to count. After this process of synthesis, by which the number 5 becomes known, there would follow in thorough teaching the process of *analysis*, by which the child learns that other component parts of 5 are 3 and 2, two 2's and 1.

What is the other method referred to? It is claimed by many that each number up to 10 should be taught as one would teach an apple or a cube, by presenting it as a whole, requiring the child to discover for himself *all* the facts involved in it. Thus, give him a group of 5 objects, tell him that there are 5, and then let him find out by analysis that it includes a 4 and a 1, a 2 and a 3, two 2's and a 1.

But is it possible to learn and afterwards to recognize "at sight" a number presented as a whole? Only by associating with each number a *special arrangement* of the objects in the group from which the number is taught. If the *linear* arrangement of objects is adopted for all numbers, as is the case when they are taught from the ball frame or strings of beads in the kindergarten material, 6 can hardly be distinguished as such, except by counting to see if it is 1 more than 5, or by separating it into the other groups of which it is composed.

What distinctive arrangements other than the linear are possible for each of the numbers up to 10? Arrangements somewhat similar to those found on dice or dominoes. Such arrangements receive the name of *number pictures*.

What special advantages would possibly be gained by teaching numbers in this way? Each number would have an individuality quite independent of the preceding numbers, and could, therefore, be presented as a whole and always recognized in that form at sight. A mental picture, vivid and definite, of each number would be in this way indelibly stamped upon the child's memory. The analysis of each number into its component parts would be greatly facilitated and the facts thus discovered more easily and more accurately remembered.

Would not the child thus taught get the impression that the form or the arrangement of the group was essential? Such an impression would not last long; the child's experience in manipulating his blocks, tablets, etc., would soon obliterate this. Besides, any possible disadvantage resulting therefrom on this score would be more than compensated for by the greater certainty and definiteness of his knowledge of the number and its relation.

What kinds of objects are best for teaching numbers? In teaching to count, and, indeed, for many purposes, the old fashioned ball frame is very useful. Strings of beads or buttons, quantities of pumpkin seeds, beans, little squares or discs of leather are at the command of every teacher. A simple board, eight or ten inches square, in which are bored little holes in rows, intersecting so as to make squares, say three-quarter inches each way, together with a quantity of shoe pegs form a useful and inexpensive apparatus. If common numbers are to be taught in the second of the two methods above outlined, the main reliance must be at the outset on the number pictures.

How can these number pictures be provided for school use? Charts such as Parker's or Dunton's can be purchased at some considerable expense; but every teacher has a blackboard and can make them for herself. Any simple mark may be adopted, such as dots, circles, crosses and the like. Cubes with the number pictures on them like dice, or tablets like dominoes would be useful for the children at their desks.

Explain somewhat more in detail the use of number pictures. Suppose the number under consideration is 5, teacher presents the picture of it, thus: ⁙ and calls 5; children make 5 on their slates, or find it on their dominoes or cubes, or make it with their pegs, beans or buttons.

When the number itself is thus known as a whole the analysis of it will proceed thus: Separate the group thus: ⁖ : or ⁚ ⁖ that is, into 3 and 2; then thus: ⁘ ·, 4 and 1; and lastly thus: : : · that is two 2's and 1. Children taught to state all the facts they have discovered.

What forms of expression are appropriate in the statement of these facts? The simplest and most natural possible. Especially should the technical term add, subtract, multiply and divide, together with their associates, be avoided. As in the rudiments of all subjects the difficulty of scientific terminology should be deferred till the elementary ideas have been completely appropriated.

What sorts of exercises for practice are desirable? The circumstances of the school and the teachers' own versatility must determine this point. However, besides the varieties already indicated, exercises in measuring lengths, in imaginary buying and selling, in combining and separating the children into groups, illustrating the numbers taught, will all prove interesting and profitable.

What about abstract numbers? The teacher need be at no pains to teach abstract numbers, *so called*. This will come of itself when the minds of the children are ready for it. All the children's thought and reasoning should, in this regard, be upon *objects*, first as actually present; afterwards as brought to the imagination of the child through little *stories* told by the teacher.

How much time should this work take? In the schools which have won recognition as representing