is not purely a matter of statistics. We can say that the heart and lungs are indispensable to breathing and to the circulation of the blood and that no kangaroo lacking these organs could live. In that case, their presence in the kangaroo's body is perceived as necessary. A strictly empirical theory is unable to explain this relation of necessity between concepts, since statistical relations are always contingent and cannot rule out exceptions.

The rationalist tradition, by contrast, stresses the idea of definition. A concept is defined in terms of other concepts. The rationalist system applies to concepts the principles which codify the organization of mathematical knowledge. Any new mathematical idea is defined in terms of ideas already known. If such a system is to avoid turning into a vicious circle, the existence of primitive notions which do not require definition must be presupposed. In mathematics the notion of number was considered for a long time to be primitive; then the introduction of sets as a new primitive notion at the beginning of the twentieth century led to a definition of numbers. Similarly, we must imagine that certain concepts used by human beings require no definition and are primitive concepts which serve to define all other concepts. To the rationalist, such concepts can only be innate. Several objections can be raised against this way of conceiving of the system of concepts, the most obvious of which is that there appears to be no reason why concepts thus defined might be of any use. A concept such as *Horse* is useful insofar as the entities we categorize as horses present consistent aspects and behaviours; but a concept bringing together all objects that are two-and-a-half feet high would almost certainly be useless. If concepts owe nothing to experience and everything to their definition, then there is no prima facie reason why the concepts we form should have the slightest usefulness, unless we agree with Descartes that the hand of God guarantees harmony between our mind and the universe. A second objection against a system of concepts organized like mathematics is raised by Fodor, who shows that understanding of concepts requires no analysis of their definition: if we want to be clear about the difference between a *Horse* and a *Donkey* or between *laying* and *throwing* a book on a table, it comes to us as an image rather than as a logical definition.

The choice here is an impossible one. If the meaning of a word cannot be broken down into predicates, then it is equally impossible to see it as an image or a prototype. The main objection against the empirical theory is its inability to exclude. If all concepts are kinds of average perceptions,

prototypes, then nothing is impossible and all we have is at best atypical things. Empirical astonishment and rationalist astonishment are therefore different in nature. If somebody claims to have seen a sheep without a mouth, empiricists will be surprised by the novelty of the thing; but if they then come across a few hundred more mouthless sheep, they will stop being surprised. Rationalists, on the other hand, will not react in that way: they will want to know how such a sheep could eat. Rationalist astonishment is not susceptible to things statistical; and even after seeing their ten thousandth mutant sheep, rationalists will go on seeking an explanation. A fundamental characteristic of human beings is not just their ability to be astonished over lengthy periods but also the ability to clarify the reasons for their astonishment and to make others share it. Although this is, as will be seen, an essential aspect of language use, a strictly empiricist conception of human understanding can offer no explanation of it.

Coming now to a consideration of the biological role of conceptualization, we can see that here too there is a clear dichotomy between the empiricist and the rationalist conceptions. Depending on whether concepts are perceptual representations or logical representations, accounts of their origins will not coincide. On the one hand, roughly speaking, empiricist discourse will hold that concepts derive from the capacity for categorization and that the use of them in language comes later. The rationalist view, on the other hand, says that the reason why we have concepts is a logical one: they arose along with language. Their categorizing power is thereby seen as a consequence of their being used predicatively. So did language create meaning? Or was it the improvement of our ability to see the world as segmented that profoundly changed our ancestors' way of communicating?

The solution to this dilemma proposed in the following pages consists not of a loose compromise between the rationalist and the empiricist views of concepts, but rather of a suggestion that we abandon the idea of a concept as a single representation in favour of a dual representation. This choice of duality is pregnant with consequences; of necessity, it will entail first justifying the existence of two cognitive apparatuses operating in tandem, then considering two separate biological functions. And it will lead to the reconstruction of two separate evolutionary histories. That is what we are about to embark on.