

two eyes, one nose and two ears, one head and two arms, two legs, etc., long before it has a glimmer of the idea of ratio, much less that the ratio of two equal quantities is *one*. There is nothing in the number records or present experience of the race which shows that its first number ideas are ratios. It may be confidently asserted that every person who reads these lines had not only an idea of number but of many special numbers before he had one idea of quotient or ratio. These facts show that a number is not necessarily a ratio. The conception of a number as a ratio includes the idea of number and the idea of ratio.

2. The number ideas which first arise in the mind are occasioned by the phenomena of nature, or, if preferred, by environment and subjective experience. Nature occasions ideas of number by presenting to the mind one and more than one (many) objects or experiences. The mind discriminates between one and more than one, and the idea of number arises. The moment the mind perceives the number distinction between one object and two objects, it has the idea of number. This does not involve the idea of ratio. The number of objects in a group or events in succession is gained by *numbering the group or succession*. The mother knows she has five children and the boy perceives that the cherry cluster has six cherries in it, that the bird's nest has four eggs in it, etc. Nature presents to the mind groups of objects *to be numbered*, and thus teaches number, and the number thus learned is *a collection of ones*, not a ratio. I have a suspicion that nature is a much wiser teacher of primary ideas than dabblers in philosophy.

3. The number one cannot have its *genesis* in the mind as the ratio of *two* equal quantities, for this involves the absurdity that the idea of "two" is in the mind *before* the idea of one. How can the mind compare *two* quantities before it perceives that *one quantity and one quantity are two quantities, i. e., that two is one and one*—a collection of ones. Nor is the difficulty obviated by leaving out the idea of "two," and simply comparing equal concrete magnitudes. In the absence of the idea of number the *ratio* between the equal magnitudes is not conceivable, for the idea of ratio involves number representatives. In the absence of number they are simply known as *equal*, and three quantities may be equal as well as two. A philosopher may see or think he sees that the ratio between the two eyes in his