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THE PSYCHOLOGY OF INTELLIGENCE

JEAN PIAGET



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PREFACE

A book on the “Psychology of Intelligence” could cover half the realm of psychology. The following pages are confined to outlining one view, that based on the formation of “operations,” and to determining as objectively as possible its place among others which have been put forward. The first task is to define intelligence in relation to adaptive processes in general ([Chap. I](#)), then to show, by examining the “psychology of thought”, that the act of intelligence consists essentially in “grouping” operations according to certain definite structures ([Chap. II](#)). Then, if intelligence is thus conceived as the form of equilibrium towards which all cognitive processes tend, there arises the problem of its relations with perception ([Chap. III](#)), and with habit ([Chap. IV](#)), as well as the question of its development ([Chap. V](#)) and of its socialization ([Chap. VI](#)).

In spite of the abundance and the value of well-known studies, the psychological theory of intellectual mechanisms is only in its infancy, and we are barely beginning to glimpse the sort of precision of which it might be capable. It is this feeling of research in progress that I have sought to express.

This little volume contains the substance of the lectures that I had the privilege of giving at the Collège de France in 1942 at an hour when university men felt the need to show their solidarity in the face of violence and their fidelity to permanent values. It is difficult for me, as I rewrite these pages, to forget the welcome given by my audience, as well as the contact which I had at that time with my friends.

J.P.

PREFACE TO THE SECOND (FRENCH) EDITION

The reception given to this little work has in general been a favourable one, which gives us the courage to reprint it without any alterations. Nevertheless, one criticism has frequently been levelled at our conception of intelligence—that it makes no reference to the nervous system or to its maturation in the course of the individual's development. That, we think, is a simple misunderstanding. Both the concept of "assimilation" and the transition from rhythms to regulations and from these to reversible operations demand a neurological as well as a psychological (and logical) interpretation. And these two interpretations, far from contradicting each other, can only agree. We shall explain ourselves elsewhere on this essential point, but we have never felt entitled to deal with it before completing the detailed psychogenetic researches which are summed up in this little book.

NOTE

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PART ONE

THE NATURE OF INTELLIGENCE

CHAPTER I

INTELLIGENCE AND BIOLOGICAL ADAPTATION

EVERY psychological explanation comes sooner or later to lean either on biology or on logic (or on sociology, but this in turn leads to the same alternatives). For some writers mental phenomena become intelligible only when related to the organism. This view is of course inescapable when we study the elementary functions (perception, motor functions, etc.) in which intelligence originates. But we can hardly see neurology explaining why 2 and 2 make 4, or why the laws of deduction are forced on the mind of necessity. Thus arises the second tendency, which consists in regarding logical and mathematical relations as irreducible, and in making an analysis of the higher intellectual functions depend on an analysis of them. But it is questionable whether logic, regarded as something eluding the attempts of experimental psychology to explain it, can in its turn legitimately explain anything in psychological experience. Formal logic, or logistics, is simply the axiomatics of states of equilibrium of thought, and the positive science corresponding to this axiomatics is none other than the psychology of thought. With the tasks thus allotted, the psychology of intelligence must assuredly continue to take account of logistic discoveries, but these will never go so far as to dictate to psychology its own solutions; they will merely raise problems for it.

So we must start from this dual nature of intelligence as something both biological and logical. The two chapters that follow aim to define these preliminary questions and, in particular, will attempt to reduce to the greatest unity possible

in the present state of knowledge these two fundamental but at first sight irreducible aspects of human thought.

THE PLACE OF INTELLIGENCE IN MENTAL ORGANIZATION

Every response, whether it be an act directed towards the outside world or an act internalized as thought, takes the form of an adaptation or, better, of, a re-adaptation. The individual acts only if he experiences a need, i.e., if the equilibrium between the environment and the organism is momentarily upset, and action tends to re-establish the equilibrium, i.e., to re-adapt the organism (Claparède). A response is thus a particular case of interaction between the external world and the subject, but unlike physiological interactions, which are of a material nature and involve an internal change in the bodies which are present, the responses studied by psychology are of a functional nature and are achieved at greater and greater distances in space (perception, etc.) and in time (memory, etc.) besides following more and more complex paths (reversals, detours, etc.). Behaviour, thus conceived in terms of functional interaction, presupposes two essential and closely interdependent aspects: an affective aspect and a cognitive aspect.

There has been much discussion on the relations between affect and cognition. According to P. Janet, a distinction must be drawn between "primary action" or the relation between subject and object (intelligence, etc.) and "secondary action" or the subject's reaction to his own actions; this reaction, which constitutes elementary feelings, consists of regulations of primary action and ensures the release of the energy available inside the organism. But besides these regulations, which determine the energetics or inner economy of behaviour, we must, it seems, take into account those which govern its ends or values, and such values characterize an energetic or economic interaction with the external environment. According to Claparède, feelings appoint a goal for behaviour, while intelligence merely provides the means (the "technique"). But

there exists an awareness of ends as well as of means, and this continually modifies the goals of action. In so far as feeling directs behaviour by attributing a value to its ends, we must confine ourselves to saying that it supplies the energy necessary for action, while knowledge impresses a structure on it. Thus arises the solution proposed by the so-called Gestalt psychology: behaviour involves a "total field" embracing subject and objects, and the dynamics of this field constitutes feeling (Lewin), while its structure depends on perception, effectorfunctions, and intelligence. We shall adopt an analogous formula, with the reservation that feelings and cognitive configurations do not depend solely on the existing "field," but also on the whole previous history of the acting subject. We shall simply say then that every action involves an energetic or affective aspect and a structural or cognitive aspect, which, in fact, unites the different points of view already mentioned.

Indeed, all feelings consist either of regulations of internal energies (P.Janet's "basic feelings", Claparède's "interest", etc.) or of factors controlling exchanges of energy with the external environment ("values" of all kinds, real or imaginary, from the "valencies" characteristic of Lewin's "total field" and E.S.Russell's "valencies" to interindividual or social values). Will itself is to be thought of as a matter of affective, and therefore energetic, operations,¹ bearing on the higher values, and making them capable of reversibility and conservation (moral feelings, etc.) just as the system of logical operations does so for concepts.

But if all behaviour, without exception, thus implies an energetics or an "economy", forming its affective aspect, the interaction with the environment which it instigates likewise requires a form or structure to determine the various possible circuits between subject and object. It is this structuring of behaviour that constitutes its cognitive aspect. A perception, sensori-motor learning (habit, etc.), an act of insight, a judgment, etc., all amount, in one way or another, to a structuring of the relations between the environment and the organism. It is in this that they reveal a certain affinity among

themselves which distinguishes them from affective phenomena. We shall refer to them as cognitive functions in a wide sense (to include sensori-motor adaptation).

Affective life and cognitive life, then, are inseparable although distinct. They are inseparable because all interaction with the environment involves both a structuring and a valuation, but they are none the less distinct, since these two aspects of behaviour cannot be reduced to one another. Thus we could not reason, even in pure mathematics, without experiencing certain feelings, and conversely no affect can exist without a minimum of understanding or of discrimination. An act of intelligence involves, then, an internal regulation of energy (interest, effort, ease, etc.) and external regulation (the value of the solutions sought and of the objects concerned in the search), but these two controls are of an affective nature and remain comparable with all other regulations of this type. Similarly, the perceptual or intellectual elements which we find in all manifestations of emotion involve cognition in the same way as any other perceptual or intelligent reactions. What common sense calls "feelings" and "intelligence", regarding them as two opposed "faculties", are simply behaviour relating to persons and behaviour affecting ideas or things; but in each of these forms of behaviour, the same affective and cognitive aspects of action emerge, aspects which are in fact always associated and in no way represent independent faculties.

Furthermore, intelligence itself does not consist of an isolated and sharply differentiated class of cognitive processes. It is not, properly speaking, one form of structuring among others; it is the form of equilibrium towards which all the structures arising out of perception, habit and elementary sensori-motor mechanisms tend. It must be understood that if intelligence is not a faculty this denial involves a radical functional continuity between the higher forms of thought and

¹ Prof. Piaget wishes to make it clear that his use in this book of the words "operation" and "operational" has no connection with the methodological doctrine of "Operationism". (*Translator's note*).

the whole mass of lower types of cognitive and motor adaptation; so intelligence can only be the form of equilibrium towards which these tend. This does not mean, of course, that a judgment consists of a co-ordination of perceptual structures, or that perceiving means unconscious inference (although both these theories have been held), for functional continuity in no way excludes diversity or even heterogeneity among structures. 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 a law of development, such that each one brings about a more inclusive and stable equilibrium for the processes that emerge from the preceding level. Intelligence is thus only a generic term to indicate the superior forms of organization or equilibrium of cognitive structurings.

This view means, right from the start, an insistence on the central role of intelligence in mental life and in the life of the organism itself; intelligence, the most plastic and at the same time the most durable structural equilibrium of behaviour, is essentially a system of living and acting operations. It is the most highly developed form of mental adaptation, that is to say, the indispensable instrument for interaction between the subject and the universe when the scope of this interaction goes beyond immediate and momentary contacts to achieve far-reaching and stable relations. But, on the other hand, this use of the term precludes our determining where intelligence starts; it is an ultimate goal, and its origins are indistinguishable from those of sensori-motor adaptation in general or even from those of biological adaptation itself.

ADAPTIVE NATURE OF INTELLIGENCE

If intelligence is adaptation, it is desirable before anything else to define the latter. Now, to avoid the difficulties of teleological language, adaptation must be described as an equilibrium between the action of the organism on the environment and

vice versa. Taking the term in its broadest sense, "assimilation" may be used to describe the action of the organism on surrounding objects, in so far as this action depends on previous behaviour involving the same or similar objects. In fact every relation between a 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. It is in this way that, physiologically, the organism absorbs substances and changes them into something compatible with its own substance. Now, psychologically, the same is true, except that the modifications with which it is then concerned are no longer of a physico-chemical order, but entirely functional, and are determined by movement, perception or the interplay of real or potential actions (conceptual operations, etc.). Mental assimilation is thus the incorporation of objects into patterns of behaviour, these patterns being none other than the whole gamut of actions capable of active repetition.

Conversely, the environment acts on the organism and, following the practice of biologists, we can describe this converse action by the term "accommodation", it being understood that the individual never suffers the impact of surrounding stimuli as such, but they simply modify the assimilatory cycle by accommodating him to themselves. Psychologically, we again find the same process in the sense that the pressure of circumstances always leads, not to a passive submission to them, but to a simple modification of the action affecting them. This being so, we can then define adaptation as an equilibrium between assimilation and accommodation, which amounts to the same as an equilibrium of interaction between subject and object.

Now in the case of organic adaptation, this interaction, being of a material nature, involves an interpenetration between some part of the living body and some sector of the external environment. Psychological life, on the other hand, begins, as we have seen, with functional interaction, that is to say, from the point at which assimilation no longer alters assimilated objects in a physico-chemical manner but simply incorporates

them in its own forms of activity (and when accommodation only modifies this activity). We can then understand that, superimposed on the direct interpenetration of organism and environment, mental life brings with it indirect interaction between subject and object, which takes effect at ever increasing spatio-temporal distances and along ever more complex paths. The whole development of mental activity from perception and habit to symbolic behaviour and memory, and to the higher operations of reasoning and formal thought, is thus a function of this gradually increasing distance of interaction, and hence of the equilibrium between an assimilation of realities further and further removed from the action itself and an accommodation of the latter to the former.

It is in this sense that intelligence, whose logical operations constitute a mobile and at the same time permanent equilibrium between the universe and thought, is an extension and a perfection of all adaptive processes. Organic adaptation, in fact, only ensures an immediate and consequently limited equilibrium between the individual and the present environment. Elementary cognitive functions, such as perception, habit and memory, extend it in the direction of present space (perceptual contact with distant objects) and of short-range reconstructions and anticipations. Only intelligence, capable of all its detours and reversals by action and by thought, tends towards an all-embracing equilibrium by aiming at the assimilation of the whole of reality and the accommodation to it of action, which it thereby frees from its dependence on the initial *hic* and *nunc*.

DEFINITION OF INTELLIGENCE

If we undertake to define intelligence, which is certainly important for determining the field which we shall be studying under this heading, it is sufficient that we be agreed on the degree of complexity of distant interaction which we shall call "intelligent". But here difficulties arise, since the lower demarcation line remains arbitrary. For some, such as Claparède and Stern, intelligence is a mental adaptation to new

circumstances. Thus Claparède opposes intelligence to instinct and habit, which are hereditary or acquired adaptations to recurring circumstances; but for him it begins with the most elementary empirical trial-and-error (the origin of the implicit trial-and-error which subsequently characterizes the search for a hypothesis). For K. Bühler, who also divides mental structures into three types (instinct, training and intelligence), this definition is too broad; intelligence only appears with acts of insight (*Aha-Erlebnis*), while trial-and-error is a form of training. Köhler likewise reserves the term intelligence for acts of abrupt restructuring and excludes trial-and-error. It cannot be denied that the latter appears right from the formation of the simplest habits, which are themselves, when they are first formed, adaptations to new circumstances. On the other hand, problem, hypothesis, and control, whose combination is the mark of intelligence according to Claparède also, already exist in embryo in the needs, the trials-and-errors and the empirical test characteristic of the least developed sensori-motor adaptations. We must therefore choose between these two alternatives: either we must be satisfied with a functional definition at the risk of encompassing almost the entire range of cognitive structures, or else we must choose a particular structure as our criterion, but the choice remains arbitrary and runs the risk of overlooking the continuity which exists in reality.

However, it is still possible to define intelligence by the direction towards which its development is turned, without insisting on the question of boundaries, which become a matter of stages or of successive forms of equilibrium. We can therefore regard the matter from the point of view both of the functional situation and of the structural mechanism. From the first of these points of view, we can say that behaviour becomes more "intelligent" as the pathways between the subject and the objects on which it acts cease to be simple and become progressively more complex. Thus perception only requires simple paths, even if the object perceived is very remote. A habit might seem more complex, but its spatio-temporal articulations are welded into a unique whole with no

independent or separable parts. An act of intelligence, on the other hand, such as finding a hidden object or recognizing the meaning of a picture, involves a certain number of paths (in space and time) which can be both isolated and synthesized. Thus, from the point of view of the structural mechanism, elementary sensori-motor adaptations are both rigid and unidirectional, while intelligence tends towards reversible mobility. That, as we shall see, is the essential property of the operations which characterize living logic in action. But we can see straight away that reversibility is the very criterion of equilibrium (as physicists have taught us). To define intelligence in terms of the progressive reversibility of the mobile structures which it forms is therefore to repeat, in different words, that intelligence constitutes the state of equilibrium towards which tend all the successive adaptations of a sensori-motor and cognitive nature, as well as all assimilatory and accommodatory interactions between the organism and the environment.

CLASSIFICATION OF POSSIBLE INTERPRETATIONS OF INTELLIGENCE

From the biological point of view, intelligence thus appears as one of the activities of the organism, while the objects to which it adapts itself constitute a particular sector of the surrounding environment. But as the knowledge that intelligence builds up achieves a privileged equilibrium, because this is the necessary limit of sensorimotor and symbolic interaction, while distances in space and time become indefinitely extended, intelligence engenders scientific thought itself, including biological knowledge. It is therefore natural that the psychological theories of intelligence should come to be placed among biological theories of adaptation and theories of knowledge in general. It is not surprising that there should be some relationship between psychological theories and epistemological doctrines since, even if psychology has been freed from philosophical tutelage, there happily remains some bond between the study of mental functions and that of the

processes of scientific knowledge. But what is more interesting is that there exists a parallelism, and a fairly close one, between the great biological doctrines of evolutionary variation (and therefore of adaptation) and the particular theories of intelligence as a psychological fact; psychologists have, in fact, often been unaware of the currents of biological inspiration behind their interpretations, just as biologists have sometimes unwittingly adopted one particular psychological position among other possible ones (cf. the role of habit in Lamarck or of competition and strife in Darwin); moreover, in view of the affinity between the problems, there may be a simple convergence of solutions and so the latter may confirm the former.

From the biological point of view, the relations between the organism and the environment admit of six possible interpretations according to the following combinations (each of which has led to its own solution, classical or contemporary): either (I) we reject the idea of a genuine evolution, or else (II) we admit its existence; then, in both cases (I and II) we attribute adaptations (1) to factors external to the organism, or (2) to internal factors, or (3) to an interaction between the two. So (I) from the non-evolutionist point of view, we may attribute adaptation (I1) to a pre-established harmony between the organism and the properties of the environment, (I2) to a preformism allowing the organism to respond to every situation by actualizing its potential structures, or else (I3) to the "emergence" of complete structures, irreducible to elements and determined simultaneously from within and from without.¹

As for the evolutionist points of view (II), they likewise explain adaptive variations, by environmental pressure (Lamarckism II1), or by endogenous mutations with subsequent selection (mutationism II2)², or (II3) by a progressive interaction between internal and external factors.

Now it is striking to note how we find the same broad currents of thought in the interpretation of knowledge itself, regarded as a relationship between the thinking subject and objects. Corresponding to the pre-established harmony of

creationist vitalism, there is (I1) the realism of those doctrines which see in reason an innate adaptation to eternal forms or essences; corresponding to preformism, there is (I2) apriorism which explains consciousness by internal structures which precede experience; and corresponding to the “emergence” of new structures there is (I3) contemporary phenomenology, which simply analyses the various forms of thought, refusing either to derive them genetically from each other or to distinguish in them the roles of subject and object. Evolutionist interpretations, on the other hand, reappear in those epistemological schools which allow for the progressive development of reason; corresponding to Lamarckism there is (II1) empiricism, which explains knowledge by the pressure of objects; corresponding to mutationism there are (II2) conventionalism and pragmatism, which attribute the fittingness of mind to reality to the untrammelled creation of subjective ideas, subsequently selected according to a principle of simple expediency. Finally, interactionism (II3) involves a relativism, which would describe knowledge as the product of

¹ Pre-established harmony (I1) is the solution inherent in classical creationism and it constitutes the only explanation of adaptation which is in fact at the disposal of vitalism in its pure form. Preformism (I2) has sometimes been associated with vitalist solutions, but it can become independent of them and often persists in mutationist guises among authors who deny all constructive character to evolution and consider every new characteristic as the actualization of potentialities which hitherto were merely latent. Conversely, the view based on emergence (I3) reverts to explaining the innovations which arise in the hierarchy of beings by complex structures which are irreducible to the elements of the previous level. From these elements there “emerges” a new totality, which is adaptive because it unites in an indissociable whole both the internal mechanisms and their relations with the external environment. While admitting the fact of evolution, the hypothesis of emergence thus reduces it to a series of syntheses, each irreducible to the others, so that it is broken up into a series of distinct creations.

² In mutationist explanations of evolution subsequent selection is due to the environment itself. In Darwin it was attributed to competition.

an indissociable collaboration between experience and deduction.

Without insisting on this parallelism in its most general form, we may now note how contemporary strictly psychological theories of intelligence are inspired by the same currents of thought, whether biological emphasis is dominant or whether philosophical influences related to the study of knowledge are felt.

There is no doubt, to begin with, that a fundamental incompatibility divides two kinds of interpretations: those which, while recognizing the existence of the facts of development, cannot help considering intelligence as a primary datum, and thus reduce mental evolution to a sort of gradual awakening of consciousness without any real construction of anything, and those which seek to explain intelligence by its own development. It should be noted moreover that the two schools collaborate in the discovery and analysis of actual experimental facts. That is why it is fitting to classify objectively all contemporary all-embracing interpretations, inasmuch as they have helped to throw light on one particular aspect or another of the facts to be explained; the demarcation line between psychological theories and philosophical doctrines is in fact to be found in this appeal to experience, and not in the initial hypotheses.

Among the non-evolutionist theories, there are first of all (I1) those which remain constantly faithful to the idea of an intelligence-faculty, a sort of direct knowledge of physical entities and of logical or mathematical ideas by a pre-established harmony between intellect and reality. We must confess that few experimental psychologists still adhere to this hypothesis. But the problems arising from the common frontiers of psychology and the analysis of mathematical thought have caused certain symbolic logicians, e.g. Bertrand Russell, to formulate such a conception of intelligence and even to wish to impose it on psychology itself (cf. his *Analysis of Mind*).¹

A more prevalent hypothesis (I2) is that according to which intelligence is determined by internal structures, which are

likewise not formed but gradually become explicit in the course of development, owing to a reflection of thought on itself. This apriorist current has in fact inspired a good deal of the work of the German *Denkpsychologie* and is consequently found at the root of numerous experimental researches on thought, using the familiar methods of introspection, which have been developing from 1900–1905 to the present day. Naturally this does not mean that every use of these methods of investigation leads to this explanation of intelligence: Binet's work testifies to the contrary. But for K. Bühler, Selz and many others, intelligence eventually became, as it were, "a mirror of logic", which imposes itself from within with no possible causal explanation.

In the third place (I3), corresponding to emergence and phenomenology (with the actual historical influence of the latter), there is a recent theory of intelligence which has raised the problem anew in a very suggestive way: the Configuration (*Gestalt*) theory. The notion of a "complex configuration", resulting from experimental researches in perception, involves the assertion that a whole is irreducible to the elements which compose it, being governed by special laws of organization or equilibrium. Now, having analysed these laws of structuring in the realm of perception and having come across them again in motor functions, memory, etc., the Configuration theory has been applied to intelligence itself, both in its reflective (logical thought) and its sensori-motor form (intelligence in animals and in children at the pre-linguistic stage). Thus Köhler, in connection with chimpanzees, and Wertheimer, in connection with the syllogism, etc., have spoken of "immediate restructurings" seeking to explain the act of insight by the "goodness" (*Prägnanz*) of well organized structures, which are neither endogenous nor exogenous but embrace subject and

¹ The author desires to indicate that his discussion of Russell's views on this and subsequent pages refers only to that writer's first period. Russell has since rejected this position in favour of an extreme empiricism. (*Translator's note.*)

object in a total field. Furthermore, these *Gestalten*, which are common to perception, movement and intelligence, do not evolve, but represent permanent forms of equilibrium, independent of mental development (we may in this respect find all intermediate stages between apriorism and the Configuration theory, although the latter is normally found linked with a physical or physiological realism of "structures").

Such are the three principal non-genetic theories of intelligence. It may be noted that the first reduces cognitive adaptation to pure accommodation, since it sees thought only as the mirror of ready-made "ideas", that the second reduces it to pure assimilation, since it regards intellectual structures as exclusively endogenous, and that the third unites assimilation and accommodation in a single whole, since, from the *Gestalt* point of view, there exists only the field linking objects and the subject, with neither activity on his part nor the isolated existence of the object.

As for genetic interpretations, we find once more those which explain intelligence in terms of the external environment only (associationist empiricism corresponding to Lamarckism), the activity of the subject (the trial-and-error theory at the level of individual adaptation, corresponding to mutationism at the level of hereditary variations) and the relationship between subject and object (operational theory).

Empiricism (III) is scarcely upheld any longer in its pure associationist form, except for some authors, of predominantly physiological interests, who think they can reduce intelligence to a system of "conditioned" responses. But we find less rigid forms of empiricism in Rignano's interpretations, which reduce reasoning to mental experience, and especially in Spearman's interesting theory, which is both statistical (factor analysis of intelligence) and descriptive; from this second point of view, Spearman reduces the operations of intelligence to the "apprehension of experience" and to the "eduction" of relations and "correlates", that is to say, to a more or less complex reading of immediately given relations. These

relations, then, are not constructed but discovered by simple accommodation to external reality.

The notion of trial-and-error (II2) has given rise to several interpretations of learning and of intelligence itself. The trial-and-error theory elaborated by Claparède constitutes in this respect the most far-reaching exposition: intelligent adaptation consists of trials or hypotheses, due to the activity of the subject, and of their selection, effected afterwards under the pressure of experience (successes or failures). This empirical control, which from the outset selects the subject's trials, is subsequently internalized in the form of anticipations due to awareness of relations, just as motor trial-and-error is extended into symbolic trial-and-error or imagination of hypotheses.

Finally, emphasizing the interaction of the organism and the environment leads to the operational theory of intelligence (II3). According to this point of view, intellectual operations, whose highest form is found in logic and mathematics, constitute genuine actions, being at the same time something produced by the subject and a possible experiment on reality. The problem is therefore to understand how operations arise out of material action, and what laws of equilibrium govern their evolution; operations are thus concerned as grouping themselves of necessity into complex systems, comparable to the "configurations" of the Gestalt theory, but these, far from being static and given from the start, are mobile and reversible, and round themselves off only when the limit of the individual and social genetic process that characterizes them is reached.¹

This sixth point of view is the one we shall develop. As for trial-and-error theories and empiricist conceptions, we shall discuss them with particular reference to sensori-motor intelligence and its relations with habit ([Chap. IV](#)). The Configuration theory necessitates a special discussion, which we shall focus upon the important problem of the relations between perception and intelligence ([Chap. IV](#)). As for the doctrine of an intelligence pre-adapted to independently subsisting logical entities and that of a thought reflecting an *a priori* logic, we shall return to them at the beginning of the next chapter. In fact these both raise what we may call the

“preliminary question” of the psychological study of intellect: may we hope for a real explanation of intelligence, or does intelligence constitute a primary irreducible fact, being the mirror of a reality prior to all experience, namely logic?

¹ We should note in this respect that, although the social nature of operations follows from their character as effective action and their gradual grouping, we shall nevertheless, for the sake of clarity of exposition, reserve the discussion of social factors in thought until [Chapter VI](#).