

said to be a property of things any more than the sensations as psychical experiences are properties of the external things which occasion them. In the case of the simplest sensation there is action of the brain and sense organ. The child does something with the brain and sense organs. The results of the higher mental processes are still farther removed from things. A mind has a capacity for sensations ; and a thing has a capacity for occasioning sensations. But these sensations are neither knowledge nor things. They are raw materials which, under certain mental processes, become products ; which products, again, are neither things nor properties of things. Number is, we may well believe, no exception to this law. It is a process and a product of mental action ; it is due to the separating and combining energy of mind ; that is, to analysis-synthesis, which is the essential feature of all psychical operations.

In primary number work we, indeed, have the child use things, and perform actions with things, to enable him to see relations of things, in order to help him at last to see the mental relations which make number. But neither the things nor the physical acts with things are numbers. A child may form a group of, say, twelve things by three physical acts : he puts down a first group of four things, then a second group of four things, and finally a third group of four things. But no one will say that these physical acts are the idea twelve. The physical processes of separating and uniting are employed as auxiliary to the psychical processes. The physical whole-twelve things is a *UNITY*, which the child breaks up into parts, and which he re-makes by putting the parts together again. He is led to perform these operations in such a way as to *see* the relations of the parts to one another, and to the whole. And so, by the repetition of such acts,

the clear seeing of the relations of the things leads finally to the process of *mentally* relating through which number is constituted. That is, the operations with things, their separation and re-combination, conduces to the mental process of analysis-synthesis, the thinking of a whole as made up of parts, and of the parts as making up the whole. The sentence four dollars taken three *times* makes twelve dollars may, indeed, describe the physical act. But this act is simply a means to the mental process ; and it is this mental process and its products that the sentence properly expresses. In other words, the three *times* means that in forming the idea of twelve, as made up of *three* equal units, there are three related mental acts, dealing with a first four, a second four, a third four. making the three fours which compose the whole. This is exactly what the mind does in forming the idea of *three* with reference to any unit whatever. The kind, a magnitude of the unit of reference, does not affect the mental operation. This is the idea of *times* in number : it is, of course, abstract and is a psychological necessity to every idea of number as a measure of magnitude. For, as Prof. Dewey says : " If, for example, a child when he gets to four (in counting objects) does not carry in his mind his previous acts of counting one, two, three, the object would not be the *fourth*, as order, and hence not *four* as sum ; but simply another independent unity. '*Times*' denotes simply the act of mind in taking things, not as severally independent, but kept together (mental synthesis) as parts of one whole."

ABSTRACT TO CONCRETE.

But while teachers should be on their guard against making too much of the concrete, they must be on the alert against the barren manipulation of symbols. Thus, some of our phil-