Minor Arts and Industries

Drawing and Designing
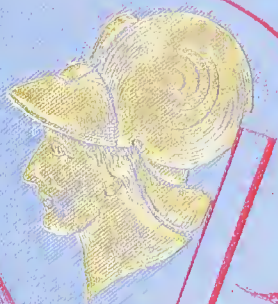
Charles·G·Leland.
M.A; F.R.L.S.

DRAWING AND DESIGNING

IN A SERIES OF LESSONS

BY

CHARLES G. LELAND, M.A., F.R.L.S.

AUTHOR OF

"PRACTICAL EDUCATION," "TWELVE MANUALS OF ART WORK," "INDUSTRIAL ART IN EDUCATION," Etc.

Drawing.

Drawing and Designing

PUBLISHERS' PREFACE.

Mr. CHARLES G. LELAND, in his work on "Practical Education,"
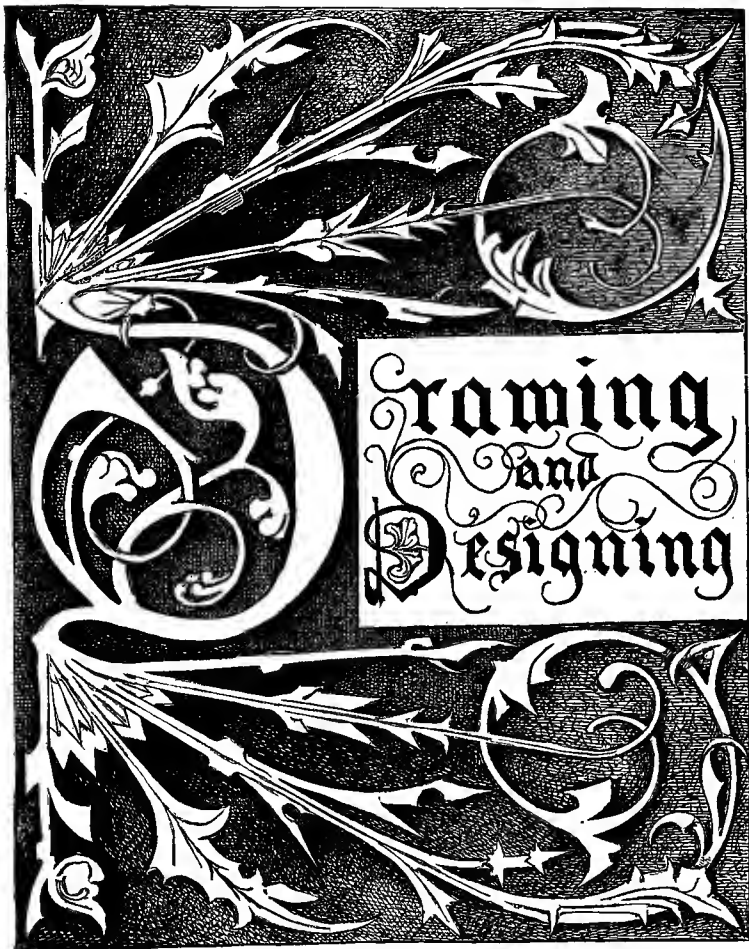distinctly insists on the utility, indeed the paramount importance, of
a sound and practical rudimentary training, whether in connection
with elementary or more advanced technical education. This is
becoming daily and increasingly apparent to those who, in their care
and training of the young of both sexes, are guided by reason and
common sense. Failing such a basis, it is obvious that no process
of later cramming is likely to produce equally successful and
permanently beneficial results.

This series of manuals on "The Minor Arts and Industries" is
designed on the lines thus laid down. It will be found that each
handbook presents the subject with which it deals in a thoroughly
popular and practical manner; that the lessons carry the student on
his road step by step from the simplest elements to the point where
the most advanced works fitly find their place in his course of study;
in short, the greatest pains have been taken to insure a thorough
mastery of the rudiments of each subject, and so clearly to state
each lesson, illustrating it where necessary by plans and drawings,
that even very young children may be interested in and trained to
practical work. On similar grounds the self-taught student will find
these manuals an invaluable aid to his studies.

The present volume on "Drawing and Designing," forms a fitting
introduction to such a series. A boy or girl who realizes that he or

she can design and draw, or, in other words, *can think and understand*, will easily be led to grasp the rudiments of almost any other kind of work. The reputation of the editor, who was the first in any country to make industrial art a branch of education in public schools, is a sufficient guarantee of the merit of this volume and its successors.

The minor decorative arts have, during recent years, assumed great importance, not only as a means of livelihood to many, but as avocations for leisure hours to many more. The books of this series will treat in a simple and practical manner of the various decorative arts, inclusive of the better-known industries, such as wood-carving, leather-work, metal-work, modeling, etc., and many beautiful arts which have been lost or forgotten.

Naturally, the first step to be made toward learning any art is to master the principles of design ; therefore, the present volume is in a manner introductory to the entire series.   Mr. Leland asserts that anyone who can write can learn to draw, and without a knowledge of drawing it is impossible to attain satisfactory results with any ornamental art.

The publishers offer this little volume as the simplest and most practical key to a working knowledge of any of the Minor Arts and Industries.

CONTENTS.

Contents.

A MANUAL OF DRAWING AND DESIGNING.

INTRODUCTION.

THE advantages offered by this system are as follows :—

I. By means of it any person who is capable of learning to write may also learn not only to draw, but also to design or to invent original outline decorative designs.

II. Designing as well as drawing, by it, go hand in hand from the first lesson.

III. Every lesson is very easy, and forms a gradual advance from the preceding. All that is required is, that every one as it comes shall be perfectly mastered and practised.

IV. The pupil who shall thoroughly master this system, will have learned all the lines and curves which occur in organic nature—that is to say, in vegetation, in animals, or the human form.

V. It explains very clearly how the most graceful and apparently capricious lines and ornaments result from only two or three very simple principles. And it also shows how the most apparently bewildering and complicated " Arabesque " patterns may be evolved from easy beginnings.

VI. It forms the alphabet of all the minor arts, such as modelling, embroidery, wood carving, leather work, inlaying,

ornamental and practical working in wood, metals, &c., since anyone who can design simple patterns may with perfect confidence attempt any of them.

VII. It teaches *spacing*, or the adapting patterns to given surfaces, and clearly shows how to make designs for panels, round or square, vases, bellows, fans, borders, frames, wall-papers, carpets, book-covers, &c.

VIII. It has been successfully taught by the author to nearly two thousand pupils.

IX. The effort to *design* makes the pupil think and invent. It awakens interest and attention, and very soon developes an intelligence which not only makes of the pupil a better copyist, but a better student in all branches of education.   It was found that in the public schools of Philadelphia, children who attended the classes in Industrial Art, and who learned design by the system here set forth, excelled in all other studies.
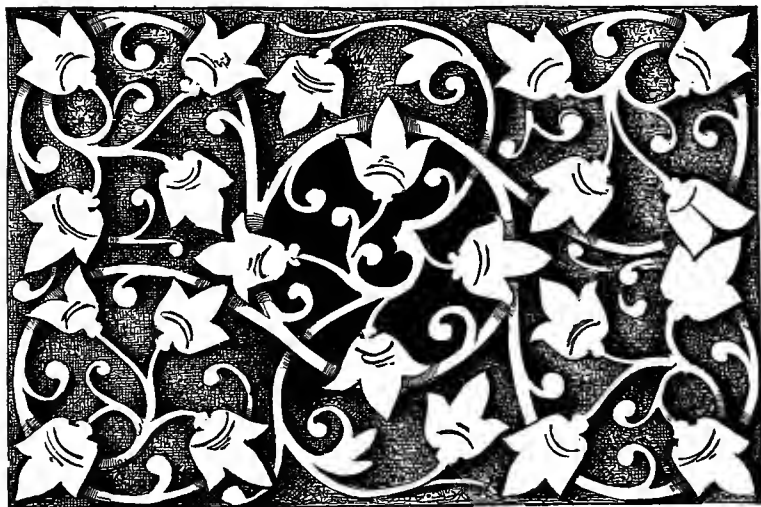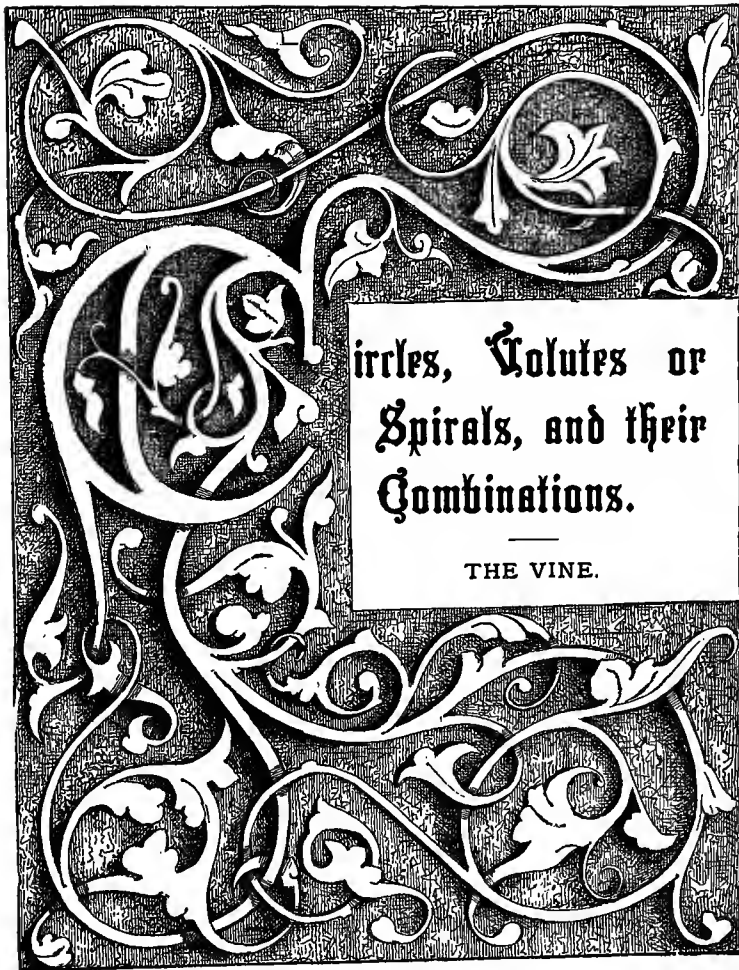
Circles, Volutes or Spirals, and their Combinations.

THE VINE.

PREPARATION FOR DRAWING.

BY Design we mean the invention or composition of patterns,
by Drawing the art of executing or setting them forth. Many
persons confuse these terms ; in French there is but one word—
dessiner—for both. And even among those who do not fall into
this error comparatively few have reflected that there may be a
very easy first stage of designing simple outline patterns, from
which, if thoroughly mastered, the pupil may without difficulty
advance to the execution of beautiful and original work. Any
person who can learn to write can also learn to draw ; it is never
too late to do either, but the earlier one attains proficiency the
greater is the ease of execution. According to the system taught
in this work, *design* and *drawing* are learned together. By means
of it children of ten or eleven years of age, or even younger,
have been able after a few weeks' practice to produce good
working patterns fit to be put in hand, and worked out in wood,
metal, mosaics, carpets, &c.

It has always been usual to begin instruction in Drawing
with straight lines and their combinations. But it is much
better, and in the end very much easier, to commence with
circles and curves. The proportion of pupils who could draw
circles very well indeed if they began with them, as compared
to those who ever learn at any time to do so, is very small. He
who can make a circle can in a short time draw or design with
far greater ease than from any other beginning, because all
curves are for all practical purposes composed of parts of
circles. By a very simple combination of the parts of a circle

we can produce all the lines found in plants and animals. And for a beginning in *Design* it is best to bear in mind and perfectly understand the Vine, or Bine, or Creeper, because it forms the *motive* or principle of a great proportion of all the best decorative ornament known.

Let the beginner be provided with a drawing-pencil, H B (or Medium) or Hard, a piece of fine sand-paper on which to sharpen the lead when it dulls, cartridge or drawing-paper, a piece of india-rubber, a pair of compasses, and a common foot-rule marked into divisions.

To learn to draw lines accurately and with ease, and to obtain full command of the pencil and familiarity with it, the following rules should be observed :—

I. In sitting, rest on the body, and do not throw all its weight on the arms or elbows. In case of weariness, it is better to learn to rest on the left fore-arm ; the right arm and hand should be trained to be free as possible.

II. If the pupil rests his weight on the right fore-arm or right elbow, he cannot draw a circle or pattern of more than two or three inches in diameter. If—as most beginners do—he throws the weight of the body on the wrist, this circle cannot be larger than a penny. To increase its size the hand is rubbed along, which produces a cramped and petty style. Left to themselves beginners invariably design minute ornaments and diminutive leaves or flowers.

III. Draw from the shoulder as much as possible, and exercise freely at the black board with chalk.

IV. Learn to draw large and full patterns. It is very easy when this can be done to descend to minute work. But it is very difficult for designers accustomed to petty work to execute bold, vigorous, and large sketches.

V. Draw lightly—as lightly as possible—in making the first draught. Then it will be easy to erase with the india-rubber.

VI. Use the rubber freely. It is absurd and impossible to suppose that pupils can be taught to *design* so accurately as to hope to dispense with it. Those who constantly strive at an early stage for such accuracy, become cramped and timid in their design. The sketches of all great artists show that they altered and drew again and again. If the pupil exercises care and takes due pains, he will draw all the better and more confidently for knowing that inaccuracies may be corrected, and improvements be introduced.

VII. Take the utmost pains to master the first lesson. The more the pupil works at it the easier will the next be, and if the first five or six are practised, reviewed, and understood to perfection, he may be assured that in a very short time he will be able to produce beautiful examples of decorative design.

LESSON FIRST.

DRAWING CIRCLES.

TAKE a pair of compasses with a lead pencil on one point, and draw a circle. Then reducing the sweep a little, make inside the outer circle another. (Fig. 1.) This double line is supposed to be a vine with the ends joined. Draw it a number of times of different sizes, and with the utmost care and accuracy.

Then ruling a square very lightly, draw within it and without compasses a circle, by freehand. (Fig. 2.) Yet again, rule two intersecting crossed lines of equal length at right angles, so as to form a cross or an ×, and draw a circle touching the tips (Fig. 3). Finally, draw circles by freehand alone of different sizes. If the pupil cannot by the second lesson draw a circle fairly well, then let the second be devoted to the same work, and even a third, for it is in the ability to do so that the real secret of all designing lies, and he who can

PLATE I.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Circles. With and without the Compasses.

execute it with confidence and ease will master design with no difficulty.   It is a good practice to make a circle with compasses and to draw others near to and round it.

It is generally supposed that to draw a circle accurately by freehand is a very difficult thing, and to prove it many tell the story that a great artist named Giotto once, instead of leaving a card or his name, drew one so perfectly that it was at once understood that he must have been the caller, since only a very great artist could have done it.   Hence the saying, " Round as the O of Giotto."   It is probable that Giotto had devoted some days or hours to perfecting himself in this work.   And if the pupil will give his or her will or attention to it, and resolve earnestly that the skill to draw a good circle shall be acquired, it will be.   And anyone who can draw an O or a spiral can draw *anything*.

LESSON SECOND.

DRAWING DOUBLE LINES.

ASSUMING that the pupil can now make circles without difficulty, let him practise the drawing and *doubling* of semi-circles, and three-quarter circles.   Then let him draw a three-quarter circle, three inches in diameter at least, and within this another line close to it, as in Fig. 4.   This line *gradually* approaches the other so that when finished the two may be said to represent the stem of a water-lily, or a slender serpent from the middle to the tail, or a vine.   Let the beginner practise this in three-quarter circles of different sizes, for the second lesson.   And if he will take pains to practise drawing circles by freehand for a few days, at intervals, until he can execute them fairly well and easily, he will have mastered the greatest difficulty and got over the first step in Drawing.
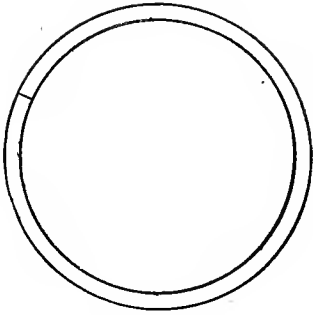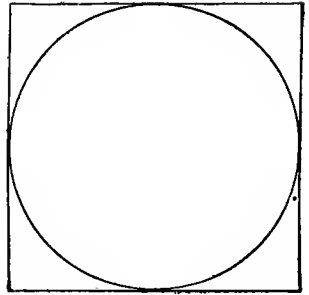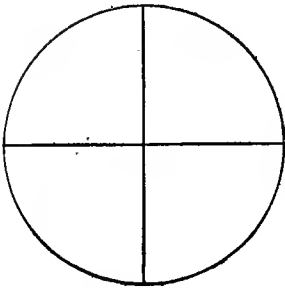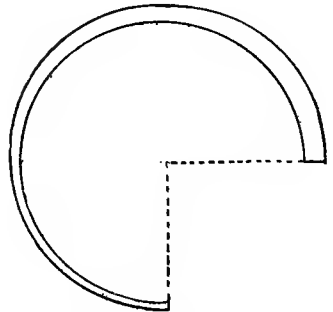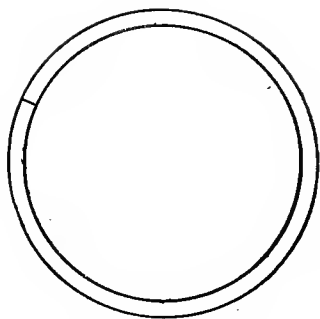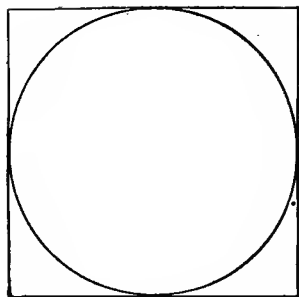
PLATE I.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Circles. With and without the Compasses.

execute it with confidence and ease will master design with no difficulty. It is a good practice to make a circle with compasses and to draw others near to and round it.

It is generally supposed that to draw a circle accurately by freehand is a very difficult thing, and to prove it many tell the story that a great artist named Giotto once, instead of leaving a card or his name, drew one so perfectly that it was at once understood that he must have been the caller, since only a very great artist could have done it. Hence the saying, " Round as the O of Giotto." It is probable that Giotto had devoted some days or hours to perfecting himself in this work. And if the pupil will give his or her will or attention to it, and resolve earnestly that the skill to draw a good circle shall be acquired, it will be. And anyone who can draw an O or a spiral can draw *anything*.

LESSON SECOND.

DRAWING DOUBLE LINES.

ASSUMING that the pupil can now make circles without difficulty, let him practise the drawing and *doubling* of semi-circles, and three-quarter circles. Then let him draw a three-quarter circle, three inches in diameter at least, and within this another line close to it, as in Fig. 4. This line *gradually* approaches the other so that when finished the two may be said to represent the stem of a water-lily, or a slender serpent from the middle to the tail, or a vine. Let the beginner practise this in three-quarter circles of different sizes, for the second lesson. And if he will take pains to practise drawing circles by freehand for a few days, at intervals, until he can execute them fairly well and easily, he will have mastered the greatest difficulty and got over the first step in Drawing.
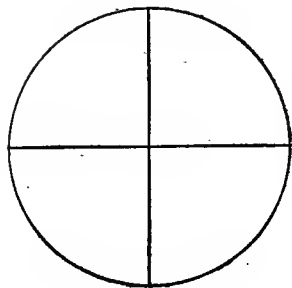
PLATE II.

Fig. 5.

Fig. 6.
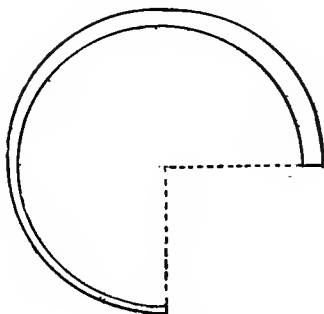
(10)

LESSON THIRD.

PARTS OF CIRCLES BRANCHING ON A CIRCLE.

DRAW a circle, as in Fig. 5, and at four equi-distant points out-side, four smaller circles of half its diameter just touching it. Now, regarding the larger circle as a trunk or central vine, make of each of the four circles a branch or shoot growing from it and gradually diminishing. See that each of these smaller circles is about two-thirds or three-fourths of a circle. Erase the remainder with rubber. *Be careful that all grow in the same direction.* Beginners generally make mistakes in this. In all design of this kind, the law of growth or of organic development must be strictly observed. These branches which shoot off from the circle-stem are called Tangential, or touching, curves.

The pupil may now take the same design and draw a similar three-quarter circle off-shoot inside the greater circle (Fig. 6). Smaller branches with a diameter half the size of that of the four outer branches, may be added between them. If all these branches *balance* one another ; that is to say, if they are placed equi-distantly, and in due proportion, it will not be possible to make a design of which the general form or "construction line" will not be absolutely perfect. For it is from this ideal arrange-ment that growth begins. And the perfection or accuracy may be maintained to a very great degree in the most varied and complicated designs, if we bear in mind the legitimate develop-ment of this beginning.

In working on this exercise the pupil may instead of four out-side branches have two or three, or five, or six or more. The number of the inner offshoots may also be varied, only let him observe that all must *balance*, or be placed at regular distances.

LESSON FOURTH.

THE LINE OF BEAUTY. MAKING VINES.

IF the pupil will draw half or two-thirds of a circle, and then add
half a circle to its end, turning in a contrary direction, it will
make a letter S.   Now the central part of this curve or S forms
very nearly (or near enough for illustration and practical use),
the so-called Line of Beauty, which is found wherever organic
life assumes graceful forms and lines.   Now if we take the last
design (or Fig. 6), and add *to the ends* of the four circles out-
side and the one inside, four more equal semi-circles, or three-
quarter circles, or smaller curves if we will, we shall form S's or
lines of beauty, and these may be made to grow to a greater or
less distance, and if we choose to *cross* the other parts of the
design, however we do this we shall still be sure to have an
elegant and correct general design.   All of this can be laid out
or planned in the first place with a pair of compasses, or ever
with coins of different sizes.

Beginning with a circle (or half-circle) to start from, any
number of circles may be drawn touching it, or one another;
and others again may be drawn outside, just touching these, and
so on.   Then all of these circles may, with the greatest ease, be
made into one vine consisting of half, or three-quarter circles,
the remaining half or quarter of each to be rubbed out (Fig. 6).
The beginner must bear it in mind that if the central doubled
circle, on which the first branches grow, be, let us say, one inch in
diameter, the branches must be of about two-thirds of an inch
in thickness next the trunk, while their offshoots in turn must
be two-thirds of their size at the same place.   By a little study
and practice of what has thus far been laid down, the student

can have no difficulty in producing the construction lines of beautiful and greatly varied designs by simply developing vines in the manner here indicated.

LESSON FIFTH.

THE SPIRAL OR VOLUTE.

IN the previous lessons the pupil has been taught how to draw circles and parts of circles, and how to connect them so as to form graceful vine-like outlines. He will now come to the only great remaining difficulty in simple outline decorative design. This is to understand and how to draw *a spiral line*. This is called a spiral, volute, or helix line (*helix* being the Latin for a snail), because its twist is precisely like that of the gradually expanding line of a snail's shell, which rolls out from a dot or point in a curl or twist, growing larger towards the mouth.

There are geometrical rules or laws for drawing an approximate spiral, as, for instance, by connecting certain gradually expanding distances indicated by points with semi-circles (Fig. 7). But as savages and children of eight years of age find no great difficulty, with a little practice, in drawing spirals or volutes by eye alone, the best way is to simply attempt them by free-hand. And as for a long time no spirals of more than two or three involutions will be required, the simple rule of drawing as well as one can in semi-circles, will be found to be all-sufficient.

Of the three methods indicated by the three diagrams in Fig. 7, Nos. 2 and 3 are theoretically, perhaps, the easiest for those who expect to construct every volute by rule. But those who practise drawing by free-hand and construction by eye, will, when a little guidance or help to an unusually involved

PLATE III.

No. 1.   No. 2.   No. 3.

Fig. 7.

Fig. 8.

(14)
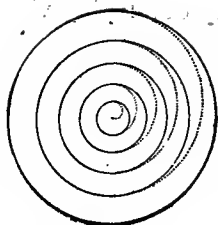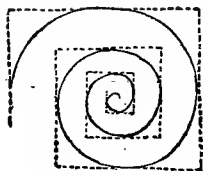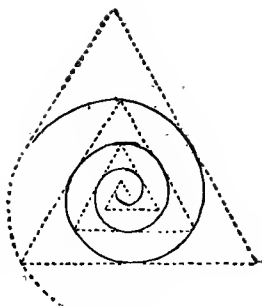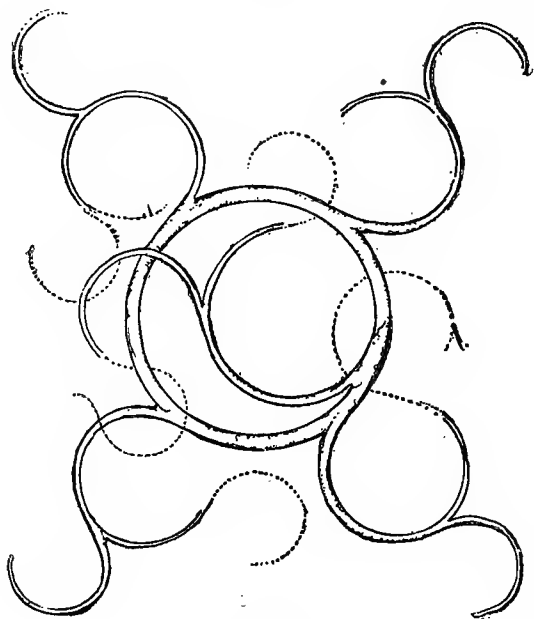
spiral is required, find that circles at the necessary distances are by far the most conducive to graceful and rounded designs. But as the volute or spiral forms the great principle of all organic form, everyone should try to master it.

Now if the pupil can draw a spiral curve formed of only four or five semi-circles, every successive one twice the diameter of the one preceding, as shown in Fig. 8, and if he will copy this figure until he can draw it from memory, he will have mastered all the difficulties necessary for designing the most beautiful, elaborate, or apparently difficult patterns in decorative design. That is to say, he can do this if he has learned to readily execute all that is taught in the preceding lessons.

To draw Fig. 8 we begin by making a central circle, with four or five circles touching it at equal distances on the outside, or crossing it (indicated by dotted lines in Fig. 8), and two inside. Double the lines in the proportions of gradually diminishing water-lily stems. Small off-shoots or twigs, consisting of quarter or eighth parts of a circle, may be added to these in almost any place, but not, at first, in profusion. Draw only a few, as shown in Fig. 8, and be careful that they balance one another—that is, do not place them at unequal distances. Then change every curve to a spiral or volute. Of course the distances between the circles (or curves) can be enlarged or diminished.

If the pupil finds it difficult to master the volute or spiral by simple free-hand, let him practise it with the circles, triangles, and squares. As soon as the eye shall have become familiar with it and its gradually expanding proportion, the hand will find it easier to form. As this is the one great difficulty in designing, let the pupil go no further till he can draw it with ease. He who can do this can draw anything, and any child can do it who will try.

PLATE IV.

Fig. 9.
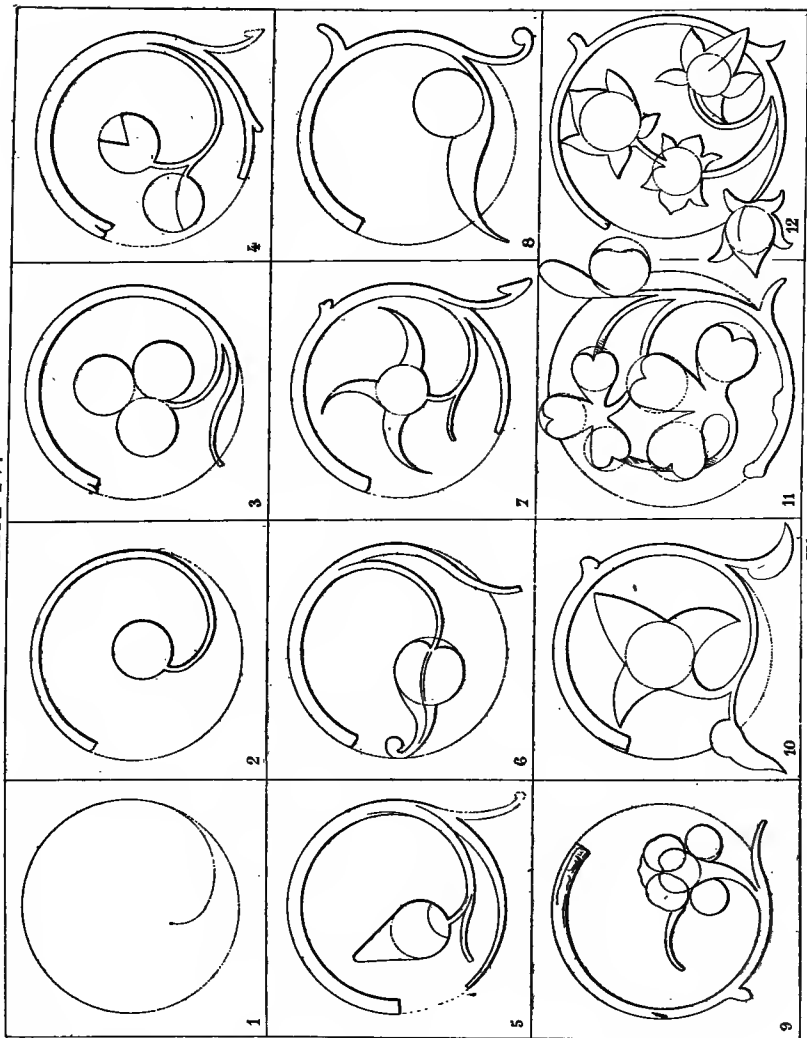
LESSON SIXTH.

ORNAMENTS.

IF we regard Fig. 8 as a vine with a regularly diminishing stem, all of its offshoots diminishing in the same proportion, it is evident that all it needs is to add leaves and flowers to perfect it. These are the *ornaments*. The flower which is placed at the end of a stem or offshoot is called a *finial*, because it ends it, from *finis*—the end. They may also be called *terminals*.

The simplest ornament or finial is a round ball, made by the end of the spiral abruptly turning round into itself in a small circle. Or we may add two more balls of the same size. (Fig. 9, Nos. 2 and 3.) All of the ornaments necessary for the beginner to learn may be made from a ball or circle. In Fig. 9, No. 4, the finial is a circle in which two lines radiating from the centre make an angle. This indicates a partly-opened bud. The small ornament closely adjoining it is a half-circle.

By studying the ornaments in Fig. 9, it will be seen how by a simple addition of two or three lines or semi-circles, the ball may be varied into several ornaments. These should be drawn on a scale of four inches diameter in black or red paint in outline, as here given, and hung up in the school, so that they may be distinctly seen from any part of the room, that pupils when they wish for ornaments in their designs, may have suggestions before them. It is advisable to do the same with all the figures in the whole course, as it will save a great deal of time and trouble to the teacher. The painting some in black and others in bright red, gives a more striking relief than if all were executed in only one colour.

Ornaments may consist of any simple flower or bud (conven-

C

tionalized), the spots of a pack of cards, &c., but the most effective design is made with the simplest finials.

Let it be closely observed that to make any one of these ornaments, firstly, the large outer circle must be drawn. Secondly, the small enclosed circles, or balls. Thirdly, that in Nos. 6 and 7 one side of the leaf, beginning at the stem and proceeding to the point, forms an S, or "line of beauty," while the other side is simply a portion of a circle. All designing of conventional leaves and flowers may be reduced to these principles. The ornament may be first drawn in light lines with lead-pencil, and then re-drawn with a pen. The best pen for this purpose is "Gillott's No. 303," or for the finest lines No. 179. The ink should be liquid India ink. That made by E. Wolff and Son may be specially commended as not being liable to grow thick or gummy. The dotted lines which are not to be inked are to be erased with india-rubber. The pupil who will carefully study and copy all these ornaments will find no difficulty in mastering all the floral ornaments in such works as those of Hulme or Collins.

The teacher should at this stage see that the pupils do not attempt to invent new ornaments. All beginners err by believing that the ornaments form the chief portion of the design, and devote themselves chiefly to elaborating them. In fact, the construction line is—or ought to be—nine-tenths of the whole conception.

Always first draw the vine, with all its branches, very carefully. The ornaments should be simply balls, very lightly indicated. When all is completed, the balls may be altered to other forms.

It cannot be too earnestly urged that all the lessons thus far shall be learned perfectly. If this be done, all that is to come will be very easy.
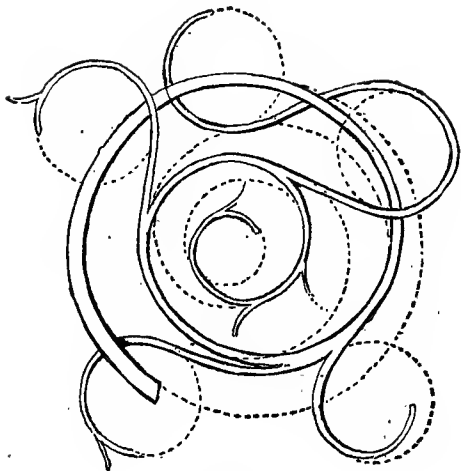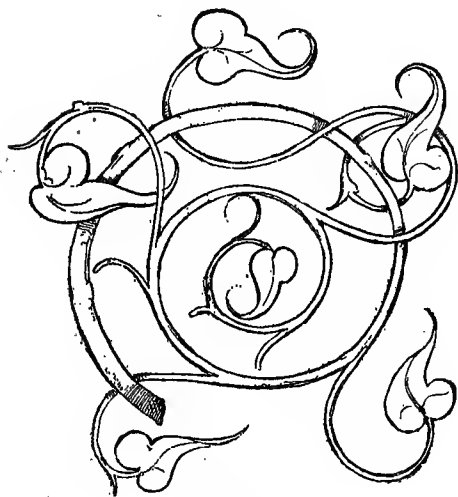
PLATE V.

Fig. 10.

Fig. 11.

LESSON SEVENTH.

THE SUBSTITUTION OF ORNAMENTS.

LET the pupil now draw Figs. 10 and 11. It may be observed that it should be executed on a circle of from four to six inches diameter. Then draw it again, but with a different ornament, and repeat this until all or several of the ornaments shall have been applied. All should be drawn in lines of uniform thickness, with no attempt at special effect or shading. The time has not as yet come for it. When he can execute it well by copying from the pattern, let him draw it from memory. Should the pupils be very young, or slow to learn, this may be made the subject for two, or even three lessons. The time will not be lost if the result is achieved. Fig. 10 is the construction line of Fig. 11.

LESSON EIGHTH.

DRAWING VINES WITH ORNAMENTS.

IF the pupil has perfectly mastered and is able to execute with ease all the previous lessons, he certainly understands that circles placed together in regular order, no matter how few or how many they may be, can be converted into a vine with spiral off-shoots or curving sprouts of less than a circle, and clad with leaves and flowers, that is to say, with *ornaments*. Let him now copy Fig. 12, first of all executing the circles on which it is constructed. These are, 1st, the great central ring or trunk ; 2nd, three circles of three sizes, all entirely within it ; 3rd, five circles crossing it, each half within and half without it ; 4th, eight circles on the branch to the right, and as many on that to the left. It
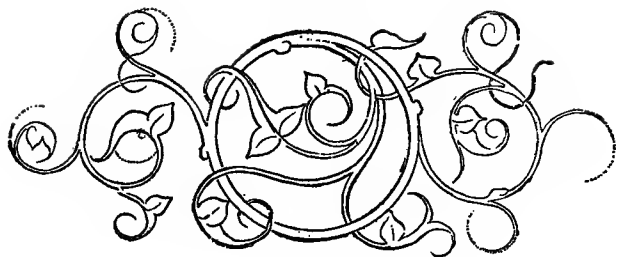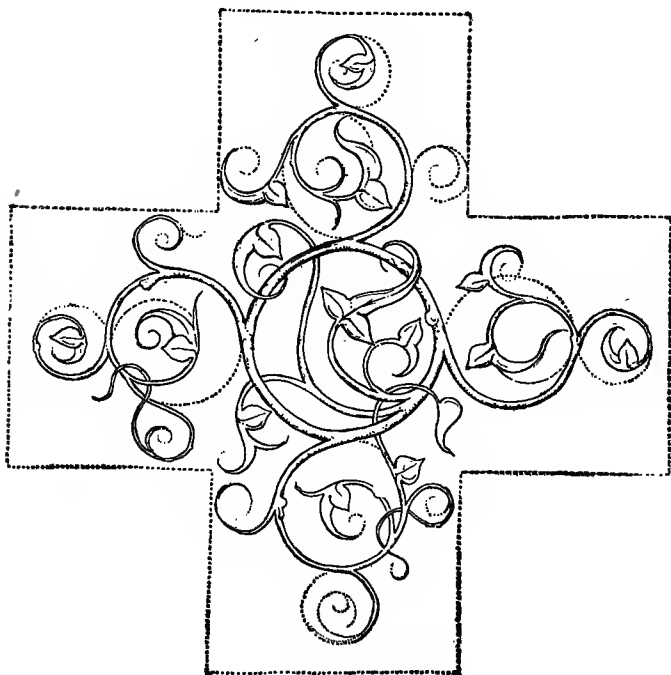
PLATE VI.

Fig. 12.

Fig. 13.

is to be supposed that the pupil by this time understands how to put circles together in some order, and also that the ends of the vines be made to assume a graceful, capricious, and "free-hand" appearance by converting them into an S,—that is, by adding semi-circles to the end. Great vigour and increased beauty is obtained by making these branches cross the other branches, or the trunk. Hitherto the pupil has been taught to turn circles just touching one another into vines—now he may combine intersecting circles with these, lying across each other.

LESSON NINTH.

ADDING BRANCHES TO BRANCHES.

IT may be that the teacher has a class of small children, who require two, or perhaps four times as much instruction as older ones, and there are also grown-up people who experience great difficulty in familiarizing their fingers with the pencil, and their minds with even the simplest problems of design. For such an easy method may be adopted, which, as will be seen, leads them at once to the subject of this lesson—that is, the art of combining ornaments into a pattern. Let such a pupil take an ornament, for instance, No. 3, Fig. 9, the simple clover-leaf, and drawing it of two inches diameter, *cut* it very carefully out of card-board, though thin brass, copper, iron, or wood, is better. Now by lay-ing this on paper, and by drawing round the edges with a pencil, the ornament is made. Turn the pattern round on the other side, and placing it adjoining the first, it will make an S offshoot. Keep doing this, and one can make a straight line of ornaments, or a circle, or else fill any space with them. It is just as if a child were to be given twenty leaves all alike, and told to range them in any given order, so as to look as if they were growing

out of one another. That is to say, the pupil may, instead of one, cut out twenty ornaments, and arrange them in the order of growth. *Vide* Figs. 14 and 15 for illustrations of ornaments set together. By such simple practice any beginner soon acquires some ideas of design, and skill with the pencil, and is, so to speak, prepared to begin to draw properly. This, which is a kindergarten or infant-school method of design, will not be needed among pupils of more advanced intelligence. It illustrates, however, to perfection the first step in composition and invention.

Now, if the advanced pupil who has worked thus far will draw once more Fig. 12, and then add either its right or left side branch to the top and bottom of the central circle (taking care that all grow in the same direction), he will have Fig. 13. And the doing this is just what the child does when he puts his cut-out patterns one to the other, so as to produce a new growth. And if the advanced pupil chooses, he may keep putting this branch again to its own end, only observing that he must turn it round to make an S, and this may be kept up as far as one chooses. It may now be observed that Fig. 13 would exactly fill up a cross or square. To make the ends of the cross longer, to any extent, we have only to draw more circles, fill them with spirals and ornament, in short, draw the ornament as if growing out of itself, but reversed. Having made this ornamented cross, draw it again, but using another ornament. The pupil now knows how to fill up a cross with a decorative design. He has learned how to draw a circle, to add branches to it right and left, above and below, how to convert them into spiral branches and add to these ornaments. And he knows how to extend or expand this growth and ornament to any space.
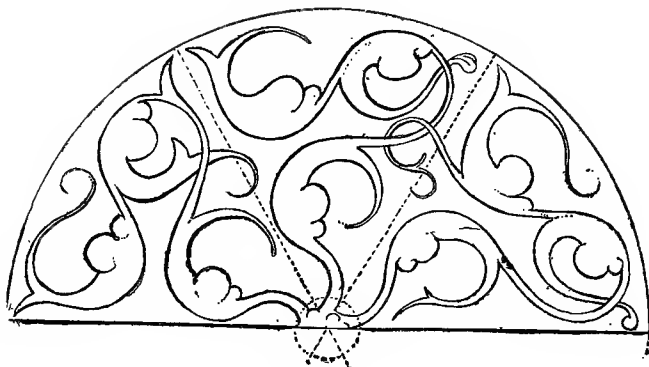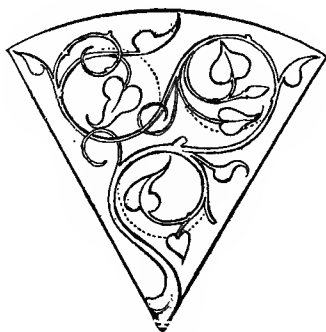
PLATE VII.

Fig. 15 *b*.

Fig. 14 *a*.

LESSON TENTH.

SPACING.

In Lesson Ninth the pupil was taught how to fill up a cross
with a design. *To fill any given space accurately is called* SPACING,
and there are many schools of design where even the teachers
are ignorant of its principles.

Let us suppose that we wish to exactly cover a *fan* with an
ornament. We draw a circle and subdivide it into six parts.
Take one of these sixth parts (Fig. 14), and fill it with as many
circles as will fit into it (*i.e.,* 3). Then convert these into a vine
with off-shooting spiral branches and ornaments, as shown in
Figs. 9, 10, 11. Repeat this as in Fig. 15. This amounts, in this
instance, as there is no long extent of mere stem, to simply
putting three spiral ornaments together in the order of growth,
as the young pupil was taught to do with the cut-out patterns in
Lesson Ninth.

Observe that at the point or base of the fan the vine begins
from a knob. This is *the* ROOT. Now we may draw two of
these fans together. Three will make a semi-circle, six a full
circle. (Fig. 15 *b.*) In thus combining them, make the vines grow
from one root. In this exercise, as in all others, draw the pattern
several times, changing the ornament every time.

Another way to space or fill up a circle is to take a cross-
decoration (such as Fig. 13), draw a circle round it, just enclosing
it, and fill up the spaces between the arms of the cross with off-
shooting spiral branches and ornaments. Rub out the cross, and
we shall have a circular design. Let the pupil do this without a
pattern. (Fig. 16.) Draw Fig. 16 with ornament different from
that which is given here.

PLATE VIII.

Fig. 16.

LESSON ELEVENTH.

TO DESIGN A BORDER.

A BORDER is like a band filled up with ornament. It may be of any breadth or length. As its ornaments, be what they may, are generally repeated at regular intervals, it follows that a wave-line, or one composed of semi-circles joining like ∪⌢∪⌢ might wind round and include them.

Draw two parallel lines, or borders, Fig. 17 *a*, and then a third very lightly in the middle between them. Take the compasses and draw a semi-circle, which, if continued, would just touch, in a circle, the two other lines. From the other side inscribe another semi-circle just joining this. Continue till a wave line of the required length is formed. Double this line to make a vine. Fill it with spiral branches and ornaments growing in proper order (Fig. 17 *b*). The teacher should take great care that the pupils understand this, else they will be sure to make some grow *up* the vine and others *down*. By adding new spirals or parts of circles to the spiral branch inside every wave, and making them run over and curl round into the next semi-circle, beautiful and varied effects may be produced. Let the pupil, for an exercise, draw the circles on which Fig. 17 is based.

In drawing a wave-line to surround a square frame, begin by dividing it into exact squares (Fig. 17). If the vine is to have a root, or a beginning, as in Fig. 15, the number of these squares on two sides of the frame should be *unequal*, and the root be placed in the centre square. Unless this is done there will be a different direction to the curves in the corners. From the root a growth is sent out to either side which may turn the corners and go down to the centre of the other sides.
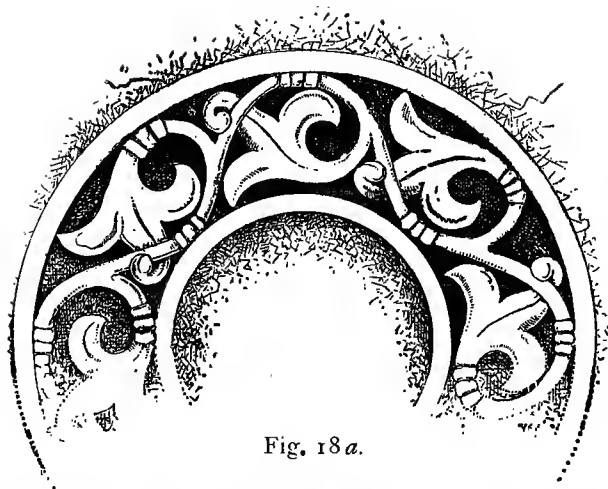
.
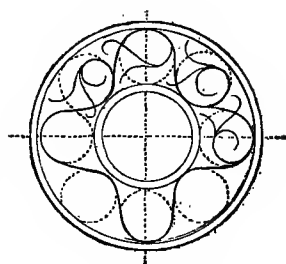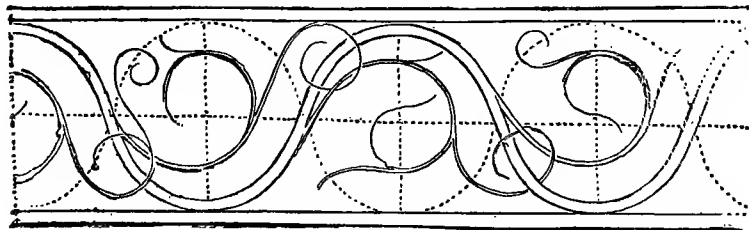
PLATE IX.

Fig. 18 a.

Fig. 17 b.

Fig. 18 b.

Fig. 17 a.

All borders need not be drawn in this formal manner, but in this way a beginner may make a simple and correct pattern of one. It is something when one is ignorant to know how to go about anything by rule. Variations may be introduced after-wards to any extent.

In this lesson we may include circular borders. Draw two circles one within the other, two or three inches apart, the diameter of the outside circle being from twelve to fifteen inches. Divide these with a ruler and pencil into equal sub-divisions or "squares." They may be longer, say a square and a half, construct the wave-line and fill up as before. As this is puzzling or difficult for young pupils, the teacher would do well to show them how to execute it (Fig. 18 *b*).

LESSON TWELFTH.

HOW TO DRAW A VASE.

TAKE Fig. 19. With the compasses draw a circle, B, C, from A as a centre. Draw a line through it vertically or "up and down," continuing it downwards to H. This outside distance is half a diameter of the circle, or as far as from A to C. Then draw a line, D, E, which is also half a diameter in length. At the distance of one-eighth of the diameter draw F, G. This will make the base of the vase, or D, E, F, G. Connect the ends with two small semi-circles. Draw lines from B to E, and from C to D. Now take the compasses, and make a circle which can be exactly formed (or "inscribed") within one-fourth of the large circle. This will be the *centre line* of the handle. The handle consists of two lines outside of this central line. It is the root or begin-ning of the vine. Continue it into circles, as in Fig. 11, forming the vine and its branches. Then affix the ornaments. Draw at
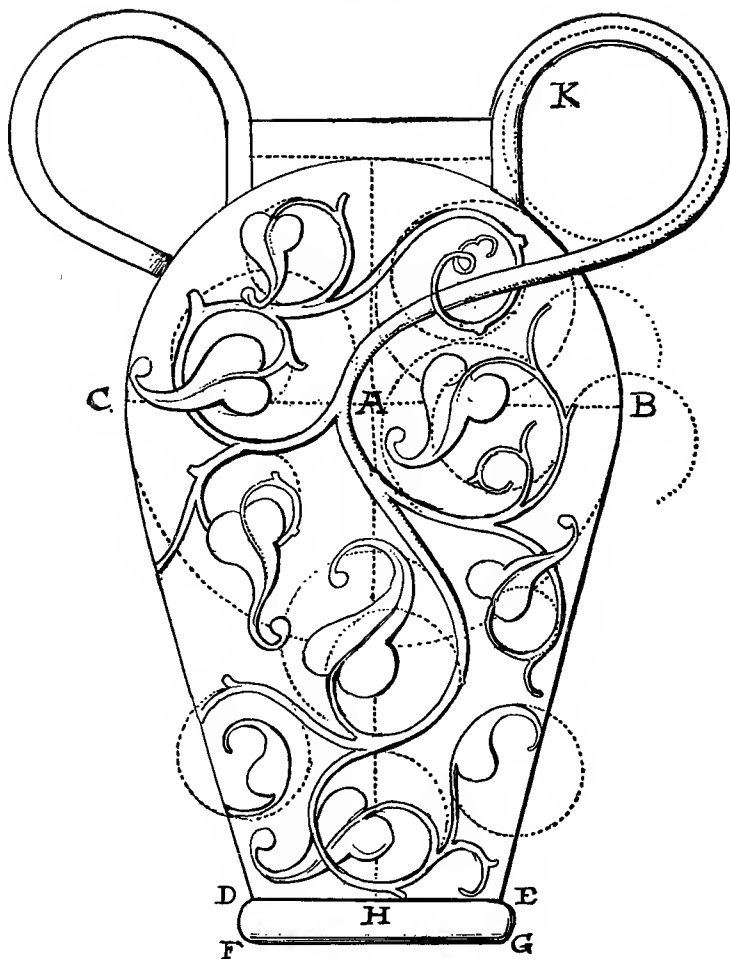
PLATE X.

Fig. 19.

(30)

the top two parallel lines corresponding to the base D, E, F, G. Make a handle on the other side, equal to the handle K. It is not to be understood that all vases are to be drawn or ornamented in this manner, but it is a good beginning for a pupil to know how to draw *one* correctly.

It may be observed that the general shape of a vase corresponds to that of an egg. This also gives a good rule of proportion for the type on the title-page of a book, or for a pair of bellows.

The teacher may draw the outline of *a pair of bellows* by this figure, or copy the outline of any vase, pitcher, cup, plate, frame, panel (*i.e.* a square or double square, or brick), oval waiter or an artist's palette for paint, and require the pupil to *space* it with circles of different sizes, and make them into an ornamented vine. There should be in the school a large portfolio in which any designs, ornaments, or outlines may be kept. By referring to these for suggestions, the pupils will be greatly aided. Those who are dull or slow in learning may be set from time to time to simply *copying* designs, and then be required to vary them by rubbing out the ornaments, and putting others in their place. They may also be trained in adding circles to vines, and converting them into spirals and ornaments. Some children develop skill in designing long before they can draw well, while others, on the contrary, can draw, but are slow in invention. But all are sure of success by application.
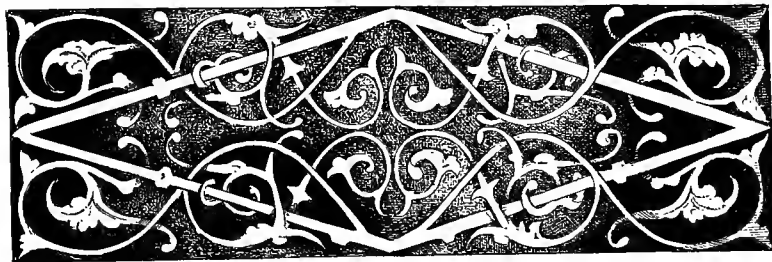
PLATE XI.

Fig. 20.

(32)

LESSON· ·THIRTEENTH.

ROOTS.

WHEN we draw a spiral and turn it into a vine, it follows that
it must begin from a root, and it is often awkward or ungraceful
to have this root, or " butt-end," or beginning in sight.   To
obviate this, artists have had recourse to many devices.   Some-
times they assume that the border, or frame, or edge, which fre-
quently surrounds a pattern is a trunk, and make the vines or
spirals grow out of it all in one direction.   In Figs. 5, 6, 8 we
have a round border, with branches growing from it.   The pupil
may now draw a square or six-sided border, with all the branches
inside it.   One exercise on this lesson may be to make one, or two,
or three vines fill the space, with or without interlacing or crossing.

Another way to treat the root is, as in Figs. 14 and 15, to
draw in the centre of a circular design a small circle, or knob,
which is assumed to be a root, and let the vines grow from this.
Again this may be a *face*, the ears, horns, hair, mustachios and
beard of which are prolonged and developed into crochets.
(Fig. 20.)   The pupil may also copy this, making the face three
inches in diameter and substituting other crochets, or orna-
ments, or leaves.   Or the face may be omitted and the space
filled in with something else.

Notwithstanding the shading and its apparent elaboration,
Fig. 20 will be found on examination to be quite as easy as
regards composition as Figs. 5 or 6.   It is constructed on a
large central circle at each outer corner of which a smaller
circle is drawn, as in Fig. 6, and to these at equal distances
a few smaller rings are added.   If the pupil objects that
the general conception is the great difficulty, let him remember

D

that this general conception, with the lines of the beard and mustachios, &c., was repeated tens of thousands of times by the artists of the Renaissance period, and that if he can simply copy it, but substitute other ornaments, he will soon be able to originate an entire subject. These faces and patterns which seem so original to us were only types or models which were copied over and over again with variations, and if the pupil will execute this face several times and change it a little at every drawing, he will soon know how to make a bold design. This face may be changed to a Tortoise with its four paws and tail branching out into ornaments, or into a fish with branching fins, lizard with its legs and tail spreading into ornaments, or any other animal which will fill the space. Or the centre space may be occupied with initials, or a monogram, or a date, or armorial devices.

LESSON FOURTEENTH.

ROOTS *continued*

WHENEVER it is possible it must be assumed that there is some *idea* in a design ; that it is a vine, or plant, or animal, lattice, or pillar, &c., for when an artist merely fills up a space in *any* way with loose ornament, it is very likely to be without strength or character. Now the root of a design must sometimes be shown, and nothing has taxed the ingenuity of designers more, all the world over, than to do this gracefully. For a root converted into a ball, or a vase from which vines grow, does not look well in vacant space. But when we give it a head with eyes and mouth, however slightly (or *conventionally*) it is indicated, the entire vine and ornaments become a flying animal. The ground may be then assumed to be air, earth, or water. In all ages,

and in most styles of design, this conversion of vines into animals has been done instinctively, not from a mere fondness for monsters, but to intimate a reason or give something like an idea to the design. In Fig. 21 we have a design of this character. As in all exercises, the pupil may draw it, varying the circles or spirals. Every semi-circle in a spiral means a full circle at first. When this is done, substitute other ornaments.

LESSON FIFTEENTH.

THE COMPOSITION OF PATTERNS.

IT is assumed that the pupil by this time understands how, from a given circle, part of a circle, or spiral curve, another part of a circle may grow, either from its side or from its end, turning to an S, and how additions of the same kind may be made to any extent, so as to fill up any given space with a vine, and how to ornament it. What we must now consider is *the manner in which ornaments may be placed together so as to form harmonious designs*.

Firstly, the intelligent pupil, or teacher, should perfectly understand that simple repetition of anything in regular order is the basis of decorative art. This forms *proportion* or *balance*. Even a line or a band drawn round a cup is ornamental, because its every part reproduces or continues the rest of it. So it is with a string of beads or a row of dots or balls. (Fig. 22 *a.*) In architecture and in the decoration of buildings repetition is necessary to secure harmony and strength. But it becomes very monotonous when there is a great deal of it very apparent in *ornament*, and especially where there is much that is florid and in detail. In such cases an improved effect is produced by having every other division *unlike*, as when we see in a row first a face, then a wreath, or first a diamond, and then a circle or egg, and so on. (Fig.
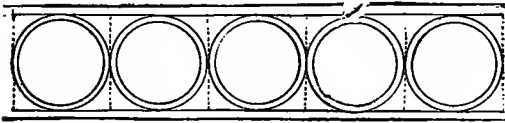
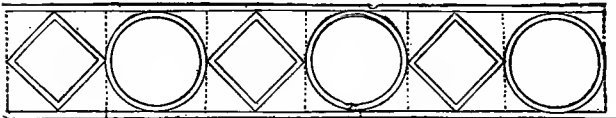PLATE XII.

Fig. 21.

Fig. 22 *a*.   Simple repetition.

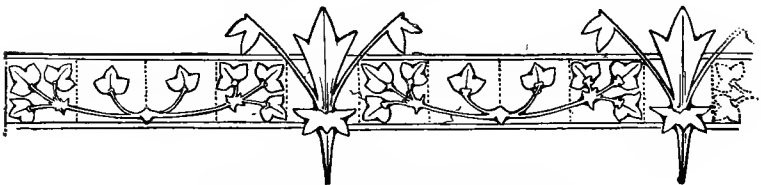Fig. 22 *b*.   Alternation.

Fig. 22 *c*.   Compound alternation.

22 *b*.) *Alternation* may be double, triple, or of any number. It may consist of two or three *small* alternate ornaments, and then one *large* one. (Fig. 22 *c*.) And all this may be in a border, or row, or line, horizontally, *i.e.*, side-ways, or vertically, *i.e.*, up and down. Or it may be in a frame or circle, or in any vine-pattern, and finally it may be found in any kind of design whatever in which the same " units " occur several times. Units are the parts which are repeated.

The principle of repetition is shown when we have rows of squares of the same size, arranged horizontally (side by side), or vertically (up and down). This is the same with circles. But the principle of alternation begins when we make our design on diamonds with the acute (oblong) angles, or corners up and down. (Lesson Twentieth.) So with circles, which, when they are placed with their centres in a line, side by side, and up and down, are simply in repetition, but when so arranged that a third comes in between every two, making a triangle of space instead of a diamond, they are in alternation. (Fig. 38 *a*.)

A great deal of decorative art is wearisome and flat, because it consists of mere repetition. But a little change in a few details will, with very little trouble, give variety and character to any such design ; and what has been taught in the previous lessons leads directly up to this, and qualifies any pupil to do it.

Firstly, as regards repetition, we have seen in Figs. 14 and 15 how easy it is to put three circles together at regular intervals, make them into spirals, and ornament them, and then how the same, Fig. 14, is repeated three times in Fig. 15. The teacher must here explain this perfectly to all the pupils, and exercise them in it.

There is a very large class of designs, as, for instance, those on covers of books or round boxes or in panels, which generally consist of a branch or vine, doubled, trebled, or most frequently repeated four times. When regarded by itself this branch is,
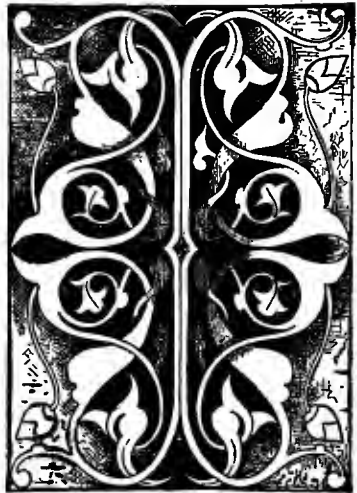
PLATE XIII.

Fig. 23.

Fig. 24.

Fig. 25.

perhaps, not remarkable, but when quadrupled it may become very striking.   There is an article which is not difficult to make or expensive to buy, which should be used by every designer. It is the Folding, or Pocket Kaleidoscope (described by Baptista Porta and Kircher), and can be furnished by any art supplies dealer.   Take two square pieces of looking-glass (or cut any square piece of mirror in two), say six inches by six, lay them side by side, face on the table, and paste over their backs a piece of muslin, which will just cover them and go over the sharp edges. This will be, of course, like the covers of a blotter or album, opening and shutting.   Now if we place this, half opened, up and down on a table, on a design, we shall see the design multiplied and united into a circle.   By opening the glass at different angles it will multiply the pattern from three to twelve times, and by moving it here and there over a large piece of ornamented work, a really infinite number of original designs will present themselves.   No artist's eye is so perfectly trained that he can tell by looking at an ornament, what it, or a part of it, would be quite like if multiplied from three to twelve times, but with this double glass he can determine it in an instant.   When by means of it the pupil has got a design which he likes, he has only to draw two straight lines with a lead pencil on it, along the glass, giving the angle, and he can find it again when wanted.

Now if the pupil will draw Fig. 23, he will find that one fourth of it consists of a vine of two circles like an S, ornamented in a manner which should be easy for any person to copy who has had a dozen lessons.   Repeat this four times, and let the ornament grow out of a straight trunk.   The *root* from which the four vines grow is indicated in the centre.   Having done this, study and copy Fig. 24.   This will be found to consist of the same lines as Fig. 23, the only difference being in the ornaments, those in the first being taken from Old English decoration, while in the second they are Moorish.

The beginner who is learning to draw, should of course form by free-hand all four parts of these patterns. But for the practised and varied artist who may be working in haste, there is a far more expeditious method. Let him draw the pattern on paper with a very soft block pencil (BB, or BBB), and then double it over, lay it on the table (some prefer a blotting pad), and rub the back with a burnisher, or an ivory paper-knife. Open it, and it will be found to be *double.* Touch it up if necessary with the pencil, and double and rub again. In this way the whole outline may be taken very readily and perfectly.

Figs. 23 and 24 are double squares or panels, and the pupil may here observe that this is a shape which often occurs, and that this construction line or pattern shows how it may be spaced or exactly filled up. In each quarter there are two large circles; by making the vine on three or four, or any other number, the entire construction is varied, though the ornaments may be the same. Or the same lines of construction may be retained, as in this case, and other ornaments adopted.

LESSON SIXTEENTH.

VARIATION OF PATTERNS.

MANY persons who can draw the human figure well, or paint excellent landscapes, are often bewildered by complicated arabesques and ornamented interlacings (such as the pupil has been learning to design), and believe them to be beyond their power, when, in fact, anybody who has advanced to this lesson, may make them as apparently difficult as any in the world, yet without a fault. All that is necessary to do is to make a number of circles, adjacent or intersecting, convert them all into a vine, put a spiral into every bend of the vine, turn the ends of

these here and there into "lines of beauty," or the S, and add ornaments. The more circles we have (especially those which intersect or cross), the more intricate the design will be. Or we may draw and cut out from paper a very simple vine indeed, taking care that the branches and ornaments leave wide spaces. Now design another, and lay the first upon it, and fit it in, and if they have been drawn with any adaptability, the result will be in all cases a pattern of a very elaborate and complicated nature, which, with a little alteration and correction, will look very well.

But though artists like to be thought capable of designing elaborate and complicated patterns, it does not follow that it *should* be done to any great extent. When a pattern is so pro-fuse, and its ornaments are so close together that the eye does not at once take in the design, it is *over-done.* This is a very common fault in fashionable wall-papers and carpets, and even the abuse of it has been actually commended by a South Ken-sington lecturer, Mr. MOODY, in his praise of over-worked designs. But *the beginner should never fill up more than one-third or half a space with pattern, nor sacrifice construction lines to ornament.* By following this rule, pupils will acquire a far more vigorous, original, and clear style than if they were to crowd masses on masses together, and so make mere foliage of ornaments.

If the pupil will now carefully copy and study Fig. 25, which is a variation on an ornament in Ely Cathedral, he may observe that the spiral ornaments right and left are alike, but different when taken up and down—that is to say, that though they have the same kind of leaves they are differently disposed. In the original they are all quite alike in every detail, vertically or sideways. As regards the central ornaments, a very little inge-nuity will enable a designer to substitute something for it, such as a row of oval rings, diamonds, hearts, or simple modifications
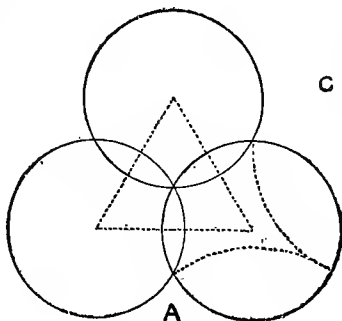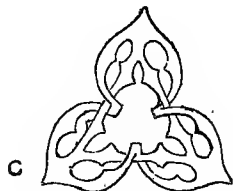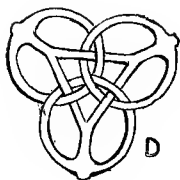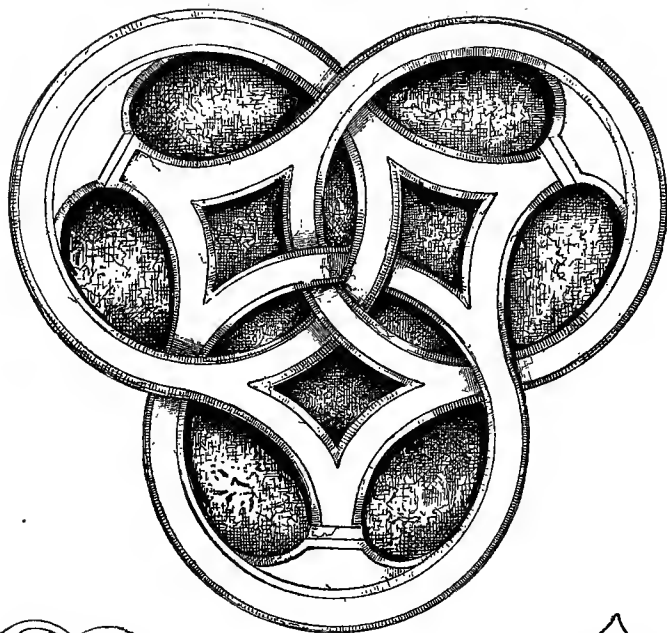
PLATE XIV.

Fig. 27.

of them. Draw a variation of this model, both as regards the vine ornaments as well as the centre.

Let the pupil observe that good designs are based on regular geometrical forms, and on repetition. But even repetition is, of course, more *varied* than one unit, and alternation is an advance in this respect on repetition. Variation of minor details is the next step. And it must not be carried too far at an early stage. Very trifling differences indeed of minor ornaments will serve to convey an expression of originality and freedom to the whole.

The student will design in the most admirably original manner in due time who begins by most carefully mastering Repetition, Alternation, and Variation, according to their rudiments or principles.

LESSON SEVENTEENTH.

SIMPLE GEOMETRICAL BASES.

DESIGNS may be made by taking a simple geometrical figure such as a circle, square, triangle, ellipse or oval, crescent, &c., and repeating them either singly or alternating. *Secondly*, they may be combined, intersected, put on one another, or made to cross. *Thirdly*, they may be used as the frame or scaffold of a design, from which vines or spirals may grow. Fig. 26*a* (page 50) represents the combination of four segments of a circle with an ellipse, Fig. 27 three interlacing circles. Very young pupils should *not* be first of all trained solely to many lessons in mere geometry as a basis for design, a very few simple figures thoroughly mastered will be sufficient for them. Freedom of hand and boldness of invention are generally more or less repressed in the young by their being taught to evolve everything from problems in geometry, and to make mere tile patterns. In the East, as

during the Middle Ages, the boldest and most beautiful patterns were executed or designed in the simplest manner. But for the older or more advanced pupils, the study of geometry as applied to design, is very useful. It is generally forgotten, however, that while geometry lies at the bottom of art, art does not by any means underlie geometry, and that a young pupil trained to rely entirely on the latter from the beginning, very often fails on that very account to produce original and vigorous patterns.

The teacher should now take different figures, as in Fig. 27, and repeat, vary, alter, or combine them, with or without ornamenting. To simply teach the principles of combination they may be cut out of card-board, and disposed of till a suitable pattern is found. Or they may be put together and multiplied with the folding mirrors. It may be observed that flowers, shells, and coloured geometrical figures placed in the mirrors furnish an inexhaustible variety of subjects. But great care should be taken lest the pupil should overcrowd his mind with too many conceptions and too much material, ere he has learned to use it.

It may be observed that an endless variety of beautiful figures or designs may be made out of Fig. 27 alone, by simply rubbing out here and adding there. A little practice in this will greatly stimulate originality and inventiveness. If Fig. 27 be drawn on a scale of about four or five inches diameter to each of its three circles, and the folding mirror be then applied to it at different angles, a number of beautiful designs of different sizes will be shown. This will of itself give subjects to copy and again vary.

Fig. 26*a* is Fig. 26*b* quadrupled by means of the folding glass By applying the glass to it again, a larger series of more elaborate designs can be evolved.

For practice the pupil may here draw triangles and other polygons, squares, diamonds, circles, ogees (the upper halves of semi-circles with points curving inwards), ellipses, and parts of

circles, and combine these. It will not be necessary for the
beginner to learn more than these, nor need he combine more
than two, or at most three such figures to form the skeletons of
good, bold designs. Branches or spirals with ornaments may
be thrown off from these geometrical combinations, as in Fig. 42.
While it is true that every decorative design must have an exact
geometrical base, let it also be remembered that there are
thousands of schools in which children are kept at drawing and
combining simple figures until all their ideas of design are about
equivalent to the art of setting tiles. Children who have been
thoroughly trained for a year or two in mere geometrical drawing
are much harder to teach bold free-hand and circular design,
than the utterly ignorant. The writer has had experience of
hundreds of them, and it was among these and these only that
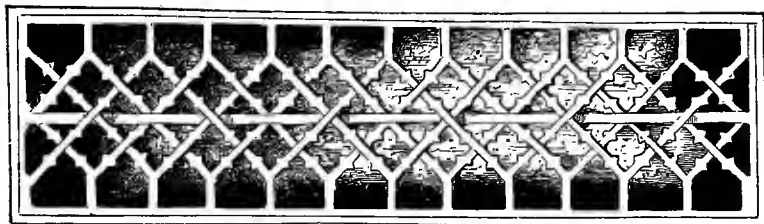he ever found pupils whom he almost despaired of being able to
teach true designing.
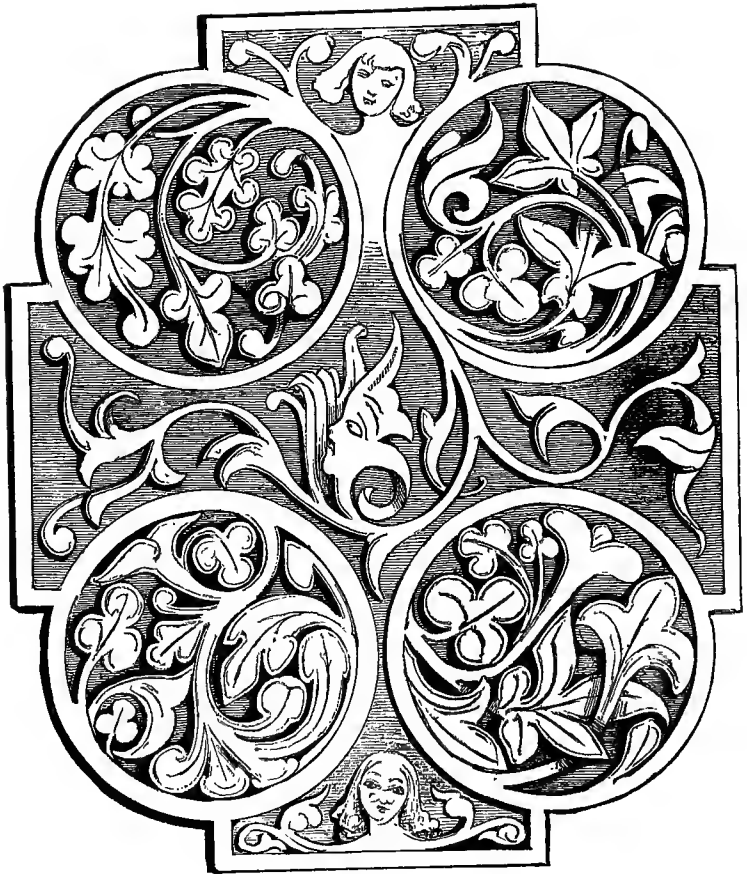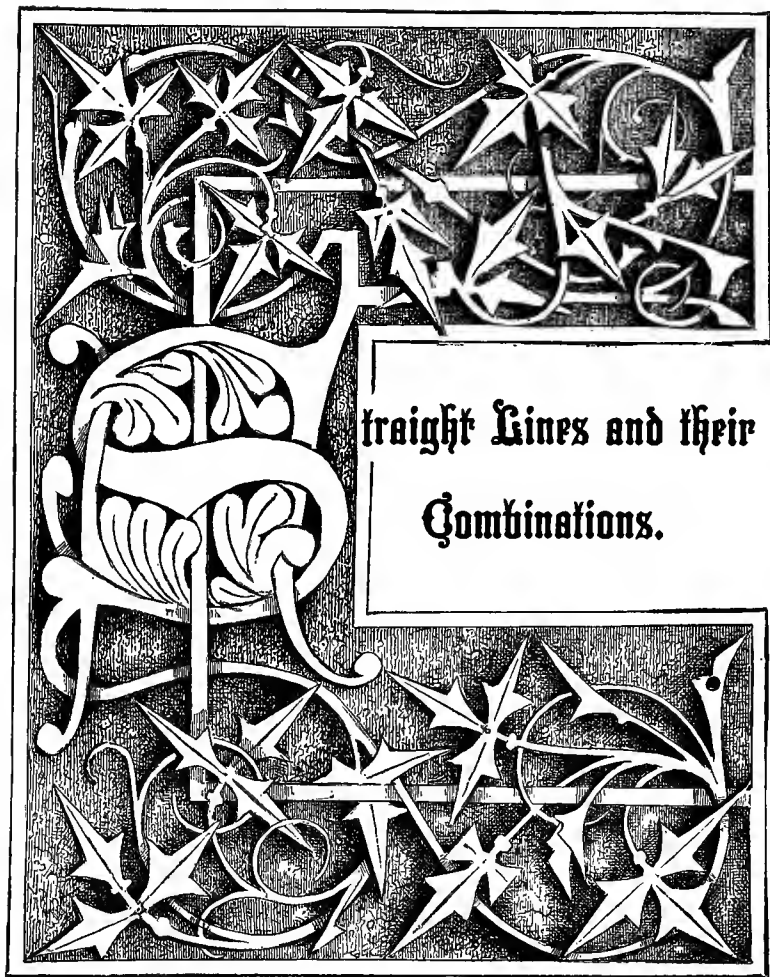
Straight Lines and their Combinations.

STRAIGHT LINES AND THEIR COMBINATIONS.

LESSON EIGHTEENTH.

STRAIGHT LINES.

THE first step in drawing and designing patterns in straight lines should not be to draw quantities of "marks" about an inch or two in length, but to rule a sheet full of lines six inches long, and an inch or two apart, and then cross them with others, so as to make a chess-board. When this can be done accurately *with the ruler*, it may be executed in free-hand, but this is not of much consequence at first. The ability to do so will grow much faster by devotion to design.

By drawing a chess-board, and merely rubbing out the lines in certain places (Fig. 28) an endless variety of patterns may be produced. The pupil should devote at least one lesson, and subsequently a great deal of practice to this subject. The first step is to rub lines out, the next to put them in. He should also experiment on these with the folding mirror.

The next step after dividing and working up the chess-board pattern, is to take two, three, or four lines close together, then draw parallel to them, at some distance, a similar group, and so on. That is to say, we need not have all our lines at just equal distances. This will give a wider field for composition. This makes a *plaid* pattern. (Fig. 29 *a*).
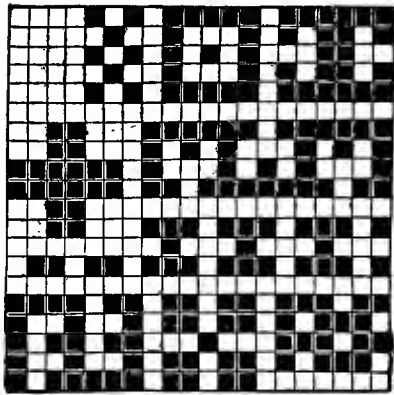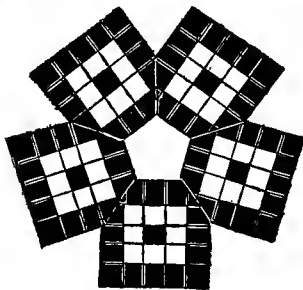
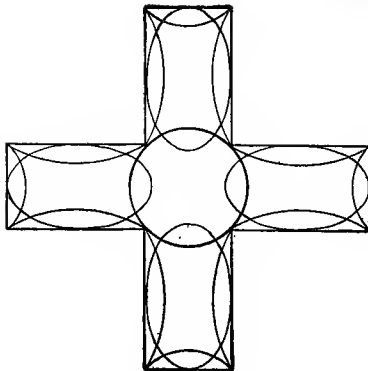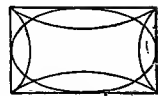PLATE XV.

Fig. 28. *a*

Fig. 28 *b*.

Fig. 26 *b*.

Fig. 26 *a*.

On the chess-board lines we can, by merely rubbing out, make and leave standing by themselves at regular distances, squares, crosses of different shapes, bricks, and other objects. Then we can draw lines between these, or make dots or circles in them at intervals. Or we may have squares and crosses alternate at intervals.[1] (Fig 30.)

It may be observed that the patterns, as in Fig. 30, of lines formed on squares, have a Chinese appearance, and in fact most Chinese furniture and window lattices, &c., display them. This style of design, known as "long and short sticks," has a very curious origin, and a mythical or mysterious meaning. An early Chinese emperor having observed that the lines on the back of a tortoise formed such a design, imagined that the short, or broken, or half lines meant imperfection, darkness, death, evil, pain, &c., while the double, or long, or whole ones meant the contrary. So he made a series of twelve groups of these lines, which his followers believe contains the key to all earthly wisdom. The twelve groups are generally inscribed on Chinese inkstands. Every conceivable ornament which can be made of "longs and shorts," such as those in Fig. 30, are believed to have a meaning, and form, in fact, letters and a mystical writing.

[1] For more detailed and elaborate instruction in straight-line drawing and design, the teacher or student should obtain the invaluable little text book, "The Anatomy of Pattern," by LEWIS F. DAY, author of "Every Day Art:" I have been greatly indebted to it, as well as to FERGUSON's great work on the "Alhambra," for suggestions in this later portion of my book. At this stage of invention it becomes absolutely necessary to have at hand or make some collection of designs, and to have recourse to different authorities to suggest motives or ideas.
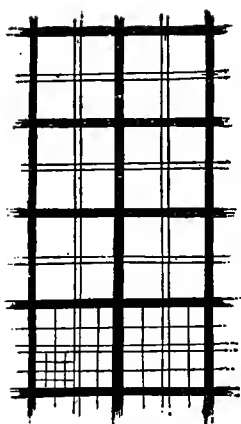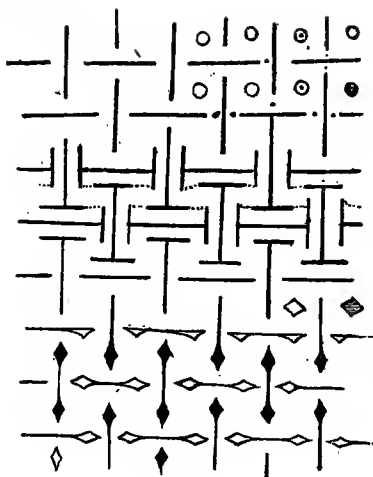
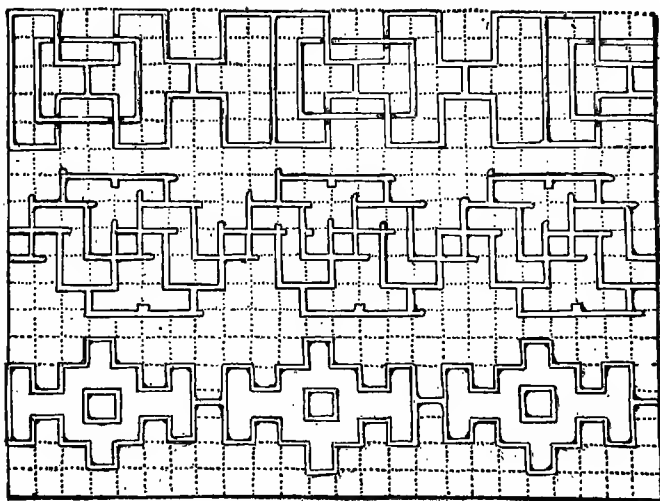PLATE XVI.

Fig. 29 *a*.

Fig. 29 *b*.

Fig. 30.   Longs and Shorts.

LESSON NINETEENTH.

PATTERNS BASED ON TRIANGLES.

IF we take a sheet of chess-board lines and draw other lines over it, but diagonally, right and left, the whole will be changed from squares to triangles. By rubbing out and supplying lines, or by filling in certain triangles at intervals with black, we can now produce an endless variety of diamonds, hexagons, or six-sided figures, octagons and stars, to say nothing of far more complicated and irregular ones. By studying Fig. 31 the pupil will understand this.

The teacher and pupils should exert their ingenuity in endeavouring to invent or discover new patterns both on chess-board lines, or squares, and on the triangles. These may be in lines or solid blocks, or both combined, and the blocks may be black or white. Hitherto the work has been confined to outline, but the first step is now made by using light and shade. Black squares, triangles, &c., are made by filling in the lines with India ink and a finely-pointed brush.

Six equal-sided triangles set close together make a *hexagon*, or six-sided figure. This, like the triangle, may also be made the basis or beginning of a great variety of ornament. Let it be observed in the exercises on the square and triangle, that if we have the sheet ruled full of these, we can always pick out, let us say, two or three, four, five, or any number of the small subdivisions lying together, and fill them in with black. This makes a figure of some kind, no matter what. Then leave a similar figure next to it in white lines, and then blacken the one next to this. Very large spaces of squares or triangles may be blacked over, or rubbed out to leave white spaces around the units of design or pieces retained.
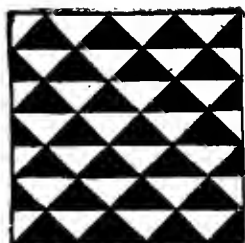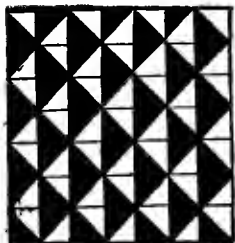
PLATE XVII.
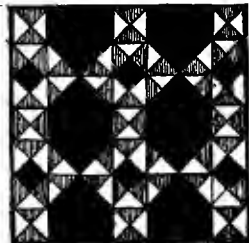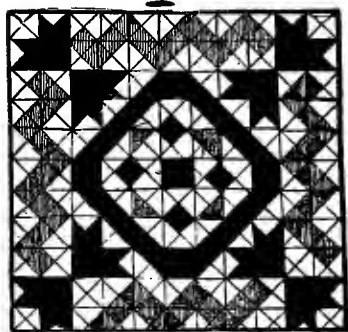

Fig. 31 *a*.　　　　Fig. 31 *b*.　　　　Fig. 31 *c*.
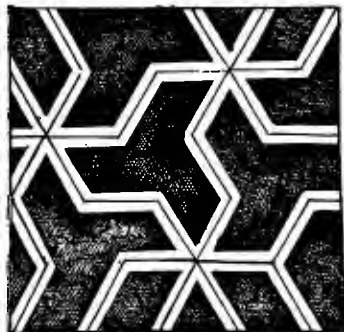
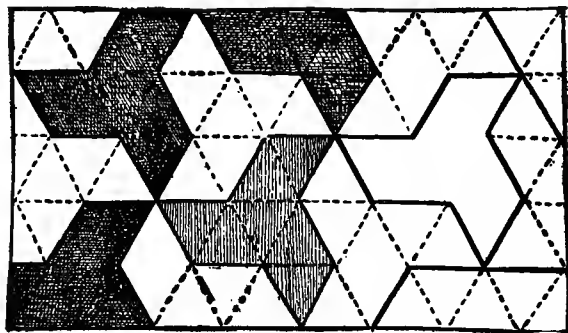Fig. 31 *d*.　　　　　　Fig. 31 *e*.

Fig. 31 *f*.

LESSON TWENTIETH.

OF DIFFERENT POLYGONS.

THE pupil has now learned how to draw square, and triangular, and six-sided figures. The five-sided or pentagon, the seven and eight-sided, and other figures may be set at intervals, but they will not make a regular *diaper* pat tern ; that is to say, one which, like the square, can be made by merely drawing lines across one another at regular intervals, and by so doing produce figures all alike and all fitting together like the cells of a bee-hive, which are six-sided. We can make octagons or eight-sided figures, by marking out on the chess-board a cross, made of a square with another square set to each end, and fitting four equal-sided or equilateral triangles into each space between the curves. But if we set any number of *hexagons* made on squares together, it will be seen that a small square comes in between them. (Fig. 32.) For this lesson the pupil may draw hexagons, and as in the previous lessons on the square and triangle, vary and ornament them, or make them bases for lines. The pupil should, at this stage of instruction, be able to draw promptly from memory all the previous exercises, and to produce varia-tions on them.

Fig. 33 *a* shows how to form, firstly, the three equi-distant points which make the corners of an equilateral triangle. These are got by making a circle, and then by marking off the inter-sections as indicated in Fig. 33 *a.* Two equal-sided triangles joined by any side, make a diamond, which is a figure frequently used in planning patterns. The diamond may be placed ver-tically, or up and down, horizontally or sideways, and also in combination. It is the favourite division, when set vertically with point up or angle-ways, for designing wall-papers and woven fabrics.
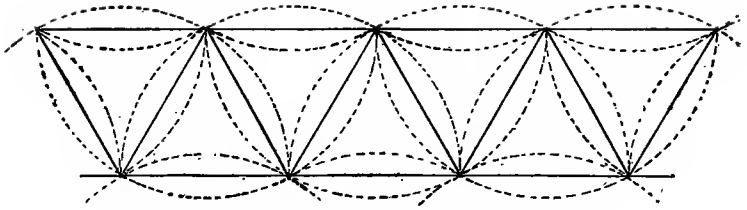
PLATE XVIII.

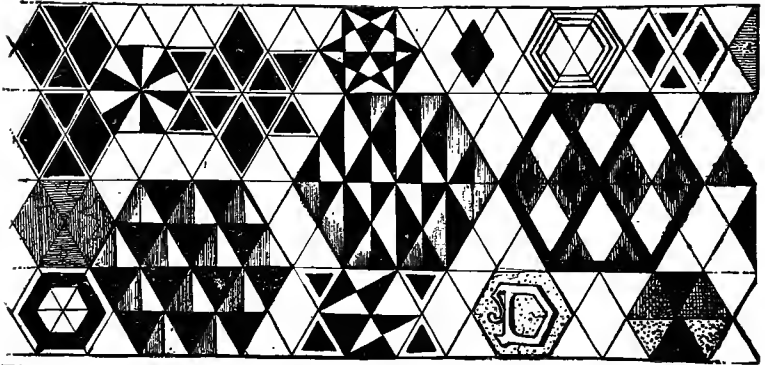Fig 33 *a*.   How to form Equilateral Triangles.

Fig. 33 *b*.   Equilateral, or Equal-sided Diamonds, and Equal-sided Hexagons.
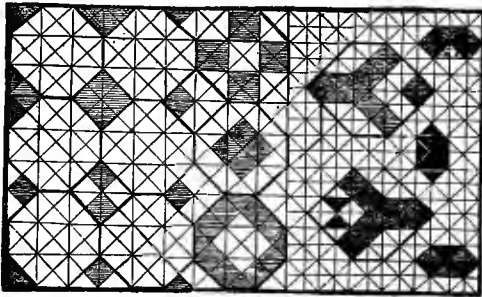
Fig. 32.   Irregular Hexagons.

LESSON TWENTY-FIRST.

TO DESIGN COMPLICATED ARABESQUE PATTERNS.

IF we draw the lines of a chess-board " up and down and across "
the paper before us, so that they are parallel with the top and
sides, they form horizontal-vertical squares. But if we make them
by drawing *diagonally* so that the squares appear with points up
and down and to either side, then they are set angle-wise.
(Fig. 32.)

There are two entirely different methods of designing intricate
and elaborate patterns of merely intersecting lines. One is to
draw on a series of squares (chess-board) or triangles, or diamonds,
a simple pattern, as in Fig. 34 *a*. With a little practice any child
can soon make a figure of this kind, since almost any conceivable
combination of a few cross-lines on angles will serve. When it
is formed, take the folding looking-glass, and adapt it to Fig.
34 *a*. Move it about till a suitable figure presents itself. Or else
double the pattern by making it interlace with itself, as in
Fig. 34 *b*. Double this once more with the glass, and Fig. 34 *c*
will result. This process may be kept up with very remarkable
results of intricacy and beauty, with this or with any other figure
in the book.

Another way to produce these Moorish or Arabic patterns
is that which may be studied in Fig. 35, a beautiful design
executed by Mr. A. DUNBAR SMITH, of the Brighton School of
Sciences and Arts. Having drawn the lines "just as they cross
in a cane-seat chair " (L. F. DAY), observe that we may mark out
a large square or star at one point, whence the lines radiate from
its corner. Taking this as a centre, make round it a star or a
circle, and adapt them to the lines. A very little practice in thus

PLATE XIX.
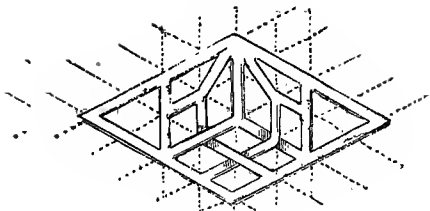
Fig. 34 *a*.
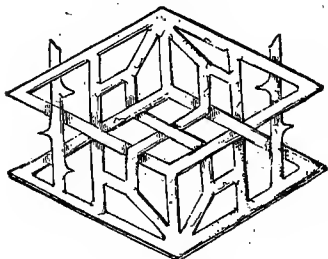
Fig. 34 *b*.
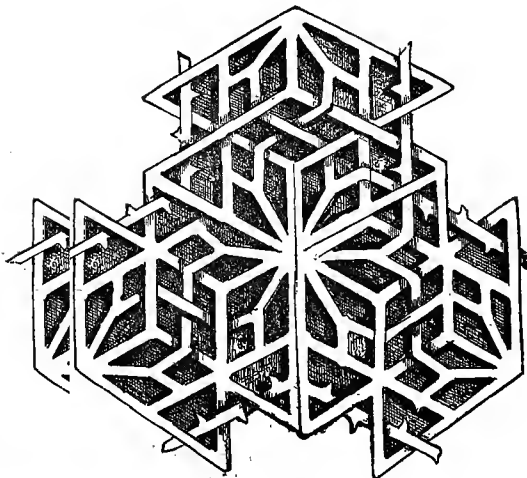
Fig. 34 *c*.

PLATE XX.

Fig. 35.

(59)
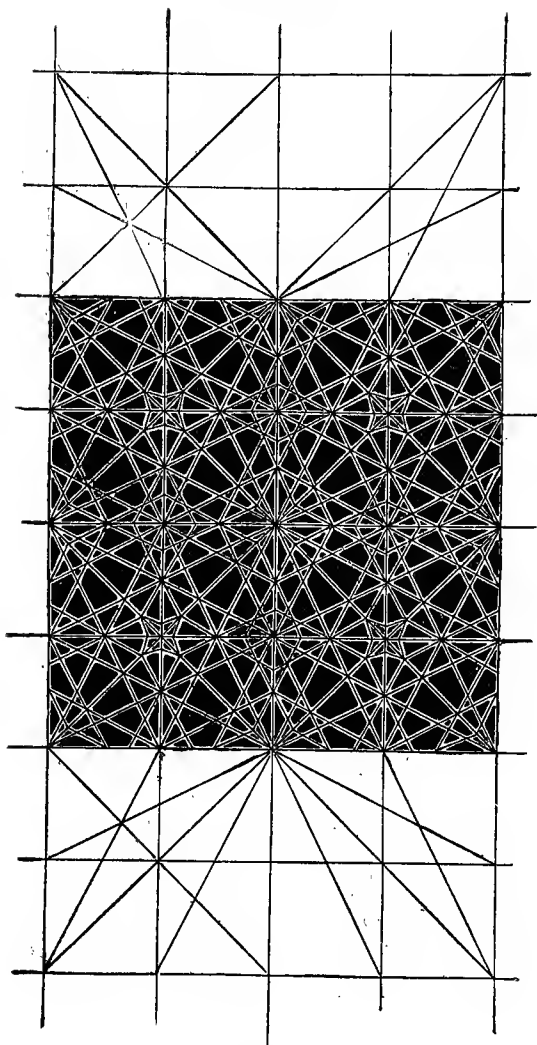
putting a very few octagons or other simple figures together, and placing stars within many-sided circle-like figures, will enable the pupil to form an infinite number of such designs. By the very easy process of rounding or curving these enclosed spaces, we get the beautiful Gothic tracery of windows and ceilings.

It will occur to the pupil that if large and small circles be placed at regular intervals on a diagram of straight lines (*i.e.*, of squares and triangles), they may be changed to hexagons, by erasing those portions of the circle which surround the sides, the polygons, or several-sided figures, remaining.

Circles in Combination with Straight Lines.
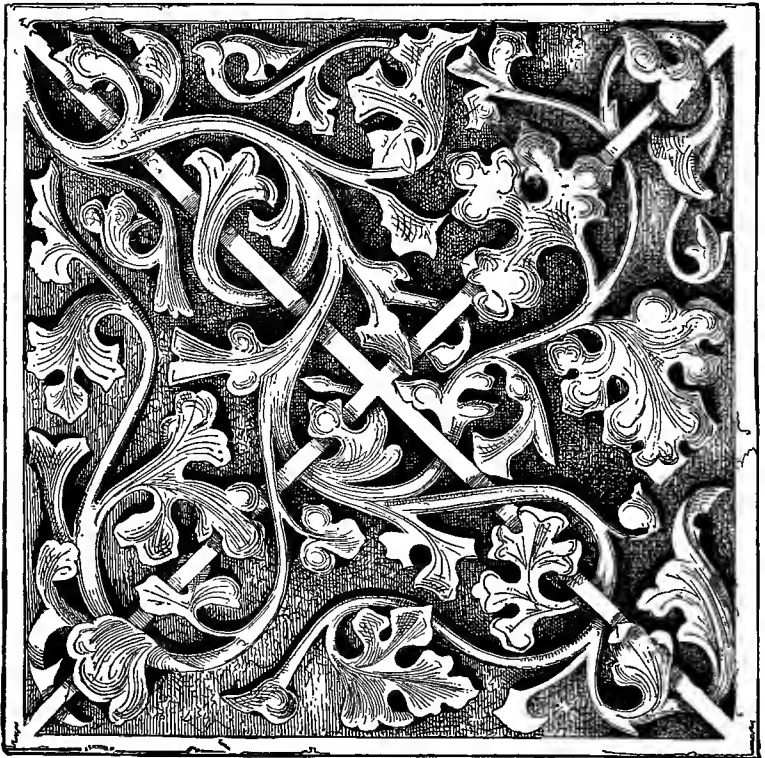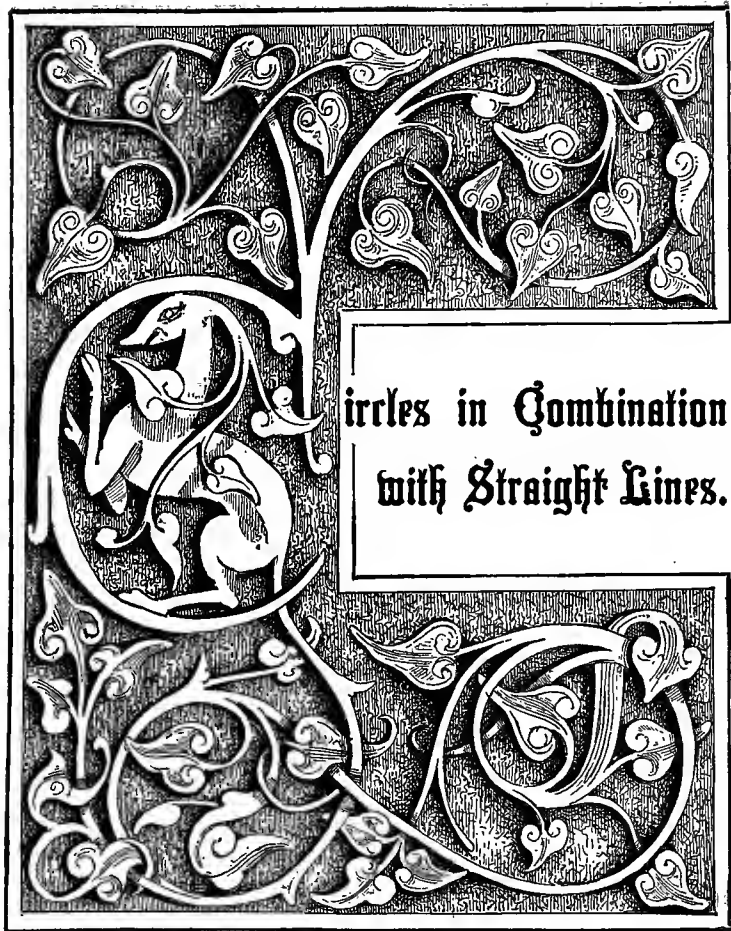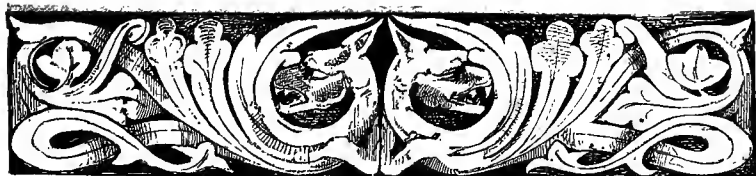
CIRCLES IN THEIR COMBINATION WITH STRAIGHT LINES.

LESSON TWENTY-SECOND.

CONNECTING CIRCLES.

IF we draw the chess-board either horizontally or set angle-wise with points up and down, we can then fill each square with a circle, or make the corner of each square a centre for a circle of the same size. Then again we may make the circles smaller than the squares, and connect them sideways or up and down with bars or lines, single or double. (Fig. 36 *b*.) Or instead of circles we may place at intervals, in like manner, figures made of parts of circles combined, which may be cut, connected, or disconnected. (Fig. 36 *e*.)

LESSON TWENTY-THIRD.

INTERSECTING CIRCLES.

CIRCLES may be drawn intersecting one another on the lines of the chess-board. The circles may be doubled or ornamented, and the spaces formed filled in with block or pen-shading, or colour, or certain portions of the lines may be rubbed away, and other connecting lines drawn. A great variety of beautiful

PLATE XXI.
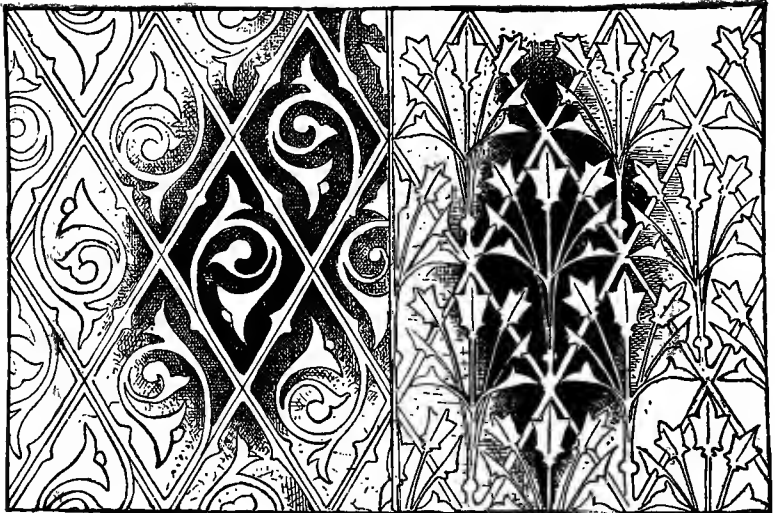
Fig. 37 *a*.   Fig. 37 *b*.

Fig. 36 *a*.   Fig. 36 *b*.   Fig. 36 *c*.
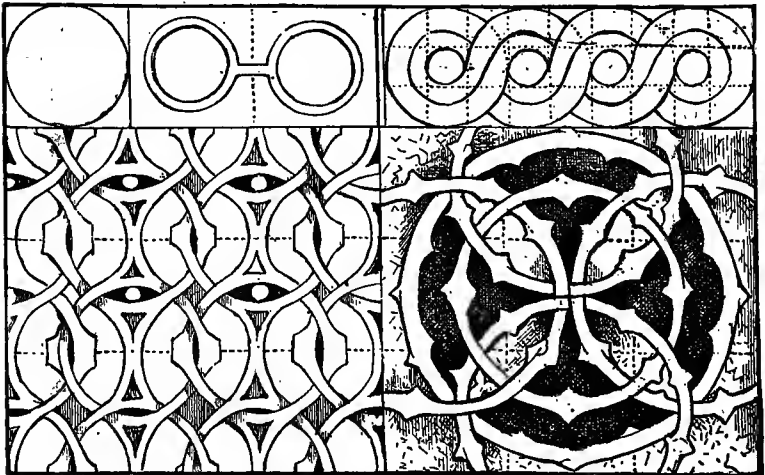
Fig. 36 *d*.   (64)   Fig. 36 *e*.

patterns may thus be produced with great ease with the com-
passes and india-rubber. (Fig. 36 *d* and *e*.) In all designs where
there are vacant spaces these may be filled according to taste,
with spiral ornaments, stars, hexagons, smaller circles, or other
ornaments, or connected here and there with straight lines.

LESSON TWENTY-FOURTH.

VARYING MONOTONY. GIVE-AND-TAKE PATTERNS.

IT has been observed in Lesson Sixteenth, that, in designing for
decoration—as, for instance, wall-papers, carpets, dress patterns
—there must be repetition, or the same thing over and over, and
yet that a very little variation breaks this up and renders it more
agreeable. We like certain general principles of uniformity in
everything, but we are quite as much pleased with caprice, or
originality, in small details. One way to relieve monotony in
design is to have every other panel or circle a little different
If we draw a body of circles or diamonds all touching one
another with the same spiral ornamented in every one, it is still
a great improvement to see them growing in different directions.
(Fig. 37 *a*.)

Again, if we draw a chess-board horizontally and fill every
square with ornament (then erasing the straight lines), it will
appear very monotonous. But make the squares with the points
up and down, or "set angle-ways," and draw the ornaments,
then they wave up and down or run in diagonals, which is less
uniform apparently, if not in reality. (Fig. 37 *a* and *b*.)

This is so well understood that in South America the Indians
(whose houses, on account of earthquakes, were often very long,
but had only the ground floor), relieved this wall-like appearance
by covering them with diagonal bars of ornament. If the units
of design be every other one different, and also running in

F

PLATE XXII.
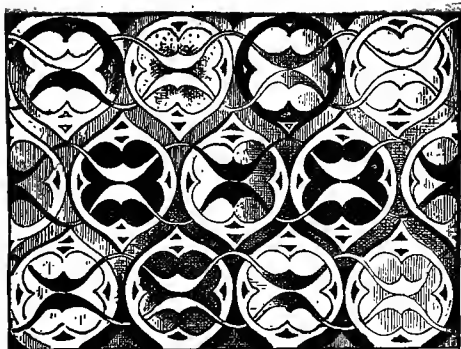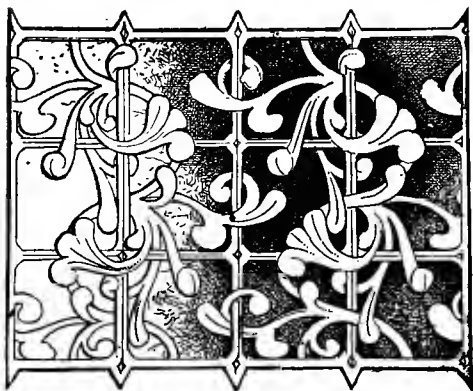
Fig. 38 b.

Fig. 38 c.

Squares and Volutes.
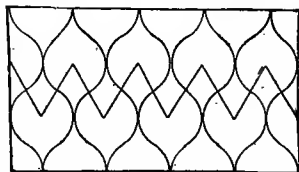
Fig. 38 a.

diagonal lines, there will be a still further relief from dull uniformity.

When the ground of a pattern is divided into regular spaces or compartments, such as squares, hexagons (or six-sides), circles, or diamonds (as in Fig. 37 *a*), the beginner generally keeps his pattern within the lines. To relieve the monotony of this there is what is called "give and take," made by every unit of design sending a part of itself into the next division, so that all in turn give and take a certain amount of space. See Fig. 37 *b*. Copy this and make variations, substituting other ornaments.

The pupil must not forget to test every pattern with the folding glasses. By doing this a very beautiful six-rayed star ornament may be made from Fig. 37 *b*. Place the root of the ornament or flower which fills the diamond in the corner of the glasses, each leaf of the glass being along or on two of the sides of the diamond. This is, of course, simply six repetitions of the diamond, with the roots of the ornament uniting in one.

LESSON TWENTY-FIFTH.

ZIG-ZAGS AND OTHER LINES.

PATTERNS, or *units of design* (that is, the parts which are repeated), may be spaced at regular intervals, or put into place ; therefore, *Firstly*, with circles touching one another, this tends to produce *a zig-zag, or the rising of points into the small spaces between the circles.* (Fig. 38 *a* and *b*.) *Secondly*, in horizontal squares or rectangles (*i.e.*, any kind of squared figures, long or short). *Thirdly*, in squares or diamonds, with the points up and down. (Fig. 37 *a* and *b*.) Or designs such as vines may be made *on* the lines of these circles, squares, or diamonds, crossing two or more of them instead of being enclosed *in* them. (Fig. 38 *c*.)

The beginner should very strictly observe that whenever lines, or boughs, or vines cross one another or interlace, they must absolutely do so alternately, or pass under and over, or in and out, just as threads do in a woven cloth.

Copy as much as possible *after* having attained facility in design and in handling the pencil, as it trains the eye to accuracy. One must be able to copy well to preserve models and motives for study. But in most schools mere copying is the basis, and often the end of all art-training. When in a hurry, copies may be made by tracing. There is a so-called parchment note-paper, which is perfectly adapted for tracing. There is also tracing-paper—not oiled or greased—adapted for pen-drawing.

Everyone who draws should copy or trace as many good designs as he can find, and make a collection of them, keeping them in volumes for reference. I have found leaves of note-papers, or half-sheet joined at the ends, pasted on one by one as they accumulate, the best form for ordinary notes of copying. When the pupil wishes to make a design, such a collection is very useful to suggest subjects or ornaments. It will be found to be well worth while to always have such leaves ready, and when a pattern occurs, say on a wall-paper, a book-cover, or in a book, to at once trace or copy it for the collection. Every flower, leaf, or weed may yield something. How to conventionalize these and adapt them to ornament, may be learned from " Suggestions for Floral Design," by F. E. Hulme.

LESSON TWENTY-SIXTH.

THE INDIAN LEAF.

THE Chinese have a figure or diagram which is commonly placed on their tombstones. It consists of a circle in which a line like an S divides it into two parts. One half is coloured red or gilt, and the other is black. This is explained as meaning Male and Female, Time and Eternity, Good and Evil, Light and Darkness, &c., the whole meaning the Universe. Each one of these divisions is shaped like a leaf. This leaf occurs as the commonest ornament on Indian shawls. It has passed to the Arabs and Moors, and is their principal decoration in details. By them it is very much varied, being sometimes made with two points or scolloped, as in Fig. 39 *c* and 24. It is of all ornaments the easiest to draw (except the simple circle or ball), and its long flowing lines with tendrils, or stems, adapt it specially to sheet leather work.

If we examine it we shall see (Fig. 39) that it is made by drawing two circles within another circle of twice their diameters, and rubbing out one half of each of the two thus enclosed. This figure of the semi-circle with an angle or tail attached to it, opens a wide field of decoration. For we can make it by not only putting circles into circles, as in Fig. 39 *a*, *b*, but by rounding off one of the corners of any triangle. (Fig. 40 *b* and *c*). This was very extensively used in Gothic architecture. When a double square or brick was divided by a diagonal line, and a leaf put into each, it was called perpendicular; but when, as in Fig. 39 *a*, the leaf had a curve to one side or the other, it was termed flamboyant, from flambe, or flamme, a flame, because it was supposed to be flame-formed. Fig. 40 shows a few of the infinite varieties

As any square piece of looking-glass cut in two will answer

PLATE XXIII.
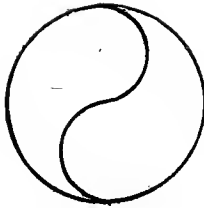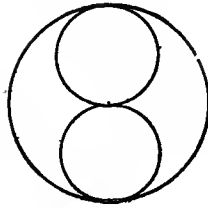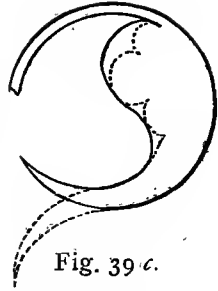
Fig. 39 *a*.   Fig. 39 *b*.   Fig. 39 *c*.

Indian Leaf.
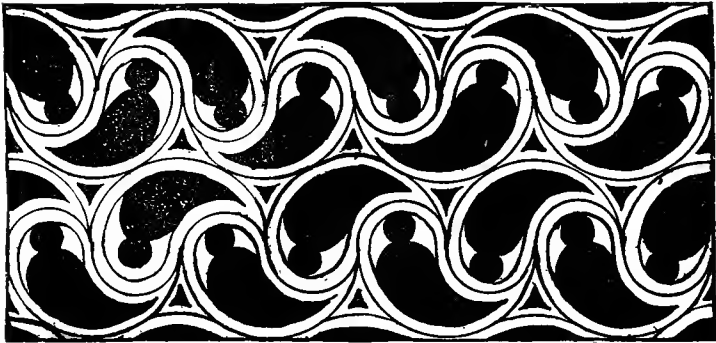
Fig. 39 *d*.
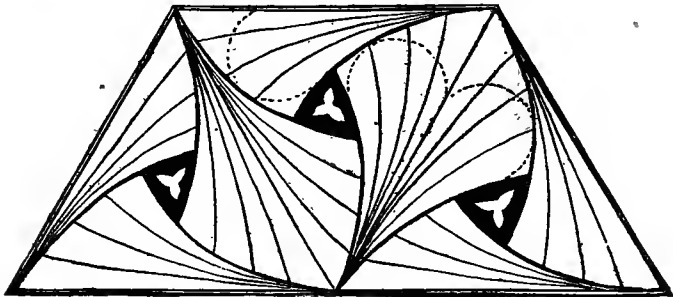
Fig. 39 *e*.

of ornament which may be made with the leaf. Its end may be subdivided into scollops (Fig. 39 *c*), or it may be grouped in hearts. (Fig. 40 *b*). Or we may construct an Arab diagram as in Fig. 35, and put the leaf into all its spaces.

It will be seen therefore that there are two ways by which these Gothic tracery patterns may be made, one by combining circles alone, and another by arranging the circles in series of squares and triangles. The latter is most generally adopted for distribution. For an excellent and more elaborate analysis of this work, the pupil may consult "The Anatomy of Pattern," by Lewis F. Day. The leaf as made from circles within circles forms an important element in Old Celtic or Irish design. It occurs in the Tara Brooch, and frequently in the Book of Kells. It is also a royal symbol in Japan.

The leaf doubled forms a heart, which is easily converted into a fan. This makes a very graceful ornament, and one which wi, s extensively used in the "fan-ceilings" of the fifteenth century. (Fig. 39 *e*, 40 *c*). For this lesson the pupil may complete the six-sided figure containing the fans or compose a design from any of the leaf patterns.

LESSON TWENTY-SEVENTH.

DEVELOPING PATTERNS FROM PORTIONS.

THE object of this lesson is that the pupil shall test Fig. 40 *a*, *b*, *c*, with the folding glasses, and copy any of the designs thus suggested. It is extremely abundant in portions which may be repeated or varied into new devices. With such a glass, the illustrations in this book may be literally increased to hundreds ; all admirably adapted to being copied and then combined and multiplied again into hundreds of others all as original and beautiful.

Plate XXIV.
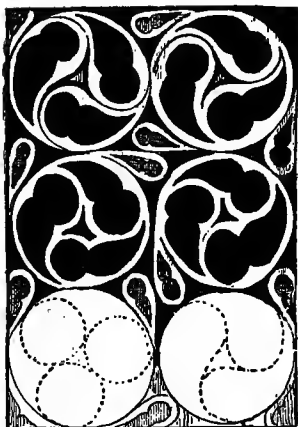
Fig. 40 *a*.
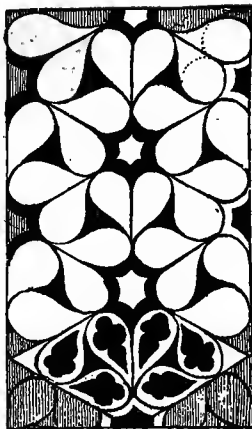
Fig. 40 *b*.

Leaf Pattern.
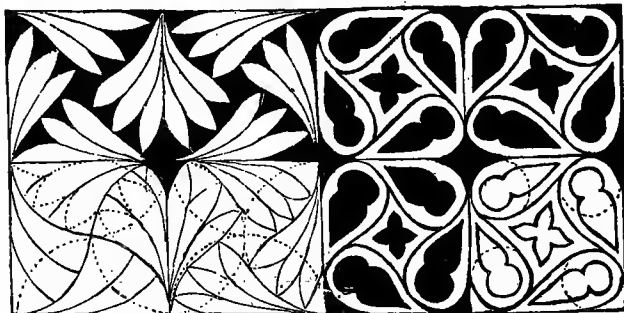
Fig. 40 *c*.
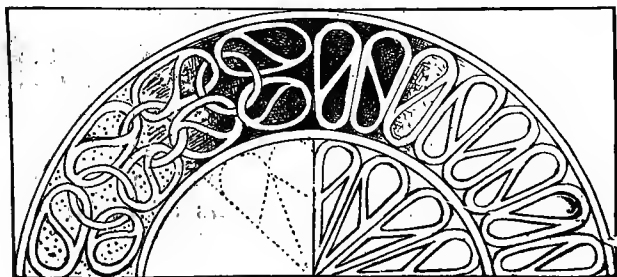
Fig. 40 *d*.

As any square piece of looking-glass cut in two will answer for this purpose, it is to be supposed that every pupil can obtain one. Those who, however, can not, may work as follows : Take any piece of stiff paper, or card-board, and cut an angle or wedge out of it. Put this on a pattern, and having selected a base, draw it and repeat it. But the glass is much better.

By examining Fig. 41 *b*, it will be seen that the border of 41 *a* consists of five circles and two simple figures interlaced. The knot ornament in the centre is only three circles interlaced, and is anything but complex or difficult. The accompaniment of broad bands with very narrow ones with small ornaments is very characteristic of both Moorish and Old Irish work. It is very effective, and generally easy enough when the geometrical frame is once made.

It is to be strictly observed that when any pattern is tried with the glass it is *sure* to give some form, perhaps many, for an entirely new basis. When this is copied and shaded, another, and larger series of far richer and more startling effects may be grasped, and also numbers of small patterns be picked out. Magnify the whole by three, four, or six, and a still larger series, with proportional amount of " bits " for motives, is again evolved, and this process may be kept up for ever.

It is true that radically new ornaments cannot really be created by this means, but remarkable variations of those in use often appear. And while the whole design given by the glass is always a mere repetition of units, yet by means of it very remarkable, beautiful and bizarre units are constantly produced, by the constant dissection and combination anew of parts.

PLATE XXV.
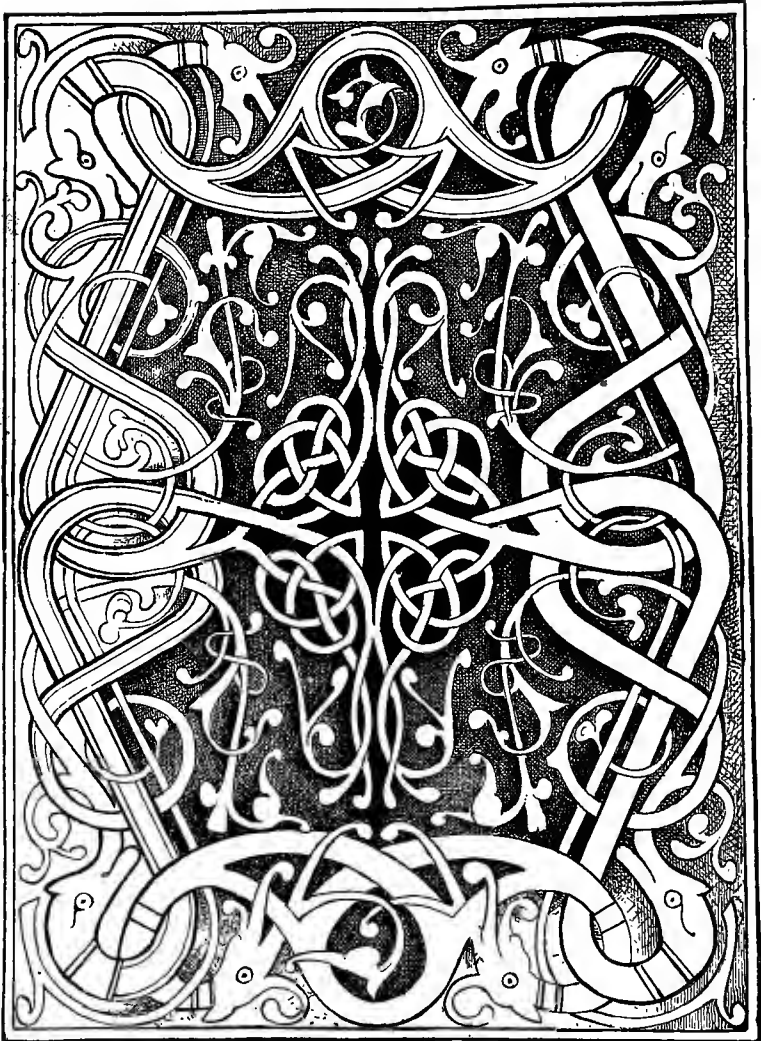
Fig. 41 a. Interlocked Pattern.

LESSON TWENTY-EIGHTH.

GEOMETRICAL BASE WITH ORNAMENTS.

IT will be seen that Fig. 42 is constructed on a diamond, or double equilateral triangle, intersected by an × or a cross, which has been separated into two obtuse angles, with four circles. It might have as well been made on an × or cross. Or a single circle might have been in the centre, or three or four
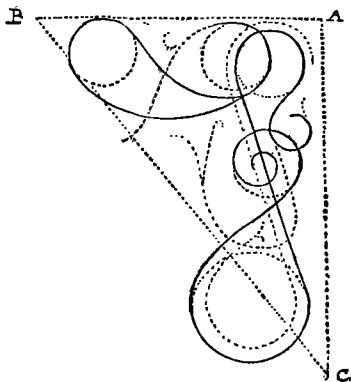
Fig. 41 *b.*

circles interlocking have been put there. Almost any conceivable combination of from two to five simple geometrical figures will give such a frame, into and through which vines may flow, or to which ornaments in great variety may be attached. As in Fig. 41, the principal feature is the combination of broad bands with light ornamentation. It may be observed that this figure consists of four equal and similar parts, and that it is three squares in length and two in width.

PLATE XXVI.
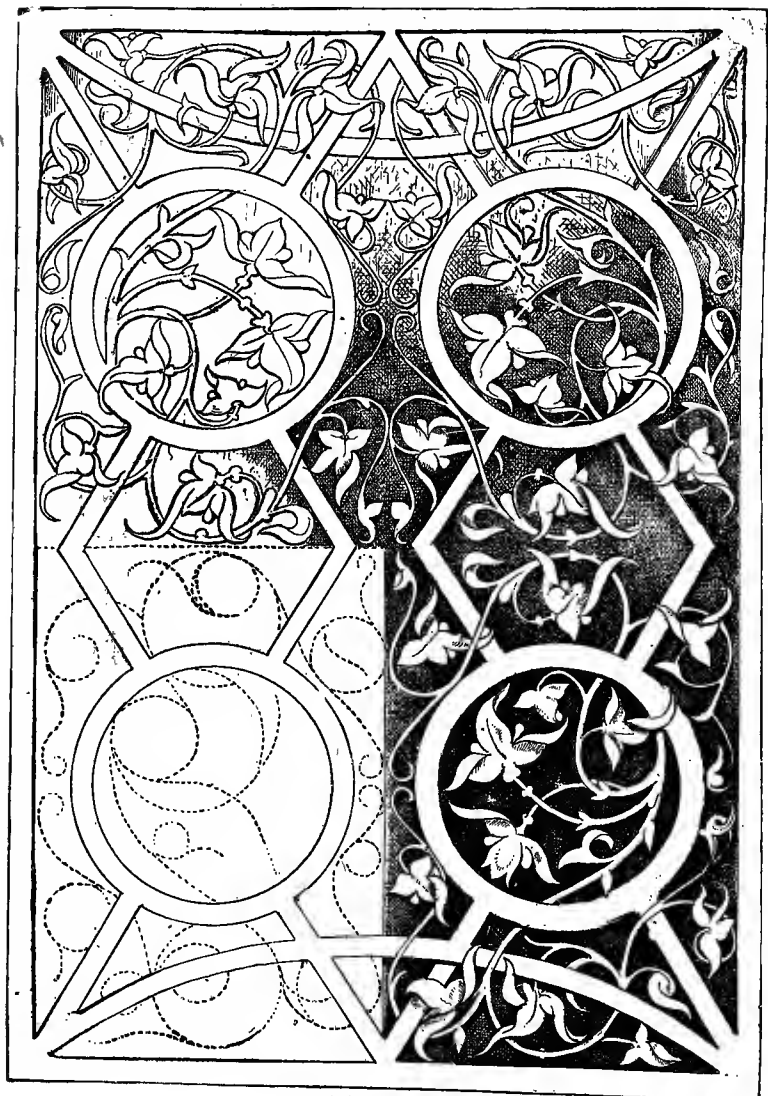
Fig. 42.

LESSON TWENTY-NINTH.

ADAPTATION TO OBJECTS.

IT is to be regarded as very important that pupils shall not merely learn to design patterns by themselves, or in an abstract fashion, but also from the beginning invent and draw them with a view to a definite purpose, or *to filling a certain given space.* There should be hung up in every class-room, or kept in the album of every pupil, a list of objects which may be taken as subjects for lessons. As for example :—

Chairs.—Ornaments may be made for the leather seats and backs of chairs, *i.e.,* in square panels. Also the whole chair may be designed for carving.

Boxes.—A box with the lid forms at an angle three panels. Boxes large and small have in all ages been subjects for artists to ornament.

Plaques or Plates.—Design for repoussé, or hammered metal-work. Also for china-painting. A salver is a large metal plaque.

Cigar-caskets.

Ash-trays.—For cigar ashes.

Vases.—One of the best subjects to cover with designs.

Casks, Small Barrels, or Kegs.—Useful for waste-paper boxes, or to contain umbrellas and canes. May be carved or painted.

Fans.

Frames for looking-glasses or pictures.

Scoops.—A flat wooden, or better a metallic scoop or dust-pan. should hang by every fire-place. They are useful for catching up or taking coals, ash, or anything dropped or spilled. To be of brass repoussé.

Horns.—To contain many objects. May be carved or painted, stained, &c. Anciently artists were very fond of decorating them.

Albums, Portfolios, Book-covers.—To be executed in stamped leather, papier maché, &c.

Cylinders.—Of cardboard, metal, or leather. To contain papers, music, &c., useful in travelling. The design for a cylinder is in reality that of a square surface or panel.

Wall-papers.

Carpets.

Rugs.

Embroidery.—New patterns for embroidery of all kinds are always in demand. This is an inexhaustible field.

Tiles.

Leather-cushions.—Round or square. Useful for travellers when made flat. They may be made either of pieces sewed together, or with the pattern hand-worked and painted.

Flower-pot cases or boxes.—" Window gardens."

Panels of doors.

Architectural Ornament.—This field of design is too extensive to be treated here. Every pupil should study some work on this subject.

Lamps.—Hanging or hand-lamps.

Hanging-boxes for letters or papers.

Cabinets,and furniture such as *footstools.*

Milking or three-legged Stools.

Sabots or *Wooden Shoes.*

Designs for Jewellery.—Including patterns for chasing on heads of canes, silver ware, &c.

Umbrella handles.—For this lesson the pupil may select any of these subjects, space its plane surface with circles, and fill in with ornament.

CONCLUSION.

IT is coming to be understood that in education we must not teach too many things at once, and that even in learning languages it is better to master the pronunciation, and then the meaning of words, instead of teaching both with the grammar. After simple outline decorative Design, as taught in this manual, is mastered, object-drawing may be taken up. Relief is much harder to execute than superficial outline, and perspective more difficult still. And as the learning the alphabet must precede reading, *so outline decorative design should precede the copying objects or pictures.*

Inventiveness and imagination cannot be directly taught by *any* process in a few lessons. But they may be aided in their development by first teaching the simple principles which cannot be dispensed with in any work, however "inspired" it may be.

If a pupil be first trained in circular outline decorative design, and then in object copying, more advanced geometry and perspective, he will be far more skilled in a given time than if he had been put at all these together in the beginning. The writer says this from years of experience and earnest experiment.
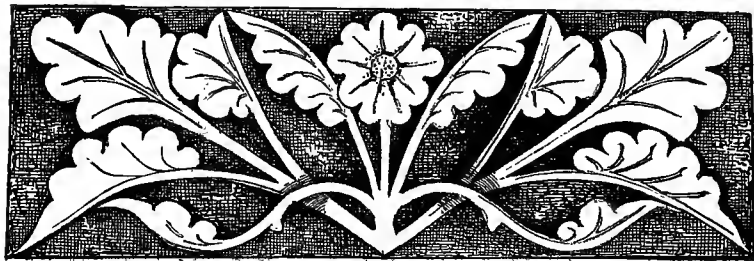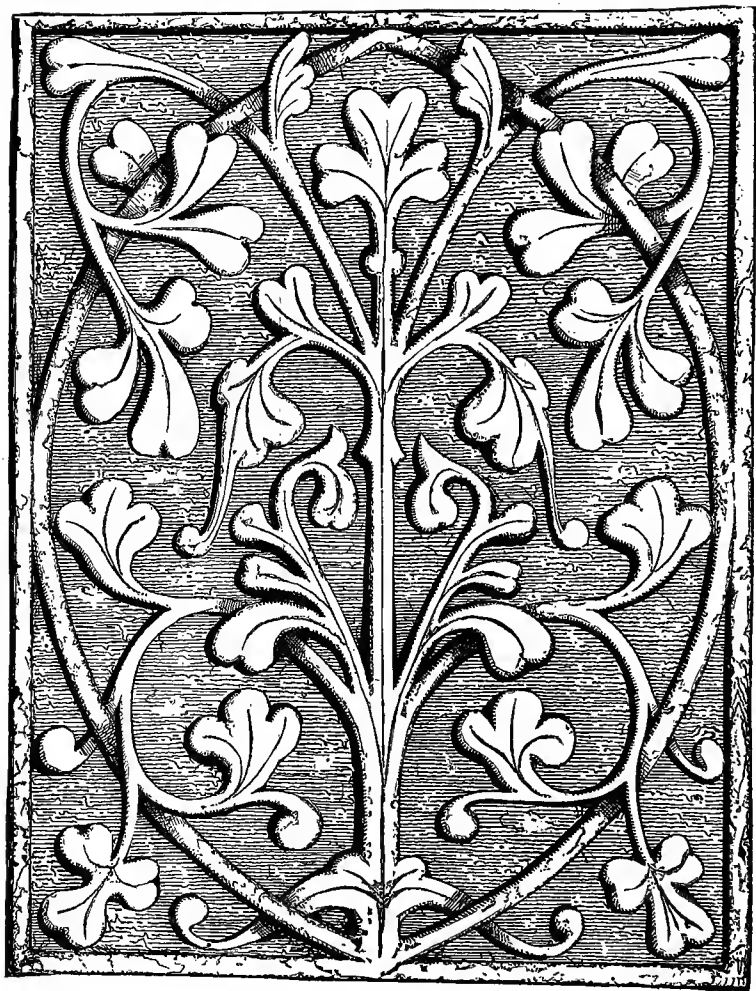
A. H. ABBOTT & CO.

IMPORTERS OF

Artists' Materials and Draughtsmen's Supplies

50 MADISON STREET, CHICAGO.

GUIDE BOOKS.

BÆDEKER'S GUIDES.

The Eastern Alps, including the Bavarian Highlands, the Tyrol, Salzkammergut, Styria, Carinthia, Carniola, and Istria,.......... ....**$2.50**

England, Wales, and Scotland, as far as Loch Maree and the Cromarty Firth... **3.75**

London and Its Environs, including Excursions to Brighton, the Isle of Wight, etc..................... .... **2.50**

The Rhine, from Rotterdam to Constance **2.50**

Belgium and Holland.. 2.00

Northern Germany 2.50

Southern Germany and Austria, including Hungary and Transylvania.. **2.50**

Paris and its Environs............ .... 2.50

Central Italy and Rome 2.50

Northern Italy, including Leghorn, Florence, Ravenna, the Island of Corsica, and routes through France, Switzerland, and Austria **2.50**

Southern Italy and Sicily, with Excursions to the Lipari Islands, Malta, Sardinia, Tunis, and Corfu.. **2.50**

Norway and Sweden.. 3.00

Switzerland, and the adjacent portions of Italy, Savoy, and the Tyrol... **2.75**

The Travelers' Manual of Conversation, In four languages—English, French, German, and Italian.................................... **1.25**

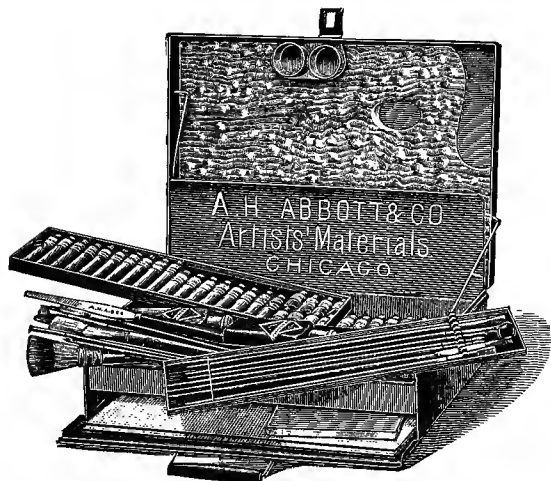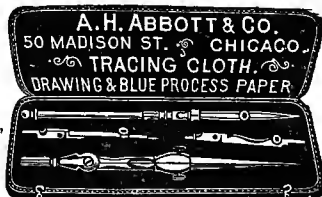**Palestine and Syria... 7.50**

Lower Egypt, with the Fayum and the Peninsula of Sinai................ **5.50**

MISCELLANEOUS GUIDES.

Murray's Handbook for Travelers in Ireland.................$4.00

France. By the author of "Madamoiselle Mori," etc...................... **1.25**

The Land of Greece. Described and illustrated by Chas. Henry Hanson... **4.00**

Florence. By Augustus J. C. Hare... **1.00**

Walks in Rome. By Augustus J. C. Hare................................... **3.50**

The Maritime Provinces (Canada). Osgood........................ **1.50**

All Round Route and Panoramic Guide (Hudson, St. Lawrence, Niagara, etc.) By C. R. Chisholm **1.50**

The Thousand Islands. By F. B. Hough................................ **1.25**

General Guide to the United States and Canada. 2 Vols. Part I.—Eastern States and Canada; Part II.—Western and Southern States. Each.. **1.25**

Rand, McNally & Co.'s Guide to the Pacific Coast, California, Arizona, New Mexico, Colorado, and Kansas. Paper, **.75**; cloth. **1.00**

A Week in Chicago. Profusely illustrated............................. **.25**

Pictoral Guide of Chicago. With folded map and many illustrations. **.25**

Guide Book for Mt. Desert. By Mrs. Clara Barnes.................. **1.00**

Rand, McNally & Co.'s Illustrated Guide to Niagara Falls. **.25**

Official Guide to the Yellowstone National Park. By John Hyde. Cloth, **$1.00**; paper... **.50**

The Mexican Guide. By Thos. A. Janvier. Revised yearly........... **2.50**

Any book sent postpaid on receipt of price. Besides the above partial list we keep in stock a large selection of Guide Books, Maps, and works of reference for tourists and travelers. We publish pocket maps of all the American States and Territories, the Canadian Provinces, and Foreign Countries, and can furnish maps and guides to every country and every important city in the world.

Send for complete list to

RAND, McNALLY & CO.,

MAP AND BOOK PUBLISHERS,

148 TO 154 MONROE ST., CHICAGO.

RAND, McNALLY & CO.'S POCKET MAPS OF FOREIGN COUNTRIES.

Afghanistan, Indexed (paper cover)..$	25
Africa, in three sheets, two being 21 x14 inches, and one 14 x 11 inches, and showing plans of cities of Algiers and Tunis	75
Alaska, 37 x 30 inches	1 00
Asia, 21 x 14 inches	50
Australia and New Zealand, with plans of Sydney and Pt. Jackson, 21x14 in	50
Austro-Hungarian Monarchy, with plan of Vienna, 21 x 14 inches	50
Belgium and The Netherlands, with plan of Brussels, 21 x 14 inches	50
British America (Dominion of Canada), 21 x 14 inches....................	50
British Columbia, 14 x 21 inches..	50
Central America, 14 x 11 inches	50
China, 21 x 14 inches	50
Cuba, 21 x 14 inches	50
Denmark, with North portion of the German Empire, comprising Schleswig Holstein and Lanenburg, 11 x 14 inches	50
Egypt and the Egyptian Soudan (paper cover)...........................	25
England and Wales, 21 x 14 inches, with Index of cities, towns, etc.	75
Europe, 21 x 14 inches...	50
France, 21 x 14 inches, with plan of Paris, and Index to cities, towns, etc.	75
Germany, in two sheets, 21x14 inches each, with Index to cities, towns, etc.	1 00
Greece, and the Ionian Islands, 21 x 14 inches............................	50
Holland, see Belgium.	
Honduras, 48 x 36 inches; scale, 10 miles to 1 inch......	5 00
India, Indo-China and Further India, with plans of Calcutta and Bombay, 21 x 14 inches	50
Ireland, 21 x 14 inches, with Index to cities, towns, etc.	75
Italy, 21 x 14 inches	50
Japan, in two sheets, 21 x 14 inches each.................................	1 00
Mexico, 21 x 14 inches..	50
Mexico, 72 x 52 inches, handsomely colored (in leather case)..............	7 50
Netherlands, see Belgium	
New Zealand, see Australia..	
North America, showing the West India Islands and Central America, 21 x 14 inches	50
Oceanica. 21x 14 inches..	50
Palestine, with plans showing Environs of Jerusalem, journeyings of Christ, and sketch showing divisions into tribes, 21 x 14 inches..	50
Persia and Afghanistan, 14 x 11 inches....................................	50
Portugal, see Spain..	
Russia (European), 21 x 14 inches..	50
Scotland, 21 x 14 inches, with Index to cities, towns, etc.	75
South America, in two sheets, 21 x 14 inches, showing plans of Bay of Rio de Janeiro, Isthmus of Panama and City of Buenos Ayres.........	75
Spain and Portugal, with plans of Madrid and Lisbon, 21 x 14 inches	50
Sweden and Norway, 21 x 14 inches..	50
Switzerland, 21 x 14 inches	50
Turkey in Asia (Asia Minor), and Transcancasia, 21 x 14 inches	50
Turkey in Europe, 21 x 14 inches...	50
World, on Mercator's Projection. 21 x 14 inches	50
World, on Mercator's Projection, 58 x 41 inches...........................	2 50

Except where otherwise stated, these Maps are neatly bound in cloth cases.

We make the production of maps a specialty, and keep the largest stock of map plates in the country. Are prepared to furnish Authors and Publishers with maps to illustrate Books of Travel and Historical and Educational Works at a merely nominal charge over the cost of paper and printing.

Maps which require to be specially prepared, are compiled, engraved and printed with the utmost care and accuracy.

A full line of Maps of the States and Territories in U. S. and of Foreign countries, on a *large scale;* also, of Modern Geographical, Classical, Political, Physical, Astronomical, Biblical, Anatomical and Biological Atlases, Globes and Map Racks, kept in stock.

RAND, McNALLY & CO., Publishers,