## Practical.

## DRAWING.

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(The Ellior of this Department will be glad to answer questions for information addressed to him in care of the School Journal.)

X.

1. Draw a square of 3 inches sides, divide this into 16 equal squares by lines parallel to sides. Form this into picture of a window by doubling the outer square and the two inner diameters.

Let the pupil make the square by first drawing two lines at right angles and of 3 inches in length, bisecting each other, then through extremities of these draw the sides of the square required.

2. Draw an equilateral triangle of 1 in. side. On upper side of the base erect a hexagon, and on the lower side an octagon.

3. Draw a parallelogram 4 in, by 6 in. Divide it into three equal parts by parallel lines. In the inner section place "star-crosses" covering the space, and in the outer hexagons also covering the spaces.

4. i. Describe a circle of 11 in. diameter.

ii. Describe an ellipse whose axes are  $2\frac{1}{2}$  in. and  $1\frac{1}{2}$  in. respectively.

iii. Form an oval from these two figures.

8. Draw a square of 3 in. side. Bisect each side, and on each of the half sides describe semicircles, alternately within and without the square. Join the corners of the square by the diagonals, then within it draw a concentric square of  $\frac{3}{4}$  in. side, and within this another joining centre points of the sides.

6. Draw a vase 4 in. in height. Make the top 1 in. in height, and the base 1 inch. Take extreme width 21 inches. Join top and base by appropriate curves.

7. (i.) Draw a cubical block of 2 in. side so as to show the top and left side of the block.

(ii.) Represent same block above the level of the spectator's eye.

(iii.) Draw a cubical box (without a lid) showing the thickness of the material. About half the inside to be visible, and box situated to left of the spectator.

To draw these objects properly the pupil should have them explained first from the solid object placed before the class.

8. Give pictures of a cylinder whose height is 3 in. and diameter 2 in.

(i.) The top visible-object standing on one end.

(ii.) The cylinder lying in a horizontal position, the right end being visible.

9. Draw a cone of 2 in. diameter at base and height 2 inches.

(i). When below the level of the eye.

(ii.) When above the level of the eye.

10. Draw a sphere—stating why its position will make no alteration in the outline of the picture.

The same remark will apply to these figures, they can only be drawn intelligently by pupils who have observed the outline of the real objects; after having shown them to the class, and mentioned their peculiarities of outline, there will be no difficulty found in the drawing.

XI.

1. Explain the following terms :- Diagonal, diameter, right oblique diagonal-as applied to a square-; ellipse, axes of an ellipse, oval, pentagon, octagon, prism, pyramid, cone, cylinder.

Illustrate each definition by a drawing.

Be sure that these definitions are not mere verbal ones, then take several other common definitions as an additional exercise such as those relating to the circle.

2. Make a hexagon of 2 inches side, and within it place a sixpointed star.

This is best done by first drawing the hexagon by means of an equilatoral triangle then joining every alternate angular point of the hexagon, when the intersections of these points will give the inner points of the star required. Strengthen the lines, which join the points found, with angular points of the hexagon, and a star is produced. Strengthen also outline of hexagon itself.

3. Give working drawings of a box, without lid, 3 ft. x 2 ft. x  $1\frac{1}{2}$  ft. thickness of wood  $1\frac{1}{2}$  inches. Scale  $\frac{1}{12}$ .

Explain fully, meaning of a working drawing. Draw first the plan, then the front elevation, using same length and thickness as in plan, next give the end elevation, showing how measurements are obtained from the other two already found.

4. Cover a space 5 in. by 3 in. with triangles, alternately filled and empty.

Draw an equilateral triangle of 3 in. perpendicular height, bisect itssides, and through points thus found draw lines parallel to sides of first triangle. The ornament within may be of any symmetrical form.

5. Draw a square of 1 inch side. On each side of this square draw another square. Fill the four outer squares with interlacing curves.

Take care in this that the perpendicular heights of the curves are equal, otherwise the figure will be very unsymmetrical. See Paper VII.

6. Draw two concentric equil. triangles whose sides are 2 inches, and width of sides  $\frac{1}{2}$  of an inch. Let them be drawn so that the vertex of one is  $\frac{1}{2}$  inch above the base of the other. Interlace these triangles, and form them into a rosette by placing a circular strip of equal width around them.

7. Draw an ellipse whose axes are respectively 4 inches and  $2\frac{1}{2}$  inches.

(a) by means of foci, pins, and string.

(b) by means of surrounding parallelogram.

These two plans have been fully explained in our paper No. VI. 8. Draw pattern moulding ; width of moulding 2 inches, length 5 inches, width of T lines  $\frac{1}{2}$  inch and length of upright of T  $1\frac{1}{2}$  inch.

Let these be drawn alternately so as to slightly overlap one an other.

9. Draw from memory a box with lid half-opened, dimensions 1<sup>1</sup>/<sub>2</sub> ft., 1 ft., 1 ft. Scale <sup>1</sup>/<sub>2</sub>th.

Be careful that the pupil represents the open space between the box itself and the hinge when in this position, and also only the lines visible in the thickness of the lid, &c. It will be best to show the class a practical illustration before drawing this objectr

10. Draw cylinder lying on its side, given length 4 m., diamete of end 2½ in., position to right of spectator. Place it on a solid block 5 m. x 3 in. x 2 inches.

Note that only visible portions are shown in this answer.

11. Draw outline of common egg-cup. Take special care of the drawing of lines showing union of stem and base as mentioned in our paper No. VIII.

12. Draw outline of conventionalized ivy-leaf. Height 4 inches, extreme width 24 inches.

## DICTATION EXERCISES.

Dictation exercises may be made very profitable, but many teachers have no work of this kind in their schools. The writer has used them to cultivate memory and attention; to improve the spelling; and as an exercise in capitalization, punctuation, etc. He has employed the oral and the written method with different