

teristics that one or another psychologist recognizes as those of "intelligence." (All writers are in agreement in attributing this quality to at least the last of these stages, from twelve to eighteen months.) There is a continuous progression from spontaneous movements and reflexes to acquired habits and from the latter to intelligence. The real problem is not to locate the first appearance of intelligence but rather to understand the mechanism of this progression.

For many psychologists this mechanism is one of association, a cumulative process by which conditionings are added to reflexes and many other acquisitions to the conditionings themselves. According to this view, every acquisition, from the simplest to the most complex, is regarded as a response to external stimuli, a response whose associative character expresses a complete control of development by external connections. One of us,³ on the other hand, has argued that this mechanism consists in *assimilation* (comparable to biological assimilation in the broad sense): meaning that reality data are treated or modified in such a way as to become incorporated into the structure of the subject. In other words, every newly established connection is integrated into an existing schematism. According to this view, the organizing activity of the subject must be considered just as important as the connections inherent in the external stimuli, for the subject becomes aware of these connections only to the degree that he can assimilate them by means of his existing structures. In other words, associationism conceives the relationship between stimulus and response in a unilateral manner: $S \rightarrow R$; whereas

³ Jean Piaget, *The Origins of Intelligence in Children* (New York: International Universities Press, 1951; London: Routledge and Kegan Paul, 1953).

the point of view of assimilation presupposes a reciprocity $S \rightleftharpoons R$; that is to say, the input, the stimulus, is filtered through a structure that consists of the action-schemes (or, at a higher level, the operations of thought), which in turn are modified and enriched when the subject's behavioral repertoire is accommodated to the demands of reality. The filtering or modification of the input is called *assimilation*; the modification of internal schemes to fit reality is called *accommodation*.

2. Stage 1

The point of departure of development should not be sought in the reflexes conceived as simple isolated responses, but in the spontaneous and total activities of the organism (studied by E. von Holst and others). There are relatively fixed and predictable reflexes embedded in this total activity, but they can be viewed as a differentiation of this global activity, as we shall see. Some of these reflexes are developed by exercise instead of remaining unchanged or atrophying and are the points of departure for the development of schemes of assimilation.

On the one hand, it has been shown by the study of animal behavior as well as by the study of the electrical activity of the nervous system that the organism is never passive, but presents spontaneous and global activities whose form is rhythmic. On the other hand, embryological analysis of the reflexes (G. E. Coghill and others) has enabled us to establish the fact that reflexes are formed by differentiation upon a groundwork of more global activities. In the case of the locomotive reflexes of the batrachians, for example, it is an overall rhythm which culminates in a succession of differentiated and coordinated