logical concepts, such as negation, and the inferences that they licence, are normative, and that one confuses the causal properties of the representations of processes which underly our performance of these inferences, with their normative properties. Truth itself just becomes the recognition of truth, and thus loses its objectivity and normativity.

The circularity argument can be summarised through a well known apologue (which was first used by an unorthodox disciple of Kant, Jacob Friedrich Fries, and then by Schopenhauer, and later by Popper and some his disciples to deal precisely with some versions of evolutionary epistemology). The baron of Münchhausen is famous, among other things, for having, one day, succeeded in performing the following feat: he drew himself out of a swamp, together with his horse, by pulling up his hair with his hand. The naturalist psychologist does the same, by trying to draw out the normative properties of thought and knowledge from their natural, swampy, properties. But this is cheating, and we know that Münchhausen was a liar. The morals of the story is that would be nice indeed if we could perform the trick, but it is a best wishful thinking to believe that we could.

It is now high time that we consider the possible answers that the naturalised epistemologist can give to such a threat. There are two possible answers.

The first one has already been indicated. We could call it the “so what?” response. It consists in simply rejecting the philosopher’s definition of knowledge, and to say that the naturalised epistemologist can discharge the obligation of defining, or even in a looser sense characterising, the notion of knowledge. In this sense he says that he is not trying to do what the a priorist philosopher is saying that he does: giving a descriptive and naturalistic account of the notion of knowledge and of other normative concepts related to it. For there are only particular scientific descriptions of natural processes, in neurophysiological, biological, and causal terms. This is Quine’s answer, in at least a number of his writings where he proposes the notion of a naturalised epistemology. According to him such an epistemologist has only to describe, in behavioural, and non intentional terms, the relations between an organism and its environment. There exist only causal relations. Since these relations are only causal, they contain no intentionalistic elements, such as notions like belief. The concept of truth itself contains no normative elements. It consists simply in the fact that we can pass from certain sentences such as “ ‘Snow is white’ is true iff snow is white” to “disquoted” sentences such as “snow is white”, according to Tarski’s famous equivalence schema. And there is no need to ask for questions about the justification, validity, or rationality of knowledge claims. Hence traditional questions about the validity of our knowledge, such as the problem of scepticism

do not arise: as Quine says, the only doubts are scientific doubts. Radical or transcendental doubts, such as those of which philosophers are found of, are just *irrelevant*. Epistemology keeps its name only by courtesy. In fact it is eliminated, because there is no such things as what we ordinarily call knowledge: it can be reduced, all the way down, to causal processes.

Quine's version of naturalised epistemology is of course behaviourist, in the Skinnerian style. But the same "so what" response can also be given from a neuroscientific standpoint (Patricia and Paul Churchland), or even from an evolutionary neo-darwinian standpoint (Donald Campbell). We describe how the brain works, or how our species has adapted, through a series of blind random variations and selections. It's only our illusion to think that our claims to knowledge are "justified". For at bottom the processes which account for selection are blindly causal.

From a psychological point of view, this deflationary answer is unsatisfactory: for it does not even try to explain why we can have the feeling that our claims to knowledge are justified, and that we can engage in such activities as assessing our beliefs and call them "knowledge". From a logical point of view, it is self-defeating. For although it proposes to get rid of the very ordinary notion of knowledge, it nevertheless purports to give a *theory* about it, and to *claim* that this theory is correct; but how can this be done, if one does not even admit that we could speak of the truth or of the correctness of this theory? How could the eliminativist just say that he or she *believes* in his own theory to be true if the concept of belief itself is empty? This just seems to illustrate that it is not easy to dispense completely with such normative notions.

This suggests a second reaction. Perhaps the naturalised epistemologist does not need to deny that the concept of knowledge and the other notions of epistemology have a normative character. But he may try to explain them through notions which, although they are normative, can lend themselves to some sort of naturalistic analysis in psychological or in biological terms. In this sense, what the naturalised epistemologist has to do first is to find an appropriate equivalent of the troublesome evaluative notion of justification.

This is what some contemporary philosophers- epistemologists have done. In a number of works, and in particular in his book *Epistemology and Cognition*, the American philosopher Alvin Goldman has suggested that the notion of justification could be analysed further in the following way:

(1) X knows that p iff p is causally related in any appropriate way, with the fact that X believes that p .

Since it tries to cash out the notion of justification in terms of a causal relation, this is sometimes called the "causalist" analysis of knowledge. The proposal is to characterise the relation as causal, in order to account for the causal processes which make knowledge possible. This processes must not be simply

causal in the sense of being descriptive. They must also have a normative element. Goldman proposes that this element is provided if we use the idea that these causal processes must not be just any sort of causal processes. They must be *reliable* in the sense that they lead, in a secured way, to a large number of true beliefs, which are thus justified if and only if they are the outcome of these reliable processes. According to Goldman, when we talk of the justification of our beliefs, we are just in fact talking about the reliability of the processes which lead to them, and which produce a high proportion of true beliefs.

This is an *a priori* analysis, just as the traditional definition. But it can be backed by an empirical psychological analysis, for we have the means to investigate the nature of these processes. Here we can use the concepts of cognitive psychology, and the duality between process and representation. By studying the cognitive psychology of perception and of memory, of logical deductive and inductive inference, of imagination and of various sort of problem solving and of heuristics of the individual. Which of these processes are reliable? Which lead us to less errors than others, and what are the conditions of their correct functioning? Goldman's programme consists in using an informed psychology in order to assess knowledge claims.

His analysis does not get rid of the normative notions. He still talks of normative justifications. But he tries also to give a factual analysis of them. This looks attractive, and seems to escape the Münchhausen problem. But a number of problems remain. First what is the criterion of reliability? Goldman suggests that it is that the causal processes are "appropriate" or "normal". He could just as well have said "correct", but then we step back onto a normative notion, and how are we to define it? He tries to define it, by saying that the processes in question must be able to produce a *high proportion* of true beliefs, which he estimates as equal or superior to 50 %. But what does this fancy arithmetic mean, and how can it be ascertained? Second, what is reliability itself? The criterion just mentioned seems to suggest that it could be unnoticed by the subject, that is unconscious and external to his access. But then how can we say that reliability give us an equivalent of justification, if justification and knowledge are properties to which the subject must be able to have a conscious access? How could we be justified without believing that we are? How could we be engaged in the task of revising our beliefs and improve our knowledge, if all this happens through processes to which we have no internal access? What is a norm, or indeed a rule, which could not been recognised as such or ascertained by the subject itself, and he could not check with the help of the evaluation of others, as teachers of the norm?

For these reasons, and for other technical ones into which I shall not enter here, the reliabilist proposal of naturalised epistemology does not solve really our problem. At best it is bound to appeal to the normative features that it wants to explain "naturalistically".

There is another solution, which I shall only indicate (for lack of time). It consists in adopting a version of darwinian evolutionary epistemology: our knowledge feature are just those which have conducted our species to adapt. But

how can we, on such a view, account for the normative features of knowledge? The trick here consists in suggesting first to replace the notion of reliability by a *functional* notion, the notion of proper functioning of our cognitive processes. This is a normative notion, because a proper function is a function which is *normal*. But it can be also reduced to a causal notion, if we tie the function itself with the causal circumstances, through natural selection, of its historical origin in the species. Thus teleology is, by the usual maneuver, discharged at the causal level. Second we could account for the fact that certain of our beliefs and principles of inference appear to us to be justified and obvious through the fact that these are precisely the beliefs and the principles which have had an adaptive role and which have enhanced inclusive fitness. Upon this view, there would be a sort of natural preestablished harmony between what we experience as justified true beliefs, principles or methods on the one hand, and the effective reliability of these beliefs, principles and methods. This is nice, but it explains only the fact that some cognitive mechanisms for producing the beliefs have evolved, not the production of the particular beliefs and inference which we have come to have, and the feeling of their obviousness only in a very general way.

In spite of all their difficulties, I want to suggest that such views, reliabilist and teleological-evolutionary, are on the right track, at least in the general sense. What they have in common is both the recognition of the normative dimension of knowledge and an attempt to come to grips with at least some sort of causal explanation of it through natural factors. They do not try to escape from the circle of normativity or the Münchhausen problem. For there is no way to avoid it. This does not mean that these attempts are wrong. It only means that we have to think of the circle as virtuous, instead of as vicious.

The suggestion is that there is an intimate relationship between the normative “superior” dimension of knowledge, the one that we can analyse in more or less conceptual, abstract, and a priori terms, and its underlying causal nature in natural “inferior” processes of a psychological and biological nature, for norms are not floating in some mysterious platonic or transcendental realm: the normative is not independent from the factual, it *emerges* from it. Now the notion of emergence is suspect to many, and justly so. It has the flavour of a creeping dualism, where the normative element in our thought could be more or less detached from its underlying causal basis. So I would rather prefer the notion that a number of philosophers have proposed to replace it, the notion of *supervenience*. Supervenience, in the version that I would advocate, is not a relation of bilateral determination nor of reduction. It is a relation of determination of some “supervenient” properties by “subvenient ones”, with the former being reduced to the latter. I would take a lot of time to explain the nature of the appropriate relation, but the thought is this: norms depend from natural facts, but they are not reducible to them.

II

Let us now, at last, turn to Piaget and genetic epistemology. My initial question, you remember, was: is he a naturalised epistemologist, and does he escape the kind of difficulties that I have described, and if so how?

It seems to me obvious that genetic epistemology is a species of naturalised epistemology, for it attempts to account for our knowledge, natural and scientific, through an analysis of its growth through biological, and then cognitive-developmental structures, and because development is a natural process. As I already said at the beginning, he disavows the idea that the theory of knowledge could be made only at the normative, conceptual level. His main targets here are not modern analytic philosophers, whom he never read, but the Kantian transcendental approach to knowledge, which (with some qualifications) he rejects, and the logical positivist method of an analysis of the meaning of scientific statements. He believes that epistemology cannot be made in such an a priori way, be it based on a transcendental subject or on a logical analysis of meaning. He sees, as I said, genetic epistemology has continuous with psychology, and indeed as a special kind of psychology, his own brand of developmental psychology. But does Piaget falls into the traps that philosophers have usually denounced in such attempts? On the positive side, I want to indicate that he does not, and that his own solution is in fact close to the one that I have suggested. On the negative side, I want to indicate that he still encounters encounters problems with his account on the normative dimension.

First the positive, bright, side. I see four faces of it. 1) Piaget is well aware of the psychologistic fallacy in logic, which he himself denounces in a number of places (for instance in *La psychologie de l'intelligence*). For him the logical structures studied by logicians are perfectly abstract, structural in the formal sense of the term, and it is not the aim of genetic epistemology to put forward a latter day version of the empiricist view of logic which was proposed by Mill and Bain, among many others. But he does not want to say either that they are, as Frege and Russell conceived them, purely platonic structures independent of the knowing subject. Indeed, as well known, he wants to account for the way in which they are acquired, through a series of processes of internalisation of operations which are, in their very nature, tied to actions. The resulting effect, logical thought at its maturity, is the product of this development. But it is the product of a series of assimilations which are neither preprogrammed in the mind nor completely causal in nature. 2) This feature is linked to the second one which I want to emphasize: the knowing subject does not passively receive its knowledge structures; he elaborates upon them, and he comes to evaluate them, espacially through the dynamical revision of belief and knowledge. Thus the normative element in the notion of knowledge is recognized by Piaget. As we have seen this element is linked to three senses of the notion of “normativity”: conceptual necessity,

evaluative justification, and meta-level evaluation of evaluations. These features come in the forefront in many studies of logical thinking, where he acknowledges the sense of *necessity* that is attached to logical norms and principles, and in many studies about the notion of knowledge where he stresses the point on the *necessity* of the relation of justification which is felt by the subjects when they claim to know. When we claim to have knowledge of an item, we evaluate it. This modal element is present in every norm, and it has been also studied by Piaget, perhaps in more detail, about moral norms, in *Le jugement moral chez l'enfant*, among other studies. The leading idea here is not very different from that which was proposed by many logicians which defended the idea that logic involves norms and ideal principles of deductive reasoning just in the same sense as the sense in which morals involve norms of deontic, practical reasoning. 3) Third, as Professor Richard Kitchener remarks in his book on Piaget's theory of knowledge (Yale 1986, ch.5), we can make the very distinction between the first level of normative evaluation and the second level of evaluation that I have made above. There is on the one hand what Kitchener calls "normative epistemology", or "epistemology proper", which deals with the question: "How is knowledge (developmentally) possible?", and there is on the other hand what Kitchener calls "meta-epistemology", which raises questions about the relationship between genetic epistemology and the history of science. 4) Finally, the account given by Piaget of the relationship between the normative conditions of knowledge and the natural world seems to be just in the spirit of the non-reductive kind of naturalism that I have advocated.

Now on the darker, more negative side, we can remark that the normative level is not sufficiently distinguished from the empirical and natural one. Professor Kitchener, in the book just mentioned says that "the aim of epistemology may better be put by saying that epistemology is the study of the constitution of valid knowledge." (p.133). Yes, but in what sense of *valid*? Let us consider briefly the logical case. Remind yourself of the famous story of Achilles and the Tortoise, as it is told by Lewis Carroll. Achilles wants to make the Tortoise accept the conclusion of an argument of the *modus ponens* or detachment form: *if, if p then q, and if p, then q*. But the Tortoise refuses to draw the inference, although she agrees that the proposition is true. She fails to recognize the distinction between a true proposition and a *valid principle of inference*. Or, if you want, the question asked by Lewis Carroll is: how can logic move the mind? It's not sufficient that we have valid principles. We must understand also why we *ought* to follow them, that how we can apply our normative principles. From a Piagetian point of view, the question: "How can logic move the mind?" does not make sense and cannot arise, because logic is, in a sense, already in the mind. Not, as I have said, in the sense that its structures would be, so to say, already there in our mental equipment, but in the sense that they develop. But then we still have to understand why we can make the distinction between true propositions and valid principles of inference, which are normative. But it's not obvious how this distinction can be made within genetic epistemology. Professor Kitchener says (p.28) that it "contains both

empirical aspects and normative ones”, but this is not enough. We want to understand not only how they can be articulated, but also how they can be distinguished from each other in the first place. It looks as if I am, here again, pressing the philosophical point which motivated the normative definition of knowledge that we have considered, and that the genetic epistemology can answer that he does not need to work at this normative *a priori*, level. Piaget considers the Kantian question of the conditions of possibility of knowledge. But this is immediatly to dismiss it. He says (in a paper of 1978 in *American Psychologist*, “What is psychology?”) that “transcendental” simply designates what, in knowledge, comes not from the object, but from the structures constructed by the subject” (p.649, quoted in Kitchner, p.78). The notion of a prioricity is not dissociated from the notion of chronological priority, and it is genetically constructed. So far, so good. But isn’t there another notion of a prioricity, which is the one that I have advocated, and which as to do with understanding the normative conditions of the *concept* of knowledge (not of knowledge itself)? In that respect in what sense exactly is an epistemic stage *epistemic*? In what sense does it involve structures which cannot be described only as causal, but as involving a normative element? (see, e.g., the case of perception, of which Piaget (1950 a, *Introduction à l’épistémologie génétique*, says that it is “irrational” in its more elementary compisitions (Kitchner,p.46): what, by constrast, is a piece of knowledge which is rational?). I do not find clear answers to such questions.

Let me end by some suggestions, about how we could try to understand better the relationships between what I have called the normative dimension of knowledge and its natural dimension.

First we can, and should pursue Piaget studies about the genetic origins of the notion of necessary knowledge, and of modalities such as necessity, possibility and contingency, in order to give a constructive account of such notions (this is largely what Professor Leslie Smith does in his recent book *Necessary Knowledge*, L. Erlbaum, 1996).

Second, we should pay more attention to what seems to be a basic feature of normativity. I have said that normativity comes in mostly through the possibility that a subject has of evaluating his own states of cognition, his own beliefs, and his own knowledge, through some sort of reflexion. This is, of course, what corresponds to “reflective abstraction”, in Piaget’s sense, and it has also something to do with the concept of inhibition. It is fundamentally, the possibility of having not only representations, but also met-representations, not only beliefs, but also beliefs about one’s beliefs. Here the work on the child’s theory of mind is highly relevant. The question arises, in this field, of whether this metareprentative ability of whether it is modular, and domain specific, or not. But we can try to marry the two perspectives, in the way Professor Karmilov-Smith does when she studies the processes of redescription of informations which occur at the level of reflexive jugment of the mind over its operations, in her book *Beyond Modularity*.

Third, in a less Piagetian vein, we should stress another essential feature of normativity. I have spoken, until now, of norms of knowledge as if they could be only, so to say, internal to the subject. But even if it is necessary, it is far from sufficient. A norm, or a rule is norm not only if we can recognise it, in a reflexive manner, but also if it can be taught to us by others, and if we can confront our understanding of it through checking how others understand it. It thus belongs to the concept of normativity that it has an essentially intersubjective, and indeed social dimension. Little, it seems to me, is said by Piaget about this dimension, which has also to do with language and the integration, by a subject, of linguistic rules and norms. In a sense, this social and linguistic dimension has been with the philosopher's account from the very start, since their normative conceptual definition is given at the level of developed, reflexive, and conscious thought. It may well be an account only at this level. But this level, I have tried to show, is indispensable, even when one tries to understand the psychological developmental processes which underly it.