

distinguish, name, and represent, colours exactly, though young boys will do none of these at all well. Still, interest and desire to grasp relations of colours are awakened, and so, little by little, colour is observed without regard to form. Then the pupil feels that he has neither enough knowledge nor enough skill to use each pigment effectively, and he desires to increase both. Here is reached the starting-point for instruction in the representation of colour as such, without reference to distinctive forms; that is, for painting in the network.

In these exercises the first thing at which to aim is covering evenly and with sharply defined boundaries areas gradually increasing in size. So, first one square, then two squares, and so on up to five squares, are coloured with each pigment, either in continuous rows of squares side by side or in interrupted rows of squares placed corner to corner. In this way the pupil gains familiarity with the peculiarities of the nature and of the use of each pigment. The exercises begin with the primary colours—red, blue, yellow, and following these the pure secondary colours—green, orange, and violet. The two series begin with red and green because experience shows that these colours are nearest to the boy, and so he likes to start with them.

In subsequent exercises two, three, and finally all six, colours are used in the two chief arrangements of continuous and interrupted rows of squares. The order of colours most consonant with nature is blue, green, yellow, orange, red, violet. The last step at this stage of development employs four groups of colours, similar to the groups of two lines in the drawing of lines. These, in accordance with the law of the material used, present the series of colours in all the directions given by the network with reference to one common centre. These groups, then, appear in two sets—one in which the

coloured rectangles are placed side by side, vertically or horizontally, and one in which they lie in the direction of the diagonals of the squares, which touch each other at their corners. In each set, again, there are two arrangements—one in which the various rows proceed from a common starting-point, the other in which they lie round a common invisible centre.

These four groups finish this stage of the course. The next stage—as in the case of the drawing of lines—would be the free invention of arrangements of colours, the study of intensities and tints of colours, and the study of natural forms and the representation of them in the network of squares.

#### GEOMETRICAL FORM

The observation of things around him and the exercises in language lead the boy, as has already been shown, to apprehension of form. But the forms of these things are so diverse and so difficult to analyse and define, that it is necessary to study objects in which form is simple; that is, those with plane surfaces bounded by right angles or equal angles.

Now, knowledge of line underlies all knowledge of form, and the forms are examined, above all, by reference to straight lines. Consequently, in the examination of the forms of objects, those with curved outlines are soon put on one side, and attention is first directed towards those built up on the basis of the straight line. For example, such things as the surface of a stove or the glass of a watch are curved in outline, but doors and windows have plane surfaces with straight boundaries.

Then objects and their parts and outlines are examined with respect to position and direction. For instance, the two long sides of a window-frame are parallel, and so

are the two short sides ; a long and a short side are at right angles to each other. Further material for study can be found in the various parts of a table, the sides, floor, and ceiling, of the room, and so on. Examination of these leads on to the study of simple straight-lined objects, such as cubes, prisms, and pyramids. When, through such exercises, lines as outlines are clearly grasped the need is felt for studying the relations of lines apart from objects. This begins with single lines. First are examined lines not touching each other, and classed as *parallel*, or running in the same direction, and *inclined*, or running in different directions. The latter are treated as those inclined at right angles and those inclined at other angles equal to each other. Throughout, an attempt is made to discover how the number, the situation, and the direction, of the various lines are related to each other. Secondly, are considered lines touching each other. Here the first point for consideration is the amount of convergence and divergence ; then, in how many points each line touches other lines ; lastly, whether the ends of each line are outside the various connecting points or meet in them. This leads naturally through the study of angles to that of polygons, and last of all comes the circle. The full development of these belongs to a later stage of education.

Throughout this stage there should be frequent drawing of the figures, and attention should be concentrated on the examination of actual forms and figures, not on the formulation of general truths. All complicated relations and complex inferences should be avoided, and each relation should be studied separately in as many simple combinations as possible. It should be noted that the study of lines of equal inclination leads from geometrical form to free-hand drawing.