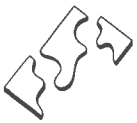

The Piagetian Picture of the World

David W. Jardine
University of Guelph

Jean Piaget's genetic epistemology has given rise to a proliferation of empirical research into child development and to practically effective teaching techniques for early childhood educators. What is left unaddressed in such efforts is the question of the overall picture of the world out of which such efforts arise and in which they are grounded. This paper is a reflection on the Piagetian picture of the world and how the question of our place in the world arises as a feature of that picture.

It could be maintained that empirical research and effective teaching practices do not need this sort of philosophical reflection on the question of "grounds" in order to proceed. In fact, Piaget maintains that such philosophical reflection is simply unnecessary. According to Piaget, a thoughtful relationship to the project and products of a scientific enterprise can be accomplished "due to the reflections of scientists themselves" (Piaget, 1947,[1] p. 90) and "the need to reflect on principles can . . . be satisfied without scientists being obliged to turn to academic philosophy" (p. 92). Put even more strongly, Piaget says that "the sciences are self-sufficient and alone guarantee their own reflection" (Piaget, 1965, p. 225).

As someone presently involved in teaching young children and training student teachers in a laboratory school setting, I find this boast of scientific self-sufficiency both dangerous and misleading. What it does is close off a scientific understanding of adulthood, childhood, and their interrelationships from any sort of questioning other than those that orient to maintaining that self-sufficiency. What it does is close off science from the whole complex of human life in which the question of our place in the world arises and in which Piagetian science arises as one possible response among others to that question. What follows is an exposition of the Piagetian picture of the world, i.e., an attempt to expose the ground for Piaget's claim to science's self-sufficiency and the image of ourselves, of children, and of who we can be in relation to each other that such a picture produces. Following this will be some preliminary reflections on the place of the Piagetian picture in the practice of teaching young children. It is there that a Piagetian orientation already holds sway and there that the question of our place in the world, and the place we might want children to inhabit, arises in powerful and compelling ways.

Introduction

In his essay "Problems of Genetic Epistemology" (1956), we find Piaget wishing to "not only communicate some of the recent results of research, but also to indicate the spirit in which it was undertaken" (p. 116). In reviewing several of such indications throughout Piaget's work, we will gain some sense of the "ground plan" from which the Piagetian picture of the world unfolds.

Piaget states in his essay that "all research in scientific psychology must start from principles of development and the formation of mental mechanisms in the child best explains their nature and functioning in the adult" (p. 116). He immediately goes on to add that "in the field of intelligence, for example, it is impossible to furnish exact psychological interpretations of logical operations, the concept of space, time, number, etc., without previously studying the development of these operations and concepts" (p. 117).

For Piaget, then, in order to provide such an "exact psychological interpretation" of the nature and functioning of the mental mechanisms of the adult, it is not sufficient to merely review or repeat the account given of such nature and functioning *in* a given realm of scientific activity. In order for that nature and functioning to be fully understood, how the concepts, categories, methods, and operations of a given realm of science *come to be given* must be examined. In order to provide such an "indispensable genetic dimension" (Piaget, 1956, p. 116) to our understanding of such mechanisms, "the concepts and categories of established science such as those of space, time, causality, number and logical classes, have been studied as they develop in the life of the child" (Inhelder, 1969, p. 23).

But the use of this phrase, "in the life of the child," should not mislead us into confusing Piaget's work with some form of child psychology. The latter is concerned with "the child for his own sake" (Piaget & Inhelder, 1966, p. viii), "the child himself" (Piaget, 1973, p. v). Genetic epistemology, on the other hand, "has as its object the examination of the formation of knowledge itself, that is to say, of the cognitive relations between the subject and objects" (p. v). It is in light of this orientation, this "spirit of research," that "children" and "adults" form features of the Piagetian picture of the world. "Children" and "adults" are of interest only insofar as they provide the occasion for the study of the development towards and possessing of the concepts and categories of established science. And insofar as Piaget's genetic epistemology presents itself as an enterprise that is in possession of such concepts and categories as the ground from which its own questioning proceeds, genetic epistemology's account of the development toward and possession of this ground is essentially an *account of itself*, an account of its own establishment. Genetic epistemology is thereby an instance of the phenomenon for which it wishes to provide an account.

The Question of Continuity

Genetic epistemology is concerned with providing what it maintains is an "indispensable genetic dimension" to our understanding of the concepts and categories of established science. That is, it wishes to provide an account of established science that it claims is indispensible. How are we to understand this indispensability? In what sense is our understanding of established science in question such that this genetic dimension shows itself to be indispensable?

To answer this question requires that we read Piaget's question "How, in *reality*, is science possible?" (Piaget, 1970, p. 731) in a particular way. Piaget's emphasis of "in *reality*" does not merely serve to distinguish his psychological-biological approach to this question—what he calls the "questions of fact"—from a more formal, Kantian approach, which is concerned with, so to speak, the "logical" possibility of science.[2] The question of the possibility of science "in *reality*" is a question of the *real emergence of science in the world*. Because of the unavailability of phylogenetic data regarding the evolutionary emergence of scientific thought,[3] the question of the real emergence of science in the world is an ontogenetic question of how we, beginning as biological entities apparently possessed of only the simplest of reflexes, are "destined to master science" (Piaget, 1952b, p. 372). The radicality of Piaget's approach to the question of the possibility of science lies in his contention that the *essential nature* of adult, scientific rationality cannot be fully understood by merely describing its requisite characteristics or properties. What is required is an understanding of how such requisite characteristics or properties are developmentally achieved "in *reality*."

In this way, more than being a straightforward epistemological questioning aimed at "resolving the problem of what is knowledge" by posing the question "how does knowledge grow?" (Piaget, 1970, p. 731), genetic epistemology is a locating or situating of science in the world and, thereby, a locating or situating of ourselves (*qua* scientific knowers) in the world. In order to make our place in the world comprehensible, how we have come to inhabit this place must be understood. To fully understand ourselves, we must come to understand how we have become what we are. In order to understand how we have become what we are, how children are "destined" to become what we are (given a normal development) must be understood.

Thus, at the end of the *Origins of Intelligence in Children* (1952b), we find Piaget speaking against an image of adult, scientific rationality (i.e., intelligence) as an autonomous, self-sufficient sphere whose place in the world can be properly understood without an understanding of how this place comes to be inhabited. But let us be clear that it is not enough for Piaget to simply locate scientific ra-

tionality as "a relationship among others between the organism and its environment" (Piaget, 1952b, p. 19). Adulthood (*qua* scientific rationality) is not merely "alongside" the forms of rationality displayed by children or the "biological apriorities" of the organism. Rather, it is linked and entangled with these in such a way that a study of the "network of relations" in which it finds itself will provide a genetic account of how adult scientific rationality comes to have its particular place in that network, its particular place in the world. Moreover, intelligence is not simply "one among others" in that it is able to pose the question of its own place in the world and propose, set up, and execute a project of research aimed at detailing how this place is achieved. And this ability to pose the question of its own place along with the ability to set up and execute a project of experimental research are some of the many features of its place in the world for which the genesis is sought.

Therefore, we must ask of genetic epistemology: How is a genetic understanding of our place in the world possible? What does such an understanding of our place in the world require if it is to be possible?

These questions refer us to a central concern of Piaget's work as a whole; one that is traceable[4] at least back to Piaget's reading of Bergson, prior to 1914. The answer to these questions provides us with an essential piece of the Piagetian picture of the world. In his *Origins of Intelligence in Children* (1952b), Piaget provides us with the clearest and most concise statement of this concern. He states that "from the fact that the living being achieves knowledge and that the child is one day destined to master science, we certainly believe that the conclusion must be drawn that there is a continuum between life and intelligence" (p. 372). Thus, although "the entire question remains of finding out what is permanent in the course of this evolution and what remains characteristic of each level under consideration" (p. 372), it is Piaget's underlying quest for continuity that provides the background against which the project of genetic epistemology is set out. Although questions of our differences from children and from our biological being arise—questions of "what remains characteristic of each level under consideration"—these differences are (genetically) comprehensible insofar as they are secured, organized, and articulated in an overall picture of the achievement of our place in the world in which some sense of continuity prevails. Were they merely differences, the *emergence* of scientific rationality in the world (i.e., its possibility "in *reality*") would remain incomprehensible.

The "Biological Problem of Intelligence"

The title of the introductory chapter of *Origins of Intelligence in Children* immediately tells us that what is at issue regarding the place and emergence of scientific rationality in the world is the "bio-

logical problem of intelligence." "The question of the relationship between mind and biological organization is one that inevitably arises at the beginning of a study of the origins of intelligence" (Piaget, 1952b, p. 1). Such a statement of inevitability entails that the question of the origins of intelligence already means, for Piaget, the question of the real emergence of intelligence in the world. However, we must not simply contrast this sense of the question of "origins" with one which takes it to mean an investigation of the essential structures of intelligence taken as a "primary, irreducible fact" (Piaget, 1947, p. 17). Rather, Piaget is claiming that there is a way of formulating the problem of "origins" vis-à-vis intelligence which is more fundamental than one which merely details the essential structures that are *peculiar to* intelligence. This way of formulating intelligence is one in which the emergence and place of intelligence are at issue from the outset. The "biological problem of intelligence" is not conceivable for Piaget as a sort of subsequent or additional investigation of a phenomenon whose essence is already understood. Rather, the formulation of intelligence as a biological problem enters into the definition of the essence of intelligence at the outset.

Therefore, Piaget does not begin his investigation by focusing on the distinctive character of intelligence. On the contrary, he begins by formulating intelligence as a *biological phenomenon among others*:

> Intelligence is adaptation. In order to grasp its relation to life in general, it is necessary to state precisely the relations that exist between the organism and the environment. Life is a continuous creation of increasingly complex forms and a progressive balancing of these forms with the environment. To say that intelligence is a particular instance of biological adaptation is thus to suppose that it is essentially an organization and that its function is to structure the universe just as the organism structures its environment. (Piaget, 1952b, p. 4)

This passage provides us, in encapsulated form, with "a coherent picture of the 'sort of device' the subject is and the general principles which guide his development" (Flavell, 1963, p. 264). We are not concerned here to detail all the pieces of this picture but rather to examine the ways in which this picture coheres around three interrelated but distinguishable senses of *continuity*.

Structuring the Universe

According to Piaget, all interactions between the organism and the environment involve a structuring of the environment. "In fact, every relation between the living being and its environment has this particular characteristic: the former, instead of submitting passively to the latter, modifies it by imposing on it a certain structure of its own" (Piaget, 1947, pp. 7-8). Thus, one sense in which there is an essential continuity across development is that at no level of de-

velopment can the environment be conceived as a ready-made organization that simply imposes itself on a passive organism-subject. Rather, the underlying organization of the organism, at any and all levels under consideration, actively structures the environment. Piaget thus speaks against an empiricist conception which "tends to consider experience as imposing itself without the subject having to organize it" (Piaget, 1952b, p. 362).

It should be noted that this notion of structuring the universe, as a feature common to *all* levels of organism-environment interactions, presents us with a radical approach to the question of our place in the world. Specifying the structures characteristic of each level under consideration is not simply a matter of ascribing different underlying structures to each level of the development of an organism-subject that is under consideration in isolation from the world *in which* such differing structures are operative. Inhabiting a place in the world is not a matter of passively residing alongside the world and specifying our place in that world by specifying the peculiar characteristics or properties that distinguish us from other entities. Inhabiting a place in the world is a matter of *actively constructing the world in which we have a place.* Even the egocentric thought of the young child, a form of thought, which, by not recognizing its own active construction of the world, does not assign itself a place in the world it has constructed, even this thought must be conceived as an active construction of the world in which it does *not* place itself.

It should be noted also that this notion of structuring the universe applies to the relationship between genetic epistemology and its topics of inquiry. The question of our place in the world is not a question that is posed to a world that can be conceived independently of how that question is posed. Genetic epistemology's attempt to understand the emergence and place of adult scientific rationality in the world must be seen as an active construction of the world *in which* scientific rationality has a place by means of the concepts, categories, and methods of genetic epistemology's particular version of science.

If we were left with being able to state that the only essential continuity between various organism-environment interactions was that they involved a structuring of the universe, the emergence of the structuring of the universe peculiar to scientific rationality would remain incomprehensible. All that would be possible would be a characterization of each level under consideration by means of an explication of its peculiar structure. Although intelligence is conceived as a particular instance of biological adaptation, "it is necessary to distinguish between the *state of adaptation* and the *process of adaptation.* In the state, nothing is clear. In following the process, things are cleared up" (Piaget, 1952b, p. 5). It is here that a second, more fundamental sense of essential continuity emerges in Piaget's work.

Functional Continuity

Instead of picturing the structure characteristic of each level under consideration as static, autonomous entities, which bear comparison only insofar as *that* they are organizations, Piaget tells us that "the schemata have always seemed to us to be . . . the products of a continuous activity which is immanent in them and of which they constitute the sequential moments of crystallization" (Piaget, 1952b, p. 388). It is here that a second sense of essential continuity across development emerges.

More fundamental than the varying structures of organism-environment interactions are the ways in which these varying structures *function.* The functioning of these structures is "more fundamental" to a Piagetian picture of development in two related senses.

First of all, the functioning of the structures of organism-environment interactions should not be conceived as the activity of a structure that can be properly understood independently of that functioning. Rather than functioning being seen as a particular feature of a structure, a structure is to be seen as a particular feature of functioning, a moment in which that functioning, the process of adaptation, is crystallized into a state of adaptation.

Secondly, all organism-environment interactions *function in precisely the same manner.* Piaget variously uses the terms "functional identity" (1952b, p. 24), "functional analogy" (p. 237), "functional invariants" (pp. 8-13), and "functional correspondence" (Piaget, 1967, p. 3) to indicate that "the essential fact concerning this functioning is, in effect, *absolute continuity*" (Piaget, 1967, p. 141, my emphasis). He stresses, however, that "these functional analogies . . . do not at all imply an identity of structure" (Piaget, 1952b, p. 240). Rather, "from the simplest of reflexes to the most systematic intelligence, the same *method of operation* seems to us to continue through all the stages, thus establishing a complete continuity between increasingly complex structures" (Piaget, 1952b, p. 153, my emphasis).

The terms that Piaget uses to describe this essentially continuous "method of operation" are *assimilation, accommodation* and *equilibration.*

Assimilation is the process whereby features of the environment are incorporated into the structure of the organism. It is a process of "integration into previous structures" (Piaget, 1967, p. 4). Thus, when adult, scientific rationality is characterized by the structures peculiar to it, it must be understood that "a structure is a system of transformations" (Piaget, 1968b, p. 5), a system of ways of operating on the world, and that "the essential aspect . . . is its operative aspect"

(Piaget, 1968a, p.15). And this "method of operation," of which the structures peculiar to scientific rationality are but moments of crystallization, is one that it shares with all forms of structuring the universe.

The other essential feature of this method of operation is the process of accommodation. Accommodation refers to the fact that the organism is often incapable of assimilating all elements of the environment into "previous structures." The process of accommodation is the "result of pressures exerted by the environment" (Piaget, 1952b, p. 6). Already existing schemata are accommodated to new elements in the environment that in some cases, "cause the old framework to crack" (Piaget, 1954, p. 397).[5] In fact, if the structures of the organism were not capable of accommodating themselves to the environment, the process of assimilation would tend to destroy the integrity of the organism by isolating it from the environment in which it finds itself. It would be unable to adapt itself to the world. On the other hand, were the organism seen as purely accommodating of the environment (i.e., not placing its own structural requirements on it), the integrity of the organism as a living organization would also be destroyed.

It is the concept of equilibrium that Piaget uses to avoid these two extremes. Equilibrium is a term used to describe the relation between assimilation and accommodation. For Piaget, adaptation is neither an autonomous assimilatory activity impervious to pressures of the environment, nor is it purely an accommodating activity in which the subject is at the caprice of that environment. Rather, "*adaptation*" (of which intelligence is a particular instance) "*is an equilibrium between assimilation and accommodation*" (Piaget, 1952b, p. 6).

But here, as with adaptation, we must distinguish between *equilibrium as a state* and *equilibrium as a process*. To say that the functions of assimilation, accommodation, and equilibration are essentially continuous across development is not to say that the states of equilibrium that are achieved are themselves in a continuous sequence.

Clearly, then, it is not enough to leave Piaget's picture here since the question of the emergence of the structures peculiar to adult, scientific rationality has not yet been posed. A third sense of essential continuity is required. Understanding this third sense requires both a re-examination of the place of equilibrium in Piaget's overall picture as well as of the equilibrium state peculiar to scientific rationality.

The Telos of Development

In the Piagetian picture of the world, *equilibration is a teleological notion* and, as such, it is an expression of "the fundamental reality about living things" (Piaget, 1967, p. 347).

"If there in fact exists a functional nucleus of the intellectual organization which comes from the biological organization in its most general aspect, it is apparent that this invariant will orient the whole of successive structures" (Piaget, 1952b, pp. 2, 3). These "functional invariants" of assimilation, accommodation, and equilibration will not only "impose on the structures certain necessary and irreducible conditions" (p. 3) but will orient the *succession* of those structures and thus make the transition between them comprehensible.

In this way, formulating life as a "progressive equilibrium" (p. 7) worked out through an ordered sequence of stages entails that the tendency towards equilibrium is not simply a tendency towards any sort of compensation or variation in the organism's structures that will accommodate a new element. Rather, "there is adaptation . . . when this variation results in an increase in the interrelationships between the environment and the organism which are favourable to its preservation" (p. 5). The modifications or variations in the organism that count as adaptive ones are thus not chaotic or undirected. They are directed towards an equilibrium that better preserves or

makes more favorable the relation between the organism and the environment.

It is only in light of this teleological sense of equilibrium that the succession of structures of organism-environment interactions can be seen to be an ordered and comprehensible *sequence*. It is only in light of the *telos* that the *emergence* of the structures peculiar to adult, scientific rationality can be made comprehensible. How does Piaget characterize this *telos* towards which all adaptive modifications in organism-environment interactions are tending?

In *The Psychology of Intelligence* (1947) Piaget states that:

> Every structure is to be thought of as a particular form of equilibrium more or less stable within its restricted field and losing its stability on reaching the limits of the field. But these structures, forming different levels, are to be regarded as succeeding one another according to the law of development, such that each one brings about a more inclusive and stable equilibrium for the processes that emerge from the preceding level. (p. 7)

Development, as a succession of structures oriented towards such stability and inclusiveness, "*tends towards an all-embracing equilibrium by aiming at the assimilation of the whole of reality*" (p. 9).

It seems, then, that the developmental sequence of structures is oriented towards a "final state" of autonomy wherein the

assimilatory schemata have become inclusive and stable to the extent that accommodating to "pressures of the environment" is no longer necessary since such pressures are no longer encountered.

This, for Piaget, is not precisely true. To show this will require a brief examination of one aspect of the equilibrium peculiar to scientific rationality, in contrast to those which precede it. This will show why, for Piaget, although adult, scientific rationality does not present us with a "pure embodiment" of this *telos*, it does present us with the highest (i.e., most stable and most inclusive) form of equilibrium yet achieved by life. It should be noted, however, that since Piaget calls intelligence "an *extension* and *perfection* of all adaptive processes" (p. 7) and since his studies of the origins of intelligence are *invariably* studies of the concepts and categories of established science, perhaps the question of such embodiment should be left, temporarily, in suspense.

Organic and Intellectual Adaptation

It would be at the very least impractical to attempt to delineate all the details of the mechanisms leading from organic to intellectual adaptation in Piaget's picture of the world. By contrasting these two extremes, however, we will be able to better understand how Piaget characterizes intellectual adaptation as that form of equilibrium towards which the organism is tending.

Organic Adaptation

In the case of organic adaptation, that to which the organism must accommodate itself is an "actual intrusion" of the environment (Piaget, 1959, p. 101). It is restricted to compensating for only its own exclusive, "immediate and momentary" (Piaget, 1947, p. 7) contacts with reality. This restriction to the immediate, actual, and momentary entails that the compensatory activities involved remain centered on the individual organism.

In such contacts, not only is the organism incapable of distinguishing between itself and the environment, there is also no differentiation between the processes of assimilation and accommodation themselves. This "state of chaotic undifferentiation" (Piaget, 1954, p. 397) is an unstable and exclusive form of equilibrium since, by being restricted to the immediate and momentary aspects of the environment, the organism must constantly adapt to each new element that presents itself. The schemata the organism does possess are "global" (Piaget, 1952b, p. 35) to the extent that each new element *demands* that this "overgeneralization" accommodate itself to this novelty through the process of differentiation.

Organic equilibrium thus remains "episodic,"[6] but not in the sense that the organism recognizes the "diversity of reality" (Piaget, 1954,

p. 396) and then accommodates to each episode of it. Rather, by *not* being capable of such recognition, each new element can potentially disrupt the equilibrium thus far achieved. The organism displays a "dependence on the *hic* and *nunc*" (Piaget, 1947, p. 9) of both the environment and of its own individual assimilatory activity. Organic adaptation thus "only ensures an immediate and consequently limited equilibrium between the individual and the present environment" (p. 9) since that which it is adapted *to* is restricted to "accidental contact" (Piaget, 1952b, p. 34) of the organism and its actual environment.

Intellectual Adaptation

Intellectual adaptation is not centered on either the individual organism or on the "here and now" experiences of that individual. It is, so to speak, doubly decentered, and such decentering provides it with a form of equilibrium that is more stable and inclusive than organic adaptation. Let us look at these two forms of decentration.

Adult, scientific rationality is not constituted by the activity of the assimilatory schemata of the individual subject. Rather, through a progression of "reflective abstractions (*abstraction réfléchissante*)" (Piaget, 1967, p. 32), how the *individual* organism assimilates the world has become reconstructed to the level of *general ways of operating on the world.* This progression is constituted by an increasing awareness not only that other organisms have "different points of view" on an object, but that the individual shares (or can share) general ways of operating on the world with other subjects. It is thus possible for such general ways of operating on the world to achieve "objectivity" in that a distinction can be made and maintained between the idiosyncratic or "subjective" assimilatory schemata peculiar to any one organism and those which that organism shares in common with others—"processes common to all subjects" (Piaget, 1965, p. 108). Thus, "objectivity does not . . . mean independence in relation to the assimilatory activity of intelligence, but simply dissociation from the self and from egocentric subjectivity" (Piaget, 1952b, p. 366). Objectivity is thereby not a static relation between the subject and an object, but a form of activity that operates in a manner that is decentered away from the exclusive schemata of the individual and towards schemata common to individuals. Objectivity, far from being an inert state, is a common method of operation, a *methodology*. Insuring objectivity is thus a matter of insuring that what is said to be known about an object is generated by strict adherence to this methodology.

Correlative to this decentering away from the individual is a decentering away from the actual situations in which the individual finds him or herself. Scientific rationality is not simply the application of objective methods to actual situations. It is also the projec-

tion and anticipation of "potential" or "virtual" situations (Piaget, 1959, p. 101). The assimilatory schemata of adult, scientific rationality have been objectified to the extent that potential or virtual situations can be anticipated, manipulated, and predicted without the organism having to suffer the impact of an actual intrusion of the environment.

Objectivity is thus a general method of operation in which we already know what can possibly occur and what is virtually impossible. The organism no longer need suffer the impact of every new element it confronts because now its schemata transcend the actual experience undergone by anticipating potential experiences ahead of time. For example, the individual's experience of the world will henceforth be constituted ahead of time as causally connected. Adult, scientific rationality can thus be formulated as an *active anticipation of the world*, which transcends both the individual and the particular situation of the individual by means of a common (i.e., objective) methodology. It is this active anticipation that constitutes the stability and inclusiveness of the equilibrium characteristic of science.

One further characterization is essential, however. It is clear from Piaget's interactionist point of view that the progress of equilibrium towards stability and inclusiveness is not simply a matter of a progressive "conquest of things" (Piaget, 1952b, p. 363) that are conceivable independently of the terms of that conquest. The structures that define *how* the organism conquers things are constitutive of the object it conquers. When Piaget states that "knowing reality means constructing systems of transformations that correspond more or less adequately to reality" (Piaget, 1968a, p. 15), the reality *to which* such systems of transformations are "more or less isomorphic" (p. 15) is not the external world independent of knowledge. Rather, the progressive forms of equilibrium are "increasingly adapted *to the functioning itself*" (Piaget, 1952b, p. 3).

This means, then, that in a Piagetian picture of the world, the form of equilibrium towards which life is tending is not simply characterizable as that set of structures which best parallels the structures of a reality that exists independently of that life. Rather, *the progression of equilibrium is tending towards that set of structures that is best adapted to the process of adaptation itself*. It is one in which "the progress of reason doubtless consists in an increasingly advanced awareness of the organizing activity inherent in life itself" (p. 19). Such an awareness is an "all-embracing assimilatory schemata tending to encompassing the whole of reality" since it is an awareness of the organizing activity in terms of which reality itself is constituted.

In a Piagetian picture of the world, this awareness finds its purest embodiment in adult, scientific rationality. As an active anticipa-

tion of the world, which is a reflection of the "activity inherent in life itself" and the crystallization of it into an objective methodology, science can lay out in advance procedures for dealing with its own disruption. It prepares for such disruption by laying out hypotheses which it can test, such that the potential failure of the hypothesis is already a feature of the procedure of laying it out. It is more inclusive since, as a reflective awareness of the organizing activity inherent in life itself, it already includes a methodological preparedness for the "advancement" of that awareness. It is already prepared to advance to more inclusive and more stable theories (prepared to achieve a higher form of equilibrium). In a sense, then, it "embraces the whole of reality," not by embodying equilibrium as a final state, but by *embodying the essential features of the teleological processes inherent in life itself.* And regarding such a life, if we are to raise the question of our place in the world, it is to objective science that we must turn since science embodies the organizing activity inherent in that life, in light of which this question can arise at all. Due to such embodiment, it becomes obvious why, in a Piagetian picture of the world, the sciences are seen to be self-sufficient and alone guarantee their own reflection. Calling on anything else for that guarantee or that sufficiency would entail turning away from the life out of which science emerges and in which science appears as the extension and perfection of that life.

Conclusion: Reflections on the Practice of Teaching Young Children

A Piagetian picture of the world provides us with a portrayal of the nature and achievement of our place in the world as an ordered sequence of stages, worked out according to a "law of development" (Piaget, 1947, p. 7) that operates independently of any sense we may have of who we are. Self-understanding thus becomes a matter of the objective self-ascription of properties that can be identified both as those we unquestioningly possess and those which children are destined to achieve. The sense of who we can be in relation to each other is thus set out ahead of time as something in which we, as adults, must have a very specific hand.

We not only find ourselves portrayed as *part of* a Piagetian picture, we also find that in order to properly understand and address this picture, *we must already be secured in the sort of understanding of ourselves which this picture portrays.* When Piaget defines scientific rationality as a "decentration" in which we "no longer intervene as an individual or distorting subject, but as an epistemic subject, the condition and instrument of objectivity" (Piaget, 1967, p. 338), this definition refers not only to how we are portrayed *in* this picture, but to who we must be, what place we must already have, in order to *produce* and *sustain* this picture. Genetic epistemology re-

quires at the outset that we put ourselves in the position of being the condition and instrument for the objectivity of a picture of which we are a part. A Piagetian picture thus maintains its integrity by securing itself against any intervention of the subject other than one in which that subject, as an epistemic subject, is dedicated at the outset to maintaining that security.

The question of my place in the world, and the question of the place of children in the world, must thereby be reconstructed at the outset as questions which can be posed *to* anyone and which can be posed *by* anyone. The question of my place in the world, what I am and can be in relation to children, must be formulated as the question of anyone's place. *Before* the specific details of the Piagetian picture of the world are worked out, my place in the world must be already secured as simply "one" of this anonymous "anyone." Such prior securedness in anonymity defines the objective character of the image of ourselves, of children, and of who we can be in relation to each other, portrayed in a Piagetian picture of the world.

In the totality of my involvements with children in the practice of teaching, however, I do not have anonymously secured ahead of time a sense of who I am and can be, who children are and can be, as if what we can be for each other is merely objects to which differing, stage-related properties can be ascribed to and by no one in particular. Rather, my understanding of myself and children, and what we can be for each other, is something which I am compelled to consider and reconsider over the course of our interactions with each other. It is something concretely worked out, concretely achieved and reachieved over the course of those interactions. It is not something worked out or achieved in an anonymous, theoretical picture that is produced by a prior standpoint, method, or approach, which is impervious to questioning in that working out or that achievement. In the practice of teaching, various standpoints, methods, or approaches and the pictures they produce must thereby remain open to being brought into question as *possible courses of action* or orientations that I can take and which must show themselves to have an appropriateness over the course of and in relation to actual teaching situations that arise. Deciding on an approach, then, is a matter of deciding what my place should be in a teaching situation and deciding this in relation to what I see as needed therein. It is at *this* juncture that students new to the practice of teaching have the most difficulty. *There is no methodological guarantee ahead of time that I will be able to see what method or approach is needed.* And this guarantee is *never* forthcoming. This *remains open to question* over the course of the practice of teaching. That practice thereby becomes not a simple matter of the application of a technique to a particular situation, but a matter of bringing into question who I can be, what I can do and should do in that situation, and who I conceive children to be. The question of my place in the world

and the place of children never gets straightened out except over the course of our interactions with each other.

In this way, a Piagetian approach is and remains a *possible practical orientation among others.* That is, it is a possible way of orienting and reorienting myself to children, a possibility to which I can have recourse over the course of the practice of teaching. It is a possibility that is clearly not everywhere and always called for but one that must remain open to the contingent and ongoing question of its appropriateness and place.

The potential danger of a Piagetian picture of the world does not lie in the fact that it produces an objective picture of children, adults, and their interrelations. Rather, the danger lies in the fact that legitimate questioning of our place in the world can proceed in genetic epistemology only as questioning that *follows from* the methods it sets up as the unquestioned ground of questioning. The contingent and ongoing question of appropriateness and place, the sense of our and children's place in the world as something ongoingly achieved over the course of interaction, *and* the sense of Piaget's picture as a powerful and irreplaceable *possibility among others*—all essential to the practice of effective teaching—are covered over in a Piagetian picture of the world under the guise of "objectivity."

But there is a further danger here, one that can only be mentioned in the present context. A Piagetian picture of the world demands of us that we respect the differences between adults and children as real, irreducible differences. The child's conception of the world, by displaying stage-specific characteristics, has a viability and integrity as something legitimately other than an adult's conception of the world. However, what is lost in such an orientation to children's stage-related differences, as pictured in a Piagetian picture of the world, is the potentiality of children to be and become more or other than I might picture. What is also lost is the potentiality of myself to become something other than I might picture myself to be.

Clearly, this notion of potentiality, of possibility, and its place in pedagogical praxis takes us beyond the scope of the present paper. Clearly, also, it takes us toward an image of children that transcends one in which they are pictured simply as "destined to master science," (Piaget, 1952b, p. 372) by means of anonymous, underlying processes in which neither we nor children have any hand. It also takes us toward an image of education as the opening up of possibilities, rather than as the achievement of underlying competencies that are ascribable to children as one would ascribe properties to a thing, and to which both we and children have the "objective indifference" requisite to such ascription.

Notes

1. In order to preserve the chronology of Piaget's work, the dates cited in reference to his work are those of the original publication. Moreover, the bibliography of works by Piaget is organized according to these original dates. It should be noted, however, that page references refer to the translations, not the originals.
2. See Piaget, 1965, p. 55 and *en passim*.
3. See Piaget, 1968a, p. 15.
4. See Piaget, 1965, p. 6 ff.; Piaget, 1952, p. 240.
5. This depending on whether the process of assimilation, as a functioning which is "conservative," is able to withstand this pressure by "subordinating it" (p. 397).
6. See Piaget, 1952b.

References

Flavell, J. (1963). *The developmental psychology of Jean Piaget.* New York: P. Van Nostrand.

Inhelder, B. (1969). Some aspects of Piaget's genetic approach to cognition. In H. Furth, *Piaget and knowledge: Theoretical foundations.* New Jersey: Prentice-Hall.

Piaget, J. (1947). *The psychology of intelligence.* (M. Piercy & D. Berlyne, Trans.). Totawa: Littlefield, Adams and Co. (Translation published in 1973)

Piaget, J. (1952a). Autobiography. In E. G. Boring, et al. (Eds.), *A history of psychology in autobiography, Vol. 4* (D. McQueen, Trans.) (pp. 273-256). New York: Russell and Russell.

Piaget, J. (1952b). *The origins of intelligence in children* (M. Cook, Trans.). New York: International Universities Press.

Piaget, J. (1954). *The construction of reality in the child* (M. Cook, Trans.). New York: Ballantine Books. (Translation published in 1971)

Piaget, J. (1956). Problems in genetic psychology. In A. Tenzer (Trans.), *Six psychological studies* (pp. 116-142). New York: Vintage Books. (Translation published in 1968)

Piaget, J. (1959). The role of the concept of equilibrium in psychology explication. In A. Tenzer (Trans.), *Six psychological studies* (pp. 100-115). New York: Vintage Books. (Translation published in 1968)

Piaget, J. (1965). *Insights and illusions of philosophy* (W. Mays, Trans.). New York: Meridian Books. (Translation published in 1971)

Piaget, J. (1967). *Biology and knowledge* (B. Walsh, Trans.). Chicago: University of Chicago Press. (Translation published in 1971)

Piaget, J. (1968a). *Genetic epistemology* (E. Duckworth, Trans.). New York: W. W. Norton and Co. (Translation published in 1970)

Piaget, J. (1968b). *Structuralism* (C. Maschler, Trans.). New York: Harper and Row. (Translation published in 1970).

Piaget, J. (1970). Piaget's theory. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology, Vol. 1* (G. Gellerier, Trans.) (pp. 703-732). Toronto: J. Wiley and Sons.

Piaget, J. (1973). Preface. In A. M. Battro *Piaget: A dictionary of terms* (E. Rutschi-Hermann & S. F. Campbell, Trans.) (pp. v-vi). New York: Pergamon Press.

Piaget, J., & Inhelder, B. (1966). *The psychology of the child.* New York: Harper and Row., 1972.