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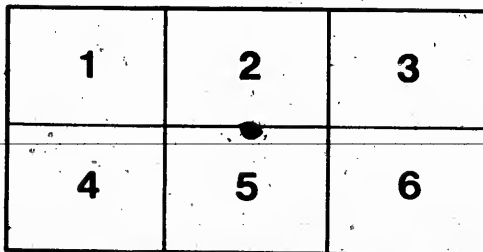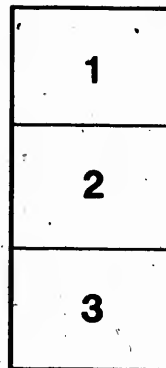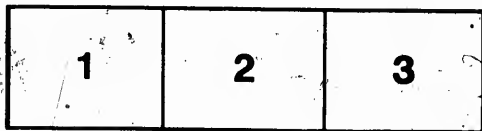
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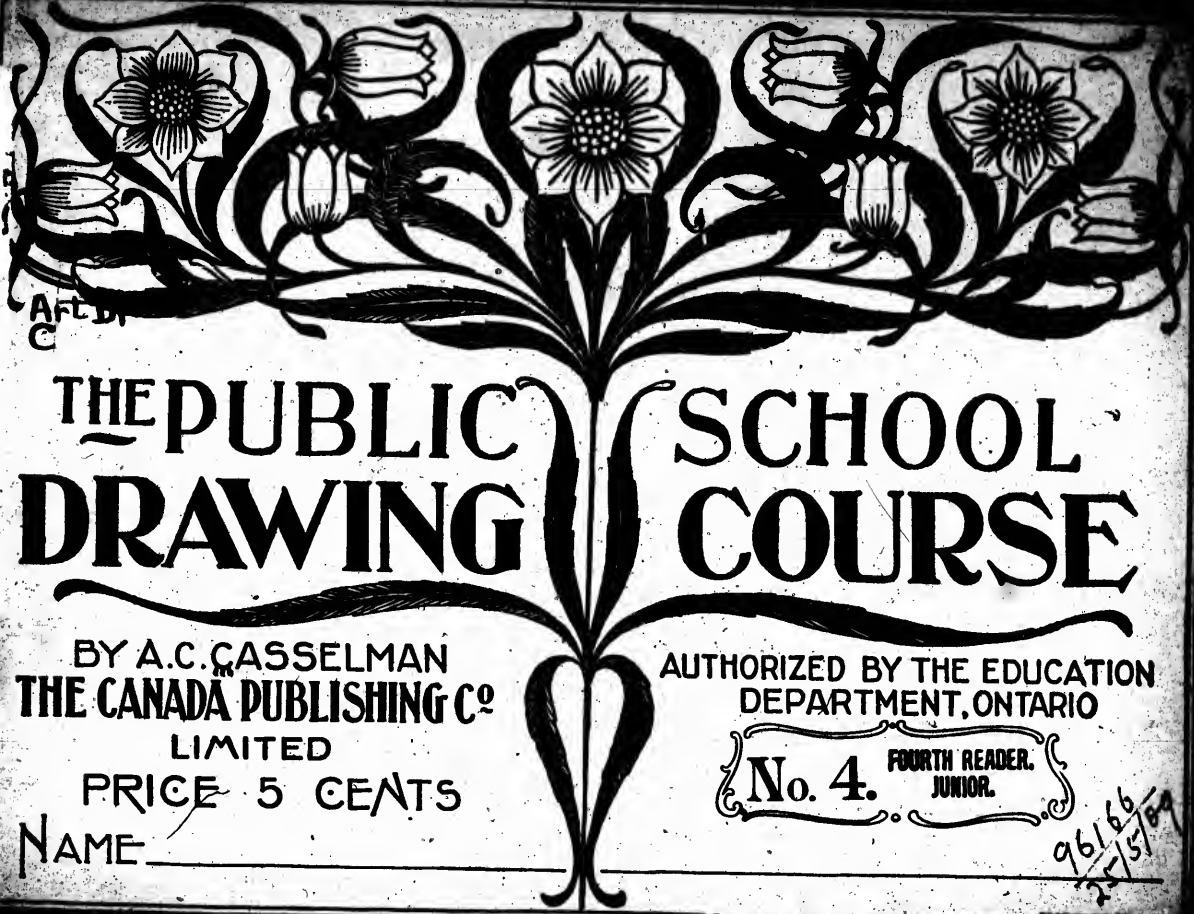
THE PUBLIC SCHOOL

DRAWING COURSE

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HINTS TO THE TEACHER.

In Book IV. the course in drawing from objects and from the memory is continued. The objects are of greater difficulty and placed in more difficult positions to judge of the apparent length of the edges. It is not expected that the pupil will draw correctly an object placed before him for the first time. It requires some practice in seeing and good knowledge of the principles outlined in the previous numbers to be able to grasp readily the drawing of objects, types of which are shown in this book. Should this book be put into the hands of a pupil who has done no previous drawing he should not be allowed to, nor can he be expected to work the exercises asked for. The proper thing for the teacher is to require him to draw easy objects and by a gradual course lead him to simple grouping.

The drawing of single objects is not the end of drawing; it is a step towards the drawing of objects in groups, so arranged as to tell some story. I would particularly warn both pupils and teachers not to copy the pictures shown here. Place similar objects grouped as shown and draw them; then compare with the group shown. Arrange differently and draw again. Many of the groups cannot be brought to school. Those should be drawn at home on practice paper, afterwards criticised by the teacher, and placed in the drawing book in school from memory or from the pupil's own drawing.

If the objects asked to be drawn cannot be obtained conveniently at the time of the year when any page is to be drawn pass on to a page where seasonable exercises are asked for. Individuality and power to express what one sees are what every teacher should strive for.

Any common objects that may be conveniently brought to school may be placed above the eye-level and drawn as they appear to each member of the class.

Working drawings are continued and some common objects should be drawn to scale from actual measurements of the object.

A few easy problems in Geometrical Drawing are given here. Many, in fact the greater number of pupils, never attend any school above a public school. No department of drawing is so generally useful to a man in every occupation as mechanical drawing, hence a little manual training in the use of the compasses, square, measure and drawing board in working the facts of Geometry is of great practical value apart from the training. The work is *descriptive* not *demonstrative*. While the teacher should explain to the pupils every term used, yet it is not intended that he should try to *prove* every problem after the manner of Euclid. The problem and its application should be pointed out. Working Drawings and Geometrical Drawing should be taught to pupils who attend only during the winter months if they have arrived at an age and an understanding to profit by them, even if they have not reached this grade in the other work. If the teacher consents, girls who do not wish to take up this work may be employed in making designs for embroidery or sewing or other suitable occupation.

The problems given are types. The teacher should in all cases make the problem special as follows: Bisect a straight line, say $3\frac{1}{4}$ inches long: Bisect an angle of say 35°. Problems based upon the types should be given as exercises. It will be easy for a pupil to divide a line or angle into four equal parts after knowing how to bisect them.

My thanks are due to, Mr. W. D. Blatchley, O.S.A., for the drawing on p. 9, Mr. J. W. Milne, for those on pp. 2, 4, 6 and 10, Mr. R. W. Magee, for those on pp. 18 and 22.

Examples of Roman Ornament are shown. These should be studied and compared with Greek Ornament and with the present ornament. They will be found useful as copies to train pupils to make an enlarged or reduced copy of any drawing.

The drawings of the Union Jack will be found interesting from the historical and patriotic standpoint, and will teach pupils the correct form of the Flag. Its evolution is a valuable history lesson.

Draw four objects like the sphere. Notice carefully the shade and the shadow cast by them, and express these.
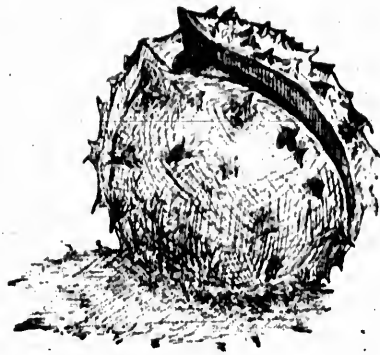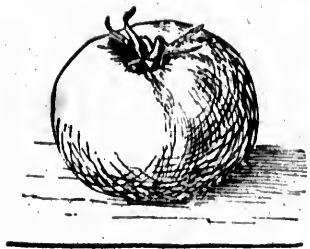
Draw two groups of objects like the sphere.

Place the objects in a picturesque position and emphasize their characteristics. Express carefully the shade and shadow.
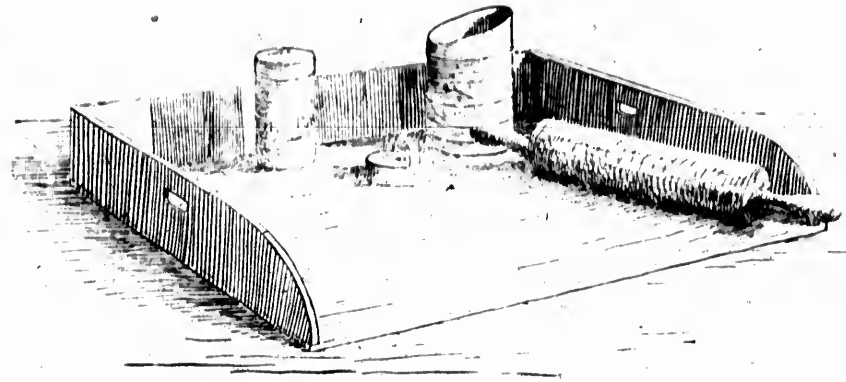
Draw three objects like the hemisphere.
Draw a group of objects like the hemisphere.

4

Draw a suggestive group
composed of objects like
the cylinder

Draw a teapot and cup and saucer grouped differently from thi
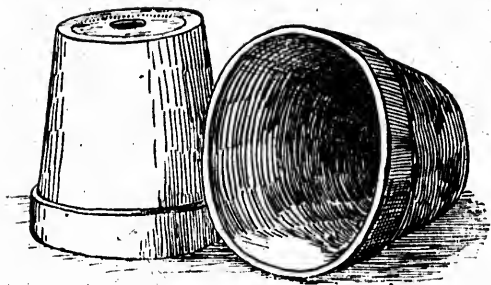
Draw in a group a teapot, cup, a bowl and cream pitcher

Reserve this page and the next for drawing wild flowers, when they may be conveniently obtained.

Draw a flower pot in two positions.
Draw a group of two or three flower pots.

Draw the pupil as he appears to you.

So that the pupil may be seen by the whole class, he or she should be sitting on a chair placed on a table.

As a home exercise, draw some member of your family

Draw a chair below the eye-level. Draw a chair above the eye-level. Place other common objects above the eye-level and draw them. Objects placed above the eye-level should be large enough to be seen distinctly by every member of the class.
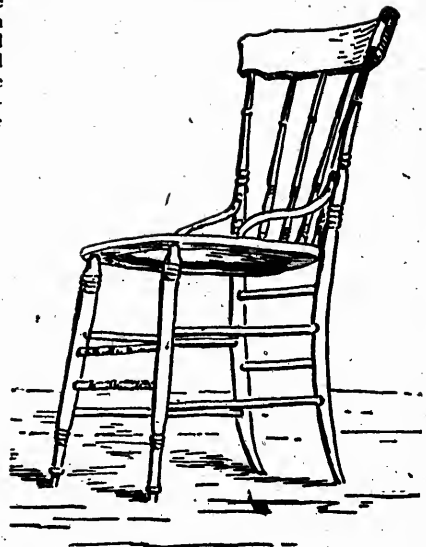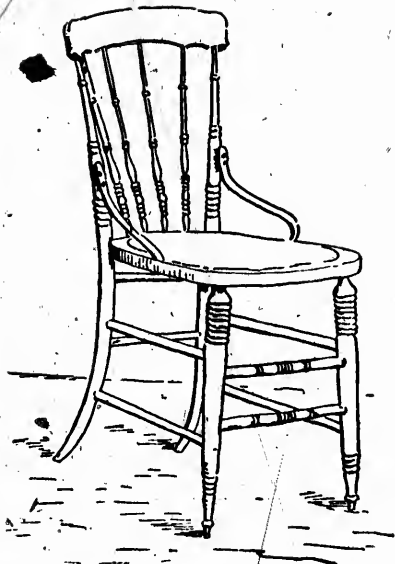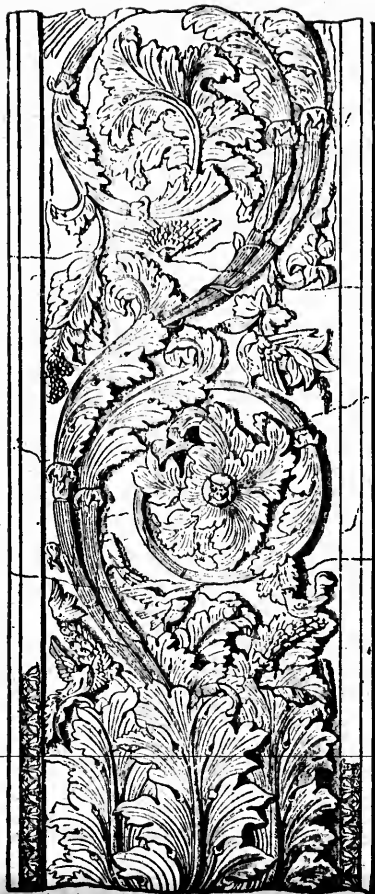
This is an example of an ornament on a pilaster at Rome. It is a good example of the elaborateness of the Roman style of ornament. It shows the extensive use of the acanthus, and the scroll so profusely used by the Romans as to become characteristic of their style, although the elements used differed very little from those used by the Greeks.

Copy this scroll as an exercise in copying, or select a modern border with a wave line, and draw it. Study the border on a Canadian cent, and draw it; first get a maple leaf and draw it several times till you can draw it from memory.
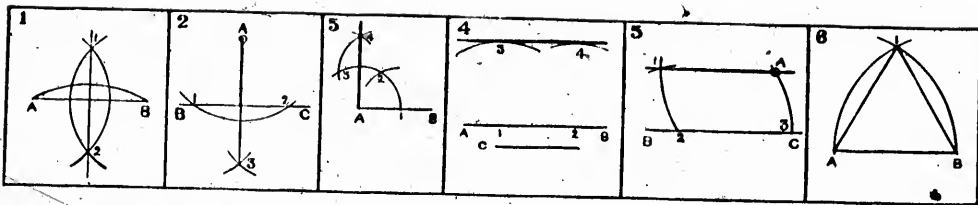
PROB. 1.—*To bisect a given straight line or arc.*

Place the point of the compasses at A, with the pencil leg MORE THAN HALFWAY to B, and draw an arc. With B as a centre and the same distance, describe another arc, cutting the first arc in 1 and 2. A straight line drawn through 1 and 2 will bisect the line or the arc.

PROB. 2.—*To draw a straight line perpendicular to a given straight line, B C, from a point, A, without it.*

With A as centre, draw an arc to cut the line B C in two points, 1 and 2. With 1 and 2 as centres, and a distance greater than half 1 2, draw arcs cutting at 3. A straight line drawn from A to 3 is perpendicular to B C.

PROB. 3.—*To draw a straight line perpendicular to a given line from its END or ANY OTHER point in it.*

From A, with any radius, draw an arc, 1 2 3. From 1 draw an arc cutting the last arc in 2. From 2 draw an arc, 3 4. From 3 draw an arc cutting the last arc in 4. Draw the straight line 4 A.

PROB. 4.—*To draw a line parallel to a given line, A B, at a distance equal to the line C away from it.*

From any two points in the line, as 1 and 2, and at the distance C, draw arcs 3 and 4. Draw a line touching these arcs.

PROB. 5.—*To draw a line parallel to a given line, B C, through a point, A.*

With A as centre and any distance to cut the line, draw an arc, 1 2. With 2 as centre and the same distance, draw an arc, A 3. From 2, at a distance equal to A 3, draw an arc, 1. Draw a straight line through 1 and A.

PROB. 6.—*To describe an equilateral triangle on a given line, A B.*

From A, at a distance A B, draw an arc, 1 B. From B, at the same distance, draw an arc, 1 A. Draw straight lines, 1 A and 1 B.
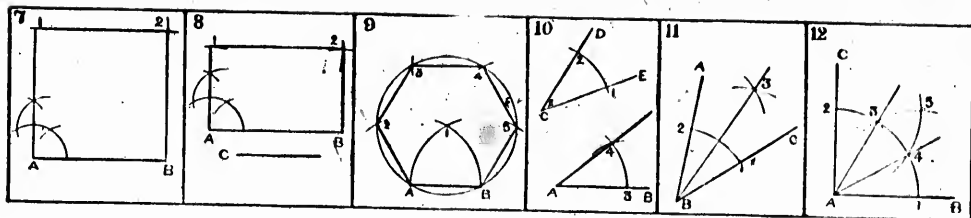
PROB. 7. — *To describe a square on a given line, A B.*

At A erect a perpendicular to A B. From A, at a distance A B, draw an arc cutting A 1 at 1. From B, at the same distance, draw an arc. From 1, at the same distance, draw an arc cutting the last at 2. Join 1 2 and 2 B. Join 1 2 MEANS TO DRAW A STRAIGHT LINE FROM 1 TO 2.

PROB. 8. — *To describe a rectangle, the two sides A B and C, being given.*

At A erect a perpendicular, A 1, equal in length to C. From B, at a distance equal to C, draw an arc. From 1, at a distance equal to A B, draw an arc cutting the last in 2. Join 1 2 and 2 B.

PROB. 9. — *To describe a regular hexagon on a given line, A B. (Special method.)*

From A and B, at a distance A B, draw arcs cutting in 1. From 1, at the same distance, draw a circumference of a circle. Set off from A or B the distance A B around the circle.

NOTE.—The side of a regular hexagon is equal to the radius of the circle containing it. This is used by coopers when they wish to cut a head to fit a cask

PROB. 10. — *From a point, A, in a given line, A B, to make an angle equal to a given angle, D C E.*

From C, at any distance, draw an arc, 1 2. From A, at the same distance, draw an arc, 3 4. From 3 cut off 3 4, equal to 1 2. Join A 4.

PROB. 11. *To bisect a given angle, A B C.*

From B, at any distance, draw an arc, 1 2. From 1 at any distance, draw an arc. From 2, at the same distance, draw an arc cutting the last in 3. Join B 3.

PROB. 12. *To trisect a right angle, C A B.*

From A, at any distance, draw an arc, 2 1. From 2 and 1, at the same distance, draw arcs cutting the first arc in 3 and 4. Then straight lines A 3 and A 4 will trisect the angle. If A 5 be joined, what angles will it bisect?

Draw a berry box in two or three different positions.
Draw a group of berry boxes arranged differently
from the group shown here.
Use the next page for optional drawings.
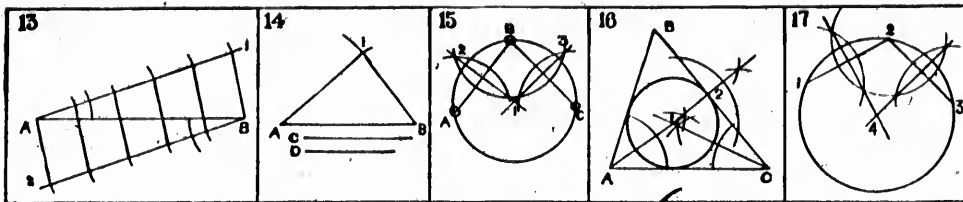
PROB. 13.—*To divide a line, A B, into any number of equal parts ; in this case five.*

At A draw a line, A 1, making any acute angle with A B. At B, on the other side from A 1, draw a line, B 2, making the same at B as A 1 makes at A. From A set off with the compasses five equal divisions on A 1. From B set off five divisions of the same length on B 2. Join the points of division as shown, then A B will be divided into five equal parts.

This method may be employed to divide a line proportionately to another given line.

PROB. 14.—*To describe a triangle when the three sides, A B, C and D, are given.*

From A, at a distance equal to C, draw an arc. From B, at a distance equal to D, draw an arc cutting the first arc in 1. Join 1 A and 1 B.

PROB. 15.—*To draw a circle to pass through three points, A, B, C, not in the same straight line.*

Join A B and B C. Bisect A B and B C by lines. Produce these till they meet at 1. This point will be the centre of the circle. Then from 1, at the distance of any of the points, describe a circle. Could A C be joined instead of A B or B C? A similar method may be used for describing a circle about a triangle.

Carpenters use this problem for describing the segment at the top of windows and doors, when the height and width of the segment are known.

PROB. 16.—*To inscribe a circle in a given triangle, A B C.*

Bisect any two of the angles of the triangle by lines. Produce the lines till they meet. This point will be the centre of the inscribed circle. From this point draw a perpendicular, 1 2, to one of the sides, as B C, and at the distance 1 2 draw a circle which will touch the other two sides.

PROB. 17.—*To find the centre of a given circle or arc.*

Draw any two chords not parallel in the arc or circle, as 1 2 and 2 3. Bisect these chords by lines meeting in 4, which will be the centre of the circle or arc.
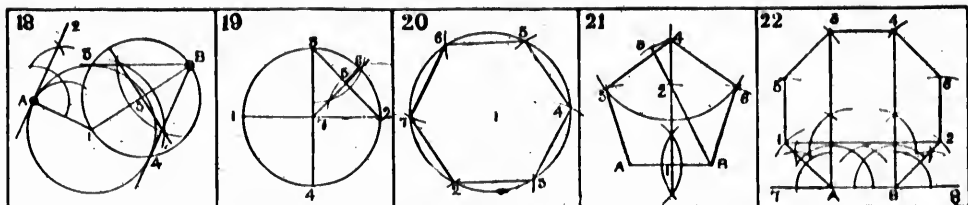
PROB. 18.—*To draw a tangent to a given circle, A 3 4. (i.) from a point, A, in the circumference, (ii.) from a point, B, outside the circle.*

(i.) Find the centre, 1, of the circle. Join A 1. At A erect a perpendicular to A 1. Then A 2 is a tangent of the circle.
(ii.) Join B 1. Describe a circle having B 1 as its diameter. Join B with the points where this circle cuts the given circle, and these lines will be tangents, as B 3 and B 4.

PROB. 19.—*To draw a line approximately as long as the circumference of a given circle.*

Draw two diameters of the circle 1 2 and 3 4 at right angles to each other. Join the opposite points of any quadrant, as 3 2. Bisect the line 3 2 by a line 7 5 6. Then a line three times the length of the diameter, together with 5 6, is a very close approximation to the length of the circumference, and is accurate enough for all practical purposes.

This is used very often by tinsmiths when they wish to cut the pattern of pipes of any diameter ; 5 6 is about one-seventh of the diameter, 3 4.

PROB. 20.—*To inscribe a regular hexagon in a given circle. (Special method.)*

Find the centre of the circle and set off the length of the radius around the circumference. Join the points, and the hexagon is formed. See Prob. 9.

PROB. 21.—*To describe a regular pentagon on a given line, A B. (Special method.)*

Bisect A B by a line 1 4 at right angles to it. Make 1 2 equal to A B. Join B 2, and produce B 2 to 3, making 2 3 equal to half of A B. From B, at a distance B 3, draw an arc cutting 1 4 in 4. 4 is the apex of the pentagon. From 4, at a distance A B, draw an arc, 5 6. From A and B, at the same distance, draw arcs cutting the last arc in 5 and 6. Join A 5, 5 4, 4 6 and 6 B.
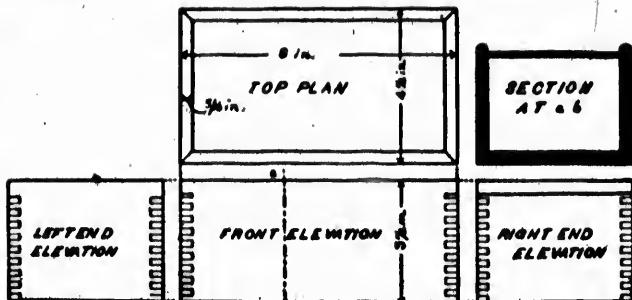
PROB. 22.—*To describe a regular octagon on a given line, A B.*

Produce A B both ways some convenient distance. At A and B erect perpendiculars, A 3 and A 4. Bisect the angles 3 A 7 and 4 B 8. Cut off B 2 and A 1 equal to A B. Join 1 2. At 2 and 1 erect perpendiculars, 1 5 and 2 6. Make 1 5 and 2 6 equal to A B. From 5 and 6, at the distance A B, draw arcs, cutting A 3 and B 4, in 3 and 4. Join 5 3, 3 4 and 4 6. Then A 1 5 3 4 6 2 B is the regular octagon.

Place a large book in several positions,
both open and closed, and draw it.

TOP PLAN

8 in.

3/8 in.

SECTION
AT a b

LEFT END
ELEVATION

FRONT ELEVATION

RIGHT END
ELEVATION

This is a working drawing of a chess-box with a sliding cover. Four views and a section are shown. The views are named. Sometimes it is necessary to show more than one section of an object and more than four views.

Make a working drawing of a box or other common object such as a spool, a smoothing-iron, a hammer or a screwdriver.

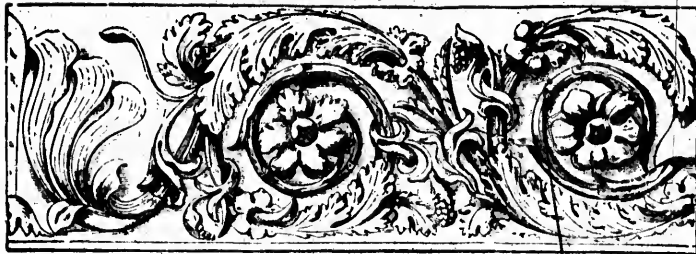Draw a group of boxes, such as are used for holding shoes, bonbons or chalk.
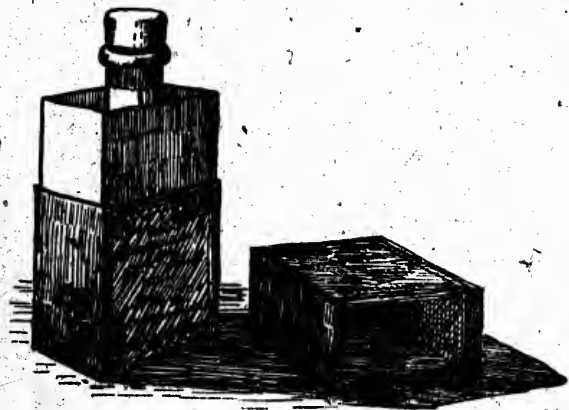
Fig. 1 is an acanthus scroll from Rome. Fig. 2 is an ancient bronze lamp found in the River Thames, England. Study its ornament and tell what nation it belonged to. How does the History of England bear you out in your conclusions? Collect examples of modern ornament. Draw them or copy the figures given here.
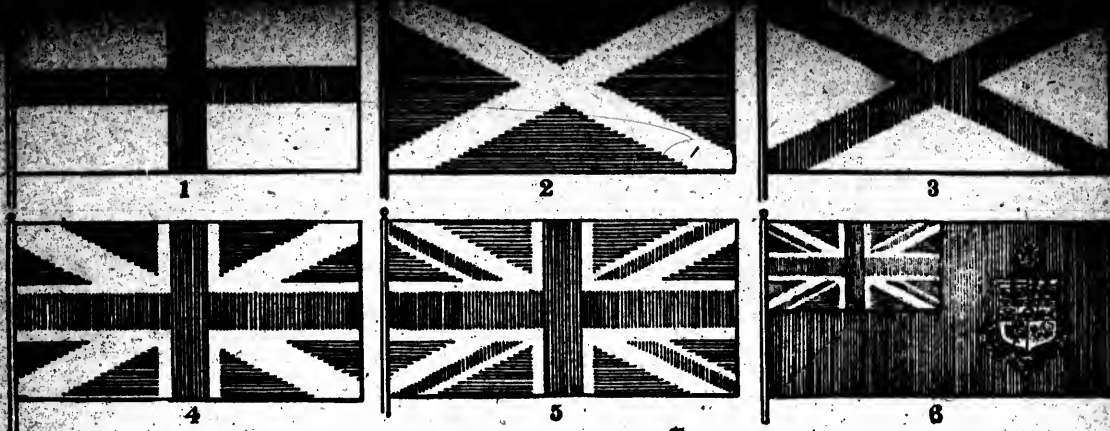
Arrange a group of similar objects and draw them.   Use the next page for optional drawings.
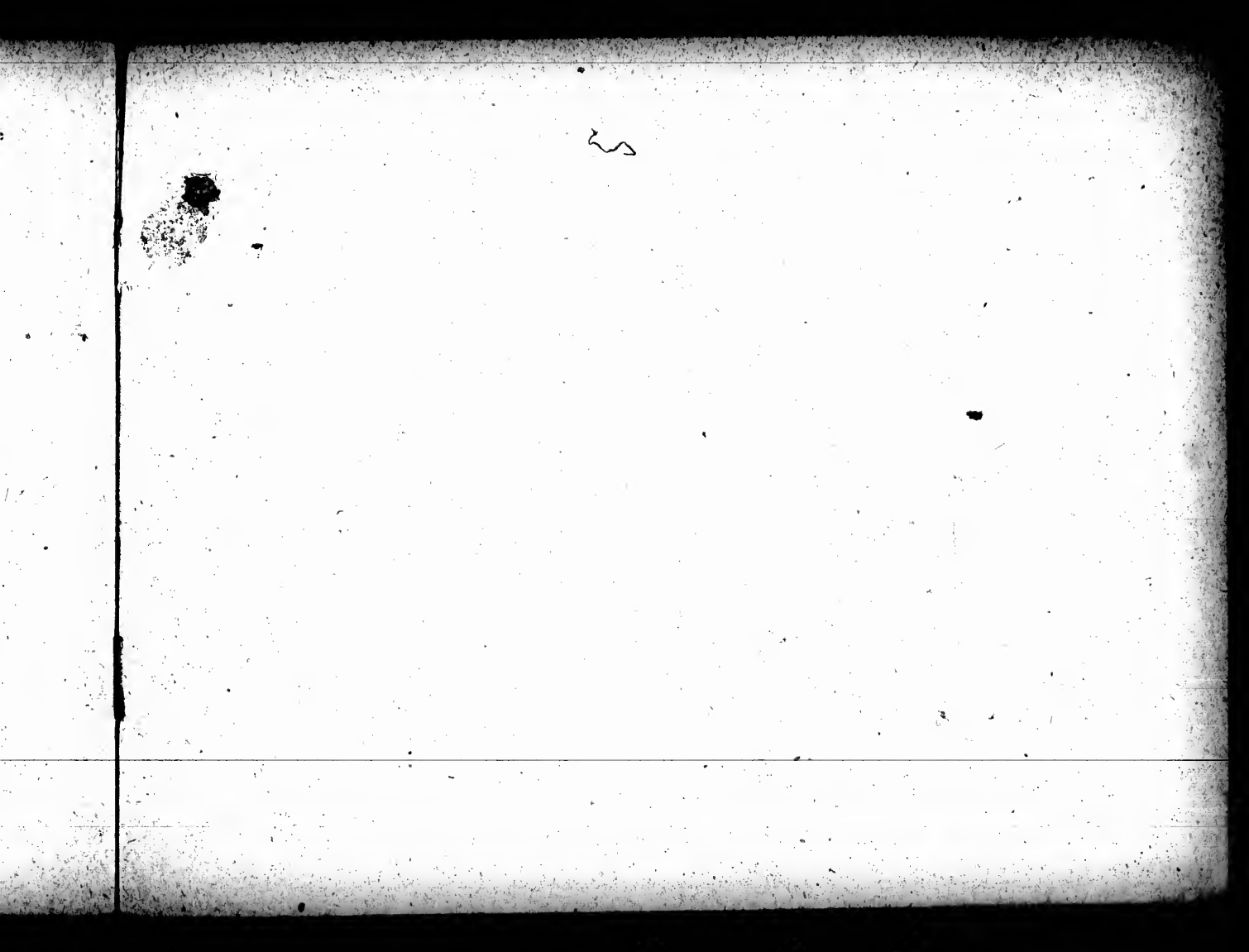
Draw the Canadian flag or the Canadian coat-of-arms. Of what is the Canadian arms composed? What is the most important position on the shield? What Provincial arms are placed here? Why are the arms of British Columbia and Prince Edward Island placed at the base of the shield?

THE UNION JACK AND THE CANADIAN FLAG.

Fig. 1 is the English "Jack" in use in England from the time of Richard I. until 1707, when the Parliaments of England and Scotland were united. It is composed of the red cross of St. George, the patron saint of England, on a white ground.

Fig. 2 is the Scotch "Jack" in use in Scotland from about A.D. 987 until 1707. It is the white saltire cross of St. Andrew, the patron saint of Scotland, on a blue ground.

Fig. 3 is the Irish "Jack" in use in Ireland until 1801, when the Irish Parliament was united with the Union Parliament of England and Scotland. It is composed of the red saltire cross of St. Patrick, the patron saint of Ireland, on a white ground.

Fig. 4 is the first "Union Jack"—the union of the "Jacks" of England and Scotland, and used by the United Kingdom from 1707 until 1801. It is composed of the white cross of St. Andrew on a blue ground and the red cross of St. George surmounting it. The cross of St. George was bordered by white for the white ground of the English "Jack." This was the flag that was hoisted over Quebec, Louisburg, Niagara and Montreal, when Canada passed from the French to the British.

Fig. 5 is the present Union Jack in use since 1801. It is the union of the "Jack" of 1707 and the Irish "Jack." It is the cross of St. Patrick and the white cross of St. Andrew joined and "counterchanged," surmounted by the red cross

The red cross of St. George is the factor from which the measurements of the other parts are obtained. The width of the arms of it are one-fifth of the width of the flag at the flagstaff, and its white border one-third of this width. The width of the arms of the cross of St. Patrick is one-third of the width of St. George's cross, and its border is one-sixth of the width of the same cross. The cross of St. Andrew is one-third of the width of the cross of St. George, and its white border one-sixth of the same cross, making the total white one-half the width of St. George's cross. In placing the crosses, precedence is given to the cross of St. Andrew, which occupies the higher position, that is, above the cross of St. Patrick in the first and third quarters, and in the second and fourth quarters the cross of St. Patrick is placed above that of St. Andrew. The position and size of the crosses should be carefully noted, as frequently they are wrongly made and wrongly placed.

In heraldry, red indicates courage, and is suggested by vertical lines; white, purity; blue, truth, suggested by horizontal lines.

Fig. 6 is the Canadian red ensign. The flag is red, with the Union Jack in the first quarter and coat-of-arms of the Dominion of Canada occupying a position as shown. The coat-of-arms is drawn a little too large relatively, but this was necessary, owing to so many details in it.

NOTE.—For the above information I am largely indebted to "The Story of the Union Jack," by Mr. Barlow Cumberland, Toronto.