CHAPTER I

The Development of Object Concept

To understand how the budding intelligence constructs the external world, we must first ask whether the child, in its first months of life, conceives and perceives things as we do, as objects that have substance, that are permanent and of constant dimensions. If this is not the case, it is then necessary to explain how the idea of an object (object concept) is built up. The problem is closely connected with that of space. A world without objects would not present the character of spatial homogeneity and of coherence in displacements that marks our universe. Inversely the absence of "groups" in the changes of position would be equivalent to endless transformations, that is, continuous changes of states in the absence of any permanent object. In this first chapter, then, substance and space should be considered simultaneously, and it is only through abstraction that we shall limit ourselves to object concept.

A question of this sort conditions all other questions. A world composed of permanent objects constitutes not only a spatial universe but also a world obeying the principle of causality in the form of relationships between things, and regulated in time, without continuous annihilations or resurrections. Hence it is a universe both stable and external, relatively distinct from the internal world and one in which the subject places himself as one particular term among all the other terms. A universe without objects, on the other hand, is a world in which space does not constitute a solid environment but is limited to structuring the subject's very acts; it is a world of pictures each

one of which can be known and analyzed but which disappear and reappear capriciously. From the point of view of causality it is a world in which the connections between things are masked by the relations between the action and its desired results; hence the subject's activity is conceived as being the primary and almost the sole motive power. As far as the boundaries between the self and the external world are concerned, a universe without objects is such that the self, lacking knowledge of itself, is absorbed in external pictures for want of knowing itself; moreover, these pictures center upon the self by failing to include it as a thing among other things, and thus fail to sustain interrelationships independent of the self.

Observation and experimentation combined seem to show that object concept, far from being innate or given ready-made in experience, is constructed little by little. Six stages can be discerned, corresponding to those of intellectual development in general. During the first two stages (those of reflexes and the earliest habits), the infantile universe is formed of pictures that can be recognized but that have no substantial permanence or spatial organization. During the third stage (secondary circular reactions), a beginning of permanence is conferred on things by prolongation of the movements of accommodation (grasping, etc.) but no systematic search for absent objects is yet observable. During the fourth stage ("application of known means to new situations") there is searching for objects that have disappeared but no regard for their displacements. During a fifth stage (about 12 to 18 months old) the object is constituted to the extent that it is permanent individual substance and inserted in the groups of displacements, but the child still cannot take account of changes of position brought about outside the field of direct perception. In a sixth stage (beginning at the age of 16 to 18 months) there is an image of absent objects and their displacements.

§ 1. THE FIRST TWO STAGES: NO SPECIAL BEHAVIOR RELATED TO VANISHED OBJECTS

Among all the impressions which assail his consciousness, the child distinguishes and quickly recognizes certain stable groups

which we shall call pictures. That is why we have stated (*O.I.*)[1] that every schema of reproduction assimilation is extended sooner or later in generalizing assimilation and recognitory assimilation combined, recognition being derived from assimilation.

The most elementary example of this process is incontestably that of sucking. The nursling, from the second week of life, is capable of finding the nipple and differentiating it from the surrounding teguments; therein is proof that the schema of sucking in order to nurse begins to be dissociated from the schemata of empty sucking or of sucking at random, and thus results in recognition through acts. So also, after the fifth to the sixth week of life, the child's smile reveals that he recognizes familiar voices or faces whereas strange sounds or images astonish him. In a general way, every functional use (hence all primary circular reaction) of sucking, of sight, of hearing, of touch, etc., gives rise to recognitions.

But none of that proves or even suggests that in the first weeks of life the universe is really cut up into objects, that is, into things conceived as permanent, substantial, external to the self, and firm in existence even though they do not directly affect perception. In itself, recognition is not at all a recognition of objects and it can be affirmed that none of the characteristics mentioned here defines recognition in its beginnings, for they are the product of an extremely complex intellectual elaboration and not of an elementary act of simple sensorimotor assimilation. True, in the associational theory of recognition it could be asserted that recognition merely confers upon the recognized qualities the constitution of the object itself: if, in order to recognize a thing, it is really necessary to have retained the image of that thing (an image capable of being evoked, and not simply the motor schema readapting at each new contact), and if recognition results from an association between this image and actual sensations, then naturally the conserved image will be able to act in the mind when the object itself is absent and thus suggest the idea of its conservation. Recognition will thenceforth be extended into belief in the permanence of the object itself.

[1] J. Piaget, *The Origins of Intelligence in Children* (New York: International Universities Press, 1952); hereafter referred to as *O.I.*

But in the elementary examples now under consideration, recognition does not necessitate any evocation of a mental image. For recognition to begin, it is enough that the attitude previously adopted with regard to the thing be again set in motion and that nothing in the new perception thwart that process. The impression of satisfaction and familiarity peculiar to recognition could thus stem only from this essential fact of the continuity of a schema; the subject recognizes his own reaction before he recognizes the object as such. If the object is new and impedes action, there is no recognition; if the object is too well known or constantly present, the automatism of habit suppresses any opportunity for conscious recognition; but if the object resists the activity of the sensorimotor schema sufficiently to create a momentary maladjustment while giving rise soon after to a successful readjustment, then assimilation is accompanied by recognition. The latter is only the realization of mutual conformity between a given object and a schema all ready to assimilate it. Recognition accordingly begins by being subjective before it becomes object recognition, which of course does not prevent the subject from projecting recognized perception into the undifferentiated universe of his adualistic consciousness (since in the beginning nothing is experienced as subjective). In other words, recognition is at first only a particular instance of assimilation: the thing recognized stimulates and feeds the sensorimotor schema which was previously constructed for its use, and without any necessity for evocation. If this is true, it is self-evident that recognition does not, by itself and without further complication, to lead object concept. In order that the recognized picture may become an object it must be dissociated from the action itself and put in a context of spatial and causal relations independent of the immediate activity. The criterion of this objectification, hence of this rupture in continuity between things perceived and the elementary sensorimotor schemata, is the advent of the behavior patterns related to absent pictures: search for the vanished object, belief in its permanence, evocation, etc. But primary assimilation only implies total continuity between action and environment and does not lead to any reaction beyond the immediate and actual excitation.

Furthermore, independently of recognition, there is no

proof that direct perception is at first a perception of objects. When we perceive a motionless thing we place it in a space in which we are ourselves and thus conceive it according to the laws of perspective; the particular point of view from which we see it does not at all prevent us from imagining its depth, its reverse side, its possible displacements, in short, everything that makes it an object characterized by its form and constant dimensions. When we perceive it in motion or simply removed from its initial location we distinguish between these changes of position and changes of state and thus contrast at every moment the thing as it is with the thing as it appears to our sight; again, this dual distinction leads to the permanence characteristic of object concept. But does the child do the same from the very beginnings of his activity? It is permissible, not to say necessary, to doubt it. Regarding the motionless object, only little by little will a suitable spatial structure make it possible to attribute to it the relief, the form, and the depth characteristic of its objective identity. With regard to the thing in motion, the child has not been given the power from the outset to differentiate between changes of position and changes of state and thus to endow flowing perceptions with the quality of geometric "groups," consequently of objects. On the contrary, failing to locate himself at the outset in space, and to conceive an absolute relativity between the movements of the external world and his own, the child at first does not know how to construct either groups or objects and may well consider the changes in his image of the world as being simultaneously real and constantly created by his own actions.

True, from the earliest stages, certain operations herald the formation of the object: they are, on the one hand, the intercoordinations between heterogeneous schemata which precede the coordination of prehension and of sight (coordination of which creates a special problem) and, on the other hand, the sensorimotor accommodations. These two types of behavior lead the child to transcend the absolutely immediate, and assure a beginning of continuity of pictures perceived.

With regard to the intercoordination of schemata, that of sight and hearing may be mentioned. From the second month of life and the beginning of the third, the child tries to look

at the objects he hears (*O.I.*, obs. 44-49), thus revealing the relationship he is establishing between certain sounds and certain visual pictures. It is clear that such coordination endows sensory pictures with a greater degree of solidity than when they are perceived through a single kind of schemata: the fact of expecting to see something instills in the subject who listens to a sound a tendency to consider the visual image as existing before the perception. So also every intersensory coordination (between sucking and prehension, prehension and sight, etc.) contributes to arousing the anticipations which are assurances of the solidity and coherence of the external world.

But that is very far from object concept. The intercoordination of heterogeneous schemata is explained, as we have seen (*O.I.*, Chap. II, §3-4), by a reciprocal assimilation of the presenting schemata. In the case of sight and hearing, therefore, there exists at the outset no objective identity of the visual image with the auditory image (which can also be a tactile or gustatory picture, etc.), but simply a sort of subjective identity; the child tries to see what he hears because each schema of assimilation seeks to encompass the whole universe. Thereafter a coordination of this kind does not yet imply any permanence conceived as independent of present action and perception; discovery of the visual picture announced by the sound is only the extension of the act of trying to see. However, if the act of searching with the glance is, in us adults, accompanied by a belief in the firm existence of the object looked at, we are not justified in assuming that this relation has been obvious from the outset. Just as lip movement or any other functional exercise creates by itself its own object or its own result, so also the nursling may consider the picture which he contemplates as the extension, if not the product, of his effort to see. Perhaps one can reply that the localization of the sound in space, combined with the localization of the visual picture, confer an objectivity on the thing which is simultaneously heard and seen. But as we shall see, the space involved here is still only a space dependent on the immediate action and not precisely an objective space in which things and actions are placed in relation to each other in groups which are independent of the body itself. In short, intersensory coordi-

nations contribute to solidifying the universe by organizing actions but they do not at all suffice to render that universe external to those actions.

Sensorimotor accommodations of every kind often lead not only to anticipations concerning perception (such as the above-mentioned coordinations), but also to extensions of the action related to the image perceived, even after the image has disappeared. Here again it may seem at first that object concept has already been acquired, but a more stringent examination dispels this illusion.

The clearest example is that of visual accommodations; when the child knows how to follow with his eyes an image which is being displaced, and above all when he has learned how to extend that movement of the eyes by an appropriate shift of head and torso, he very quickly reveals behavior patterns comparable to a search for the thing seen which then vanished. This phenomenon, particularly distinct in the case of sight, is also found in connection with sucking, prehension, etc.

OBS. 1. Laurent, as early as the second day, seems to seek with his lips the breast which has escaped him (*O.I.*, obs. 2). From the third day he gropes more systematically to find it (*O.I.*, obs. 4-5, 8, and 10). From 0;1 (2) and 0;1 (3) he searches in the same way for his thumb, which brushed his mouth or came out of it (*O.I.*, obs. 17, 18, etc.). Thus it seems that contact of the lips with the nipple and the thumb gives rise to a pursuit of those objects, once they have disappeared, a pursuit connected with reflex activity in the first case and with a nascent or acquired habit in the second case.

OBS. 2. In the realm of sight, Jacqueline, as early as 0;2 (27) follows her mother with her eyes, and when her mother leaves the visual field, continues to look in the same direction until the picture reappears.

Same observation with Laurent at 0;2 (1). I look at him through the hood of his bassinet and from time to time I appear at a more or less constant point; Laurent then watches that point when I am out of his sight and obviously expects to see me reappear.

Noteworthy too are visual explorations (*O.I.*, obs. 33), alternate glances (*O.I.*, obs. 35) and reversed glances (*ibid.*, obs. 36) which attest to a sort of expectation of some familiar picture.

OBS. 3. Analagous behavior is observable with respect to hearing from the time coordination exists between this function and that of sight, that is to say from the time movements of eyes and head objectively bear witness to some searching. Thus at 0;2 (6) Laurent finds with his glance an electric kettle whose lid I shake (see *O.I.*, obs. 49). When I interrupt the noise, Laurent looks at me a moment, then again looks at the kettle even though it is now silent; hence we may assume that he expects new sounds to come from it, in other words, he behaves with regard to the interrupted sound as he does with regard to the visual pictures which have just disappeared.

OBS. 4. Prehension gives rise to behavior patterns of the same kind. Just as the child seems to expect to see again that which he has just seen and to hear again the sound which has just ceased, so also, when he begins to grasp, he seems to be convinced of the possibility that his hand will rediscover the object it has just relinquished. Thus during the behavior patterns described in *O.I.*, obs. 52-54, Laurent, considerably before knowing how to grasp what he sees, constantly lets go and recaptures the objects he is handling. At 0;2 (7) in particular, Laurent holds a sheet in his hand for a moment, then lets it go and grasps it again soon afterward. Or he holds his hands together, separates them, holds them together again, etc. Finally it may be recalled that as soon as coordination between prehension and sight has been established, the child brings before his eyes everything he grasps outside the visual field, thus revealing expectation comparable to that which we have noted in connection with hearing and sight (See *O.I.*, obs. 85, 89, and 92).

OBS. 5. A reaction slightly more complex than these is that of the child who stops looking at a certain picture and directs his glance elsewhere and who then returns to the first picture; that is the equivalent, in the realm of primary circular reactions, of the deferred reactions which we shall analyze in connection with the second stage.

Thus Lucienne, at 0;3 (9) sees me at the extreme left of her visual field and smiles vaguely. She then looks in different directions, in front of her and to the right, but constantly returns to the place in which she sees me and dwells on it every time for a moment.

At 0;4 (26) she takes the breast but turns when I call her and smiles at me. Then she resumes nursing, but several times in succession, despite my silence, she turns directly to the position from which she can see me. She does it again after a pause of a few minutes. Then I withdraw; when she turns without finding me her expression is one of mingled disappointment and expectation.

At 0;4 (29) same reaction; she is on my lap but with her back to me, and sees my face by turning very much to the right. She then constantly returns to that position.

At first these facts and analogous ones which it would be easy to accumulate seem to indicate a universe similar to ours. The gustatory, visual, auditory, or tactile images that the child ceases to suck, see, hear or grasp seem to exist for him in the capacity of permanent objects which are independent of the action and which the action simply finds again. But in comparing these same behavior patterns with those we describe in connection with subsequent stages, it is apparent how superficial this interpretation would be and how phenomenalistic this primitive universe remains, far from constituting from the outset a world of substances. An essential difference contrasts these early behavior patterns with the true search for objects. True search is active and causes the intervention of movements which do not solely extend the interrupted action, whereas in the present behavior patterns either there is simple expectation, or else the search only continues the earlier act of accommodation. In these latter two cases the expected object is still related to the action itself.

True, in several of our examples there is simply expectation, that is to say passivity and not activity. In the case of the disappearing visual image the child limits himself to looking at the place where the object vanished (obs. 2): thus he merely preserves the attitude of the earlier perception and if nothing reappears, he soon gives up. If he had object concept, on the contrary, he would actively search to find out where the thing could have been put; he would remove obstacles, change the position of the presenting objects at hand, and so on. Lacking prehension, the child could search with his eyes, change his perspective, etc. But that is precisely what he does not know how to do, for the vanished object is not yet for him a permanent object which has been moved; it is a mere image which reenters the void as soon as it vanishes, and emerges from it for no objective reason.

When, on the contrary, there is a search (obs. 1, 3, 4, and 5) it is noteworthy that the search merely reproduces the earlier act of accommodation. In the case of sucking, it is a reflex mechanism which allows the child to grope until he encounters the objective. With regard to observations 3, 4, and 5, the child is content with repeating the act of accommodation just performed. In none of these acts is it possible to speak of the object as existing independently of the activity. The objective is in the direct extension of the act. It is as though the child did not dissociate one from the other and considered the goal to be attained as depending on the action alone and, more precisely, on only one type of action. In the event of failure the child promptly gives up instead of attempting, as he will later do, special steps to complete the initial act. True, during these first stages, the child does not know how to grasp and consequently his potentialities for active searching amount to very little. But if the motor unskillfulness of these initial stages sufficed to explain the child's passivity, in other words, if the child, while not knowing how to search for the absent object, nevertheless believes in its permanence, we should state that search for the vanished object begins as soon as the habits of prehension have been acquired. But we shall now see that this is not the case.

In short, the first two stages are characterized by the absence of any special behavior related to vanished objects. Either the image which disappears immediately sinks into oblivion, that is to say, into the affective void, or else it is regretted, desired, and again expected, and the only behavior pattern utilized to rediscover it is the mere repetition of earlier accommodations.

The latter case applies chiefly to persons, when they have paid too much attention to the nursling and he can no longer bear solitude; he stamps and cries at the disappearance of every image, thus revealing his keen desire to see it reappear. But does this mean that the baby conceives of the vanished image as an object existing in space, remaining identical to itself and escaping sight, touch and hearing because it has been displaced and is masked by various solid substances? In such an hypothesis it would be necessary to attribute to the nursling a most improbable power of spatial representation and intellectual construction, and it would no longer be possible to understand the difficulty he will have, until about 9 or 10 months of age, in searching actively for objects when they are covered by a cloth or a screen of some kind right before his eyes (see the third and fourth stages). But the hypothesis is neither necessary nor does it conform to observations. It is not necessary because it suffices, for the child to hope for the return of the interesting image (of his mother, etc.), that he attribute to it a sort of affective or subjective permanence without localization or substantiation; the vanished image remains, so to speak, "at disposal" without being found anywhere from a spatial point of view. It remains what an occult spirit is to the magician; ready to return if one catches it successfully but obeying no objective law. How does the child go about bringing to himself the image of his desires? Merely by crying at random or by looking at the place where it disappeared or where it was last seen (obs. 2 and 5). It is here that the hypothesis of an object situated in space is contrary to the findings of observation. The child's initial search is not at all an effort to understand the displacements of the vanished image; it is only an extension or repetition of the most recent acts of accommodation.

§ 2. THE THIRD STAGE: BEGINNING OF PERMANENCE EXTENDING THE MOVEMENTS OF ACCOMMODATION

The behavior patterns of the third stage are those which are observable between the beginnings of prehension of things seen and the beginnings of active search for vanished objects. Hence they still are earlier than object concept but mark progress in the solidification of the universe depending on action.

Between three and six months of age, as we have seen elsewhere (*O.I.*, Chap. II, §4), the child begins to grasp what he sees, to bring before his eyes the objects he touches, in short to coordinate his visual universe with the tactile universe. But not until the age of 9 or 10 months does active search for vanished objects occur in the form of the use of grasping to remove solid objects that may mask or cover the desired object. This intermediate period constitutes our third stage.

But, if this long lapse of time is necessary for transition from prehension of an object at hand to true search for a missing ob-

ject, it is because the interim is filled with the acquisition of a series of intermediate behavior patterns all of which are necessary to proceed from the mere perceived image to the concept of permanent object. In this connection we can distinguish these five types of behavior: 1) "visual accommodation to rapid movements"; 2) "interrupted prehension"; 3) "deferred circular reaction"; 4) the "reconstruction of an invisible whole from a visible fraction," and 5) the "removal of obstacles preventing perception." The first of these behavior patterns merely extends those of the second stage, and the fifth fulfills those of the fourth stage.

Visual accommodation to rapid movements makes possible the anticipation of future positions of the object and consequently endows it with a certain permanence. This permanence of course remains related to the act of accommodation itself, and thus the behavior patterns merely extend those of the second stage; but there is progress in the sense that the anticipated position of the object is a new position and not one observed a moment earlier to which the eyes merely return. Two particular instances are of special importance: reaction to the movement of bodies which disappear from the visual field after having induced a lateral turn of the head, and reaction to falling movements. Both these behavior patterns seem to have developed under the influence of prehension.

OBS. 6. Laurent's reaction to falling objects still seems to be nonexistent at 0;5 (24): he does not follow with his eyes any of the objects which I drop in front of him.

At 0;5 (26), on the other hand, Laurent searches in front of him for a paper ball which I drop above his coverlet. He immediately looks at the coverlet after the third attempt but only in front of him, that is, where he has just grasped the ball. When I drop the object outside the bassinet Laurent does not look for it (except around my empty hand while it remains up in the air).

At 0;5 (30) no reaction to the fall of a box of matches. The same is true at 0;6 (0), but then when he drops the box himself he searches for it next to him with his eyes (he is lying down).

At 0;6 (3) Laurent, lying down, holds in his hand a box five centimeters in diameter. When it escapes him he looks for it in the right direction (beside him). I then grasp the box and drop it myself, vertically and too fast for him to be able to follow the trajectory. His

eyes search for it at once on the sofa on which he is lying. I manage to eliminate any sound or shock and I perform the experiment at his right and at his left; the result is always positive.

At 0;6 (7) he holds an empty match box in his hand. When it falls his eyes search for it even if they have not followed the beginning of the fall; he turns his head in order to see it on the sheet. Same reaction at 0;6 (9) with a rattle, but this time he has watched the initial movement of the object. The same is true at 0;6 (16) when his eyes have followed the beginning of the fall, at 0;6 (20) etc., etc.

At 0;7 (29) he searches on the floor for everything I drop above him, if he has in the least perceived the beginning of the movement of falling. At 0;8 (1) he searches on the floor for a toy which I held in my hand and which I have just let drop without his knowledge. Not finding it, his eyes return to my hand which he examines at length, and then he again searches on the floor.

OBS. 7. At 0;7 (30) Lucienne grasps a small doll which I present to her for the first time. She examines it with great interest, then lets it go (not intentionally); she immediately looks for it in front of her but does not see it right away.

When she has found it, I take it from her and place a coverlet over it, before her eyes (Lucienne is seated); no reaction.

At 0;8 (5) Lucienne searches systematically on the floor for everything that she happens to drop. When an object is released in front of her, sometimes she searches for it also with her eyes, but less often (an average of one out of four times). The need to grasp what was in her hand therefore plays a role in this reaction to movements of falling; the permanence belonging to the beginnings of the concept of tactile object (of which we shall again speak in connection with interrupted prehension) thus interferes with the permanence arising from visual accommodation.

At 0;8 (12) I again observe that Lucienne tries harder to find fallen objects with her eyes when she has previously touched the objects.

At 0;9 (25) she looks at my hand which I at first hold motionless and then suddenly lower; Lucienne searches for it on the floor for a long time.

OBS. 8. Jacqueline's search for the fallen object took place later. At 0;8 (20) for example, when she tries to reach a cigarette case hanging above her and it drops, she does not search in front of her at all but continues to look up in the air.

At 0;9 (8), same negative reaction with her parrot, which is bulky; it falls on her quilt while she is trying to reach it above her; she does not lower her eyes and continues to search in the air. However the parrot contains a rattle and makes a noise in falling.

At 0;9 (9) on the other hand, Jacqueline makes the same parrot fall by chance on the left of the bassinet and this time, because of the noise, she looks around for it. As the parrot has entered between the quilt and the wicker, Jacqueline perceives only its tail; however she recognizes the object (an instance of "reconstitution of invisible totalities" of which we shall subsequently speak) and tries to grasp it. But by trying to grasp it she wedges it down until she can see it no longer. However, still hearing the rattle inside the parrot, she taps the quilt which covers it and the sound ensues (this is a mere utilization of circular reaction related to this toy). But it does not occur to her to search under the quilt.

OBS. 9. The same day, at 0;9 (9), Jacqueline is seated in her bassinet and looks at my watch which I hold 20-30 centimeters away from her eyes and which I let drop by its chain.

At the first attempt, Jacqueline follows the trajectory, but with a certain tardiness, and finds the watch on the quilt covering her lap. The noise of the fall doubtless helps her and above all the fact that I lower the watch without yet letting it go.

Second attempt; she does not follow the movement, looks at my empty hand with surprise and seems to look around it (this time I have merely let the object go).

Third attempt: she again searches around my hand, then looks on my lap and takes possession of the object.

In order to eliminate the role of sound, I continue with the chain alone; in eight new sequential attempts Jacqueline only once searched on the floor. The other times she was content to examine my hand.

Then I lower the chain slowly, but quickly enough to precede the child's glance; Jacqueline searches on the floor. Then I recommence, merely letting the chain go; six negative attempts. The next two times Jacqueline searches on her lap but with her hand only, while looking in front of her. Finally, during the last attempts, she gives up this tactile search and only examines her hands.

OBS. 10. At 0;9 (10) a new experiment with Jacqueline, but using a little notebook of 8x5 centimeters which I let fall from high up (above her eye level) on to a cushion placed on her lap. This time Jacqueline immediately searches on the floor, although she has not

had time to follow the trajectory; she sees only the point of departure and my empty hands.

At 0;9 (11) same experiment with her parrot: she again looks immediately at the floor. With the watch chain, on the other hand, the reaction is completely negative, evidently because the object is less bulky; Jacqueline examines my empty fingers in astonishment. Hence object concept does not yet exist: in the case of the parrot or the notebook it is simply the movement of accommodation which continues, and when the object is too small for the eyes to follow at its point of departure nothing happens.

At 0;9 (16) Jacqueline, seated on my arm, plays with her celluloid duck and lets it fall behind my shoulder. Then she immediately tries to find it again but, and this is very interesting, she does not try to look around my back; she pursues her investigations in front. We shall understand the reason for this error by proving, later on, how difficult it is for the child to take account of screens and to conceive that an object can be "behind" another object.

From 0;9 (18) reaction to falling movements seems to be acquired; falling objects, even when the child has not held them just beforehand, immediately cause the child to look at the ground.

OBS. 11. At 0;9 (6) Jacqueline looks at her duck which I hold level with her eyes and which I move horizontally to the back of her head. She follows it for a moment with her eyes, then loses sight of it. Nevertheless, she continues this movement of accommodation until she finds the duck again. She has searched assiduously for quite a while.

Then I replace the duck before her and repeat the experiment, but in the other direction. Same reaction at first, but then during the search she forgets what she wants and takes possession of another object.

OBS. 11a. In this connection we may mention Lucienne's progress since obs. 5 in remembering positions. It involves a behavior pattern bringing us back to the behavior patterns of the second stage but more complex than they and contemporaneous with those of the third. At 0;8 (12) Lucienne is seated next to me; I am at her right. She sees me, then plays with her mother. Then she looks at me while her mother slowly goes away, on the left, to the door of the room and disappears. Lucienne follows her with her eyes until she ceases to be visible, then, all at once, she turns her head in my direction. She looks at my face at once; she knew that I was there even though she had not looked at me for a few minutes.

OBS. 12. So also Laurent, at 0;6 (0), looks at a rattle which I move horizontally from left to right, at the level of his face. He manages to follow the beginning of the trajectory, then loses sight of the moving object; then he abruptly turns his head and turns it back again 50 centimeters farther. Then I make the object describe the reverse trajectory and he searches for it a moment without recovering it, then gives up.

In the following days the reaction becomes more definite and Laurent rediscovers the object in any direction whatever. Same observation at 0;6 (30), at 0;7 (15), at 0;7 (29), etc.

This capacity for rediscovering the object by following its trajectory develops in Laurent as did the memory of positions in Lucienne (obs. 11a). Thus at 0;7 (11) I am playing with Laurent when his mother appears above him. After she disappears, he throws his head back in order to find her again. He catches sight of her just as she is leaving the room (before he hears the sound of the door). Then he returns to me but always turns around again to see if his mother is still there.

However commonplace these facts may be they are important in forming object concept. They show us that the beginnings of permanance attributed to images perceived arise from the child's action in movements of accommodation. In this respect the present behavior patterns merely extend those of the second stage but reveal essential progress: the child no longer seeks the object only where he has recently seen it but hunts for it in a new place. He anticipates the perception of successive positions of the moving object and in a sense makes allowance for its displacements. But precisely because this beginning of permanence is only an extension of the action in progress, it could only be very limited. The child cannot conceive of just any displacements or just any objective permanence. He is limited to pursuing, more or less correctly, with his eyes or with his hand the trajectory delineated by the movements of accommodation peculiar to the immediately preceding perception; and it is only in the measure in which, in the absence of the objects, he continues the process begun in their presence that he is able to endow them with a certain permanence.

Let us look at this more closely. With regard to Laurent (and to Lucienne, although we have not had the opportunity of understanding the origins of her reaction to falling movements), we prove that at first a search for the fallen object takes place more often when it is the child himself who has let it drop; the permanence attributed to the object is consequently greater when the action of the hand interferes with that of the eyes. Jacqueline's apprenticeship is among the most suggestive. At first (obs. 8) there is no reaction to the fall because the child has not observed the initial movement of the falling object. Then Jacqueline observes that initial movement but instead of extending it when the object perceived leaves the visual field, she returns to the point of departure to search for the toy (obs. 9); however, when the movement is slow or a concomitant sound helps the child in her search, she manages to reconstitute the exact trajectory. In the next phase (beginning of obs. 10), the reaction is positive when the object is sufficiently bulky to have been followed with the eyes long enough, but it remains negative with too slender a chain. Finally only the positive reaction becomes generalized.

It therefore seems clear that the displacement attributed to the object depends essentially on the child's action (movements of accommodation which are extended by looking) and that permanence itself remains related to that very action.

As far as the first point is concerned, it would be impossible to give to the child the concept of autonomous displacements. When we are following an object with our eyes and when, after having lost sight of it, we try to find it again, we have the feeling that it is in a space independent of ourselves; consequently we accept as true that the movements of the object occur without relationship to our own, outside our area of perception, and we strive to move ourselves so as to be reunited with it. On the other hand, everything takes place as if the child, when witnessing the falling movement from the start, is not aware that he moves himself about, in order to follow the movement, and consequently is not aware that his body and the moving object are located in the same space; if the object is not found within the exact extension of the movement of accommodation, the child will give up hope of finding it again. Thereafter, in his consciousness, the object's movement is one with the kinesthetic or sensorimotor impressions which accompany his own movements of eyes, head, or torso; when he loses sight of the moving object the only procedures suitable for finding it

again therefore consist either in extending movements which have already been delineated or in returning to the point of departure. Nothing forces the child to consider the object as having been displaced in itself and independently of its movement; all that he is given is an immediate connection between his kinesthetic impressions and the reappearance of the object in his visual field, in short a connection between a certain effort and a certain result. There does not yet exist what we shall later call (Chap. II) an objective displacement.

Then regarding the second point, that is to say the permanence attributed to the object as such, it is self-evident that this permanence remains related to the subject's action. In other words, the visual images the child pursues acquire in his eyes a certain solidity to the precise extent that he tries to follow them, but they do not yet constitute substantial objects. The mere fact that the child does not imagine their displacement as being an independent movement and that he often searches for them (that is to say, when he has not been able to look at them long enough) at the very point where they made their departure, reveals that for him, these images still remain at the disposal of the action itself, and in certain absolute situations. True, that is a beginning of permanence, but such permanence remains subjective; it must produce in the child an impression comparable to that which he experienced in discovering that he could suck his thumb when he wished, see things move when he moved his head, hear a sound when he rubbed a toy against his bassinet or pulled the strings attached to the rattle hanging from its hood, etc. The nature of the primitive object conceived as being at disposal is therefore on a par with the whole of the behavior patterns of this stage, that is to say, with the primary and secondary circular reactions during which the universe presents itself to the subject as depending on his activity. There is progress over the first stages during which the object is not distinguished from the results of reflex activity or mere primary circular reaction (that is to say, the actions exerted by the subject on his own organism to produce some interesting result), but it is a progress in degree and not in quality; the object still exists only in connection with the action itself.

As we shall see later, the proof that the object is still nothing more than this is that the child at this age still manifests no

particular behavior pattern related to vanished objects. Lucienne's reaction at 0;7 (30) when I cover her doll with a piece of cloth (obs. 7) already makes this apparent.

This dependence of the object on the action is found again in the second group of acts which we can now emphasize: the acts of interrupted prehension. These observations are in the same relation, in comparison to obs. 4 of the first stages, as are the visual accommodations to rapid movements in comparison to obs. 2 and 5. In other words, the permanence peculiar to the beginnings of the tactile object is still only an extension of accommodation movements, but henceforth the child will try to grasp the lost object in new positions and no longer only in the same place. As soon as prehension becomes a systematic operation, interest in which surpasses all else (between the ages of four to six months), the child learns at one stroke to follow with his hand objects which escape him, even when he does not see them. It is this behavior pattern which permits the subject to attribute a beginning of permanence to tactile objects.

OBS. 13. At 0;8 (20) Jacqueline takes possession of my watch which I offer her while holding the chain in my hand. She examines the watch with great interest, feels it, turns it over, says *apff*, etc. I pull the chain; she feels a resistance and holds it back with force, but ends by letting it go. As she is lying down she does not try to look but holds out her arm, catches the watch again and brings it before her eyes.

I recommence the game; she laughs at the resistance of the watch and still searches without looking. If I pull the object progressively (a little farther each time she has caught it) she searches farther and farther, handling and pulling everything that she encounters. If I pull it back abruptly, she is content to explore the place where the watch departed, touching her bib, her sheet, etc.

But this permanence is solely the function of prehension. If, before her eyes, I hide the watch behind my hand, behind the quilt, etc., she does not react and forgets everything immediately; in the absence of tactile factors visual images seem to melt into each other without substance. As soon as I replace the watch in Jacqueline's hands and pull it back she searches for it again, however.

OBS. 14. Here is a counterproof. At 0;9 (21) Jacqueline is seated and I place on her lap a rubber eraser which she has just held in

her hand. Just as she is about to grasp it again I put my hand between her eyes and the eraser; she immediately gives up, as though the object no longer existed.

The experiment is repeated ten times. Every time that Jacqueline is touching the object with her finger at the moment when I cut off her view of it she continues her search to the point of complete success (without looking at the eraser and often dropping it by displacing it involuntarily, etc.). On the other hand, if no tactile contact has been established before the child ceases to see the eraser, Jacqueline withdraws her hand.

Same attempts with a marble, a pencil, etc., and same reactions. My hand does not interest her at all; therefore it is not a shift in interest that causes forgetfulness; it is simply because the image of my hand abolishes that of the object beneath it, unless, let us repeat, her fingers have already grazed the object or perhaps also unless her hand is already in action under mine and ready to grasp.

At 0;9 (22) same observations.

OBS. 15. At 0;6 (0) Lucienne is alone in her bassinet and, watching what she is doing, grasps the material covering the sides. She pulls the folds toward herself but lets them go at each attempt. She then brings before her eyes her hand which is tightly closed, and opens it cautiously. She looks attentively at her fingers and recommences. This goes on more than ten times.

It is therefore sufficient for her to have touched an object, believing she grasps it, for her to conceive of it as being in her hand although she no longer feels it. Such a behavior pattern, like the preceding ones, shows the degree of tactile permanence the child attributes to objects he has grasped.

OBS. 16. So also Laurent, at 0;7 (5) loses a cigarette box which he has just grasped and swung to and fro. Unintentionally he drops it outside the visual field. He then immediately brings his hand before his eyes and looks at it for a long time with an expression of surprise, disappointment, something like an impression of its disappearance. But far from considering the loss as irremediable, he begins again to swing his hand, although it is empty; after this he looks at it once more! For anyone who has seen this act and the child's expression it is impossible not to interpret such behavior as an attempt to make the object come back. Such an observation, combined with the preceding one (Lucienne at 0;6) places in full light the true nature of the object peculiar to this stage: a mere extension of the action.

Subsequently Laurent, to whom I have returned the box, again loses it several times; when he has just held it he is satisfied to stretch out his arm in order to find it again, or else he stops searching altogether (see the next observation).

OBS. 17. As early as 0;4 (6) Laurent searches with his hand for a doll he has just let go. He does not look at what he is doing but extends his arm in the direction toward which it was oriented when the object fell.

At 0;4 (21) also, he lowers his forearm in order again to find under the sheet a stick he held in his hand and which he has just let go.

Same reaction at 0;5 (24) with all sorts of objects. I then try to determine how extensive his search is. I touch his hand with a doll which I immediately withdraw; he is satisfied to lower his forearm without really exploring the surrounding area (see Chap. II, obs. 69).

At 0;6 (0), 0;6 (9), 0;6 (10), 0;6 (15), etc., I observe the same facts. Laurent believes the object has disappeared if he does not find it merely by lowering his arm; the object for which he searches is therefore not yet endowed with true mobility but is conceived as merely extending the interrupted act of prehension. On the other hand, if the fallen object touches the child's cheek, his chin, or his hand, he knows very well how to find it again. It is therefore not motor incapacity which explains the lack of true searching but rather the primitive quality attributed to the object.

At 0;6 (15) I again observe that if the object suddenly falls from his hand Laurent does not search for it. On the contrary, when the hand is about to grasp the escaping object or when the hand displaces the object, shakes it, etc., then a search takes place. Only, in order to recover the object Laurent is always satisfied to raise his arm with no trajectory of true exploration.

At 0;7 (5) he grasps and swings the cigarette box of obs. 16; when he loses it right after having taken it he searches on the coverlet with his hand. However, when he drops it under any other circumstance, he does not try to find it again. I then again offer him the same box above his eye level; he makes it fall by touching it but does not search for it!

At 0;7 (12) he lets go, at his right, a rattle which he was holding in his hand; he searches for it for quite a while without hearing or touching it. He gives up and then begins again to search at the same place. Finally he fails. Next he loses it on his left and finds it twice more because the object is in the direct range of his arm movements

Finally, from 0;8 (8) he truly searches for everything that falls from his hands.

We must first emphasize the difference between these reactions and the behavior patterns of the fourth stage, which consist in searching with the hands for the object disappearing from the visual field. In obs. 13-14 as in obs. 6-12 (accommodation to rapid movements) it is still only a question of a permanence merely extending earlier accommodation movements and not of a special search for the vanished object. The child, holding something in his hand, wishes to keep it when it escapes him; he then merely reproduces the gesture of grasping which he made shortly before. Such a reaction certainly presupposes that the subject expects his gesture to lead to the desired result. But this expectation is merely based on the belief that the object is at the disposal of the act. In this regard obs. 15 and 16 have decisive significance. That does not yet at all imply the substantial permanence of the thing independently of the gesture or the existence of objective trajectories.[2] Proof of this is that the least obstacle advening to change the situation as a whole discourages the child. The child is content merely to stretch out his arm; he does not truly search and invents no new procedure for rediscovering the vanished object. This is all the more striking because, as we shall see, it is along the very lines indicated by the present behavior patterns that such procedures will be formed.

Let us examine a third group of behavior patterns also capable of engendering a beginning of object permanence: the deferred circular reactions. As we have seen, the permanence peculiar to objects of this stage is not yet either substantial or truly spatial; it depends on the action itself and the object merely constitutes that which is at the disposal of that action. We have proved, moreover, that such a situation stems from the fact that the activity of the child at this level consists essentially in primary and secondary circular reactions and not yet in tertiary reactions. In other words, the child spends the better part of his time in reproducing all sorts of interesting results evoked by the sights around him and tries only a little to study new things for their own sake, to experiment. Thereafter the universe of that stage is

[2] See Chap. II, obs. 69.

composed of a countless series of potential actions, the object being nothing more than the material at the disposal of those actions. If this is true, it is to be expected that the secondary circular reactions constitute one of the most abundant sources of elementary permanence; that is what the analysis of deferred circular reactions will show.

It must be noted that sooner or later circular reaction brings with it a sort of revival that prolongs its influence over the child's behavior. We do not, of course, speak of the fact that circular reaction reappears every time the child finds himself facing the same objects (shaking himself when he sees the bassinet hood, pulling the chain when he sees the rattle to which it is attached, etc.) for there deferred behavior patterns are not involved, but rather merely habits revived by the presence of a familiar stimulus. We are thinking exclusively of those acts in the course of which circular reaction is interrupted by circumstances and resumes shortly after without any external stimulus. In such cases the fact that the child returns of his own accord to the position and gestures necessary for the resumption of the interrupted act endows the objects thus rediscovered and recognized with a permanence analogous to those of which we have just spoken. The permanence is even more marked because the rediscovered action, being more complex, gives rise to a proportionately greater solidification of the perceived images.

OBS. 18. At 0;8 (30) Lucienne is busy scratching a powder box placed next to her on her left, but abandons that game when she sees me appear at her right. She drops the box and plays with me for a moment, babbles, etc. Then she suddenly stops looking at me and turns at once in the correct position to grasp the box; obviously she does not doubt that this will be at her disposal in the very place where she used it before.

OBS. 19. At 0;9 (3) Jacqueline tries to grasp a coverlet behind her head, in order to swing it.[8] I distract her by offering her a celluloid

[8] This behavior of "swinging" already belongs to the fourth stage with respect to the general development of intelligence (see *O.I.*, obs. 139). But, with regard to object concept, the deferred reaction to which it gives rise in this observation does not yet transcend the level of the third stage. It is apparent that, without considerable artifice, it is impossible to synchronize the corresponding steps of the evolutions peculiar to the various categories

duck. She looks at it, then tries to grasp it, but suddenly stops to look behind her for the coverlet which she did not see.

At 0;9 (13) she tries to grasp with her left hand a bottle which I place beside her head. She succeeds only in grazing it by turning her face slightly. She gives up shortly and losing sight of the bottle pulls a coverlet in front of her. But suddenly she turns around to reapply herself to her attempts at prehension. It all happens as if she has retained the memory of the object and returns to it, after a pause, believing in its permanence.

OBS. 20. Laurent has had many such reactions since 0;6. If the child is interrupted as he pulls the string hanging from the hood, scratches the edge of the bassinet, etc., he will immediately turn in the right direction and rediscover these objects. Let us limit ourselves to describing an observation of him at 0;6 (12), which pertains at the same time to deferred circular reaction, accommodation of the eyes to the movement of falling and tactile-manual search for the object. Without being typical from the point of view of interrupted circular reaction, this observation sums up very well what we have hitherto seen regarding the constitution of the object at that stage.

I place a rattle on the edge of the bassinet hood, barely held in place by a string attached behind it. Laurent at once stirs around in order to swing the object as if it were a toy somehow hanging there; but the rattle falls in front of his face and so close that he grasps it immediately. He replaces the rattle up in the air; same reaction, five or six times in succession. It is therefore possible to consider these acts taken together as constituting a new circular schema: stirring about, making the object fall, and grasping it. What will happen when the cycle remains incomplete, that is to say when the object, instead of falling in a visible place, disappears from the visual field? Will the reaction thus interrupted be extended in deferred reaction and how?

1. When the object falls after having been detached by the movement of the child, his eyes search for it in front of him, at the usual place. If he does not see it he again stirs about, but looking in front of him and not up in the air. If he then hears the rattle, he stretches out his hand and grasps whatever may be there, without true exploration (thus he takes possession either of the rattle itself, if it happens to come under his hand, or of the sheet, the coverlet, etc.).

of sensorimotor intelligence, and that temporal displacements are produced, the more comprehensible the farther removed they are from the elementary stages.

2. When the rattle, in falling from the hood, makes a noise in falling, Laurent immediately stretches out his hand in its direction (without seeing it). But if in touching it he pushes it back involuntarily, he does not put his hand forward to follow the trajectory of the object; he merely brings back whatever he finds (the sheet, etc.).

3. When the child has not seen the beginning of the fall of the rattle, he does not search for it in front of him; the object no longer exists. In particular, when it is I who make it fall unexpectedly, its disappearance gives rise to no search. It is therefore only as a function of the total cycle that searching is set in motion.

These behavior patterns are important; their accumulation and systematization will gradually bring with them belief in the permanence of the external world. But they are not in themselves alone enough to constitute object concept. They imply simply that the child considers as permanent everything which is useful to his action in a particular situation under consideration. Thus in obs. 19 Jacqueline, whose attention has been distracted from swinging a coverlet located behind her, returns to the original position, convinced that in the moment of turning she will find the desired object. But in this there is only a global and practical permanence, and nothing yet implies that objects once removed from their context will remain for her identical to themselves; we shall see that when the child begins to search actively for objects which have disappeared from his perceptual field (4th stage), he is still capable only of that entirely practical belief in global permanence. These behavior patterns, therefore, do not go much further than the primitive anticipation arising from visual accommodation to rapid movements or from interrupted prehension. It is not the object which constitutes the permanent element (for example the coverlet), but the act itself (swinging the coverlet), hence the whole of the situation; the child merely returns to his action.

Will reconstructions of an invisible whole from a visible fraction mark progress? Theoretically, behavior patterns like these could be observed at any age, hence from the first stages; it would suffice that the child, accustomed to a certain object as a whole, should try to see it as a whole when he catches sight of part of it. But, in fact, we have not definitely observed such reactions until after prehension has been acquired. Doubt-

less it is solely the habit of grasping and manipulating objects, of thus endowing them with a relatively constant form, and of locating them in a space that has greater or less depth, that permits the child to form an image of their totality. Nevertheless, it seems to us that this still does not prove that the thing seen or grasped is considered by the subject as being a permanent object of constant dimensions, or, above all, that it is situated among objective displacement groups. It suffices simply to make the child consider it as being a whole, even when he limits himself to looking at it without getting hold of it, and to make him try to see the whole of it when he perceives only a part of it.

OBS. 21. At 0;5 (8) Laurent looks at my hand whose movement he imitates. I am hiding behind his bassinet hood. Several times Laurent obviously tries to see me, his gaze leaving my hand and rising along my arm to the point where my arm seems to issue from the hood; he stares at this point and seems to search for me all around it.

At 0;5 (25) Laurent shakes himself when I place a newspaper partly on the edge of his bassinet hood and partly on the string which connects the hood to the handle (see *O.I.*, obs. 110). If he sees a very small portion of the newspaper he will react in the same way. I observe several times in succession that he looks behind him toward the place where the rest of the newspaper is, as though he expected to see all of it appear.

At 0;6 (17) I offer the child a pencil, and at the moment he is getting ready to grasp it I lower it gradually behind a horizontal screen. At the first attempt he withdraws his hand while he still sees one centimeter of the pencil; he looks at this extremity with curiosity, without seeming to understand. When I raise the pencil one to two centimeters he grasps it at once. Second attempt: I lower the pencil so as to let about two centimeters of it show. Laurent again withdraws his outstretched hand. When three to four centimeters of pencil show he grasps it. Same reactions in a series of sequential attempts; it therefore seems that the child acknowledges the entireness—at least virtual—of the pencil when he sees three or more centimeters of it and believes it is impaired when he sees only one to two centimeters of it. When the pencil is entirely hidden, Laurent of course no longer reacts and even stops looking at the screen.

OBS. 22. At 0;8 (15) Lucienne looks at a celluloid stork which I have just taken away from her and which I cover with a cloth. She

does not attempt to raise the cloth to take the toy. (We shall return to this phase of the experiment; see obs. 30.) But when a part of the stork appears outside the cloth, Lucienne immediately grasps this bit as though she recognized the whole animal.

The proof that this involves a reconstruction of the whole is that not every partial presentation is equally propitious. The head or tail immediately gives rise to a search; Lucienne removes the cloth[4] in order to extricate the animal. But sight of the feet alone arouses great interest although the child does not try to grasp; Lucienne seems not to recognize the stork, or at least to consider it as being changed. These facts cannot therefore be interpreted by saying that the child grasps anything whatever. Moreover, when Lucienne recognizes the stork just by its head or tail she expects to find a whole; at first she raises the cloth, knowing in advance that neither head nor tail is isolated. Hence it is all the more curious that the child remains incapable of raising the screen when the entire animal is hidden; it is the sign that the act of reconstructing a totality from a visible fraction of the thing is psychologically simpler than the act of searching for an object that has completely vanished.

OBS. 23. At 0;9 (7) Lucienne reveals analogous reactions but in connection with a toy hitherto unfamiliar to her. I offer her a celluloid goose which she has never seen before; she grasps it at once and examines it all over.

I place the goose beside her (Lucienne is seated) and cover it before her eyes, sometimes completely, sometimes revealing the head (white head, yellow beak).

Two very distinct reactions.

In the first place, when the goose disappears completely, Lucienne immediately stops searching even when she is on the point of grasping it; she withdraws her hand and looks at me, laughing.

In the second place, when the beak protrudes, not only does she grasp the visible part and draw the animal to her, but from the very first attempts she sometimes raises the coverlet beforehand in order to grasp the whole thing! The goose is therefore conceived as being at least a virtual totality, even when only the head appears.

Never, even after having raised the coverlet several times on seeing the beak appear, has Lucienne tried to raise it when the goose was completely hidden! Here again is proof of the fact that recon-

[4] This act of removing the cloth belongs to the fourth stage in so far as the function of intelligence is concerned, but the object concept remains characteristic of the third stage.

struction of a totality is much easier than search for an invisible object.

Same reactions at 0;9 (8), that is, the following day.

OBS. 24. No object is more interesting to the child at this stage than his bottle (Jacqueline and Laurent were weaned around 0;6 and were almost exclusively bottle-fed until about 1;0). It is therefore permissible to consider the child's reactions toward it as typical and as characterizing the whole of this stage.

Until about 0;9 (4) Laurent, in whose case particularly I analyzed this phenomenon, manifested three distinct reactions, the sum of which clarifies the three preceding observations and permits an inference free of ambiguity.

1. If the bottle disappears from his perceptual field this is enough to make it cease to exist from the child's point of view. At 0;6 (19), for instance, Laurent immediately begins to cry from hunger and impatience on seeing his bottle (he was already whimpering, as he does quite regularly at mealtime). But at the very moment when I make the bottle disappear behind my hand or under the table—he follows me with his eyes—he stops crying. As soon as the object reappears, a new outburst of desire; then flat calm after it disappears. I repeat the experiment four more times; the result is constant until poor Laurent, beginning to think the joke bad, becomes violently angry.

This behavior pattern is conserved with the same definiteness until about 0;9. Hence it seems apparent that to the child the objective existence of the bottle is subordinate to his perception. This does not mean, of course, that the vanished bottle has been fundamentally forgotten; the child's ultimate rage reveals clearly enough that he believes he can count on the object. But this is precisely because he considers it as being at the disposal of his desires, like the objects of which we have been speaking, and not as having substantial existence under my hand or under the table. Otherwise he would behave quite differently at the moment of its disappearance; he would manifest, at that exact moment, a still more intense desire than during normal perception. That is clearly revealed by the following reaction.

2. When I make only part of the bottle disappear and Laurent sees a small fraction of it near my hand, or a cloth, or the table, the manifestations of his desire are more imperious than when he saw the whole bottle. At the very least, they remain identical: Laurent kicks and cries while staring fixedly at the visible portion of the object. Up to 0;7 (1) he has not stretched out his arms, because he

has not been in the habit of holding his bottle, but from that date on he tries to take it. If I offer it to him half-covered by a cloth, he takes possession of what he sees, never doubting for a single second that his bottle is involved. Thus he reacts as did Lucienne with respect to her stork (obs. 22) or her goose (obs. 23), with the difference that he does not know how to raise the cloth and is content to extricate the bottle from it by degrees and quite clumsily. (As we have noted, the action of removing the cloth or any obstacle belongs to the fourth stage with regard to the development of the intelligence in general; and it appears shortly before the discovery of the object characteristic of the same stage, a discovery which it sets in motion sooner or later.)

Finally, let us note in connection with this second reaction that Laurent recognizes his bottle no matter what part of it is visible. If he sees the nipple, his reaction is natural, but even when he sees the wrong end his desire is the same; hence he admits at least the virtual entireness of the bottle in the same sense as at 0;6 (17) he admitted that of the pencil (obs. 21) and Lucienne that of the swan and the goose (obs. 22 and 23). But, as will be revealed by the third reaction which illuminates the meaning of the first two, this wholeness is considered by the child as only virtual. Everything occurs as though the child believed that the object is alternately made and unmade; if, independently of any screen, the bottle is presented to Laurent upside down he will consider it incomplete and lacking a nipple, at the same time expecting the nipple to appear sooner or later in one way or another. When the child sees a part of the object emerge from the screen and he assumes the existence of the totality of that object, he does not yet consider this totality as being formed "behind" the screen; he simply admits that it is in the process of being formed at the moment of leaving the screen.

3. Let us briefly describe this third reaction, to which we will return in detail in connection with the concept of space and of groups obtained by reversals.

From 0;7 (0) until 0;9 (4) Laurent is subjected to a series of tests, either before the meal or at any other time, to see if he can turn the bottle over and find the nipple when he does not see it. The experiment yields absolutely constant results; if Laurent sees the nipple he brings it to his mouth, but if he does not see it he makes no attempt to turn the bottle over. The object, therefore, has no reverse side or, to put it differently, it is not three dimensional. Nevertheless Laurent expects to see the nipple appear and evidently in this hope he assiduously sucks the wrong end of the bottle (for more information on this behavior see obs. 78, Chap. II). It is in this sense that we

speak of virtual totality from the point of view of object concept; to Laurent the bottle is already a whole, but its various elements are still conceived as being at his disposal and not as remaining organized in space.

Such a reaction confirms the meaning of the first two as well as that of the various preceding observations.

OBS. 25. So also Jacqueline, at 0;6 (29), opens her mouth on seeing the bottle approach. When it is near her, within reach, I hide the bottle with my hand. Jacqueline kicks in anger and impatience; it does not occur to her to remove my hand, but she stares at it with an expression of intense expectation and desire. All this occurs as though the bottle seemed to her to emanate from my hand and as though this emanation having just disappeared, she expected it to reappear.

These behavior patterns surely are a sign of a beginning of solidification of the thing perceived and of a certain permanence attributed to visual and tactile images. But they do not yet prove the existence of objects in general. When a part of a toy is visible the child believes in its material existence but when it is completely hidden the subject ceases to acknowledge that it exists substantially and is merely concealed behind the screen. In other words Laurent, in obs. 21, doubtless does not imagine that I am behind the hood but rather that I am something about to arise from the hood. Neither he nor Jacqueline, in obs. 24 and 25, envisages the bottle behind my hand. As for Lucienne, in obs. 22 and 23, she considers the stork and the goose as entities that somehow issue from the coverlet itself. The concepts of "in front of" and "behind," the idea of an object remaining in substantial form under another object which conceals it are, in effect, of great complexity, for they presuppose the elaboration of groups and of laws of perspective; we have just shown that the latter are far from being formed at the outset, as soon as the capacity to grasp visual objects is acquired.

The following behavior patterns seem, nevertheless, to bear witness to the presence of such concepts. At the outset, the observations we shall describe on "removal of obstacles preventing perception" seem more decisive than they really are, but a careful analysis will show us that they are different from the later behavior patterns with which one might be tempted to compare them. From the age of five to seven months the child becomes capable of practicing a sort of game of hide-and-seek which consists in removing from in front of his face the screen obstructing his view.

OBS. 26. At 0;7 (29) Jacqueline is hidden behind her pillow (which she herself has placed over her face). I call her; she immediately gets rid of this obstacle in order to look at me.

At 0;8 (12) a pillow is placed over her face; she immediately removes it amid peals of laughter and tries at once to see who is there.

At 0;8 (13) Jacqueline has a sheet over her face. Hearing my approaching footsteps she immediately uncovers herself.

OBS. 27. At 0;5 (25) Laurent removes clumsily, but as rapidly as possible, a cushion which I place over his face and which prevents him from seeing. When I place something less irksome over his face, such as his light little pillow, he does not remove it at once but gets rid of it as soon as he hears a voice and tries to see who is in front of him.

At 0;7 (15) he is lying down and spontaneously with both hands pulls his shawl over him, up to his nose. He looks under the shawl with curiosity. I call him; he looks above and behind him but it does not immediately occur to him to displace the shawl. After a moment, however, he displaces it and sees me in front of him. Then he resumes his game and again covers himself up. I call him again; this time he immediately lowers the shawl so as to get a better view. But he does not see me because I am a little nearer his feet than before; it does not enter his mind to lower the screen a little more, although I call him continually.

At 0;7 (28) Laurent is seated and I place a large cushion between him and me so as to make a screen. The cushion remains upright, but sometimes I put it at Laurent's side (10 centimeters from his face), sometimes at my side (20-30 centimeters away from him); when the screen is beside him he lowers it at once, but when it is next to me he does not react. However I disappear and reappear slowly as I had just done when he lowered the cushion at his side, and nothing would be easier for him than to repeat the thing in this new position.

Between 0;7 (13) and 0;8 (0) Laurent discovers the behavior patterns of the fourth stage with regard to the mechanism of intelli-

gence: removing obstacles (*O.I.*, obs. 122-123), etc. From the point of view which interests us here, such behavior patterns precede by several weeks the object construction of the fourth stage, but they lead to it little by little. Thus at 0;8 (1) Laurent with one hand lowers a cushion masking the lower half of a box which I offer him and grasps the box with the other. At 0;8 (8) he goes so far as to lean forward in order to see his bear for a longer time, as I make it disappear behind the cushion, etc. But we shall see presently that during this period of transition (until about 0;9), the child always behaves as though the object which has disappeared altogether from his perceptual field no longer exists (see obs. 32 and 33).

Such behavior patterns, like that of the reconstructions of an invisible whole from a visible fraction, at first seem to show that the child possesses the concept of a substantial object hidden behind a screen. But before reaching this conclusion we should ask at what point the child's action no longer merely extends his earlier or habitual accommodations. In the latter case it would not yet be possible to speak of the concept of objects being displaced in space, but only of a beginning of permanence relative to the perception and the action in progress. Emphasis must be placed on the point that, in the examples just described, the child is trying less to free the object masked by a screen than to free his own perception; if that is what he is trying to do he can succeed without having in advance the concepts of "in front of," "behind," or of objects hidden by one another. Doubtless such a behavior pattern will lead to these concepts, but it does not at all involve them at first.

When Jacqueline and Laurent free their faces from the pillow or from various cloths (obs. 26 and 27), they do nothing more than any baby can do from the age of 6 months. In some excellent experiments Mme. Bühler has shown that on an average from the seventh month the child, even when lying on his stomach, is able to get rid of a cloth placed over his face.[5]

When, later (obs. 27), from 0;7 (15) Laurent removes the coverlet which separates him from me, he is only generalizing what he was learning in a practical way when he removed the cloths placed on his face. This does not yet involve the act

[5] C. H. Bühler and H. Hetzer, *Kleinkindertests* (Leipzig: Barth, 1932), pp. 42-43.

by which the child conceives of one object as remaining permanent behind others; it relates, rather, to a practical schema which endows objects with no permanence other than that whose nature we have seen in connection with deferred circular reactions and the other behavior patterns of this stage. The proof is that, if he knows how to remove the screen sufficiently to look in front of him, he does not yet succeed in displacing it in relation to the hidden object. Therein is still a permanence merely extending accommodation movements and not yet an objective permanence independent of the action.

In short, none of these facts yet attests to the existence of objects properly so called. Objects remain, in such behavior patterns, those things at disposal of which we have spoken, endowed with a global and completely practical permanence, that is to say, depending on the continuance of actions as such. This makes us understand the true nature of the "reconstructions of invisible totalities from a visible fraction"; either the child sees a fragment of the object and the action of grasping thus set in motion bestows a totality on the thing perceived, or else he no longer sees anything and no longer attributes any objective existence to the vanished object. It would therefore be impossible to say that the half-hidden objective is conceived as being masked by a screen; it is simply perceived as being in the process of disappearing, the action alone bestowing on it a total reality.

However, it is self-evident that these latter two groups of behavior patterns and particularly the fifth (obs. 26 and 27) are those which bring us closest to the true taking possession of the object, that is to say, to the advent of active search for the vanished object. It seems to us that this search becomes differentiated, only from the time when it no longer merely extends in an immediate way the movements of accommodation, but when in the course of the action new movements become necessary to remove the obstacles (like the screens) intervening between subject and object. This is precisely what does not yet happen during the present stage. All the behavior patterns enumerated hitherto merely extend the action in progress. Clearly, in regard to visual accommodations to rapid movements, interrupted prehensions, and deferred circular reactions, the third consist merely in returning to the momentarily suspended act

and not in complicating the action by removing the obstacles which arise. The reconstruction of invisible totalities and the removal of obstacles preventing perception both seem to involve this differentiation, but this only appears to be true. When the child tries to get a half-hidden object and, to do this, removes the obstacle which covers the hidden portion, he by no means performs an action as complicated as that of removing a screen masking the entire object. In the latter case the child must momentarily give up his attempt at direct prehension of the object in order to raise a screen recognized as such; in the former case, on the contrary, the child sees part of the object which he tries to grasp, he reconstructs the totality only as a function of the immediate action and in removing the obstacle does nothing more than he always does when he extricates some toy from the coverlet or the cloths clumsily grasped along with it. It is therefore impossible yet to speak of a special behavior pattern consisting in removing the screen. Regarding the removal of obstacles preventing perception we have just seen that this is a question of an object in relation to the subject and not in relation to the object; there is, indeed, differentiation of the action but the obstacle-screen and the object as such are not yet related. From this point of view, the object is still only the extension of the action in progress.

What will happen when the child, trying to grasp some object, sees it completely disappear behind a screen? We have hitherto examined what the child knows how to do during this third stage; it is now important to make clear what he does not know how to do. In the situation we have just posed this striking and essential phenomenon is produced: the child either gives up all searching or searches for objects elsewhere than under the screen, for example around the hand which has just placed them there.

OBS. 28. At 0;7 (28) Jacqueline tries to grasp a celluloid duck on top of her quilt. She almost catches it, shakes herself, and the duck slides down beside her. It falls very close to her hand but behind a fold in the sheet. Jacqueline's eyes have followed the movement, she has even followed it with her outstretched hand. But as soon as the duck has disappeared—nothing more! It does not occur to her to

search behind the fold of the sheet, which would be very easy to do (she twists it mechanically without searching at all). But, curiously, she again begins to stir about as she did when trying to get the duck and again glances at the top of the quilt.

I then take the duck from its hiding-place and place it near her hand three times. All three times she tries to grasp it, but when she is about to touch it I replace it very obviously under the sheet. Jacqueline immediately withdraws her hand and gives up. The second and third times I make her grasp the duck through the sheet and she shakes it for a brief moment but it does not occur to her to raise the cloth.

Then I recommence the initial experiment. The duck is on the quilt. In trying to get it she again causes it to slide behind the fold in the sheet; after having looked at this fold for a moment (it is near her hand) she turns over and sucks her thumb.

I then offer her her doll which is crying. Jacqueline laughs. I hide it behind the fold in the sheet; she whimpers. I make the doll cry; no search. I offer it to her again and put a handkerchief around it; no reaction. I make the doll cry in the handkerchief; nothing.

OBS. 29. At 0;8 (2) Jacqueline is seated beside a table and looks at a matchbox which I shake above the table, making as much noise as possible. The box passes slowly under the table, continuing to make a noise; Jacqueline then looks at me instead of searching under the table to see where the noise comes from.

Several attempts, all negative.

At 0;8 (16) while she watches I place her little bells under the coverlet, rolling them up into a ball to facilitate her search. I shake the whole thing to make the bells ring. No reaction. As long as she hears the noise she laughs but then her eyes follow my fingers instead of searching under the coverlet.

Then I pull the string attached to the bells, which has remained visible. She imitates the sound and listens to it but still does not look under the coverlet. I then raise it in order to reveal the object; Jacqueline quickly stretches out her hand, but just when she is about to get it I cover it up again and Jacqueline withdraws her hand. I repeat the experiment but this time hide the bells behind a fold in the sheet; same negative reaction, despite the sound. Subsequent attempts yield nothing more.

At 0;9 (8), at the age when she knows how to remove a screen blocking her view (see obs. 26 and 27), Jacqueline plays with a parrot. I take it away from her and place it behind the fold of the sheet, before her eyes. I tap on it and the rattle sounds. Jacqueline

does the same but does not search under the sheet. I then let her glimpse a few millimeters of the end of the tail; she looks at it curiously as though without understanding. She tries to grasp it but picks up the sheet along with the parrot; she jumbles them together without being able to differentiate them.

OBS. 30. At 0;8 (12) Lucienne behaves like Jacqueline at the same age; when she is at the point of grasping an object and it is made to disappear under a handkerchief, a coverlet, or the observer's hand, she immediately gives up.

When I hide her rattle under the coverlet and make it sound she looks in the right direction but merely examines the coverlet itself, without trying to raise it.

At 0;8 (15) Lucienne is seated and tries to recapture a celluloid stork (containing a rattle) which she has just held and shaken (see obs. 22). I place the stork beside her right knee, covering it with the edge of the cloth on which the child is seated; nothing would be simpler than to find it again. Moreover Lucienne has watched each of my movements most attentively and they were slow and clearly visible. However, as soon as the stork disappears under the cloth, Lucienne stops looking at it and looks at my hand. She examines it with great interest but pays no more attention to the cloth.

I extricate the stork before Lucienne's eyes. She takes it, and as she does so her interest is aroused. As a precaution I take pains to repeat this maneuver after each subsequent test. Furthermore, uncovering the stork before the child's eyes should help her; her negative reactions are therefore all the more interesting.

Attempts 2-7: still nothing, except that Lucienne looks at my empty hands with stupefaction.

Attempt 8: After hiding the stork while the child watches, I tap on the cloth. Lucienne hears the stork and taps in turn. But as soon as she hears the sound thus produced, she looks at my hand (which is on the edge of the bassinet 30 centimeters away), as though the stork should be there still, or should be there again.

Attempts 9-12: partial presentations, described in obs. 22.

Attempts 13-15: When the stork is again completely hidden Lucienne resumes her negative reactions. She begins again to look at my hand when she hears the stork under the cloth. Twice in succession she even happens to tap on my hand as she has just done with the stork covered by the cloth; new proof that she thinks the stork should emanate from that hand.

At 0;8 (16), the next day, the same experiment yields the same

result: Lucienne continues to search in my hands when she has herself tapped on the stork covered by the cloth.

OBS. 31. At 0;9 (7) Lucienne tries to grasp a celluloid goose, which I cover either completely or partially. We have seen, in obs. 23, the beginning of these reactions: Lucienne is able to grasp the goose with precision when she perceives the beak (in this case she extricates it from the coverlet and even raises the latter in advance) but she remains incapable of searching for the object when it is entirely covered up.

At the end of the experiment I facilitate things as follows: the animal is lying under the coverlet and Lucienne has withdrawn her hand; I tap on the goose which then rattles very distinctly. Lucienne imitates me at once, taps harder and harder, and laughs; but it does not occur to her to raise the screen. Then I again let the beak emerge; Lucienne at once raises the coverlet to look for the animal. I cover it up again; she taps, laughs, looks at my hands for a moment, but does not again touch the screen.

OBS. 32. Laurent, as we have seen (obs. 24), ceases to cry at 0;6 (19) and until about 0;9, at the time when he sees the bottle he desired disappear; everything occurs as though the child believed that it ceased to exist in substance. In particular, at 0;7 (3), when Laurent has been on a diet for a week, he cries from hunger after each meal and clings frantically to his bottle; however if I hide it slowly behind my arm or my back this is enough to calm Laurent. He screams on seeing it disappear, but at the precise moment when he can no longer see it at all he ceases to react.

At 0;7 (28) I offer him a little bell behind a cushion (the cushion in obs. 27); so long as he sees the little bell, however small it may be, he tries to grasp it from above the screen which he lowers more or less intentionally. But if the little bell disappears completely he stops all searching.

I then resume the experiment, using my hand as a screen. Laurent's arm is outstretched and about to grasp the little bell at the moment I make it disappear behind my hand (which is open and at a distance of 15 cm. from him); he immediately withdraws his arm, as though the little bell no longer existed. I then shake my hand, always revealing the back of it and gripping the little bell in my palm; Laurent watches attentively, greatly surprised to rediscover the sound of the little bell, but he does not try to grasp it. I turn my hand over and he sees the little bell; he then stretches out his hand toward it. I hide the little bell again by changing the position of my hand;

Laurent withdraws his hand. In short, he does not yet have the concept that the little bell is "behind" my hand for he has no concept of the "reverse side" of it (see obs. 24, reaction 3).

Afterward I put the little bell before him, but at the moment he is about to grasp it with outstretched hand I cover it with a thin cloth; Laurent withdraws his hand. He taps on the little bell with his index finger, through the cloth, and the little bell rings; Laurent watches this phenomenon with great interest, then his eyes follow my hand as I withdraw it open and look at it for a moment (as though the little bell were going to arise from it). But he does not raise the cloth.

OBS. 33. From about 0;8, as we have seen (obs. 27), Laurent begins to remove the screen or even to lean forward to look over it. But during this entire phase intermediate between the third and the fourth stage he never once succeeds in raising the screen when the object has entirely disappeared. Thus at 0;8 (8) he is incapable of finding my watch under his little pillow, placed before him. This is all the more curious because he has just searched with his hand (outside the visual field) for the watch which escaped him ("tactile object" and "interrupted prehension": see obs. 17). But when I put the watch under his eyes, and at the moment he is about to grasp it I cover it with his small pillow, he withdraws his hand, whimpering. It would, however, be very easy for him to raise his pillow as he always does in play.

At 0;8 (25) Laurent watches me when I place a cushion against my face. He begins by pushing himself up in order to look at me over the screen, then he pulls the screen away (therefore he knows I am there). But when I lie down before him with the cushion over my head he does not raise it, even if I say "coucou." He simply looks at my shoulder at the place where I disappear under the cushion and no longer reacts. Similarly, the objects he sees me hide under the cushion give rise to no reaction. It is only after 0;9 that he applies himself to searching for the object in such circumstances.

In short, so long as the search for the vanished object merely extends the accommodation movements in progress, the child reacts to the object's disappearance. On the other hand, as soon as it is a question of doing more, that is, of interrupting the movements of prehension, of visual accommodation, etc., in order to raise a screen conceived as such, the child abandons all active search; he is content to look at the examiner's hand as

though the object should emanate from it. Even when he hears the object under the cloth which serves as a screen he does not seem to believe in its substantial permanence.

How, then, can the whole of the behavior patterns of this stage be interpreted? They surely mark notable progress over those of the preceding stage. A greater degree of permanence is attributed to vanished images, since the child expects to find them again not only in the very place where they were left but also in places within the extension of their trajectory (reaction to falling, interrupted prehension, etc.). But in comparing this stage to the following ones we prove that this permanence remains exclusively connected with the action in progress and does not yet imply the idea of a substantial permanence independent of the organism's sphere of activity. All that the child assumes is that in continuing to turn his head or to lower it he will see a certain image which has just disappeared, that in lowering his hand he will again find the tactile impression experienced shortly before, etc. Moreover he shows impatience or disappointment in the event of failure. He always knows, in the end, how to search for the image in its absolute position, that is, where he saw it at the beginning of the experiment (in the hands of the experimenter, for instance); but this return to the initial position is still determined by the activity itself, the advantage of this position rising merely from the fact that it characterized the beginning of the action in progress.

Two explanations could account for this apparent limitation of objective permanence. In the first place it could be maintained that the child believes as we do in a universe of substantial objects; but he would pay attention only to the things on which he can act, disregarding the other things and forgetting them at once. According to the second explanation, on the other hand, the images perceived would be endowed with true permanence only to the extent that they would depend on the action itself; the child would thus imagine the existence of these images as resulting in some way from the very effort put forth to utilize and find them again.

If it is impossible to decide between those two hypotheses when only the factors of the present stage are under consideration, examination of the entire evolution of object concept

seems to impose the choice of the second, especially with reference to the hidden implications on which each hypothesis in reality rests. If the first were true it would have to be maintained that the child from the outset conceives of the universe as being external to the action itself and thus distinguishes it from the relations existing among things as such. Furthermore and by virtue of that very fact, it would be necessary to maintain that the initial universe is at first spatial not only to the extent that it is perceived, but also to the extent that vanished objects are deemed to occupy a determined position. On the other hand, the second hypothesis attributes to the child a sort of practical solipsism such that external images are not immediately dissociated from the activities which utilize them and such that the self knows nothing of itself as subject, and therefore fuses into objects the impressions of effort, tension, desire, and satisfaction which accompany acts. The primitive universe, therefore, would not be organized spatially except as a function of the action in progress, and the object would exist for the subject only to the extent that it depends on that very action. If the problem is stated in these terms everything seems to favor the second solution. On the one hand, we do not see how the child would dissociate from his activity the universe insofar as it is permanent, precisely since he does not yet try to concern himself with vanished objects and therefore in no way experiences their resistance to himself. On the other hand, we shall see that the most significant behavior patterns stand in the way of attributing to the child belief in a motionless and general space which invisible objects would occupy along with other bodies, and his own, as well as things. In reality the subject does not exist in his own consciousness and still less is he situated in space; from this time, things are arranged spatially only in the immediate action and remain permanent only as a function of that action.

In effect, at this stage the child does not know the mechanism of his own actions, and hence does not dissociate them from the things themselves; he knows only their total and undifferentiated schema (which we have called the schema of assimilation) comprising in a single act the data of external perception as well as the internal impressions that are affective and kinesthetic, etc., in nature. So long as the object is present it is assimilated in that schema and could not therefore be thought of apart from the acts to which it gives rise. When it disappears, either it is forgotten because it is not sufficiently dynamogenic or else it gives way to a feeling of disappointment or expectation and to the desire to continue the action. Then that which is the essential of circular reaction or reproductive assimilation is produced: a conservation effort. This effort radiates as always in movements extending the action in progress, and if the vanished image is rediscovered it appears merely as the completion of that action. None of this implies substantial permanence: the permanence in question is still only that with which circular reaction in general is impregnated, that is to say definitively the assimilatory activity itself. The child's universe is still only a totality of pictures emerging from nothingness at the moment of the action, to return to nothingness at the moment when the action is finished. There is added to it only the circumstance that the images subsist longer than before, because the child tries to make these actions last longer than in the past; in extending them either he rediscovers the vanished images or else he supposes them to be at disposal in the very situation in which the act in progress began.

Proof that this interpretation is the right one, however painful it may be to our realism, is that the child makes no attempt to search for the object when it is neither within an extension of the gesture made, nor in its initial position; here obs. 28-33 are decisive.

But could not the latter facts be accounted for simply by the lack of motor skill or defects of the child's memory? We do not at all see how. On the one hand it is not difficult for a baby of seven to nine months to lift a cloth, a coverlet, etc. (as he does in obs. 26 and 27). On the other hand we shall see in studying the behavior patterns of the fourth stage that the formation of the object is far from finished when the child begins to look under screens; at first he does not take account of the displacements perceived and always searches for the object in its initial position!

But then could it not be said that the object exists in substance from the very beginning, only its localization in space be-

ing subject to difficulties? As we shall see later such a distinction is in fact devoid of meaning; to exist as object is to be ordered in space, for the elaboration of space is precisely the objectification of perceived images. A reality which merely remains at disposal of the action without being situated in objective displacement groups is therefore not an object; it is only a potential act.

A final remark: The state of affairs at the end of this third stage is still inconsistent. On the one hand, the child tends to attribute a certain visual permanence to images extending his accommodations of sight. On the other hand, he tends to rediscover what falls from his hands and thus to form a sort of tactile object. But there is not yet a merging of these two cycles; the child still does not try to grasp an object that disappears from his visual field without having been in contact with his hands shortly before. It will be the task of the fourth stage to bring about this coordination.

§ 3. THE FOURTH STAGE: ACTIVE SEARCH FOR THE VANISHED OBJECT BUT WITHOUT TAKING ACCOUNT OF THE SEQUENCE OF VISIBLE DISPLACEMENTS

An essential acquisition marks the beginning of this fourth stage. The child is no longer content to search for the vanished object when it is found in the extension of accommodation movements; henceforth he searches for it even outside the perceptual field, that is, behind screens interposed between the subject and the image perceived. This discovery rises from the fact that the child begins to study displacements of objects (by grasping them, shaking them, swinging them, hiding and finding them, etc.) and thus begins to coordinate visual permanence and tactile permanence, which, as we have just noted, remain unlinked during the preceding stage.

But such discoveries, however it may seem, do not yet mark the definitive advent of object concept. The experiment shows that when the object disappears successively in two or more distinct places, the child still confers on it a sort of absolute position; he does not take note of the sequential displacements, although they are quite visible, and seems to reason as if the place where the object was found the first time remains where he

will find it when he wants to do so. In the fourth stage, therefore, the object remains intermediate between the thing at disposal of the preceding stages and the object properly so called of the fifth and sixth stages.

At what age does the child begin to search for the object hidden behind a screen? According to our observations, this occurs between the ages of 8 and 10 months.[6] But it is hard to determine with precision the boundary between the third stage and the fourth and, if one adheres to a precise criterion, that is, the advent of the behavior pattern which consists in raising the screen in order to find the objective, it is only around 0;9 that the present stage begins, that is, with a well marked temporal displacement as compared to the corresponding stage of the development of intelligence (*O.I.*, Chap. IV).

OBS. 34. At 0;8 (29) Laurent plays with a tin box (see *O.I.*, obs. 126). I take it from him and place it under his pillow; whereas four days previously the child did not react in a similar circumstance (see obs. 33), this time he grasps the pillow and perceives the box of which he immediately takes possession. Same reaction at the second test. But is this chance or is the behavior intentional? It is doubtless merely an attempt on Laurent's part and not yet real anticipation. Proof of this is his inertia as soon as I slightly modify the conditions of the experiment. At the third test I place the box 15 centimeters away from him, and as soon as he extends his hand I cover the object with the same pillow as before; he immediately withdraws his hand.

The next days, analogous reactions, difficult to interpret. At 0;9 (17) on the other hand, it suffices that he see a cigar case disappear under a cushion for him to raise the screen and discover the object. At the first attempts the case was completely hidden; nevertheless Laurent found it easily. Then I let a fraction of the object appear; the effort is increased tenfold, Laurent displacing the cushion with one hand and trying to catch the case with the other. In a general

[6] See obs. 0;9 cited by Stern, *Psychol. der frühen Kindheit* (4th ed.), p. 97. In their *Kleinkindertests* Mmes. Bühler and Hetzer consider as characteristic of the 9th and 10th months the behavior pattern which consists in finding a toy under a folded cloth when this toy has been hidden before the child's eyes (see test 7 of Series IX, p. 49). After the 8th month, it is true, the children observed by these writers can find an object half hidden in a pocket (test 8 of series VIII, p. 47, Fig. 15), but as part of the toy remains visible it involves a behavior pattern comparable to our third stage.

way, when the object disappeared completely Laurent showed less animation but the search continued until the end.

At 0;9 (20) in the same way he finds my watch under a quilt, under a cloth, etc. At 0;9 (24) he searches for a little duck under his pillow, under a spread cloth, etc. The behavior pattern has now been acquired and is accompanied by a growing interest.

OBS. 35. As we have seen, up to 0;9 (22) Jacqueline has manifested reactions typical of the third stage (see obs. 8-9, 13-14, 25 and 28-29). Nevertheless, from 0;9 and even from 0;8 (15) some sporadic searching for the hidden object is observable.

The most elementary searches derive merely from the removal of obstacles preventing perception, of which we have spoken in connection with obs. 26 and 27; at a given moment instead of removing a pillow or sheet only when it covers her own face, she manages to remove it when it covers someone else.

For example, at 0;8 (14) Jacqueline is lying on my bed beside me. I cover my head and cry "coucou"; I emerge and do it again. She bursts into peals of laughter, then pulls the covers away to find me again. Attitude of expectation and lively interest.

At 0;8 (16) she faces a coverlet raised between her and me, within reach of her hand but not touching it. I am behind this screen and call her. She responds to each sound but it does not occur to her to lower the coverlet. I rise and reveal myself as briefly as possible, then disappear behind the coverlet. This time she pulls it down with her hand and stretches her head to see me. She laughs at her success. I recommence, lowering myself still further; she again pulls the coverlet down. Jacqueline finally removes it when it completely conceals me.

Obviously these two behavior patterns belong to the fourth stage with regard to the mechanism of intelligence since there is subordination of means to ends with coordination of heterogeneous schemata. On the other hand, with regard to object concept (the elaboration of which naturally lags behind the progress of the intellectual function in general, since it results from this progress instead of engendering it by itself), these behavior patterns remain midway between the third and fourth stage; it is evident that Jacqueline assumes my presence in the sheets or the coverlet, and in this she is already in the fourth stage, but the movements she makes to find me again extend those of obs. 26-27 in such a way that they still belong to the third stage. Let us note, furthermore, that the object searched for in the course of these two behavior patterns is a person, and that persons are obviously the most easily substantiated of all the child's

sensorial images; hence it is natural that as early as 0;8 (15) Jacqueline behaves as we have just seen toward her father when she does not find some toy hidden under a screen.

Concerning the search for inanimate objects which disappeared under screens, Jacqueline's first attempts took place at 0;9 (8) and at 0;9 (20). At 0;9 (8), that is, right after the events in obs. 29, Jacqueline is seated on a sofa and tries to get hold of my watch. I place it under the edge of the coverlet on which the child is seated; Jacqueline immediately pulls the edge of the coverlet, spies the watch, and takes possession of it. I again hide the object, she finds it, and so on eight times in succession.

On the days following, she lapses into disinterest in vanished objects. At 0;9 (20), on the other hand, I hide her parrot under her quilt after she has amused herself by raising this spontaneously; she again grasps the quilt, raises it, perceives the parrot, and seizes it. At the second attempt, the same game but with a certain slowness. At the third attempt the search seems no longer to interest her at all.

At 0;9 (21) and at 0;9 (22) Jacqueline lapses into the behavior patterns characteristic of the third stage (see obs. 14), then, at 0;9 (23) makes fresh progress.

OBS. 36. At 0;9 (23), the day after the last observation made on her related to interrupted prehension (obs. 14), Jacqueline reveals a reaction which clearly belongs to those of the fourth stage while extending those of the third.

We recall that, at 0;9 (21) and 0;9 (22) when Jacqueline tries to grasp an object on her lap and I place a screen between her hand and the object, she renounces her attempt unless her fingers have already grazed the object. At 0;9 (23), placed in the same situation, she pursues her search, provided always that the movement of grasping has already been made before the visual disappearance of the object.

Thus I place an eraser on her lap and hide it with my hand at the moment she stretches out her hand. Jacqueline's hand is at least five centimeters from the eraser and has therefore not yet touched it; however she continues to search under my hand until she has been completely successful. It also happens that she has her hand over mine when I hide the eraser; she also searches under this hand. However, if the movement of grasping has not been made before I hide the eraser, it is not set in motion after the event.

OBS. 37. At 0;10 (3) I resume the same experiment. I place a small sponge on her lap and hide it with my hand. Contrary to what took

place several days before, Jacqueline immediately grasps my hand and casts it aside, then takes possession of the object. This happens a great many times with any object at all: pliers, pipe, etc. Moreover, even if Jacqueline has made no movement before I hide the object, she searches for it once it is hidden.

A moment later I place her parrot under a coverlet; she immediately raises it and searches for the object.

Same reactions at 0;10 (6) and the days following. At 0;10 (12) she scratches a sheet from the outside and every time she does so I take my index finger out from under the sheet, which makes her laugh. At a given moment she scratches but I do not take out my hand again; then she raises the sheet to look for it. A moment later, new disappointment; she again raises the sheet, but as she still does not see my hand, which I purposely withdraw further, she raises the sheet still higher until she sees my fingers.

It is therefore very clear that she believes in the substantial existence of the vanished object, whatever screen may be placed between it and herself.

OBS. 38. At 0;9 (25) Lucienne, like Jacqueline at the same age, manifests behavior patterns which are intermediate between those of the second and third stages. Moreover Lucienne's intermediate behavior patterns are interesting in that they foretell that which is characteristic of the present stage: the difficulty in conceiving of sequential positions of the vanished object. We shall distinguish between two phases of the experiment, I and II.

I. Lucienne is seated on a cloth. I place under its edge a familiar rubber doll which she likes to suck and nibble. Lucienne watches me (I work slowly and visibly), but she does not react.

Second attempt: This time I let the doll's feet emerge: Lucienne grabs them at once and pulls the doll out from under the blanket.

Third attempt: I again hide the object completely. Lucienne pulls the cloth about and raises it as though she were discovering this new procedure in the very course of her groping, and perceives an extremity of the doll; she leans forward to see better and looks at it, much surprised. She does not grasp it.

Attempts 4 and 5 (the doll is henceforth completely hidden each time): negative reaction.

Sixth attempt: Lucienne again pulls the cloth about and makes half the object appear. This time she again looks at it with great interest and at length, as though she did not recognize it. Then she grasps and sucks it.

Seventh attempt: Lucienne searches at once, grasps the cloth and the doll together and has difficulty in dissociating them.

Eighth attempt: She raises the cloth right away but still leans forward in order to have a close view of the doll before grasping it, as though she were not sure of its identity.

II. *First attempt:* I now place the doll under a coverlet 10 centimeters from the original place. I raise the coverlet, put the doll on the floor, and cover it slowly and visibly. As soon as the doll is hidden Lucienne manifests her anger, although it is just as easy for her to find the doll as it was before. She whimpers for a moment but does not search anywhere.

Second attempt: I again place the doll under the original cloth; Lucienne immediately searches for it and finds it.

Third attempt: I again place the object under the coverlet. A strange thing happens. Lucienne not only makes no attempt to raise the coverlet but again pulls the cloth about and ends by raising it!

Attempts 4-6: same reaction. That evening, same experiment; Lucienne searches only under the cloth and never under the coverlet!

It is evident that obs. 34, 36, and 38 are transitional between the preceding stage and the present one. There is certainly something new in the sense that in each of those observations, in obs. 36 and 38 as well as in obs. 37, the child undertakes an active search for the vanished object; he is not content to extend a movement of accommodation (such as lowering the eyes, turning the head, etc.) but he removes the screen which masks the object or searches under the screen. But in obs. 36, the child undertakes this search only if he has previously made the movement of prehension while the object was still visible. Hence everything occurs as though the child still did not have enough faith in permanency to press a search that was not begun in the presence of the object! So also in obs. 38, the child tries only gradually to search under the screen, and when he has found the thing desired he examines it as though doubtful of its identity. Subsequently, however (obs. 37 and end of obs. 38), the search always takes place, at least within the boundaries we shall now define.

The chief interest of this stage is that the active search for the vanished object is not immediately general, but is gov-

erned by a restrictive condition: the child looks for and conceives of the object only in a special position, the first place in which it was hidden and found. It is this peculiarity which enables us to contrast the present stage with the succeeding stages and which should be emphasized now.

The procedure is as follows, at least in the most characteristic period of the stage. Suppose an object is hidden at point A: the child searches for it and finds it. Next the object is placed in B and is covered before the child's eyes; although the child has continued to watch the object and has seen it disappear in B, he nevertheless immediately tries to find it in A! We shall call this the typical reaction of the fourth stage. Toward the end of the stage a reaction appears which we shall consider residual. It is as follows: the child follows with his eyes the object in B, searches for it in this second place, and if he does not find it immediately (because the object is buried too deeply, etc.) he returns to A.

Let us begin by describing the typical reaction. It is noteworthy that this reaction was presaged from the third stage by a series of signs which were doubtless noticed. It has been observed, for example, that in obs. 28-30, showing that the child at the third stage gives up searching for the object hidden behind a screen, the subject does not actually abandon all investigation but searches for the object in the same place where it was found before it was put under the screen. Thus Jacqueline, in obs. 28, searches for the duck on top of her quilt and even resumes wriggling to make it fall, although she saw it slide down under a fold in the sheet. In obs. 30 Lucienne, after having seen me place a stork under a cloth, looks at my hand to see if the stork is still there. Such behavior patterns seem to show us that the object is not yet at this stage a substantial thing remaining in the place to which it was moved but a thing at disposal in the place where the action has made use of it. This is precisely what happens during the whole of the fourth stage: the child learns to search for the object behind a screen—and thereby makes progress over the second stage—but he always returns to the same screen, even if one moves the object from one location to another, because the original screen seems to him to constitute the special place where the action of finding is successful.

OBS. 39. At 0;10 (3) after the events recorded in obs. 37 on that day, Jacqueline looks at the parrot on her lap. I place my hand on the object; she raises it and grasps the parrot. I take it away from her and, before her eyes, I move it away very slowly and put it under a rug, 40 centimeters away. Meanwhile I place my hand on her lap again. As soon as Jacqueline ceases to see the parrot she looks at her lap, lifts my hand and hunts beneath it. The reaction is the same during three sequential attempts.

II. I then simplify the experiment in the following way; instead of hiding the parrot under the rug I place it in plain view on the edge of a table, 50 centimeters away. At the first attempt Jacqueline raises my hand and obviously searches under it, always watching the parrot on the table.

Second attempt: She raises my hand from her lap without looking under it and without taking her eyes from the parrot.

Third attempt: She stops looking at the parrot on the table for a moment and searches carefully under my hand. Then she again looks at the object while removing my hand.

Fourth attempt: She removes my hand without looking at it any more. As this last reaction might be due to automatism I give up the experiment and several days later devise the following:

OBS. 40. At 0;10 (18) Jacqueline is seated on a mattress without anything to disturb or distract her (no coverlets, etc.). I take her parrot from her hands and hide it twice in succession under the mattress, on her left, in A. Both times Jacqueline looks for the object immediately and grabs it. Then I take it from her hands and move it very slowly before her eyes to the corresponding place on her right, under the mattress, in B. Jacqueline watches this movement very attentively, but at the moment when the parrot disappears in B she turns to her left and looks where it was before, in A.

During the next four attempts I hide the parrot in B every time without having first placed it in A. Every time Jacqueline watches me attentively. Nevertheless each time she immediately tries to rediscover the object in A; she turns the mattress over and examines it conscientiously. During the last two attempts, however, the search tapers off.

Sixth attempt: She no longer searches.

From the end of the eleventh month the reactions are no longer as simple and become of the type we call "residual."

OBS. 41. As early as 0;9 (25) Lucienne, as we recall, refused to search for a doll under a coverlet after having previously found it

under another cloth. She even searched for the doll under the cloth after having seen it being covered up by the coverlet (*ibid.*, II, third attempt).

I. A few days later, at 0;10 (3), Lucienne is seated with a coverlet over her lap and a cloth spread on the floor, at her left. I hide her rubber doll under the coverlet, in A; without hesitation Lucienne raises the coverlet and searches. She finds the doll and sucks it. I immediately place the doll under the cloth in B, taking care to have Lucienne see me. She looks at me until the doll is entirely covered up again, then without hesitation looks at A again and raises the coverlet. She searches for a while in disappointment.

Same reaction with perfect regularity in four sequential experiments; failure does not seem to discourage her at all.

II. In what follows I modify the experiment so as to simplify it and compare it to obs. 39, series II. Once Lucienne has searched in A for the object hidden in B, I again raise the cloth at B in order to show her that the doll is still there, then I cover it up again; but Lucienne looks at the doll in B and, as though motivated by a new impetus, returns to A to pursue her search!

Following attempts: same preparations and same reactions. Thus it may be seen that the reaction in obs. 39, series II, was not attributable to perseveration alone.

OBS. 42. At 0;10 (9) Lucienne is seated on a sofa and plays with a plush duck. I put it on her lap and place a small red cushion on top of the duck (this is position A); Lucienne immediately raises the cushion and takes hold of the duck. I then place the duck next to her on the sofa in B, and cover it with another cushion, a yellow one. Lucienne has watched all my moves, but as soon as the duck is hidden she returns to the little cushion A on her lap, raises it and searches. An expression of disappointment; she turns it over in every direction and gives up.

Same reaction three times in succession.

At 0;10 (26) Lucienne is seated. I place a pencil between her knees in A, under a coverlet. She raises the cover and takes the pencil. I then place it in B under the same coverlet but on her left; Lucienne watches what I do, looks at B for a while after the object has disappeared, then she looks for it in A. Subsequently the reaction changes slightly and becomes of the residual type (see obs. 49).

OBS. 43. At 0;9 (16) Laurent swings in his hammock. In the cords above him I attach a chain which makes a noise at each swinging. Laurent looks at it constantly, with great interest. I then take the

chain and bring it very slowly behind my back. Laurent watches this displacement of the object. As soon as the chain is hidden I shake it and it makes a noise; Laurent then stops looking at me and searches for it in the air for a while, disregarding the direction from which the sound emanates. This first observation, although not related to the manual search for the object, shows how Laurent, at the beginning of this stage, is still unaware of the order of successive displacements of the object when he tries to locate it.

From 0;9 (17), that is, the next day, I find the same behavior in manual searching as revealed by the following observations.

OBS. 44. At 0;9 (17), just after having discovered a box under a cushion (see obs. 34), Laurent is placed on a sofa between a coverlet A on the right and a wool garment B on the left. I place my watch under A; he gently raises the coverlet, perceives part of the object, uncovers it, and grasps it. The same thing happens a second and a third time but with increasing application. I then place the watch under B; Laurent watches this maneuver attentively, but at the moment the watch has disappeared under garment B, he turns back toward coverlet A and searches for the object under that screen. I again place the watch under B; he again searches for it under A. By contrast, when for the third time I again place the watch under garment B, Laurent, whose hand is outstretched, raises the screen at once without turning to A; he finds the watch immediately. I then try a fourth time to put the watch under B, but at the moment when Laurent has both hands in the air; he watches my gesture attentively, then turns and again searches for the watch in A!

We see that with the exception of the attempt at the beginning of which Laurent's hand was already directed toward screen B, the child has regularly searched for the object in A, even when he has just seen it disappear under B.

OBS. 45. A quarter-hour later I resume an analogous experiment with Laurent. He is seated on a sofa between cushion A on his right and cushion B. At first he busies himself with raising B before I hide anything under it. I then place my watch under A; Laurent, who has watched me do this, searches indolently under A without finding it, then grasps cushion B and plays with it. Twice in succession I put the watch back under A; he searches for it and finds it. Afterward I put it under B; he raises B and finds it. I put it back under A; he looks for it there immediately. Finally I place it twice under B but each time he turns back to A.

Does this series of reactions mark progress over the preceding (the

number of correct responses is greater than before) or does it simply attest to the absence of systematic reaction, an absence caused both by relative indifference and by the fact that the habit of searching for vanished objects is still too recent? We shall see that this second interpretation is the right one; during the few weeks that follow the harder Laurent tries to rediscover the vanished object the more he searches for it in the original location A.

At 0;9 (20) for example, Laurent is in his bed and watches me when I hide a celluloid duck under his quilt A on his right. Laurent finds it immediately but when I take it from him to hide it on his left under sheet B he watches it and then turns and looks under A. I replace the duck in A; Laurent grasps it there. I again place it in B; Laurent, after having seen cloth B cover up the object, follows my hand with his eyes and searches there for the duck. At the third attempt, the duck being again in B, Laurent looks for it in A.

At 0;9 (21) Laurent is seated between pillow A and napkin B. Three times in succession I hide my watch under A where Laurent finds it. Then I place it alternately under A and under B. Every time the watch is under A, the child finds it there. But the first two times it is under B he looks for it under A. The third time, on the other hand, he raises B, but his hand was already two centimeters from that napkin at the time the watch disappeared under it.

At 0;9 (23) Laurent is seated between bib A and pillow B. I hide my watch chain twice in succession under A, then alternately under B and under A. Every time it is under A Laurent finds it there. By contrast, out of five attempts with the watch chain under B he returns four times to look under A and tries only once to search under B. This last movement is perhaps explainable as before by virtue of the fact that it was begun before the object disappeared entirely from the visual field.

At 0;9 (26) the child is seated between bib A, and cloth B. I hide a penknife under A twice in succession; Laurent finds it there. Afterward I hide it alternately ten times under A and ten times under B. When the penknife is under A, Laurent looks for it there each time without hesitation. On the other hand, out of ten attempts under B, Laurent searches for the object eight times under A (although he has seen it disappear under B every time) and only twice under B.

At 0;9 (28) Laurent is seated between two pillows A and B. I hide my watch alternately at A and at B (beginning once under A, which is on the left); out of five times under B not one attempt is successful as the child returns each time under A!

So also at 0;9 (30) Laurent watches alternately disappear under each pillow sometimes my watch, sometimes the celluloid duck, sometimes the plush cat he has just received. Despite the attraction of these objects he looks for them only under A and not once under B, although he sees them disappear there!

The same applies at 0;10 (4) and until 0;10 (16).

Thus it may be seen that if Laurent's reactions are a little less systematic than those of Jacqueline and Lucienne, they are no less definite. On the whole it may be said that, between 0;9 (17) and 0;10 (16) when the object is moved from an initial position A to a later position B, Laurent searches for it in A much more often than in B. When he searches for it in B it is often because the movement of prehension directed toward B was already made and thus is merely extended. But several instances remain in which the child searches immediately in B without returning to A. Do these instances arise from the fact that Laurent, being on the average more advanced than his sisters, goes through the present stage more rapidly, or to the fact that his interest in searches of this type has been less great, it seems to us, than was the case with his older sisters? It is hard to tell without a comparison with a sufficient number of other cases. The only sure thing is that Laurent within a month searches for the object in A much more often than in B and that his reactions are thus comparable to those of our two other subjects. Unfortunately during the months following we were unable to extend the analysis of his case from the point of view of the object, as we focused all our attention on the problems of space itself.

These typical reactions of the fourth stage, observed in our three children over a period of two to four weeks, could not show more clearly that the object still retains a special position; seemingly the child has not taken note of the displacements he has witnessed, but searches for the object in the original place. Later the child makes progress; he searches for the object in the second position (in B). But in the next few weeks if he does not find the vanished thing immediately or if the problem is complicated by the introduction of a third position (C), it will cause the child to return to position A and search there for the object as though nothing had happened in the meantime! This residual reaction seems to us sufficiently related to the preceding one to be classed in the same stage. Hence we shall state that the fifth stage begins only when the child once for all abandons searching in A for the object which he has seen being displaced into B or C. The boundary line is not easy to draw

with certainty, because these residual reactions may appear again quite late and may, through temporal displacement, overlap the later stages.

Here are a few examples.

OBS. 46. At 0;11 (7) Jacqueline is seated between two cushions, A and B. I hide a brush under A. Jacqueline raises the cushion, finds the brush and grasps it. I take it from her and hide it under B, but quite far down. Jacqueline searches for it in B, but indolently, and then returns to A where she pursues her investigations with much more energy.

At 0;11 (15) Jacqueline holds a trumpet which I take from her in order to put it under an eiderdown quilt on her left, in A. She finds it, then I hide it in B, that is to say, on her right under the same quilt. Jacqueline searches for it in B, but does not find it. She then returns to A and searches for a moment. Then she goes back to B and after a few seconds abandons all attempts.

I resume the experiment by hiding the object in A, then, after she has found it again, in B, but less far down; Jacqueline immediately searches for it in B and finds it again.

Third attempt: The trumpet is first put in A; Jacqueline searches for it and takes it. Then I place it in B; Jacqueline begins by searching in A, and only after this tries in B. She finally returns to A and gives up.

OBS. 47. At 0;11 (21) Jacqueline is in an armchair and I hide a celluloid swan on her right, in A; she finds it. I then put it on the left, in B; she finds it there too. Then I take the swan and, before her eyes, let it fall to the floor. She sees it fall, even leans over to watch it (but not far enough); not having caught sight of it, she immediately looks for it in B, under the left-hand cushion.

A moment later I make the swan reappear, bring it before her eyes, then let it fall again. She leans over once more and not seeing it, returns to B to look for it under the cushion.

OBS. 48. At 1;0 (0) Jacqueline swings in a hammock suspended from the ceiling. The same day she has received a doll made of celluloid balls, trimmed with a rattle which sounds at the slightest movement. I place the doll above Jacqueline among the cords that hold up the hammock. Jacqueline swings herself, the doll immediately makes a sound and the child raises her eyes; she recognizes the doll and smiles. Afterward I take the doll and very slowly put it behind my

back. I make it sound; Jacqueline smiles, leans over in order to see behind me and, not succeeding in doing so, raises her eyes to look attentively at the place where the doll hung.

Same reaction three times in succession, then a negative reaction.

OBS. 49. I. At 0;10 (26), that is, just after the last reaction in obs. 42, Lucienne searches for a pencil between her knees, in A, where I hid it. After she has found it I place the pencil in B, under the same coverlet, but on her left. This time Lucienne immediately looks in B and finds the object.

After that I place the pencil in succession in A, in B, then in C, that is, under the same coverlet but on her right. Lucienne searches properly and finds the pencil in A, then in B. However, as soon as she sees the pencil disappear in C, she searches for it in A!

II. I now hide my watch chain in A; Lucienne searches for it and finds it. Then I place it in B, but quite far down; Lucienne searches for it, but not finding it at once, she gives up her investigation and resumes searching in A! Same reaction in the remainder.

III. This time I hide my watch in A, then in C, without making any further use of position B. Lucienne finds the watch in A, but never once tries to find it in C despite repeated tests; when she sees the watch disappear in C, she immediately searches for it in A. Hence there is a return to the reaction of obs. 41 and 42, as soon as one more position is added!

OBS. 50. Here are the last residual reactions of the third stage observed with Lucienne in the same situation, which will not prevent these reactions from reappearing in other circumstances, as we shall see (obs. 51). It is worthwhile to describe these last events in order to analyze the manner of extinction of such a systematic behavior pattern.

At 0;10 (27) Lucienne is sitting with her legs apart. I place the watch chain between her knees and cover it with a pillow (A); she searches for it and finds it. I then place it on the left, under a cloth (B); Lucienne looks for it there but barely raises this cloth and immediately resumes looking under the pillow in A. At the second attempt she searches at greater length under the cloth B and finds the object. But when I put it in a third place, C, she searches only under the pillow or the cloth, that is, in A or in B.

At 0;11 (3), same experiment. Lucienne searches and finds it in A. When the object is in B she looks at length at B, then searches indolently in A, and returns to B.

At 0;11 (26) when the object is in B, Lucienne searches in B but

does not find it at once; then she again returns to A but without conviction and as though to relieve her conscience. Same reaction three times in succession, but as though she were performing a rite.

The next day, at 0;11 (27), same attitude. I put a ball in A, under a rubber sheet on her left; then after she has found it I bring the ball slowly under the bassinet. Lucienne tries to see by pushing herself up, then immediately returns to A, under the rubber sheet, and moves the sheet. She still seems to be searching, but indolently.

Here is the last reaction of the same type. At 0;11 (30) Lucienne, seated in her bassinet, searches for my watch, which always interests her deeply, under a cloth on her left, in A. Then I make the watch disappear under the bassinet, on the right, in B. Three sequential attempts:

1. She looks in B and searches in the right direction. She leans over to see better. Then an expression of resentment; she even whimpers. Then, as though an idea occurred to her, she searches in A, under the cloth, with some persistence; she gives up.

2. Exactly the same reactions but she only searches very rapidly on the right, as though to relieve her conscience. There is no longer any real searching.

3. Same reactions, but Lucienne is content to grip the cloth in A, without raising it or searching; therefore she no longer believes in what she is doing there!

In the following attempts, Lucienne enters the fifth stage.

Before discussing the totality of these events it is fitting to cite several examples of residual reactions analogous to the preceding ones but reappearing in the course of the subsequent stages because of a temporal displacement which is explained by the difficulty of the problems involved. Examination of these tardy reactions will help us to understand the true nature of the foregoing facts.

OBS. 51. At 1;3 (9) Lucienne is in the garden with her mother. Then I arrive; she sees me come, smiles at me, therefore obviously recognizes me (I am at a distance of about 1 meter 50). Her mother then asks her: "Where is papa?" Curiously enough, Lucienne immediately turns toward the window of my office where she is accustomed to seeing me and points in that direction. A moment later we repeat the experiment; she has just seen me 1 meter away from her, yet, when her mother pronounces my name, Lucienne again turns toward my office.

Here it may be clearly seen that if I do not represent two archetypes to her, at least I give rise to two distinct behavior patterns not synthesized nor exclusive of one another but merely juxtaposed: "papa at his window" and "papa in the garden."

At 1;6 (7) Lucienne is with Jacqueline who has just spent a week in bed in a separate room and has gotten up today. Lucienne speaks to her, plays with her, etc., but this does not prevent her, a moment later, from climbing the stairs which lead to Jacqueline's empty bed and laughing before entering the room as she does every day; therefore she certainly expects to find Jacqueline in bed and looks surprised at her own mistake.

At 2;4 (3) Lucienne, hearing a noise in my office, says to me (we are together in the garden): "That is papa up there."

Finally, at 3;5 (0) after seeing her godfather off in an automobile, Lucienne comes back into the house and goes straight to the room in which he slept, saying, "I want to see if godfather has left." She enters alone and says to herself, "Yes, he has gone."

We know the little game which consists in saying to children: "Go look in my room and see if I am there," and we know how often the child yields to the suggestion. Jacqueline and Lucienne have never been taught the custom by us, but Lucienne has let herself be taken in by it after the foregoing observation. It seems probable that there is here some residual reaction analogous to the preceding.

OBS. 52. Let us cite an observation made not on our children but on an older cousin who suggested to us all the foregoing studies. Gérard, at 13 months, knows how to walk, and is playing ball in a large room. He throws the ball, or rather lets it drop in front of him and, either on his feet or on all fours, hurries to pick it up. At a given moment the ball rolls under an armchair. Gérard sees it and, not without some difficulty, takes it out in order to resume the game. Then the ball rolls under a sofa at the other end of the room. Gérard has seen it pass under the fringe of the sofa; he bends down to recover it. But as the sofa is deeper than the armchair and the fringe does prevent a clear view, Gérard gives up after a moment; he gets up, crosses the room, goes right under the armchair and carefully explores the place where the ball was before.

The general fact common to all these observations is that the child, after seeing an object disappear under a screen B, goes to look for it under screen A under which he searched for it and found it a moment before. In obs. 39 to 45, characterizing what

we have called the typical reaction of this fourth stage, the child searches for the object in A as soon as he has seen it disappear in B and without first trying to find it in B. In obs. 46 to 50 characterizing the residual reactions, the child searches first in B and, if he fails, returns to A. Or again, accustomed to searching indiscriminately in A or in B, he does not search in C if the object has been put in this third place, but returns to A or to B (obs. 49 and 50). Finally, in obs. 51 and 52 the child, even after having transcended this fourth stage (this is certain with respect to Lucienne and very probable with respect to Gérard) relapses, in certain circumstances, into residual reaction.

How are these facts to be interpreted? Three interpretations seem possible to us according to whether one attributes these strange behavior patterns to difficulties of memory or of spatial localization, or to the incomplete formation of object concept.

The first explanation seems to be the simplest from the point of view of adult psychology. Everyone, in a moment of absent-mindedness, has behaved somewhat like our children. For example I take my clothesbrush out of the small bag in which it is usually kept and place it on a table; afterward when I want to use it I look for it in its bag and cannot understand its disappearance. Or else I go to look for a necktie in my closet, place it before me, and when ready to put it on, return to my tie rack; I see my pipe on my desk, put it in my pocket, then hunt for it on the desk, etc. This is not, fortunately, either confusion related to the constitution of objects as permanent substances or confusion related to spatial localization; I have merely forgotten the sequential displacements of the object, and left without it, I search for it in the place where my attempts are ordinarily crowned with success or else in the place where I noted its presence on the last occasion. So also it could be stated that Gérard (obs. 52), having known perfectly well at first that the ball had left the armchair and was to be found under the sofa, little by little lost all memory of the events; no longer knowing very well what he was doing under the sofa, he remembered having found the ball under the armchair and immediately followed his impulse. In the example in obs. 51, there is no doubt that the habit of seeing her father at the office window, of seeing Jacqueline in bed or of seeing her godfather in the guest

room is important in Lucienne's reactions; it could therefore be affirmed that she forgets what she has just seen and reverts to her habitual schema. In residual reactions in general it is permissible to think that the child, after having failed to find the object in B, no longer remembers the order of events very well and tries at all events to seek the object in A. In typical reactions one could go so far as to believe that, faced with the disappearance of the object, the child immediately ceases to reflect; in other words, he does not try to remember the sequence of positions and thus merely returns to the place where he was successful in finding the object the first time.

The second explanation pertains to the constitution of space. It can be asserted that between the ages of 9 and 12 months the child still has too much difficulty in elaborating objective displacement groups for him to take note of the localization of invisible objects. Surely, if he saw the object uninterruptedly, nothing would be easier for him than to form the two following groups (we shall designate by M the position of the object when it is at rest in the child's hand and by A and B the other positions of the same object):

$$(1)\quad M \rightarrow A;\quad A \rightarrow B;\quad B \rightarrow M, \text{ or}$$
$$(2)\quad M \rightarrow A;\quad A \rightarrow M;\quad M \rightarrow B;\quad B \rightarrow M.$$

But precisely because in normal times he sees the object uninterruptedly, the child does not need to be aware of such groups; he puts them into action without thinking about them. In other words, the child grasps the object where he sees it or else where he has just seen it without needing to retrace his itinerary mentally. If such were the case, that is, if the "group" remained chiefly practical without being a concept to him, it could very well be that the localization of objects in space would remain a matter of mere sensorimotor schemata, hence of immediate and not considered actions. There would, consequently, be no image of localizations but merely an empirical use of localization. The hierarchy of behavior patterns would therefore be the following: the object would first be sought where it is seen, then where it was seen and finally where it was found behind a screen for the first time. But when the object disap-

pears behind a second screen the child would use up the series of these behavior patterns in the first place before searching for it behind this new obstacle; no longer seeing it, but having already seen and found it in a first position, the child would therefore return to A merely through failure to vary his action of searching and to vary it in relation to the sequential positions. This is seen, for example, when the subject manages to search in B but refuses to search in C (obs. 49 and 50): the search in A and in B having been successful, it is useless to try in C ! In other words, there would be no localization from the point of view of object but solely from the point of view of action. The object would have a special position merely because the group remains practical or subjective and is not yet entirely objective or representative.

With this hypothesis it would be easy to explain the chronological order of the behavior patterns observed. The child would begin with the typical reaction for the reasons just demonstrated: having previously found the object in A and not trying to imagine its localization in B, he would return to A as soon as the object disappears in B. In the second place the child, discovering gradually and empirically the failure of his procedure, would begin to search for the object also in B; but unaware as he still is of objective localization, if he did not succeed at once he would return to his search in A. Residual reaction would therefore indicate the persistence of practical or subjective localization or its primacy in relation to objective localization. Finally, in obs. 51, the belated resurrection of this behavior pattern would stem from the fact that, as the object has a very unyielding practical or subjective localization (for reasons of habit), the objective and representative localizations would momentarily pass over to the second plane.

But still a third explanation is possible with regard to the constitution of object concept. It is possible that during this third stage the object is still not the same to the child as it is to us: a substantial body, individualized and displaced in space without depending on the action context in which it is inserted. Thus the object is, perhaps, to the child, only a particularly striking aspect of the total picture in which it is contained; at least it would not manifest so many "moments of freedom" as do our

images. Hence there would not be one chain, one doll, one watch, one ball, etc., individualized, permanent, and independent of the child's activity, that is, of the special positions in which that activity takes place or has taken place, but there would still exist only images such as "ball-under-the-armchair," "doll-attached-to-the-hammock," "watch-under-a-cushion," "papa-at-his-window," etc. Certainly the same object reappearing in different practical positions or contexts is recognized, identified, and endowed with permanence as such. In this sense it is relatively independent. But, without being truly conceived as having several copies, the object may manifest itself to the child as assuming a limited number of distinct forms of a nature intermediate between unity and plurality, and in this sense it remains a part of its context. Obs. 51 permits us to understand this hypothesis: when Lucienne looks for me at the window when she knows that I am beside her two behavior patterns are obviously involved, "papa-at-his-window" and "papa-in-front-of-oneself"; and, if Lucienne does not hesitate to consider the two papas as being one and the same person, she nevertheless does not succeed in abstracting this person from the total pictures with which he is connected sufficiently to refrain from looking for him in two places simultaneously. *A fortiori*, in obs. 52, the child who does not find the "ball-under-the-sofa" does not hesitate to look for the "ball-under-the-armchair" since here there are two distinct totalities. Whereas we think of the ball as able to occupy an infinitude of different positions, which enables us to abstract it from all of them at once, the child endows it with only a few special positions without being able, consequently, to consider it as entirely independent of them. In a general way, in all the observations in which the child searches in A for what he has seen disappear in B, the explanation should be sought in the fact that the object is not yet sufficiently individualized to be dissociated from the global behavior related to position A.

Such then are the three possible explanations for the phenomenon: defect of memory, defect of spatial localization, or defect of objectification. But far from trying to choose among them, we shall on the contrary try to show that these three explanations, seemingly different, in reality constitute only a

single explanation, seen from three distinct points of view. It is only if one retained one of the three explanations to the exclusion of the two others that it would be disputable. But if all three are accepted, they are complementary.

First, the defect of memory. The great difference between the behavior of the ten-month-old child and our own seemingly analogous behavior (looking for the brush in its usual place when we have just put it somewhere else) is that we could very well keep the memory of the sequential displacements if we paid attention whereas, by hypothesis, the child cannot. If we change the order of movements of the brush, the necktie or the pipe, it is because we are absentminded; but being otherwise quite capable of remembering the sequential displacements of the things which surround us, we attribute to them by virtue of this fact an objective structure, and by extension we conceive of the brush, etc., in an identical way even in moments of the worst absentmindedness. On the contrary, in obs. 39 to 52 the child manifests the *maximum* of attention and interest of which he is capable, and if one may refer to absentmindedness in certain events of obs. 51, this could not be involved when the child is trying by every means to find the hidden object he wants. In particular in the instances of typical reaction (obs. 39 to 46), the child is watching the object with the greatest fixity as it disappears in B, yet immediately afterward he turns to A; it would therefore be unrealistic to admit that he forgets the displacements out of mere absentmindedness. Thereafter to the extent that a defect of memory intervenes it would only involve a systematic difficulty in arranging events in time and, consequently, in noting the sequence of displacements. Seeing the object disappear, the child would not try to reconstruct its itinerary; he would, without reflection or memory, go straight to the position where his action had already succeeded in finding it. But then in this hypothesis, the spatial and objective structure of the universe would become, at the same stroke, entirely different from what it is for us. Let us suppose the existence of a mind which retained no memory of the order of displacements: its universe would consist in a series of total pictures whose coherence would pertain to the action itself and not to the relations sustained by the elements of the different pictures

with each other. This first interpretation is tantamount to the next two: the construction of objective groups of displacements presupposes time and memory, just as time presupposes a universe spatially and objectively organized.

With regard to the second explanation, it is equally true, provided it includes the first and third. It is perfectly accurate to say that the child searches for the object in A when it has disappeared in B, simply because the practical schema prevails over the objective group of displacements. The child does not take note of those displacements and when (in the residual reactions) he begins to note them, he still subordinates them to the schemata of immediate action. But if that is the case it must be concluded, first, that the memory of the positions does not play a decisive role and, second, that the object remains linked with a global context instead of being individualized and substantiated as an independent and permanent body in motion.

Hence we are brought to the third solution inasmuch as it really involves the first two solutions and vice versa. In a word, during this fourth stage the object remains a practical object rather than a substantial thing. The child's reactions remain inspired in whole or in part by a sort of phenomenalism mixed with dynamism. The object is not a thing which is displaced and is independent of those displacements; it is a reality at disposal in a certain context, itself related to a certain action. In this respect the behavior patterns of the present stage merely extend those of the preceding one. They are phenomenalistic since the object remains dependent on its context and not isolated in the capacity of a moving body endowed with permanence. They are dynamic, moreover, since the object remains in the extension of the effort and of the feeling of efficacy linked with the action by which the subject finds the object again. From this dual point of view the progress made by the child in learning to search for the object behind a screen has not yet sufficed to cause him to attribute an objective structure to the things which surround him. In order that these things really become objects the awareness of relations of position and displacement must be acquired. The child will have to understand the "how" of the appearance and disappearance of these objects and thus will have to abandon belief in the possibility of their mysterious reappearance at

the place they have left and where action itself has discovered them. In short, a truly geometric rationalism will have to supersede the phenomenalism of immediate perception and the dynamism of practical efficacy.

§ 4. THE FIFTH STAGE: THE CHILD TAKES ACCOUNT OF THE SEQUENTIAL DISPLACEMENTS OF THE OBJECT

From the end of the first year of life until toward the middle of the second there extends a stage characterized by the progressive acquisition of spatial relations whose absence during the stage just passed prevents the definitive formation of object concept. In other words, the child learns to take account of the sequential displacements perceived in the visual field; he no longer searches for the object in a special position but only in the position resulting from the last visible displacement. This discovery we consider the beginning of the fifth stage.

Thus characterized, the behavior patterns of the present stage are of great interest in connection with the questions raised with respect to the fourth stage. To the extent that these behavior patterns bear upon visible displacements they reveal a nascent geometric rationalism; this constitutes the new element peculiar to them. True, to the extent that they remain incapable of making allowance for invisible displacements (those which the child does not see) they conserve an element of mixed phenomenalism and dynamism. But such a complication does not alter in any way the regularity of the development. Far from disappearing entirely the practical and egocentric object defends foot by foot the terrain which the geometric relationships will conquer. In a general way, it may be said that every complication in the problems encountered and particularly the complication resulting from invisible displacements causes the habits of the preceding stages to reappear through temporal displacement. This circumstance does not make it easier to describe the behavior patterns of the present stage; but if we follow the chronological order of their manifestations, the mechanism of the patterns will be intelligible.

The first acquisition of the fifth stage (which marks its advent) is signified by the success of the tests whose initial failure

is described in obs. 39 to 52: when the object is hidden under a first screen under which the child finds it, and then under a second screen, the subject no longer searches for the object under the first screen, but only under the second one.

OBS. 53. At 1;0 (20) Jacqueline watches me hide my watch under cushion A on her left, then under cushion B on her right; in the latter case she immediately searches in the right place. If I bury the object deep she searches for a long time, then gives up, but does not return to A.

At 1;0 (26), same experiment. At the first attempt Jacqueline searches and finds in A where I first put the watch. When I hide it in B Jacqueline does not succeed in finding it there, being unable to raise the cushion altogether. Then she turns around, unnerved, and touches different things including cushion A, but she does not try to turn it over; she *knows* that the watch is no longer under it.

Subsequent attempts: Jacqueline never succeeds in finding the watch in B because I hide it too deep, but neither does she ever try to return to A to see if it is still there; she searches assiduously in B, then gives up.

At 1;1 (22) new experiments with different objects. The result is always the same.

OBS. 54. Laurent, at 0;11 (22) is seated between two cushions A and B. I hide the watch alternately under each; Laurent constantly searches for the object where it has just disappeared, that is, sometimes in A, sometimes in B, without remaining attached to a privileged position as during the preceding stage.

It is noteworthy that the same day Laurent reveals a very systematic mind in searching for the vanished object. I hide a little box in my hand. He then tries to raise my fingers to reach the object. But, instead of letting him do this and without showing the box, I pass to him with two fingers of the same hand a shoe, a toy, and finally a ribbon; Laurent is not fooled and always returns to the proper hand despite its displacements, and at last opens it and takes the box. When I take it from him to put it in the other hand, he searches for it there immediately.

At 1;0 (20) likewise, he searches sequentially in both my hands for a button I am hiding. Afterward he tries to see behind me when I make the button roll on the floor (on which I am seated) even though, to fool him, I hold out my two closed hands.

At 1;1 (8) etc., likewise, he takes note of all the visible displacements of the object.

OBS. 54a. Lucienne also, at 1;0 (5), no longer looks for the object only in B and does not return to the initial place, even in the event of continuous failure.

Same observations at 1;0 (11) etc.

On this point phenomenalism has certainly yielded to awareness of relation; the child takes account of all the visible displacements he has observed and dissociates the object from its practical context.

But if we interpose the simplest possible of invisible displacements the phenomena of the preceding stage immediately reappear. In this connection we have tried the following experiment: hiding an object not directly under the screen, but in a box without a lid; box and object are made to disappear under a screen and the box brought out empty. The child does not succeed in understanding, except by luck, that the object can have been left behind under the screen.

OBS. 55. At 1;6 (8) Jacqueline is sitting on a green rug and playing with a potato which interests her very much (it is a new object for her). She says "po-terre" and amuses herself by putting it into an empty box and taking it out again. For several days she has been enthusiastic about this game.

I. I then take the potato and put it in the box while Jacqueline watches. Then I place the box under the rug and turn it upside down thus leaving the object hidden by the rug without letting the child see my maneuver, and I bring out the empty box. I say to Jacqueline, who has not stopped looking at the rug and who has realized that I was doing something under it: "Give papa the potato." She searches for the object in the box, looks at me, again looks at the box minutely, looks at the rug, etc., but it does not occur to her to raise the rug in order to find the potato underneath.

During the five subsequent attempts the reaction is uniformly negative. I begin again, however, each time putting the object in the box as the child watches, putting the box under the rug, and bringing it out empty. Each time Jacqueline looks in the box, then looks at everything around her including the rug, but does not search under it.

II. At the seventh attempt, I change the technique. I place the object in the box and the box under the rug but leave the object in the box. As soon as I remove my empty hand Jacqueline looks under the rug, finds and grasps the box, opens it and takes the potato out of it. Same reaction a second time.

III. Then I resume the first technique: emptying the box under the rug and bringing it forth empty. At first Jacqueline looks for the object in the box, and not finding it there, searches for it under the rug. Hence the attempt has been successful. This occurs a second time but from the third attempt on, the result becomes negative again, as in I. Is this due to fatigue?

OBS. 56. The next day, at 1;6 (9), I resume the experiment but with a celluloid fish containing a rattle. I put the fish in the box and the box under the rug. There I shake it and Jacqueline hears the fish in the box. I turn the box upside down and bring it out empty. Jacqueline immediately takes possession of the box, searches for the fish, turns the box over in all directions, looks around her, in particular looks at the rug but does not raise it.

The next attempts yield nothing further. I do not use technique II of the preceding observation.

That evening I repeat the experiment with a little lamb. Jacqueline herself puts the lamb in the box and when the whole thing is under the coverlet she says with me, "Coucou, lamb." When I take out the empty box she says, "Lamb, lamb," but does not look under the coverlet.

Whenever I leave the whole thing under the coverlet she immediately searches for the box and brings out the lamb. But when I start again, using the first technique, she no longer looks under the coverlet!

OBS. 57. At 1;0 (16) Lucienne looks at my watch chain which I place in my own hand; she opens my hand and takes the chain. I recommence, but after having closed my hand I place it on the floor next to the child (Lucienne is seated), and cover my fist with a coverlet. I take out my fist and extend it to Lucienne, who has watched the whole thing most attentively; Lucienne opens my hand, finds nothing, looks all around her but does not raise the coverlet.

Attempts 2-4: Same reaction.

Fifth attempt: Lucienne raises the coverlet mechanically or by chance, and perceives the chain. This must not have been intentional since it did not affect the rest of the behavior.

Attempts 6-10: Return to the initial reaction. Lucienne searches attentively around my hand, looks at the coverlet but does not raise it.

This reaction could not, however, be attributed to boredom; Lucienne seems to be very much interested.

These first failures are significant. For example, Jacqueline knows very well how to search for an object hidden behind a screen, as we have established to be the case for more than six months. But she succeeds in keeping track of only the visible displacements of the object and locates it only where she has actually seen it. In the experiment now under discussion an invisible displacement is involved (the object leaves the box or the hand when both are under the rug) and the object occupies a space where it has not been directly perceived (under the rug); these are two new conditions of the experiment. In effect, so long as the child sees the box or the hand disappear under the rug he knows that the object is in the box and the box under the rug; but from this he does not succeed in concluding that, when the box comes out empty, the object has been left under the rug. Hence the search for the object as yet makes allowance only for observed displacements and positions in which the object has actually been seen.

It is true that series II and III of obs. 55 end in the child's success. But precisely by virtue of the fact that in series II I have left the box under the rug, Jacqueline has acquired the movement of searching for the object under this screen; afterward she will therefore look there for the same object when she does not find it elsewhere. But as we have seen, this discovery is not generalized, and on the next day (obs. 56), the attempts are all negative. Hence this was only a practical schema and not yet an awareness of relations or an image of what I was doing under the screen: removing the object from the box. Yet, as we have seen, such a movement is familiar to the child.

Nevertheless, after a few days the child succeeds in solving the problem. But this new acquisition is immediately accompanied by a reappearance, on the new plane thus discovered, of the earlier phenomena of reversal of the order of displacements. Here are made most clearly manifest the temporal displacements mentioned at the beginning of this section.

Let us first analyze how the child discovers the result of the invisible displacement. Does it occur through awareness of relations, in which case there would really be a utilization of the unseen displacements, or merely through empirical or practical apprenticeship, in which case there would not be a true image of invisible displacements. The second solution seems to us the right one, precisely since the discovery is immediately accompanied by the resurrection of earlier behavior patterns, displaced chronologically by one or several steps.

OBS. 58. At 1;6 (16) Jacqueline looks at a ring which I place in my left hand. She opens my hand by raising my fingers and finds the object, all with great pleasure and even a certain agitation.

I. *First attempt:* I ostensibly place the ring in my left hand, then press the left hand against the right and extend both hands closed, the ring having passed into the right hand. Jacqueline searches in the left and, astonished, says, "Ring, ring, where it is?" but it does not occur to her to look in the right hand.

Second attempt: She searches directly for the ring in the right hand, finds it and laughs. Is this luck, or does the gesture of pressing one hand against the other suggest to her to begin with the right one?

Third attempt: This time I place the ring in the right hand and then pass it into the left one. Jacqueline looks in the right hand, astonished at not finding anything, then grasps the left one and laughs at her success.

Attempts 4 and 5: Same reaction (changing hands each time).

II. I now place the ring in my hand, then put my hand in a beret placed between Jacqueline's knees. After having left the ring in the beret I withdraw my hand and extend it closed.

1. By a lucky chance, Jacqueline had not paid sufficient attention to my closed hand and immediately turns to the beret, as when I merely hid an object under a screen. Of course she finds the ring and laughs. But this chance occurrence, which might have falsified the result of the experiment, on the contrary serves to emphasize the interest of the following reactions: despite this first success Jacqueline did not, in fact, succeed immediately in understanding the ring's itinerary.

2. Jacqueline's first movement is again to turn toward the beret. But seeing my fist come out of it, she grasps it and opens it. Much surprised to find nothing, she repeats over and over, "Where it is, where it is?" but it does not occur to her to look in the beret.

3 and 4. Same reactions.

5. Still not finding the ring in my hand, Jacqueline looks all

around her, sees the beret but without any idea of looking inside it. On the other hand, it does occur to her to look inside my other hand, even though she does not see it (I am leaning on it). I hold my other hand out to her, she opens it, then gives up all search.

6. She gives up right away.

III. Three hours later I resume these two experiments. That of series I yields no more than immediately positive results: Jacqueline now understands that I can pass the ring from one hand to the other. With regard to the experiment in series II, here are the results (five attempts):

1. Negative reaction: Jacqueline opens my hand, searches all over, but does not think of the beret into which she has, however, seen me slip my hand.

2. Same beginning, then she looks at the beret. She perceives it at the very moment in which she is examining my hand all over. She grasps the beret, looks inside it and finds the ring. Laughs.

3. Opens my hand, searches for a moment, then without hesitation searches in the beret.

4 and 5: Same reaction.

OBS. 59. Lucienne at 1;1 (4) finds a watch chain in my fist. I then replace the chain in my hand and slip this hand under a pillow. I leave the chain under the pillow and bring my hand out closed.

I. *First attempt:* Lucienne looks in my hand, then finding nothing, looks at me, laughing. She resumes searching, then gives up.

Attempts 2-5: Same reactions. I use the watch instead of the chain to increase her interest; same difficulty.

Sixth attempt: This time, sudden success. Lucienne opens my hand as soon as I take it out from under the pillow. After having examined it a moment she stops, looks around her, then suddenly looks under the pillow and finds the watch.

Subsequent attempts: Same reaction.

II. Then I resume the experiment with a quilt which is on the child's right. Lucienne begins by looking in my hand which I have removed closed from under the quilt. After having opened and explored it for a moment Lucienne searches under the quilt without hesitation.

Subsequent attempts: Same success.

But I did not yet try that day to pass rapidly from the quilt to the pillow or vice versa in order to see if there were memory of the localizations. This experiment will be found later.

It may be seen that this discovery of the result of invisible displacements appears to be the effect of practical learning rather than a representation of the relations themselves. Thus, in obs. 58, series I, if Jacqueline looks in the second hand for the ring which is gone from the first one, it is doubtless merely because seeing the other hand incites her to repeat with it the behavior applied to the first hand. Proof of this is that subsequently (series II, attempt 5) she happens to search for the object in my other hand, which played no role in the experiment with the beret. It therefore seems that Jacqueline is guided by the memory of the movements which succeeded rather than by awareness of the actual relationships. In the experiment with the beret (series II), the good luck of the first attempt is far from having been utilized from the outset in the following attempts; it is necessary to resume the experiment three hours later to succeed in the goal. It therefore seems that all of this is the work of practical learning and not a deduction of the relations themselves. With regard to Lucienne (obs. 59), her discovery seems, on the contrary, to result from invention through a mental combination of the relations involved. But we shall see that neither she nor Jacqueline escapes the reappearance by temporal displacement of the phenomena of reversal of the order of displacements, proof that the representation of the object's itinerary is not yet dependable.

In effect, as soon as the behavior pattern consisting in making allowance for the invisible displacement was acquired, we tried the following experiment: combining this new schema of the transfer of objects outside the visual field with the schema of the order of sequential positions. In other words, we have tried to correlate the experiments made in connection with the third stage (to cause searching for the object in two sequential positions) with those of which we have just spoken. For example, let the child be seated between cushion A and cushion B. I put the object in one hand and the hand under A. I bring my hand out closed; thereafter the child knows he must look in A as soon as he has ascertained that my hand is empty. But when I repeat these same procedures in B, will the child immediately search in B, or, through a resurrection of the behavior

patterns of the third stage, will he return to A? The experiment has shown that over a longer or shorter period, it is the latter behavior pattern which presents itself first.

OBS. 60. Jacqueline, at 1;6 (16), that is, after the experiments of obs. 58, undergoes three new series of tests.

I. In order to check on the firmness of the recent acquisitions I take a key in my fist, place my fist in a beret, leave the key in the beret and finally throw it on the floor at the end of the room. Jacqueline runs toward the beret but as I say, "Key, key, look for the key," she turns around, looks at me laughingly, looks at my hands which are open and, resuming her idea, goes toward the beret. She picks it up and without hesitation puts in her hand and removes the key.

II. I seat Jacqueline on a bed between a pillow A, 50 centimeters away from her on her left, and a quilt B, 50 centimeters on her right.

1. I put the key in my right hand, put my hand under the pillow and withdraw it, empty and closed; Jacqueline opens the hand and searches. Then she takes my left hand (cf. obs. 58, series I and II, attempt 5). When she ascertains that my left hand also is empty, she says: "Where it is, where it is?" I put my hands behind my back. She looks at the bed, and seeing the pillow rushes forward and finds the key underneath.

2. I repeat the whole process with the quilt. Jacqueline looks first in my right hand at quite some length, then in my left hand (which has not come into the experiment). Afterward she looks at the quilt and searches under it.

3. Same reactions with the pillow.

Thus it seems that Jacqueline's behavior is entirely correct with respect to screens A and B and that there is no reappearance of the difficulties of the third stage. But might this not be due to the lengthy preliminary procedures, that is, to the fact that she searched in my left hand after having found nothing in my right? Thus she might have forgotten the sequential positions of the object under the screens and gone directly to the correct place, not through reflection but, on the contrary, through automatism. This seems indicated by what follows: as soon as Jacqueline gives up searching both my hands in sequence she reverses the positions in relation to A and B.

III. Two hours later I put Jacqueline back on her bed between pillow A and quilt B. She holds a flower in her hands, freshly picked and highly valued by her. I take it from her, put it in my right hand, put my hand under pillow A and bring it out empty and closed. Jacqueline says spontaneously, "Search, search," and opens my hand.

Then, instead of looking under the pillow in A, she turns to the other side and plunges under quilt B!

The next day, at 1;6 (17) I resume the experiment with a tape measure rolled up; I place it in my hand, put my hand under pillow A and bring it out closed. Jacqueline opens my hand, says: "Where it is, look," and goes straight under quilt B. Same reaction with a button.

OBS. 61. I. Fearing that the last reaction might have resulted from chance or from automatism, I interrupt the experiment for three days and resume it on 1;6 (20). I abandon the quilt for the same reason and put Jacqueline between garment A and cushion B.

1. I place the object in my hand, put my hand under A and bring it out closed. Jacqueline searches in my hand, looks at it all over, then looks at me with astonishment, examines the floor, and as though enlightened by her thought, turns over garment A. She takes the object and laughs.

2. I repeat the same gestures in B. Jacqueline opens my hand, again hesitates for a moment, then returns to A without hesitation! The reaction is very definite, with an attitude of sustained attention.

II. At 1;7. (1) Jacqueline, who has not been tested since series I, is seated on a bed between pillow A and quilt B.

1. I place the object in my hand, the hand under pillow A and bring it forth closed. Jacqueline looks in my hand, then under A and finds the object.

2. I repeat the experiment in B. Jacqueline watches me, opens my hand and searches. Afterward she pauses, seems to reflect for an instant, then goes straight to pillow A. She raises it, examines the under part of it attentively and, only then and after a pause, searches under quilt B where she finds it.

3-5. Experiment in B. Always the same reaction; she begins by searching in A and only then goes to B.

OBS. 62. Finally, here are three new behavior patterns observed with Jacqueline in slightly different circumstances; the mechanism of these patterns is analogous to that of the preceding ones.

I. At 1;7 (7) Jacqueline finds an adult's slipper and puts it on her foot. I take it from her, put my watch inside it and shake it. Jacqueline hears the noise, searches, and finds the watch. Then I place the watch in the slipper, the slipper under my leg and empty the slipper of its contents. The watch falls to the floor under my leg, making a very distinct noise. I withdraw the slipper and say to Jacqueline, "Search." Jacqueline has followed each of my movements very at-

tentively. First she explores the inside of the slipper. But finding nothing she stretches out her hand immediately, not under my outstretched leg, but into my vest pocket from which I took the watch at the beginning of the game! She therefore has no concern for the object's itinerary, which was, however, very easy to reconstruct.

II. At 1;7 (9) Jacqueline is sitting on me and I am lying on a sofa. She has in her hand a piece of yellow paper which she holds in high regard. I hide it in my hand, while she watches, of course, put my hand under a coverlet behind her (she turns around and is watching my movements). I withdraw my hand closed and hold it out to her. She opens it, feels it, then turns around, looks under the coverlet and finds the paper.

After which I put the paper back into my hand, put my hand under my vest, in front of her, and hold my hand out to her, closed; Jacqueline opens it, feels it, turns around and extends her hand halfway toward the quilt. Then, a sudden turnabout, and her hand searches under the vest.

Hence this time there is complete success but with a residue of preceding behavior patterns. The same applies to the following series:

III. At 1;7 (11) Jacqueline is seated on a bed.

1. I place a pebble in my hand, put my hand under quilt A and withdraw it closed. Jacqueline opens my hand, then searches under A and finds the pebble.

2. Same experiment under my vest B. Jacqueline opens my hand and goes under vest B at the first try. Consequently success ensues.

3. I place the pebble in my hand and press this hand against the other one in C, leaving the pebble there. Jacqueline searches in my first hand, then under vest B, then finally under the quilt A. She takes no account of position C, although she has watched each of my movements.

4. I repeat the same experiment (3). This time Jacqueline looks in my first hand, then under quilt A, then at last under vest B, but still takes no account of my other hand.

The complication of the problem has therefore caused merely empirical reactions to reappear at once.

OBS. 63. At 1;1 (18) Lucienne is seated on a bed, between shawl A and cloth B. I hide a safety pin in my hand and my hand under the shawl. I remove my hand closed and empty. Jacqueline opens it at once and looks for the pin. Not finding it, she searches under the shawl and finds it.

After which I place the pin in my hand and my hand under cloth B. Lucienne looks at my hand but does not open it, guessing right away that it is empty, and after this quick look immediately searches under shawl A!

At 1;1 (24) Lucienne watches me put a ring in my hand and my hand under A, then, after she has found the ring, under B; the experiment is successful.

But, with a beret, things become complicated. I put my watch in the beret and the beret under pillow A (on the right); Lucienne lifts the pillow, takes the beret, and removes the watch from it. Then I place the beret, again containing the watch, under cushion B on the left; Lucienne looks for it in B but, as it is hidden too far down for her to find it at once, she returns to A.

Then, twice, I raise cushion B so that Lucienne sees the beret obviously containing the object; both times she resumes looking in B but, not finding the watch right away, returns to A! She searches even longer in A than in B after having seen the object in B!

These results seem to us to have a certain interest from two points of view. In the first place, they furnish us with a good example of the law of temporal displacements; when an operation passes over from one plane of consciousness or of action to another, it has to be relearned on this new plane. In particular, the group of displacements of the object which, at the beginning of this fifth stage, had been constituted on the plane of direct perception of relationships of position, must be formed anew as soon as it has been transferred to the plane of representation of these relationships. In effect, when an invisible displacement of the object intervenes, the child relapses into the same difficulties which he has already overcome when visible displacements were involved. The unobserved displacement must be imagined, since it is not directly perceived.

In the second place, such results are interesting from the point of view of object concept. They show us that the object, although already constituted as permanent substance when visible displacements are involved, still remains dependent on its context as a phenomenalistic whole and on the practical and dynamic schema which it extends when it is subjected to invisible displacements.

It is true that in a particular case, memory may play a much greater role than in the experiments described in connection with the third stage: it is more difficult to remember four or five sequential displacements than only two, especially if some of them have not been perceived but inferred. But here, as before, it does not seem to us that the child's memory can be called upon independently of the spatial elaborations whose orderly arrangement in time is only one of the elements inseparable from the others; memory is only a construction of temporal relationships, and if it fails to bring order to these relationships in the course of experiments which hold the child's interest it is apparent that the failure pertains to the actual content of these relationships, that is, to the nature of the events and not only to their sequence.

In other words, if the child does not remember the order of displacements, it is because in such cases he does not construct a coherent spatial group. But then it is apparent that for the child the object is not yet entirely what it is for us. From the moment when the child takes account of the visible displacements (obs. 53-54a), the object is certainly dissociated from its phenomenalistic and practical context and consequently endowed with substantial and geometric permanence. But from the moment that the displacements are too complicated to be arranged in groups accessible to representation (and to memory), the object again becomes dependent on the context of the whole and on the practical schema leading to its possession. There is nothing contradictory in this dual nature of the object during the fifth stage since two different planes are involved. The child who speaks, or even the adult, may alike bestow the quality of object on the things which surround them and yet find themselves incapable of so doing with regard to the stars or other distant bodies; the discovery of the singleness of the sun or the oneness of the moon during its different phases is a good example of this, as many children of four to six years of age are far from having made the discovery. There is therefore nothing surprising in the fact that the child of 12 to 16 months of age considers as objects only those images that are near and remains doubtful with regard to bodies subjected to invisible displacements.

§ 5. THE SIXTH STAGE: THE REPRESENTATION OF INVISIBLE DISPLACEMENTS

After the sixth stage the child becomes capable of constructing objects when the displacements are not all visible. That of course does not signify that this discovery is immediately generalized to include the whole universe, since we have just seen that during the years following this is still not the case. It merely means that the child succeeds in resolving the problems raised in the course of the preceding experiments and has resolved them by means of a new method: that of representation. This success became systematic in Jacqueline's case at 1;7 (20) and in Lucienne's at 1;3 (14).

OBS. 64. I. At 1;7 (20) Jacqueline watches me when I put a coin in my hand, then put my hand under a coverlet. I withdraw my hand closed; Jacqueline opens it, then searches under the coverlet until she finds the object. I take back the coin at once, put it in my hand and then slip my closed hand under a cushion situated at the other side (on her left and no longer on her right); Jacqueline immediately searches for the object under the cushion. I repeat the experiment by hiding the coin under a jacket; Jacqueline finds it without hesitation.

II. I complicate the test as follows: I place the coin in my hand, then my hand under the cushion. I bring it forth closed and immediately hide it under the coverlet. Finally I withdraw it and hold it out, closed, to Jacqueline. Jacqueline then pushes my hand aside without opening it (she guesses that there is nothing in it, which is new), she looks under the cushion, then directly under the coverlet where she finds the object.

During a second series (cushion and jacket) she behaves in the same way.

I then try a series of three displacements: I put the coin in my hand and move my closed hand sequentially from A to B and from B to C; Jacqueline sets my hand aside, then searches in A, in B and finally in C.

Lucienne is successful in the same tests at 1;3 (14).

OBS. 65. At 1;7 (23) Jacqueline is seated opposite three object-screens, A, B, and C (a beret, a handkerchief, and her jacket) aligned equidistant from each other. I hide a small pencil in my

hand, saying, "Coucou, the pencil." I hold out my closed hand to her, put it under A, then under B, then under C (leaving the pencil under C); at each step I again extend my closed hand, repeating, "Coucou, the pencil." Jacqueline then searches for the pencil directly in C, finds it and laughs.

I repeat the experiment nine times in succession, always taking the following precautions: 1) I show the child my closed hand every time I withdraw it from under one of the three object-screens, and especially after having brought it out of the third one. 2) I vary the order in each experiment, taking care to begin by putting my hand under the object-screen under which the child found the pencil during the preceding test. For example, the first attempt having been made in the order A, B, C, the second test will follow the order C, A, B (the pencil being in B), the third, B, C, A, etc. 3) Each time I move the object-screens; sometimes the beret is on the left, sometimes in the middle, sometimes on the right, etc. 4) Each time the pencil is left under the last screen under which I passed my hand.

During the first eight experiments Jacqueline constantly searches for and finds the pencil under the last object-screen under which I put my hand. At the ninth attempt she searches for it under the next to the last one and at the tenth she recommences without hesitation to investigate under the last one. Moreover she makes one characteristic hesitation at the sixth attempt; she first touches the handkerchief (under which the pencil was hidden the time before) but without turning it over, then passes spontaneously to the beret (correct), as though mentally correcting her mistake. Attention and interest are very lively throughout, except during attempts 8 and 9 (fatigue). Effort revives in attempt 10.

At 1;7 (24), the next day, I repeat the experiment under the same conditions. Jacqueline continues to turn over the last screen only. However, sometimes she hesitates and touches sequentially the next to last screen (without turning it over), then the last one (finally turning it over), as though with reflection and mental association. During test 7, Jacqueline even touches the three screens in succession, following the order in which I myself had slid in and withdrawn my closed hand, but she again turned over only the last screen.

Clearly, there is definitely a system here. These facts cannot be explained by chance alone, given the modifications I introduce each time in the order followed. Moreover, it is impossible to state that the child remembers the third position only; the hesitations he often reveals show, on the contrary, that he mentally retraces the order followed. Finally, the longer the experiment lasts the harder it is

to remember the last position because of the increasing interference of memories.

OBS. 66. At 1;7 (23) Jacqueline reveals herself to be equally capable of conceiving of the object present under a series of superimposed or encasing screens.

I. Before her eyes I put a pencil in a strainer (which I turn over on the floor). I place a beret on the strainer and a coverlet on the beret; Jacqueline raises the coverlet at once, then the beret, then the strainer, and takes possession of the pencil.

Then I put the pencil in a closed matchbox which I cover with the beret and the coverlet. Jacqueline raises both screens, then opens the box.

I put the pencil back in the box, put a piece of paper around it, wrap this in a handkerchief, then cover the whole thing with the beret and the coverlet. Jacqueline removes these last two screens, then unfolds the handkerchief. She does not find the box right away but continues looking for it, evidently convinced of its presence; she then perceives the paper, recognizes it immediately, unfolds it, opens the box and grasps the pencil.

II. I now complicate the test by juxtaposing two screens on the same plane, for example, the pencil in the paper (Jacqueline watches me attentively), and put the box beside the paper. I wrap both objects in a handkerchief which I place beside a beret and cover handkerchief and beret with my coat. Jacqueline removes the coat and immediately goes to the handkerchief, which she unfolds without hesitation. The box appears first; Jacqueline opens it, looks inside it at length, turns it all over, then returns to the handkerchief. Then she perceives the paper, grasps it hastily, unfolds it, and finds the pencil. It is therefore proven that Jacqueline has forgotten the exact location of the pencil. Nevertheless she does not question its substantial permanence or its presence within the object-screens; not finding it in the box she looks for it again in the handkerchief, and the sight of the paper at once reinforces her conviction.

I resume the experiment a moment later, somewhat modifying the conditions. I put the pencil back in the paper and the paper next to the box, but I put them both under Jacqueline's jacket and not under the handkerchief. The handkerchief is placed beside the jacket, and the whole thing is covered by my coat. Jacqueline, who has observed all these maneuvers attentively, at first lifts my coat, then takes up the handkerchief, apparently through perseveration, given the conditions of the preceding experiment. After having explored the handkerchief at length she goes to the jacket and takes the box and the

paper out of it simultaneously. She grasps the box and throws it back without opening it (and without shaking it to hear the sound, as she has happened to do lately when she knew the box contained some object), then unfolds the paper until she finds the pencil.

Here again is proof that Jacqueline remembers only a part of the incasements observed. But whatever may be the basis of her memories, she assumes the presence of the hidden object despite all complications, and directs all her search as a function of this image. She knows, moreover, how to choose an object by its contents (cf. the paper and the box in the second attempt, etc.).

It may be seen how such behavior patterns differ from those of the preceding stage. In general terms it can be said that the child has become capable of directing his search by means of representation. Sometimes he takes note of the invisible displacements of the object and shows himself able to deduce them as well as to perceive them, sometimes, through thought, he masters a series of incasements too complex not to give rise to a true awareness of relationships.

The simplest case is that of obs. 64: looking for the object under a screen under which the child saw my closed hand disappear, but without having directly perceived the displacements of the object. It has been proven previously (obs. 55-57) that the child at the fifth stage shows himself to be at first incapable of succeeding in such an experiment; he clearly sees that the object is placed in receptacle R (hand, box, etc.), that R is put under screen E (coverlet, etc.), and that R is removed empty; but he does not search for the object under E. True, a little later the child becomes able to look under screen E for the vanished object (see obs. 58-59); but, as we have observed, this ability seems the result, first of all, of practical learning and empirical groping rather than of an actual image of the itinerary followed by the object (hence of invisible displacements). It has sufficed to hide the object under two different screens E^1 and E^2 for behavior patterns analogous to those of the fourth stage to reappear (obs. 60-63). From the point of view of representation such a result entails an obvious conclusion: the child still knows how to arrange only the series of directly perceived displacements and if the intervention of invisible displacements can give rise to a practical adaptation it is still not occasion for true representation. Now, obs. 64, which marks the beginning of the present stage, reveals a very different method of search; the child henceforth imagines the whole of the object's itinerary, including the series of invisible displacements. Thus it can be said that the object is definitively constituted; its permanence no longer depends at all on the action itself but obeys a totality of spatial and kinematic laws which are independent of the self.

Obs. 65 is a valuable indication of this. It bears witness to an obvious capacity for representation. By searching for the object only under the last screen under which I slid my closed hand, Jacqueline follows a system and follows it consciously; given the growing interference of memories (the test is repeated ten times) she finds herself obliged each time to retrace the order I followed in order to recall under which screen I passed my hand last. Such a system, although remaining the simplest possible, presupposes the representation of invisible displacements of the object. With regard to the object itself, it is clear that such behavior patterns imply the postulate of its permanence, since the law of its displacements is entirely dissociated from the action itself.

Obs. 66 gives rise to analogous remarks. True, in such a case the child has directly perceived all the elements of the problem; the object is not extracted from a bottle or from a fist outside the perceptual field as before (obs. 64 and 65) but is placed in a receptacle in which it remains, and this receptacle is itself placed, before the child's eyes, under a series of superposed screens. Moreover the child does not need to recall the procedures in detail, since, in case of initial failure, he can grope until success has been attained. Nevertheless we believe such a behavior pattern entails representation and deduction, given the necessity, in order to reach the object, of putting into relationship with each other all the "direct connections" at work in the experiment. When the child sees some object disappear into a receptacle or under a screen it can be said that the act of searching for it presupposes nothing more than a direct connection, since the act of turning over the screen or opening the receptacle is already coordinated in itself and the desire of attaining the object merely sets that act in motion. But when the receptacle or the screen is itself hidden in other receptacles or under

other screens and thus becomes an object for search while remaining receptacle or screen as it was at first, the child is forced to take note of their dual natures simultaneously. Such a relation is therefore complex or indirect and transcends the level of simple direct connections which have just been discussed; it is analogous to that of P. Janet's "basket of apples" which is simultaneously a thing to grasp, like any object, and a receptacle in relation to the apples. Confronted by a series of incasements such as those of obs. 66, to direct his search the child must necessarily subordinate the whole of his procedures to the representation of the hidden object; even if it is not accompanied by a precise memory of the positions, such a behavior pattern thus involves a sort of "multiplication of relations" or of sensorimotor deduction comparable to those we have analyzed in connection with the sixth stage of the development of intelligence (*O.I.*, Chap. VI).

From the point of view of object formation each of our observations thus leads to the same conclusion: the object is no longer, as it was during the first four stages, merely the extension of various accommodations, nor is it, as in the fifth stage, merely a permanent body in motion whose movements have become independent of the self but solely to the extent to which they have been perceived; instead, the object is now definitely freed from perception and action alike and obeys entirely autonomous laws of displacement. In effect, by virtue of the very fact that it enters the system of abstract or indirect images and relations, the object acquires in the subject's consciousness, a new and final degree of liberty. It is conceived as remaining identical to itself whatever may be its invisible displacements or the complexity of the screens which mask it. Doubtless this representation of the object which we call the characteristic of the sixth stage is already budding in the preceding stages. As soon as the child at the fourth stage begins to search actively for the vanished object it can be claimed that there exists a sort of evolution of the absent object. But never until the present stage has this behavior led to real evocation, because it has merely utilized a system of signs linked with the action; searching for an object under a screen when the subject has seen it disappear there (stages IV and V) does not necessarily presup-

pose that the subject "imagines" the object under the screen but simply that he has understood the relation of the two objects at the moment he perceived it (at the moment when the object was covered) and that he therefore interprets the screen as a sign of the actual presence of the object. It is one thing to assume the permanence of an object when one has just seen it and when some other object now in sight recalls its presence, and it is quite another thing to imagine the first object when there is nothing in sight to attest its hidden existence. True representation therefore begins only when no perceived sign commands belief in permanency, that is to say, from the moment when the vanished object is displaced according to an itinerary which the subject may deduce but not perceive. That is why up to the fifth stage inclusively as soon as the displacements are not all visible the child searches for objects in the place where they were found the first time, as though they were always at the subject's disposal, whereas from this sixth stage he takes account of all possible displacements, even if they are invisible.

Can it be said that this difference between the behavior patterns of the sixth stage and those of the fifth concern only the construction of space and not the permanence of the object as such? In this hypothesis an object whose displacements it is impossible to reconstruct would nevertheless be conceived as being as invariant and as identical to itself as if all its movements were known. For example, even though I cannot imagine or deduce the course of a small stone which I toss down the irregular slope of a mountain, I know that it remains somewhere as an object and that its properties (or those of its parts, in the event of fragmentation) have remained identical to what they were at the moment of the fall. But let us beware of too facile comparisons. If the adult can lend the quality of objects to bodies whose trajectory he does not know or to bodies he has seen only for a moment, it is by analogy with others of whose displacements he is already aware, whether these are absolute or related to the movements of the body itself. But, sooner or later, representation and deduction enter into this knowledge. With regard to the baby at the fifth stage, to the extent that he does not know how to imagine or to deduce the invisible displacements of bodies he remains incapable of perceiving these bodies as ob-

jects truly independent of the self. A world in which only perceived movements are regulated is neither stable nor dissociated from the self; it is a world of still chaotic potentialities whose organization begins only in the subject's presence. Outside the perceptual field and the beginnings of objectivity which are constituted by the organization of perceived movements, the elements of such a universe are not objects but realities at the disposal of action and consciousness. On the contrary, the representation and deduction characteristic of the sixth stage result in extending the process of solidification to regions of that universe which are dissociated from action and perception; displacements, even invisible ones, are henceforth envisaged as subservient to laws, and objects in motion become real objects independent of the self and persisting in their substantial identity.

A final consequence essential to the development of representation is that henceforth, the child's own body is regarded as an object. Thanks to imitation, for example, and in particular to the behavior patterns of the present stage (these are characterized by the fact that imitation becomes embedded in representation), the child is now able to see his own body as an object by analogy with that of another person. Moreover, nascent spatial, causal, and temporal images permit him to locate himself in a space and time reaching beyond him everywhere, and to consider himself as mere cause and mere effect among the totality of the connections he discovers. Having thus become an object among other objects at the very moment when he learns to conceive of their true permanence even outside all direct perception, the child ends by completely reversing his initial universe, whose moving images were centered on an activity unconscious of itself, and by transforming it into a solid universe of coordinated objects including the body itself in the capacity of an element. Such is the result of object construction on the sensorimotor plane, until reflection and conceptual thought pursue this elaboration on new planes of creative intelligence.

§ 6. THE CONSTITUTIVE PROCESSES OF OBJECT CONCEPT

We have hitherto limited ourselves to describing merely the historical development of object concept. The time has come to

attempt an explanation of this development by attaching it to the whole of the intellectual evolution peculiar to the child's first two years of life.

To understand the formation of initial sensorimotor objects it may not be useless to compare the elementary processes of the child's intelligence to those used by scientific thought to establish the objectivity of the beings it elaborates. For if the structures employed by thought vary from one stage to another and, *a fortiori*, from one mental system to another, thought remains constantly identical to itself from the functional point of view. It is therefore not illegitimate to elucidate one of the terms of intellectual evolution by the directly opposite term, that is, the construction of practical objects by that of scientific objects, provided that the first term, when it is sufficiently understood, elucidate the second in return.

Now three criteria seem to us to contribute to the definition of the object peculiar to the sciences: in the first place, every objective phenomenon permits anticipation, in contrast to other phenomena whose advent, fortuitous and contrary to all anticipation, permits the hypothesis of a subjective origin. But, as subjective phenomena also can give rise to anticipation (for example, the "illusions of the senses") and moreover as unexpected events are sometimes those which mark the failure of an erroneous interpretation and thus entail progress in objectivity, a second condition must be added to the first: a phenomenon is the more objective the more it lends itself, not only to anticipation, but also to distinct experiments whose results are in accordance with it. But that is still not enough, for certain subjective qualities may be linked with constant physical characteristics, as qualitative colors with luminous waves. In this case, only a deduction of the totality succeeds in dissociating the subjective from the objective: only that phenomenon constitutes a real object which is connected in an intelligible way with the totality of a spatio-temporal and causal system (for example, luminous waves constitute objects because they have a physical explanation, whereas quality is dissociated from the objective system).

These three methods are found to be the very same which the little child uses in his effort to form an objective world. At first

the object is only the extension of accommodation movements (anticipation). Then it is the point of intersection, that is, of reciprocal assimilation of multiple schemata which manifest the different modalities of the action (concordance of the experiments). Finally, the object is fully constructed in correlation with causality to the extent that this coordination of schemata results in the formation of an intelligible spatio-temporal world endowed with permanence (comprehension related to a deductive system of the totality).

The first contact between the acting subject and the environment, that is, taking possession of things through reflex assimilation, does not at all imply awareness of the object as such. Even if, as we have asserted, such an activity involves a capacity for repetition, generalization, and recognition, nothing as yet forces the child to dissociate the action itself from its point of application. What he recognizes when he finds the nipple, for example, is a certain relation between the object and himself, that is, a global image in which all the sensations connected with the act in progress intervene. Such recognition has nothing in common with a perception of objects. The same is true of the activity characteristic of the first schemata to be acquired. When the child rediscovers his thumb when he wants to suck it or finds familiar images because he wishes to look at them, etc., nothing as yet leads him to make of these sensorial images substances detached from the activity itself; so long as the action succeeds, as far as the subject is concerned his objective is one and the same thing as his awareness of desire, of effort or of success.

The question of the object's independence and permanence begins to be raised only when the child perceives the disappearance of desired objects and applies himself to searching for them actively. Here the first method of constructing the object makes its entrance: the effort of accommodation and the anticipations which spring from it.

During the first two stages the behavior of the subject shows how much he is already aware of the periodic disappearance of objects. The newborn child who is nursing manifests emotion when the breast is taken from him, and the nursling, as soon as he has learned to smile, knows how to express his disappointment when his mother suddenly leaves his visual field. But the

subject's only positive reaction for finding lost objects consists in reproducing the latest accommodation movements he has made; he sucks the air or stares at the place where his mother's image disappeared. The object is still only the extension of the action; the child counts only on the repetition of his accommodation movements to realize his desire and, in case of failure, on the efficacy of his passion and his anger. He is acquainted only with actions which succeed at once and others which fail momentarily, but up to now the failure has not sufficed to permit distinction between permanent objects and an activity being exerted on them. At most, the effort of accommodation arising at the moment of the object's disappearance foretells the advent of the need for conservation which will subsequently constitute the object itself.

This elementary permanence is accentuated when, in the course of the third stage, the child no longer limits himself to searching for the object only where it has just disappeared but extends the accommodation movement in the direction it followed up to then (reaction to the fall, etc.). The act of losing contact with the object momentarily to find it in a new position apparently marks progress in the dissociation of action and object, hence in the autonomy conferred upon the latter. But, as we have emphasized in discussing the nature of these behavior patterns, so long as the search for the object consists merely in extending accommodation movements already made in its presence, the object cannot yet show either an independent trajectory in space or consequently intrinsic permanence. It is therefore not yet an object.

On the other hand, progress is made in the consolidation of objects when the accommodation of a single series of schemata (visual, tactile, etc.) is followed by a search involving the coordination of multiple primary schemata. We may cite as an example of this second process of elaboration of the object the behavior patterns of "deferred circular reaction," of search for the whole when only a part of the object has been seen, and the suppression of obstacles preventing perception (end of the third stage). In those cases the child is no longer limited to following some object in motion with his eyes or hand; he combines visual and tactile searching. This coordination of two or

more distinct series of accommodations certainly reinforces the consolidation and externalization of the object (the dissociation between the object and the action). Mr. Szuman has shown this in his interesting studies of object concept.[7] The telereceptive sphere of perception, he says following Sherrington, entails, from the moment the baby knows how to grasp what he sees, a sort of motor restlessness which is appeased only by prehension and the perceptions belonging to the sphere of contact. The polysensory complexes which thus determine the dynamic association among the various sensory impressions and above all between sight and prehension would then themselves form objects whose different characteristics would spring from the multiple and sequential varieties of activities made possible by the initial coordination (sensory or primary characteristics, functional ones and those acquired through imitation).

But however exact Mr. Szuman's analyses may be, we do not believe that the coordination of schemata suffices to explain the permanence belonging to the object. So long as the child does not undertake special searches to find objects which disappear, that is, so long as he does not succeed in deducing their displacements in space when he no longer sees them, one should not yet speak of object conservation. Even when the child succeeds in pursuing interrupted actions (deferred circular reaction) because of progress in coordination between sight and prehension, he merely conceives of the object as being connected with his behavior patterns and with the special positions which characterize them, without attributing to it either an independent existence or an independent trajectory. Hence there exists elaboration of practical objects—which constitute, according to Mr. Szuman's definition, centers of possible experiences or points of crystallization of each characteristic sphere of activities—but not yet permanent substances.

We can say the same of the excellent observations of Mmes. Rubinow and Frankl[8] on the objectification of the bottle. Like Mr. Szuman, these writers characterize the object not by its

[7] S. Szuman, "La Genese de l'objet," *Kwartalnik Psycholog.* (Poznan, 1932), Vol. III, No. 3-4.

[8] Rubinow and Frankl, "Die erste Dingauffassung beim Saugling," *Zeitschrift f. Kinderforschung*, Vol. 133, Chap. 34, p. 1 (with a conclusion by C. Bühler).

substantial permanence but by its practical qualities. Thus if during the fourth month every solid body approaching the nursling's face sets sucking in motion, during the fifth month only pointed bodies produce this effect. A primary characteristic of the object "bottle" would thus be constituted first in connection with the movement (the object must approach for its point to be noticed), then statically (the pointed thing as such setting sucking in motion). But although it is accurate to consider these phenomena as characterizing stages in object construction (since they show us how the objective characteristics gradually become detached from accommodation movements after having been formed through coordination between sight and sensations of contact), it seems to us that the practical object thus elaborated is still far from the true object or permanent substance with a spatially defined trajectory.

Real permanence begins only with a third process in object construction: the search for the vanished object in a comprehensible spatio-temporal universe. We recall that the three steps of this search characterize our last three stages: simple search without taking account of objective displacement groups, then search based upon the group of perceived displacements, and finally search involving representation of displacements not perceived. The problem is, therefore, to understand how the child succeeds in elaborating such relations and thereby even constructing permanent objects under the moving images of immediate perception.

At its point of departure this active search for the vanished object merely extends the behavior patterns of the first three stages. The child begins to pursue invisible objects only after he has made the movement of grasping when they are in sight. But even when this schema becomes generalized and searching takes place independently of this condition, the object is at first sought only in a special place—where it was found the first time. Therefore it still depends on the action and constitutes only a practical object; it is not differentiated from the outset but is part of the whole situation in which it gave rise to a successful search. The only progress consists in pursuing the object behind a screen and no longer only when it is partly visible, as during the third stage.

But this progress, if at first it presupposes no profound transformation of behavior, nevertheless entails two important consequences. The first is that the object gradually becomes detached from the activity: the fact that the child succeeds in conceiving of objects as existing behind screens leads him to dissociate, far more than in the past, subjective action from the reality on which it bears. Henceforth reality resists the subject's effort in a new way; there is no longer only resistance through the opposition of forces as in the contacts between muscular activity and a solid mass,[9] but also resistance through complication of the field of action and intervention of obstacles preventing the subject from perceiving the objective. Hence the second result: the action ceases to be the source of the external world and becomes merely a factor among other factors, one that is central, no doubt, but of the same order as the various elements which make up his total environment. Henceforth the child places his own hand movements among those of external bodies, endowing the latter with an activity complementary to his own. In short, to the extent that objects become detached from the action, the body itself becomes an item among other items and is thus brought into an aggregate system. This step marks the beginnings of true objectification.

Objects are constructed to the extent that this transition operates, from the complete and unconscious egocentrism of the first stages to the localization of the body itself in an external universe. To the extent that things are detached from action and that action is placed among the totality of the series of surrounding events, the subject has power to construct a system of relations to understand these series and to understand himself in relation to them. To organize such series is to form simultaneously a spatio-temporal network and a system consisting of substances and of relations of cause to effect. Hence the construction of the object is inseparable from that of space, of time, and of causality. An object is a system of perceptual images endowed with a constant spatial form throughout its sequential displacements and constituting an item which can be isolated in

[9] Maine de Biran thought he saw in this first type of resistance the constitutive process of objectification. But the subject can very well incorporate the sensation of the obstacle into the schema of his own activity, granted that all bodily action is limited and is accompanied by the more or less clear consciousness of this limitation.

the causal series unfolding in time. Consequently the elaboration of the object is bound up with that of the universe as a whole. To understand this genesis it would thus be necessary to anticipate the next chapters and show how displacement groups as well as temporal and causal structures are formed. But since, inversely, it is only by achieving belief in the object's permanence that the child succeeds in organizing space, time, and causality, we must begin our analysis by trying to explain the behavior patterns which tend to construct the object as such. How then does the child come to search for the object not only in a special place but by taking account of displacements observed sequentially, then even displacements occurring outside the perceptual field?

To understand this process let us first say what it is not: it is neither an *a priori* deduction nor training by purely empirical associations. Next we shall see what it is: an actually constructive deduction.

That it does not consist in a simple deduction emerges clearly from the fact of the gropings necessary to learn the relationships of displacements. The child begins (fourth stage) by searching for the object where he has already found it the first time. Then, when he knows how to find it in the last position in which he saw it (fifth stage) he must still learn the possibility of transfer; the object placed in a box which one empties under a coverlet will be sought in the box, then where it was previously found but not in the place where it disappeared. Once the habit of searching under that coverlet has been acquired it will be necessary to learn again to take into account sequential displacements, etc. Such gropings in fact sufficiently demonstrate the necessity for active experience in order to build up sequential perceptions; that is, for the child to understand that the object constitutes an independent body in motion which is capable of multiple displacements, perception and action must constitute a single whole in the form of sensorimotor schemata, and these schemata must, thanks to the action itself, proceed from the global or dynamic state to the analytic state or the separation of spatio-temporal elements. To explain this evolution of schemata and account for the fact that the individualized and permanent object supersedes the undifferentiated and merely practical ob-

ject it would therefore be useless to invoke a mechanism of identification envisaged as innate and consubstantial with all thought. What is innate in identification is simply the function of assimilation and not the sequential structures which that function elaborates and among which identification is only one simple example in particular. How are we to account for object construction from the laws of the schemata of assimilation?

Such construction is not the act of an *a priori* deduction, nor is it due to purely empirical gropings. The sequence of the stages which we have distinguished testifies much more strongly to progressive comprehension than to haphazard achievements. If there is experimentation, the experiments are directed: in finding the object the child organizes his motor schemata and elaborates his operative relationships rather than submitting passively to the pressure of events.

The solution to the problem, therefore, seems to us to be the following: the permanence of the object stems from the constructive deduction which from the fourth stage is constituted by reciprocal assimilation of the secondary schemata, that is, the coordination of schemata which have become mobile. Until this level has been reached the object merely extends the activity itself; its permanence is only practical and not substantial, because the universe is not detached from the action nor objectified in a system of relationships. The coordination of the primary schemata, in particular that coordination between sight and prehension which gives rise to the secondary circular reactions, does indeed result in a relative externalization of things; but so long as the secondary schemata remain global or undifferentiated instead of being dissociated the better to unite, this externalization does not go far enough to constitute a substantial permanence. On the contrary, from the fourth stage onward the secondary schemata become mobile through a reciprocal assimilation which permits them to combine among themselves in different ways; it is this process of complementary dissociation and regroupment which, by engendering the first acts of intelligence properly so called, enables the child to build a spatio-temporal world of objects endowed with causality.

As we have seen (*O.I.*, Chap. IV, §3), the mobile schemata resulting from the coordination of secondary reactions con-

stitute not only some kinds of motor concepts that may be arranged in practical judgments and reasonings, but also some systems of relations that permit an increasingly precise elaboration of the objects on which these behavior patterns bear. The reciprocal assimilation of the schemata therefore entails the construction of physical connections and consequently of objects as such. Thus the union of the schemata of prehension with those of striking, which explains the behavior pattern consisting in removing obstacles (*O.I.*, Chap. IV, §1-2), permits the child to construct the relations "above," and "below," "hidden behind," etc., and leads him to base his belief in the permanence of the object on truly spatial relations. But above all, the combinations of the mobile schemata make possible a better accommodation of behavior to the specific characteristics of objects. The fact that the schemata can henceforth adjust themselves to each other leads the child to observe the detail of objects much more closely when his action bears upon them than when the objects are absorbed in the acts as a whole and remain undifferentiated. For this reason the behavior patterns of "exploration of new objects" appear at the fourth stage and, during the fifth, are extended in tertiary circular reactions, that is, in experiments in order to see. It is in this context that, from the fifth stage on, the true object will be elaborated.

It may be recalled that the specific behavior patterns of the fifth stage—"discoveries of new means through active experimentation"—are explainable precisely by this union of the coordination of schemata and of tertiary reactions. The union of this progressive accommodation with the reciprocal assimilation of the schemata constitutes, with respect to the intelligence, a process of learning which should not be considered as either purely experimental or purely deductive, but which partakes simultaneously of experience and mental construction. Sensorimotor intelligence, having arrived at this level, is therefore essentially the construction of relations or constructive deduction.

This process explains, it seems to us, the discovery of the object's real permanence. After having established during the fourth stage that the vanished object remains behind a screen, the child succeeds during the fifth stage in bestowing on that object an autonomous trajectory and consequently a truly spatial

permanence. This discovery simultaneously presupposes two things: 1) experience, since only the failure of his initial search teaches the child that the object is no longer where it was found the first time but rather where it was last hidden, and 2) deduction, since without the reciprocal assimilation of schemata the child would not succeed in assuming the existence of objects hidden behind the screen nor in postulating their permanence, once and for all, particularly when he has not found them where he first looked for them. In short, object conservation, which is the first of the forms of conservation, results like all the others in the close union of a rational or deductive element and an empirical element, indicating that deduction is constantly at work in close relation to things or at their suggestion.

We shall see this still better in studying the more truly spatial characteristics of the solid object, such as its form and constant dimensions; the constitution of these characteristics, linked with that of all space, predicates the constant collaboration of experience and the reciprocal assimilation of the schemata.

Finally, during the sixth stage, the coordination of the schemata is internalized in the form of mental combinations, while accommodation becomes representation. Thereafter deduction of the object and of its spatial characteristics is achieved in the construction of a collective universe in which displacements that are merely indicated are inserted among observed movements and complete them in a truly coherent whole.

CHAPTER II

The Spatial Field and the Elaboration of Groups of Displacements

It can be said that the formation of object concept is correlated to the organization of the spatial field. The aggregate of facts established in the preceding chapter will therefore be useful to us from this new point of view.

The conclusion to which the analysis of object concept has led us is that in the course of his first twelve to eighteen months the child proceeds from a sort of initial practical solipsism to the construction of a universe which includes himself as an element. At first the object is nothing more, in effect, than the sensory image at the disposal of acts; it merely extends the activity of the subject and, without being conceived as created by the action itself (since the subject knows nothing of himself at this level of his perception of the world), it is only felt and perceived as linked with the most immediate and subjective data of sensorimotor activity. During the first months the object does not, therefore, exist apart from the action, and the action alone confers upon it the quality of constancy. At the other extreme, on the contrary, the object is envisaged as a permanent substance independent of the activity of the self, which the action rediscovers provided it submits to certain external laws. Furthermore, the subject no longer occupies the center of the world, a center all the more limited because the child is unaware of this perspective; he places himself as an object among other objects and so becomes an integral part of the universe